VNMR Command and Parameter Reference

Varian NMR Spectrometer Systems
With VNMR 6.1C Software

Pub. No. 01-999164-00, Rev. B0801

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Revision history:
A0800 – Initial release for VNMR 6.1C software
A1200 – Added MAGICAL operators per B. Adams and R. Kyburz; removed obsolete dslice macro per C. Hofstetter and M. Hedehus.|
B0301 – Updated CP/MAS parameters on *MERCURYplus* systems|
B0501 – Updates
B0801 – Added setLP1 macro

Applicability of manual:
UNITY*INOVA*, *MERCURYplus*, *MERCURY VxWorks Powered*, *MERCURY*, UNITY*plus*, *GEMINI 2000*, UNITY, and VXR-S
NMR spectrometer systems with VNMR 6.1C software installed

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Introduction

The *VNMR Command and Parameter Reference* describes in detail the commands, macros, and parameters in VNMR 6.1C software. Information new to VNMR in this version is shown by a change bar (as shown to the left of this paragraph).

Title Line Codes

Each entry has a letter in parentheses in the title line that identifies the type of entry:

(C)	VNMR command
(M)	VNMR macro command (from the `maclib` directory)
(O)	MAGICAL programming operator
(P)	VNMR parameter
(U)	UNIX command (not executable within VNMR)
(C,U) (M,U)	Executable from UNIX or VNMR (note that syntax is different)

Applicability

An entry with applicability information applies only to the system or accessory listed. If the entry does not include applicability information, the entry applies to all systems.

Command and Macro Syntax

Each command and macro entry includes the syntax used when entering it into the system. The following examples illustrate this syntax:

`halt`	If no parentheses are shown, enter the command or macro exactly as shown, e.g., enter `halt`.
`delexp(exp_num)`	If parentheses are shown, enter the command or macro name as shown, but replace arguments with a value, e.g., if `exp_num` is `5`, enter `delexp(5)`.
`rttmp(file)`	Arguments can be a string (e.g., name of file or solvent), number, variable, or parameter (e.g., `pw`),. If a string, enclose it with single quote marks, e.g., if `file` is `samp02`, enter `rttmp('samp02')`. If number, variable, or parameter, do *not* use marks.
`rl<(frequency)>`	Angle brackets (`<` and `>`) indicate optional input, e.g., if `frequency` not needed or the default value of `frequency` is acceptable, enter `rl`, but if `frequency` has a value such as 10, enter `rl(10)`.
`md(<from_exp,>to_exp)`	Arguments can also be optional. Use a comma to separate arguments, e.g., `md(2,3)`. Unless stated otherwise, the order of arguments is often important.
`nll<('pos')>`	A keyword is frequently used as an argument. In the syntax, keywords are shown in single quotes and are entered exactly as shown, e.g., to use the optional keyword `'pos'` for `nll`, enter `nll('pos')`.

`dc2d('f1'|'f2')`	A vertical bar indicates an OR condition, e.g., either `'f1'` or `'f2'` can be an argument to `dc2d`.
`sin(angle)<:n>`	Some commands return values to a calling macro. This is shown by a colon followed by one or more variables, e.g., if `angle` is variable `x` and `n` is variable `rt`, then `sin(x):rt` returns the value of `sin(x)` to the calling macro via the variable `rt`.
`z(reset1,reset2,...)`	Three dots indicate the sequence of arguments continues. Unless a limit is given, you can enter one argument, two, three, or as many as needed.

Parameter Syntax

Parameter syntax is always in the form `parameter_name=value`. If `value` is a string, enclose it in single quote marks; otherwise, no marks are used, e.g., `auto='y'`, `plotter='ThinkJet'`, `spin=5`. Note that some parameters are not user-enterable.

Notational Conventions

Throughout all VNMR manuals, `typewriter-like characters` identify commands, parameters, directories, file names, and text displayed on the screen.

Because pressing the Return key is required at the end of almost every command or line of text you type on the keyboard, assume this use of the Return key unless stated otherwise.

GLIDE and Menu Buttons

Many commands can be executed by selecting buttons in the *GLIDE* user interface and the VNMR menu system. For example, moving the mouse cursor to the File button in the Main menu and clicking the left button on the mouse is the same as entering the `files` command. This is shown by the following entry in the description of the `files` command:

Alternate: File button in the Main menu

Refer to the online interactive help and the manual *Getting Started* for a complete description of *GLIDE* and the VNMR menu system.

Other Sources of Information

For further information about an entry, refer to the manual listed under “See also.” For general coverage on VNMR, refer to the following manuals (each manual is also online):

Release Notes
Getting Started
Walkup NMR Using GLIDE
User Guide: Liquids NMR
User Guide: Solid-State NMR
User Guide: Imaging
VNMR User Programming
VNMR and Solaris Software Installation

A

aa — Abort acquisition with error (C)

Syntax: `aa`

Description: Aborts an experiment that has been submitted to acquisition. If the experiment is active, it is aborted immediately, all data is discarded, and the experiment is interpreted as an error. Any data collected from an earlier block size transfer is retained. If any `werr` processing is defined, that processing occurs, followed by any queued experiments. The `login` name, and the FID directory path in `file` are used as keys to find the proper experiment to abort.

In some circumstances, there is a delay between the time `go` is entered and the acquisition is started. During this time, instructions based on the selected pulse sequence are being generated. This is signified by the letters "PSG" appearing in the upper left corner of the status window. An `aa` command issued under these circumstances reports that no acquisition is active but it instead stops the instruction generation process and the message "PSG aborted" appears.

See also: *Getting Started*

Related:

`file`	File name of a parameter set (P)
`go`	Submit experiment to acquisition (C)
`halt`	Abort acquisition with no error (C)
`werr`	Specify action when error occurs (C)
`werr`	When error (P)

abort — Terminate action of calling macro and all higher macros (C)

Syntax: `abort`

Description: Terminates the action of the calling macro and all higher levels of nested macros. `abort` is used only in macros and not entered from the keyboard. It generates an error condition, which is the reason why the calling macro and any parent (nested) macros above will also be aborted. To exit from the execution of a macro without generating an error, use `return`.

See also: *VNMR User Programming*

Related:

`abortoff`	Terminate normal functioning of `abort` in a macro (C)
`aborton`	Restore normal functioning of `abort` in a macro (C)
`return`	Terminate execution of a macro (C)

abortallacqs — Reset acquisition computer in a drastic situation (C)

Applicability: All systems except *MERCURY* and *GEMINI 2000*

Syntax: `abortallacqs`

Description: Reboots the acquisition system from the host computer. Wait at least 30 seconds before attempting new acquisitions.

See also: *Getting Started*

abortoff — Terminate normal functioning of abort in a macro (C)

Syntax: `abortoff`

Description: Changes the action of an abort command in a macro. Normally, abort (or any command aborting with an error condition) terminates the action of the calling macro and all higher levels of nested macros; however if the abortoff command is executed prior to a macro containing the abort command, only the macro containing abort terminates and execution continues to the next macro. The operation of the abortoff command is nullified by the aborton command. abortoff is used only in macros and not entered from the keyboard.

See also: *VNMR User Programming*

Related:
- abort — Terminate action of calling macro and all higher macros (C)
- aborton — Restore normal functioning of abort in a macro (C)

aborton — Restore normal functioning of abort in a macro (C)

Syntax: aborton

Description: Nullifies the operation of a abortoff command and restores the normal functioning of the abort command. aborton is used only in macros and not entered from the keyboard.

See also: *VNMR User Programming*

Related:
- abortoff — Terminate normal functioning of abort in a macro (C)

abs — Find absolute value of a number (C)

Syntax: abs(number)<:value>

Description: Finds the absolute value of a number. Absolute value is a nonnegative number equal in numerical value to the given number (e.g., abs(-6.5) is 6.5).

Arguments: number is the given real number.

value is the return value with the absolute value of the given number. The default is to display the value in the status window.

Examples:
```
abs(-25)
abs(n):abs_val
```

See also: *VNMR User Programming*

AC1–AC9 — Automated calibration (obsolete)

Description: These macros are no longer used in VNMR and are replaced by AC1S-AC11S.

Related:
- AC1S-AC11S — Autocalibration macros (M)

AC1S-AC11S — Autocalibration macros (M)

Applicability: UNITY *INOVA*, *MERCURY* series, and *GEMINI 2000* systems

Syntax: ACnS, where n is a number from 1 to 11.

Description: Performs automatic system calibration. When finished with the calibration routines, the current probe file is updated. If the probe is new to the system (i.e., all values in the probe file are zero), system power levels are determined followed by calibration. If power levels are listed in the current probe file, these values are used. The macro AC1S determines ^{1}H pw90, AC5S begins ^{13}C calibration, including decoupler power calibrations. AC10S performs ^{19}F calibration, and AC11S performs ^{31}P calibration.

See also: *Getting Started*

ACbackup — Make backup copy of current probe file (M)

Applicability: UNITY*INOVA*, *MERCURY* series, and *GEMINI 2000* systems

Syntax: `ACbackup`

Description: Called by the autocalibration macros `AC1S-AC11S` to back up the probe file after calibration ends. This macro is not usually called by the user.

See also: *Getting Started*

Related: `AC1S-AC11S` Autocalibration macros (M)

ACreport — Print copy of probe file after autocalibration (M)

Applicability: UNITY*INOVA*, *MERCURY* series, and *GEMINI 2000* systems

Syntax: `ACreport`

Description: Called by the autocalibration macros `AC1S-AC11S` to print a copy of the probe file before beginning a new autocalibration run.

See also: *Getting Started*

Related: `AC1S-AC11S` Autocalibration macros (M)

acos — Find arc cosine of number (C)

Syntax: `acos(value)<:n>`

Description: Finds the arc cosine (also called the inverse cosine) of a number.

Arguments: `value` is a number in the range of ±–1.0 to +1.0.

`n` is a return argument giving the arc cosine, in radians, of `value`. The default is to display the arc cosine value in the status window.

Examples:
```
acos(.5)
acos(value):acos_val
```

See also: *VNMR User Programming*

Related: `sin` Find sine value of an angle (C)

acosy — Automatic analysis of COSY data (C)

Syntax: `acosy`

Description: Automatically analyzes a 2D COSY data set with `fn`=`fn1` and `sw`=`sw1`. In this algorithm, a fuzzy pattern recognition technique is used to detect peaks and cluster the cross peaks into groups. Symmetry measures and chemical shifts for all cross peaks are calculated. Connectivities and the correlation table are displayed on the computer screen. This method is less sensitive to the threshold and rejects most artifacts in the peak list. The old algorithm used in the previous version of VNMR, `acosyold`, is still available for comparison.

Alternate: Find Correlations button in the Automatic COSY Analysis Menu.

See also: *User Guide: Liquids NMR*

Related:
- `acosyold` Automatic analysis of COSY data (C)
- `fn` Fourier number in 1st indirectly detected dimension (P)
- `fn1` Fourier number in directly detected dimension (P)
- `ll2d` Automatic and interactive 2D peak picking (C)
- `sw` Spectral width in directly detected dimension (P)
- `sw1` Spectral width in 1st indirectly detected dimension (P)

acosyold — Automatic analysis of COSY data, old algorithm (C)

Syntax: `acosyold`

Description: Analyzes COSY data using the algorithm from previous versions of VNMR.

Related: `acosy` Automatic analysis of COSY data (C)

acqdisp — Display message on the acquisition status line (C)

Syntax: `acqdisp(message)`

Description: Displays the message specified on the acquisition status line. `acqdisp` is used primarily by the acquisition process to update the VNMR screen.

Arguments: `message` is a text string, up to 8 characters long.

See also: *Getting Started*

acqi — Interactive acquisition display process (C)

Syntax: `acqi<('par'|'disconnect'|'exit'|'standby')><:$ret>`

Description: Opens the Acquisition window for interactive locking and shimming on the lock signal, FID, or spectrum. When using a spectrometer, `acqi` normally automatically starts. On UNITY*INOVA* systems only, you can use the Acquisition window to shim on the sample while an acquisition is in progress. This feature is not available on other systems. On all systems, if the console has been recently rebooted, enter `su` before running `acqi`.

If `acqi` is connected to the console and you start an acquisition (`su`/`go`/`au`), `acqi` automatically disconnects.

The pulse sequence and parameter set for the FID/spectrum display can be selected by entering `gf` from VNMR. Note that if clicking the FID button in `acqi` causes `acqi` to "disconnect," the common cause is that `gf` had not been executed from VNMR.

The FID display is controlled by the parameters `lsfid`, `phfid`, and `dmgf`. These display parameters are automatically sent to `acqi` when `acqi` is first invoked. These parameters may subsequently be changed and sent again to `acqi` with the command `acqi('par')`. If `phfid` is not set to "Not Used" for the FID display in `acqi`, a slide control will be available in `acqi` for the interactive adjustment of the `phfid` parameter. The slide will be in the IPA set of adjustments. If the parameter `dmgf` exists and is set to `'av'`, the FID display in `acqi` displays the square root of the sum of the squares of the real and imaginary channels.

The spectrum display is controlled by parameters `sp`, `wp`, `dmg`, `rp`, `lp`, `rfl`, `rfp`, `vs`, `vp`, `sw`, and `fn`. These parameters are automatically sent to `acqi` when `acqi` is first invoked. These parameters can subsequently be changed and sent again to `acqi` with the command `acqi('par')`. The preparation macro `gf` also calls `acqi('par')`, thereby causing these parameters to be sent to `acqi`. If `fn` is greater than 64K, it is lowered to 64K.

A convenient method of setting these parameters is to acquire a spectrum with `go`, then `ft` and adjust the display with the `ds` command options. Once the display is set the way you want, enter `gf`. The same display should then appear when the spectrum display is selected from `acqi`. Note that weighting parameters are not used in the *acqi* spectrum display.

The manual *Getting Started* has a step-by-step description of using `acqi`.

Arguments: `'par'` causes the current values of parameters `lsfid`, `phfid`, `dmgf`, `sp`, `wp`, `dmg`, `rp`, `lp`, `rfl`, `rfp`, `vs`, `sw`, and `fn` to be sent to `acqi`.

'disconnect' causes acqi to be disconnected. Clicking the Close button in acqi is equivalent, and puts acqi in the standby mode. Lock parameters, the spin parameter, and the shim values are sent back to the current VNMR experiment when acqi is "disconnected." If the experiment has the load parameter set to 'y', then the shim values are not delivered to the experiment. (Spin adjustment is optional on *MERCURY* and *GEMINI 2000* systems.)

'exit' causes an exit from acqi. Clicking the exit button in the Acquisition window is equivalent.

$ret is a return value with the success or failure of running acqi. The default is a warning displayed in the status window if acqi fails.

'standby' starts acqi and puts it into the standby mode. In this mode, a button labeled Acqi is present in VNMR's permanent menu.

Examples:

```
acqi
acqi('par')
acqi('disconnect')
acqi('exit')
acqi:$ok
```

See also: *Getting Started*

Related:

Acqstat	Bring up the acquisition status display (U)
dmg	Display mode in directly detected dimension (P)
dmgf	Absolute-value display of FID data or spectrum in acqi (P)
ds	Display a spectrum (C)
fn	Fourier number in directly detected dimension (P)
ft	Fourier transform 1D data (C)
gf	Prepare parameters for FID/spectrum display in acqi (M)
go	Submit an experiment to acquisition (C)
load	Load status of displayed shims (P)
lkof	Track changes in lock frequency (P)
lp	First-order phase in directly detected dimension (P)
lsfid	Number of complex points to left-shift the np FID (P)
phfid	Zero-order phasing constant for np FID (P)
rfl	Ref. peak position in 1st indirectly detected dimension (P)
rfp	Ref. peak frequency in directly detected dimension (P)
rp	Zero-order phase in directly detected dimension (P)
sp	Start of plot in directly detected dimension (P)
spin	Sample spin rate (P)
sw	Spectral width in directly detected dimension (P)
vp	Vertical position of the spectrum (P)
vs	Vertical scale (P)
wp	Width of plot in directly detected dimension (P)

acqmeter — Open Acqmeter window (M)

Syntax: acqmeter<(remote_system)>

Description: Opens the Acqmeter window and shows a time line of lock level, temperature (VT), and/or spinner speed. When first opened, only lock level is displayed. By clicking anywhere in the lock level window with the right mouse button, a menu pops up with choices to close the lock level window, show a temperature (VT) window, show a spinner window, open a properties window, or close the Acqmeter window. Click on the choice desired in the menu with either the left or right mouse button. In the properties window, the host, font, color, and graphical mode can be changed. Continue to click in any Acqmeter window

with the right mouse button to open the menu and then open or close windows, or close the Acqmeter window, as desired.

Arguments: `remote_system` is the host name of a remote machine on the same network. The default is the local machine. To activate the remote feature, the local and remote machines must be on the same Ethernet LAN (local area network) and the local machine must be able to get the Internet address of the remote machine (usually in the `/etc/hosts` file).

Examples:
```
acqmeter
acqmeter('inova500')
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`acqi`	Interactive acquisition display (C)
`Acqmeter`	Open Acqmeter window (U)

`Acqmeter` Open Acqmeter window (U)

Syntax: `Acqmeter <remote_system> <-f file> <&>`

Description: Opens the Acqmeter window and shows a time line of lock level, temperature (VT), and/or spinner speed. When first opened, only lock level is displayed. By clicking anywhere in the lock level window with the right mouse button, a menu pops up with choices to close the lock level window, show a temperature (VT) window, show a spinner window, open a properties window, or close the Acqmeter window. Click on the choice desired in the menu with either the left or right mouse button. In the properties window, the host, font, color, and graphical mode can be changed. Continue to click in any Acqmeter window with the right mouse button to open the menu and then open or close windows, or close the Acqmeter window, as desired.

Arguments: `remote_system` is the host name of a remote machine on the same network. The default is the local machine. To activate the remote feature, the local and remote machines must be on the same Ethernet LAN (local area network) and the local machine must be able to get the Internet address of the remote machine (usually in the `/etc/hosts` file).

`-f file` is the name of a template file in the directory `$vnmruser/vnmrsys/templates/acqstat` used to set the attributes of the Acqmeter window when it opens. This allows customizing the Acqmeter window for different users and experiments. The default name of the file is `default`.

& (ampersand) character added to the command makes `Acqmeter` into a background process. For example, if “lab” is the remote machine host name, entering the command `Acqmeter lab &` displays the acquisition status of the “lab” remote machine as a background process. To activate the remote feature, the local and remote machines must be on the same Ethernet LAN (local area network) and the local machine must be able to get the Internet address of the remote machine (usually in the `/etc/hosts` file).

Examples:
```
Acqmeter &
Acqmeter inova400 &
Acqmeter gem300 -f inova500.lisa &
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`acqi`	Interactive acquisition display (C)
`acqmeter`	Open Acqmeter window (M)

`acqstat` Open Acquisition Status window (M)

Syntax: `acqstat<(remote_system)>`

Description: Opens the Acquisition Status window, which displays acquisition information such as the current acquisition task, experiment number, spinner status, and temperature status. When the host computer is attached to a spectrometer, this window should open automatically when VNMR is started. In the properties window, the host, font, color, and graphical mode can be changed. For a complete description of these windows, refer to the manual *Getting Started*.

Arguments: `remote_system` is the host name of a remote machine on the same network. The default is the local machine. To activate the remote feature, the local and remote machines must be on the same Ethernet LAN (local area network) and the local machine must be able to get the Internet address of the remote machine (usually in the `/etc/hosts` file).

Examples:
```
acqstat
acqstat('u500')
```

Alternate: Acquisition Status choice in the Workspace menu.

See also: *Getting Started*

Related:

`Acqstat`	Open the Acquisition Status window (U)
`showstat`	Display information about status of acquisition (C,U)

`Acqstat` Open Acquisition Status window (U)

Syntax: `Acqstat <remote_system> <-f file> <&>`

Description: Opens the Acquisition Status window, which displays acquisition information such as the current acquisition task, experiment number, spinner status, and temperature status. When the host computer is attached to a spectrometer, this window should open automatically when VNMR is started. In the properties window, the host, font, color, and graphical mode can be changed. For a complete description of these windows, refer to the manual *Getting Started*.

Arguments: `remote_system` is the host name of a remote machine on the same network. The default is the local machine. To activate the remote feature, the local and remote machines must be on the same Ethernet LAN (local area network) and the local machine must be able to get the Internet address of the remote machine (usually in the `/etc/hosts` file).

`-f file` is the name of a template file in the directory `$vnmruser/vnmrsys/templates/acqstat` used to set the attributes of the Acquisition Status window when it opens. This allows customizing the Acquisition Status window for different users and experiments. The default name of the file is `default`.

& (ampersand) character added to the command makes `Acqstat` into a background process. For example, if “lab” is the remote machine host name, entering the command `Acqstat lab &` displays the acquisition status of the “lab” remote machine as a background process. To activate the remote feature, the local and remote machines must be on the same Ethernet LAN (local area network) and the local machine must be able to get the Internet address of the remote machine (usually in the `/etc/hosts` file).

Examples:
```
Acqstat &
Acqstat inova400 &
Acqstat gem300 -f inova500.lisa &
```

Alternate: Acquisition Status choice in the Workspace menu.

See also: *Getting Started*

Related:

`Acqstat`	Open the Acquisition Status window (U)
`showstat`	Display information about status of acquisition (C,U)

acqstatus — Acquisition status (P)

Applicability: All systems, except codes marked with an asterisk (*) are not used on *MERCURY* and *GEMINI 2000* systems.

Description: Whenever wbs, wnt, wexp, or werr processing occurs, the acquisition condition that initiated that processing is available from the parameter acqstatus. This acquisition condition is represented by two numbers, a "done" code and an "error" code. The done code is set in acqstatus[1] and the error code is set in acqstatus[2]. Macros can take different actions depending on the acquisition condition.

The done codes and error codes are listed below and in the file acq_errors in /vnmr/manual. For example, a werr macro could specify special processing if the maximum number of transients is accumulated. The appropriate test in the macro would be:

```
if (acqstatus[2] = 200) then
"do special processing, e.g. dp='y' au"
endif
```

Done codes:

11. FID complete
12. Block size complete (error code indicates bs number completed)
13. Soft error
14. Warning
15. Hard error
16. Experiment aborted
17. Setup completed (error code indicates type of setup completed)
101. Experiment complete
102. Experiment started

Error codes:

Warnings
101. Low-noise signal
102. High-noise signal
103. ADC overflow occurred
104. Receiver overflow occurred*

Soft errors
200. Maximum transient completed for single-precision data
201. Lost lock during experiment (LOCKLOST)

300. *Spinner errors:*
301. Sample fails to spin after three attempts at repositioning
302. Spinner did not regulate in the allowed time period (RSPINFAIL)*
303. Spinner went out of regulation during the experiment (SPINOUT)*
395. Unknown spinner device specified (SPINUNKNOWN)*
396. Spinner device is not powered up (SPINNOPOWER)*
397. RS-232 cable not connected from console to spinner (SPINRS232)*
398. Spinner does not acknowledge commands (SPINTIMEOUT)*

400. *VT (variable temperature) errors:*
400. VT did not regulate in the given time vttime after being set
401. VT went out of regulation during the experiment (VTOUT)
402. VT in manual mode after automatic command (see Oxford manual)*
403. VT safety sensor has reached limit (see Oxford manual)*
404. VT cannot turn on cooling gas (see Oxford manual)*
405. VT main sensor on bottom limit (see Oxford manual)*
406. VT main sensor on top limit (see Oxford manual)*
407. VT sc/ss error (see Oxford manual)*

408. VT oc/ss error (see Oxford manual)*
495. Unknown VT device specified (VTUNKNOWN)*
496. VT device not powered up (VTNOPOWER)*
497. RS-232 cable not connected between console and VT (VTRS232)*
498. VT does not acknowledge commands (VTTIMEOUT)

500. *Sample changer errors:*
501. Sample changer has no sample to retrieve
502. Sample changer arm unable to move up during retrieve
503. Sample changer arm unable to move down during retrieve
504. Sample changer arm unable to move sideways during retrieve
505. Invalid sample number during retrieve
506. Invalid temperature during retrieve
507. Gripper abort during retrieve
508. Sample out of range during automatic retrieve
509. Illegal command character during retrieve*
510. Robot arm failed to find home position during retrieve*
511. Sample tray size is not consistent*
512. Sample changer power failure during retrieve*
513. Illegal sample changer command during retrieve*
514. Gripper failed to open during retrieve*
515. Air supply to sample changer failed during retrieve*
525. Tried to insert invalid sample number*
526. Invalid temperature during sample changer insert*
527. Gripper abort during insert*
528. Sample out of range during automatic insert
529. Illegal command character during insert*
530. Robot arm failed to find home position during insert*
531. Sample tray size is not consistent*
532. Sample changer power failure during insert*
533. Illegal sample changer command during insert*
534. Gripper failed to open during insert*
535. Air supply to sample changer failed during insert*
593. Failed to remove sample from magnet*
594. Sample failed to spin after automatic insert
595. Sample failed to insert properly
596. Sample changer not turned on
597. Sample changer not connected to RS-232 interface
598. Sample changer not responding*

600. *Shimming errors:*
601. Shimming user aborted*
602. Lost lock while shimming*
604. Lock saturation while shimming*
608. A shim coil DAC limit hit while shimming*

700. *Autolock errors:*
701. User aborted (ALKABORT)*
702. Autolock failure in finding resonance of sample (ALKRESFAIL)
703. Autolock failure in lock power adjustment (ALKPOWERFAIL)*
704. Autolock failure in lock phase adjustment (ALKPHASFAIL)*
705. Autolock failure, lock lost in final gain adjustment (ALKGAINFAIL)*

800. *Autogain errors.*
801. Autogain failure, gain driven to 0, reduce pw (AGAINFAIL)

Hard errors
901. Incorrect PSG version for acquisition
902. Sum-to-memory error, number of points acquired not equal to np

903. FIFO underflow error (a delay too small?)*
904. Requested number of data points (np) too large for acquisition*
905. Acquisition bus trap (experiment may be lost)*

1000. *SCSI errors:*
1001. Recoverable SCSI read transfer from console*
1002. Recoverable SCSI write transfer from console**
1003. Unrecoverable SCSI read transfer error*
1004. Unrecoverable SCSI write transfer error*

1100. *Host disk errors:*
1101. Error opening disk file (most likely a UNIX permission problem)*
1102. Error on closing disk file*
1103. Error on reading from disk file*
1104. Error on writing to disk file*

See also: *Getting Started*

Related:		
	react	Recover from error conditions during werr processing (M)
	werr	Specify action when error occurs (C)
	werr	When error (P)

add — Add current FID to add/subtract experiment (C)

Syntax:
(1) `add<(multiplier<,'new'>)>`
(2) `add('new')`
(3) `add('trace',index)`

Description: Adds the last displayed or selected FID to the current contents of the add/subtract experiment (exp5). The parameters lsfid and phfid can be used to shift or phase rotate the selected FID before it is combined with the data in the add/subtract experiment. A multi-FID add/subtract experiment can be created by using the 'new' keyword. Individual FIDs in a multi-FID add/subtract experiment can subsequently be added to using the 'trace' keyword followed by the index number of the FID.

Arguments: multiplier is a value that the FID is to be multiplied by before being added to the add/subtract experiment (exp5). The default is 1.0.

'new' is a keyword to create a new FID element in a add/subtract experiment.

'trace' is a keyword to use the next argument (index) as the number of the FID to add to in an add/subtract experiment. The default is to add to the first FID in a multi-FID add/subtract experiment.

index is the index number of the FID to be used as a target in a multi-FID add/subtract experiment.

Examples:
```
add
add(0.75)
add('new')
add('trace',2)
```

See also: *User Guide: Liquids NMR*

Related:		
	clradd	Clear add/subtract experiment (C)
	lsfid	Number of complex points to left-shift ni interferogram (P)
	phfid	Zero-order phasing constant for np FID (P)
	select	Select a spectrum without displaying it (C)
	spadd	Add current spectrum to add/subtract experiment (C)
	sub	Subtract current FID from add/subtract experiment (C)

addfids — Add a series of FIDs together (M)

Applicability: Systems with LC-NMR accessory.

Syntax: `addfids<(start,finish)>`

Description: Improves signal-to-noise by adding adjacent FIDs that represent the same peak. Given a series of FIDs that represent separate data, such as occur during an LC-NMR run, some of the adjacent FIDs can actually represent the same peak in the LC run.

To obtain the FID numbers to use, you can enter `dss` or `dsww` (e.g., enter `dsww(25,35)` and then determine that peak numbers 28 to 31 contain the peaks of interest), or you can enter `dconi` and then read the Index counter on line 1 of the display.

Arguments: `start` is the number of the first FID to be co-added. The default is that you are prompted for the value.

`finish` is the number of the last FID to be co-added. The default is that you are prompted for the value.

Examples:
```
addfids
addfids(25,28)
```

See also: *User Guide: Liquids NMR*

addi — Start interactive add/subtract mode (C)

Syntax: `addi`

Description: Starts the interactive add/subtract mode. Before entering `addi`, start the process with `clradd` and `spadd`, then display a second spectrum on the screen. This may involve changing experiments, selecting a second member of an array of spectra, a different trace of a 2D spectrum, or displaying a spin simulated spectrum. The Fourier numbers *(*`fn`) *must* be the same in the two spectra to be manipulated. The width (`sw`) of the two spectra need *not* be identical, although adding spectra of different widths will probably not be meaningful. Having selected the second spectrum and ensuring it is in `nm` mode, enter `addi` to begin the interactive process.

After `addi` is invoked, spectrum 1, the spectrum selected by the `spadd` command, appears in the center of the display. Spectrum 2, the spectrum that was active when `addi` was entered, appears on the bottom. The sum or difference of these spectra appears on top of the screen. When `addi` is first entered, this spectrum will be the sum (1 + 2) by default. The spectra is manipulated using the mouse.

The select button toggles between different modes of control.

- When the label at the screen bottom reads "`active`: `current`", all of the parameters (except `wp`) control spectrum 2, and spectrum 2 can be phased, scaled, or shifted relative to spectrum 1.
- After clicking on select, the label at the screen bottom reads "`active: addsub`", and now all of the parameters except `wp` control spectrum 1.
- Clicking select again toggles the label to read "`active: result`", and now parameter changes affect only the sum or difference spectrum.

Note that `wp` always controls all spectra, because differential expansions of the two spectra are not supported. Note also that the colors of the labels change to match the colors of the different spectra.

The sum/difference spectrum displayed on the screen while `addi` is active is strictly a temporary display. Once all manipulations have been performed, and

assuming the sum/difference is something you wish to perform further operations with (such as plotting), it must be saved into the add/subtract experiment (`exp5`) by clicking on save. At this point, spectrum 1, which was in the add/subtract experiment, is overwritten by the sum or difference spectrum, and `addi` ceases operation. In most cases, you will next want to enter `jexp5` `ds` to display the difference spectrum on the screen, ready for further manipulation (expansion, line listing, etc.) and plotting. If you wish to continue with the add/subtract process by adding in a third spectrum, display that spectrum in the usual way and enter `addi` again.

Alternate: Interactive Mode button in the Add/Subtract Menu.
Add/Subtract button in the Deconvolution Menu.

See also: *User Guide: Liquids NMR*

Related:

`clradd`	Clear add/subtract experiment (C)
`jexp`	Join existing experiment (C)
`nm`	Select normalized intensity mode (C)
`spadd`	Add current spectrum to add/subtract experiment (C)
`spmin`	Take minimum of two spectra in add/subtract experiment (C)
`spsub`	Subtract current spectrum from add/subtract experiment (C)
`wp`	Width of plot in directly detected dimension (P)

`addnucleus` Add new nucleus to existing probe file (M)

Syntax: `addnucleus<(nucleus)>`

Description: Appends entries for nuclei not in the default probe file to the end of the file.

Arguments: If no argument is entered, a prompt is displayed requesting the nucleus entry.

`nucleus` is a nucleus entry in the `nuctable`.

Examples:
```
addnucleus
addnucleus('Si29')
```

See also: *Getting Started*

Related:

`addprobe`	Create new probe directory and probe file (M)
`getparam`	Receive parameter from probe file (M)
`probe`	Probe type (P)
`setparams`	Write parameter to current probe file (M)

`addpar` Add selected parameters to current experiment (M)

Syntax:
```
addpar<('2d'|'3d'|'3rf'|'4d'|'downsamp'|'fid'|
   'image'|'ll2d'|'lp'<,dim>|'oversamp'|'ss')>
```

Applicability: The `'3d'`, `'3rf'`, `'4d'`, `'fid'`, and `'image'` arguments work on all systems but are only useful if system has the proper hardware.

Description: Creates selected parameters in the current experiment.

Arguments: If no argument is entered, `addpar` displays instructions for its use.

`'2d'`, `'3d'`, `'3rf'`, `'4d'`, `'downsamp'`, `'fid'`, `'image'`, `'ll2d'`, `'lp'`, `'oversamp'`, and `'ss'` are keywords (only one keyword is used at a time) specifying the parameters to be created:

- `'2d'` specifies creating `ni`, `phase`, and `sw1`, which can be used to acquire a 2D data set (functions the same as macro `par2d`).
- `'3d'` specifies creating `d3`, `ni2`, `phase2`, and `sw2`, which can used to acquire a 3D data set (functions the same as macro `par3d`).

- `'3rf'` specifies retrieving the `ap` and `dg2` display templates for third rf channel and 3D parameters (functions the same as macro `par3rf`).
- `'4d'` specifies creating the acquisition parameters `d4`, `ni3`, `phase3`, and `sw3`, which can be used to acquire a 4D data set (functions the same as macro `par4d`).
- `'downsamp'` specifies creating the parameters `downsamp`, `dscoef`, `dslsfrq`, `dsfb`, and `filtfile` for digital filtering and downsampling (functions the same as macro `pards`).
- `'fid'` specifies creating FID display parameters `axisf`, `crf`, `deltaf, dotflag`, `vpf`, and `vpfi` if the parameter set is older and lacks these parameters (functions the same as macro `fidpar`).
- `'ll2d'` specifies creating `th2d` and `xdiag` for the `ll2d` 2D peak picking program (functions the same as macro `parll2d`).
- `'lp'` specifies creating `lpalg`, `lpopt`, `lpfilt`, `lpnupts`, `strtlp`, `lpext`, `strtext`, `lptrace`, and `lpprint` for linear prediction in the acquisition dimension (functions the same as macro `parlp`). The display template for the `dglp` macro is also created if necessary.
- `'oversamp'` specifies creating parameters `def_osfilt`, `filtfile`, `oscoef`, `osfb`, `osfilt`, `oslsfrq`, and `oversamp` for oversampling and digital filtering (functions the same as macro `paros`).
- `'ss'` specifies adding parameters `ssorder, ssfilter`, `ssntaps`, and `sslsfrq` for time-domain solvent subtraction (functions the same as macro `parfidss`).

`dim` specifies the dimension when adding linear prediction parameters: `1` for the first implicit dimension or `2` for the second implicit dimension. Default is the acquisition dimension. Therefore, `addpar('lp')` creates the parameters listed above; `addpar('lp',1)` creates `lpalg1`, `lpopt1`, `lpfilt1`, `lpnupts1`, `strtlp1`, `lpext1`, `strtext1`, `lptrace1`, and `lpprint1;` and `addpar('lp',2)` creates `lpalg2`, `lpopt2`, `lpfilt2`, `lpnupts2`, `strtlp2`, `lpext2`, `strtext2`, `lptrace2`, and `lpprint2.` Each separate dimension of a multidimensional data set can have its own unique parameters.

Examples:

```
addpar
addpar('3d')
addpar('lp',1)
```

See also: *Getting Started*; *User Guide: Liquids NMR; User Guide: Imaging*

Related:

`def_osfilt`	Default value of `osfilt` (P)
`dglp`	Display group of linear prediction parameters (M)
`fidpar`	Add parameters for FID display in current experiment (M)
`osfilt`	Oversampling filter for real-time DSP (P)
`par2d`	Create 2D acquisition parameters (M)
`par3d`	Create 3D acquisition parameters (M)
`par3rf`	Get display templates for 3rd rf channel parameters (M)
`par4d`	Create 4D acquisition parameters (M)
`pards`	Create digital filtering and downsampling parameters (M)
`parfidss`	Set up parameters for time-domain solvent subtraction (M)
`paros`	Create oversampling and digital filtering parameters (M)
`parll2d`	Create parameters for 2D peak picking (M)
`parlp`	Create parameters for linear prediction (M)

addparams — Add parameter to current probe file (M)

Syntax: `addparams(param,value,nucleus<,'tmplt'><,'system'>)`

Description: Adds a new parameter and its value for a specified nucleus to the probe file or to the probe template.

Arguments: `param` is the name of the parameter to be added.

`value` is a string with the value to be written for the parameter.

`nucleus` is the nucleus to add in the probe file.

`'tmplt'` is a keyword to add the parameter to the local template. The default is the probe file.

`'system'` is a keyword to add the parameter to the system-level template or probe file, provided that you have write permission to that file. The default is to add the parameter to the local template or probe file.

Examples:
```
addparams('ref_pwr','53',tn)
addparams('ref_pwx','00',dn,'tmplt')
addparams('ref_pwx2','00',dn2,'tmplt','system')
```

See also: *Getting Started*

Related:

`getparam`	Receive parameter from probe file (M)
`setparams`	Write parameter to current probe file (M)
`updateprobe`	Update probe file (M)

addprobe — Create new probe directory and probe file (M)

Syntax: `addprobe(probe_name<,'stdar'|'system'><,'stdpar'>)`

Description: Creates a new probe directory and a probe file. Default nuclei included in this file are ^{1}H, ^{19}F, ^{13}C, and ^{15}N. The information is saved in the user's directory `vnmrsys/probes`.

Arguments: `probe_name` is the name to be given to the probe directory and probe file.

`'stdpar'` and `'system'` are keywords for the second and third arguments:

- If the second argument is `'stdpar'`, calibration values from the standard parameter sets (`stdpar/H1.par`, `stdpar/C13.par`, etc.) will be read and written into the probe file.
- If the second argument is `'system'` and the user has write permission into the VNMR system probes directory (typically `/vnmr/probes`), then a system-level probe directory will be made.
- If the second argument is `'system'` and the third argument is `'stdpar'`, then both actions in the preceding bullets will occur.
- The default is the probe file is created with all parameters initialized to zero.

Examples:
```
addprobe('idpfg')
addprobe('idpfg','stdpar')
addprobe('idpfg','system','stdpar')
```

See also: *Getting Started; Walkup NMR Using GLIDE*

Related:

`addnucleus`	Add new nucleus to existing probe file (M)
`getparam`	Receive parameter from probe file (M)
`probe`	Probe type (P)
`setparams`	Write parameter to current probe file (M)

addrcvrs — Combine data from multiple receivers (M)

Applicability: Imaging systems with multiple receivers.

Syntax: `addrcvrs`

Description: Combines image data that has been acquired by multiple receivers. First transforms the data from each receiver separately with `'wft2d'`. Weights the individual images by the factors specified in the `'rcvrwt'` parameter and forms the RMS average.

Examples: `addrcvrs`

Related:

rcvrwt	Weighting for different receivers (M)
wft2d	Weight and Fourier Transform 2D data (C)
rmsAddData	Add transformed data files with weighting (U)

adept — Automatic DEPT analysis and spectrum editing (C)

Syntax: `adept<(<'noll'><,'coef'><,'theory'>)>`

Description: Automatically analyzes a set of four DEPT spectra and edits the spectra so that the spectra is arrayed as follows:

- #4 is CH_3 carbons only
- #3 is CH_2 carbons only
- #2 is CH carbons only
- #1 is all protonated carbons

Because `adept` modifies the transformed data, it should not be repeated without retransforming the data between calls. `adept` produces a text file `dept.out` in the current experiment directory, which contains the result of the analysis.

Arguments: The following keyword arguments can be supplied in any order:

`'noll'` causes the line listing to be skipped. If `'noll'` is not supplied as an argument, `adept` first performs a line listing. In that case, the threshold parameter `th` must be set properly before starting `adept`.

'`coef'` causes the combination coefficients to be printed.

`'theory'` causes theoretical coefficients to be used. The default is optimized coefficients.

Examples:

```
adept
adept('coef')
adept('theory','noll')
```

See also: *User Guide: Liquids NMR*

Related:

autodept	Automated complete analysis of DEPT data (M)
deptproc	Process DEPT data (M)
padept	Perform `adept` analysis and plot resulting spectra (C)
pldept	Plot DEPT data, edited or unedited (M)
th	Threshold (P)

aexppl — Automatic plot of spectral expansion (M)

Syntax: `aexppl<(expansion_factor)>`

Description: Plots automatically expansions of given regions. Regions have to be defined first by using the `region` command or by using the cursors in `ds`.

Arguments: `expansion_ factor` is a spectral expansion factor in units of Hz/mm. The default is 2 Hz/mm.

Examples: `aexppl`
`aexppl(20)`

See also: *Getting Started*

Related:

`ds`	Display a spectrum (C)
`region`	Divide spectrum into regions (C)

ai — Select absolute-intensity mode (C)

Syntax: `ai`

Description: Selects the *absolute-intensity display mode* in which the scale is kept constant from spectrum to spectrum to allow comparison of peak heights from one spectrum to another. The alternative is the normalized-intensity display mode (`nm`) in which spectra are scaled so that the largest peak in the spectrum is `vs` mm high. The modes are mutually exclusive—the system is always in either `nm` or `ai` mode. Enter `aig`? to determine which mode is currently active.

See also: *Getting Started*

Related:

`aig`	Absolute intensity group (P)
`nm`	Select normalized-intensity mode (C)
`vs`	Vertical scale (P)

aig — Absolute-intensity group (P)

Description: Contains the result of the `ai` or `nm` command. `aig` is not set in the usual way but can be queried (`aig?`) to determine which display mode is active.

Values: `'ai'` indicates the absolute-intensity display mode is active.

`'nm'` indicates the normalized-intensity display mode is active.

See also: *Getting Started*

Related:

`ai`	Select absolute intensity mode (C)
`dmg`	Display mode in directly detected dimension (P)
`nm`	Select normalized-intensity mode (C)
`?`	Display individual parameter value (C)

alfa — Set alfa delay before acquisition (P)

Description: After the final event in the pulse sequence, including any receiver gate times occurring following the final pulse, acquisition occurs after a delay. This delay includes a fixed part, `alfa`, and a variable part, `1/(beta*fb)`.

- On *GEMINI 2000* $^{1}H/^{13}C$ systems, `beta` is `3`.
- On *MERCURY* series and *GEMINI 2000* broadband systems, `beta` is `2`.
- On systems with 4-pole Butterworth filters, `beta` is `2.`
- On systems with 8-pole Butterworth (200-kHz) filters, `beta` is `3.8.`
- On systems with 8-pole elliptical filters, `beta` is `1.29`.
- On UNITY*INOVA* and UNITY*plus* with 4-pole Bessel filters or UNITY systems with 6-pole Bessel filters, `beta` is `2.3` (only systems with 2-MHz and 5-MHz Analog-to-Digital Converter boards use this filter).

Because the total delay before acquisition is the sum of `alfa` and `1/(beta*fb)`, it is possible to shorten the delay beyond “normal” values by setting `alfa` negative (to a maximum of `1/(beta*fb)`). The macros `hoult` and `calfa` frequently result in such negative values of `alfa`.

To set alfa to a negative number, use either the setvalue command to enter a specific value of alfa, or use the setlimit command to allow entry of negative values of alfa directly from the keyboard.

Values: 0 to 100,000,000; in µs.

See also: *Getting Started*

Related:

calfa	Recalculate alfa so that first-order phase is zero (M)
fb	Filter bandwidth (P)
hoult	Set parameters alfa and rof2 according to Hoult (M)
rof2	Receiver gating time following pulse (P)
setlimit	Set limits of a parameter in a tree (C)
setvalue	Set value of any parameter in a tree (C)

alock — Automatic lock control (P)

Description: Governs Autolock control following the insertion of a sample with change or sample, and following initiation of an acquisition with the go, ga, or au. Manual adjustment of lock power, gain, and phase is possible using the acqi command. On UNITY and VXR-S systems, switching between simple (hardware) Autolock and simple lock is possible with buttons in the Acquisition window.

Values: Possible values are 'a', 'auto', 'n', 's', 'samp', 'u', or 'y', where:

'a' or 'auto' selects the optimizing Autolock function, which performs a lock capture and an automatic lock power and gain adjustment before data acquisition begins (lock phase is *not* optimized).

'n' leaves the lock in its current state.

's' or 'samp' selects the optimizing Autolock function, which performs a lock capture and an automatic lock power and gain adjustment before data acquisition begins (lock phase is *not* optimized) but only if the sample has just been changed.

On UNITY*INOVA*, UNITY*plus*, UNITY, and VXR-S, 'u' turns lock off so that the experiment runs unlocked. On *GEMINI 2000*, 'u' is inoperative.

On UNITY*INOVA*, UNITY*plus*, and *GEMINI 2000*, 'y' turns on the software Autolock function, which searches for the correct Z0 value only.

On UNITY and VXR-S, 'y' turns on the hardware Autolock function, with lock power, lock gain, and lock phase not adjusted.

See also: *Getting Started*

Related:

acqi	Interactive acquisition display process (C)
au	Submit experiment to acquisition and process data (C)
change	Submit a change sample experiment to acquisition (M)
ga	Submit experiment to acquisition and FT the result (C)
gf	Prepare parameters for FID/spectrum display in acqi (M)
go	Submit experiment to acquisition (C)
lock	Submit an Autolock experiment to acquisition (C)
sample	Submit change sample, Autoshim experiment to acquisition (M)

ampmode — Independent control of amplifier mode (P)

Applicability: UNITY*INOVA* and UNITY*plus* systems.

Description: Gives override capability over the default selection of amplifier modes. Unless overridden, the usage of rf channels determines whether the amplifier for a channel is in pulse, CW (continuous wave), or idle mode:

- Observe channel is set to the pulse mode.
- Other used channels are set to the CW mode.
- Any unused channels are set to the idle mode.

The `ampmode` parameter can be used to override this selection.

`ampmode` does not normally exist but can be created by the user with the command `create('ampmode','flag')`.

Values: List of characters in which the mode of the first amplifier is determined by the first character, the mode of the second amplifier by the second character, and so on. For each amplifier, one of the following characters is used:

- `'c'` selects CW mode.
- `'i'` selects idle mode.
- `'p'` selects pulse mode.
- `'d'` selects default behavior.

For example, `ampmode='ddp'` selects default behavior for the first two amplifiers and forces the third channel amplifier into pulse mode. Additional filtering is usually required when an amplifier in the same band as the observe amplifier is placed in the CW mode.

See also: *VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C)
`dn`	Nucleus for the first decoupler (P)
`tn`	Nucleus for observe transmitter (P)

`amptype` Amplifier type (P)

Applicability: All systems except *GEMINI 2000*.

Description: Specifies the type of amplifier on each rf channel of the spectrometer. The value is set in the CONFIG window (opened from `config`) using the label Type of Amplifier.

On UNITY*INOVA*, UNITY*plus*, UNITY, and VXR-S systems, for each channel, the types are Class C, Linear Full Band, Linear Low Band, Linear Broadband, or, for the fourth channel only, Shared. Selecting Shared means that the amplifier is fully configured for the third channel, and that the fourth channel shares this amplifier with the third channel.

When a type is selected for a channel, a letter (one of the values described below) is added to the value of `amptype`. For example, a system already set to Linear Full Band on the observe transmitter channel and the first decoupler channel would have `amptype='aa'`. Selecting the third channel as Linear Low Band would set `amptype='aal'`. Finally, selecting Shared for the fourth channel would set `amptype='aaln'`.

On *MERCURY* systems, `amptype` specifies the type of amplifier on each rf channel of the spectrometer. The value is set in the CONFIG window (opened from `config`) using the label Type of Amplifier.

Values: On UNITY*INOVA*, UNITY*plus*, UNITY, and VXR-S Systems:

`'a'` indicates the channel uses a linear full-band amplifier. A full-band amplifier has two outputs: 12 MHz to ^{31}P, and ^{19}F/^{1}H.

`'b'` indicates the system uses a linear broadband amplifier.

`'c'` indicates the system uses a class C amplifier.

'l' indicates the channel uses a linear low-band amplifier. A low-band amplifier has one output from 12 MHz to ^{31}P only.

'n' indicates the fourth channel shares a linear amplifier with the third.

On *MERCURY* series systems:

'aa' indicates the system has a linear 4-Nucleus amplifier with two outputs: ^{13}C/^{31}P and ^{19}F/^{1}H at a nominal 35W each.

'bb' indicates the system has a linear broadband amplifier with two outputs: ^{15}N to ^{31}P and ^{19}F/^{1}H at a nominal 125W and 75W respectively.

'cc' indicates the system has a linear CP/MAS amplifier with two outputs: ^{15}N to ^{31}P and ^{19}F/^{1}H at a nominal 300W and 100W respectively.

See also: *VNMR and Solaris Software Installation; MERCURYplus and MERCURY-Vx CP/MAS Installation, Testing, and Operation*

Related: config Display current configuration and possibly change it (M)

analyze Generalized curve fitting (C)

Syntax: (curve fitting) analyze('expfit',xarray<,options>)
(regression) analyze('expfit','regression'<,options>)

Description: Provides interface to curve fitting program expfit (using the curve fitting syntax), supplying expfit with input data in the form of the text file analyze.inp in the current experiment. expfit can be called from UNIX with the syntax:

```
expfit options <analyze.inp >analyze.list
```

expfit does a least-squares curve fitting to the data supplied in analyze.inp. Macros are available for the specialized uses of analyze, such as the 'T1' and 'kinetics' options. These macros avoid the need to select options and get the correct file format.

In the regression mode (using the regression syntax above), the type of curve fitting, ('poly1',...) must be selected. The regression section in the manual *User Guide: Liquids NMR* gives the input file format and describes the menus that permit choices indirectly through menu buttons.

The text file analyze.inp for the options 'T1', 'T2', 'kinetics', 'contact_time', and 'regression' contains the following lines (note that (1), (2), (3), etc. do not appear in the file but are used to identify lines in the explanation):

```
(1)   <text line>
(2)   <text line>
(3)   npeaks npairs <xscale> <yscale>
(4)   <NEXT npairs1>
(5)   peaks
(6)   x y
(6)   x y
   ...
(4)   <NEXT npairs2>
(5)   peaks
(6)   x y
(6)   x y
   ...
```

Line-by-line explanation:

(1) Optional descriptive text line, for regression only. Omit line otherwise.

(2) Optional *y*-axis title, for regression only. Omit line otherwise.

(3) Line containing an integer for the number of peaks (`npeaks`) followed by another integer for the number of (`x,y`) pairs per peak (`npairs`). If regression, the *x*-scale type and *y*-scale type are also listed.

(4) In the regression mode, a line beginning with the keyword `NEXT` is inserted at the start of each data set when the number of pairs per peak is variable. In this case, the number of (`x,y`) pairs for the peak (`npair1`, `npair2`, etc.) is also given on the line.

(5) Peak index.

(6) Data pairs, one to a line, are listed by peak in the following order:

```
x y     (first peak, first pair)
x y     (first peak, second pair)
...
x y     (second peak, first pair)
x y     (second peak, second pair)
...
```

In the regression mode, the line beginning with `NEXT` is inserted at the start of the data for each peak when the number of pairs per peak is variable. In this case, the header contains the maximum number of pairs for any peak.

For `'T1'`, `'T2'`, `'kinetics'`, and `'contact_time'`, information from the file `fp.out` and values of the arrayed parameter `xarray` are used to construct the file; thus, it is necessary to run `fp` prior to `analyze`.

For regression, `analyze.inp` is made by running `expl('regression')`. If the regression mode is not selected, `analyze.inp` may be slightly different.

In addition to output to the standard output, which is usually directed to `analyze.list`, `expfit` makes a file `analyze.out`, which is used by `expl` to display the results of the analysis.

User-supplied analysis programs can be called by `analyze` in place of `expfit`. Such programs should read their input from `stdin` and write the output listing to `stdout`. No `analyze.out` file needs to be generated unless display by `expl` is desired. Use the program `expfit` as a model.

Arguments: `'expfit'` is a required first argument.

`xarray` is the name of the parameter array holding x-values in `'T1'`, `'T2'`, `'kinetics'`, and `'contact_time'`, and is used only with these options.

`'regression'` sets regression mode and signifies generalized curve fitting with choices `'poly1'`, `'poly2'`, `'poly3'`, and `'exp'`.

`options` are any of the following keywords:

- `'T1'` sets T_1 analysis (the default).
- `'T2'` sets T_2 analysis.
- `'kinetics'` sets kinetics analysis, with decreasing peak height.
- `'increment'` sets kinetics analysis, with increasing peak height.
- `'list'` makes an extended listing for each peak.
- `'diffusion'` sets a special analysis for diffusion experiments.
- `'contact_time'` sets a special analysis for solids cross-polarization spin-lock experiments.
- `'poly1'` sets a linear fitting. It is used in regression mode only.

- 'poly2' sets a quadratic fitting. It is used in regression mode only.
- 'poly3' sets a cubic fitting It is used in regression mode only.
- 'exp' sets exponential curve fitting. It is used in regression mode only.

Examples:
```
analyze('expfit','d2','T1','list')
analyze('expfit','pad',kinetics','list')
analyze('expfit','p2','contact_time','list')
analyze('expfit','regression','poly1','list')
```

See also: *User Guide: Liquids NMR*

Related:

contact_time	MAS cross-polarization spin-lock contact time (M)
expfit	Least squares fit to polynomial or exponential curve (U)
expl	Display exponential or polynomial curves (C)
pexpl	Plot exponential or polynomial curves (C)
kini	Kinetics analysis, increasing intensity (M)
t1	T_1 exponential analysis (M)
t2	T_2 exponential analysis (M)

ap — Print out "all" parameters (C)

Syntax: `ap<(template)>`

Description: Prints a parameter list containing "all" parameter names and values.

Arguments: `template` is the name of the template. The default is a template controlled by the parameter ap, which can be modified with the command paramvi('ap'). See the manual *VNMR User Programming* for rules on building a template.

Examples:
```
ap
ap('newap')
```

See also: *Getting Started; VNMR User Programming*

Related:

addpar	Add selected parameters to the current experiment (M)
ap	"All" parameters display control (P)
dg	Display group of acquisition/processing parameters (C)
hpa	Plot parameters on special preprinted chart paper (C)
pap	Plot out "all" parameters (C)
paramvi	Edit a variable and its attributes with vi text editor (C)
ppa	Plot a parameter list in "English" (M)

ap — "All" parameters display control (P)

Description: Controls the display of the ap and pap commands to print and plot a parameter list. Use paramvi('ap') to modify the string value of ap.

See also: *Getting Started*; *VNMR User Programming*

Related:

ap	Print out "all" parameters (C)
dg	Display group of acquisition/processing parameters (C)
pap	Plot out "all" parameters (C)
paramvi	Edit a variable and its attributes with vi text editor (C)

apa — Plot parameters automatically (M)

Syntax: `apa`

Description: Selects automatically the appropriate command on different plotter devices to plot the parameter list. For example, apa generates a ppa on Zeta plotter or an hpa on an Hewlett-Packard plotter.

See also: *VNMR User Programming*

Related:

hpa	Plot parameters on special preprinted chart paper (C)
ppa	Plot a parameter list in “English” (M)

aph — Automatic phase adjustment of spectra (C)

Syntax: `aph<:$ok,$rp,$lp>`

Description: Automatically calculates the phase parameters `lp` and `rp` required to produce an absorption mode spectrum and applies these parameters to the current spectrum. Values calculated do *not* depend on the initial values of `lp` and `rp`.

Arguments: `$ok` is 1 if the phase adjustment succeeds, or 0 if the adjustment fails.

`$rp` is the calculated value of `rp`. If `$rp` is requested as a return value, `rp` is returned but not applied to the current spectrum.

`$lp` is the calculated value of `lp`. If `$lp` is requested as a return value, `lp` is returned but not applied to the current spectrum.

Alternate: Autophase button in the 1D Data Manipulation Menu.

See also: *Getting Started*

Related:

aph0	Automatic phase of zero-order term (C)
aphx	Perform optimized automatic phasing (M)
lp	First-order phase in directly detected dimension (P)
rp	Zero-order phase in directly detected dimension (P)

aph0 — Automatic phase of zero-order term (C)

Syntax: `aph0<:$ok,$rp,$lp>`

Description: Automatically adjusts only the zero-order frequency-independent term `rp` and does not rely on the frequency-dependent term `lp` being previously adjusted. In favorable circumstances, spectra may be obtained in such a way that only `rp` is expected to change. In these cases, if `lp` has been determined for one spectrum, then `rp` only can be computer-adjusted for subsequent spectra by `aph0` (“aph-zero”). Note that `aph0` does not correctly phase an exactly on-resonance peak.

Arguments: `$ok` is 1 if the phase adjustment succeeds, or 0 if the adjustment fails.

`$rp` is the calculated value of `rp`.

`$lp` is the current value of `lp`.

See also: *Getting Started*

Related:

aph	Automatic phase adjustment of spectra (C)
aphx	Perform optimized automatic phasing (M)
lp	First-order phase in directly detected dimension (P)
rp	Zero-order phase in directly detected dimension (P)

aphb — Auto phasing for Bruker data (C)

Syntax: `aphb<(threshold)>`

Description: Phases Bruker data using the autophasing program.

Arguments: `threshold` determines if a data point is large enough to qualify it as part of a peak. If no argument is given, or if the value is equal to or less than 0, the threshold is calculated from the spectrum.

Examples:

```
aphb
aphb(2)
```

See also: *Getting Started*

Related:
- `aph` Automatic phase adjustment of spectra (C)
- `aph0` Automatic phase of zero-order term only (C)

aphx — Perform optimized automatic phasing (M)

Syntax: `aphx`

Description: Optimizes parameters and arguments for the `aph` command. `aphx` first performs an `aph` then calculates a theoretical value for `lp`. If `lp` set by the `aph` is different from the calculated value by 10 per cent, the calculated value is used and an `aph0` is performed.

See also: *Getting Started*

Related:
- `aph` Automatic phase adjustment of spectra (C)
- `aph0` Automatic phase of zero-order term only (C)
- `lp` First order phase along directly detected dimension (P)

apinterface — AP Interface board type (P)

Applicability: UNITY and VXR-S systems. On UNITY*INOVA* and UNITY*plus* systems, `apinterface` does not apply, and the value of the label AP Interface Type should be set to N/A in the CONFIG window. `apinterface` does not apply to *MERCURY-VX*, *MERCURY*, and *GEMINI 2000*.

Description: Sets the type of AP Interface board on UNITY and VXR-S systems. The system value is set within the CONFIG window (opened from `config`) using the label AP Interface Type.

Values: `1` is for systems with the older XL Interface board (Type 1 in CONFIG window). This board is present on 200-MHz through 400-MHz systems with class C amplifiers and on early systems with ENI and/or TPL linear amplifiers (mostly VXR-500 systems but also including some others).

`2` is for systems with the newer AP Interface board present on all 200- through 600-MHz systems configured with linear amplifiers and can include systems with fine attenuators (Type 2 in CONFIG window).

3 is for systems with an AP Interface board that contains additional control lines to enable setting the decoupler modulation mode with the AP bus instead of with high-speed lines (Type 3 in CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:
- `config` Display current configuration and possibly change it (M)

appmode — Application mode (P)

Applicability: All systems except *MERCURY-VX*, *MERCURY*, and *GEMINI 2000*.

Description: A global parameter that allows selection of specialized system applications modes, such as imaging, by setting the global parameters `sysmaclibpath`, `sysmenulipath`, and `syshelppath`.

For example, in `/vnmr/maclib` is a subdirectory `maclib.imaging` that contains macros used primarily with imaging applications. Similarly, in `/vnmr/menulib` is a subdirectory `menulib.imaging` for imaging- related menus. By separating the imaging macros and menus into subdirectories, access to imaging-specific macros and menus is more convenient. This separation also allows minor modifications to some macros and menus while retaining the names that are in common use or required by other VNMR commands.

The dconi menu illustrates how appmode works. In normal 2D spectroscopy operation (defined by setting appmode='standard'), the dconi menu displays a button labeled Peak that provides access to interactive 2D peak-picking. With appmode='imaging', however, this button is labeled Mark instead and now performs the 1D or 2D mark function, which is more appropriate for imaging data. The dconi menu tailored for imaging is found in menulib.imaging, which is searched by VNMR before searching the /vnmr/menulib directory when appmode is set to 'imaging'. The search order is userdir+'/?' followed by vnmrsys/maclib, maclibpath, sysmaclibpath, and then /vnmr/maclib.

The value of appmode can be set either by entering its value directly from the command line or by selecting the 2:Setup button from the Main Menu and then clicking on the 5:App Mode button. New applications modes can be added by creating the appropriate subdirectories in /vnmr/maclib, /vnmr/menulib, and /vnmr/help, and adding the desired applications mode name to the _appmode macro. Subdirectories should be named by adding the file extension .appmodename to the corresponding parent directory name (e.g., maclib.solids, menulib.automation).

Values: 'standard' sets standard application mode.

'imaging' sets imaging application mode.

Alternate: App Mode button in the Setup Menu.

See also: *VNMR and Solaris Software Installation*; *User Guide: Imaging*

Related: config Display current configuration and possibly change it (M)

apt — Set up parameters for APT pulse sequence (M)

Syntax: apt<(solvent)>

Description: Converts a parameter set to the APT (attached proton test) experiment.

Arguments: solvent is the name of the solvent used. The default for solvent is $CDCl_3$ or, if in the automation mode, the default is read from the file sampleinfo.

Alternate: APT button in the 1D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

Related:
- aptaph — Automatic processing for APT spectra (M)
- capt — Automated carbon and APT acquisition (M)
- hcapt — Automated proton, carbon, and APT acquisition (M)

APT — Change parameters for APT experiment (M)

Syntax: APT<('GLIDE')>

Description: Converts the current parameter set to an APT experiment.

Arguments: 'GLIDE' is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding carbon spectrum for the experiment..

Related: apt Set up parameters for APT experiment (M)

aptaph — Automatic processing for APT spectra (M)

Syntax: aptaph

Description: Automatically phases APT spectra.

See also: *User Guide: Liquids NMR*

Related: apt Set up parameters for APT pulse sequence (M)

arccos — Calculate arc cosine of real number (M)

Applicability: Systems with imaging capabilities.

Syntax: `arccos(x<,'silent'>)<:rad,deg>`

Description: Calculates the arc cosine value of a real number. The answer is given, in radians and degrees, in the top VNMR display window and is optionally returned to two destination variables. The calculation is based on the identity `arccos(x)=arctan(sqrt(1-x*x)/x)`. Since `arccos` calls the macro `arctan` rather than the built-in math function `atan`, the calculation is somewhat slow.

Arguments: `x` is a real number in the range of ±1.0.

`'silent'` is a keyword to suppress the display of the results in the top VNMR display window.

`rad` is a return value in radians.

`deg` is a return value in degrees.

Examples:
```
arccos(.5)
arccos(-.2,'silent'):r1,d1
```

See also: *User Guide: Imaging*

Related:

`acos`	Find arc cosine of number (C)
`arcsin`	Calculate arc sine of a real number (M)
`arctan`	Calculate arc tangent of a real number (M)
`atan`	Find arc tangent of a number (C)

arcsin — Calculate arc sine of real number (M)

Applicability: Systems with imaging capabilities.

Syntax: `arcsin(x<,'silent'>)<:rad,deg>`

Description: Calculates the arc sine value of a real number. The answer is given, in radians and degrees, in the top VNMR display window and is optionally returned to two destination variables. The calculation is based on the identity `arcsin(x)=arctan(x/sqrt(1-x*x))`. Since *arcsin* calls the macro `arctan` rather than the built-in math function `atan`, the calculation is somewhat slow.

Arguments: `x` is a real number in the range of ±1.0.

`'silent'` is a keyword to suppress the display of the results in the top VNMR display window.

`rad` is a return value in radians.

`deg` is a return value in degrees.

Examples:
```
arcsin(.5)
arcsin(-.2,'silent'):r1,d1
```

See also: *User Guide: Imaging*

Related:

`arccos`	Calculate arc cosine of a real number (M)
`arctan`	Calculate arc tangent of a real number (M)
`asin`	Find arc sine of number (C)
`atan`	Find arc tangent of a number (C)

arctan — Calculate arc tangent of real number (M)

Applicability: Systems with imaging capabilities.

Syntax: `arctan(x<,'silent'>)<:rad,deg>`

Description: Calculates the arc tangent value of a real number. The answer is given, in radians and degrees, in the top VNMR display window and is optionally returned to two destination variables. The calculation is based on a rational approximation.

Arguments: `x` is a real number.

`'silent'` is a keyword to suppress the display of the results in the top VNMR display window.

`rad` is a return value in radians.

`deg` is a return value in degrees.

Examples:
```
arctan(.5)
arctan(-.2,'silent'):r1,d1
```

See also: *User Guide: Imaging*

Related:

`arccos`	Calculate arc cosine of a real number (M)
`arcsin`	Calculate arcsine of a real number (M)
`asin`	Find arc sine of number (C)
`atan`	Find arc tangent of a number (C)

`array` Easy entry of linearly spaced array values (M)

Syntax: `array<(parameter<,number_steps,start,step_size)>`

Description: Arrays a parameter to the number of steps, starting value and step size given by the user. All values of the array will satisfy the limits of the parameter.

If `array` is typed with none or only some of its arguments, you enter an interactive mode in which you are asked for the missing values.

Arguments: `parameter` is the name of the parameter to be arrayed. The default is an interactive mode in which you are prompted for the parameter. Only numeric parameters can be arrayed.

`number_steps` is the number of values of the parameter. The default is an interactive mode in which you are prompted for the number of steps.

`start` is the starting value of the parameter array. The default is an interactive mode in which you are prompted for the starting value.

`step_size` is the magnitude of the difference between elements in the array. The default is an interactive mode in which you are prompted for the step size.

Examples:
```
array
array('pw')
array('tof',40,1400,-50)
```

See also: *User Guide: Liquids NMR*

`array` Parameter order and precedence (P)

Description: Whenever an array of one or more parameters is set up, the string parameter `array` tells the system the name of the parameter or parameters that are arrayed and the order and precedence in which the arraying is to take place. The parameter `array` is automatically updated when acquisition parameters are set. “Diagonal arrays” (those corresponding to using parentheses in the parameter `array`) must be entered by hand.

Values: `''` (two single quotes with no space between) indicates no parameter is arrayed.

'`x'` indicates the parameter `x` is arrayed.

'x,y' indicates the parameters x and y are arrayed, with y taking precedence. That is, the order of the experiments is x_1y_1, x_1y_2,... x_1y_n, x_2y_1, x_2y_2,... x_2y_n,... x_my_n, with a total of $m \times n$ experiments being performed.

'y,x' indicates the parameters x and y are arrayed, with x taking precedence. That is, the order of the experiments is x_1y_1, x_2y_1,... x_ny_1, x_1y_2, x_2y_2,... x_my_2,... x_my_n, with total of $m \times n$ experiments being performed.

'(x,y)' indicates the parameters x and y are jointly arrayed. The number of elements of the parameters x and y must be identical, and the order of experiments is x_1y_1, x_2y_2,... x_ny_n, with n experiments being performed.

Joint arrays can have up to 10 parameters. Regular multiple arrays can have up to 20 parameters, with each parameter being either a simple parameter or a diagonal array. The total number of elements in all arrays can be 2^{32}–1.

See also: *User Guide: Liquids NMR*

Related:
- array — Easy entry of linearly spaced array values (M)

arraydim — Dimension of experiment (P)

Description: After calcdim calculates the dimension of an experiment, the result is put into the parameter arraydim. If an experiment is arrayed, arraydim is the product of the size of the arrays.

See also: *Getting Started*

Related:
- calcdim — Calculate dimension of experiment (C)
- celem — Completed FID elements (P)

asin — Find arc sine of number (C)

Syntax: asin(value)<:n>

Description: Finds the arc sine (also called the inverse sine) of a number.

Arguments: value is a number in the range of ±1.0.

n is a return argument giving the arc sine, in radians, of value. The default is to display the arc sine value in the status window.

Examples:
```
asin(.5)
asin(val):asin_val
```

See also: *VNMR User Programming*

Related:
- sin — Find sine value of an angle (C)

asize — Make plot resolution along f_1 and f_2 the same (M)

Syntax: asize

Description: Adjusts the 2D display parameters (sc, wc, sc2, and wc2) so that the displayed resolution along both f_1 and f_2 is the same. It is not suggested for heteronuclear experiments where the chemical shift spread of one nucleus is much greater than that of the other.

See also: *User Guide: Liquids NMR*

Related:
- sc — Start of chart (P)
- sc2 — Start of chart in second direction (P)
- wc — Width of chart (P)
- wc2 — Width of chart in second direction (P)

A

assign — Assign transitions to experimental lines (M)

Syntax: (1) `assign<('mark')>`
(2) `assign(transistion_number,line_number)`

Description: Assigns the nearest calculated transition to the lines from a `dll` or `nll` listing after `spinll` has placed them in `slfreq`. All lines may not be assigned and transitions must be greater than `sth`. The next `spins('iterate')` determines new parameters to minimize the differences in position of the assigned pairs.

Arguments: `'mark'` makes assign use the lines selected with the mark button in place of `dll`. The results of the `mark` operation are stored in the file `mark1d.out`, which is cleared by the command `mark('reset')`.

`transition_number` is a single calculated transition number that is assigned to a line from the `dll` listing.

`line_number` is the index of the line from the `dll` listing. Setting `line_number=0` removes an assignment from a calculated transition.

Alternate: auto assign button in the Spin Simulation Line Assignment Menu.

Examples:
```
assign
assign('mark')
assign(4,0)
```

See also: *User Guide: Liquids NMR*

Related:

`dll`	Display listed line frequencies and intensities (C)
`mark`	Determine intensity of the spectrum at a point (C)
`nll`	Find line frequencies and intensities (C)
`slfreq`	Measured line frequencies (P)
`spinll`	Set up `slfreq` array (M)
`spins`	Perform spin simulation calculation (C)
`sth`	Minimum intensity threshold (P)

at — Acquisition time (P)

Description: Length of time during which each FID is acquired. Since the sampling rate is determined by the spectral width `sw`, the total number of data points to be acquired (`2*sw*at`) is automatically determined and displayed as the parameter `np`. `at` can be entered indirectly by using the parameter `np`.

Values: Number, in seconds. A value that gives a number of data points not a multiple of 64 (*MERCURY-VX*, *MERCURY*, and *GEMINI 2000* systems and systems with an Output board) or a multiple of 2 (systems with an Acquisition Controller or Pulse Sequence Controller board) are readjusted automatically to be a multiple of 64 or 2 (refer to the description of `acquire` in the manual *VNMR User Programming* to identify these boards).

See also: *Getting Started; VNMR User Programming*

Related:

`np`	Number of data points (P)
`sw`	Spectral width in directly detected dimension (P)

atan — Find arc tangent of a number (C)

Syntax: `atan(value)<:n>`

Description: Finds the arc tangent (also called the inverse tangent) of a number.

Arguments: `value` is a number between $\pi/2$ and $-\pi/2$.

n is a return argument giving the arc tangent, in radians, of value. The default is to display the arc tangent value in the status window.

Examples:
```
atan(.5)
atan(val):atan_val
```

See also: *VNMR User Programming*

Related: sin — Find sine value of an angle (C)

atan2 — Find arc tangent of two numbers (C)

Syntax: `atan2(y,x)<:n>`

Description: Finds the arc tangent (also called the inverse tangent) of the quotient of two numbers.

Arguments: y and x are two numbers, where the quotient y/x is between π/2 and –π/2 and x is not equal to zero.

n is a return argument giving the arc tangent, in radians, of y/x. The default is to display the arc tangent value in the status window.

Examples:
```
atan2(1,2)
atan2(val):atan2_val
```

See also: *VNMR User Programming*

Related: sin — Find sine value of an angle (C)

atext — Append string to current experiment text file (M)

Syntax: `atext(string)`

Description: Adds a line of text to the current experiment text file.

Arguments: string is a single line of text.

Examples:
```
atext('T1 Experiment')
```

See also: *Getting Started*

Related:
- ctext — Clear the text of the current experiment (C)
- text — Display text or set new text for current experiment (C)
- write — Write formatted text to a device (C)

attens — Fast attenuators present (P)

Applicability: *GEMINI 2000* broadband systems. *GEMINI 2000* $^{1}H/^{13}C$ systems have fixed levels, therefore the value should be set to 'n'.

Description: Sets the version of RF Control board. The RF Control board provides computer control of the output power of the transmitter and decoupler channel. The value is set in the CONFIG window (opened from config) using the label BB Atten Type. The most recent version of the board, which began shipping in April 1991, is the *diode switching* version. This replaced the *relay switching* version. The diode switching version is much faster—it changes power levels in typically 3 to 4 µs, as compared to 2 to 5 ms for the relay switching board.

To identify which version is on a system, locate the RF Control board (labeled RF CTRL at the left end of the lower card cage) and examine the space below the three small gold coaxial connectors on the board. The relay switching version has a 0.5-inch black potentiometer below the connectors; the diode switching version has either blank space or an unused connector. If the version is still not identified, shut down the system and pull out the RF Control board. If the part number printed on the board is 00-990988-00, the board is the diode

switching version. If the part number is 00-966900-00, it is the relay switching version.

Values: `'n'` for the relay switching version (Slow choice in the CONFIG window).

`'y'` for the diode switching version (Fast choice in the CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:

`config`	Display current configuration and possibly change it (M)
`pfiltr`	Programmable filters (P)

au — Submit experiment to acquisition and process data (M)

Syntax: `au<(<'nocheck'><,'next'><,'wait'>)>`

Description: Performs the experiment described by the current acquisition parameters, checking the parameters `loc`, `spin`, `gain`, `wshim`, `load`, and `method` to determine the necessity to perform various actions in addition to simple data acquisition. This may involve a single FID or multiple FIDs, as in the case of arrays or 2D experiments. `au` causes the data to automatically be processed according to the following parameters:

- `wbs` specifies what happens after each block.
- `wnt` specifies what happens after each FID is collected.
- `wexp` specifies what happens when the entire acquisition is complete (which may involve several complete FIDs in the case of 1D arrays or 2D experiments).

Before starting the experiment, `au` executes the two user-created macros if they exist. The first is `usergo`, a macro that allows the user to set up general conditions for the experiment. The second is a macro whose name is formed by `go_` followed by the name of the pulse sequence (from `seqfil`) to be used (e.g., `go_s2pul`, `go_dept`). This macro allows a user to set up experiment conditions suited to a particular sequence.

Arguments: `'nocheck'` is a keyword to override checking if there is insufficient free disk space for the complete 1D or 2D FID data set to be acquired.

`'next'` is a keyword to put the experiment started with `au('next')` at the head of the queue of experiments to be submitted to acquisition.

`'wait'` is a keyword to stop submission of experiments to acquisition until `wexp` processing of the experiment, started with `au('wait')`, is finished.

Examples:

```
au
au('wait')
```

Alternate: Automatic button in the Acquire Menu.

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`auto_au`	Controlling macro for automation (M)
`change`	Submit a change sample experiment to acquisition (M)
`ga`	Submit experiment to acquisition and FT the result (M)
`gain`	Receiver gain (P)
`go`	Submit experiment to acquisition (M)
`go_`	Pulse sequence setup macro called by `go`, `ga`, and `au` (M)
`load`	Load status of displayed shims (P)
`loc`	Location of sample in tray (P)
`lock`	Submit an Autolock experiment to acquisition (C)
`method`	Autoshim method (P)
`sample`	Submit change sample, Autoshim experiment to acquisition (M)
`seqfil`	Pulse sequence name (P)

shim	Submit an Autoshim experiment to acquisition (C)
spin	Submit a spin setup experiment to acquisition (C)
spin	Sample spin rate (P)
su	Submit a setup experiment to acquisition (M)
usergo	Experiment setup macro called by go, ga, and au (M)
wbs	Specify action when bs transients accumulate (C)
wexp	Specify action when experiment completes (C)
wnt	Specify action when nt transients accumulate (C)
wshim	Conditions when shimming is performed (P)

AuC — Get parameters for carbon 1D experiment in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: AuC

Description: Retrieves standard carbon parameter set and *GLIDE*-related parameters.

AuCALch3i — Set up autocalibration with CH3I sample (M)

Syntax: AuCALch3i

Description: Retrieves standard proton parameter set and setup for automatic calibration of proton (observe and decouple), carbon (observe and decouple), gcal, and C/H gradient ratio. The AuCALch3i macro is the same as the AuCALch3i1 macro.

Related:

AuCALch3i1	Get autocalibration with CH_3I sample (M)
gcal	Gradient calibration constant (P)

AuCALch3i1 — Get autocalibration with CH_3I sample (M)

Syntax: AuCALch3i1

Description: Retrieves standard proton parameter set and setup for automatic calibration of proton (observe and decouple), carbon (observe and decouple), gcal, and C/H gradient ratio. The AuCALch3i1 macro is the same as the AuCALch3i macro.

Related:

AuCALch3i	Set up autocalibration macros with CH_3I sample (M)
gcal	Gradient calibration constant (P)

AuCALch3oh — Set up autocalibration with Autotest sample (M)

Syntax: AuCALch3oh

Description: Retrieves standard proton parameter set and setup for automatic calibration of proton (observe), carbon (decouple), gcal and C/H gradient ratio. The AuCALch30h macro is the same as the AuCALch30h1 macro.

Related:

AuCALch3oh1	Autocalibration macros with Autotest sample (M)
gcal	Gradient calibration constant (P)

AuCALch3oh1 — Get autocalibration with Autotest sample (M)

Syntax: AuCALch3oh1

Description: Retrieves standard proton parameter set and setup for automatic calibration of proton (observe), carbon (decouple), gcal and C/H gradient ratio. The AuCALch30h1 macro is the same as the AuCALch30h macro.

Related:
- AuCALch3oh — Autocalibration macros with Autotest sample (M)
- gcal — Gradient calibration constant (P)

Aucalibz0 — Automatic Hz to DAC calibration for Z0 (M)

Applicability: Autocalibration routine

Syntax: Called by Augmapz0 calibration routine

Description: Called by Augmapz0 calibration routine. Automatically calibrates lock frequency change per Z0 DAC unit change. the calibrated value is written out in the probe file as lkhzdac parameter.

Related:
- Augmapz0 — Automatic lock gradient map generation and Z0 calibration (M)
- Aufindz0 — Automatic adjustment of Z0 (M)

AuCdec — Carbon decoupler calibration macro (M)

Syntax: AuCdec

Description: Used by AuCALch3i and AuCALch3oh autocalibration routines to do carbon decoupler calibrations. Calibrates high-power pulse widths and dmf.

Related:
- AuCALch3i — Get autocalibration with CH_3I sample (M)
- AuCALch3oh — Get autocalibration with Autotest sample (M)
- dmf — Decoupler modulation frequency for first decoupler (P)

AuCDEPT — Get parameters for carbon and DEPT experiments in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: AuCDEPT

Description: Retrieves standard carbon parameter set and *GLIDE*-related parameters, and sets up carbon and DEPT chains.

AuCexp — Get parameters for ^{13}C & ^{13}C-detected experiments in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: AuCexp

Description: Retrieves standard carbon parameter set and *GLIDE*-related parameters. Supports APT, DEPT, HETCOR (phase-sensitive), PROTON, and COSY.

AuCgrad — Carbon/proton gradient ratio calibration macro (M)

Syntax: AuCgrad

Description: Used by AuCALch3i1 and AuCALch3oh1 autocalibration routines for C/H gradient ratio calibrations.

Related:
- AuCALch3i1 — Get autocalibration with CH_3I sample (M)
- AuCALch3oh1 — Get autocalibration with Autotest sample (M)

AuCobs — Carbon observe calibration macro (M)

Syntax: AuCobs

Description: Used by AuCALch3i1 autocalibration routines for carbon observe calibrations.

Related:
- AuCALch3i1 — Get autocalibration with CH_3I sample (M)

audiofilter — Audio filter board type (P)

Applicability: All systems except *MERCURY-VX*, *MERCURY*, and *GEMINI 2000*.

Description: Sets the type of audio filter board used where the spectral width (sw) is less than 100 kHz. The filter type is set in the CONFIG window (opened from config) using the label Audio Filter Type.

Values: 'b' indicates the system has a 100-kHz Butterworth filter board (100 kHz Butterworth choice in the CONFIG window.).

'e' indicates the system has a 100-kHz elliptical filter board (100 kHz Elliptical choice in the CONFIG window).

'2' indicates the system has a 200-kHz Butterworth filter board (200 kHz Butterworth choice in the CONFIG window).

'5' indicates the system has a 500-kHz elliptical filter board (500 kHz Elliptical choice in the CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:
- config — Display current configuration and possibly change it (M)
- sw — Spectral width in directly detected dimension (P)

AuF — Get parameters for fluorine 1D experiment in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: AuF

Description: Retrieves standard fluorine parameter set and *GLIDE*-related parameters.

Aufindz0 — Automatic adjustment of Z0 (M)

Syntax: Aufindz0

Description: Finds z0 by doing lock 1D spectrum. The frequency is then used along with the lkhzdac value in the probe file to calculate the z0 value for a given solvent and autolocking is done. This requires previous calibration of the hzdac value done using the Aucalibz0 macro.

Related:
- Aucalibz0 — Automatic Hz to DAC calibration for Z0 (M)
- Aumapz0 — Automatic lock gradient map generation and Z0 calibration (M)

Augcal — Probe gcal calibration macro (M)

Syntax: Augcal

Description: Used by AuCALch3i1 and AuCALch3oh1 autocalibration routines for probe gcal calibrations.

Related:
- AuCALch3i1 — Get autocalibration with CH_3I sample (M)
- AuCALch3oh1 — Get autocalibration with Autotest sample (M)
- gcal — Gradient calibration constant (P)

Augmap — Automated gradient map generation (M)

Syntax: Augmap

Description: Automatically adjusts gradient level, offset, window, and pulse width to generate a z1–z4 gradient map using a 2-Hz D_2O sample. This macro is used by the Aumakegmap auto gradient map generation macro and is applicable only for a lock gradient map.

Related:
- Aumakegmap — Auto lock gradient map generation (M)
- gsize — Number of z-axis shims used by gradient shimming (P)

Augmapz0 — Automatic lock gradient map generation and z0 calibration (M)

Syntax: Augmapz0

Description: Using the 2-Hz D_2O sample, the augmapz0 macro automatically creates a lock gradient map, followed by Hz to DAC calibration of Z0 for the autolocking procedure.

Related:
- Aucalibz0 — Automatic Hz to DAC calibration for Z0 (M)
- Aufindz0 — Automatic adjustment of Z0 (M)

AuH — Get parameters for proton 1D experiment in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: AuH

Description: Retrieves standard proton parameter set and *GLIDE*-related parameters.

AuH4nuc — Set up parameters for selectable 4nuc (HCPF) experiment (M)

Applicability: *GLIDE*

Syntax: AuH4nuc

Description: Retrieves standard proton parameter set and *GLIDE*-related parameters. Fluorine, carbon, and phosphorus can be added to the chain.

AuHCOSY — Set up parameters for ^{1}H and COSY experiments in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: AuHCOSY

Description: Retrieves standard proton parameter set and *GLIDE*-related parameters, and sets up a proton and COSY chain.

AuHdec — Proton decoupler calibration (M)

Syntax: AuHdec

Description: Used by AuCALch3i autocalibration routine to do proton decoupler calibrations. Calibrates high-power pulse widths and dmf.

Related:
- AuCALch3i — Get autocalibration with CH3I sample (M)
- dmf — Decoupler modulation frequency for first decoupler (P)

AuHexp — Get parameters for ^{1}H & ^{1}H-detected experiments in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: AuHexp

Description: Retrieves standard proton parameter set and *GLIDE*-related parameters. Supports COSY, HMQC, HMBC, HSQC, HMQCTOXY, HSQCTOXY, NOESY, ROESY, TOCSY, DEPTHMQC, and CARBON. A gradient coherence

selection option is included for COSY, HMQC, HMBC, HSQC, and DEPTHMQC.

AuHobs — Proton observe calibration macro (M)

Syntax: `AuHobs`

Description: Used by `AuCALch3i` and `AuCALch3oh` autocalibration routines for proton observe calibrations.

Related:
- `AuCALch3i` — Get autocalibration with CH3I sample (M)
- `AuCALch3oh` — Get autocalibration with Autotest sample (M)

AuHsel — Get parameters for ^{1}H and ^{1}H-detected experiments in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: `AuHsel`

Description: Retrieves standard proton parameter set and *GLIDE*-related parameters for ^{1}H and ^{1}H-detected selective excitation experiments. Supports TOCSY1D and NOESY1D, ROESY1D, and HOMODEC.

Aumakegmap — Auto lock gradient map generation (M)

Syntax: `Aumakegmap(<lk or hs or H1>)`

Description: Generates z1–z4 lock gradient (`'lk'` argument), lock homospoil (`'hs'` argument), or ^{1}H gradient map (`'H1'` argument). If no argument is given, the defaults is `'lk'`, if `gradtype='nnh'` to `'hs'`. The doped 2-Hz D_2O should be used for `hs` and `lk` maps. `H1` map is typically done on the sample. Automatically adjusts gradient level, offset, window, and pulse width. The map name is automatically stored in the probe file.

Related:
- `Aumapz0` — Automatic lock gradient map generation and Z0 calibration (M)

AuNuc — Get parameters for a given nucleus (M)

Syntax: `AuNuc(nucleus,solvent)`

Description: Retrieves standard parameter set for a given nucleus and adds all required parameters for *GLIDE* or Tcl/dg driven parameters. If no parameter set exists in `stdpar`, then carbon parameters are retrieved and `tn` changed.

AuP — Get parameters for phosphorus 1D experiment in *GLIDE* (M)

Applicability: *GLIDE*

Syntax: `AuP`

Description: Retrieves standard phosphorus parameter set and *GLIDE*-related parameters.

auto — Prepare for an automation run (C)

Applicability: Systems with an automatic sample changer.

Syntax: `auto<(automation_directory)>`

Description: Prepares the automation directory for an automation run. `auto` aborts if the spectrometer is already in automation mode.

Arguments: `automation_directory` is the name of the automation directory, either an absolute UNIX path (i.e.the first character is a “/”) or a relative path (the first

character is not a "/"). The default is the value of the parameter autodir. If for some reason autodir is not defined, you are prompted to provide the location of the automation directory. If not given as an argument, you are prompted for the path. If the automation directory is not present, it is created with full access for all users. auto aborts if it fails to create this directory.

Examples:
```
auto
auto('/home/vnmr1/autorun_620')
```

See also: *User Guide: Liquids NMR*

Related:

auto_au	Controlling macro for automation (M)
autodir	Automation directory absolute pathname (P)
autogo	Start an automation run (C)
autoname	Prefix for automation data file (P)

auto — Automation mode active (P)

Applicability: Systems with an automatic sample changer.

Description: A global variable that shows whether or not an automation run is in progress. Macros typically test this parameter because actions can differ between the automation and non-automation modes. The value of auto is not enterable by the user. An automation experiment is initiated with the autogo command. The auto parameter is only set to 'y' for those macros and commands that are run as part of an automation experiment.

Values: 'y' indicates automation mode is active.

'n' indicates automation mode is inactive.

See also: *User Guide: Liquids NMR*

Related:

auto_au	Controlling macro for automation (M)
autogo	Start an automation run (C)
autora	Resume suspended automation run (C)
autosa	Suspend current automation run (C)

AutoAddEXP — Add selected experiment to *GLIDE* chain (M)

Applicability: *GLIDE*

Syntax: AutoAddEXP(experiment)

Description: Adds a specified experiment to the *GLIDE* chain.

Arguments: experiment is the name of the experiment to be added.

Examples: AutoAddEXP('COSY')

auto_au — Controlling macro for automation (M)

Applicability: Systems with an automatic sample changer.

Syntax: auto_au

Description: Reads sampleinfo file (defines an automation experiment) using the lookup facility, sets the solvent and loc parameters based on the SOLVENT and SAMPLE# fields of sampleinfo, runs exec on the entry in the MACRO field, and writes the experiment text based on the TEXT field. After that, auto_au examines the value of the wexp parameter:

- If wexp is set to 'procplot', then auto_au calls au.
- If wexp is set to 'autolist', then auto_au inserts 'auto' as the first argument to autolist and calls au('wait').

- If wexp is set to anything else, auto_au does not call au.

If no data is generated from the requested MACRO field, due to an error or some other reason, auto_au sets the STATUS field to "No Data Requested."

auto_au is used only during automation and should not be called directly. It provides a starting point for all automation experiments. As such, it is a convenient point for user customization of automation.

See also: *User Guide: Liquids NMR*

Related:

au	Submit experiment to acquisition and process data (M)
auto	Prepare for an automation run (C)
autolist	Set up and start chained acquisition (M)
exec	Execute a VNMR command (C)
loc	Location of sample in tray (P)
lookup	Look up words and lines from a text file (C)
solvent	Lock solvent (P)
wexp	When experiment completes (P)

Autobackup — Back up current probe file (M)

Syntax: Autobackup

Description: Makes a copy of the probe file before starting the calibrations and prints the current calibration file. Autobackup is called by the autocalibration routines AuCALch3i1 and AuCALch3oh1.

Related:

AuCALch3i1	Get autocalibration with CH_3I sample (M)
AuCALch3oh1	Get autocalibration with Autotest sample (M)

Autocalnext — Run next item in calibration chain (M)

Applicability: *GLIDE*

Syntax: Autocalnext

Description: Starts the current routine in the list of experiments.

Autocalpar — Add *GLIDE* calibration parameters (M)

Applicability: *GLIDE*

Syntax: Autocalpar

Description: Adds *GLIDE* calibration-related parameters to the current parameter sets. Used by *GLIDE* setup macros.

Autocalsave — Save current item in the calibration directory (M)

Applicability: *GLIDE*

Syntax: Autocalsave(file)

Description: Saves the current FID in the directory userdir+/data/+sample.

Arguments: file is the name of the file to be saved.

AutoCheck — Check for FID file (M)

Applicability: *GLIDE*

Syntax: AutoCheck(file):$present,$file_name

Description: Checks if a FID file exists in the userdir+/data/+sample directory.

Arguments: `file` is the file name of the FID file to be checked.
`present` is a return value of 1 if the FID file exists or 0 if it does not exist.
`file_name` is a return string with the full file name if the FID file exists.
Examples: `AutoCheck('PROTON'):$FID_yes,$file`
Related:
`AutoStrtfid` Recall stored FID (M)
`AutoStrtpar` Recall stored parameters (M)

`Autoclrexp` Clean up current experiment (M)

Applicability: *GLIDE*
Syntax: `Autoclrexp`
Description: Removes `.def`, `macdir`, and `eou*` files.

`AutoDelCAL` Delete selected calibration routine from *GLIDE* chain (M)

Applicability: *GLIDE*
Syntax: `AutoDelCAL(experiment)`
Description: Removes the specified calibration routine from the *GLIDE* chain.
Arguments: `experiment` is the name of the calibration routine to delete.
Examples: `AutoDelCAL('Cdec')`

`AutoDelEXP` Delete selected experiment from *GLIDE* chain (M)

Applicability: *GLIDE*
Syntax: `AutoDelEXP('experiment')`
Description: Removes the specified experiment from the *GLIDE* chain.
Arguments: `experiment` is the name of experiment to be deleted.
Examples: `AutoDelEXP('COSY')`

`autodept` Automated complete analysis of DEPT data (M)

Syntax: `autodept`
Description: Processes DEPT spectra, plots the unedited spectra, edits the spectra, plots the edited spectra, and prints outs editing information.
Alternate: Full Analysis button in the Automatic DEPT Analysis Menu.
See also: *User Guide: Liquids NMR*
Related:
`adept` Automatic DEPT analysis and spectrum editing (C)
`deptproc` Process DEPT data (M)
`padept` Perform `adept` analysis and plot resulting spectra (C)
`pldept` Plot DEPT data, edited or unedited (M)

`autodir` Automation directory absolute path (P)

Applicability: Systems with an automatic sample changer or LC-NMR accessory.
Description: When using a sample changer, `autodir` is a global variable that holds the absolute path of the currently active automation directory. When VNMR is started, `autodir` is set to the absolute path of the last automation run.

When using the LC-NMR accessory, `autodir` specifies a directory in which experiments using a stored queue are saved.

See also: *User Guide: Liquids NMR*

Related:

auto	Set up an automation directory (C)
autoname	Prefix for automation data file (P)

Autoexplist — Display current *GLIDE* selection (M)

Applicability: *GLIDE*

Syntax: `Autoexplist`

Description: Shows current *GLIDE* selection from the list of experiments in the text window.

autogo — Start automation run (C)

Applicability: Systems with an automatic sample changer.

Syntax: `autogo<(file<,automation_directory>)>`

Description: Starts an automation run. The `autogo` parameter cannot be entered while the spectrometer is in automation mode. You must have an `enter` queue prepared to start an automation run. The queue is checked to verify that it was prepared using the `enter` command (`autogo` aborts if an error in the format is found.) Your automation directory is also checked for the presence of a non-empty `enter` queue (`autogo` aborts if the current queue in the automation directory is present and not empty). Finally, `autogo` checks the automation directory and runs the `auto` command if this directory is not present or another problem is found. When `autogo` completes, the system is in automation mode and your automation run starts.

Arguments: `file` is the file name of your `enter` queue. The default is that the system prompts you for the location of the `enter` queue.

`automation_directory` is the pathname of the automation directory. The default is the current value of the parameter `autodir`.

Examples:

```
autogo
autogo('MySamples')
autogo('MySamples','/home/vnmr1/AutoRun_621')
```

See also: *User Guide: Liquids NMR*

Related:

auto	Set up an automation directory (C)
autodir	Automation directory absolute path (P)
autoname	Prefix for automation data file (P)
enter	Enter sample information for automation run (C)

AutoLIST — Run chained experiments (M)

Applicability: *GLIDE*

Syntax: `AutoLIST(experiment1,experiment2,...)`

Description: Saves the current FID (first argument), executes the second argument, and executes `au('next','wait')` to start the next acquisition.

Arguments: `experiment1,experiment2`,... are names of the experiments to be run.

Examples: `AutoLIST('PROTON')`

autolist — Set up and start chained acquisition (M)

Syntax: `autolist(<options,>experiment1<,experiment2<,...>)`

Description: Sets up parameters for chained experiments by executing the experiments given as arguments and then starting a chained acquisition. Note that the macro au is executed as part of autolist and should not be included in the arguments to autolist.

Arguments: options is one or more of the following keywords:

- 'auto' is a keyword to add 'wait' to the au call (e.g, au('wait','next')).
- 'glide' is a keyword to process the current data with the glidewexp macro instead of the procplot macro. Typically, the macros that chain experiments, such as hcosy, hcapt, hc, and hccorr, start the experiment and then set wexp to 'autolist' with the autolist arguments being the list of experiments.
- 'start' is a keyword to make the first experiment in the list as one that needs to be acquired rather than processed.

experiment1,experiment2,... are experiments written as strings (e.g., 'dept' or 'c13'). experiment1 is the current experiment and, when it finishes, the macro procplot is called to process the data. If experiment2 is listed, that experiment is executed and then the macro au('next') is performed. For subsequent experiments, the text, solvent and temp are used from the preceding experiment. Also, the wexp parameter is reset to 'autolist' with the first experiment removed.

Examples:
```
autolist('h1','c13','dept')
autolist('glide',''h1',hcosy')
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

auto_au	Controlling macro for automation (M)
au	Submit experiment to acquisition and process data (M)
hc	Automated proton and carbon acquisition (M)
hcapt	Automated proton, carbon, and APT acquisition (M)
hccorr	Automated proton, carbon, and HETCOR acquisition (M)
hcosy	Automated proton and COSY acquisition (M)
procplot	Automatically process FIDs (M)
solvent	Lock solvent (P)
temp	Sample temperature (P)
wexp	When experiment completes (P)

Automacrodir — Create directory to save macros in *GLIDE* run (M)

Applicability: *GLIDE*

Syntax: Automacrodir

Description: Makes a directory in userdir+/maclib.glide to save *GLIDE*-created macros. The directory name is the same as the experiment number (exp1, exp2, etc). Macros are stored and executed at the appropriate juncture in the *GLIDE* run.

Automkdir — Create directory to save data in *GLIDE* run (M)

Applicability: *GLIDE*

Syntax: Automkdir

Description: Makes a directory in userdir+/data to save *GLIDE* run data. The directory name is supplied by the file expsolv.def. FIDs are stored in the file seqfil.fid.

autoname — Create path for data storage (C)

Syntax: `autoname<(<text_file><,parameter_name>)>:$path`

Description: Determines a path where data can be stored. This command provides the functionality of the `autoname` parameter without being in automation mode.

Arguments: `text_file` is the name of a text file from which information can be extracted to construct the path name. Any file can be used to get information. The file `sampleinfo` in the current experiment directory is used as the default if a `text_file` is not specified.

`parameter_name` is the name of an alternate parameter to be used as the `autoname` parameter. The default is to use `autoname.` The specifications of a `parameter_name` are similar to those used by the `autoname` parameter during an automation run. If an alternate parameter is used, it will probably need to be created in the global tree as a string.

`$path` is a return argument with the path. If no return argument is present, the result is displayed on line 3.

Examples:
```
autoname:$autoname_path
autoname(curexp+'/text'):$p1
```

See also: *User Guide: Liquids NMR*

Related:

`auto`	Set up an automation directory (C)
`autogo`	Start automation run (C)
`autodir`	Automation directory absolute path (P)
`autoname`	Prefix for automation data file (P)
`enter`	Enter sample information for automation run (M)
`status`	Display status of sample changer (C,U)

autoname — Prefix for automation data file (P)

Applicability: Systems with an automatic sample changer.

Description: Stores a string in the global tree that determines a prefix to the file name of the FID data (e.g., `0204.fid`) during an automation run. Percent signs (%) are used to delimit a string to search for in the `sampleinfo` file, and the word after the delimited string is used in the file name. This word can be terminated with a space, tab, or carriage return. Text not delimited by percent signs is copied from `autoname` without any changes.

If `autoname` does not start with a slash mark (/), the file is stored in the path given by `autodir`; otherwise, the name is used as is. The sample number is not automatically appended, but a revision number is appended.

Values: If `autoname` is a null string, the file name `%SAMPLE#:%%PEAK#:%` is the default, resulting in the name `sample_number+revison_number.fid` (LC-NMR uses `PEAK#:` in the `sampleinfo` file, resulting in the name `peak_number+revision_number.fid`). Note that the `autoname` of the user doing the automation run is used for all file names and that the resulting path and file name must be accessible (with read-write permission) by that user.

`autoname` controls the version number attached to the name of a file and uses the value of VNMR parameters as part of the file's name. For example, `autoname='$seqfil$_$tn$` names a file with the current value of the parameters `seqfil` and `tn`. The resulting file name might be `s2pul_H1` or `dept_C13`. If a numeric value is used, this value is truncated to an integer. For example, if `autoname='$sfrq$'`, the file name would be 500, not 500.456.

`%Rn%`, where `n` is 0 to 9 (default is 2) is a special substitute string. `n` determines how the revision number is appended to the FID file name:

- If n is 0, no revision digits are appended (all names must be uniquely constructed without these revision digits).
- If n is 1 to 9, the revision number is padded with leading zeroes to form an n-digit number. If more places are needed than specified, more zeroes are used.

If n is greater than 9 (more than one digit), Rnn is still used as a search string in the sampleinfo file. Rn must be specified at the end of the autoname string; the revision digits are always appended.

You can also specify the starting number to be used when constructing the version number by appending a colon (:) and start number after Rn. The default starting value is 1. A zero is not allowed.

Examples: Using the enter program, a sample is entered with the following information (which is copied to the sampleinfo file):

```
SAMPLE#: 3
  MACRO: h1
   USER: John Doe
SOLVENT: CDCl3
   TEXT: EthylBenzene in CDCl3
         Page 01-3015
         This is a text
USERDIR: ...
```

This entry creates the following file names for each autoname string:

autoname *string*	*File name created*
''	0301.fid
'%USER:%'	John01.fid
'%Page%'	01-301501.fid
'%USER:%/%Page%'	John/01-301501.fid
'/export/home/%TEXT:%'	/export/home/EthylBenzene01.fid
'%USER:%%R0%'	John.fid
'%USER:%-%R5%'	John-00001.fid
'%USER:%-%R1%'	John-10.fid (if tenth revision)

See also: *User Guide: Liquids NMR*

Related:

auto	Set up an automation directory (C)
autogo	Start automation run (C)
autodir	Automation directory absolute path (P)
autoname	Create path for data storage (C)
enter	Enter sample information for automation run (C)
status	Display status of sample changer (C,U)

Autoplot2D — Check for *GLIDE*-selected plot options (M)

Applicability: *GLIDE*

Syntax: Autoplot2D

Description: Checks if *GLIDE*-selected plot options are present before executing plot2D.

Related:

plot2D	Plot 2D spectra (M)

Autopsgset — Set up parameters for various experiments (M)

Applicability: *GLIDE*

Syntax: `Autopsgset(file,par1,par2,...,par11)`

Description: Sets up parameters for various experiments using information in a `parlib` file. Same as `psgset` except `Autopsgset` does not do `prune`.

Arguments: `file` is the name of a file from the user or system `parlib` that provides information on setting up the parameters listed. The parameters `seqfil` and `pslabel` are set to the supplied file name.

`par1,par2, ...par11` are 1 to 11 parameters to be returned from `parlib`.

Related:

`prune`	Prune extra parameters from current tree (C)
`psgset`	Set up parameters for various experiments (M)
`pslabel`	Pulse sequence label (P)
`seqfil`	Pulse sequence name (P)

`autora` Resume suspended automation run (C)

Applicability: Systems with an automatic sample changer.

Syntax: `autora`

Description: Resumes a previously suspended automation run. No matter what caused the interruption (including `autosa`, power failure, or system bootup), the system examines the condition of the automation file and resumes acquisition for all experiments that have not finished. If `autora` is executed while an automation run is in progress, it has no effect.

See also: *User Guide: Liquids NMR*

Related:

`autosa`	Suspend current automation run (C)

`Autormmac` Delete macro set from `curexp+'/macdir'` (M)

Applicability: *GLIDE*

Syntax: `Autormmac`

Description: Removes `macdir` entries for a specified experiment.

`autosa` Suspend current automation run (C)

Applicability: Systems with an automatic sample changer.

Syntax: `autosa`

Description: Suspends the automation mode at the conclusion of the current experiment and changes the system to the manual mode. The currently running experiment is not interrupted.

See also: *User Guide: Liquids NMR*

Related:

`autora`	Resume suspended automation run (C)

`autoscale` Resume autoscaling after limits set by scalelimits macro (M)

Syntax: `autoscale`

Description: Returns to autoscaling in which the scale limits are determined by the `expl` command such that all the data in the `expl` input file is displayed.

See also: *User Guide: Liquids NMR*

Related:

`expl`	Display exponential or polynomial curves (C)
`scalelimits`	Set limits for scales in regression (M)

Autosetgpar — Add *GLIDE* parameters to current parameter sets (M)

Applicability: *GLIDE*

Syntax: `Autosetgpar`

Description: Used by *GLIDE* setup macros to add *GLIDE*-related parameters to the current parameter sets.

Autosetwexp — Create AutoLIST from experiments list (M)

Applicability: *GLIDE*

Description: Makes `AutoLIST` using the experiments list and sets up the `wexp` parameter.

Related:

`AutoLIST`	Run chained experiments (M)
`wexp`	Specify action when experiment completes (P)

autostack — Automatic stacking for processing and plotting arrays (M)

Syntax: `autostack`

Description: When processing and plotting arrayed 1D spectra, VNMR automatically determines whether the stacking mode is horizontal, vertical or diagonal from the number of traces and the number of lines in the spectrum. If this automatic function is not desirable (or makes an undesirable decision), it can be overridden by placing the `stack` macro in the experiment startup macro or by calling `stack` before processing (or reprocessing) a spectrum. `autostack` switches back to automatic determination of the stack mode by destroying the `stackmode` parameter.

See also: *Getting Started*

Related:

`procarray`	Process arrayed 1D spectra (M)
`plarray`	Plot arrayed 1D spectra (M)
`stack`	Fix stacking mode for processing / plotting arrayed spectra (M)
`stackmode`	Stacking control for processing (P)

AutoStrtfid — Recall stored FID (M)

Applicability: *GLIDE*

Syntax: `AutoStrtfid(file)`

Description: Searches for presence of a FID file in the `userdir+'/data/'+sample` directory. If the FID exists, is retrieved and processed. `AutoStrtfid` is used by NOESY1D and TOCSY1D macros in *GLIDE*.

Arguments: `file` is the name of the FID file to be recalled.

Examples: `AutoStrtfid('PROTON')`

AutoStrtpar — Recall stored parameters (M)

Applicability: *GLIDE*

Syntax: `AutoStrtpar(file)`

Description: Searches for presence of a FID file in the `userdir+'/data/'+sample` directory. If the FID exists, the parameters are retrieved. `AutoStrtpar` is used by most macros in *GLIDE*.

Arguments: `file` is the name of the FID file to be recalled.

Examples: `AutoStrtpar('PROTON')`

autotest **Open Auto Test Window (C)**

Syntax: autotest

Description: Opens the Auto Test window.

See also:

autotime **Displays approximate time for automation (M)**

Syntax: autotime(<automation directory>)

Description: Displays approximate time for each experiment and for each location in an automation run. If no argument is given, time is calculated for the current automation run (enterQ).

Related: explist Display approximate time for current experiment chain (M)

Autowrmac **Write a string to a macro in curexp+'/macdir' (M)**

Applicability: *GLIDE*

Syntax: Autowrmac(expt<,'acq'|'prc'|'plt'>,string)

Description: Writes out the specified string to exptacq, exptprc, or exptplt files in curexp+'/macdir'. These files are executed at an appropriate juncture in a *GLIDE* chain.

Arguments: expt is the name of the experiment.

'acq'|'prc'|'plt' is a keyword to set the file to write to exptacq, exptprc, or exptplt, respectively. The default is 'acq'.

string is the text to write to the file.

Examples: Autowrmac('COSY','prc','ni=256')

av **Set abs. value mode in directly detected dimension (C)**

Syntax: av

Description: Selects the absolute-value spectra display mode by setting the parameter dmg to the string value 'av'. In the *absolute-value display mode*, each real point in the displayed spectrum is calculated as the square root of the sum of the squares of the real and imaginary points comprising each respective complex data point. All information, including noise, is always positive, and the relationship between signal and noise is linear.

For multidimensional data, av has no effect on data prior to the second Fourier transform. If pmode='full', av acts in concert with commands ph1, av1, or pwr1 to yield the resultant contour display for the 2D data.

See also: *Getting Started*

Related:

av1	Set abs. value mode in 1st indirectly detected dimension (C)
av2	Set abs. value mode in 2nd indirectly detected dimension (C)
dmg	Display mode in directly detected dimension (C)
dmgf	Absolute-value display of FID data or spectrum in acqi (P)
ft	Fourier transform 1D data (C)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
pa	Set phase angle mode in directly detected dimension (C)
pa1	Set phase angle mode in 1st indirectly detected dimension (C)
ph	Set phased mode in directly detected dimension (C)
ph1	Set phased mode in 1st indirectly detected dimension (C)

pmode	Processing mode for 2D data (P)
pwr1	Set power mode in 1st indirectly detected dimension (C)
wft	Weigh and Fourier transform 1D data (C)
wft1d	Weigh and Fourier transform of 2D data (C)
wft2d	Weigh and Fourier transform 2D data (C)

av1 — Set abs. value mode in 1st indirectly detected dimension (C)

Syntax: av1

Description: Selects the absolute-value spectra display mode along the first indirectly detected dimension by setting the parameter dmg1 to the value 'av1'. If the parameter dmg1 does not exist, av1 creates it and set it to 'av1'.

In the *absolute-value display mode*, each real point in the displayed trace is calculated as the square root of the sum of the squares of the real and imaginary points comprising each respective complex data point. For hypercomplex data, the real-real and imaginary-real points from each respective hypercomplex data point are used in the summation. In this mode, all information, including noise, is always positive; and the relationship between signal and noise is linear.

The av1 command is only needed if mixed-mode display is desired. If the parameter dmg1 does not exist or is set to the null string, the display mode along the first indirectly detected dimension defaults to the display mode of the directly detected dimension (characterized by the parameter dmg). For the contour display of multidimensional data, the result of av1 is the same as for traces provided that pmode='partial' or pmode='' (two single quotes with no space between).

See also: *User Guide: Liquids NMR*

Related:	
av	Set abs. value mode in directly detected dimension (C)
dmg1	Data display mode in 1st indirectly detected dimension (P)

av2 — Set abs. value mode in 2nd indirectly detected dimension (C)

Syntax: av2

Description: Selects absolute-value spectra display mode for the second indirectly detected dimension by setting the parameter dmg2 to the value 'av2'. If dmg2 does not exist or is set to the null string, av2 creates dmg2 and set it equal to 'av2'.

In the *absolute-value display mode*, all information, including noise, is positive; and the relationship between signal and noise is linear. Each real point in the displayed trace is calculated as the square root of the sum of the squares of the real and imaginary points comprising each respective complex data point. For hypercomplex data, the real-real and imaginary-real points from each respective hypercomplex data point are used in the summation.

The av2 command is only needed if mixed-mode display is desired. If the parameter dmg2 does not exist or is set to the null string, the display mode along the second indirectly detected dimension defaults to the display mode of the directly detected dimension (characterized by the parameter dmg). For the contour display of multidimensional data, the result of av2 is the same as for traces provided that pmode='partial' or pmode='' (two single quotes with no space between).

See also: *Getting Started*

Related:	
av	Set abs. value mode in directly detected dimension (C)
dmg2	Data display mode in 2nd indirectly detected dimension (P)

averag **Calculate average and standard deviation of input (C)**

Syntax: `averag(number1,number2,...):average,sd, number_arguments,sum_numbers,sum_squares`

Description: Finds average, standard deviation, and other characteristics of a set of numbers.

Arguments: `number1,number2,...` is a finite set of numbers.

`average` is the average of the numbers.

`sd` is the standard deviation of the numbers.

`number_arguments` is the number of `number1,number2`,... arguments.

`sum_numbers` is the sum of the numbers

`sum_squares` is the sum of squares of the numbers.

Examples: `averag(3.4,4.3,3.5,5.4):r1,r2`

See also: *VNMR User Programming*

awc **Additive weighting const. in directly detected dimension (P)**

Description: Adds the current value of `awc` to each value of the weighting function along the directly detected dimension. This dimension is often referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, and so forth. `awc` is applied *after* the sinebell and exponential function, but *before* the Gaussian function. This allows using `gf` as a Gaussian apodization even when `awc` is non-zero. Typical value of `awc` is *'n'*.

See also: *Getting Started*

Related:

`awc1`	Additive weighting const. in 1st indirectly detected dimension (P)
`awc2`	Additive weighting const. in 2nd indirectly detected dim. (P)
`gf`	Gaussian function in directly detected dimension (P)

awc1 **Additive weighting const. in 1st indirectly detected dimension (P)**

Description: Adds the current value of `awc1` to each value of the weighting function along the first indirectly detected dimension This dimension is often referred to as the f_1 dimension of a multidimensional data set. `awc1` is analogous to the parameter `awc`. The "conventional" parameters (`lb`, `gf`, etc.) operate on the detected FIDs, while this "2D" parameter is used during processing of the interferograms.

See also: *User Guide: Liquids NMR*

Related:

`awc`	Additive weighting const. in directly detected dimension (P)

awc2 **Additive weighting const. in 2nd indirectly detected dimension (P)**

Description: Adds the current value of `awc2` to each value of the weighting function along the second indirectly detected dimension This dimension is often referred to as the f_2 dimension of a multidimensional data set. `awc2` is analogous to the parameter `awc`. The value of `awc2` can be set with `wti` on the 2D interferogram data.

See also: *User Guide: Liquids NMR*

Related:

`awc`	Additive weighting const. in directly detected dimension (P)
`wti`	Interactive weighting (C)

axis — Provide axis labels and scaling factors (C)

Syntax:
```
axis('fn'|'fn1'|'fn2')
   <:$axis_label,$freq_scaling,$scaling_factor>
```

Description: Displays or returns values of the axis labels and scaling factors to the calling macro. See the macro `rl` for an example of using this command.

Arguments: `'fn'|'fn1'|'fn2'` is the Fourier number parameter for the axis of interest.

`$axis_label` is the axis label (e.g., `ppm`, `kHz`, `cm`, or `ppm(sc)`).

`$freq_scaling` is the divisor needed to convert from units of Hz to the units defined by the `axis` parameter with any scaling. `axis` uses the current value of the `axis` parameter for that dimension and also checks for axis scaling using the corresponding `scalesw`, `scalesw1`, or `scalesw2` parameter.

`$scaling_factor` is a second scaling factor, determined solely by the `scalesw` type of parameter. This last scaling factor is independent of the value of the `axis` parameter.

Examples:
```
axis('fn')
axis('fn1'):$lab,$fr,$scl
```

See also: *VNMR User Programming*

Related:

`axis`	Axis label for displays and plots (P)
`rl`	Set reference line (M)
`scalesw`	Scale spectral width in directly detected dimension (P)
`scalesw1`	Scale spectral width in 1st indirectly detected dimension (P)
`scalesw2`	Scale spectral width in 2nd indirectly detected dimension (P)

axis — Axis label for displays and plots (P)

Applicability: Certain arguments work only if system has the proper hardware.

Description: Specifies the units for the axis display and plot.

For 1D experiments, `axis` uses a single letter that includes `'h'` for Hz, `'p'` for ppm, and `'k'` for kHz (e.g., `axis='h'`).

For 2D experiments, `axis` uses two letters, with the first letter describing the detected spectral axis (f_2), and the second letter describing the indirectly detected axis (f_1). Thus `axis='ph'` is appropriate for a homonuclear 2D-J experiment, with a referenced ppm scale along the spectral axis and an axis in Hz (`'h'`) along the J-axis. `axis='pp'` is appropriate for COSY or NOESY experiments.

For 3D experiments, `axis` uses three letters with the first letter describing the detected spectral axis (f_3), the second letter describing the first indirectly detected axis (f_1), and the third letter specifying the second indirectly detected axis (f_2).

The special letter `d` is used to reference the indirectly detected axis to the parts per million of the decoupler channel, as appropriate for heteronuclear chemical shift correlation experiments, which would typically have `axis='pd'`. The letter `n` is used to suppress the axis display on one or both axes (e.g., `axis='nn'`, `axis='pn'`).

For systems with multiple decouplers, the characters `'1'`, `'2'`, and `'3'` can be used to reference an axis relative to the frequency of that decoupler. Setting `axis='p1'` is effectively the same as `axis='pd'`.

For image display, `axis` can have values `'c'` (for centimeters), `'m'` (for millimeters), and `'u'` (for microns). These values rely on the parameters `lro`

and lpe for scaling. If both f_1 and f_2 dimensions are spatial, the display aspect ratio is adjusted to retain the aspect ratio of the imaging.

Values:
'1' sets the axis label for units of ppm relative to the first decoupler.
'2' sets the axis label for units of ppm relative to the second decoupler.
'3' sets the axis label for units of ppm relative to the third decoupler.

'c' sets the axis label for units of centimeters.
'd' sets the axis label for units of ppm relative to the first decoupler.
'h' sets the axis label for units of hertz.

'k' sets the axis label for units of kilohertz.
'm' sets the axis label for units of millimeters.
'n' sets no axis label display.

'p' sets the axis label for units of ppm relative to the observe transmitter.
'u' sets the axis label for units of micrometers.

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

axis	Provide axis labels and scaling factors (C)
axisf	Axis label for FID displays and plots (P)
dscale	Display scale below spectrum or FID (C)
lpe	Field of view parameter for phase encode, in cm (P)
lro	Field of view parameter for readout, in cm (P)
pscale	Plot scale below spectrum or FID (C)

axisf — Axis label for FID displays and plots (P)

Description: Specifies the units for the FID axis display and plot. To create the FID display parameters axisf, dotflag, vpf, vpfi, crf, and deltaf (if the parameter set is older and lacks these parameters), enter addpar('fid').

Values:
's' sets the axis label for units of seconds.

'm' sets the axis label for units of ms.

'u' sets the axis label for units of µs.

'n' sets no axis label display.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
axis	Axis label for displays and plots (P)
dscale	Display scale below spectrum or FID (C)
pscale	Plot scale below spectrum or FID (C)

B

B0 — Magnet main static field (P)

Applicability: Systems with imaging capabilities.

Description: The field strength, in gauss, of the main magnetic field. This value is used by planning macros in their calculations.

Values: Number, in units of gauss. Nominal value is `234.9*h1freq`. For example, a 4.7T (200 MHz) system has a value of approximately 47,000.

See also: *User Guide: Imaging*

Related:

`h1freq`	Proton frequency of spectrometer (P)

bandinfo — Shaped pulse information for calibration (M)

Applicability: Information only useful on systems capable of shaped pulse generation.

Syntax: `bandinfo<(shape,width<,ref_power>)>:duration,power`

Description: Displays a table containing the duration and the predicted 90° pulse power setting for the pulse shape and bandwidth given by the arguments. No parameter settings are changed. The necessary data is contained in the `shapeinfo` file in the VNMR `shapelib` subdirectory.

Arguments: If `bandinfo` is run without arguments, VNMR prompts operator for input

`shape` is the name of the shape. The default is system prompts for a name.

`width` is the bandwidth, in Hz, desired for the pulse.

`ref_power` is value of `tpwr` to which `pw90` is set. The default is 55 dB.

`duration` is the duration, in µs, of the pulse.

`power` is the predicted 90° pulse power setting.

Examples:

```
bandinfo
bandinfo('sinc',10):pw,tpwr
```

See also: *VNMR User Programming*

Related:

`pulseinfo`	Shaped pulse information for calibration (M)
`pw90`	90° pulse width (P)
`tpwr`	Observe transmitter power level with linear amplifiers (P)

banner — Display message with large characters (C)

Syntax: `banner(message<,color>)`

Description: Displays text as large-size characters on the VNMR graphics windows.

Arguments: `message` is the text to be displayed. If the text includes a single quotation mark (`'`), it must be preceded by a backslash (`\'`). Multiline displays are available by inserting two backslashes (`\\`) between lines. Any undefined characters are displayed as a “bug” shape.

`color` is the color of text on a color display: `'red'`, `'yellow'`, `'green'`, `'cyan'`, `'blue'`, `'magenta'`, and `'white'`. The default is `'yellow'`.

Examples:

```
banner('banner sample')
banner('Don\'t Touch','blue')
```

See also: *VNMR User Programming*

bc — 1D and 2D baseline correction (C)

Description: Makes 1D or 2D baseline correction using a spline or a second to twentieth order polynomial fitting of predefined baseline regions. `bc` defines every other integral (those integrals that disappear when `intmod='partial'`) as baseline and attempts to correct these points to zero.

1D baseline correction

Syntax: `bc<(n|'unbc'<,nsubregion<,minpoints<,minregion>>>)>`

Description: Performs a 1D baseline correction. The nonintegrated parts of the spectrum (i.e., every odd region between integral reset points, or the integral gaps with `intmod='partial'`) are divided into baseline subregions. The number of baseline subregions in each area are adjusted as possible, so that the subregions are more or less equal in size. Finally, the "center of gravity" (midpoint in *x and* average of the *y* values in the region) for each of the subregions is calculated.

Arguments: `n` is an integer from `1` to `20` for the baseline correction step. A polynomial of the (`n-1`)th order is calculated "through" the "baseline points" using the Chebychev least-squares fitting algorithm, and that polynomial function is subtracted from the spectrum. The coefficients of the polynomial are written into the file `cureexp+'/bc.out'`. The default is `1`(a spline fit).

`'unbc'` is a keyword to make `bc` read in the coefficients from the file written by the previous `bc` operation and reverse that operation. This option is only functional for polynomials with two or more coefficients performing baseline correction operations on 1D spectra or individual 2D traces (i.e., baseline corrections cannot be undone with the default spline correction).

`nsubregion` defines the number of subregions (minimum 3, maximum 400). By default, the total number of subregions is 20 (if `fn<2048`), 40 (if `fn=2048` or `fn=4096`), or 80 (if `fn>4096`).

`minpoints` sets the minimum number of data points required in an integral gap for `bc` to regard it as baseline. Use this to exclude small, nonintegrated areas between close signals. The default is `fn/1000` (but at least 3).

`minregion` defines the minimum number of subregions assigned to each baseline area. The default is 1.

Examples:
```
bc
bc(3)
bc('unbc')
```
`bc(1,200,8,2)` gives a spline correction using 200 baseline subregions, a gap of 8 data points between two (even) integral regions is regarded as baseline, and each baseline area is split into at least two subregions.

See also: *Getting Started*; *User Guide: Liquids NMR*

2D baseline correction

Syntax:
```
bc(trace_direction<,num_coeff><,trace_start>
   <,trace_end>)
```

Description: 2D baseline correction can be performed on three types of 2D data:

- f2 spectra (`trace_direction='f2'`) after the first half of a 2D FT (`wft1da`).
- f2 traces (`trace_direction='f2'`) after a full 2D FT (`wft2da`).
- f1 traces (`trace_direction='f1'`) after a full 2D FT (`wft2da`).

Arguments: `trace_direction` specifies the direction, `'f1'` or `'f2'`, along which the 2D baseline correction is to take place.

`num_coeff` is the number of coefficients, from 1 to 20, used in the fitting procedure. The default value is 1, which gives a spline fit. A value of 2 gives a linear baseline fit ($a + bx$), a value of 3 gives a quadratic fit ($a + bx + cx^2$), etc. The maximum value (20) gives a 19th-order polynomial fit with 20 coefficients.

`trace_start` is the trace number for the spectrum on which the 2D baseline correction is to start. It must lie within the appropriate range or an error results.

`trace_end` is the trace number for the spectrum on which the 2D baseline correction is to end. It must lie within the appropriate range or an error results.

Examples:
```
bc('f1')
bc('f2',3)
bc('f2',3,10,60)
```

See also: *User Guide: Liquids NMR*

Related:

`dc`	Calculate spectral drift correction (C)
`fn`	Fourier number in directly detected dimension (P)
`intmod`	Integral display mode (P)
`trace`	Mode for 2D data display (P)
`wft1da`	Weight and Fourier transform phase-sensitive data (M)
`wft2da`	Weight and Fourier transform phase-sensitive data (M)

bc2d — 2D baseline correction (obsolete)

Description: The `bc2d` macro is no longer functional. Use `bc` as the replacement.

Related:

`bc`	1D and 2D baseline correction (C)

beepoff — Turn beeper off (C)

Syntax: `beepoff`

Description: Turns off the beeper sound so that the system does not use sound to warn the user when errors occur. The default is the beeper is turned on.

See also: *VNMR User Programming*

Related:

`beepon`	Turn beeper on (C)

beepon — Turn beeper on (C)

Syntax: `beepon`

Description: Turns on the beeper sound so that the user hears a sound when errors occur. The default is the beeper is turned on.

See also: *VNMR User Programming*

Related:

`beepoff`	Turn beeper off (C)

binom — Set up parameters for BINOM pulse sequence (M)

Applicability: Sequence is not supplied with *MERCURY* series or *GEMINI 2000*.

Syntax: `binom`

Description: Sets up a binomial water suppression pulse sequence.

Alternate: BINOM button in the 1D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

bootup — Macro executed automatically when VNMR activated (M)

Syntax: `bootup<(foreground)>`

Description: Executed automatically when VNMR is started up. The `bootup` macro displays a message, looks for a macro `login` in the user's local `maclib` directory and executes it (if found), starts `Acqstat` and `acqi` (`acqi` is not run if system is configured as a workstation), and then starts the menu system. This set of actions can be modified on a per user basis by constructing custom `bootup` or `login` macros in the user's `maclib` directory. A custom `login` macro is preferred because all custom `bootup` macros are overridden whenever a new VNMR release is installed.

Arguments: `foreground` is 0 if VNMR is being run in the foreground or nonzero if being run in the background. This argument is passed to the `login` macro.

See also: *VNMR User Programming*

Related:

`acqi`	Interactive acquisition display process (C)
`Acqstat`	Bring up the acquisition status display (U)

boresize — Magnet bore size (P)

Applicability: Systems with imaging capabilities.

Description: Holds the internal usable diameter of the gradient set. This parameter is used by various pulse sequence setup macros to determine the validity of the field of view and slice offset input. It is defined in the system gradient table files found in `$vnmrsystem/imaging/gradtables`, and is automatically set from one of those files when a value is entered for `gcoil`.

Values: 18, 31, 33, 40 (nominal, in cm)

See also: *User Guide: Imaging*

Related:

`createtable`	Generate new gradient calibration file (M)
`gcoil`	Current gradient coil (P)
`gmax`	Maximum gradient strength (P)
`setgcoil`	Update system gcoil configuration (M)
`sysgcoil`	System gradient coil (P)
`trise`	Gradient rise time (P)

box — Draw a box on a plotter or graphics display (C)

Syntax:
```
box(<'keywords',>x1mm,x2mm,y1mm,y2mm
  <,'nolimit'>)<:r1,r2>
```

Description: Draws a box on a plotter or a graphics display.

Arguments: `'keywords'` identifies the output device (`'graphics'|'plotter'`), drawing mode (`'xor'|'normal'`), and drawing capability (`'newovly'|'ovly'|'ovlyC'`).

- `'graphics'|'plotter'` is a keyword for the output device. The default is `'plotter'`. The output selected is passed to subsequent `pen`, `move`, or `draw` commands and remains active until a different output is specified.
- `'xor','normal'` is a keyword for the drawing mode when using the `'graphics'` output device. The default is `'normal'`. In the `'xor'` mode, if a line is drawn such that one or more points of the line are in common with a previous `'xor'` line, the common points are erased. In the `normal` mode, the common points remain. The mode selected is passed to

subsequent pen, move, and draw commands and remains active until a different mode is specified.

- 'newovly', 'ovly' and 'ovlyC' are keywords that specify an interactive drawing capability that is slightly slower than the 'xor' mode but more consistent in color. 'newovly' clears any previous draws, boxes, and writes made with the 'ovly' modes and draws the figure. 'ovly' draws without clearing so that multi-segment figures can be created. 'ovlyC' clears without drawing.

x1mm is the left edge of the box, x2mm is the right edge, y1mm is the bottom, and y2mm is the top. The location of the edges are given in plotter units (mm on most plots) and are scaled in mm for the graphics display. (If units are in Hz or ppm, you can use the hztomm command to convert units.)

'nolimit' allows the box to extend outside the limits determined by the parameters sc, wc, sc2, and wc2.

r1, r2 return the location of the upper left corner of the box.

Examples:
```
box('plotter',20,100,40,150)
box(25,105,45,155,'nolimit'):r1,r2
```

See also: *Getting Started*

Related:

gin	Return current mouse position and button values (C)
hztomm	Convert positions from Hz or ppm to plotter units (C)
sc	Start of chart (P)
sc2	Start of chart in second direction (P)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)
wcmax	Maximum width of chart (P)

boxes — Draw boxes selected by the mark command (M)

Syntax:
```
boxes<('graphics'|'plotter')>
```

Description: Draws boxes on a plotter or a graphics display with the location of the edges given in Hz. The data to make the boxes is stored in the mark2d.out file produced by the mark command. If there is no data in mark2d.out, a box is drawn from the current cursor positions. The boxes command also numbers the boxes above the upper left corner.

Arguments: 'graphics'|'plotter' is a keyword to send output to the graphics display or to the plotter, respectively. The default is 'graphics'.

Examples:
```
boxes
boxes('plotter')
```

See also: *User Guide: Liquids NMR*

Related:

mark	Determine intensity of spectrum at a point (C)

bpa — Plot boxed parameters (M)

Syntax:
```
bpa:$sc2_minimum
```

Description: Plots a box around the entire chart (assuming blank paper) and then plots “chemist-style” parameters in boxes along the lower edge of the chart. bpa is the same as ppa, but with a different layout. Both ppa and bpa behave somewhat naively if the pulse sequence is more complex, but they were designed primarily for chemists, not for spectroscopists.

Arguments: sc2_minimum returns the minimum value for sc2 to plot a scale properly. To use the command pir, vp has to be set to a non-zero value.

See also: *Getting Started*

Related:

apa	Plot parameters automatically (M)
pap	Plot out “all” parameters (C)
pir	Plot integral amplitudes below spectrum (C)
ppa	Plot a parameter list in “English” (M)
sc2	Start of chart in second direction (P)
vp	Vertical position of spectrum (P)

br24 Set up parameters for BR24 pulse sequence (M)

Applicability: Systems with solids hardware. Sequence not supplied with *MERCURY* series or *GEMINI 2000*.

Syntax: `br24`

Description: Converts a FLIPFLOP, MREV8, or S2PUL parameter set into a BR24 solids line-narrowing multiple-pulse sequence.

See also: *User Guide: Solid-State NMR*

Related:

cylbr24	Set up parameters for cycled BR24 pulse sequence (M)
flipflop	Set up parameters for FLIPFLOP pulse sequence (M)
mrev8	Set up parameters for MREV8 pulse sequence (M)
s2pul	Set up standard two-pulse sequence (M)

browser Start Image Browser application (U)

Applicability: Systems with imaging capabilities.

Syntax: (From UNIX) `browser <macro_name> <XView_arguments> <-image path> <-imagelist path>`

Description: Starts up the Image Browser application. Image Browser requires the environment variable BROWSERDIR to be set to point to the user’s directory `ib_initdir`, which contains initialization files and directories. The environment variable and the initialization directory can be created when the `makeuser` command is run.

Image Browser reads in files in Flexible Data Format (FDF) for displaying and processing. To generate files in FDF format, the following macros are available to write out single or multislice images:

- For the current imaging software, which includes sequences `sems`, `mems`, and `flash`, use the `svib` macro (the `svimg` macro is a precursor to `svib` and is being obsoleted).
- For older style SIS imaging sequences and microimaging sequences, use the macro `svsis`.
- 3D data can be saved in the FDF format by the `ft3d` macro.

The FDF format is an ASCII header describing the data, followed by the data. For more information on FDF, see the *VNMR User Programming* manual.

After images are read into Image Browser, it can write out image data in a number of other formats for use with other imaging applications.

`browser` can be used to extract up to three Maximum Intensity Projections (MIPs).

Arguments: Arguments can appear in any order.

`macro_name` is the file name of a macro, which must be stored in `$BROWSERDIR/macro/macro_name`. The macro is executed when Image Browser starts. If no macro name is specified, the macro `startup` is executed.

`XView_arguments` are any type of standard XView arguments, which can be found by typing `man xview` on a UNIX command line.

`-image path` specifies the path of an image that should be loaded at startup. It is loaded after the `startup` macro is executed. Multiple `-image` arguments can be used to load multiple images.

`-imagelist path` specifies the path of a file containing a list of image files to be loaded.

See also: *User Guide: Imaging; VNMR User Programming*

Related:

`fdfgluer`	Make FDF file from header and data parts (C)
`ft3d`	Perform a 3D Fourier transform on a 3D FID data set (M,U)
`svib`	Generate and save images as Image Browser FDF files (M)
`svsis`	Generate and save images as FDF files (M)

bs — Block size (P)

Description: Directs the acquisition computer, as data are acquired, to periodically store a block of data on the disk, from where it can be read by the host computer.

CAUTION: If bs='n', block size storage is disabled and data are stored on disk only at the end of the experiment. If the experiment is aborted prior to termination, data will be lost.

Values: 1 to 32767 transients, `'n'`

See also: *Getting Started*

Related:

`wbs`	Specify action when *bs* transients accumulate (C)
`wbs`	When block size (P)

btune — Tune broadband channel on MERCURY series and GEMINI 2000 (M)

Applicability: *MERCURY* series and *GEMINI 2000* broadband systems.

Syntax: `btune`

Description: Turns on the broadband transmitter, directing to the probe about 0.5 watts of rf at frequency `sfrq`, enabling the user to tune the probe coil. Before entering `btune`, be sure to move the proper cable on the back of the left-hand magnet leg to the BNC connector labeled TUNE, and also to move the proper cable leading to the probe to the BNC connector labeled TUNE. Enter `tuneoff` to turn off the transmitter. `btune` cannot be executed while the console is acquiring or interactive acquisition (`acqi`) is connected. For the full tuning procedure, see the probe installation manual.

See also: *Getting Started; Autoswitchable NMR Probes Installation*

Related:

`acqi`	Interactive acquisition display process (C)
`ctune`	Tune carbon channel on $^{1}H/^{13}C$ *GEMINI 2000* (M)
`dtune`	Tune lock channel on *GEMINI 2000* (M)
`htune`	Tune proton channel on *GEMINI 2000* (M)
`sethw`	Set values for hardware in acquisition system (C)
`sfrq`	Transmitter frequency of observe nucleus (P)
`su`	Submit a setup experiment to acquisition (M)
`tuneoff`	Turn off probe tuning mode, *MERCURY* series, *GEMINI 2000* (M)

C

c13 — Automated carbon acquisition (M)

Syntax: `c13<(solvent)>`

Description: Prepares parameters for automatically acquiring a standard ^{13}C spectrum. The parameter `wexp` is set to `'procplot'` for standard processing. If `c13` is used as the command for automation via the `enter` command, the `au` is supplied automatically and should not be entered on the MACRO line of the `enter` program. However, it is possible to customize the standard `c13` macro on the MACRO line by following it with additional commands and parameters. For example, `c13 nt=1` uses the standard `c13` setup but with only one transient.

Arguments: `solvent` is the name of the solvent. In automation mode the solvent is supplied by the `enter` program. The default is `'CDCl3'`.

Examples:
```
c13
c13('DMSO')
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`au`	Submit experiment to acquisition and process data (M)
`c13p`	Process of 1D carbon spectra (M)
`enter`	Enter sample information for automation run (C)
`proc1d`	Processing macro for simple (non-arrayed) 1D spectra (M)
`procplot`	Automatically process FIDs (M)
`wexp`	When experiment completes (P)

c13p — Process 1D carbon spectra (M)

Syntax: `c13p`

Description: Processes non-arrayed 1D carbon spectra using a set of standard macros. `c13p` is called by the `proc1d` macro, but can also be used directly. Fully automatic processing (up to a point where a spectrum could be plotted) is provided: Fourier transformation (using pre-set weighting functions), automatic phasing (`aphx` macro), automatic integration (`integrate` macro if required only), vertical scale adjustment (`vsadjc` macro), avoiding excessive noise (`noislm` macro), threshold adjustment (`thadj` macro), and referencing to the TMS signal if present (`setref` macro then `tmsref` macro).

See also: *Getting Started, User Guide: Liquids NMR*

Related:

`aphx`	Perform optimized automatic phasing (M)
`c13`	Automated carbon acquisition (M)
`integrate`	Automatically integrate 1D spectrum (M)
`noislm`	Limit noise in spectrum (M)
`proc1d`	Processing macro for simple (non-arrayed) 1D spectra (M)
`setref`	Set frequency referencing for proton spectra (M)
`thadj`	Adjust threshold (M)
`tmsref`	Reference spectrum to TMS line (M)
`vsadjc`	Adjust vertical scale for carbon spectra (M)

calcdim — Calculate dimension of experiment (C)

Syntax: `calcdim`

Description: Calculates the dimension of an experiment and puts the result into the parameter arraydim. If an experiment is arrayed, arraydim is the product of the size of the arrays.

See also: *Getting Started*

Related:

arraydim	Dimension of experiment (P)

calfa — Recalculate alfa so that first-order phase is zero (M)

Syntax: calfa

Description: Based upon the current alfa and lp values, calfa calculates a new value for alfa so that the first-order phase parameter lp is rendered approximately 0. When digital filtering is active (dsp='r' or dsp='i'), calfa also adjusts rof2 as well as alfa. For calfa to work properly, a trial spectrum must be obtained and phased to pure absorption. This spectrum provides calfa with the current alfa and lp values. calfa pertains to processing 2D data. Unless lp is approximately 0, fpmult will affect both the dc offset and the curvature of the spectrum.

See also: *User Guide: Liquids NMR*

Related:

alfa	Set alfa delay before acquisition (P)
cfpmult	Calculate first-point multiplier for 2D experiments (M)
crof2	Recalculate rof2 so that lp = 0 (M)
dc	Calculate spectral drift correction (C)
dsp	Type of DSP for data acquisition (P)
fpmult	First-point multiplier for np FID data (P)
hoult	Set parameters alfa and rof2 according to Hoult (M)
lp	First-order phase in directly detected dimension (P)
rof2	Receiver gating time following pulse (P)

calibflag — Correct systematic errors in DOSY experiments (P)

Syntax: calibflag

Description: Corrects systematic errors in DOSY experiments.

Values: 'y' corrects systematic deviations in DOSY analysis.

'n' omits gradient correction in DOSY analysis.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)

calibrate — Start a dialog for autocalibration routines (M)

Syntax: calibrate

Description: Starts a dialog for autocalibration routines.

capt — Automated carbon and APT acquisition (M)

Syntax: capt<(solvent)>

Description: Prepares parameters for automatically acquiring a standard ^{13}C spectrum, followed by an APT experiment. In non-automation mode, the carbon and APT spectra are acquired in the experiment in which capt is entered. Following acquisition completes, the commands rttmp('C13') and rttmp('apt') can be used for further processing of the carbon and APT spectra, respectively.

Arguments: `solvent` is name of the solvent used. In automation mode, the `enter` program supplies name. In non-automation mode, the default is `'cdcl3'`.

Examples:
```
capt au
capt('dmso')
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`apt`	Prepare parameters for APT experiment (M)
`c13`	Automated carbon acquisition (M)
`enter`	Enter sample information for automation run (C)
`rttmp`	Retrieve experiment subfile (M)

CARBON — Set up parameters for carbon spectrum (M)

Applicability: *GLIDE* only.

Syntax: `CARBON`

Description: Internal macro that sets up parameters for a carbon spectrum in *GLIDE*. `CARBON` is used only when carbon is selected in a proton experiment.

cat — Display one or more text files in text window (C)

Syntax: `cat(file1<,file2,...>)`

Description: Displays the contents of one or more text files on the text window. It pauses after the window has filled and waits for the user to indicate whether it should display more or should terminate.

Arguments: `file1,file2,...` are the names of the files to be displayed.

Examples:
```
cat('/vnmr/manual/cat')
cat('/vnmr/manual/cat','/vnmr/manual/cattn')
```

See also: *Getting Started*

cattn — Coarse attenuator type (P)

Applicability: Systems (not including *MERCURY* series and *GEMINI 2000*) with a coarse attenuator.

Description: Identifies the type of coarse attenuator if this attenuator is present on the current rf channel. The value of `cattn` is set in the CONFIG window (opened by entering `config`) using the label Coarse Attenuator.

Values: 0 for no coarse attenuator, as in the case with class C amplifiers (Not Present choice in CONFIG window).

63 for standard UNITY 63-dB attenuator (63 dB choice in CONFIG window).

79 for standard UNITY*INOVA* or UNITY*plus* 79-dB attenuator, optional on UNITY systems (79 dB choice fin CONFIG window).

127 for imaging attenuator (63.5 dB SIS choice in CONFIG window).

63 for UNITY*INOVA* deuterium decoupler channel.

See also: *VNMR and Solaris Software Installation*

Related:

`config`	Display current configuration and possibly change it (M)
`fattn`	Fine attenuator (P)
`tpwr`	Observe transmitter power level with linear amplifiers (P)

cd — Change working directory (C)

Syntax: `cd<(directory)>`

Description: Changes current working directory to another directory.

Arguments: `directory` is the name of the directory that becomes the new current working directory. The change is made only if the directory name already exists and the user has permission to be in the directory. If no argument is included, `cd` changes the current working directory to the user's home directory.

Examples:
```
cd
cd(userdir+'/exp1')
cd('/home/george/vnmrsys')
```

See also: *Getting Started*

Related:
- `pwd` Display current working directory (C)

cdc — Cancel drift correction (C)

Syntax: `cdc`

Description: Turns off the drift correction started by the `dc` command and resets the spectral drift correction parameters `lvl` (level) and `tlt` (tilt) to zero.

See also: *Getting Started*

Related:
- `dc` Calculate spectral drift correction (C)
- `dcg` Drift correction group (P)
- `lvl` Zero-order baseline correction (P)
- `tlt` First-order baseline correction (P)

cdept — Automated carbon and DEPT acquisition (M)

Syntax: `cdept<(solvent)>`

Description: Prepares parameters for automatically acquiring a standard ^{13}C spectrum, followed by a DEPT experiment. In non-automation mode, the carbon and DEPT spectra are acquired in the experiment in which `cdept` was entered. Following the completion of the acquisition, the `rttmp('C13')` and `rttmp('dept')` commands can be used for further processing of the carbon and DEPT spectra, respectively.

Arguments: `solvent` is name of the solvent used. In automation mode, the `enter` program supplies name. In non-automation mode, the default is `'cdcl3'`.

Examples:
```
cdept au
cdept('DMSO')
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:
- `adept` Automatic DEPT analysis and spectrum editing (C)
- `c13` Automated carbon acquisition (M)
- `dept` Prepare parameters for DEPT experiment (M)
- `enter` Enter sample information for automation run (C)
- `rttmp` Retrieve experiment subfile (M)

celem — Completed FID elements (P)

Description: Indicates the current number of completed FIDs in an experiment. When `go` or `au` is entered, `celem` is set to 0. As each FID acquisition is completed, `celem` is updated to reflect this. This parameter is most useful in conjunction with `wbs`, `wnt`, `wexp`, and `werr` processing commands.

See also: *Getting Started*

Related:
- `arraydim` Dimension of experiment (P)
- `au` Submit experiment to acquisition and process data (C)

go	Submit experiment to acquisition (C)
ni	Number of increments in 1st indirectly detected dimension (P)
wbs	Specify action when bs transients accumulate (C)
werr	Specify action when error occurs (C)
wexp	Specify action when experiment completes (C)
wnt	Specify action when nt transients accumulate (C)

center — Set display limits for center of screen (C)

Syntax: center

Description: Sets parameters sc and wc (horizontal control) and parameters sc2 and wc2 (vertical control) to produce a display (and subsequent plot) in the center portion of the screen (and page). For 2D data, space is left for the scales.

Alternate: Center button in the 1D Display Size Selection Menu
Center button in the 2D Display Size Selection Menu

See also: *Getting Started; User Guide: Liquids NMR*

Related:

full	Set display limits for a full screen (C)
fullt	Set display limits for full screen with room for traces (C)
left	Set display limits for left half of screen (C)
right	Set display limits for right half of screen (C)
sc	Start of chart (P)
sc2	Start of chart in second direction (P)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)

centersw — Move cursor to center of spectrum (M)

Syntax: centersw

Description: Sets cursor position parameter cr in the directly detected dimension for the center of the spectrum.

See also: *Getting Started*

Related:

centersw1	Move cursor to center of spectrum in 1st indirect dimension (M)
centersw2	Move cursor to center of spectrum in 2nd indirect dimension (M)
cr	Cursor position in directly detected dimension (P)

centersw1 — Move cursor to center of spectrum in 1st indirect dimension (M)

Syntax: centersw1

Description: Sets cursor position parameter cr1 in the first indirectly detected dimension to the center of the spectrum.

See also: *User Guide: Liquids NMR*

Related:

centersw	Move cursor to center of spectrum (M)
cr1	Cursor position in 1st indirectly detected dimension (P)

centersw2 — Move cursor to center of spectrum in 2nd indirect dimension (M)

Syntax: centersw2

Description: Sets cursor position parameter cr2 in the second indirectly detected dimension to the center of the spectrum.

See also: *User Guide: Liquids NMR*

Related:
- centersw — Move cursor to center of spectrum (M)
- cr2 — Cursor position in 2nd indirectly detected dimension (P)

cexp — Create a VNMR experiment (M)

Syntax: `cexp(<experiment_dir,>experiment_number)`

Description: Creates a VNMR experiment as a temporary workspace that can hold a complete 1D, 2D, or 3D data set. Up to 9999 experiments can be created. Experiment 5 is special because it is the add-subtract experiment. `cexp` creates the appropriate `jexp`xxx macro so that the newly created experiment can be joined.

Arguments: `experiment_dir` specifies the path of the directory in which the particular experiment is to be created. If `experiment_dir` is not entered, the default is the VNMR user directory specified by `userdir`.

`experiment_number` specifies the number, from 1 to 9999, of the VNMR experiment to be created.

Alternate: Create New button in the Workspace Menu.

Examples:
```
cexp(3)
cexp('/data',2)
```

See also: *User Guide: Liquids NMR*

Related:
- delexp — Delete an experiment (C)
- jexp — Join existing experiment (C)
- userdir — VNMR user directory (P)

cf — Current FID (P)

Description: Specifies which FID to operate on when working with multi-FID data. All subsequent operations such as Fourier transformation are applied to the selected data block.

When an experiment acquires `nf` number of data segments through explicit acquisition, `cf` indicates the `cf`th FID to use. For example, in the COSY-NOESY experiment with `nf=2`, `cf=1` would select the COSY part of the experiment, and `cf=2` would select the NOESY part.

Values: `1` through the value of parameter `nf`.

See also: *User Guide: Imaging*

Related:
- nf — Number of FIDs (P)

cfpmult — Calculate first-point multiplier for 2D experiments (M)

Syntax: `cfpmult`

Description: Calculates an `fpmult` value for the dataset, which is then used by `wft2da`. For 2D experiments, such as NOESY, run `cfpmult` on the transformed first increment, prior to entering `wft2da`, to minimize "f_2 ridges" in the final 2D spectrum. To do this manually for a 2D dataset, enter `fpmult=1.0 wft(1) cdc` in the VNMR command line and note whether the spectrum (essentially the baseline) moves up or down when `dc` is typed. Vary the value of `fpmult` until the dc correction (jump in the baseline) is as small as possible. With care, `fpmult` can be set to two decimal places. Typical values for `fpmult` range from 1.00 to 2.00. The default value is 1.0.

This calculation only needs to be performed for cosine-type experiments, such as NOESY, where both the t_2 FID and the t_1 interferogram decay. `cfpmult` might give incorrect values for first increments of experiments having baseline distortions (e.g., water suppression with 11-echo or 1331); in such cases, manual optimization of `fpmult` is more suitable.

When processing 2D data, unless the parameter `lp` is approximately 0, `fpmult` affects both the dc offset and the curvature of the spectrum. See the entries for `alfa` and `calfa` for more information.

See also: *User Guide: Liquids NMR*

Related:

`alfa`	Set `alfa` delay before acquisition (P)
`calfa`	Recalculate `alfa` so that first-order phase is zero (M)
`crof2`	Recalculate rof2 so that lp = 0 (M)
`dc`	Calculate spectral drift correction (C)
`fpmult`	First point multiplier for `np` FID data (P)
`lp`	First-order phase in directly detected dimension (P)
`wft2da`	Weight and Fourier transform phase-sensitive data (M)

change — Submit a change sample experiment to acquisition (M)

Applicability: Systems with automatic sample changer.

Syntax: `change`

Description: Removes the sample currently in the probe and loads the sample currently in sample location `loc`. `change` runs in the acquisition computer and is inoperative if `loc` is `0` and/or `traymax` is `'n'` or `0`. `change` also sets all hardware according to the current parameters.

See also: *User Guide: Liquids NMR*

Related:

`au`	Submit experiment to acquisition and process data (C)
`ga`	Submit experiment to acquisition and FT the result (C)
`go`	Submit experiment to acquisition (C)
`loc`	Location of sample in tray (P)
`lock`	Submit an autolock experiment to acquisition (C)
`sample`	Submit change sample, Autoshim experiment to acquisition (M)
`shim`	Submit an Autoshim experiment to acquisition (C)
`spin`	Submit a spin setup experiment to acquisition (C)
`su`	Submit a setup experiment to acquisition (M)
`traymax`	Sample changer tray size (P)

cla — Clear all line assignments (M)

Syntax: `cla`

Description: Clears the line assignment parameters `clindex` and `slfreq` for spin simulation iteration, which matches simulated spectra to actual data.

See also: *User Guide: Liquids NMR*

Related:

`assign`	Assign transitions to experimental lines (M)
`dla`	Display line assignments (M)
`clindex`	Index of experimental frequency of a transition (P)
`slfreq`	Measured line frequencies (P)

cla — Calculated transition number (P)

Description: A global arrayed parameter that stores the transition number of calculated transitions of the spin simulation program when they are above a threshold set

by sth. In the iterative mode, the cla value of an assigned transition is associated with an experimental frequency whose index is the clindex value.

See also: *User Guide: Liquids NMR*

Related:

clamp	Calculated transition amplitude (P)
clfreq	Calculated transition frequency (P)
clindex	Index of experimental frequency of a transition (P)
sth	Minimum intensity threshold (P)

clamp — Calculated transition amplitude (P)

Description: A global arrayed parameter that stores the transition amplitude of calculated transitions of the spin simulation program when they are above a threshold set by the parameter sth. Enter dla('long') to display clamp.

See also: *User Guide: Liquids NMR*

Related:

cla	Calculated transition number (P)
clfreq	Calculated transition frequency (P)
clindex	Index of experimental frequency of a transition (P)
dla	Display line assignments (C)
sth	Minimum intensity threshold (P)

cleanexp — Remove old files and directories from an experiment (M)

Syntax: `cleanexp<(file1<,file2<,...>>)>`

Description: Removes experiment subfiles from chained experiments that exist in an experiment directory. cleanexp only cleans the currently active experiment.

Arguments: file1, file2, ... are specific experiment subfiles to be removed. If no argument is given, all files in curexp/subexp are removed.

Examples:

```
cleanexp
cleanexp('H1','relayh')
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

curexp	Current experiment directory (P)
hccorr	Automated proton, carbon, and HETCOR acquisition (M)
hcosy	Automated proton and COSY acquisition (M)

clear — Clear a window (C)

Syntax: `clear<(window_number)>`

Description: Clears one of the four windows on the GraphOn terminal (status, input, graphics, text) or one of the two windows on the Sun (text and graphics).

Arguments: window_number is the number (1 to 4) of the window to be cleared:

- 1 clears the status window (GraphOn only)
- 2 clears the graphics window
- 3 clears the input window (GraphOn only)
- 4 clears the text window (the default value).

Examples:

```
clear
clear(2)
```

See also: *VNMR User Programming*

cleardosy — Delete temporarily saved data in current subexperiment (M)

Syntax: `cleardosy`

Description: Deletes any copies of DOSY data temporarily saved in the current subexperiment.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)

clfreq — Calculated transition frequency (P)

Description: A global arrayed parameter that stores the transition frequency of calculated transitions of the spin simulation program when they are above a threshold set by the parameter sth. Enter dla to display clfreq.

See also: *User Guide: Liquids NMR*

Related:

cla	Calculated transition number (P)
clamp	Calculated transition amplitude (P)
clindex	Index of experimental frequency of a transition (P)
dla	Display line assignments (M)
sth	Minimum intensity threshold (P)

clindex — Index of experimental frequency of a transition (P)

Description: A global arrayed parameter where each value contains the index of an experimental frequency assigned to the associated calculated transition for use in iterative spin simulation. Use assign to make the assignments. A value of zero indicates no assignment.

See also: *User Guide: Liquids NMR*

Related:

assign	Assign transitions to experimental lines (M)
cla	Clear line assignments (M)
cla	Calculated transition number (P)
dla	Display line assignments (M)

clradd — Clear add/subtract experiment (C)

Syntax: `clradd`

Description: Deletes the add/subtract experiment (exp5).

Alternate: clear button in the Add/Subtract Menu.

See also: *User Guide: Liquids NMR*

Related:

add	Add current FID to add/subtract experiment (C)
sub	Subtract current FID from add/subtract experiment (C)

color — Select plotting colors from a graphical interface (M)

Syntax: `color`

Description: Displays a window with color palettes for selecting colors for plotting the background of the VNMR display screen, spectrum, integral, FID, etc.

See also: *Getting Started*

Related:

pl	Plot spectra (C)
setcolor	Set colors for graphics window and for plotters (C)

combiplate — View a color map for visual analysis of VAST microtiter plate (U)

Syntax: (From UNIX) `combiplate`

Description: Opens the CombiPlate window, which provides a map of microtiter plate, allowing data to be viewed from individual sample wells. The window enables viewing integral region intensities by colors and color densities.

See also: *User Guide: Liquids NMR*

Related:
- `combishow` — Display regions as red, green, and blue in CombiPlate window (M)
- `dlivast` — Produce text file and process last wells (M)

combishow — Display regions as red, green, and blue in CombiPlate window (M)

Syntax: `combishow(r,g,b)`

Description: Displays integral regions shown on the spectrum as red (`r`), green (`g`), and blue (`b`) in the CombiPlate window. CombiPlate reads the regions automatically. 1, 2, or 3 integral regions can be designated. At least one integral region must be specified. Combishow displays spectra associated with individual wells.

See also: *User Guide: Liquids NMR*

Related:
- `combiplate` — View a color map for visual analysis of VAST microtiter plate (U)
- `dlivast` — Produce text file and process last wells (M)

compressfid — Compress double-precision VNMR FID data (M,U)

Syntax:
(From VNMR) `compressfid(<inFIDdir,>outFIDdir)`
(From UNIX) `compressfid -i inFIDdir -o outFIDdir -f`
(From UNIX) `compressfid -e exp_number -o outFIDdir -f`

Description: Compresses double-precision VNMR FID data to single-precision and updates the parameter `dp` in the file `procpar`. `compressfid` can be run through a macro interface in VNMR or directly at the UNIX level. In entering FID directory names, leave off the `.fid` directory extension.

Arguments:
`inFIDdir` is the double-precision FID directory to be compressed. If `inFIDdir` is not entered, the default FID directory is `curexp/acqfil.`

`outFIDdir` is the FID directory to receive the output.

`exp_number` is the number of the experiment that contains the FID data.

`-i` specifies that the next argument is the input FID directory.

`-o` specifies that the next argument is the output FID directory.

`-e` specifies that the next argument is the number of the experiment that contains the FID data. The `-e` and the `-i` options are mutually exclusive.

`-f` specifies that any existing directory with the name `outFIDdir.fid` is to be overwritten. Note that the macro interface in VNMR always overwrites any preexisting directory with the name specified by `outFIDdir.fid.`

Examples:
(From VNMR) `compressfid('/vnmr/fidlib/fid1d', 'testfid1d')compressfid('testfid1d')`
(From UNIX) `compressfid -e 5 -o testfid1d -f`
(From UNIX) `compressfid -i /vnmr/fidlib/fid1d -o testfid1d -f`

See also: *Getting Started*

Related:
- `dp` — Double precision (P)

config — Display current configuration and possibly change it (M)

Syntax: `config <('display')>`

Description: Displays the current system configuration parameters in a window (called the CONFIG window). The values of the configuration parameters can be changed if `config` is entered from the console without any arguments and the user has write access to the directories `/vnmr` and `/vnmr/conpar`. If so, the user can interactively make changes to the choices in the window. Usually, `vnmr1`, the VNMR system administrator, configures the system and then sets the protection on `/vnmr/conpar` to permit read-only access by other users.

If the user does not meet the conditions above, or if the VNMR system administrator enters the command `config('display')`, instead of the interactive mode, the user is restricted to the display mode. In this mode, the CONFIG window appears but the user cannot make any changes. On *MERCURY* series and *GEMINI 2000*, the mode is always interactive.

If `config` is entered without any arguments, the program checks if the user is logged in as `vnmr1`. If so, it runs in interactive mode; if not, it runs in display mode. By entering `config('display')`, vnmr1 can run in the display mode instead of interactively.

In the interactive mode, a separate panel displays the options with the current choice appearing to the right. Position the mouse over the choice to be modified, then use the left button to cycle through each choice or use the right button to display a menu of all possible choices.

On systems other than *MERCURY* series and *GEMINI 2000*, the Use Console Data button sets parameter values in the CONFIG window using information captured during console startup.

- On UNITY*INOVA*, this button makes `config` capture from the system all values shown in the CONFIG window except Sample Changer, Sample Changer Serial Port, Rotor Synchronization, Frequency Overrange, and Upper Limit of decoupler power. For the Gradients entry, `config` recognizes the Performa I and Performa II modules but not other gradients. For the VT Controller entry, if VT is found, `config` does not change the value set, and if VT is not found, `config` changes the value to Not Present.
- On *MERCURY-Vx* systems, this button captures all the values except Sample Changer and Sample Changer Serial Port. The VT Controller entry is set the same way as UNITY*INOVA systems (see above)*.
- On UNITY*plus*, this button captures all values except Sample Tray Size, Rotor Synchronization, Frequency Overrange, Upper Limit of decoupler power, and Gradients. The VT Controller entry is set the same way as UNITY*INOVA systems (see above).*
- On UNITY and VXR-S systems, this button captures only System Type, Maximum Spectral Width, and Fifo Loop Size parameter values.

The EXIT, and SAVE button writes a new `conpar` configuration file before leaving. The QUIT, no SAVE button terminates the session with no modifications to the `conpar` file, but remember that the parameters in VNMR are always set. These two buttons require use of the left button on the mouse. In the display mode, the current choices are displayed in the text window.

To send output to the printer, enter the sequence of commands `printon config('display') printoff`.

Commands for working with parameters (such as `create`, `destroy`, `exists` and `setvalue`) have an option to select which parameter tree the

parameter is in. The systemglobal tree is the internal VNMR name for /vnmr/conpar, and it can be used to search for, modify, or create a parameter in conpar. But note that any changes made, either directly (e.g., by typing vttype=0) or by using create and similar commands, only affect parameters in memory. To permanently change parameters:

- For parameters in config, enter the change in the CONFIG window and then quit using the Exit & Save button.
- For other parameters, after creating or changing the parameter, enter fsave('/vnmr/conpar','systemglobal').

Both methods, usually restricted to vnmr1 only, overwrite conpar.

The CONFIG labels listed below can be changed in the interactive mode. For each label, the choices available and a short description of the label is provided. Shown in parentheses is the associated VNMR parameter, which you should refer to for further information.

CONFIG window on UNITY*INOVA*, UNITYplus, UNITY, VXR-S, and Imaging systems:

- System Type: Spectrometer or Data Station. Sets the basic type of system (system).
- Console: VXR-S, UNITY, UNITY*plus*, UNITY*INOVA*, Gemini 2000, *MERCURY*, or SISCO Imager. Sets the type of system console (Console). When go, au, or ga is entered, the value set is copied to the current experiment as the console parameter (lowercase c).
- Proton Frequency: 085, 100, 200, 300, 400, 500, 600, 750, 800, 900, 3T, and 4T. Sets the resonant frequency, in MHz or tesla, of ^{1}H as determined by magnet field strength (h1freq).
- Sample Changer: For UNITY*INOVA* – None, Carousel, SMS 50 Sample, SMS 100 Sample, VAST, NMS, LC-NMR. For UNITY*plus*, UNITY, and VXR-S– None, Carousel, SMS/ASM 50 Sample, SMS/ASM 100 Sample, VAST, NMS, LC-NMR. Sets the type of sample changer. Set to none if a sample changer is not present or is to be disabled (traymax).
- Sample Changer Serial Port: Not Used, Port A, Port B. Sets the serial port used to connect the sample changer. Select Not Used if no sample changer is present (smsport).
- Shimset: Varian 13 Shims, Varian 14 Shims, Oxford 15 Shims, Oxford 18 Shims, Varian 18 Shims, Varian 20 Shims, Varian 23 Shims, Varian 26 Shims, Varian 28 Shims, Varian 29 Shims, Varian 35 Shims, Varian 40 Shims, Ultra Shims, and Whole Body. Sets type of shim sets on system (shimset).
- Audio Filter Type: 100 kHz Elliptical, 100 kHz Butterworth 200 kHz Butterworth, 500 kHz Elliptical. If the spectral width (sw) is less than 100 kHz, sets type of audio filters used (audiofilter).
- VT Controller: Not Present, Present. Sets whether a variable temperature controller is present or not on the system (vttype).
- Maximum DMF: 9900, 32700, 2.0e6. Sets maximum frequency, in Hz, for decoupler modulation (parmax[11]).
- Max. Spectral Width: 100 kHz, 200 kHz, 500 kHz, 2 MHz, 5 MHz. Sets maximum spectral width available to a system (parmax[5]).
- Max. Narrowband Width: 100 kHz, 200 kHz, 500 kHz. Defines the maximum spectral width of the Input board (maxsw_loband).

- AP Interface Type: Type 1, Type 2, Type 3, N/A. Sets type of AP bus interface board in the system (`apinterface`).
- Fifo Loop Size: 63, 1024, 2048. Sets size of FIFO loop, which depends on the type of controller board in the system (`fifolpsize`).
- Rotor Synchronization: Not Present, Present. Sets whether system supports the solids rotor synchronization module (`rotorsync`).
- Lock Frequency: (number entered directly). Sets lock frequency of the system. **To observe NMR signals, the lock frequency value must be set correctly** (`lockfreq`).
- IF Frequency: 10.0 MHz, 10.5 MHz, (20.0 MHz UNITY*INOVA* only).
- Number of RF Channels: 1, 2, 3, 4, 5. Selects which rf channel is listed in the Configure panel that appears in the lower section of the CONFIG window (`numrfch`).
- Gradients: Not Present, Present. Sets whether system has optional gradients for the X, Y, or Z axis. If present, the gradients are listed in the Configure panel in lower section of CONFIG window (Gradients is not associated with any VNMR parameter).
- Configure: RF Channel 1 (Obs), RF Channel 2 (Dec), RF Channel 3 (Dec2), RF Channel 4 (Dec 3), RF Channel 5 (Dec4), Gradients. Sets which labels appear in the Configure panel in lower section of CONFIG window (Configure is not associated with any VNMR parameter)
- Type of RF: U+ Direct Synthesis, U+ H1 Only, Direct Synthesis, Broadband, Fixed Frequency, Deuterium Decoupler (UNITY*INOVA* only), SIS Modulator. Sets type of frequency generation on the current rf channel (`rftype` and `rfchtype`).
- Synthesizer: Not Present, PTS 160, PTS 200, PTS 250, PTS, 320, PTS 500, PTS 620, PTS 1000. Sets type of PTS frequency synthesizer on the current rf channel (`ptsval`).
- Latching: Not Present, Present. On systems equipped with a special version of the PTS frequency synthesizer, sets how frequency values are sent on the current rf channel (`latch`).
- Frequency Overrange: Not Present, 10000 Hz, 100000 Hz. On systems equipped with a special version of the PTS frequency synthesizer, sets the presence of a signal phase stability option on the current rf channel (`overrange`).
- Step Size: 0.1 Hz, 0.2 Hz, 1 Hz, 100 Hz. Sets frequency step size on current rf channel. (`parstep[7]`, `parstep[8]`, `parstep[16]`, `parastep[20]`).
- Coarse Attenuator: Not Present, 63 dB, 79 dB, 63.5 dB (SIS). Sets range of coarse attenuator if this attenuator is present on the current rf channel (`cattn`).
- Upper Limit: (number entered directly). Sets upper limit of the coarse attenuator if this attenuator is present on the current rf channel (`parmax[17]`, `parmax[9]`,`parmax[18]`, `parmax[21]`).
- Fine Attenuator: Not Present, Present. Sets whether a fine attenuator is present or not on the current rf channel (`fattn`).
- Waveform Generator: Not Present, Present. Sets whether a waveform generator board is present or not on current rf channel (`rfwg`).

- Type of Amplifier: Class C, Linear Full Band, Linear Low Band, Shared, Linear Broadband. (Shared is fourth channel only.) Sets type of amplifier on the current rf channel (amptype).
- X Axis, Y Axis, Z Axis: None, WFG + GCU, Performa I, Performa II/III, Performa II/III+WFG, Performa XYZ, Performa XYZ+WFG, SIS (12 bit), Homospoil. On systems with gradients, sets type of gradient for each axis. The value is set separately for each axis (gradtype).
- Imaging Gradient Coil. Detects the gradient coil configuration file that defines the current installed gradient coil (sysgcoil).

CONFIG window on *MERCURY series* systems:

Several parameters, other than those listed below, are set automatically because they have only one choice (e.g., Console is set to '*MERCURY*').

- System Type: 4-Nucleus, Broadband. Sets the basic type of system (rftype).

  The *MERCURY-Vx* 300-MHz 4-Nucleus system uses the Hi/Lo Reference Generator board. For this system, in CONFIG window set System Type to Broadband (rftype='fe').
  If the board type is unknown, look at the rf card cage in the back of the console. The third rf board from the left is the reference generator. If the top of the board is labeled Hi/Lo, select Broadband, but if it is labeled 4-Nucleus or 5-Nucleus select 4-Nucleus as the system type
- Proton Frequency: 200, 300, 400. Sets the resonant frequency, in MHz, of ^{1}H, as determined by magnet field strength (h1freq).
- VT Controller: Not Present, Present. Sets whether a variable temperature controller is present or not on the system (vttype).
- Auto Spinner: Not Present, Present. Sets whether spin hardware is present or not on the system (spinopt).
- Type of Amplifier: 4-Nucleus (35W/35W), Broadband (75W/125W), CP/MAS(100W/300W). Sets type of amplifier in the system (amptype: aa on 4-Nucleus, bb on Broadband, cc on CP/MAS).
- Sample Changer: – None, Carousel, SMS 50 Sample, SMS 100 Sample, VAST, NMS. Sets the type of sample changer. Set to None if a sample changer is not present or is to be disabled (traymax).
- Sample Changer Serial Port: For only *MERCURY-Vx* – Not Used, Port A, Port B. Sets the serial port used to connect the sample changer. Select Not Used if no sample changer is present (smsport).
- Pulsed Field Gradient: Not Present, Homospoil, Performa I, Performa II. Sets whether the PFG hardware is present or not on the system (gradtype). Homospoil can be used for gradient shimming, but not for experiments like gHMQC.
- Lock Frequency: (number entered directly). Sets the lock frequency of the system. **This value must be set correctly to observe NMR signals** (lockfreq).
- Homodecoupler: Not Present, Present. Sets whether a homonuclear decoupler board is present or not (homdec). Standard on *MERCURY-Vx*.
- Max. Decoupler: (number entered directly). On broadband systems, sets maximum power level for CW decoupling (parmax[9]).

CONFIG window on *GEMINI 2000* systems:

Several parameters, other than those listed below, are set automatically because they have only one choice (e.g., `Console` is set to `'g2000'`)

- System Type: 1H/13C, Broadband. Sets the basic type of system (`rftype`).
- Proton Frequency: 200, 300, 400. Sets the resonant frequency, in MHz, of ^{1}H, as determined by magnet field strength (`h1freq`).
- VT Controller: Not Present, Present. Sets whether a variable temperature controller is present or not on the system (`vttype`).
- Auto Spinner: Not Present, Present. Sets whether spin hardware is present or not on the system (`spinopt`).
- Sample Changer: None, Carousel, ASM/SMS 50 Sample, ASM/SMS 100 Sample. Sets the type of sample changer. Set to None if a sample changer is not present or is to be disabled (`traymax`).
- Pulsed Field Gradients: Not Present, Present. Sets whether the PFG hardware is present or not on the system (`gradtype`).
- Lock Frequency: (number entered directly). Sets the lock frequency of the system. **This value must be set correctly to observe NMR signals** (`lockfreq`).
- Homodecoupler: Not Present, Present. On $^{1}H/^{13}C$ systems, sets whether a homonuclear decoupler board is present or not (`homdec`).
- Homo Dec. Offset: (number entered directly). On $^{1}H/^{13}C$ systems, sets the homonuclear decoupler offset to compensate for differences in individual boards. The installation engineer sets the value, and it should not require changing by the user (`hdofst`).
- BB Atten Type: Slow, Fast. On broadband systems, sets the version of RF Control board (`attens`).
- Max. Decoupler: (number entered directly). On broadband systems, sets maximum power level for CW decoupling (`parmax[9]`).

Arguments: `'display'` is a keyword that the VNMR system administrator can use to make `config` run in the display mode rather than the interactive mode.

Alternate: Hardware button in the Configuration Menu.

Examples:
```
config
config('display')
```

See also: *VNMR and Solaris Software Installation*

Related:

`amptype`	Amplifier type (P)
`apinterface`	AP Interface board type (P)
`attens`	Fast attenuators present (P)
`audiofilter`	Audio filter type (P)
`cattn`	Coarse attenuator (P)
`Console`	System console type (P)
`fattn`	Fine attenuator (P)
`fifolpsize`	FIFO loop size (P)
`gradtype`	Gradients for X, Y, and Z axes (P)
`h1freq`	Proton frequency of spectrometer (P)
`hdofst`	Proton homonuclear decoupler offset (P)
`homdec`	Proton homonuclear decoupler present (P)
`latch`	Frequency synthesizer latching (P)
`lockfreq`	Lock frequency (P)
`maxsw_loband`	Maximum spectral width of Input board (P)
`numrfch`	Number of rf channels (P)

overrange	Frequency synthesizer overrange (P)
parmax	Parameter maximum values (P)
parmin	Parameter minimum values (P)
parstep	Parameter step size values (P)
ptsval	PTS frequency synthesizer value (P)
rfchtype	Type of rf channel (P)
rftype	Type of rf generation (P)
rfwg	RF waveform generator (P)
rotorsync	Rotor synchronization (P)
shimset	Type of shim set (P)
spinopt	Spin automation (P)
sysgcoil	System gradient coil (P)
system	System type (P)
traymax	Sample changer tray slots (P)
vttype	Variable temperature controller present (P)

confirm — Confirm message using the mouse (C)

Syntax: `confirm(message):response`

Description: Displays a dialog box with the specified message and two buttons: Confirm and Cancel. Clicking on the buttons with the mouse produces a return value.

Arguments: `message` is a single-line muticharacter string to be shown in the dialog box.

`response` is 1 if the user clicks the left button of the mouse on the Confirm button or presses the Return key; `response` is 0 if the user clicks the mouse on the Cancel button.

Examples:
```
confirm('Are you sure you want pw>100?'):$response
```

See also: *VNMR User Programming*

Console — System console type (P)

Description: A global parameter that sets the type of system console: UNITY*INOVA*, *MERCURY* series , SISCO Imager, *GEMINI 2000*, UNITY*plus*, UNITY, or VXR-S. The value is usually set using the Console label in the CONFIG window (opened from `config`); however, on *MERCURY* series and *GEMINI 2000* systems, the value is automatically set.

When `go`, `au`, or `ga` is entered, the value of the `Console` parameter is copied from the systemglobal parameter tree to the current experiment and named as the `console` parameter (lowercase c). If `console` does not exist in an old parameter set, `rt` via `fixpar` creates it and sets it to `''`. Both `console` and `Console` are type acquisition. Macros can use `Console` and `console` to take conditional action based on spectrometer type.

Values: `'g2000'` is a *GEMINI 2000* console (Gemini 2000 choice in CONFIG window).

`'inova'` is a UNITY*INOVA* console (UnityInova choice in CONFIG window).

`'mercury'` is a *MERCURY* series console.

`'sisco'` is a SISCO imager console (sisco choice in CONFIG window).

`'unity'` is a UNITY console (Unity choice in CONFIG window).

`'uplus'` is a UNITY*plus* console (UnityPlus choice in CONFIG window).

`'vxrs'` is a VXR-S console (VXR-S choice in CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:

au	Submit experiment to acquisition and process data (M)
config	Display current configuration and possibly change it (M)
fixpar	Correct parameter characteristics in experiment (M)
ga	Submit experiment to acquisition and FT the results (M)
rt	Retrieve FIDs (M)
go	Submit experiment to acquisition (M)
system	System type (P)

contact_time MAS cross-polarization spin-lock contact time (M)

Applicability: Systems with solids module.

Syntax: `contact_time`

Description: Processes data obtained using an array of values for a pulse-length parameter. It runs the UNIX program `expfit`, which does an exponential curve fitting that determines the value of *Tch* and *T1rho*. The output is matched to the equation

$$I = [S\_inf - (S\_inf - S0) * exp(-T/Tch)] * exp(-T/T1rho) + S0$$

where *Tch* is the time constant of a spin-locked cross-polarization process, and *T1rho* is relaxation time of ^{13}C polarization in the proton rotating field.

The required input is file `fp.out` from the program `fp` and the values of the arrayed parameter. The output table is file `analyze.list` in the current experiment. The file `analyze.out` is used by the `expl` to display the results.

See also: *User Guide: Solid-State NMR*

Related:

expfit	Least-squares fit to polynomial or exponential curve (U)
expl	Display polynomial/exponential curves (C)
fp	Find peak heights (C)

conv2ta Convert imaging 3D transform to absolute value (U)

Applicability: Systems with imaging capabilities.

Syntax: (From UNIX) `conv2ta in_file out_file scaling_factor`

Description: Converts a complex 3D transformed data file into a 3D 8-bit absolute value data file suitable for viewing by using `disp3d`. The `conv2ta` command reads the header in the transformed file, typically named `filename.transform`, to determine the dimensions of the data, takes the magnitude of the complex data, scales the data, and writes out only the data (with no header) in 8-bit pixels. It also prints out the dimensions of the file that will be needed by `disp3d`.

Arguments: `in_file` is a valid UNIX file name of the 3D transformed data file.

`out_file` is a valid UNIX file name of the output file in 8-bit bytes.

`scaling_factor` is a value to scale the data so that it is in a range for viewing by `disp3d`. Reasonable values generally range from 1 to 4000. A value of 1000 is typical.

Examples: (From UNIX) `conv2ta kiwi3d.transform kiwi3d.av 1000`

See also: *User Guide: Imaging*

Related:

acqmeter	Open Acqmeter window (M)
acqstat	Open Acquisition status window (U)
disp3d	Convert 3D data (U)
sa	Stop acquisition (C)

convert — Convert data set from a VXR-style system (M,U)

Syntax: (From VNMR) `convert(VXR_file)`
(From UNIX) `cpos_cvt VXR_file`

Description: Converts data stored on a VXR-style system (VXR, XL, or Gemini) to the format used in VNMR software. The VNMR macro `convert` loads the data from `VXR_file` into the current experiment and converts it to the new format. The UNIX command `cpos_cvt` writes the converted data in a subdirectory of the current working directory, using the original name of the data set.

Arguments: `VXR_file` is the name of a VXR-style file to be converted to VNMR style

See also: *Getting Started*

Related:

`cpos_cvt`	Convert data set from a VXR-style system (C,U)
`decomp`	Decompose a VXR-style directory (C)
`unix_vxr`	Convert UNIX text files to VXR-style format (M,U)
`vxr_unix`	Convert VXR-style text files to UNIX format (M,U)

convertbru — Convert Bruker data (M,U)

Syntax: (From UNIX) `convertbru file <options>`
(From VNMR) `convertbru(file<,options>)`

Description: A C-language program for converting 32-bit Bruker AMX data and 24- and 32-bit Bruker AM data into a 32-bit format compatible with the Varian `sread` program. After converting the Bruker data into the new format, the converted data can be read into VNMR using `sread` and can then be processed normally. The parameters `proc` and `proc1` are set appropriately by `sread`, so that `wft` or `wft2da` correctly processes the data.

Bruker AM parameters are converted to Varian parameters as shown in the table "AM Parameter Conversion." Bruker parameter names that do not conflict with a Varian parameter name are converted under the original name: `td`, `fw`, `ds`, `o1`, `o2`, `ns`, `te`, `id`, `sfo1`, `sfo2`, and `ro`. Parameters `proc` and `proc1` are set to `'rft'` for all spectra (assuming TPPI data in both dimensions).

AM Parameter Conversion

Bruker	*Varian*	*Bruker*	*Varian*
sweeps completed	`ct`	`sp`	`satdly`
`td`	`np`	`dp`	`dpwr`
`dw`	`dw`	`te`	`temp`=`te`–273
`fw`	`fb`=`1.1*sw/2`	`id`	`sw1`=1/`id`
`ds`	`ss`	`sfo1`	`sfrq`=`sfo1`+`o1`
`sw`	`sw`	`sfo2`	`dfrq`=`sfo2`+`o2`
experiments done	`ni`	`p#`	`p#`
`o1`	`tof`	`d#`	`d#`
`o2`	`dof`	`s#`	`s#`
`rd` (or `d1` if `rd`=0)	`rd`	`ro`	`spin`
`pw` (or `p0` if `pw`=0)	`pw`	`rg`	`gain`
`p1`	`pw90`	`date`	`date`
`de`	`de`	`time`	`time`
`ns`	`nt`		

Bruker AMX parameters are converted toVarian parameters as shown in the table "AMX Parameter Conversion." All Bruker parameters are converted

under their original names if the name doesn't conflict with the name of a Varian parameter. Arrayed Bruker parameters like P and D are converted to the names P# and D#, where # is the index into the array.

Because sread is limited to 8-character parameter names, the parameters routwd1# and routwd2# are converted to rtwd1# and rtwd2#.

The parameter proc is set to 'ft' when the Bruker parameter aq_mod is 1, and proc is set to 'rft' when aq_mod is 2. proc1 is always set to rft, assuming TPPI in t1.

If there is a file named info in the directory with the Bruker data, it is read in and put into the text file for the converted data set.

AMX Parameter Conversion

Bruker	*Varian*	*Bruker*	*Varian*
ns (from acqu)	nt	te	temp=te-273
ns (from acqus)	ct	sfo1	sfrq=sfo1
td (from acqus)	np	sfo2	dfrq=sfo2
td (from acqu2s)	ni	o1	tof
sw_h	sw	o2	dof
sw_h	dw=1.0e6/sw	ro	spin
sw_h (from acqu2s)	sw1	rg	gain
fw	fb=1.1*sw/2	date	date
ds	ss	date	time
rd (or d1 if rd=0)	rd	nucleus	tn
de	de	decnuc	dn
pw (or p0 if pw=0)	pw	pulprog	pslabel
p1	pw90	pulprog	seqfil

Arguments: file is the input file name. For AMX data, file should be the name of the directory that contains the acqus, acqu2s, and fid or ser files. For AM data, file should be the name of the file containing the AM data. The file argument is not required to have a .bru extension, but if it does, the .bru extension is removed before creating the output file. Unless the -cfile option is present, the output file will have the same name as the input file, but with a .cv extension, and will be written into the current working directory.

options for AMX and AM data are the following, which can be entered in any order as long as file comes first (options are usually not necessary, but can be used to override the default actions of convertbru):

- -bam or -bamx specifies whether input is AM or AMX data. The default is determined from name of the input file given.
- -cfile specifies that the output file is given the name specified by file and is written with .cv appended to the name
- -dxxx, where xxx is the decoupler frequency (it must be a value between 10.0 and 640.0 MHz). The default is to read from data set.
- -f specifies that old output file is to be overwritten. The default is to not overwrite old files.
- -olsb or -omsb specifies whether the data has the least- or most-significant byte first. For AM data, the default is determined from data set. For AMX data, the default is -olsb.

- `-pxxx,` where `xxx` is the number of 24- or 32-bit words to skip before converting data. This option is for use with `-t` option to skip the header in AM data without converting it. Typical header sizes are 216 or 256 words. The default is 0.
- `-s3` or `-s4` specifies if AM data is 24-bit (3-byte) or 32-bit (4-byte). All AMX data is 32-bit. The default is determined from the data set.
- `-tall, -thdr,` or `-tdata` specifies whether `convertbru` should convert the header and the data, just the header, or just the data. The default is `-tall.`

Examples: Convert AM data from a UNIX shell (in all these examples, the file name is arbitrarily named `br_data`):

- `convertbru br_data` determines the file format and converts the header and data in the file `br_data.`
- `convertbru br_data -d250.0 -cout` determines the file format, converts the header and data in the `br_data`, sets the decoupler frequency to 250.0 MHz, and writes to an output file named `out.cv` in the current working directory.
- `convertbru br_data -thdr` determines file format and converts only the header in the file `br_data.`
- `convertbru br_data -tdata -p256 -s3 -omsb` converts only the data in `br_data` after skipping the 256-word header. The data is converted assuming it is 24-bit AM data words with the most-significant byte first.

Convert AM data from VNMR:

- `convertbru('br_data','-tdata','-p256','-s3', '-omsb')` converts only the data in `br_data` after skipping the 256-word header. The data is converted assuming it is 24-bit AM data words with the most-significant byte first.

Convert AMX data from a UNIX shell:

- `convertbru br_data -f` converts `acqus` and `acqu2s` files to ASCII, if needed, and then converts data and overwrites the existing `br_data.cv` file.

Convert AMX data from VNMR:

- `convertbru('br_data','-f')` converts `acqus` and `acqu2s` files to ASCII, if needed, and then converts data and overwrites the existing `br_data.cv` file.
- `convertbru('br_data','-c/home/vnmr1/bdata/data1')` converts `acqus` and `acqu2s` files to ASCII, if needed, and then converts the data and writes it to `/home/vnmr1/bdata/data1.cv.`

See also: *Getting Started*

Related:

`readbrutape`	Read Bruker data files from 9-track tape (U)
`sread`	Read converted data into VNMR (C)
`wft2da`	Weight and Fourier transform phase-sensitive data (M)

copy — Copy a file (C)

Syntax: `copy(<'-r',>from_file,to_file)`

Description: Makes a copy of a file using the UNIX `cp` command. All arguments are passed. `copy` operates the same as the VNMR `cp` command.

Arguments: `'-r'` is a keyword requesting a recursive copy (i.e., copy a directory).

`from_file` is the name of the file (or directory if `'-r'` used) to be copied.

`to_file` is the name of the copy of the file (or directory). If the `from_file` argument has an extension (e.g., `.fid`), be sure the `to_file` argument has the same extension.

Examples:
```
copy('-r','/home/vnmr1/vnmrsys/seqlib','/vnmr/seqlib')
copy('/home/vnmr1/vnmrsys/seqlib/d2pul', \
   '/vnmr/seqlib/d2pul')
```

See also: *Getting Started*

Related: `cp` Copy a file (C)

cos — Find cosine value of an angle (C)

Syntax: `cos(angle)<:n>`

Description: Finds the cosine of an angle.

Arguments: `angle` is the angle, given in radians.

`n` is the return value with the cosine of `angle`. The default is to display the cosine value in the status window.

Examples:
```
cos(.5)
cos(val):cos_val
```

See also: *VNMR User Programming*

Related: `sin` Find sine value of an angle (C)

cosy — Set up parameters to a COSY pulse sequence (M)

Syntax: `cosy`

Description: Sets up for a COSY (correlated spectroscopy) experiment.

Alternate: COSY button in the 2D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

Related:
- `cosyps` Set up parameters for phase-sensitive COSY pulse sequence (M)
- `dqcosy` Set up parameters for double-quantum filtered COSY (M)
- `relayh` Set up parameters for RELAYH pulse sequence (M)

COSY — Change parameters for COSY experiment (M)

Syntax: `COSY<('GLIDE')>`

Description: Converts the current parameter set to a COSY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

cosyps — Set up parameters for phase-sensitive COSY pulse sequence (M)

Syntax: `cosyps`

Description: Sets up a phase-sensitive COSY (homonuclear correlation) experiment.

Alternate: COSYPS button in the 2D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

Related: `cosy` Set up parameters for COSY pulse sequence (M)

dqcosy	Set up parameters for double-quantum filtered COSY (M)
relayh	Set up parameters for RELAYH pulse sequence (M)

cp — Copy a file (C)

Syntax: `cp(<'-r',>from_file,to_file)`

Description: Makes a copy of a file using the UNIX `cp` command. All arguments are passed. `cp` operates the same as the VNMR `copy` command.

Arguments: `'-r'` is a keyword requesting a recursive copy (i.e., copy a directory).

`from_file` is the name of the file (or directory if `'-r'` used) to be copied.

`to_file` is the name of the copy of the file (or directory). If the `from_file` argument has an extension (e.g., `.fid`), be sure the `to_file` argument has the same extension.

Examples:
```
cp('/home/vnmr1/vnmrsys/seqlib/d2pul',   \
   '/vnmr/seqlib/d2pul')
cp('-r','/home/vnmr1/vnmrsys/seqlib','/vnmr/seqlib')
```

See also: *Getting Started*

Related:

copy	Copy a file (C)

cp — Cycle phase (P)

Description: Sets the values that real-time variable oph is calculated as, either 0,1,2,3 (`cp='y'`) or 0 (`cp='n'`). The only circumstance where setting `cp='n'` may be useful is when displaying an FID with `acqi`. If there is an imbalance between the two receiver channels, the FID displayed for `acqi` may show alternating dc levels. The standard `gf` macro that prepares parameters for the FID display in `acqi` automatically handles this issue.

Values: `'y'` makes oph calculate as 0,1,2,3; this is the typical value.
`'n'` makes oph calculate as 0.

See also: *VNMR User Programming*

Related:

acqi	Interactive acquisition display process (C)
go	Submit experiment to acquisition (C)
gf	Prepare parameters for FID/spectrum display in `acqi` (M)

cpmgt2 — Set up parameters for CPMGT2 pulse sequence (M)

Syntax: `cpmgt2`

Description: Macro to set up a CPMGT2 (Carr-Purcell Meiboom-Gill T_2) experiment.

See also: *User Guide: Liquids NMR*

Related:

t2	T_2 exponential analysis (M)

cpos_cvt — Convert data set from a VXR-style system (M,U)

Syntax: (From UNIX) `cpos_cvt VXR_file`
(From VNMR) `convert(VXR_file)`

Description: Converts data stored on a VXR-style system (Gemini, VXR, or XL) to the format used in VNMR software. `cpos_cvt` writes the converted data in a subdirectory of the current working directory, using the original name of the data set. The VNMR command `convert` loads the data from `VXR_file` into the current experiment and converts it to the new format.

Arguments: `VXR_file` is the file name in the VXR-style format to be converted to the VNMR style.

See also: *Getting Started*

Related:

`convert`	Convert data set from a VXR-style system (C,U)
`decomp`	Decompose a VXR-style directory (C)
`rt`	Retrieve FIDs (C)
`unix_vxr`	Convert UNIX text files to VXR-style format (M,U)
`vxr_unix`	Convert VXR-style text files to UNIX format (M,U)

cptmp — Copy experiment data into experiment subfile (M)

Syntax: `cptmp<(file)>`

Description: Copies the data (parameters, FID, and transformed spectrum) from the current experiment into a subdirectory inside `curexp+'/subexp'`.

Arguments: `file` is the name of the subfile to receive the data. The default is to take the name from the transmitter nucleus (if `seqfil='s2pul'`) or to use the pulse sequence name.

Examples:
```
cptmp
cptmp('cosy')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`curexp`	Current experiment directory (P)
`rttmp`	Retrieve experiment data from experiment subfile (M)
`seqfil`	Pulse sequence name (P)
`svtmp`	Move experiment data into experiment subfile (M)

cpx — Create pbox shape file (M)

Syntax: `cpx<(ref_pw90,ref_pwr)> or cpx<('g')>`

Description: Calls UNIX command `Pbox`, which generates the specified pulse shape or decoupling/spin locking pattern, as defined by the `shapelib/Pbox.inp` file.

Arguments: `ref_pw90` is the reference 90° pulse width

`ref_pwr` is the reference power level.

`'g'` is a keyword that is required only when generating gradient shapes and if the file type is not specified otherwise.

Examples:
```
cpx
cpx('g')
cpx(pw90*compH,tpwr)
```

See also: *User Guide: Liquids NMR*

Related:

`Pbox`	Pulse shaping software (U)

cr — Cursor position in directly detected dimension (P)

Description: Contains the current cursor position. The `rl` macro uses `cr` to set the reference line.

See also: *Getting Started*

Related:

`centersw`	Move cursor to center of spectrum (M)
`crf`	Current time-domain cursor position (P)
`crl`	Clear ref. line in directly detected dimension (M)

delta	Difference of two frequency cursors (P)
rl	Set reference line in directly detected dimension (M)

cr1 — Cursor position in 1st indirectly detected dimension (P)

Description: Contains the current cursor position along the first indirectly detected dimension. Analogous to the cr parameter except that cr1 applies to the first indirectly detected dimension of a multidimensional data set. The rl1 macro uses cr1 to set the reference line along this dimension.

See also: *User Guide: Liquids NMR*

Related:

centersw1	Move cursor to center of spectrum in 1st indirect dimension (M)
cr	Cursor position in directly detected dimension (P)
cr2	Cursor position in 2nd indirectly detected dimension (P)
rl1	Set ref. line in 1st indirectly detected dimension (M)

cr2 — Cursor position in 2nd indirectly detected dimension (P)

Description: Contains the current cursor position along the second indirectly detected dimension. Analogous to the cr parameter except that cr2 applies to the second indirectly detected dimension of a multidimensional data set. The rl2 macro uses cr2 to set the reference line along this dimension.

See also: *User Guide: Liquids NMR*

Related:

centersw2	Move cursor to center of spectrum in 2nd indirect dimension (M)
cr	Cursor position in directly detected dimension (P)
cr1	Cursor position in 1st indirectly detected dimension (P)
rl2	Set ref. line in 2nd indirectly detected dimension (M)

crcom — Create user macro without using text editor (M)

Syntax: `crcom(file,actions)`

Description: Creates a macro file in the user's macro library (maclib) with the contents given in the actions argument.

Arguments: file is the file name of the user macro to be created. If a macro of the same name already exists, the user is asked whether or not to overwrite it.

actions is a string containing the actions making up the user macro. The string cannot include a carriage return. If a single quote is needed within the string, it must be preceded by a backslash (see second example below).

Examples:

```
crcom('plot','pl pscale pap page')
crcom('lds','load=\'y\' su load=\'n\'')
```

See also: *VNMR User Programming*

create — Create new parameter in a parameter tree (C)

Syntax: `create(parameter<,type<,tree>>)`

Description: Creates a parameter in one of the parameter trees. A *parameter tree* is a UNIX file containing the attributes of parameters as formatted text. Refer to the command paramvi for a description of the file contents.

Arguments: parameter is the name of the parameter to be created.

type is the type of values in the parameter to be created and can be one of the following values (default is 'real'):

- 'real' is a value with no limits on range and can be positive or negative.

- 'string' is a value composed of characters. Entry of strings can be limited to selected words by enumerating the possible values with the command setenumeral. For example, the enumerated values of intmod are 'off', 'partial', and 'full'. Therefore, intmod can be set only to one of these three string values, such as intmod='full'.
- 'delay' is a value from 0 to 8190, in unit of seconds.
- 'frequency' is a positive real number value.
- 'flag', like 'string', is a value composed of characters. Entry of flags can be limited to selected characters by enumerating the possible values with the command setenumeral. For example, the enumerated values of dmm are 'c', 'f', 'g', 'm', 'p', 'r', 'u', 'w', and 'x'. Therefore, dmm can only be set to a combinations of these nine characters, such as dmm='ccw'. If enumerated values are not set, the 'string' and 'flag' types are identical.
- 'pulse' is a value from 0 to 8190, in units of µs.
- 'integer' is a value composed of integers (0,1,2,3,...).

tree is one of the following types of parameter trees (default is 'current'):

- 'current' contains parameters that are adjusted to set up an experiment. The parameters are from the file curpar in the current experiment.
- 'global' contains user-specific parameters from the file global in the vnmrsys directory of the present UNIX user.
- 'processed' contains parameters with which the data was obtained. These parameters are from the file procpar in the current experiment.
- 'systemglobal' contains instrument-specific parameters from the text file /vnmr/conpar. Most of these parameters are defined using the config program. All users have the same systemglobal tree. Note that conpar is not written out when you exit; the only time conpar is ever modified is by the config program. Thus, any changes you make to conpar using create (or destroy, setvalue, etc.) are not permanent. To permanently create a parameter in conpar, you must use a text editor to change /vnmr/conpar.

Examples:
```
create('a')
create('b','string')
create('c','real','global')
```

See also: *VNMR User Programming*

Related:

destroy	Destroy a parameter (C)
display	Display parameters and their attributes (C)
fread	Read parameters from file and load them into a tree (C)
fsave	Save parameters from a tree to a file (C)
paramvi	Edit a parameter and its attributes using vi text editor (M)
prune	Prune extra parameters from current tree (C)
setenumeral	Set values of a string variable in a tree (C)
setgroup	Set group of a parameter in a tree (C)
setprotect	Set protection mode of a parameter (C)

createtable — Generate system gradient table (M)

Syntax: createtable

Description: Generates a gradient table in the $vnmrsystem/imaging/gradtables directory (/vnmr/imaging/gradtables) needed to run an imaging experiment. The system prompts the user for the boresize of the magnet, the

maximum gradient strength (gmax), and the gradient rise time. The directory /vnmr/imaging/gradtables is set up to have group write permission mode for all VNMR users; however, the VNMR administrator, vnmr1, may want to set the write permission mode for vnmr1 only.

Systems with three-axis pulse field gradients (PFGs) or microimaging gradients might not have the same gradient strength on each axis. If the gradient strength varies, createtable prompts for the maximum gradient strength for each axis (gxmax, gymax, and gzmax). Additionally, three-axis PFG amplifiers may be limited in their total current output, and hence the gradient strength, when gradients are simultaneously applied on all three axes. If this limitation exists, the user can enter the maximum combined gradient strength, which will be the combination of $x+y+z$, in gauss/cm.

The macro expects gradient strength entered in gauss/cm, risetime in µs (it is converted to seconds when it is put in the table), and boresize in cm.

Gradient tables are needed when using the obliquing, phase encode, or magic-angle gradient PSG statements.

See also: *User Guide: Imaging*

Related:		
	gmax	Maximum gradient strength (P)
	gxmax,gymax,gzmax	Maximum gradient strengths for each axis (P)

crf — Current time-domain cursor position (P)

Description: Contains current time-domain cursor position. To create crf and the other FID display parameters axisf, dotflag, vpf, vpfi, and deltaf (if the parameter set is older and lacks these parameters), enter addpar('fid').

Values: Number, in seconds.

See also: *Getting Started*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	crl1	Clear ref. line in 1st indirectly detected dimension (C)
	deltaf	Difference of two time cursors (P)
	fidpar	Add parameters for FID display in current experiment (M)

crl — Clear reference line in directly detected dimension (M)

Syntax: crl

Description: Clears frequency referencing along the directly detected dimension by setting the reference parameters rfl and rfp to zero. crl also resets the referencing parameters refpos and reffrq.

See also: *Getting Started*

Related:		
	crl1	Clear ref. line in 1st indirectly detected dimension (C)
	crl2	Clear ref. line in 2nd indirectly detected dimension (C)
	rl	Set ref. line in directly detected dimension (M)
	reffrq	Reference frequency of reference line (P)
	refpos	Position of reference frequency (P)
	rfl	Ref. peak position in directly detected dimension (P)
	rfp	Ref. peak frequency in directly detected dimension (P)

crl1 — Clear reference line in 1st indirectly detected dimension (M)

Syntax: crl1

Description: Clears frequency referencing along the first indirectly detected dimension by setting the reference parameters rfl1 and rfp1 to zero. crl1 also resets the referencing parameters refpos1 and reffrq1.

See also: *User Guide: Liquids NMR*

Related:

crl	Clear ref. line in directly detected dimension (C)
rl1	Set ref. line in 1st indirectly detected dimension (M)
reffrq1	Ref. frequency of reference line in 1st indirect dimension (P)
refpos1	Position of reference frequency in 1st indirect dimension (P)
rfl1	Ref. peak position in 1st indirectly detected dimension (P)
rfp1	Ref. peak frequency in 1st indirectly detected dimension (P)

crl2 Clear reference line in 2nd indirectly detected dimension (M)

Syntax: crl2

Description: Clears frequency referencing along the second indirectly detected dimension by setting the reference parameters rfl2 and rfp2 to zero. crl2 also resets the referencing parameters refpos2 and reffrq2.

See also: *User Guide: Liquids NMR*

Related:

crl	Clear ref. line in directly detected dimension (C)
rl2	Set ref. line in 2nd indirectly detected dimension (M)
reffrq2	Ref. frequency of reference line in 2nd indirect dimension (P)
refpos2	Position of reference frequency in 2nd indirect dimension (P)
rfl2	Ref. peak position in 2nd indirectly detected dimension (P)
rfp2	Ref. peak frequency in 2nd indirectly detected dimension (P)

crmode Current state of the cursors in df, ds, or dconi programs (P)

Description: Stores the current state (box mode or cursor mode) of cursors in the df, ds, or dconi interactive display programs. crmode is mostly used by programmable menus to determine the status of the cursors. It is stored in the file vnmrsys/global.

Values: 'b' signifies the box mode, 'c' signifies the cursor mode.

See also: *VNMR User Programming*

Related:

dconi	Interactive 2D data display (C)
df	Display a single FID (C)
ds	Display a spectrum (C)

crof2 Recalculate rof2 so that lp = 0 (M)

Syntax: crof2<(alfa)>

Description: Recalculates a new value for rof2 (receiver gating time following a pulse) based upon the current rof2 and lp (first-order phase) values, so that lp is rendered approximately 0. For crof2 to work properly, a trial spectrum must be obtained and phased to pure absorption. This spectrum provides the current rof2 and lp values for crof2. The value of the alfa delay is left constant, provided rof2 does not become less than 1 µs.

crof2 pertains to processing 2D data. Unless lp is approximately 0, fpmult affects both the dc offset and the curvature of the spectrum.

Arguments: alfa specifies a value for the alfa delay before acquisition.

See also: *User Guide: Liquids NMR*

Related:

alfa	Set alfa delay before acquisition (P)
cfpmult	Calculate first point multiplier for 2D experiments (P)
fpmult	First point multiplier for np FID data (P)
lp	First-order phase along directly detected dimension (P)
rof2	Receiver gating time following a pulse (P)

ct — Completed transients (P)

Description: Stores a nonuser-enterable informational parameter that changes during the course of an experiment to reflect the number of completed transients. During most experiments, an accurate transient counter is displayed in the acquisition status window, updated every five seconds.

The value of ct is displayed in the acquisition parameter group by the dg command and is only updated when data processing occurs on the FID. In an experiment that is accumulating and not processed until the acquisition is complete, ct always indicates 0 until the end of the acquisition.

See also: *Getting Started*

Related:

dg	Display parameters of acquisition/processing group (C)

ctext — Clear the text of the current experiment (C)

Syntax: ctext

Description: Clears the text from the current experiment text file (a block of text that may be used to describe the sample and experiment).

See also: *Getting Started*

Related:

atext	Append string to the current experiment text (M)
text	Display text or set new text for current experiment (C)

ctune — Tune carbon channel on $^{1}H/^{13}C$ GEMINI 2000 (M)

Applicability: *GEMINI 2000* $^{1}H/^{13}C$ systems.

Syntax: ctune

Description: Turns the ^{13}C transmitter on, directing about 0.5 watt of rf to the probe coil. Before entering ctune, be sure to move the proper cable on the back of the left-hand magnet leg to the BNC connector labeled TUNE, and also to move the proper cable leading to the probe to the BNC connector labeled TUNE. Enter tuneoff to turn off the transmitter. ctune cannot be executed while the console is acquiring or interactive acquisition (acqi) is connected. For the full tuning procedure, see the manual *Autoswitchable NMR Probes Installation.*

See also: *Getting Started; Autoswitchable NMR Probes Installation.*

Related:

acqi	Interactive acquisition display process (C)
btune	Tune broadband channel on *MERCURY* series, *GEMINI 2000* (M)
dtune	Tune lock channel on *GEMINI 2000* (M)
htune	Tune proton channel on *GEMINI 2000* (M)
sethw	Set values for hardware in acquisition system (C)
su	Submit a setup experiment to acquisition (M)
tuneoff	Turn off probe tuning mode, *MERCURY* series, *GEMINI 2000* (M)

curecc — Name of eddy current compensation file (P)

Applicability: Systems with the imaging capabilities.

Description: A global string parameter containing the name of the file containing the last eddy current compensation file set. `eddysend` updates this parameter from ECC Tool window or from the keyboard.

See also: *User Guide: Imaging*

Related:

`eccTool`	Pop-up ECC Tool window (M)
`eddysend`	Update acquisition eddy current settings (M)

`curexp` Current experiment directory (P)

Description: Contains the full UNIX path to the currently active experiment. This parameter is useful when accessing text files generated by various commands (e.g., `cat(curexp+'/fp.out')`).

See also: *Getting Started*

Related:

`systemdir`	VNMR system directory (P)
`userdir`	VNMR user directory (P)

`curscan` Scan currently in progress (P)

Applicability: Systems with LC-NMR accessory.

Description: Keeps track of which “scan” is currently in progress. If `curscan` does not exist, the `parlc` macro can create it.

See also: *User Guide: Liquids NMR*

Related:

`nscans`	Number of scout/real scan repetitions (P)
`parlc`	Create LC-NMR parameters (M)

`curwin` Current window (P)

Description: An arrayed global parameter. The first value is the index of the selected window pane in the VNMR graphics window. The second value is the number of window pane rows. The third value is the number of columns.

See also: *Getting Started*

Related:

`fontselect`	Open FontSelect window (C)
`jwin`	Activate current window (M)
`mapwin`	List of experiment numbers (P)
`setgrid`	Activate selected window (M)
`setwin`	Activate selected window (C)

`CustomQ` Set up a custom queue in automation (M)

Syntax: `CustomQ(solvent)`

Description: Reads the `EXPLIST` in the `sampleinfo` file, calls appropriate setup macro (`AuHexp` or `AuCexp`), and sets up `explist` and `wexp` parameters appropriate for the selected chain. This macro is called by `auto_au`.

`cutoff` Data truncation limit (P)

Description: Defines the distance above and below the current vertical position `vp` at which spectra and integrals are truncated. By arraying `cutoff` to have two different values, the truncation limits above and below the current vertical position can be controlled independently (e.g., `cutoff=50` truncates data at `vp+50` mm and `vp–50` mm, and `cutoff=50,10` truncates data at `vp+50` mm and `vp-10` mm). `cutoff='n'` disables the action of `cutoff`.

`cutoff` is not active during interactive spectral displays (i.e., for the `ds` command), but is active during non-interactive spectral displays and plots (for the `dss` and `pl` commands).

Values: `'n'`, number in mm.

See also: *Getting Started*

Related:

`ds`	Display a spectrum (C)
`dss`	Display stacked spectra (C)
`pl`	Plot spectra (C)
`vp`	Vertical position of spectrum (P)

cyclenoe — Set up parameters for CYCLENOE pulse sequence (M)

Applicability: Systems in which the observe channel is equipped with direct synthesis rf and a linear amplifier. Sequence is supplied with *MERCURY* and *GEMINI 2000* as `noedif`.

Syntax: `cyclenoe`

Description: Sets up a difference NOE experiment.

See also: *User Guide: Liquids NMR*

Related:

`noedif`	Convert parameters for NOE difference experiment (M)

cylbr24 — Set up parameters for cycled BR24 pulse sequence (M)

Applicability: Systems with solids module. Sequence is not supplied with *MERCURY* and *GEMINI 2000*.

Syntax: `cylbr24`

Description: Sets up a BR24 sequence with quadrature detection and prepulse for solids multiple-pulse line narrowing.

See also: *User Guide: Solid-State NMR*

Related:

`br24`	Set up parameters for BR24 pulse sequence (M)

cylmrev — Set up parameters for cycled MREV8 pulse sequence (M)

Applicability: Systems with a solids module. Sequence is not supplied with *MERCURY* and *GEMINI 2000*.

Syntax: `cylmrev`

Description: Sets up a MREV8 sequence with quadrature detection and prepulse for solids multiple-pulse line narrowing.

See also: *User Guide: Solid-State NMR*

Related:

`mrev8`	Set up parameters for MREV8 pulse sequence (M)

cz — Clear integral reset points (C)

Syntax: `cz<(frequency1,frequency2,...)>`

Description: Removes currently defined integral reset points.

Arguments: `frequency1,frequency2,...` are reset points corresponding to specified frequencies to be removed. The default is remove all reset points.

Examples:

```
cz
cz(800,600,250,60)
```

See also: *Getting Started*

Related	dli	Display listed integral values (C)
	dlni	Display listed normalized integral values (C)
	nli	Find normalized integral values (C)
	z	Add integral reset point at the cursor position (C)

D

d0 — Overhead delay between FIDs (P)

Applicability: UNITY*INOVA* systems

Description: Defines the extra overhead delay at the start of each FID or array element. Overhead times between increments and transients on the UNITY*INOVA* are deterministic, i.e., both known and constant. However, the time between increments (typically `x`) is longer than the time between transients (`y`, not including times that are actually part of the pulse sequence, such as `d1`). Some experiments may benefit if it is ensured that these two times are not only constant but equal. To ensure that the times are constant and equal, insert the time `d0` at the start of each transient (before the pulse sequence actually starts); the actual delay is then `y+d0`. However, the overhead time may differ with different system configurations. To keep the `d0` delay consistent across systems, set `d0` greater than the overhead delay. The inter-FID delay `x` is then padded so that `y+d0=x+(d0-(x-y))`.

Currently, `d0` only takes into account the extra delay at the start of each array element. It does not take into account the overhead delays at the start and end of each scan. It also does not take into account delays when arraying `status` statements, shims, or spinner speeds.

The `d0` parameter does not exist in any parameter set and must be created by the user. To create `d0`, enter `create('d0','delay')`. If `d0` is nonexistent, do not insert a delay between transients.

Values: `'n'`, `'y'`, or `0` to the maximum delay time (in seconds).

If `d0='n'`, the software calculates the overhead time for an array element and then delays that length of time at the beginning of subsequent transients for every array element. The calculated value of `d0` can be viewed by entering `d0='y'` in the VNMR input window.

If `d0` is set to a value, that value is the length of delay time at the beginning of subsequent transients for every array element. If the value is greater than the array overhead time, the array overhead time is padded to `d0`.

See also: *VNMR User Programming*

Related: `create` Create new parameter in parameter tree (C)

d1 — First delay (P)

Description: Length of the first delay in the standard two-pulse sequence and most other pulse sequences. This delay is used to allow recovery of magnetization back to equilibrium, if such a delay is desired.

Values: On *MERCURY* series systems: 0, 0.2 µs to 150,000 sec. On *GEMINI 2000* systems: 0 to 4095 sec, smallest value possible is 0.2 µs, finest increment possible is 0.1 µs. On systems with a Data Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.1 µs, finest increment possible is 12.5 ns. On systems with a Pulse Sequence Controller or Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 25 ns. On systems with an Output board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 0.1 µs. (Refer to the `acquire` statement in the manual *VNMR User Programming* for a description of these boards.)

See also: *Getting Started*

Related:

alfa	Set alfa delay before acquisition (P)
d2	Incremented delay in 1st indirectly detected dimension (P)
d3	Incremented delay in 2nd indirectly detected dimension (P)
d4	Incremented delay in 3rd indirectly detected dimension (P)
pad	Preacquisition delay (P)

d2 — Incremented delay in 1st indirectly detected dimension (P)

Description: Length of the second delay in the standard two-pulse sequence. The delay is controlled by the parameters ni and sw1 in a 2D experiment.

Values: On *MERCURY* series systems: 0, 0.2 µs to 150,000 sec. On *GEMINI 2000* systems: 0 to 4095 sec, smallest value possible is 0.2 µs, finest increment possible is 0.1 µs. On systems with a Data Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.1 µs, finest increment possible is 12.5 ns. On systems with a Pulse Sequence Controller or Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 25 ns. On systems with an Output board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 0.1 µs. (Refer to acquire statement in the manual *VNMR User Programming* for a description of these boards.)

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

d1	First delay (P)
ni	Number of increments in 1st indirectly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)

d2pul — Set up parameters for D2PUL pulse sequence (M)

Applicability: This pulse sequence is made obsolete on the *GEMINI 2000* because when tn is 'H1' and dn is not 'H1', the software automatically uses the decoupler as the observe channel and the broadband channel as the decoupler channel. To run the equivalent of d2pul, set tn='H1' and dn='H1', and then run s2pul. D2PUL is also not on *MERCURY* series systems

Syntax: d2pul

Description: Sets up a standard two-pulse sequence using the decoupler as transmitter.

Alternate: D2PUL button in the 1D Pulse Sequence Setup Secondary Menu.

See also: *User Guide: Liquids NMR*

Related:

dhp	Decoupler high power with class C amplifier (P)
dn	Nucleus for the first decoupler (P)
dof	Frequency offset for first decoupler (P)
dpwr	Power level for first decoupler with linear amplifiers (P)
homo	Homodecoupling control for first decoupler (P)
s2pul	Set up parameters for standard two-pulse sequence (M)
tn	Nucleus for the observe transmitter (P)
tof	Frequency offset for observe transmitter (P)
tpwr	Power level of observe transmitter with linear amplifiers (P)

d3 — Incremented delay for 2nd indirectly detected dimension (P)

Description: Length of a delay controlled by the parameters ni2 and sw2 in a 3D experiment. The d2 delay, which is controlled by ni and sw1, is incremented through its entire implicit array first before d3 is incremented. To create

parameters d3, ni2, phase2, and sw2 to acquire a 3D data set in the current experiment, enter addpar('3d').

Values: On systems with a Data Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.1 µs, finest increment possible is 12.5 ns. On systems with a Pulse Sequence Controller or Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 25 ns. On systems with an Output board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 0.1 µs. (Refer to acquire statement in the manual *VNMR User Programming* for a description of these boards.)

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	d1	First delay (P)
	ni2	Number of increments in 2nd indirectly detected dimension (P)
	par3d	Create 3D acquisition, processing, display parameters (C)
	phase2	Phase selection for 3D acquisition (P)
	sw2	Spectral width in 2nd indirectly detected dimension (P)

d4 — Incremented delay for 3rd indirectly detected dimension (P)

Description: Length of a delay controlled by the parameters ni3 and sw3 in a 4D experiment. The d3 delay, which is controlled by ni2 and sw2, is incremented through its entire implicit array first before d4 is incremented. To create parameters d4, ni3, phase3, and sw3 to acquire a 4D data set in the current experiment, enter addpar('4d').

Values: On systems with a Data Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.1 µs, finest increment possible is 12.5 ns. On systems with a Pulse Sequence Controller or Acquisition Controller board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 25 ns. On systems with an Output board: 0 to 8190 sec, smallest value possible is 0.2 µs, finest increment possible is 0.1 µs. (Refer to acquire statement in the manual *VNMR User Programming* for a description of these boards.)

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	d1	First delay (P)
	ni3	Number of increments in 3rd indirectly detected dimension (P)
	par4d	Create 4D acquisition parameters (C)
	phase3	Phase selection for 4D acquisition (P)
	sw3	Spectral width in 3rd indirectly detected dimension (P)

DAC_to_G — Store gradient calibration value in DOSY sequences (P)

Syntax: DAC_to_G

Description: DAG_to_G is automatically set by the setup_dosy macro by retrieving the gradient strength from the probe calibration file if probe<>'' and storing it in DAC_to_G. If probe=' ' (i.e., the probe is not defined), then DAC_to_G is set to the current value of the global parameter gcal

See also: *User Guide: Liquids NMR.*

Related:		
	dosy	Process DOSY experiments (M)
	setup_dosy	Set up gradient levels for DOSY experiments (M)
	setgcal	Set the gradient calibration constant (M)

da — Display acquisition parameter arrays (C)

Syntax: `da<(par1<,par2><,par3...>)>`

Description: Displays arrayed acquisition parameters.

Arguments: `par1,par2,par3,...` are names of parameters to be displayed.The default is to display all such parameters.

Examples:
```
da
da('d2')
```

See also: *User Guide: Liquids NMR*

Related:

`dg`	Display parameters of acquisition/processing group (C)

daslp — Increment for t1 dependent first-order phase correction (P)

Applicability: UNITY*INOVA* systems.

Description: Causes "shearing" of f_1 traces of a 2D dataset and is used to rotate the narrow projection of some solids correlations into the f_1 dimension. Several solids experiments for Dynamic Angle Spinning (DAS) and a triple-quantum filtered 2D MAS experiment require the use of `daslp`. (Note that the command `rotate` shears two traces and is inapplicable for these experiments.)

When created, the value of `lp` for each increment of a 2D experiment is incremented by the value of `daslp` after the first Fourier transformation. The incremented phase correction is applied to the interferogram created from the coefficient table by `ft1d`, `ft2d`, `wft1d` and `wft2d`, when coefficients are present. `daslp` is also used with `ft1da`, `ft2da`, `wft1da` and `wft2da`.

Values: Real values, typically similar in size to the value of parameter `lp`.

See also: *User Guide: Liquids NMR; User Guide: Solid-State NMR*

Related:

`ft1d`	Fourier transform along f_2 dimension (C)
`ft1da`	Fourier transform phase-sensitive data (M)
`ft2d`	Fourier transform 2D data (C)
`ft2da`	Fourier transform phase-sensitive data (M)
`lp`	First-order phase in directly detected dimension (P)
`rotate`	Rotate 2D data (C)
`wft1d`	Weight and Fourier transform f2 for 2D data (C)
`wft1da`	Weight and Fourier transform phase-sensitive data (M)
`wft2d`	Weight and Fourier transform 2D data (C)
`wft2da`	Weight and Fourier transform phase-sensitive data (M)

date — Date (P)

Description: An informational parameter taken from the UNIX-level calendar (which is set by the UNIX system operator only and cannot be entered by the user). Whenever data are acquired, the date is copied from UNIX and written into the acquisition parameters, thus maintaining a record of the date of acquisition.

See also: *Getting Started*

daxis — Display horizontal LC axis (M)

Applicability: Systems with LC-NMR accessory.

Syntax: `daxis(time,major_tic,minor_tic)`

Description: Displays a horizontal LC axis. Horizontal axes are assumed to be used with "LC plots" of an entire LC run and are labeled accordingly.

Arguments: `time` is the time scale, in minutes (decimal values are fine), of the axis.
`major_tic` is spacing, in minutes (decimal values are fine), of major tics.
`minor_tic` is spacing, in minutes (decimal values are fine), of minor tics.

See also: *User Guide: Liquids NMR*

Related:

`paxis`	Display horizontal LC axis (M)

Dbppste — Set up parameters for Dbppste pulse sequence (M)

Syntax: `Dbppste`

Description: Converts a parameter set to Dbppste experiment; replaces the macro `bppste`.

See also: *User Guide: Liquids NMR*

Related:

`dosy`	Process DOSY experiments (M)
`fiddle`	Perform reference deconvolution (M)
`setup_dosy`	Set up gradient levels for DOSY experiments (M)

Dbppsteinept — Set up parameters for Dbppsteinept pulse sequence (M)

Syntax: `Dbppsteinept`

Description: Converts a parameter set to Dbppsteinept experiment.

See also: *User Guide: Liquids NMR*

Related:

`dosy`	Process DOSY experiments (M)
`fiddle`	Perform reference deconvolution (M)
`setup_dosy`	Set up gradient levels for DOSY experiments (M)

dc — Calculate spectral drift correction (C)

Syntax: `dc`

Description: Turns on a linear baseline correction. The beginning and end of the straight line to be used for baseline correction are determined from the display parameters `sp` and `wp`. `dc` applies this correction to the spectrum and stores the definition of the straight line in the parameters `lvl` (level) and `tlt` (tilt). The correction is turned off by the command `cdc`.

Care must be taken to ensure that a resonance does not appear too close to either end of the spectrum, or `dc` can produce the opposite effect from that intended; namely, it induces a sloping baseline where none was present!

Alternate: DC button in the 1D Data Manipulation Menu.

See also: *Getting Started*

Related:

`bc`	1D and 2D baseline correction (C)
`cdc`	Cancel drift correction (C)
`dc`	Drift correction group (P)
`lvl`	Zero-order baseline correction (P)
`sp`	Start of plot (P)
`tlt`	First-order baseline correction (P)
`wp`	Width of plot (P)

dc2d — Apply drift correction to 2D spectra (C)

Syntax: `dc2d('f1'|'f2')`

Description: Computes a drift correction and applies it to each individual trace.

Arguments: `'f1'` is a keyword to apply drift correction in the f_1 axis direction.

'f2' is a keyword to apply drift correction in the f_2 axis direction.

Examples:
```
dc2d('f1')
dc2d('f2')
```

See also: *User Guide: Liquids NMR*

Related:

axis	Axis label for displays and plots (P)
bc	1D and 2D baseline correction (C)

dcg — Drift correction group (P)

Description: Contains the results of the dc or cdc command. This parameter cannot be set in the usual way but it can be queried by entering dcg? to determine whether drift correction is active.

Values: 'dc' indicates drift correction is active.
'cdc' indicates drift correction is inactive.

See also: *User Guide: Liquids NMR*

Related:

cdc	Cancel drift correction (C)
dc	Calculate spectral drift correction (C)

dcon — Display noninteractive color intensity map (C)

Syntax: dcon<(options)>

Description: Produces a "contour plot," actually a color intensity map, in the graphics window. The parameters sp and wp, sp1 and wp1, and sp2 and wp2 control which portion of the spectrum is displayed. The parameters sf and wf, sf1 and wf1, and sf2 and wf2 control which portion of time-domain data (FIDs and interferograms) is displayed. The parameter trace selects which dimension is displayed along the horizontal axis. The parameters sc, wc, sc2, and wc2 control where on the screen the display occurs. The parameter th is active as a threshold to black out all contours whose intensity is below th. That is, if th=7, the colors 1 to 6 are not used for the display. The parameter vs controls the vertical scale of the spectrum.

dcon displays either absolute-value mode or phase-sensitive 2D data. In av mode, data are shown in 15 different colors (starting with black), with each color representing a factor of two in intensity (a single color is used on monochrome screens). In the ph mode, the normal display of colors ranges from –6 to +6, each representing a factor of two in intensity, with the color black representing intensity 0 in the center.

Arguments: options can be any of the following:

- 'linear' is a keyword to use linear instead of logarithmic increments.
- 'phcolor' is a keyword to use a phased color set with positive and negative peaks.
- 'avcolor' is a keyword to use an absolute-value color set with positive peaks. Negative contours only *cannot* be displayed, but if the data can be rephased, 180° added to rp1, and dcon('avcolor') entered again, the same thing is accomplished by inverting the phase of all peaks. Alternatively, dpcon can display negative peaks only.
- 'gray' is a keyword to use a gray scale color set.
- 'noaxis' is a keyword to omit the display outline and any horizontal or vertical axis.

- `'plot'` causes the `dcon` display to be sent to the plotter instead of being drawn on the graphics window.

Examples:
```
dcon
dcon('gray')
dcon('linear','phcolor','plot')
```

See also: *User Guide: Liquids NMR*

Related:

`dconi`	Interactive 2D data display (C)
`dconi`	Control display selection for the dconi program (P)
`dconn`	Display color intensity map without screen erase (C)
`dpcon`	Display plotted contours (C)
`image`	Display noninteractive gray scale image (M)
`imageprint`	Plot noninteractive gray scale image (M)
`sc`	Start of chart (P)
`sc2`	Start of chart in second direction (P)
`sf`	Start of FID (P)
`sp`	Start of plot (P)
`sp1`	Start of plot in 1st indirectly detected dimension (P)
`sp2`	Start of plot in 2nd indirectly detected dimension (P)
`th`	Threshold (P)
`trace`	Mode for *n*-dimensional data display (P)
`wc`	Width of chart (P)
`wc2`	Width of chart in second direction (P)
`wf`	Width of FID (P)
`wp`	Width of plot (P)
`wp1`	Width of plot in 1st indirectly detected dimension (P)
`wp2`	Width of plot in 2nd indirectly detected dimension (P)

`dconi` Interactive 2D data display (C)

Syntax: `dconi<(options)>`

Description: Opens a 2D data display that can be interactively adjusted. The `dconi` program can accommodate any data set that can be displayed by `dcon`, `dpcon`, and `ds2d`, including 2D FIDs, interferograms, 2D spectra, planes from 3D data sets, and images. These data sets are generated by the commands `df2d`, `ft1d`, `ft2d`, and `ft3d`.

Arguments: `options` can be any of the following (note that the `dconi` parameter is also available to control the `dconi` program display):

- `'dcon'` is a keyword to display a color intensity map; this is the default mode, but `'dcon'` is provided for compatibility with certain macros. If `'dcon'` is the first argument, it can be followed by any of the keywords `'linear'`, `'phcolor'`, `'avcolor'`, `'gray'`, and `'noaxis'`; all of these keywords have the same meaning as when used with `dcon`.
- `'dpcon'` is a keyword to display a true contour plot. If `'dpcon'` is the first argument, it can be followed by any of the keywords `'pos'`, `'neg'`, and `'noaxis'`, and then followed by values for `levels` and `spacing`. All of these options have the same meaning as when used with `dpcon`.
- `'ds2d'` is a keyword to display a stacked plot in whitewash mode (after the first spectra, each spectra is blanked out in regions in which it is behind an earlier spectra). If `'ds2d'` is the first argument, it can be followed by any of the keywords `'nobase'`, `'fill'`, `'fillnb'`, and `'noaxis'`. All of these keywords have the same meaning as used with `ds2d`.

- `'again'` is a keyword to make `dconi` identify which display mode is currently being used and redraw the screen in that mode. This option is useful when writing VNMR menus.
- `'restart'` is a keyword to activate `dconi` without redrawing the 2D data set. This action causes `dconi` to make sure that 2D data is already displayed.
- `'toggle'` is a keyword to toggle between the cursor and box modes.
- `'trace'` is a keyword to draw a trace above the spectrum.
- `'expand'` is a keyword to toggle between the expand and full views of the spectrum.
- `'plot'` is a keyword to plot a projection or a trace.
- `'hproj_max'` is a keyword to do a horizontal projection of the maximum trace.
- `'hproj_sum'` is a keyword to do a horizontal projection of the sum of all traces.
- `'vproj_max'` is a keyword to do a vertical projection of the maximum trace.
- `'vproj_sum'` is a keyword to do a vertical projection of the sum of all traces.

Examples:

```
dconi
dconi('dcon','gray','linear')
dconi('dpcon')
```

See also: *User Guide: Liquids NMR*

Related:

`boxes`	Draw boxes selected by the mark command (C)
`crmode`	Current state of cursors in dfid, ds, or dconi (P)
`dcon`	Display noninteractive color intensity map (C)
`dconi`	Control display selection for the dconi program (P)
`dconn`	Display color intensity map without screen erase (C)
`delta1`	Cursor difference in 1st indirectly detected dimension (P)
`df2d`	Display FIDs of 2D experiment (C)
`dpcon`	Display plotted contours (C)
`ds2d`	Display 2D spectra in whitewash mode (C)
`ft1d`	Fourier transform along f_2 dimension (C)
`ft2d`	Fourier transform 2D data (C)
`ft3d`	Perform a 3D Fourier transform on a 3D FID data set (M,U)
`image`	Display noninteractive gray scale image (M)
`imconi`	Display 2D data in interactive gray-scale mode (M)
`is`	Integral scale (P)
`ll2d`	Automatic and interactive 2D peak picking (C)
`proj`	Project 2D data (C)
`sf`	Start of FID (P)
`sp`	Start of plot (P)
`sp1`	Start of plot in 1st indirectly detected dimension (P)
`th`	Threshold (P)
`vs2d`	Vertical scale for 2D displays (P)
`vsadj`	Automatic vertical scale adjustment (M)
`wf`	Width of FID (P)
`wp`	Width of plot (P)
`wp1`	Width of plot in 1st indirectly detected dimension (P)

dconi — Control display selection for the dconi program (P)

Description: Controls the selection of the 2D display that follows entering the dconi command. Because dconi is implicitly executed by ft2d, the dconi parameter also controls the display that follows the ft2d or wft2d command.

dconi can be a string parameter in the "current" parameter set. Its syntax is similar to an argument string passed to the dconi program. For example, if dconi ='dpcon,pos,12,1.2', the dconi command displays twelve positive contours with dpcon, using a spacing of 1.2. The first component of the dconi string must be the name of the display program, such as dcon, dconn, dpcon, dpconn, ds2d, or ds2dn. Subsequent components of the string are arguments appropriate for that display program. Because the entire dconi parameter is a string, single quotes around words are not necessary and mixing words and numbers is not a problem, as the example above shows.

If the dconi parameter does not exist or is set to the null string (''), the dconi program uses its normal default. If the dconi parameter is set to a string (e.g., dconi='dcon,gray,linear' for image display), and arguments are supplied to the dconi program, (e.g., dconi('dpcon')), the supplied arguments to the command take precedence. In the case of the examples above, a contour map, not an image, is displayed.

If the dconi parameter does not exist in the current experiment, it can be created by the commands
create('dconi','string')
setgroup('dconi','display')

Values: '' (two single quotes) indicates that this parameter is ignored.

String 'display_program' selects the named program for 2D displays.

String 'display_program,option1,option2' selects the named program for 2D displays with options appropriate to the program.

Examples: dconi='dpcon' selects contour drawing rather than default color map
dconi='dcon,gray,linear' selects image display mode.

See also: *User Guide: Liquids NMR; User Guide: Imaging*

Related:

dcon	Display noninteractive color intensity map (C)
dconi	Interactive 2D data display (C)
dconn	Display color intensity map without screen erase (C)
dpcon	Display plotted contours (C)
dpconn	Display plotted contours without screen erase (C)
ds2d	Display 2D spectra in whitewash mode (C)
ds2dn	Display 2D spectra in whitewash mode without screen erase (C)
ft2d	Fourier transform 2D data (C)
imconi	Display 2D data in interactive gray-scale mode (M)
wft2d	Weight and Fourier transform 2D data (C)

dconn — Display color intensity map without screen erase (C)

Syntax: dconn<(options)>

Description: Produces a "contour plot," actually a color intensity map, on the screen the same as the dcon command, but without erasing the screen before starting the plot. The options available are the same as the dcon command.

See also: *User Guide: Liquids NMR*

Related:

dcon	Display noninteractive color intensity map (C)
dconi	Control display selection for the dconi program (P)

dcrmv — Remove dc offsets from FIDs in special cases (P)

Description: If `dcrmv` exists and is set to `'y'`, hardware information is used to remove the dc offset from the FID providing `ct=1`. This only works on UNITY*INOVA*, UNITY*plus*, *MERCURY* series, and *GEMINI 2000* systems with `sw` less than 100 kHz. If this feature is desired for a particular experiment, create `dcrmv` in that experiment by entering `create('dcrmv','string')` `setgroup('dcrmv','processing') dcrmv='y'`

To create image parameters `dcrmv`, `grayctr` and `graysl` in the current experiment, enter `addpar('image').`

See also: *Getting Started; User Guide: Imaging*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`create`	Create new parameter in a parameter tree (C)
`ct`	Completed transients (P)
`dc`	Calculate spectral drift correction (C)
`setgroup`	Set group of a variable in a tree (C)

ddf — Display data file in current experiment (C)

Syntax: `ddf<(block_number,trace_number,first_number)>`

Description: Displays the file header of the data file in the current experiment. If entered with arguments, it also displays a block header and part of the data file of that block.

Arguments: `block_number` is the block number. Default is 1.

`trace_number` is the trace number within the block. Default is 1.

`first_number` is the first data element number within the trace. Default is 1.

See also: *VNMR User Programming*

Related:

`ddff`	Display FID file in current experiment (C)
`ddfp`	Display phase file in current experiment (C)

ddff — Display FID file in current experiment (C)

Syntax: `ddff<(block_number,trace_number,first_number)>`

Description: Displays the file header of the FID file in the current experiment. If entered with arguments, it also displays a block header and part of the FID data of the block.

Arguments: `block_number` is the block number. Default is 1.

`trace_number` is the trace number within the block. Default is 1.

`first_number` is the first data element number within the trace. Default is 1.

See also: *VNMR User Programming*

Related:

`ddf`	Display data file in current experiment (C)
`ddfp`	Display phase file in current experiment (C)

ddfp — Display phase file in current experiment (C)

Syntax: `ddfp<(block_number,trace_number,first_number)>`

Description: Displays the file header of the phase file in the current experiment. With arguments, it also display a block header and part of the phase file data of that block.

Arguments: `block_number` is the block number. Default is 1.

`trace_number` is the trace number within the block. Default is 1.

`first_number` is the first data element number within the trace. Default is 1.

See also: *VNMR User Programming*

Related:

ddf	Display data file in current experiment (C)
ddff	Display FID file in current experiment (C)

ddif — Synthesize and show DOSY plot (C)

Syntax: `ddif(<option>,lowerlimit,upperlimit)`

Description: Synthesizes a 2D spectrum from 1D spectra using the information produced by the dosy macro. ddif takes the 1D spectrum and a table of diffusion data stored in the file diffusion_display.inp in the current experiment and synthesizes a 2D DOSY spectrum. It is normally run by dosy, but can be directly run, for example, to recalculate a 2D DOSY spectrum with different digitization.

Arguments: option is either 'i' or 'c'.

'i' is for a display in which the 2D peak volume is proportional to 1D peak height.

'c' is for a display in which the 2D peak height equals the 1D.

lowerlimit is the lower diffusion limit (in units of 10^{-10} m^2/s).

upperlimit is the upper diffusion limit (in units of 10^{-10} m^2/s).

If arguments are not supplied, ddif defaults to showing the full range of diffusion coefficients in the file diffusion_display.inp in the current experiment. Make sure that the first increment of the DOSY data set has been transformed with the desired fn2D before using ddif. Digitization of the resultant spectrum is determined by fn2D in the spectral (F2) domain and fn1 in the diffusion (F1) domain. Make sure that the product fn2D*fn1 is not too large, or memory and processing time problems might result. Typical values are fn2D=16384 (max: 64k) and fn1=512. After dosy or ddif, 1D data is overwritten by the 2D (the dosy macro keeps a copy of the 1D data, which can be retrieved with the command undosy). Similarly, after a DOSY spectrum has been calculated, it can be retrieved with the command redosy.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)
fn2D	Fourier number to build up 2D DOSY display in frequency domain (P)
redosy	Restore the previous 2D DOSY display from the subexperiment (M)
undosy	Restore original 1D NMR data from the subexperiment (M)

dds — Default display (M)

Syntax: `dds`

Description: Looks for sequence-specific default display macro (dds_seqfil) and executes if one is found. If not, the dds macro displays 1D, 2D, or array spectrum as the case may be.

Related:

dds_seqfil	Sequence-specific default display (M)
dpl	Default plot (M)
dpr	Default process (M)

dds_seqfil — Sequence-specific default display (M)

Syntax: `dds_seqfil`

Description: Sequence-specific default display. These macros are called by the dds macro.

Examples: `dds_NOESY1D`
`dds_TOCSY1D`

Related:
`dds` Default display (M)
`dpl` Default plot (M)
`dpr` Default process (M)

debug — Trace order of macro and command execution (C)

Syntax: `debug('c'|'C')`

Description: Controls VNMR command and macro tracing. When turned on, `debug` displays a list of each command and macro in the shell tool from which VNMR was started. If VNMR is started when the user logs in, or if it was started from a drop-down menu or the CDE tool, the output goes to a Console window. If no Console window is present, the output goes into a file in the `/var/tmp` directory. This last option is not recommended. Nesting of the calls is indicated by indentation of the output. This feature is primarily a debugging tool for MAGICAL programming.

Arguments: `'c'` is a keyword to turn on command and macro tracing.

`'C'` is a keyword to turn off command and macro tracing.

Examples:
```
debug('c')
debug('C')
```

See also: *VNMR User Programming*

decfrq — Interrogate or set first decoupler frequency (obsolete)

Description: This command is no longer in VNMR. Use `dfrq` as the effective replacement.

Related: `dfrq` Transmitter frequency of first decoupler (P)

dec2frq — Interrogate or set second decoupler frequency (obsolete)

Description: This command is no longer in VNMR. Use `dfrq2` as the effective replacement.

Related: `dfrq2` Transmitter frequency of second decoupler (P)

dec3frq — Interrogate or set third decoupler frequency (obsolete)

Description: This command is no longer in VNMR. Use `dfrq3` as the effective replacement.

Related: `dfrq3` Transmitter frequency of third decoupler (P)

decomp — Decompose a VXR-style directory (M)

Syntax: `decomp<(VXR_file)>`

Description: Takes a library, as loaded from a VXR-style system (VXR, XL, or Gemini), and extracts each entry into a separate UNIX file. The file can be obtained from a magnetic tape or over limNET. `decomp` creates a UNIX subdirectory in the current working directory and uses that to write each entry as a UNIX file. The name of the UNIX subdirectory is derived from the library name.

Arguments: `VXR_file` is the name of the original file. It must have an extension in the form `.NNN`, where `NNN` is the number of entries in the original library. A limit of 432 entries is imposed.

See also: *Getting Started*

Related:

convert	Convert data set from a VXR-style system (C,U)
unix_vxr	Convert UNIX text files to VXR-style format (M,U)
vxr_unix	Convert VXR-style text files to UNIX format (M,U)

def_osfilt — Default value of osfilt parameter (P)

Description: A global parameter that establishes the default type of digital filter, Analog*Plus*™ or brickwall, when DSP is configured. The *actual* filter used in any experiment is set by the local parameter osfilt. Usually, def_osfilt is set to the value for normal use, and then osfilt is changed within a given experiment if different filter characteristics are desired.

Values: 'a' or 'A' for the Analog*Plus* digital filter. This filter is flatter in the passband and drops off somewhat more sharply than analog filters.

'b' or 'B' for the brickwall digital filter. This filter is extremely flat across the passband and drops off sharply on the edge; however, the enhanced filtering comes at the expense of somewhat reduced baseline performance.

See also: *Getting Started*

Related:

dsp	Type of DSP for data acquisition (P)
osfilt	Oversampling filter for real-time DSP (P)

defaultdir — Default directory for Files menu system (P)

Description: Stores the name to the default directory for use with the Directory Menu in the Files menu system. Initial value for defaultdir is the home or login directory of the user. Selecting the Default button in the Directory Menu sets the current directory to the value of defaultdir. The opposite action, setting the value of defaultdir to the current directory, occurs when the Set Default button in the Directory Menu is selected. If the entry for a directory is marked and the Set Default button is selected, the directory marked becomes the new value of defaultdir.

See also: *Getting Started*

delcom — Delete a user macro (M)

Syntax: delcom(file)

Description: Deletes a macro file in a user's macro library (maclib). Note that delcom will not delete a macro in the VNMR system macro library or a macro in a macro directory specified by the maclibpath parameter.

Arguments: file is the file name of the user's macro to be deleted.

Examples: delcom('lds')

See also: *VNMR User Programming*

Related:

crcom	Create user macro without using a text editor (C)
maclibpath	Path to user's macro directory (P)
macrorm	Remove a user macro (C)

delete — Delete a file, parameter directory, or FID directory (C)

Syntax: delete(file1<,file2,...>)

Description: Delete files and directories in a somewhat safer manner than the rm command. Using rm is not recommended in VNMR because rm allows wildcard

characters (* and ?) in the file description and recursive file deletion with the -r option. The delete command does not allow wildcard characters or the -r option, but you can still use the delete command to delete a file as well as remove .fid and .par directories, normally the only directories that need to be removed (experiment directories are deleted with the delexp macro).

Arguments: file1, file2, ... are the names of one or more files or directories to be deleted. When the delete command is entered, it first searches for file1. If it finds that file and it is not a directory, file1 is deleted. If file1 is not found, .fid is appended to the file name and delete searches for the file in that .fid directory. If the file is found, it is removed; otherwise ,.par is appended to the file name and delete searches for the file in that .par directory. If the file is found, it is removed; otherwise, the command takes no action and continues to the next file name. The process is repeated for each file name given as an argument.

Examples:
```
delete('/home/vnmr1/memo')
delete('/vnmr/fidlib/fid1d')
```

See also: *Getting Started*

Related:

delexp	Delete an experiment (M)
rm	Delete file (C)
rmdir	Remove directory (C)

delexp — Delete an experiment (M)

Syntax: delexp(experiment_number)

Description: Deletes an experiment.

Arguments: experiment_number is the number (from 2 through 9999) of the experiment to be deleted (experiment 1 cannot be deleted). delexp also deletes the corresponding jexpXXX macro if necessary.

Examples:
```
delexp(321)
```

Alternate: Delete button in the Workspace Menu.

See also: *User Guide: Liquids NMR*

Related:

cexp	Create an experiment (M)
jexp	Join existing experiment (C)

dels — Delete spectra from T_1 or T_2 analysis (C)

Syntax: dels(index1<,index2,...>)

Description: Deletes the spectra selected from the file fp.out (the output file of fp) used by the t1 or t2 analysis. Spectra may be restored by rerunning fp.

Arguments: index1,index2,... are the indexes of the spectra to be deleted.

Examples:
```
dels(7)
dels(2,5)
```

See also: *User Guide: Liquids NMR*

Related:

dll	Display listed line frequencies and intensities (C)
fp	Find peak heights or phases (C)
getll	Get frequency and intensity of a line (C)
t1	T_1 exponential analysis (M)
t2	T_2 exponential analysis (M)

delta — Cursor difference in directly detected dimension (P)

Description: Difference between two frequency cursors along the directly detected dimension. The value is changed by moving the right cursor, relative to the left, in the ds or dconi display.

Values: Positive number, in Hz.

See also: *Getting Started*

Related:

dconi	Interactive 2D data display (C)
delta1	Cursor difference in 1st indirectly detected dimension (P)
delta2	Cursor difference in 2nd indirectly detected dimension (P)
ds	Display a spectrum (C)
split	Split difference between two cursors (M)

delta1 — Cursor difference in 1st indirectly detected dimension (P)

Description: Difference of two frequency cursors along the first indirectly detected dimension. Analogous to the delta parameter except that delta1 applies to the first indirectly detected dimension of a multidimensional data set.

Values: Positive number, in Hz.

See also: *User Guide: Liquids NMR*

Related:

delta	Cursor difference in directly detected dimension (P)

delta2 — Cursor difference in 2nd indirectly detected dimension (P)

Description: Difference of two frequency cursors along the second indirectly detected dimension. Analogous to the delta parameter except that delta2 applies to the second indirectly detected dimension of a multidimensional data set.

Values: Positive number, in Hz.

See also: *User Guide: Liquids NMR*

Related:

delta	Cursor difference in directly detected dimension (P)

deltaf — Difference of two time-domain cursors (P)

Description: Difference between the two time-domain cursors of the df (or dfid) display. To create this parameter and the other FID display parameters axisf, dotflag, vpf, vpfi, and crf (if the parameter set is older and lacks these parameters), enter addpar('fid').

Values: Number, in seconds.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
crf	Current time-domain cursor position (P)
df	Display a single FID (C)
dfid	Display a single FID (C)

dept — Set up parameters for DEPT pulse sequence (M)

Syntax: dept

Description: Macro for the DEPT (Distortionless Enhancement by Polarization Transfer) experiment.

Alternate: DEPT button in the 1D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

Related:

adept	Automatic DEPT analysis and spectrum editing (C)
autodept	Automated complete analysis of DEPT data (M)
deptgl	Set up parameters for DEPTGL pulse sequence (M)
deptproc	Process array of DEPT spectra (M)
padept	Plot automatic DEPT analysis (C)
ppcal	Proton decoupler pulse calibration (M)

DEPT — Change parameters for DEPT experiment (M)

Syntax: `DEPT<('GLIDE')>`

Description: Converts the current parameter set to a DEPT experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding carbon spectrum for the experiment.

deptgl — Set up parameters for DEPTGL pulse sequence (M)

Applicability: Sequence is not supplied with *MERCURY* series and *GEMINI 2000*.

Syntax: `deptgl`

Description: Macro for the DEPTGL pulse sequence for spectral editing and polarization transfer experiments.

See also: *User Guide: Liquids NMR*

Related:

dept	Set up parameters for DEPT pulse sequence (M)

deptproc — Process array of DEPT spectra (M)

Syntax: `deptproc`

Description: Automatically processes arrays of DEPT-type spectra. The FIDs are transformed (using `lb=2.5`), phased, and scaled. In foreground operation, a stacked display is produced. By default, an automatic DEPT analysis (`adept`) is performed.

See also: *User Guide: Liquids NMR*

Related:

adept	Automatically edit DEPT spectra (C)
dept	Set up parameters for DEPT pulse sequence (M)
lb	Line broadening along the directly detected dimension (P)
pldept	Plot DEPT type spectra (M)
procplot	Automatically process FIDs (M)

destroy — Destroy a parameter (C)

Syntax: `destroy(parameter<,tree>)`

Description: Removes a parameter from one of the parameter trees. If the destroyed parameter was an array, the `array` parameter is automatically updated.

Arguments: `parameter` is the name of the parameter to be destroyed.

`tree` is a keyword for the type of parameter tree: `'global'`, `'current'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on types of trees.

Examples:

```
destroy('a')
destroy('c','global')
```

See also: *VNMR User Programming*

Related:

`array`	Parameter order and precedence (P)
`create`	Create new parameter in a parameter tree (C)
`display`	Display parameters and their attributes (C)
`paramvi`	Edit a variable and its attributes using `vi` text editor (C)
`prune`	Prune extra parameters from current tree (C)

`destroygroup` Destroy parameters of a group in a tree (C)

Syntax: `destroygroup(group<,tree>)`

Description: Removes parameters of a group from one of the parameters trees.

Arguments: `group` is a keyword for the type of parameter group: `'all'`, `'sample'`, `'acquisition'`, `'processing'`, `'display'`, or `'spin'`.

`tree` is a keyword for the type of parameter tree: `'global'`, `'current'`, or `'processed'`. The default is `'current'`. Refer to the `create` command for more information on trees.

Examples:
```
destroygroup('sample')
destroygroup('all','global')
```

See also: *VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C)
`destroy`	Destroy a parameter (C)
`display`	Display parameters and their attributes (C)
`groupcopy`	Copy parameters of group from one tree to another (C)
`setgroup`	Set group of a variable in a tree (C)

`df` Display a single FID (C)

Syntax: (1) `df<(index)>`
(2) `df(options)`

Description: Displays a single FID. Parameter entry after an FID has been displayed causes the display to be updated. The FID is left-shifted by the number of complex data points specified by the parameter `lsfid`. The FID is also phase-rotated (zero-order only) by the number of degrees specified by the parameter `phfid`. Left shifting and phasing can be avoided by setting `lsfid` and `phfid` to `'n'`. `df` is identical in function to the `dfid` command.

Arguments: `index` (used with syntax 1) is the number of a particular FID for arrayed 1D experiments or for 2D experiments. Default is 1.

`options` (used with syntax 2) is any of the following:

- `'toggle'` is a keyword to switch between box and cursor modes.
- `'restart'` is a keyword to redraw the cursor if it has been turned off.
- `'expand'` is a keyword to switch between expanded and full views of the FID.
- `'imaginary'` is a keyword to switch on and off the display of the imaginary FID.
- `'sfwf'` is a keyword to interactively adjust the start and width of the FID display.
- `'phase'` is a keyword to enter an interactive phasing mode.
- `'dscale'` is a keyword to toggle the scale below the FID on and off.

Examples:
```
df
df(4)
df('restart')
```

Alternate: Display FID button in the 1D Data Processing Menu.

See also: *Getting Started*

Related:

crmode	Current state of cursors in dfid, ds, or dconi (P)
dfid	Display a single FID (C)
df2d	Display FIDs of 2D experiment (C)
dfmode	Current state of display of imaginary part of a FID (P)
lsfid	Number of complex points to left-shift the np FID (P)
phfid	Zero-order phasing constant for the np FID (P)

df2d — Display FIDs of 2D experiment (C)

Syntax: `df2d<(<'nf',><array_index>)>`

Description: Produces a color intensity map of the raw 2D FIDs as a function of t_1 and t_2. The display can be modified by subsequent display commands, for example, `df2d dconn` will display the 2D FIDs without clearing the graphics screen.

Arguments: `'nf'` is a keyword specifying that the data has been collected in the compressed form using `nf`. In other words, each array element is collected as one 2D FID or image comprised of `nf` FIDs or traces.

`array_index` is the index of the array to be displayed.

Examples:
```
df2d
df2d(1)
```

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D data display (C)
df	Display a single FID (C)

df2dn — Display FIDs of 2D experiment without screen erase (obsolete)

Description: The `df2dn` command is no longer used. Entering `df2d` followed by `dconn` is functionally the same as `df2dn`.

Related:

dconn	Display color intensity map without screen erase (C)
df2d	Display FIDs of 2D experiment (C)

dfid — Display a single FID (C)

Syntax:
(1) `dfid<(index)>`
(2) `dfid<(options)>`

Description: Functions the same as the `df` command. See `df` for information.

Alternate: Display FID button in the 1D Data Processing Menu.

See also: *Getting Started*

Related:

df	Display a single FID (C)

dfmode — Current state of display of imaginary part of a FID (P)

Description: Holds a string variable that reflects the state of display of the imaginary part of a FID. `dfmode` is primarily used by the programmable menu `dfid` to determine the status of the display of the imaginary part of a FID.

Values: `'r'` indicates the current display is real only.

'i' indicates the current display is imaginary.

'z' indicates the display is zero imaginary.

See also: *VNMR User Programming*

dfrq — Transmitter frequency of first decoupler (P)

Description: Contains the transmitter frequency for the first decoupler. dfrq is automatically set when the parameter dn is changed and should not be necessary for the user to manually set.

Values: Frequency, in MHz. On *GEMINI 2000* systems, the offset range is ±50 kHz. On other systems, the value is limited by synthesizer used with the channel.

See also: *Getting Started*

Related:		
	dfrq2	Transmitter frequency of second decoupler (P)
	dfrq3	Transmitter frequency of third decoupler (P)
	dfrq4	Transmitter frequency of fourth decoupler (P)
	dn	Nucleus for first decoupler (P)
	dof	Frequency offset for first decoupler (P)
	sfrq	Transmitter frequency of observe nucleus (P)
	spcfrq	Display frequencies of rf channels (M)

dfrq2 — Transmitter frequency of second decoupler (P)

Applicability: Systems with a second decoupler.

Description: Contains the transmitter frequency for the second decoupler. dfrq2 is automatically set when parameter dn2 is changed and should not be necessary for the user to manually set.

Values: Frequency, in MHz. Value is limited by synthesizer used with the channel. If dn2='' (two single quotes with no space in between) and a second decoupler is present in the console, dfrq2 is internally set to 1 MHz.

See also: *Getting Started*

Related:		
	dn2	Nucleus for second decoupler (P)
	dof2	Frequency offset for second decoupler (P)

dfrq3 — Transmitter frequency of third decoupler (P)

Applicability: Systems with a third decoupler.

Description: Contains the transmitter frequency for the third decoupler. dfrq3 is automatically set when the parameter dn3 is changed and should not be necessary for the user to manually set.

Values: Frequency, in MHz. Value is limited by synthesizer used with the channel. If dn3='' (two single quotes with no space in between) and a third decoupler is present in the console, dfrq3 is internally set to 1 MHz.

See also: *Getting Started*

Related:		
	dn3	Nucleus for third decoupler (P)
	dof3	Frequency offset for third decoupler (P)

dfrq4 — Transmitter frequency of fourth decoupler (P)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Description: Contains the transmitter frequency for the fourth decoupler. `dfrq4` is automatically set when the parameter `dn4` is changed and should not be necessary for the user to manually set.

Values: Frequency, in MHz. Value is limited by a synthesizer used with the channel. If `dn4=''` (two single quotes with no space in between) and a fourth decoupler is present in the console, `dfrq4` is internally set to 1 MHz.

See also: *Getting Started*

Related:

`dn4`	Nucleus for fourth decoupler (P)
`dof4`	Frequency offset for fourth decoupler (P)
`spcfrq`	Display frequencies of rf channels (M)
`rftype`	type of rf generation

`dfs` Display stacked FIDs (C)

Syntax: `dfs<(<start><,finish><,step><,'all'|'imag'><,color>)>`

Description: Displays one or more FIDs. The position of the first FIDs is governed by the parameters `wc`, `sc`, and `vpf`. A subsequent FID is positioned relative to the preceding FID by the parameters `vo` and `ho`.

Arguments: `start` is the index number of the first FID for multiple FIDs. It can also be the index number of a particular FID for arrayed 1D or 2D data sets.

`finish` is the index number of the last FID for multiple FIDs. To include all FIDs, set `start` to 1 and `finish` to `arraydim` (see example below).

`step` is the increment for the FID index. The default is 1.

`'all'` is a keyword to display all of the FIDs. This is the default.

`'imag'` is a keyword to display only the imaginary FID channel.

`color` is the color of the display: `'red'`, `'green'`, `'blue'`, `'cyan'`, `'magenta'`, `'yellow'`, `'black'`, or `'white'`.

Examples:

```
dfs(1,arraydim,3)
dfs('imag')
```

See also: *Getting Started*

Related:

`arraydim`	Dimension of experiment (P)
`dfsa`	Display stacked FIDs automatically (C)
`dfsan`	Display stacked FIDs automatically without screen erase (C)
`dfsh`	Display stacked FIDs horizontally (C)
`dfshn`	Display stacked FIDs horizontally without screen erase (C)
`dfsn`	Display stacked FIDs without screen erase (C)
`dfww`	Display FIDs in whitewash mode (C)
`ho`	Horizontal offset (P)
`plfid`	Plot FID (C)
`pfww`	Plot FIDs in whitewash mode (C)
`sc`	Start of chart (P)
`vo`	Vertical offset (P)
`vpf`	Current vertical position of FID (P)
`wc`	Width of chart (P)

`dfsa` Display stacked FIDs automatically (C)

Syntax: `dfsa<(<start><,finish><,step><,'all'|'imag'><,color>)>`

Description: Displays one or more FIDs automatically by adjusting the parameters `vo` and `ho` to fill the screen in a lower left to upper right presentation (`wc` must be set

to less than full screen width for this to work). The position of the first FID is governed by parameters wc, sc, and vpf.

Arguments: start is the index number of the first FID for multiple FIDs. It can also be the index number of a particular FID for arrayed 1D or 2D data sets.

finish is the index number of the last FID for multiple FIDs.

step is the increment for the FID index. The default is 1.

'all' is a keyword to display all of the FIDs. This is the default.

'imag' is a keyword to display only the imaginary FID channel.

color is the color of the display: 'red', 'green', 'blue', 'cyan', 'magenta', 'yellow', 'black', or 'white'.

See also: *Getting Started*

Related:

dfs	Display stacked FIDs (C)
dfsan	Display stacked FIDs automatically without screen erase (C)

dfsan — Display stacked FIDs automatically without screen erase (C)

Syntax: dfsan<(<start><,finish><,step><,'all'|'imag'><,color>)>

Description: Functions the same as the command dfsa except the graphics window is not erased before starting the display. This allows composite displays of many FIDs to be created. The arguments are the same as dfsa.

See also: *Getting Started*

Related:

dfsa	Display stacked FIDs automatically (C)

dfsh — Display stacked FIDs horizontally (C)

Syntax: dfsh<(<start><,finish><,step><,'all'|'imag'><,color>)>

Description: Displays one or more FIDs horizontally by setting vo to zero and adjusting ho, sc, and wc to fill the screen from left to right with the entire array. The position of the first FID is governed by parameters wc, sc, and vpf.

Arguments: start is the index number of the first FID for multiple FIDs. It can also be the index number of a particular FID for arrayed 1D or 2D data sets.

finish is the index number of the last FID for multiple FIDs. To display all FIDs, set finish to the parameter arraydim.

step is the increment for the FID index. The default is 1.

'all' is a keyword to display all of the FIDs. This is the default.

'imag' is a keyword to display only the imaginary FID channel.

color is the color of the display: 'red', 'green', 'blue', 'cyan', 'magenta', 'yellow', 'black', or 'white'.

See also: *Getting Started*

Related:

dfs	Display stacked FIDs (C)
dfshn	Display stacked FIDs horizontally without screen erase (C)

dfshn — Display stacked FIDs horizontally without screen erase (C)

Syntax: dfshn<(<start><,finish><,step><,'all'|'imag'><,color>)>

Description: Functions the same as the command dfsh except the graphics window is not erased before starting the display. This allows composite displays of many FIDs to be created. The arguments are the same as dfsh.

See also: *Getting Started*

Related: dfsh — Display stacked FIDs horizontally (C)

dfsn — Display stacked FIDs without screen erase (C)

Syntax: `dfsn<(<start><,finish><,step><,'all'|'imag'><,color>)>`

Description: Functions the same as the command dfs except the graphics window is not erased before starting the display. This allows composite displays of many FIDs to be created. The arguments are the same as dfs.

See also: *Getting Started*

Related: dfs — Display stacked FIDs (C)

dfww — Display FIDs in whitewash mode (C)

Syntax: `dfww<(<start><,finish><,step><,'all'|'imag'><,color>)>`

Description: Displays FIDs in whitewash mode (after the first FID, each FID is blanked out in regions in which it is behind an earlier FID). The position of the first FIDs is governed by parameters wc, sc, and vpf.

Arguments: `start` is the index number of the first FID for multiple FIDs. It can also be the index number of a particular FID for arrayed 1D or 2D data sets.

`finish` is the index number of the last FID for multiple FIDs.

`step` is the increment for the FID index. The default is 1.

`'all'` is a keyword to display all of the FIDs. This is the default.

`'imag'` is a keyword to display only the imaginary FID channel.

`color` is the color of the display: `'red'`, `'green'`, `'blue'`, `'cyan'`, `'magenta'`, `'yellow'`, `'black'`, or `'white'`.

See also: *Getting Started*

Related: dfs — Display stacked FIDs (C); pfww — Plot FIDs in whitewash mode (C)

dg — Display group of acquisition/processing parameters (C)

Syntax: `dg<(template)>`

Description: Displays the group of acquisition and 1D/2D processing parameters. To display an individual parameter, enter the name of the parameter followed by a question mark (e.g., `sw?`). Parameters do not have to be displayed in order to be entered or changed. The `dg` display is controlled by the string parameter dg.

Arguments: `template` is the name of the template parameter. The default is `'dg'`. See the manual *VNMR User Programming* for rules on constructing a template. Commands such as dg1, dg2, and dgs (but not da) are macros that activate `dg` with the appropriate `template` argument (`'dg1'`, `'dg2'`, `'dgs'`, etc.).

Examples:
```
dg
dg('dgexp')
```

See also: *Getting Started; VNMR User Programming*

Related: ? — Display individual parameter value (C); da — Display acquisition parameter arrays (C); dg — Control `dg` parameter group display (P); dg1 — Display group of display parameters (M); dg2 — Display group of 3rd and 4th rf channel/3D parameters (M)

dglp	Display group of linear prediction parameters (M)
dgs	Display group of special/automation parameters (M)
da	Display acquisition parameter arrays (C)

dg — Control dg parameter group display (P)

Description: Controls the display of the dg command for the group of acquisition and 1D/2D processing parameters. dg, a string parameter, can be modified with the command paramvi('dg').

See also: *Getting Started*

Related:

dg	Display group of acquisition/processing parameters (C)
paramvi	Edit a parameter and its attributes with vi text editor (C)

dg1 — Display group of display parameters (M)

Syntax: dg1

Description: Displays the group of display parameters. To display an individual parameter, enter the name of the parameter followed by a question mark (e.g., sp?). Parameters do not have to be displayed in order to be entered or changed. The dg1 display is controlled by the string parameter dg1.

See also: *Getting Started*

Related:

?	Display individual parameter value (C)
dg1	Control dg1 parameter group display (P)
dg	Display group of acquisition/processing parameters (C)

dg1 — Control dg1 parameter group display (P)

Description: Controls the display of the dg1 command for the group of display parameters. dg1, a string parameter, can be modified with paramvi('dg1').

See also: *Getting Started*

Related:

dg1	Display group of display parameters (M)
paramvi	Edit a parameter and its attributes with *vi* text editor (C)

dg2 — Display group of 3rd and 4th rf channel/3D parameters (M)

Applicability: All systems except *GEMINI 2000*.

Syntax: dg2

Description: Displays the group of acquisition parameters associated with a second decoupler channel on a system with a third rf channel. It also displays the group of parameters associated with selective 2D processing of 3D data sets. To display an individual parameter, enter the name of the parameter followed by a question mark (e.g., sw?). Parameters do not have to be displayed in order to be entered or changed. The dg2 display is controlled by the string parameter dg2.

See also: *User Guide: Liquids NMR*

Related:

dg	Display group of acquisition/processing parameters (C)
dg2	Control dg2 parameter group display (P)

dg2 — Control dg2 parameter group display (P)

Applicability: All systems except *GEMINI 2000*.

Description: Controls the display of the dg2 command for the group of 3rd and 4th rf channel/3D parameters. dg2, a string parameter, can be modified with the command paramvi('dg2'). To retrieve the dg2 and ap display templates for the current experiment, enter addpar('3rf').

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
dg2	Display group of 3rd and 4th rf channel/3D parameters (M)
paramvi	Edit a parameter and its attributes with vi text editor (M)

dga — Display group of spin simulation parameters (M)

Syntax: dga

Description: Displays the file of spin simulation parameters (Group A). There is one such group of parameters in the data system, not one per experiment as with normal NMR parameters.

Alternate: Show Params button in the Spin Simulation Main Menu.

See also: *User Guide: Liquids NMR*

Related:

dg	Display group of acquisition/processing parameters (C)
dla	Display spin simulation parameter arrays (C)

DgcsteSL — Set up parameters for DgcsteSL pulse sequence (M)

Syntax: DgcsteSL

Description: Converts a parameter set to DgcsteSL experiment.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)
fiddle	Perform reference deconvolution (M)
setup_dosy	Set up gradient levels for DOSY experiments (M)

Dgcstecosy — Set up parameters for Dgcstecosy pulse sequence (M)

Syntax: Dgcstecosy

Description: Converts a parameter set to Dgcstecosy experiment

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)
makeslice	Synthesize 2D projection of a 3D DOSY spectrum (C)
setup_dosy	Set up gradient levels for DOSY experiments (M)
showoriginal	Restore first 2D spectrum in 3D DOSY spectrum (M)

Dgcstehmqc — Set up parameters for Dgcstehmqc pulse sequence (M)

Syntax: Dgcstehmqc

Description: Converts a parameter set to Dgcstehmqc experiment

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)
makeslice	Synthesize 2D projection of 3D DOSY spectrum (C)
setup_dosy	Set up gradient levels for DOSY experiments (M)
showoriginal	Restore first 2D spectrum in 3D DOSY spectrum (M)

dglc — Display group of LC-NMR parameters (M)

Applicability: Systems with LC-NMR accessory.

Syntax: `dglc`

Description: Displays parameters related to LC-NMR on a separate screen. This macro is equivalent to the command `dg('dglc')`.

See also: *User Guide: Liquids NMR*

Related: `dglc` Control LC-NMR parameter display (P)

dglc — Control dglc parameter group display (P)

Applicability: Systems with LC-NMR accessory.

Description: Controls the display of the LC-NMR parameters by the macro `dglc` and the equivalent command `dg('dglc')`. If this parameter does not exist, the `parlc` macro can create it.

See also: *User Guide: Liquids NMR*

Related: `dglc` Display LC-NMR parameters (M)
`parlc` Create LC-NMR parameters (M)

dglp — Display group of linear prediction parameters (M)

Syntax: `dglp`

Description: Displays the group of parameters associated with linear prediction. To display an individual parameter, enter the name of the parameter followed by a question mark (e.g., `lpopt?`). Parameters do not have to be displayed in order to be entered or changed.

See also: *User Guide: Liquids NMR*

Related: `dg` Display group of acquisition/processing parameters (C)

dgm — Display menu to view parameter screens (C)

Applicability: Systems with imaging capabilities.

Syntax: `dgm`

Description: Displays a menu for selecting and viewing a list of parameter screens.

See also: *User Guide: Imaging*

dgs — Display group of shims and automation parameters (M)

Syntax: `dgs`

Description: Displays the group of shims and automation parameters. To display an individual parameter, enter name of the parameter followed by a question mark (e.g., `sw?`). Parameters do not have to be displayed in order to be entered or changed. The `dgs` display is controlled by the parameter `dgs`.

See also: *User Guide: Liquids NMR*

Related: `dg` Display group of acquisition/processing parameters (C)
`dgs` Control `dgs` parameter group display (P)

dgs — Control dgs parameter group display (P)

Description: Controls display of the `dgs` command for the group of shims and automation parameters. `dgs`, a string parameter, can be modified by `paramvi('dgs')`.

See also: *Getting Started*

Related:
- `dgs` — Display group of special/automation parameters (M)
- `paramvi` — Edit a parameter and its attributes with `vi` text editor (C)

dhp — Decoupler high-power control with class C amplifier (P)

Applicability: System with a class C amplifier.

Description: On *GEMINI 2000* $^{1}H/^{13}C$ systems, controls decoupler high power for proton heteronuclear decoupling. `dhp` is ignored if protons are being observed (`tn=1.0`). (*GEMINI 2000* broadband systems use `dpwr` to adjust decoupler power for both homonuclear and heteronuclear decoupling.)

On systems other than the *GEMINI 2000*, `dhp` selects a decoupler high-power level for systems with class C amplifiers on the decoupler channel. Specific values of `dhp` should be calibrated periodically for any particular instrument and probe combination. As a rough guide, `dhp=75` corresponds to approximately 2 watts at 200 MHz.

CAUTION: Decoupler power greater than 2 watts in a switchable probe will damage the probe. Always carefully calibrate high-power decoupling to avoid exceeding 2 watts of power.

For systems equipped with a linear amplifier on the decoupler channel, `dhp` is nonfunctional and is replaced by the parameter `dpwr`.

Note that `dhp` runs in the opposite direction from `dlp` (i.e., for `dhp` a higher number means more power, for `dlp` a higher number means less power).

Values: On *GEMINI 2000* $^{1}H/^{13}C$ systems, 0.5 or 1.0, in watts. On other systems, 0 to 255 (where 255 is maximum power) in uncalibrated, non-linear units.

`'n'` selects low-power decoupling under the control of the parameter `dlp`.

See also: *Getting Started*

Related:
- `dlp` — Decoupler low power with class C amplifier (P)
- `dpwr` — Power level for first decoupler with linear amplifier (P)
- `tn` — Nucleus for observe transmitter (P)

dialog — Display a dialog box from a macro (C)

Syntax: `dialog(definition_file,output_file<,'nowait'>)`

Description: Opens a dialog box from a macro. The output is written to a file that can be read by the macro using the `lookup` command.

Arguments: `definition_file` is the name of the file (specified by an absolute path) that defines the layout of the dialog box. The structure of the file is the same as the definition files for *GLIDE*.

`output_file` is the name of the file (specified by an absolute path) where the results of the dialog box are written.

`'nowait'` is a keyword to return immediately, without waiting for input into the dialog box.

Examples: `dialog(userdir+'/dialoglib/array,'/tmp/array')`

See also: *VNMR User Programming*

Related:
- `lookup` — Look up words and lines from a text file (C)

diffshims — Compare two sets of shims (M,U)

Syntax: (From VNMR) `diffshims(shimfile1,shimfile2)`
(From UNIX) `diffshims shimfile1 shimfile2`

Description: Compares values for room-temperature shims stored in two separate files.

Arguments: `shimfile1` and `shimfile2` are names of separate files containing shim values. Both files must have been written using the `svs` command.

See also: *Getting Started*

Related:

`svs`	Save shim coil settings (C)

digfilt — Write digitally filtered FIDs to another experiment (M)

Syntax: `digfilt(exp_number<,option>)`

Description: Saves digitally filtered FIDs to another experiment.

Arguments: `exp_number` specifies the number of the experiment, from 1 to 9, for saving the FIDs.

`option` is one of the keywords `'nodc'`, `'zero'`, `'lfs'`, `'zfs'`, or `'t2dc'`. Use a keyword for an option if the same option was used when processing the data with `ft`, `wft`, `ft2d`, or `wft2d`.

See also: *Getting Started*

Related:

`downsamp`	Sampling factor applied after digital filtering (P)
`ft`	Fourier transform 1D data (C)
`ft2d`	Fourier transform 2D data (C)
`wft`	Weight and Fourier transform 1D data (C)
`wft2d`	Weight and Fourier transform 2D data (C)

dir — List files in directory (C)

Syntax: `dir<(string)>`

Description: Displays files in a directory on the text window. The `dir` command is identical to the `ls` and `lf` commands.

Arguments: `string` is a string argument containing the options and/or directory names used if this were the UNIX `ls` command (e.g., `dir('-l *.fid')` requests a long listing (`-l`) of all files ending with .`fid (*.fid))`. If no argument is entered, `dir` lists all files in the current working directory.

Examples:

```
dir
dir('data')
dir('-l *.fid')
```

See also: *Getting Started*

Related:

`lf`	List files in directory (C)
`ls`	List files in directory (C)

disp3d — Display 3D data (U)

Applicability: Systems with imaging capabilities.

Syntax: (From UNIX) `disp3d <fdf_file>`

Description: Displays a 3D FDF (Flexible Data Format) file or a raw 8-bit 3D data file with no header. Compatible FDF files are produced by `ft3d` with the `'fdf'` option (or by default if `appmode='imaging'`).

FDF data can also be loaded either by entering the file name as an argument to `disp3d` or by typing the file name into the File field in the `disp3d` control panel and clicking the Load button. If the FDF data word size is larger than 8 bits, the data are scaled and truncated to 8 bits for display. Raw data files can only be loaded from the control panel.

Besides the file name, the user must enter the size of the data matrix in the fast, medium, and slow dimensions in the Data size field. Typically, these would be the values `fn/2`, `fn1/2`, and `fn2/2`, respectively.

Furthermore, the desired size of the image in screen pixels—also in the fast, medium, and slow dimensions—must be entered in the Display size fields. Typically, these values would be near 100 and the relative ratio of the parameters `lro`, `lpe`, and `lpe2`, respectively.

After loading the data, a 3D volume appears in the display panel.

Arguments: `fdf_file` is the name of a file containing FDF data.

See also: *User Guide: Imaging*

Related:

`appmode`	Application mode (P)
`fn`	Fourier number in directly detected dimension (P)
`fn1`	Fourier number in 1st indirectly detected dimension (P)
`fn2`	Fourier number in 2nd indirectly detected dimension (P)
`ft3d`	Perform a 3D Fourier transform on a 3D FID data set (M,U)
`lpe`	Field of view size for phase encode axis (P)
`lpe2`	Field of view size for 2nd phase-encode axis (P)
`lro`	Field of view size for readout axis (P)

`display` Display parameters and their attributes (C)

Syntax: `display(parameter|'*'|'**'<,tree>)`

Description: Displays one or more parameters and their attributes from a parameter tree.

Arguments: Three levels of display are available: `parameter`, `'*'`, and `'**'`.

- `parameter` is the name of a single parameter and the display is of its attributes (e.g., `display('a')` displays the attributes of parameter `a` in the (default) current tree).
- `'*'` is a keyword to display the name and values of all parameters in a tree (e.g., `display('*','global')` displays all parameter names and values in the global tree).
- `'**'` is a keyword to display the attributes of all parameters in a tree (e.g., `display('**','processed')` displays the attributes of all parameters in the processed tree).

`tree` is the type of parameter tree and can be `'global'`, `'current'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on types of trees.

Examples:

```
display('a')
display('*','global')
display('**','processed')
```

See also: *VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C)
`destroy`	Destroy a parameter (C)
`paramvi`	Edit a parameter and its attributes with the `vi` text editor (C)
`prune`	Prune extra parameters from current tree (C)

dla — Display spin simulation parameter arrays (M)

Syntax: `dla<('long')>`

Description: Displays the parameters containing the line assignments for spin simulation iteration (matching simulated spectra to actual data). A `clindex` value of a calculated transition gives the index of the assigned measured line. The value is zero for unassigned transitions.

Arguments: `'long'` is a keyword to display the parameters containing the line assignments for spin simulation iteration (matching simulated spectra to actual data) and put the line assignments into the file `spini.la`. This option is most useful when the `dla` display is too large to display all the calculated transitions in the VNMR text window. The `dlalong` command operates the same as the `dla('long')` command.

Examples:
```
dla
dla('long')
```

See also: *User Guide: Liquids NMR*

Related:

`assign`	Assign transitions to experimental lines (M)
`clindex`	Index of experimental frequency of a transition (P)
`dga`	Display parameters of spin simulation group (C)
`dlalong`	Long display of spin simulation parameter arrays (C)

dlalong — Long display of spin simulation parameter arrays (C)

Syntax: `dlalong`

Description: Puts line assignments into the file `spini.la` in a more complete form, then displays this file in the text window. It is most useful when the `dla` display is too large to display all the calculated transitions in the VNMR text window. The `dla('long')` command operates the same as `dlalong`.

See also: *User Guide: Liquids NMR*

Related:

`dla`	Display spin simulation parameter arrays (M)

dli — Display list of integrals (C)

Syntax: `dli`

Description: Displays a list of integrals at the integral reset points. The frequency units of the displayed list of integrals is controlled by the parameter `axis`. The reset points may be defined with the `z` command and these frequencies are stored in `lifrq`. The calculated amplitudes of the integral region are stored in `liamp`. The reset points are stored as hertz and are not referenced to `rfl` and `rfp`. The amplitudes are stored as the actual value; they are not scaled by `ins` or by `insref`. When the integral blanking mode is used (i.e., `intmod='partial'`), only the integrals corresponding to the displayed integral regions are listed.

The displayed integral value can be scaled with the `setint` macro. The integral is scaled by the parameters `ins` and `insref`.

Alternate: Integrals button in the 1D Data Display Secondary Menu.

See also: *Getting Started*

Related:

`axis`	Axis label for displays and plots (P)
`cz`	Clear integral reset points (C)
`dlni`	Display list of normalized integrals (M)
`ins`	Integral normalization scale (P)
`insref`	Fourier number scaled value of an integral (P)

liamp	Amplitudes of integral reset points (P)
lifrq	Frequencies of integral reset points (P)
nli	Find integral values (C)
rfl	Reference peak position in directly detected dimension (P)
rfp	Reference peak frequency in directly detected dimension (P)
setint	Set value of an integral (M)
z	Add integral reset point at cursor position (C)

dlivast — Produce text file and process wells (M)

Syntax: `dlivast<(last)>`

Description: Produces a text file containing the integral of the partial regions and processes the wells.

Arguments: `last` is the number of the last well. The default is 96.

See also: *User Guide: Liquids NMR*

Related:

combiplate	View a color map for visual analysis of VAST microtiter plate (U)
combishow	Display regions as red, green, and blue in CombiPlate window (M)

dll — Display listed line frequencies and intensities (C)

Syntax: `dll<('pos'<,noise_mult>)><:number_lines,scale>`

Description: Displays a list of line frequencies and amplitudes that are above a threshold defined by th. Frequency units are defined by the parameter axis. The results of this calculation are stored in llfrq and llamp. The frequencies are stored as Hz and are not referenced to rfl and rfp. Amplitudes are stored as the actual data point value; they are not scaled by vs.

Arguments: `'pos'` is a keyword to list only positive lines.

`noise_mult` is a numerical value that determines the number of noise peaks listed for broad, noisy peaks. The default value is 3. A smaller value results in more peaks, a larger value results in fewer peaks, and a value of 0.0 results in a line listing containing all peaks above the threshold th. Negative values of `noise_mult` are changed to 3.

`number_lines` is a return argument with the number of lines above the threshold.

`scale` is a return argument with a scaling factor for line amplitudes. This scaling factor accounts for `vs` and whether the lines are listed in absolute intensity mode or normalized mode.

Examples:

```
dll
dll('pos')
dll(2.5)
dll:r1,sc
```

Alternate: Lines button in the 1D Data Display Secondary menu.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

axis	Axis label for displays and plots (P)
dels	Delete spectra from T_1 or T_2 analysis (C)
fp	Find peak heights (C)
getll	Get frequency and intensity of a line (C)
llamp	List of line amplitudes (P)
llfrq	List of line frequencies (P)
nl	Position the cursor at the nearest line (C)
nll	Find line frequencies and intensities (C)

rfl	Reference peak position in directly detected dimension (P)
rfp	Reference peak frequency in directly detected dimension (P)
th	Threshold (P)
vs	Vertical scale (P)

dlni — Display list of normalized integrals (M)

Syntax: `dlni`

Description: Displays integrals in a normalized format. The parameter `ins` represents the value of the sum of all the integrals. When the integral blanking mode is used (i.e., `intmod='partial'`), only the integrals corresponding to the displayed integral regions are listed and are used in the summation.

See also: *Getting Started*

cz	Clear integral reset points (C)
dli	Display list of integrals (C)
ins	Integral normalization scale (P)
nli	Find integral values (C)
z	Add integral reset point at cursor position (C)

dlp — Decoupler low-power control with class C amplifier (P)

Applicability: Systems with a class C amplifier.

Description: On *GEMINI 2000* $^{1}H/^{13}C$ systems, `dlp` controls the proton homodecoupler power level, if present.

On *GEMINI 2000* broadband systems with a relay switching version of the RF Control board, `dlp` has no meaning (refer to the description of the parameter `attens` for information on RF Control boards).

On *GEMINI 2000* broadband systems with a diode switching version of RF Control board, `dlp` controls a fine attenuator over a range of approximately 14 dB. In line with this attenuator is a coarse attenuator controlled by `dpwr` and `pplvl`. Unless fine control is necessary, `dlp=1023` (maximum power) is recommended. `dlp` affects pulse and CW decoupler power; therefore, it affects both the γH_2 of the 90° decoupler pulse and `dmf`.

On systems other than *GEMINI 2000*, `dlp` controls the decoupler power level for systems with a class C decoupler amplifier in the low-power mode, generally used for homonuclear decoupling. `dlp` specifies dB of attenuation of the decoupler, below a nominal 1 watt value. `dlp` is active only if `dhp='n'`.

On systems with a decoupler linear amplifier, `dlp` is nonfunctional and `dpwr` controls decoupler power.

Values: On *GEMINI 2000* $^{1}H/^{13}C$ systems, 0 to 2047 in arbitrary units (2047 is full power). On *GEMINI 2000* broadband systems with the diode switching version of the RF Control board, 0 to 1023 in arbitrary units (1023 is full power). On systems other than the *GEMINI 2000*, 0 to 39 (in dB of attenuation, 0 is maximum power).

See also: *Getting Started*

Related:

attens	Fast attenuators present (P)
dhp	Decoupler high-power control with class C amplifier (P)
dm	Decoupler mode for first decoupler (P)
dmf	Decoupler modulation frequency for first decoupler (P)
dpwr	Power level for first decoupler with linear amplifier (P)
hdofst	Proton homonuclear decoupler offset (P)

homdec	Proton homonuclear decoupler present (P)
pplvl	Proton pulse power level (P)

dm — Decoupler mode for first decoupler (P)

Description: Determines the state of first decoupler during different status periods within a pulse sequence (refer to the manual *VNMR User Programming* for a discussion of status periods). Pulse sequences may require one, two, three, or more different decoupler states. The number of letters that make up the dm parameter vary appropriately, with each letter representing a status period (e.g., dm='yny' or dm='ns'). If the decoupler status is constant for the entire pulse sequence, it can be entered as a single letter (e.g., dm='n').

Values: 'n', 'y', 'a', or 's' (or a combination of these values), where:

'n' specifies no decoupler rf.

'y' specifies the asynchronous mode. In this mode, the decoupler rf is gated on and modulation is started at a random places in the modulation sequence.

'a' specifies the asynchronous mode, the same as 'y'. The 'a' value is not available on *MERCURY* series and *GEMINI 2000* systems.

's' specifies the synchronous mode in which the decoupler rf is gated on and modulation is started at the beginning of the modulation sequence. This value has meaning only on UNITY*INOVA* and UNITY*plus* systems. On UNITY and VXR-S systems it is equivalent to 'y'. The 's' value is not available on *MERCURY* series and *GEMINI 2000*.

See also: *Getting Started*

Related:

dm2	Decoupler mode for second decoupler (P)
dm3	Decoupler mode for third decoupler (P)
dm4	Decoupler mode for fourth decoupler (P)
dmf	Decoupler modulation frequency for first decoupler (P)
dmm	Decoupler modulation mode for first decoupler (P)
dn	Nucleus for first decoupler (P)

dm2 — Decoupler mode for second decoupler (P)

Applicability: Systems with a second decoupler.

Description: Determines the state of second decoupler during different status periods within a pulse sequence. It functions analogously to dm.

Values: Same as dm, except that if dn2='' (two single quotes with no space in between) and a second decoupler is present in the console, dm2 assumes a default value of 'n' when go is executed.

See also: *Getting Started*

Related:

dm	Decoupler mode of first decoupler (P)
dmf2	Decoupler modulation frequency for second decoupler (P)
dmm2	Decoupler modulation mode for second decoupler (P)
dn2	Nucleus for second decoupler (P)

dm3 — Decoupler mode for third decoupler (P)

Applicability: Systems with a third decoupler.

Description: Determines the state of third decoupler during different status periods within a pulse sequence. It functions analogously to dm.

Values: Same as dm, except that if dn3='' (two single quotes with no space in between) and a third decoupler is present in the console, dm3 assumes a default value of 'n' when go is executed.

See also: *Getting Started*

Related:

dm	Decoupler mode of first decoupler (P)
dmf3	Decoupler modulation frequency for third decoupler (P)
dmm3	Decoupler modulation mode for third decoupler (P)
dn3	Nucleus for third decoupler (P)

dm4 Decoupler mode for fourth decoupler (P)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Description: Determines the state of fourth decoupler during different status periods within a pulse sequence. It functions analogously to dm.

Values: Same as dm, except that if dn4='' (two single quotes with no space in between) and a fourth decoupler is present in the console, dm4 assumes a default value of 'n' when go is executed.

See also: *Getting Started*

Related:

dm	Decoupler mode of first decoupler (P)
dmf4	Decoupler modulation frequency for fourth decoupler (P)
dmm4	Decoupler modulation mode for fourth decoupler (P)
dn4	Nucleus for fourth decoupler (P)

dmf Decoupler modulation frequency for first decoupler (P)

Description: Controls modulation frequency of the first decoupler. It specifies 1/pw90 at the particular power level used. After calibrating the decoupler field strength γH_2 (expressed in units of Hz), dmf should be set equal to $4*\gamma H_2$ for WALTZ, MLEV16, GARP, and XY32 (when available).

dmf is inactive for CW mode decoupling (dmm='c').

On UNITY*INOVA*, *MERCURY* series, and UNITY*plus*, dmf is also active for square wave mode decoupling (dmm='r') and fm-fm mode (dmm='f') decoupling. For dmm='f', the modulation frequency is swept back and forth between about 0.5% and 5% of the dmf frequency (e.g., if dmf is 100 kHz, the modulation is swept between approximately 500 Hz and 5 kHz). A reasonable optimum value for dmf when dmm='f' is the decoupler frequency divided by 4000.

On *GEMINI 2000*, UNITY, and VXR-S, dmf is fixed at 75 kHz for fm-fm mode decoupling (dmm='f') and noise mode decoupling (dmm='n').

Values: On UNITY*INOVA*, *MERCURY* series, and UNITY*plus*: 5 Hz to 2 MHz in steps of 5 Hz (steps are actually approximately 4.768 Hz). On *GEMINI 2000*: 100 to 25000 Hz, in steps of 100 Hz. On UNITY and VXR-S: 100 Hz to 990 or 32000 Hz, in steps of 100 Hz.

For GARP modulation, the dmf value is internally multiplied by 45, making the limit of possible dmf values to 5 Hz to 44.4 kHz when dmm='g'.

See also: *Getting Started*

Related:

dmf2	Decoupler modulation frequency for second decoupler (P)
dmf3	Decoupler modulation frequency for third decoupler (P)
dmf4	Decoupler modulation frequency for fourth decoupler (P)
dmm	Decoupler modulation mode for first decoupler (P)
pw90	90° pulse width (P)

dmf2 — Decoupler modulation frequency for second decoupler (P)

Applicability: Systems with a second decoupler.

Description: Controls the modulation frequency of the second decoupler. It functions analogously to the parameter dmf.

Values: Same as dmf except that if dn2='' (two single quotes with no space in between) and a second decoupler is present in the console (numrfch greater than 2), dmf2 assumes a default value of 1000 Hz when go is executed.

See also: *Getting Started*

Related:

dm2	Decoupler mode for second channel (P)
dmf	Decoupler modulation frequency for first decoupler (P)
dmm2	Decoupler modulation mode for second decoupler (P)
dn2	Nucleus for second decoupler (P)
numrfch	Number of rf channels (P)

dmf3 — Decoupler modulation frequency for third decoupler (P)

Applicability: Systems with a third decoupler.

Description: Controls the modulation frequency of the third decoupler. It functions analogously to the parameter dmf.

Values: Same as dmf except that if dn3='' (two single quotes with no space in between) and a third decoupler is present in the console (numrfch equals 4), dmf3 assumes a default value of 1000 Hz when go is executed.

See also: *Getting Started*

Related:

dm3	Decoupler mode for third channel (P)
dmf	Decoupler modulation frequency for first decoupler (P)
dmm3	Decoupler modulation mode for third decoupler (P)
dn3	Nucleus for third decoupler (P)
numrfch	Number of rf channels (P)

dmf4 — Decoupler modulation frequency for fourth decoupler (P)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Description: Controls the modulation frequency of the fourth decoupler. It functions analogously to the parameter dmf.

Values: Same as dmf except that if dn4='' (two single quotes with no space in between) and a fourth decoupler is present in the console (numrfch equals 5), dmf4 assumes a default value of 1000 Hz when go is executed.

See also: *Getting Started*

Related:

dm4	Decoupler mode for fourth channel (P)
dmf	Decoupler modulation frequency for first decoupler (P)
dmm4	Decoupler modulation mode for fourth decoupler (P)
dn4	Nucleus for fourth decoupler (P)
numrfch	Number of rf channels (P)

dmfadj — Adjust tip-angle resolution time for first decoupler (M)

Applicability: All systems except *MERCURY* series and *GEMINI 2000*.

Syntax: dmfadj<(tipangle_resolution)>

Description: Adjusts the parameter dmf so that time associated with the first decoupler tip-angle resolution is an integral multiple of 50 ns (UNITY*INOVA* and UNITY*plus*)

or 100 ns (UNITY and VXR-S). This eliminates time truncation error in execution of programmable decoupling or spin-locking sequence by the waveform generator. For example, the tip-angle resolution for an MLEV-16 decoupling sequence should be 90.0° since every pulse in that sequence can be represented as an integral multiple of 90.0°; however, the tip-angle resolution for a GARP decoupling sequence should be 1.0°.

Arguments: `tipangle_resolution` specifies the necessary tip-angle resolution for the programmable decoupling or spin-locking sequence to be executed. The default value is the current value of the parameter `dres`.

Examples:
```
dmfadj
dmfadj(90.0)
```

See also: *Getting Started*

Related:

`dmf`	Decoupler modulation frequency for first decoupler (P)
`dmf2adj`	Adjust tip-angle resolution time for second decoupler (M)
`dmf3adj`	Adjust tip-angle resolution time third decoupler (M)
`dmf4adj`	Adjust tip-angle resolution time fourth decoupler (M)
`dres`	Tip angle resolution for programmable decoupling (P)

`dmf2adj` Adjust tip-angle resolution time for second decoupler (M)

Applicability: Systems with a second decoupler.

Syntax: `dmf2adj<(tipangle_resolution)>`

Description: Adjusts the parameter `dmf2` to make time associated with the second decoupler tip-angle resolution an integral multiple of 50 ns (UNITY*INOVA* and UNITY*plus*) or 100 ns (UNITY and VXR-S). `dmf2adj` functions analogously to the macro `dmfadj`.

Arguments: `tipangle_resolution` specifies the necessary tip-angle resolution for the programmable decoupling or spin-locking sequence to be executed. The default value is the current value of the parameter `dres2`.

Examples:
```
dmf2adj
dmf2adj(90.0)
```

See also: *Getting Started*

Related:

`dmf2`	Decoupler modulation frequency for second decoupler (P)
`dmfadj`	Adjust decoupler tip-angle resolution time (M)
`dres2`	Tip angle resolution for second decoupler (P)

`dmf3adj` Adjust tip-angle resolution time for third decoupler (M)

Applicability: Systems with a third decoupler.

Syntax: `dmf3adj<(tipangle_resolution)>`

Description: Adjusts the parameter `dmf3` to make time associated with the third decoupler tip-angle resolution an integral multiple of 50 ns (UNITY*INOVA* and UNITY*plus*) or 100 ns (UNITY and VXR-S). `dmf3adj` functions analogously to the macro `dmfadj`.

Arguments: `tipangle_resolution` specifies the necessary tip-angle resolution for the programmable decoupling or spin-locking sequence to be executed. The default value is the current value of the parameter `dres3`.

Examples:
```
dmf3adj
dmf3adj(90.0)
```

See also: *Getting Started*

Related:

dmf3	Decoupler modulation frequency for third decoupler (P)
dres3	Tip-angle resolution for third decoupler (P)

dmf4adj — Adjust tip-angle resolution time for fourth decoupler (M)

Applicability: Systems with a deuterium decoupler as the fourth decoupler.

Syntax: `dmf4adj<(tipangle_resolution)>`

Description: Adjusts the parameter dmf4 to make time associated with the fourth decoupler tip-angle resolution an integral multiple of 50 ns (UNITY*INOVA*). dmf4adj functions analogously to the macro dmfadj.

Arguments: tipangle_resolution specifies the necessary tip-angle resolution for the programmable decoupling or spin-locking sequence to be executed. The default value is the current value of the parameter dres4.

Examples: dmf4adj

See also: *Getting Started*

Related:

dmf4	Decoupler modulation frequency for fourth decoupler (P)
dres4	Tip-angle resolution for fourth decoupler (P)

dmg — Data display mode in directly detected dimension (P)

Description: Controls the mode of data display along the directly detected dimension. dmg is in the display group and can be set manually or by executing the commands ph, av, pwr, or pa for the values 'ph', 'av', 'pwr', or 'pa', respectively.

Values: 'ph' sets the *phased mode* in which each real point in the displayed spectrum is calculated from a linear combination of real and imaginary points comprising each respective complex data point.

'av' sets the *absolute-value mode* in which each real point in the displayed spectrum is calculated as the square root of the sum of squares of the real and imaginary points comprising each respective complex data point.

'pwr' sets the *power mode* in which each real point in the displayed spectrum is calculated as the sum of squares of the real and imaginary points comprising each respective complex data point.

'pa' sets the *phase angle* mode in which each real point in the displayed spectrum is calculated as the phase angle from the arc tangent of the real and imaginary points comprising each respective complex data point.

See also: *User Guide: Liquids NMR*

Related:

aig	Absolute intensity group (P)
av	Set absolute-value mode in directly detected dimension (C)
dcg	Drift correction group (P)
dmg1	Data display mode in 1st indirectly detected dimension (P)
dmg2	Data display mode in 2nd indirectly detected dimension (P)
ft	Fourier transform 1D data (C)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
pa	Set phase angle mode in directly detected dimension (C)
ph	Set phased mode in directly detected dimension (C)
pmode	Processing mode for 2D data (P)
pwr	Set power mode in directly detected dimension (C)
wft	Weigh and Fourier transform 1D data (C)

wft1d	Weigh and Fourier transform of 2D data (C)
wft2d	Weigh and Fourier transform 2D data (C)

dmg1 — Data display mode in 1st indirectly detected dimension (P)

Description: Controls the mode of data display along the first indirectly detected dimension of a multidimensional data set. dmg1 is in the display group and can be set manually or by executing the commands ph1, av1, pwr1, or pa1 for the values 'ph1', 'av1', 'pwr1', or 'pa1', respectively. If dmg1 does not exist or if it is set to the empty string (dmg1=''), VNMR uses the value of dmg to decide the display mode along the first indirectly detected dimension.

Values:
'ph1' sets phased mode.
'av1' sets absolute-value mode.
'pwr1' sets power mode.
'pa1' sets phase angle mode.

See also: *User Guide: Liquids NMR*

Related:

av1	Set absolute-value mode in 1st indirectly det. dim. (C)
dmg	Data display mode in directly detected dimension (P)
pa1	Set phase angle mode in 1st indirectly detected dimension (C)
ph1	Set phased mode in 1st indirectly detected dimension (C)
pwr1	Set power mode in 1st indirectly detected dimension (C)

dmg2 — Data display mode in 2nd indirectly detected dimension (P)

Applicability: All systems except *MERCURY* series and *GEMINI 2000*.

Description: Controls the mode of data display along the second indirectly detected dimension of a multidimensional data set. dmg2 is in the display group and can be set manually or by executing the commands ph2, av2, or pwr2 for the values 'ph2', 'av2', or 'pwr2', respectively. If dmg2 does not exist or if it is set to the empty string (dmg2=''), VNMR uses the value of the parameter dmg instead of dmg2 to decide the display mode along the second indirectly detected dimension.

Values:
'ph2' sets phased mode.
'av2' sets absolute-value mode.
'pwr2' sets power mode.

See also: *User Guide: Liquids NMR*

Related:

av2	Set absolute-value mode in 2nd indirectly det. dim. (C)
dmg	Data display mode in directly detected dimension (P)
ph2	Set phased mode in 2nd indirectly det. dim. (C)
pwr2	Set power mode in 2nd indirectly det. dim. (C)

dmgf — Absolute-value display of FID data or spectrum in acqi (P)

Description: If the parameter dmgf exists and is set to 'av', the FID display in the acqi program is set to the absolute-value mode, which displays the square root of the sum of the squares of the real and imaginary channels. dmgf has no function outside of the acqi program. This display mode may cause the displayed FID to exceed the displayed ADC limits in acqi by as much as a factor of the square root of 2.

See also: *Getting Started*

Related;

acqi	Interactive acquisition display process (C)
av	Set absolute-value mode in directly detected dimension (C)
gf	Prepare parameters for FID/spectrum display in acqi (M)

dmi — Display multiple images (M)

Applicability: Systems with imaging capabilities.

Syntax: dmi

Description: Displays a series of multiple images from a single arrayed and/or multislice/multiecho experiment in the graphics window. The resulting display is noninteractive. The layout and size of the images are optimized to maximize the image display size.

See also: *User Guide: Imaging*

Related:

svib	Generate and save images as ImageBrowser FDF files (M)

dmm — Decoupler modulation mode for first decoupler (P)

Description: Sets the modulation modes for the first decoupler. In the standard two-pulse sequence, dmm typically has a single state because the decoupler modulation is normally not changed during the pulse sequence, but this is not fixed. For example, dmm='ccw' gives single-frequency CW decoupling during the first part of the sequence andWALTZ-16 decoupling during acquisition.

In pulse sequences using the decoupler for pulsing (INEPT, DEPT, HETCOR, etc.), decoupler modulation must be set to 'c' during periods of the pulse sequence when the decoupler is to be pulsed.

Values: On UNITY*INOVA* and UNITY*plus*, 'c', 'f', 'g', 'm', 'p', 'r', 'u', 'w', and 'x' are available; on *MERCURY* series, 'c', 'f', 'g', 'm', 'r', 'w', and 'x' are available; on VXR-S and UNITY, 'c', 'f', 'n', 'p', and 'w' are available; and on *GEMINI 2000*, 'c', 'f', 'r', and 'w' are available, where:

- 'c' sets continuous wave (CW) modulation.
- 'f' sets fm-fm modulation (swept-square wave).
- 'g' sets GARP modulation.
- 'm' sets MLEV-16 modulation.
- 'n' sets noise modulation.
- 'p' sets programmable pulse modulation using the dseq parameter to specify the decoupling sequence.
- 'r' sets square-wave modulation.
- 'u' sets user-supplied modulation using external hardware.
- 'w' sets WALTZ-16 modulation.
- 'x' sets XY32 modulation.

See also: *Getting Started*

Related:

dm	Decoupler mode for first decoupler (P)
dmf	Decoupler modulation frequency for first decoupler (P)
dmm2	Decoupler modulation mode for second decoupler (P)
dmm3	Decoupler modulation mode for third decoupler (P)
dmm4	Decoupler modulation mode for fourth decoupler (P)
dseq	Decoupler sequence for the first decoupler (P)

dmm2 — Decoupler modulation mode for second decoupler (P)

Applicability: Systems with a second decoupler.

Description: Sets the type of decoupler modulation for the second decoupler during different status periods within a pulse sequence. It functions analogously to dmm.

Values: For UNITY*INOVA* and UNITY*plus*, 'c', 'f', 'g', 'm', 'p', 'r', 'u', 'w', and 'x' are available. For VXR-S and UNITY, 'c' and 'p' are available. Refer to dmm for the definition of these values (note that if the mode 'p' is selected, dseq2 specifies the decoupling sequence). If dn2='' (two single quotes) and a second decoupler is present in the console (numrfch greater than 2), dmm2 is internally set to 'c' when go is executed.

See also: *Getting Started*

Related:

dm2	Decoupler modulation for the second decoupler (P)
dmf2	Decoupler modulation frequency for the second decoupler (P)
dmm	Decoupler modulation mode for first decoupler (P)
dn2	Nucleus for the second decoupler (P)
dseq2	Decoupler sequence for the second decoupler (P)
numrfch	Number of rf channels (P)

dmm3 — Decoupler modulation mode for third decoupler (P)

Applicability: Systems with a third decoupler.

Description: Sets type of decoupler modulation for the third decoupler during different status periods within a pulse sequence. It functions analogously to dmm.

Values: For UNITY*INOVA* and UNITY*plus*, 'c', 'f', 'g', 'm', 'p', 'r', 'u', 'w', and 'x' are available. Refer to dmm for the definition of these values (note that if the mode 'p' is selected, dseq3 specifies the decoupling sequence). If dn3='' (two single quotes) and a third decoupler is present in the console (numrfch equal to 4), dmm3 is internally set to 'c' when go is executed.

See also: *Getting Started*

Related:

dm3	Decoupler modulation for third decoupler (P)
dmf3	Decoupler modulation frequency for third decoupler (P)
dmm	Decoupler modulation mode for first decoupler (P)
dn3	Nucleus for the third decoupler (P)
dseq3	Decoupler sequence for the third decoupler (P)
numrfch	Number of rf channels (P)

dmm4 — Decoupler modulation mode for fourth decoupler (P)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Description: Sets type of decoupler modulation for the fourth decoupler during different status periods within a pulse sequence. It functions analogously to dmm.

Values: For UNITY*INOVA*, 'c', 'f', 'g', 'm', 'r', 'u', 'w', and 'x' are available. Refer to dmm for the definition of these values. If dn4='' (two single quotes) and a fourth decoupler is present in the console (numrfch greater than 4), dmm4 is internally set to 'c' when go is executed.

See also: *Getting Started*

Related:

dm4	Decoupler modulation for the fourth decoupler (P)
dmf4	Decoupler modulation frequency for the fourth decoupler (P)
dmm	Decoupler modulation mode for first decoupler (P)
dn4	Nucleus for the fourth decoupler (P)

dseq4	Decoupler sequence for the fourth decoupler (P)
numrfch	Number of rf channels (P)

dn — Nucleus for first decoupler (P)

Description: Changing the value of dn causes a macro (named _dn) to be executed that extracts values for dfrq and dof from lookup tables. The tables, stored in the directory /vnmr/nuctables, are coded by atomic weights.

Values: In the lookup tables, typically 'H1', 'C13', 'P31', etc.

See also: *Getting Started*

Related:

dfrq	Transmitter frequency of first decoupler (P)
dn2	Nucleus for second decoupler (P)
dn3	Nucleus for third decoupler (P)
dn4	Nucleus for fourth decoupler (P)
dof	Frequency offset for first decoupler (C)
tn	Nucleus for observe transmitter (P)

dn2 — Nucleus for second decoupler (P)

Applicability: Systems with a second decoupler.

Description: Changing the value of dn2 causes a macro (named _dn2) to be executed that extracts values for dfrq2 and dof2 from lookup tables. Otherwise, dn2 functions analogously to the parameters tn and dn. If an experiment does not use the second decoupler channel, the channel can be disabled by setting dn2='' (two single quotes with no space in between). This sets dm2='n', dmm2='c', dmf2=1000 (in Hz), dfrq2=1 (in MHz), dof2=0, dpwr2=0, homo2='n', dseq2='', and dres2=1.

See also: *Getting Started*

Related:

dfrq2	Transmitter frequency of second decoupler (P)
dn	Nucleus for first decoupler (P)
dof2	Frequency offset for second decoupler (C)
numrfch	Number of rf channels (P)
tn	Nucleus for observe transmitter (P)

dn3 — Nucleus for third decoupler (P)

Applicability: Systems with a third decoupler.

Description: Changing the value of dn3 causes a macro (named _dn3) to be executed that extracts values for dfrq3 and dof3 from lookup tables. Otherwise, dn3 functions analogously to the parameters tn and dn. If an experiment does not use the third decoupler channel, the channel can be disabled by setting dn3='' (two single quotes with no space in between). This sets dm3='n', dmm3='c', dmf3=1000 (in Hz), dfrq3=1 (in MHz), dof3=0, dpwr3=0, homo3='n', dseq3='', and dres3=1.

See also: *Getting Started*

Related:

dn	Nucleus for first decoupler (P)
dfrq3	Transmitter frequency of third decoupler (P)
dof3	Frequency offset for third decoupler (C)
numrfch	Number of rf channels (P)
tn	Nucleus for observe transmitter (P)

dn4 — Nucleus for fourth decoupler (P)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Description: Changing the value of dn4 causes a macro (named _dn4) to be executed that extracts values for dfrq4 and dof4 from lookup tables. Otherwise, dn4 functions analogously to the parameters tn and dn except that the only valid value for dn4 is 'H2'. If an experiment does not use the fourth decoupler channel, the channel can be disabled by setting dn4='' (two single quotes with no space in between). This sets dm4='n', dmm4='c', dmf4=1000 (in Hz), dfrq4=1 (in MHz), dof4=0, dpwr4=0, homo4='n', dseq4='', and dres4=1.

See also: *Getting Started*

Related:

dfrq4	Transmitter frequency of fourth decoupler (P)
dn	Nucleus for first decoupler (P)
dof4	Frequency offset for fourth decoupler (C)
numrfch	Number of rf channels (P)
tn	Nucleus for observe transmitter (P)

dnode — Display list of valid limNET nodes (M,U)

Applicability: Systems with limNET.

Syntax: dnode

Description: Displays the contents of the user's limNET node database (i.e., all remote nodes available to limNET). Each node is listed by name, Ethernet address (6 hexadecimal bytes), and burst size

See also: *Getting Started*

Related:

eaddr	Display Ethernet address (M,U)

dnuc — Retrieve nucleus table parameters for first decoupler (obsolete)

Description: This command is no longer part of VNMR. Use setfrq as the replacement.

Related:

setfrq	Set frequencies of rf channels in system (C)

dnuc2 — Retrieve nucleus table parameters for second decoupler (obsolete)

Description: This command is no longer part of VNMR. Use setfrq as the replacement.

Related:

setfrq	Set frequencies of rf channels in system (C)

dnuc3 — Retrieve nucleus table parameters for third decoupler (obsolete)

Description: This command is no longer part of VNMR. Use setfrq as the replacement.

Related:

setfrq	Set frequencies of rf channels in system (C)

doautodialog — Start a dialog window using def file (M)

Applicability: Systems with automation.

Syntax: doautodialog

Description: Internal macro used by enter to start a dialog window using the def file for an experiment in the dialoglib directory.

Related:

enter	Enter sample information for automation run (M,U)

dodialog — Start a dialog window with dialoglib file (M)

Syntax: dodialog

Description: Internal macro that starts a dialog window using a dialog file in the dialoglib directory.

doexpdialog — Start a dialog window with glide/exp/experiment def file (M)

Syntax: doexpdialog

Description: Internal macro that starts a dialog window using a def file in the directory /glide/exp/experiment.

dof — Frequency offset for first decoupler (P)

Description: Controls the frequency offset of the first decoupler. Higher numbers move the decoupler to higher frequency (toward the left side of the spectrum). The frequency accuracy of the decoupler offset is generally 0.0745 Hz on *GEMINI 2000* systems and 0.1 Hz on other systems. The value is specified in the config program.

Values: On *GEMINI 2000* systems, –50000 to 50000 Hz, in steps of 0.0745 Hz.

On systems other than the *GEMINI 2000*, –100000 to 100000 Hz (approximate, depends on frequency), in steps of 0.1 Hz.

See also: *Getting Started*

Related:

config	Display current configuration and possible change it (M)
dof2	Frequency offset for second decoupler (P)
dof3	Frequency offset for third decoupler (P)
dof4	Frequency offset for fourth decoupler (P)
tof	Frequency offset for observe transmitter (P)

dof2 — Frequency offset for second decoupler (P)

Applicability: Systems with a second decoupler.

Description: Controls the frequency offset for the second decoupler. dof2 functions analogously to the parameters tof and dof.

Values: –100000 to 100000 Hz (approximate, depends on frequency), in steps of 0.1 Hz. If dn2='' (two single quotes with no space in between) and a second decoupler channel is present in the console, dof2 assumes a default value of 0 when go is executed.

See also: *Getting Started*

Related:

dn2	Nucleus for second decoupler (P)
dof	Frequency offset for first decoupler (P)
tof	Frequency offset for observe transmitter (P)

dof3 — Frequency offset for third decoupler (P)

Applicability: Systems with a third decoupler.

Description: Controls the frequency offset for the third decoupler. dof3 functions analogously to the parameters tof and dof.

Values: –100000 to 100000 Hz (approximate, depends on frequency), in steps of 0.1 Hz. If dn3='' (two single quotes with no space in between) and a third decoupler channel is present in the console, dof3 assumes a default value of 0 when go is executed.

See also: *Getting Started*

Related:

dn3	Nucleus for third decoupler (P)
dof	Frequency offset for first decoupler (P)
tof	Frequency offset for observe transmitter (P)

dof4 — Frequency offset for fourth decoupler (P)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Description: Controls the frequency offset for the fourth decoupler. dof4 functions analogously to the parameters tof and dof.

Values: –100000 to 100000 Hz (approximate, depends on frequency), in steps of 2.384 Hz. If dn4='' (two single quotes with no space in between) and a fourth decoupler channel is present in the console, dof4 assumes a default value of 0 when go is executed.

See also: *Getting Started*

Related:

dn4	Nucleus for fourth decoupler (P)
dof	Frequency offset for first decoupler (P)
tof	Frequency offset for observe transmitter (P)

Doneshot — Set up parameters for Doneshot pulse sequence (M)

Syntax: Doneshot

Description: Converts a parameter set to Doneshot experiment.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)
fiddle	Perform reference deconvolution (M)
setup_dosy	Set up gradient levels for DOSY experiments (M)

dopardialog — Start a dialog with dialoglib/experiment def file (M)

Syntax: dopardialog

Description: Internal macro that starts a dialog window using a def file in the directory dialoglib/experiment.

do_pcss — Calculate proton chemical shifts spectrum (C)

Syntax: do_pcss<(<threshold><,max_cc><,max_width)>

Description: Strips a high-resolution proton spectrum down to a list of chemical shifts. The list is saved in the file pcss.outpar. If no argument is given, do_pcss automatically calculates the threshold and uses default values for the maximum allowable coupling constant and the maximum width of a spin multiplet.

Arguments: threshold sets the level whether a point belongs to a peak or is noise.

max_cc is the maximum allowable coupling constant in the spectrum. Default is 20 Hz.

max_width is the maximum width of a spin multiplet in the spectrum. Default is 60 Hz.

Examples:

```
do_pcss
do_pcss(10)
do_pcss(9,20,80)
```

See also: *User Guide: Liquids*

Related: pcss — Calculate and show proton chemical shifts spectrum (M)

dosy — Process DOSY experiments (M)

Syntax: `dosy(<'prune'>,<lowerlimit,upperlimit>)`

Description: Performs a DOSY (diffusion ordered spectroscopy) analysis of the data in an array of spectra.

`dosy` uses the commands `dll` and `fp` to determine the heights of all signals above the threshold defined by the parameter `th` and then fits the decay curve for each signal to a Gaussian using the program `dosyfit`. It stores a summary of all diffusion coefficients and their estimated standard errors and various other results as follows:

- In the directory `$HOME/vnmrsys/Dosy`: diffusion_display.inp, general_dosy_stats, calibrated_gradients, fit_errors, and diffusion_spectrum
- In the current experiment: a second copy of diffusion_display.inp.

The command `showdosy` has been incorporated into `dosy`.

Arguments: `prune` starts a dialog to allow one or more spectra to be omitted from the analysis.
`lowerlimit` is the lower diffusion limit (in units of 10^{-10} m^2/s) to be displayed.
`upperlimit` is the upper diffusion limit (in units of 10^{-10} m^2/s) to be displayed.

Without arguments, `dosy` uses all the experimental spectra and covers the whole diffusion range seen in the experimental peaks.

See also: *User Guide: Liquids NMR*

Related:

ddif	Synthesize and display DOSY plot (C)
fiddle	Perform reference deconvolution (M)
setup_dosy	Set up gradient levels for DOSY experiments (M)

dosyfrq — Larmor frequency of phase encoded nucleus in DOSY (P)

Syntax: `dosyfrq`

Description: Stores the NMR frequency of the phase encoded nucleus in DOSY experiments. It is directly set by the DOSY sequences.

See also: *User Guide: Liquids NMR*

Related: dosy — Process DOSY experiments (M)

dosygamma — Gyromagnetic constant of phase encoded nucleus in DOSY (P)

Syntax: `dosygamma`

Description: Stores the gyromagnetic constant of the phase encoded nucleus in DOSY experiments. It is automatically set by the DOSY sequences and used by the `dosy` macro.

See also: *User Guide: Liquids NMR*

Related: dosy — Process DOSY experiments (M)

dosytimecubed Gyromagnetic constant of phase encoded nucleus in DOSY (P)

Syntax: dosytimecubed

Description: Timecubed factor in the expression for diffusional attenuation. It is automatically set by the DOSY sequences and used by the dosy macro.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)

dot1 Set up a T_1 experiment (M)

Syntax: dot1<(min_T1_estimate,max_T1_estimate,time)>

Description: Sets up all parameters to perform a T_1 experiment, including d1, pw, p1, nt, and an array of d2 values, based on information entered you enter. Make sure that the parameter pw90 is set properly and contains the correctly calibrated 90° pulse width because dot1 uses this information. If you have not done a pulse width calibration recently, you may wish to do so now.

Minimum and maximum T_1 for the peaks of interest are estimates. Do the best you can. Your estimates are used to select optimum values of d2. If the T_1 does not fall between your two guesses, your experiment may not be optimum, but it should still be usable unless your estimates are extremely far off. When you are satisfied with the parameters, enter ga or au to acquire the data.

Arguments: min_T1_estimate is the estimated minimum expected T_1. The default is the system prompts the user for the value.

max_T1_estimate is the estimated maximum expected T_1. The default is the system prompts the user for the value.

time is the total time in hours that the experiment should take. The default is the system prompts the user for the value.

Examples:

```
dot1
dot1(1,2,.5)
```

See also: *User Guide: Liquids NMR*

Related:

d1	First delay (P)
d2	Incremented delay in 1st indirectly detected dimension (P)
ga	Submit experiment to acquisition and FT the result (C)
go	Submit experiment to acquisition (C)
nt	Number of transients (P)
p1	First pulse width (P)
pw	Pulse width (P)
pw90	90° pulse width (P)

dotflag Display FID as connected dots (P)

Description: When sparse FID data points are displayed, they are displayed as unconnected dots. If dotflag exists and is set to 'n', the FID dots will be connected. To create dotflag, enter create('dotflag','flag'). To create dotflag and the FID display parameters axisf, vpf, vpfi, crf, and deltaf (if the parameter set is older and lacks these parameters), enter addpar('fid').

Values: 'n' sets connecting the dots. 'y' sets not connecting the dots.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)

create	Create new parameter in a parameter tree (C)
df	Display a single FID (C)

downsamp — Downsampling factor applied after digital filtering (P)

Description: Specifies the downsampling factor applied after digital filtering. The spectral width of the data set after digital filtering and downsampling is sw divided by downsamp, where sw is the acquired spectral width. If downsamp does not exist in the current experiment, enter addpar('downsamp') to add it. addpar('downsamp') creates the digital filtering and downsampling parameters downsamp, dscoef, dsfb, dslsfrq, and filtfile.

Values: Number for the downsampling factor. 1 sets digital filtering with a filter bandwidth specified by dsfb without downsampling.

'n' sets normal data processing in VNMR without digital filtering.

See also: *Getting Started*

Related:

addpar	Add selected parameters to current experiment (M)
digfilt	Write digitally filtered FID to another experiment (M)
dscoef	Digital filter coefficients for downsampling (P)
dsfb	Digital filter bandwidth for downsampling (P)
dslsfrq	Bandpass filter offset for downsampling (P)
filtfile	File of FIR digital filter coefficients (P)
pards	Create additional parameters used by downsampling (M)
sw	Spectral width in directly detected dimension (P)

dp — Double precision (P)

Description: Sets whether data are acquired in a 16-bit or 32-bit integer format.

Values: 'n' sets 16-bit format, 'y' sets 32-bit format. If the 200-kHz receiver option is installed (Max. Narrowband Width set to 200 kHz in the CONFIG window), dp is forced to 'n' if 120000<sw<=200000. If sw>200000, dp is forced to 'y'. On wideline systems, dp='y' is required when sw>100000. On *MERCURY* series, dp='y' only.

See also: *Getting Started*

Related:

sw	Spectral width in directly detected dimension (P)

dpcon — Display plotted contours (C)

Syntax: dpcon(<options,><levels,spacing>)

Description: Produces a true contour plot display.

Arguments: options must precede levels and spacing in the argument list and can be one or more of the following:

- 'pos' is a keyword to limit the display to positive peaks only in phased spectra. The default is both positive and negative peaks.
- 'neg' is a keyword to limit the display to negative peaks only in phased spectra.
- 'noaxis' is a keyword to omit outlining the display and drawing the horizontal or vertical axis.

levels is the maximum number of contours to be shown. The default is 4.

spacing is the spacing by relative intensity of successive contour levels. The default is 2.

Examples:
```
dpcon
dpcon('pos',6)
dpcon(15,1.4)
```

See also: *User Guide: Liquids NMR*

Related:

dcon	Display noninteractive color intensity map (C)
dconi	Control display selection for the dconi program (P)
dpconn	Display plotted contours without screen erase (C)
pcon	Plot contours on plotter (C)

dpconn — Display plotted contours without screen erase (C)

Syntax: `dpconn(<options,><levels,spacing>)`

Description: Produces a true contour plot display exactly the same as the dpcon command, but without erasing the screen before drawing. The arguments are entered the same as dpcon.

See also: *User Guide: Liquids NMR*

Related:

dpcon	Display plotted contours (C)

dpf — Display peak frequencies over spectrum (C)

Syntax:
```
(1) dpf<(<'noll'><,'pos'><,noise_mult><,'top'>)>
(2) dpf<(<'noll'><,'pos'><,noise_mult><,'leader'>
      <,length>)>
```

Description: Displays peak frequencies in the graphics window, with units specified by the axis parameter. Only those peaks greater than th high are selected. If the interactive command ds is active, dpf deactivates it.

Two basic modes of label positioning are available: labels placed at the top, with *long leaders* extending down to the tops of the lines (syntax 1 using 'top' keyword) or labels positioned just above each peak, with *short leaders* (syntax 2 using 'leader' keyword). The default is short leaders.

Arguments: 'noll' is a keyword to display frequencies using last previous line listing.

'pos' (or 'noneg') is a keyword to display positive peaks only.

noise_mult is a numerical value that determines the number of noise peaks displayed for broad, noisy peaks. The default is 3. A smaller value results in more peaks, a larger value results in fewer peaks, and a value of 0.0 results in a line listing containing all peaks above the threshold th. Negative values of noise_mult are changed to a value of 3. The noise_mult argument is inactive when the 'noll' keyword is specified.

'top' is a keyword to display peak labels at the top with long leaders. In this mode, the height of labels is varied by changing the parameter wc2.

'leader' is a keyword to display labels positioned just above each peak.

length specifies the leader length, in mm, if labels are positioned just above each peak. The default is 20.

Examples:
```
dpf('pos')
dpf('leader',30)
dpf('top','noll')
dpf('pos',0.0,'leader',30)
```

See also: *Getting Started*

Related:

axis	Axis label for displays and plots (P)
dpir	Display integral amplitudes below spectrum (C)

dpirn	Display normalized integral amplitudes below spectrum (M)
pir	Plot integral amplitudes below spectrum (C)
pirn	Plot normalized integral amplitudes below spectrum (M)
ppf	Plot peak frequencies over spectrum (M)
th	Threshold (P)
vp	Vertical position of spectrum (P)
wc2	Width of chart in second direction (P)

dpir — Display integral amplitudes below spectrum (C)

Syntax: dpir

Description: Displays integral amplitudes below the appropriate spectral regions.

See also: *Getting Started*

Related:

dpf	Display peak frequencies over spectrum (C)
dpirn	Display normalized integral amplitudes below spectrum (M)
pir	Plot integral amplitudes below spectrum (C)
pirn	Plot normalized integral amplitudes below spectrum (M)
ppf	Plot peak frequencies over spectrum (M)

dpirn — Display normalized integral amplitudes below spectrum (M)

Syntax: dpirn

Description: Equivalent to the command dpir except that the sum of the integrals is normalized to the value of the parameter ins.

See also: *Getting Started*

Related:

dpir	Display integral amplitudes below spectrum (C)
ins	Integral normalization scale (P)
pirn	Plot normalized integral amplitudes below spectrum (M)

dpl — Default plot (M)

Syntax: dpl

Description: Looks for sequence-specific default plot macro (dpl_*seqfil*) and executes if one is found.

Related:

dpl_seqfil	Sequence-specific default plot (M)
dpr	Default process (M)
dds	Default display (M)

dpl_seqfil — Sequence-specific default plot (M)

Syntax: dpl_*seqfil*

Description: Sequence-specific default plot. These macros are called by the dpl macro.

Examples:

```
dpl_NOESY1D
dpl_TOCSY1D
```

Related:

dpl	Default plot (M)
dpr	Default process (M)
dds	Default display (M)

dplane — Display a 3D plane (M)

Applicability: All systems; however, although dplane is available on *MERCURY* series and *GEMINI 2000*, such systems can only process 3D data and cannot acquire 3D data.

Syntax: dplane(<plane_type,>plane_number)

Description: Displays the 2D color map of a particular data plane from a 3D spectral data set. The 3D parameters are loaded into VNMR each time dplane is executed. The parameter path3d specifies the absolute path to the directory (without the .extr file extension) where the 2D planes extracted from the 3D spectral data set reside.

Arguments: plane_type is one of the keywords 'f1f3', 'f2f3', and 'f1f2' for the f_1f_3, f_2f_3, and f_1f_2 planes, respectively. If plane_type is specified, the parameter plane is updated with that new value. plane is then used to determine the type of 3D plane to be displayed.

plane_number specifies which plane of a particular type is to be displayed:

- For plane f_1f_3, the range of plane_number is 1 to fn2/2
- For plane f_2f_3, the range of plane_number is 1 to fn1/2
- For plane f_1f_2, the range of plane_number is 1 to fn/2

Examples:
```
dplane(3)
dplane('f1f2',2)
```

See also: *User Guide: Liquids NMR*

Related:

dsplanes	Display a series of 3D planes (M)
dproj	Display a 3D plane projection (M)
getplane	Extract planes from a 3D spectral data set (M)
nextpl	Display the next 3D plane (M)
path3d	Path to currently displayed 2D planes from a 3D data set (P)
plane	Currently displayed 3D plane type (P)
prevpl	Display the previous 3D plane (M)
plplanes	Plot a series of 3D planes (M)

dpr — Default process (M)

Syntax: dpr

Description: Looks for sequence-specific default plot macro (dpr_*seqfil*) and executes if one is found.

Related:

dpr_seqfil	Sequence-specific default process (M)
dpl	Default plot (M)
dds	Default display (M)

dpr_seqfil — Sequence-specific default process (M)

Syntax: dpr_*seqfil*

Description: Sequence-specific default plot. These macros are called by the dpr macro.

Examples:
```
dpr_NOESY1D
dpr_TOCSY1D
```

Related:

dpr	Default process (M)
dpl	Default plot (M)
dds	Default display (M)

dprofile — Display pulse excitation profile (M)

Syntax: `dprofile<(axisflag<,profile<,shapefile>>)>`

Description: Displays the X, Y and Z excitation (inversion) profile for a pulse shape generated by the Pbox software. If `shapefile` is not provided, the last simulation data stored in the `shapelib/pbox.sim` file are displayed.

Arguments: The `axisflag` and `profile` arguments can be given in any order.

`axisflag` is `'y'` to display the full spectrum and a frequency scale, or `'n'` to suppress the scale and spectrum. The default is `'n'`.

`profile` is a character string identifying the desired profile. `'xyz'` selects X, Y, and Z (inversion) profiles; `'xy'` selects only the excitation (transverse) profiles; `'x'` selects only the X transverse excitation profile; and `'z'` selects only the inversion profile. The default is `'xyz'`.

`shapefile` is the name of a *.RF or *.DEC file, including the extension.

Examples:
```
dprofile
dprofile('y','xy')
dprofile('xy','n','softpls.RF')
```

See also: *User Guide: Liquids NMR*

Related:

pprofile	Plot pulse excitation profile (M)
Pbox	Pulse shaping software (U)

dproj — Display a 3D plane projection (M)

Applicability: All systems; however, although `dproj` is available on *MERCURY* series and *GEMINI 2000*, such systems can only process 3D data and cannot acquire 3D data.

Syntax: `dproj<(plane_type)>`

Description: Displays 2D color map of the 2D projection plane from a 3D spectral data set. The projection is a skyline projection. The 3D parameters are loaded into VNMR each time `dproj` is executed. For this macro, the parameter `path3d` specifies the directory (without the `.extr` extension) where the 2D projection resides that has been created from the 3D spectral data set.

Arguments: `plane_type` is one of the keywords `'f1f3'`, `'f2f3'`, and `'f1f2'` for the f_1f_3, f_2,f_3, and f_1f_2 planes, respectively. If `plane_type` is specified, the parameter `plane` is updated with that value. `plane` is then used to determine the type of 2D projection to be displayed.

Examples:
```
dproj
dproj('f1f2')
```

See also: *User Guide: Liquids NMR*

Related:

dplane	Display a 3D plane (M)
dsplanes	Display a series of 3D planes (M)
getplane	Extract planes from a 3D spectral data set (M)
nextpl	Display the next 3D plane (M)
path3d	Path to currently displayed 2D planes from a 3D data set (P)
plane	Currently displayed 3D plane type (P)
plplanes	Plot a series of 3D planes (M)
prevpl	Display the previous 3D plane (M)

dps — Display pulse sequence (C)

Syntax: `dps<(file),x,y,width,height>`

Description: Displays a picture of pulse sequences consisting of three to five parts. The top part is the transmitter pulse sequence (Tx). The second part is the decoupler pulse sequence (Dec). The third part might be the second or third decoupler (Dec2 or Dec3) pulse sequence or gradients (X, Y, or Z), depending on the program. The lowest part is the status.

The pulse parameters are displayed if there is enough space an if the length of the parameter name is less than thirty letters. The value of each pulse is also displayed. If the value delay or width is less than zero, a question mark (?) is displayed. The time units are displayed in color (on a color monitor). The height of pulses is scaled according to their power level.

`dps` also displays spin lock, transmitter gating, observe transmitter power, and other information.

Arguments: `file` specifies the name of the file containing the pulse sequences. The default is the file `seqfil`.

`x,y` specifies the start of the position with respect to the lower-left corner of the window.

`width,height` are in proportion to `wcmax` and `wc2max`.

See also: *Getting Started*

Related:

`pps`	Plot pulse sequence (C)
`seqfil`	Pulse sequence name (P)
`wc`	Width of chart (P)
`wcmax`	Maximum width of chart (P)
`wc2max`	Maximum width of chart in second direction (P)

`dpwr` Power level for first decoupler with linear amplifier (P)

Applicability: Systems with a linear amplifier.

Description: On *MERCURY* series and *GEMINI 2000* broadband systems equipped with a linear amplifier, a 63-dB attenuator between the decoupler transmitter board and the amplifier controls the power level. On systems other than *GEMINI 2000*, the configuration is the same except the attenuator can be 63 dB or 79 dB.

The system value for the attenuator upper safety limit is set fin the CONFIG window (opened by `config`). For the *GEMINI 2000*, the label Max. Decoupler in the CONFIG window sets this value; for other systems, Upper Limit sets it. For broadband decoupling of ^{1}H nuclei, typical values range from 36 to 49 dB. For homonuclear decoupling, typical values range from 5 to 15 dB.

Values: On *MERCURY* series systems, 0 to 63 dB, in steps of 1 dB.

GEMINI 2000 systems, 0 to 63 (63 is maximum power), steps of 0.5 dB.

On systems other than *GEMINI 2000*: 0 to 63 (63 is maximum power), in units of dB, if the 63-dB attenuator is installed or –16 to 63 (63 is maximum power), in units of dB, if the 79-dB attenuator is installed.

CAUTION: Decoupler power greater than 2 watts in a switchable probe will damage the probe. Always carefully calibrate decoupling to avoid exceeding 2 watts. The maximum value for `dpwr` on a 200-, 300-, or 400-MHz system with a linear amplifier on the decoupler channel has been set to 49, corresponding to about 2 watts of power. Before using `dpwr=49` for continuous decoupling, ensure safe operation by measuring the output power. This should be done during system installation and checked periodically by the user.

See also: *Getting Started*

Related:

cattn	Coarse attenuator (P)
config	Display current configuration and possible change it (M)
dpwrf	First decoupler fine power (P)
dpwr2	Power level for second decoupler (P)
dpwr3	Power level for third decoupler (P)
dpwr4	Power level for fourth decoupler (P)
fattn	Fine attenuator (P)
tpwr	Power level of observe transmitter with linear amplifiers (P)
tpwrf	Observe transmitter fine power (P)

dpwr2 — Power level for second decoupler with linear amplifier (P)

Applicability: Systems with a linear amplifier as the second decoupler.

Description: Controls the coarse attenuator (63 dB or 79 dB) that resides between the transmitter board and the linear amplifier associated with the second decoupler. The system value for the attenuator upper safety limit is set in the CONFIG window (opened by config).

Values: If 63-dB attenuator installed: 0 to 63 (63 is max. power), in units of dB. If 79-dB attenuator installed: –16 to 63 (63 is max. power), in units of dB. If dn2='' (two single quotes) and a second decoupler channel is present in the console, dpwr2 assumes a default value of 0 when go is executed.

CAUTION: Decoupler power greater than 2 watts in a switchable probe will damage the probe. Always carefully calibrate decoupling to avoid exceeding 2 watts. The maximum value for dpwr2 on a 200-, 300-, or 400-MHz system with a linear amplifier on the decoupler channel has been set to 49, corresponding to about 2 watts of power. Before using dpwr2=49 for continuous decoupling, ensure safe operation by measuring the output power. This should be done during system installation and checked periodically by the user.

See also: *Getting Started*

Related:

cattn	Coarse attenuator type (P)
config	Display current configuration and possible change it (M)
dn2	Nucleus for second decoupler (P)

dpwr3 — Power level for third decoupler with linear amplifier (P)

Applicability: Systems with a linear amplifier as the third decoupler.

Description: Controls the coarse attenuator (63 dB or 79 dB) that resides between the transmitter board and the linear amplifier associated with the third decoupler. The system value for the attenuator upper safety limit is set in the CONFIG window (opened by config).

Values: If 63-dB attenuator installed: 0 to 63 (63 is max. power), in units of dB. If 79-dB attenuator installed: –16 to 63 (63 is max. power), in units of dB. If dn3='' (two single quotes) and a third decoupler channel is present in the console, dpwr3 assumes a default value of 0 when go is executed.

CAUTION: Decoupler power greater than 2 watts in a switchable probe will damage the probe. Always carefully calibrate decoupling to avoid exceeding 2 watts. The maximum value for dpwr3 on a 200-, 300-, or 400-MHz system with a linear amplifier on the decoupler channel has been set to 49, corresponding to about 2 watts of power. Before using dpwr3=49 for continuous decoupling, ensure safe operation by

measuring the output power. This should be done during system installation and checked periodically by the user.

See also: *Getting Started*

Related:
- `cattn` Coarse attenuator type (P)
- `config` Display current configuration and possible change it (M)
- `dn3` Nucleus for third decoupler (P)

dpwr4 Power level for fourth decoupler amplifier (P)

Applicability: Systems with deuterium decoupler channel as the fourth decoupler.

Description: Controls the coarse attenuator (45 dB range) that resides on the Lock Transceiver board and the amplifier associated with the fourth decoupler. The system value for the attenuator upper safety limit is set in the CONFIG window (opened by `config`).

Values: 48-dB attenuator: 15 to 63 (63 is max. power), in units of dB.
If `dn4=''` (two single quotes) and a third decoupler channel is present in the console, `dpwr4` assumes a default value of `0` when `go` is executed.

CAUTION: Decoupling power greater than 5 watts applied to a triple-resonance probe will damage the probe. The maximum value for `dpwr4` is 63, corresponding to about 35 watts to the probe. A value of `dpwr4` equal to 52 corresponds to about 5 watts and will produce approximately a 1 kHz decoupling field. Always carefully calibrate decoupling power to avoid exceeding 5 watts. Before using `dpwr4=52` continuous decoupling, ensure safe operation by measuring the output power. Measurement should be taken during system installation and checked periodically by the user.

See also: *Getting Started*

Related:
- `cattn` Coarse attenuator type (P)
- `config` Display current configuration and possible change it (M)
- `dn3` Nucleus for third decoupler (P)

dpwrf First decoupler fine power (P)

Applicability: Systems with an optional fine attenuator on the decoupler channel.

Description: Controls the first decouple fine attenuator on UNITY*INOVA* and UNITY*plus* systems, on solids systems, or on UNITY systems where an optional second attenuator is in series with the standard attenuator on the decouple channel. Systems with this attenuator are designated within the CONFIG window (opened by `config`) by the status of the Fine Attenuator entry. The fine attenuator is linear and spans 60 dB (UNITY*INOVA* or UNITY*plus*) or 6 dB (other systems).

On *MERCURYplus* and *MERCURY-Vx* systems, `dpwrf` controls the decoupler by simulating a fine attenuator. The fine power control is linear and spans 0 to `dpwr`.

Values: 0 to 4095 (where 4095 is maximum power). If `dpwrf` does not exist in the parameter table, a value of 4095 is assumed.

On *MERCURYplus* and *MERCURY-Vx* systems, 0 to 255 (where 255 is maximum power). If `dpwrf` or `dpwrm` does not exist in the parameter table, a value of 255 is assumed. If both exist, `dpwrm` is used.

See also: *VNMR User Programming;User Guide: Solids; MERCURYplus and MERCURY-Vx CP/MAS Installation, Testing, and Operation*

Related:

config	Display current configuration and possibly change it (M)
dpwr	Power level for first decoupler with linear amplifiers (P)
dpwrf2	Second decoupler fine power (P)
dpwrf3	Third decoupler fine power (P)
dpwrm	First decoupler linear modulator power (P)
fattn	Fine attenuator (P)
tpwr	Power level of observe transmitter with linear amplifiers (P)
tpwrf	Transmitter fine power (P)

dpwrf2 — Second decoupler fine power (P)

Applicability: Systems with an optional fine attenuator on the second decoupler channel.

Description: Controls the second decoupler fine attenuator, functioning analogously to dpwrf.

Values: 0 to 4095 (where 4095 is maximum power). If dpwrf2 does not exist in the parameter table, a value of 4095 is assumed.

See also: *VNMR User Programming*

Related:

dpwrf	First decoupler fine power (P)

dpwrf3 — Third decoupler fine power (P)

Applicability: Systems with an optional fine attenuator on the third decoupler channel.

Description: Controls the third decoupler fine attenuator, functioning analogously to dpwrf.

Values: 0 to 4095 (where 4095 is maximum power). If dpwrf3 does not exist in the parameter table, a value of 4095 is assumed.

See also: *VNMR User Programming*

Related:

dpwrf	First decoupler fine power (P)

dpwrm — First decoupler linear modulator power (P)

Applicability: UNITY*INOVA*, UNITY*plus*, and *MERCURYplus* and *MERCURY-Vx* systems with a first decoupler linear modulator.

Controls the first decoupler linear modulator on UNITY*plus* systems. On *MERCURY* systems, dpwrm controls the decoupler by simulating a fine attenuator. The fine power control is linear and spans 0 to dpwr.

Values: 0 to 4095 (where 4095 is maximum power). If dpwrm does not exist in the parameter table, a value of 4095 is assumed.

On *MERCURYplus* and *MERCURY-Vx* systems, 0 to 255 (where 255 is maximum power). If dpwrm does not exist in the parameter table, a value of 255 is assumed.

See also: *VNMR User Programming; User Guide: Solids; MERCURYplus and MERCURY-Vx CP/MAS Installation, Testing, and Operation*

Related:

dpwrm2	Second decoupler linear modulator power (P)
dpwrm3	Third decoupler linear modulator power (P)
tpwrm	Observe transmitter linear modulator power (P)

dpwrm2 — Second decoupler linear modulator power (P)

Applicability: UNITY*INOVA* or UNITY*plus* systems with a second decoupler linear modulator.

Description: Controls the second decoupler linear modulator on UNITY*plus* systems.

Values: 0 to 4095 (where 4095 is maximum power). If `dpwrm2` does not exist in the parameter table, a value of 4095 is assumed.

See also: *VNMR User Programming*

Related: `dpwrm` First decoupler linear modulator power (P)

dpwrm3 — Third decoupler linear modulator power (P)

Applicability: UNITY*INOVA* or UNITY*plus* systems with a third decoupler linear modulator.

Description: Controls the third decoupler linear modulator on UNITY*plus* systems.

Values: 0 to 4095 (where 4095 is maximum power). If `dpwrm3` does not exist in the parameter table, a value of 4095 is assumed.

See also: *VNMR User Programming*

Related: `dpwrm` First decoupler linear modulator power (P)

dqcosy — Set up parameters for double-quantum filtered COSY (M)

Syntax: `dqcosy`

Description: Macro to set up a double-quantum filtered COSY (homonuclear correlation) experiment.

Alternate: DQCOSY button in the 2D Pulse Sequence Setup Secondary Menu.

See also: *User Guide: Liquids NMR*

Related: `cosyps` Set up parameters for phase-sensitive COSY (M)
`relayh` Set up parameters for COSY pulse sequence (M)

DQCOSY — Change parameters for DQCOSY experiment (M)

Syntax: `DQCOSY<('GLIDE')>`

Description: Converts the current parameter set to a DQCOSY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding carbon spectrum for the experiment.

draw — Draw line from current location to another location (C)

Syntax: `draw(<'keywords'>x,y)`

Description: Draws a line from the current location to the absolute location with coordinates given by the arguments.

Arguments: `'keywords'` identifies the output device (`'graphics'|'plotter'`), drawing mode (`'xor'|'normal'`), and drawing capability (`'newovly'|'ovly'|'ovlyC'`).

- `'graphics'|'plotter'` is a keyword for the output device. The default is `'plotter'`. The output selected is passed to subsequent `pen`, `move`, or `draw` commands and remains active until a different output is specified.
- `'xor'`,`'normal'` is a keyword for the drawing mode when using the `'graphics'` output device. The default is `'normal'`. In the `'xor'` mode, if a line is drawn such that one or more points of the line are in common with a previous `'xor'` line, the common points are erased. In the `normal` mode, the common points remain. The mode selected is passed to

subsequent draw, pen, and move commands and remains active until a different mode is specified.

- 'newovly', 'ovly', and 'ovlyC' are keywords that specify an interactive drawing capability that is slightly slower than the 'xor' mode but more consistent in color. 'newovly' clears any previous draws, boxes, and writes made with the 'ovly' modes and draws the figure. 'ovly' draws without clearing so that multisegment figures can be created. 'ovlyC' clears without drawing.

x,y are the absolute coordinates, in mm, of the endpoint of the line to be drawn. The range of x is 0 at the left edge of the chart and wcmax at the right edge. The range of y is –20 at the bottom of the chart and wc2max at the top.

Examples:
```
draw('graphics','xor'.wcmax-sc,vp+th)
draw(wcmax-sc-wc*(cr-delta-sp)/wp,wc2max)
```

See also: *Getting Started*

Related:

gin	Return current mouse position and button values (C)
move	Move to an absolute location (C)
pen	Select a pen or color for drawing (C)
wcmax	Maximum width of chart (P)
wc2max	Maximum width of chart in second direction (P))

drawslice — Display target slices (M)

Applicability: Systems with imaging capabilities.

Syntax: drawslice

Description: Displays target slices defined by the file curexp+'/mark2d.out'. The program shows graphically the position and orientation of the selected target slices on a scout image. This macro is also called by the ShowTarget button in the slice planner menu. See the plan macro for more details.

See also: *User Guide: Imaging*

Related:

curexp	Current experiment directory (P)
drawvox	Display target voxels (M)
plan	Display menu for planning a target scan (M)
ssplan	Set slice parameters for target slice (M)
voxplan	Set voxel parameters for voxel defined by 2D box cursor (M)

drawvox — Display target voxels (M)

Applicability: Systems with imaging capabilities.

Syntax: drawvox

Description: Displays target voxels defined by the file curexp+'/mark2d.out'. This program shows graphically the position of the selected target voxels on the scout image. The user can plan and then display more than one voxel with this macro. This macro is also called by the Show Target button in the voxel planner menu. See the plan macro for more details.

See also: *User Guide: Imaging*

Related:

curexp	Current experiment directory (P)
drawslice	Display target slices (M)
plan	Display menu for planning a target scan (M)
planlock	Planner lock out (P)
ssplan	Set slice parameters for target slice (M)
voxplan	Set voxel parameters for voxel defined by 2D box cursor (M)

dres — Measure linewidth and digital resolution (C)

Syntax:
```
dres<(<freq<,fractional_height>>)>
   :linewidth,digital_resolution
```

Description: Analyzes the line defined by the current cursor position for its linewidth (width at half-height) and digital resolution.

Arguments: `freq` is the frequency of the line. The default is the parameter `cr`. This overrides using the current cursor position as the frequency.

`fractional_height` is the linewidth is measured at this height.

`linewidth` is the value returned for the linewidth of the line.

`digital_resolution` is the value returned for the digital resolution of the line.

Examples:
```
dres:$width,$res
dres(cr,0.55)
```

See also: *Getting Started; VNMR User Programming*

Related:

`cr`	Current cursor position (P)
`dsn`	Measure signal-to-noise (C)

dres — Tip-angle resolution for first decoupler (P)

Applicability: Systems with waveform generators.

Description: Controls the tip-angle resolution to be used within a waveform generator decoupling sequence on the first decoupler. The optimum value is a function of the decoupling sequence to be used: for WALTZ-16, `dres=90.0`; for MLEV16-240, `dres=30.0`; and for GARP1, `dres=1.0`.

Values: 1.0 to 90.0, in units of degrees. In reality, `dres` can assume values as small of 0.7 (but no smaller) and can be specified in units of 0.1°. To use this capability, change the limits of `dres` by using `destroy('dres')` `create('dres','real')` `setlimit('dres',360,0.7,0.1)`. Making corresponding changes within the `fixpar` macro ensures that `dres` is created in the desired way with each new parameter set.

See also: *Getting Started*

Related:

`dmfadj`	Adjust decoupler tip-angle resolution time (M)
`dres2`	Tip angle resolution for second decoupler (P)
`dres3`	Tip angle resolution for third decoupler (P)
`fixpar`	Correct parameter characteristics in experiment (M)

dres2 — Tip-angle resolution for second decoupler (P)

Applicability: Systems with waveform generators.

Description: Controls the tip-angle resolution to be used within a waveform generator decoupling sequence on the second decoupler. The optimum value is a function of the decoupling sequence to be used: for WALTZ-16, `dres2=90.0`; for MLEV16-240, `dres2=30.0`; and for GARP1, `dres2=1.0`.

Values: 1.0 to 90.0, in units of degrees.

See also: *Getting Started*

Related:

`dmf2adj`	Adjust second decoupler tip-angle resolution time (M)
`dres`	Tip-angle resolution for first decoupler (P)

dres3 — Tip-angle resolution for third decoupler (P)

Applicability: Systems with waveform generators.

Description: Controls the tip-angle resolution to be used within a waveform generator decoupling sequence on the third decoupler. The optimum value is a function of the decoupling sequence to be used: for WALTZ-16, `dres3=90.0`; for MLEV16-240, `dres3=30.0`; and for GARP1, `dres3=1.0`.

Values: 1.0 to 90.0, in units of degrees.

See also: *Getting Started*

Related:

`dmf3adj`	Adjust third decoupler tip-angle resolution time (M)
`dres`	Tip-angle resolution for first decoupler (P)

dres4 — Tip-angle resolution for fourth decoupler (P)

Applicability: Systems with deuterium decoupler channel as the fourth decoupler.

Description: Controls the tip-angle resolution to be used for the decoupling sequence on the fourth decoupler. The optimum value is a function of the decoupling sequence to be used: for WALTZ-16, `dres4=90.0`; for MLEV16-240, `dres4=30.0`; and for GARP1, `dres4=1.0`.

Values: 1.0 to 90.0, in units of degrees.

See also: *Getting Started*

Related:

`dmf4adj`	Adjust fourth decoupler tip-angle resolution time (M)
`dres`	Tip-angle resolution for first decoupler (P)

ds — Display a spectrum (C)

Syntax: (1) `ds<(index)>`
(2) `ds<(options)>`

Description: Displays a single spectrum. Parameter `intmod` controls integral display:

- `intmod='off'` turns off the integral display
- `intmod='full'` displays the entire integral
- `intmod='partial'` displays every other integral region

Parameter entry after a spectrum has been displayed with the `ds` command causes the spectrum to be updated.

Two additional parameters control the behavior of the `ds` command:

- The parameter `phasing` (in the “global” parameter set) controls the percentage of the spectrum updated during interactive phasing. This parameter can be set in the range of 10 to 100. A value of 100 causes the entire spectrum to be updated. A value of 20 causes the area between the two horizontal cursors to be updated.
- The parameter `lvltlt` (in the “current” parameter set) controls the sensitivity of the interactive `lvl` and `tlt` adjustments. `lvltlt` can be set to any positive real number. It is basically a multiplier for the sensitivity. The default value is 1.0. Larger values make the adjustments larger. Smaller values make the adjustments smaller.

For arrayed 1D spectra or for 2D spectra, a particular trace can be viewed by supplying the index number as an argument. For 2D data sets, spectra can be displayed from either the f_1 or f_2 domain by setting the parameter `trace` equal to `'f1'` or `'f2'`, respectively. After entering `ft1d`, interferograms can be viewed by setting `trace='f1'` and then typing `ds`.

Spectra are scaled according to the number of completed transients ct. If nt is arrayed (nt=1,2,4,8), each spectrum is scaled by its own ct.

Arguments: index (used with syntax 1) is the index number of a particular trace to be displayed in arrayed 1D spectra or in 2D spectra (syntax 1).

options (used with syntax 2) is any of the following keywords:

- 'toggle' switches between the box and the cursor modes.
- 'restart' redraws the cursor if it has been turned off.
- 'expand' toggles between expanded and full view of the spectrum.
- 'spwp' interactively adjusts start and width of the spectrum display.
- 'phase' enters an interactive phasing mode.
- 'thresh' interactively adjusts the threshold.
- 'z' interactively sets integral resets.
- 'dscale' toggles the scale below the spectrum on and off.
- 'lvltlt' interactively adjusts the lvl and tlt parameters.
- 'scwc' interactively adjusts the start and width of chart.

Examples:
```
ds
ds(7)
ds('restart')
```

Alternate: Interactive button in the 1D Data Display Menu.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

crmode	Current state of cursors in dfid, ds, or dconi (P)
ct	Completed transients (P)
ft1d	Fourier transform along f_2 dimension (C)
intmod	Integral display mode (P)
lp	First-order phase in directly detected dimension (P)
lvl	Zero-order baseline correction (P)
lvltlt	Control sensitivity of lvl and tlt adjustments (P)
nt	Number of transients (P)
phasing	Control update region during ds phasing (P)
rp	Zero-order phase in directly detected dimension (P)
select	Select a spectrum without displaying It (C)
tlt	First-order baseline correction (P)
trace	Mode for n-dimensional data display (P)
wft1d	Weight and Fourier transform f_2 for 2D data (C)

ds2d — Display 2D spectra in whitewash mode (C)

Syntax: ds2d<(options)>

Description: Displays a stacked plot of 2D spectra in whitewash mode (after the first spectra, each spectra is blanked out in regions in which it is behind an earlier spectra). Color does not represent intensity (unlike dcon), because intensity can be seen visually, but instead successive traces are displayed in different colors so that color represents frequency.

Arguments: options can be any of the following keywords:

- 'nobase' is a keyword to activate the th parameter to suppress all intensity below the th level.
- 'fill' is a keyword to fill in the peaks. When using 'fill', th operates linearly and not logarithmically (factors of 2) as it does in the contour or color intensity displays.

- 'fillnb' is a keyword to combine base suppression and peak filling. When using 'fillnb', th operates linearly and not logarithmically (factors of 2) as it does in the contour or color intensity displays.
- 'noaxis' is a keyword to omit outlining the display and drawing the horizontal and vertical axis.

Examples:
```
ds2d
ds2d('fillnb')
```

See also: *User Guide: Liquids NMR*

Related:

dcon	Display noninteractive color intensity map (C)
dconi	Control display selection for the dconi program (P)
ds2dn	Display 2D spectra in whitewash mode without screen erase (C)
pl2d	Plot 2D spectra in whitewash mode (C)
th	Threshold (P)

ds2dn — Display 2D spectra in whitewash mode without screen erase (C)

Syntax: `ds2dn<(options)>`

Description: Displays a stacked plot of 2D spectra in whitewash mode (after the first spectra, each spectra is blanked out in regions in which it is behind an earlier spectra) the same as ds2d but without erasing the screen before drawing. The arguments are the same as ds2d.

Examples:
```
ds2dn
ds2dn('fillnb')
```

See also: *User Guide: Liquids NMR*

Related:

ds2d	Display 2D spectra in whitewash mode (C)

dscale — Display scale below spectrum or FID (C)

Syntax: `dscale<(<axis><,vert_start><,display_start><,color>)>`

Description: Displays a scale under a spectrum or FID.

Arguments: axis is a letter to be used to label the axis. For a spectrum scale, if 'p', 'h', 'k', 'c', 'm', 'u', etc. is supplied, the letter within the single quotes is used instead of the current value of axis. For an FID scale, if 's', 'm', or 'u' is supplied, it is used instead of the current value of axisf.

vert_start is a real number that sets the vertical position where the scale is drawn. The default is 5 mm below the current value of the parameter vp.

display_start is a real number that modifies the start of a display. For example, if the display is from 347 to 447 Hz, but a scale of 0 to 100 Hz is desired, display_start would be 0.

color is one of the keywords 'red', 'green', 'blue', 'cyan', 'magenta', 'yellow', 'black', or 'white' for the color of the scale.

Examples:
```
dscale
dscale(20)
dscale('h',0,'green')
dscale('h',vp-10,0)
```

See also: *Getting Started*

Related:

axis	Axis label for displays and plots (P)
axisf	Axis label for FID displays and plots (P)
pscale	Plot scale below spectrum or FID (C)
vp	Vertical position of spectrum (P)

dscoef — Digital filter coefficients for downsampling (P)

Description: Specifies the number of coefficients used in the digital filter. This parameter does not need to be changed as the parameter downsamp is changed, because dscoef is automatically adjusted by VNMR to give filter cutoffs that are the same, regardless of the value of downsamp. This is done by using dscoef*downsamp/2 coefficients in the digital filter. VNMR always rounds dscoef*downsamp/2 to an odd number. If dscoef does not exist in the current experiment, enter addpar('downsamp') to add it. Entering addpar('downsamp') creates the digital filtering and downsampling parameters downsamp, dscoef, dsfb, dslsfrq, and filtfile.

Values: Number of digital filter coefficients. The default is 61. A larger number of coefficients gives a filter with sharper cutoffs; a smaller number gives a filter with more gradual cutoffs.

See also: *Getting Started*

Related:

addpar	Add selected parameters to current experiment (M)
downsamp	Downsampling factor applied after digital filtering (P)
dsfb	Digital filter bandwidth for downsampling (P)
dslsfrq	Bandpass filter offset for downsampling (P)
filtfile	File of FIR digital filter coefficients (P)
pards	Create additional parameters used for downsampling (M)

dseq — Decoupler sequence for first decoupler (P)

Applicability: Systems with waveform generators.

Description: Specifies the decoupling sequence (without the .DEC file extension) to be used during any period of programmable decoupling on the first decoupler under status control (i.e., dmm='p'). The decoupling sequence must be located in the user's shapelib directory or in the VNMR system's shapelib directory.

See also: *Getting Started*

Related:

dmm	Decoupler modulation mode for first decoupler (P)
dseq2	Decoupler sequence for second decoupler (P)
dseq3	Decoupler sequence for third decoupler (P)

dseq2 — Decoupler sequence for second decoupler (P)

Applicability: Systems with waveform generators.

Description: Specifies the decoupling sequence (without the .DEC file extension) to be used during any period of programmable decoupling on the second decoupler under status control (i.e., dmm2='p'). The decoupling sequence must be located in the user's shapelib directory or in the VNMR system shapelib directory.

See also: *Getting Started*

Related:

dmm2	Decoupler modulation mode for second decoupler (P)
dseq	Decoupler sequence for first decoupler (P)

dseq3 — Decoupler sequence for third decoupler (P)

Applicability: Systems with waveform generators.

Description: Specifies the decoupling sequence (without the .DEC file extension) to be used during any period of programmable decoupling on the third decoupler under status control (i.e., dmm3='p'). The decoupling sequence must be located in the user's shapelib directory or in the VNMR system's shapelib directory.

See also: *Getting Started*

Related:		
	dmm3	Decoupler modulation mode for third decoupler (P)
	dseq	Decoupler sequence for first decoupler (P)

dsfb — Digital filter bandwidth for downsampling (P)

Description: Specifies the bandwidth of the digital filter used for downsampling. If dsfb does not exist in the current experiment, enter addpar('downsamp') to add it. addpar('downsamp') creates the digital filtering and downsampling parameters downsamp, dscoef, dsfb, dslsfrq, and filtfile.

Values: Number, in Hz. A smaller value rejects frequencies at the spectrum edges; a larger value aliases noise and signals at frequencies outside of ±sw/2.

'n' makes dsfb default to the final sw/2.

See also: *Getting Started*

Related:		
	addpar	Add selected parameters to current experiment (M)
	downsamp	Downsampling factor applied after digital filtering (P)
	dscoef	Digital filter coefficients for downsampling (P)
	dslsfrq	Bandpass filter offset for downsampling (P)
	filtfile	File of FIR digital filter coefficients (P)
	pards	Create additional parameters used for downsampling (M)
	sw	Spectral width in directly detected dimension (P)

dshape — Display pulse shape or modulation pattern (M)

Syntax: dshape<(pattern.ext)>

Description: Displays the real (X) and imaginary (Y) components of a shaped pulse. Any type of waveform (.RF, .DEC or .GRD) can be displayed.

Arguments: pattern is the name of a shape or pattern file specified by an absolute file name, relative file name, or a simple pattern file name. ext is a file name extension that specifies the file type. In the case of a simple file name, dshape searches for the file in the local directory, then in the user's shapelib, and finally in the directory /vnmr/shapelib. If pattern.ext is not given, dshape displays the last created waveform stored in the pbox.fid file.

Examples:
```
dshape
dshape('Pbox.RF')
```

See also: *User Guide: Liquids NMR*

Related:		
	Pbox	Pulse shaping software (U)
	pshape	Plot pulse shape or modulation pattern (M)

dshapef — Display last generated pulse shape (M)

Syntax: dshapef

Description: Displays the real (X) and imaginary (Y) components of last generated shaped pulse, stored in pbox.fid file.

See also: *User Guide: Liquids NMR*

Related:		
	Pbox	Pulse shaping software (U)
	pshapef	Plot last generated pulse shape (M)

dshapei — Display pulse shape or modulation pattern interactively (M)

Syntax: dshapei<(pattern.ext)>

Description: Displays the real (X) and imaginary (Y) components of a pulse shape, modulation pattern or gradient shape interactively. `dshapei` overwrites the existing data (FID) after the permission is granted by the user. It also asks for the duration of the waveform and displays the timescale.

Arguments: `pattern` is the name of a shape or pattern file specified by an absolute file name, relative file name, or a simple pattern file name. `ext` is a file name extension that specifies the file type. In the case of a simple file name, `dshapei` searches for the file in the local directory, then in the user's `shapelib`, and finally in the directory `/vnmr/shapelib`. If no file name is given, `dshapei` displays the last created waveform stored in the `pbox.fid` file.

Examples:
```
dshapei
dshapei('myfile.DEC')
```

See also: *User Guide: Liquids NMR*

Related:
- `Pbox` — Pulse shaping software (U)

dshim — Display a shim “method” string (M)

Syntax:
(1) `dshim<(file)>`
(2) `dshim('method'|'help')`

Description: Looks in the user's `shimmethods` directory and then in the VNMR system `shimmethods` directory for a file and displays the file (syntax 1) or displays information about `method` strings (syntax 2).

Arguments: `file` is the name of a file to be searched for in the `shimmethods` directories. The default is to display the contents of the `shimmethods` directories.

`'method'` is a keyword to explain the structure of `method` strings.

`'help'` is a keyword to describe the `method` strings in the VNMR system’s `shimmethods` directory.

Examples:
```
dshim
dshim('method')
dshim('help')
```

See also: *Getting Started*

Related:
- `method` — Autoshim method (P)
- `newshm` — Interactively create a shim “method” with options (M)
- `shim` — Submit an Autoshim experiment to acquisition (C)
- `stdshm` — Interactively create a shim “method” (M)

dslsfrq — Bandpass filter offset for downsampling (P)

Description: For downsampling, selects a bandpass filter that is not centered about the transmitter frequency. In this way, `dslsfrq` works much like `lsfrq`. If `dslsfrq` does not exist in the current experiment, add it by entering `addpar('downsamp')`. The command `addpar('downsamp')` creates the digital filtering and downsampling parameters `downsamp`, `dscoef`, `dsfb`, `dslsfrq`, and `filtfile`.

Values: A number, in Hz. A positive value selects a region upfield from the transmitter frequency; a negative value selects a downfield region.

See also: *Getting Started*

Related:
- `addpar` — Add selected parameters to current experiment (M)
- `downsamp` — Downsampling factor applied after digital filtering (P)
- `dscoef` — Digital filter coefficients for downsampling (P)

dsfb	Digital filter bandwidth for downsampling (P)
filtfile	File of FIR digital filter coefficients (P)
lsfrq	Frequency shift of the fn spectrum in Hz (P)
movedssw	Set parameters for digital filtering and downsampling (M)
pards	Create additional parameters used by downsampling (M)

dsn — Measure signal-to-noise (C)

Syntax: `dsn<(low_field,high_field)>:signal_to_noise,noise`

Description: Measures the signal-to-noise ratio of the spectrum by first measuring the intensity of the largest peak in the spectral range defined by sp and wp, and then measuring the noise in the spectral region defined by the position of the two cursors. The noise value returned from dsn is not scaled by vs. The interrelations between the signal-to-noise ratio, the noise, and peak intensities can be illustrated by comparing dsn:$sn,$noise and peak:$signal. In this case, $sn is equal to ($signal /$noise)/vs.

Arguments: low_field and high_field are the upper and lower frequencies of the noise region to be measured. The default is the position of the two cursors.

signal_to_noise is the calculated value of signal-to-noise ratio.

noise is the noise value measured within the defined spectral region.

Examples:
```
dsn:$ston
dsn(sp+sp,sp+wp-100)
dsn(10000,8000):r1
```

See also: *VNMR User Programming*

Related:

dres	Measure linewidth and digital resolution (C)
peak	Find tallest peak in specified region (C)
sp	Start of plot (P)
vs	Vertical scale (P)
wp	Width of plot (P)

dsnmax — Calculate maximum signal-to-noise (M)

Syntax: `dsnmax<(noise_region)>`

Description: Finds the best signal-to-noise in a specified region.

Arguments: noise_region is the size, in Hz, of the region. The default is the region between the cursors as defined by the parameter delta.

Examples:
```
dsnmax
dsnmax(400)
```

See also: *VNMR User Programming*

Related:

delta	Cursor difference in directly detected dimension (P)

dsp — Display calculated spectrum (C)

Syntax: `dsp<(file<,'nods'>)>`

Description: Using the current table of transitions and intensities, dsp recalculates the simulated spectrum (using the current value for the linewidth slw) and displays the spectrum. dsp can only be used after the spins program has been run. If only the linewidth slw or vertical scale svs have been changed, dsp can be used to redisplay the spectrum. If a chemical shift or coupling constant has been changed, however, dsp will not display a spectrum reflecting the changes in the parameter; spins must be run again to recalculate the new spectrum.

The number of points in the calculated spectrum is fn/2. To increase the number of points, change fn and rerun dsp without doing a transform.

To display a synthetic spectrum, prepare a file in the following format:

```
Freq1, Intens1, LineWidth1, GaussFrac1
Freq2, Intens2, LineWidth2, GaussFrac2
...
FreqN, IntensN, LineWidthN, GaussFracN
```

The units for frequency and line width are Hz. The Gaussian fraction, which is the percentage of the line shape that is Gaussian (the rest is Lorentzian) should be between 0 and 1 (i.e., 0 is pure Lorentzian, 1 is pure Gaussian). Units for intensity are not particularly important. Given numbers in a file myshape, it is only necessary to enter dsp('myshape') to display the synthetic spectrum. This approach is often preferred over deconvolution for quantifying small shoulders on large peaks.

Arguments: file is the name of a file containing spectral information that displays the result of a spectrum deconvolution. Any file in the proper format can be used to generate a display. The default is the file spins.outdata in the experiment directory. This file contains information about frequencies, intensities, line widths, and Gaussian/Lorentzian fractions.

'nods' is a keyword for dsp to recalculate the simulated spectrum but not to display the spectrum. The spectrum can be displayed with the ds or dss command.

Examples:
```
dsp
dsp('fitspec.outpar')
```

See also: *User Guide: Liquids NMR*

Related:

ds	Display a spectrum (C)
dss	Display stacked spectra (C)
fn	Fourier number in directly detected dimension (P)
slw	Spin simulation linewidth (P)
spins	Perform spin simulation calculation (C)
svs	Spin simulation vertical scale (P)

dsp — Type of DSP for data acquisition (P)

Description: Selects the type of DSP (digital signal processing) for data acquisition:

- *Inline DSP* performs digital filtering and downsampling on the workstation immediately after each oversampled FID is transferred from the console. sw and at should be set to the values desired for the final spectrum. Only the digital filtered and downsampled data is written to the disk. Selective detection of a region of a spectrum is available using the moveossw macro.
- *Real-time DSP* uses optional hardware (not available on all systems) to filter the data prior to summing to memory. Real-time DSP is not compatible with pulse sequences that use explicit acquisition to acquire less than the full number of data points (np) in a single acquire statement (e.g., solids sequences such as BR24 and FLIPFLOP).

If either type is active, the filter bandwidth parameter fb is not active. The actual analog filter *is* active and is automatically set by the software to a value that matches *(*sw/2)*oversamp as closely as possible.

Another type of DSP is available that allows post-processing of data. See the description of the pards macro for details.

Values: `'i'` selects inline DSP and calls `addpar('oversamp')` to create the DSP parameters `def_osfilt`, `filtfile`, `oscoef`, `osfb`, `osfilt`, `oslsfrq`, and `oversamp`. A value of `oversamp` greater than 1 causes the next experiment run to be oversampled, digitally filtered, and downsampled back to the selected `sw` prior to saving it to disk. On systems other than UNITY*INOVA*, inline DSP is not possible if interleaving is active (`il='y'`). Also, the command `sa` can be used to stop acquisition, but `ra` cannot be used to resume it. On UNITY*INOVA*, inline DSP is completely compatible with interleaving and with stopping and restarting on acquisition with `sa` and `ra`. Set `fsq='y'` to use frequency-shifted quadrature detection on UNITY*INOVA*.

`'r'` selects real-time DSP and calls the macro `addpar('oversamp')` to create the DSP parameters `def_osfilt`, `filtfile`, `oscoef`, `osfb`, `osfilt`, `oslsfrq`, and `oversamp` (although only `oversamp` and `osfilt` are user adjustable for real-time DSP). Use `dsp='r'` only if the optional DSP hardware is present in the system. On UNITY*INOVA* systems, set `fsq='y'` to use frequency-shifted quadrature detection.

`'n'` (or parameter `dsp` is not present) disables both types of DSP. Set `dsp='n'` if you wish to turn off DSP on a permanent or semi-permanent basis. To turn off DSP within just a single experiment, set `oversamp='n'`.

See also: *Getting Started*

Related:

`addpar`	Add selected parameters to current experiment (M)
`at`	Acquisition time (P)
`def_osfilt`	Default value of osfilt (P)
`fb`	Filter bandwidth (P)
`filtfile`	File of FIR digital filter coefficients (P)
`fsq`	Frequency-shifted quadrature detection (P)
`il`	Interleave arrayed and 2D experiments (P)
`moveossw`	Set oversampling parameters for selected spectral region (M)
`np`	Number of data points (P)
`oscoef`	Digital filter coefficients for oversampling (P)
`osfb`	Digital filter bandwidth for oversampling (P)
`osfilt`	Oversampling filter for real-time DSP (P)
`oslsfrq`	Bandpass filter offset for oversampling (P)
`oversamp`	Oversampling factor for acquisition (P)
`pards`	Create additional parameters used by downsampling (M)
`paros`	Create additional parameters used by oversampling (M)
`ra`	Resume acquisition stopped with *sa* command (C)
`sa`	Stop acquisition (C)
`sw`	Spectral width in the directly detected dimension (P)

`dsplanes` Display a series of 3D planes (M)

Applicability: All systems; however, although `dsplanes` is available on *MERCURY* series and *GEMINI 2000* systems, such systems can only process 3D data and cannot acquire 3D data.

Syntax: `dsplanes(start_plane,stop_plane)`

Description: Produces a graphical 2D color or contour map for a subset of 3D planes. The `dconi` program is used to display the planes.

Arguments: `start_plane` specifies the number of the 3D plane with which display is to begin. It must be greater than 0.

`stop_plane` specifies the number of the 3D plane with which the display is to end. If `start_plane` is greater than `stop_plane`, only the first plane,

whose number is start_plane, is plotted. The range of stop_plane depends on the value of the parameter plane as follows:

- If plane='f1f3', range of stop_plane is between 0 and fn2/2
- If plane='f2f3', range of stop_plane is between 0 and fn1/2
- If plane='f1f2', range of stop_plane is between 0 and fn/2

Examples: dsplanes(1,3)

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D data display (C)
dplane	Display a 3D plane (M)
dproj	Display a 3D plane projection (M)
getplane	Extract planes from 3D spectral data set (M)
nextpl	Display the next 3D plane (M)
plane	Currently displayed 3D plane type (P)
plplanes	Plot a series of 3D planes (M)
prevpl	Display the previous 3D plane (M)

dsptype — Type of DSP (P)

Description: Indicates the existence of digital signal processing (DSP).

Values: 0 indicates no digital signal processing. 1 indicates DSP exists.

Examples: dsptype?=0 dsptype?=1

See also: *User Guide: Liquids NMR*

Related:

dsp	Type of DSP for data acquisition (P)

dss — Display stacked spectra (C)

Syntax: dss<(<start,finish<,step>><,options>)>

Description: Displays one or more spectra on the screen, but not interactively like the command ds. When a single spectrum is displayed, integral display is controlled by the parameter intmod, which has the following values:

- intmod='off' turns off the integral display.
- intmod='full' displays the entire integral.
- intmod='partial' displays every other integral region.

For arrayed 1D spectra or for 2D spectra, a particular trace can be viewed by supplying the index number as an argument. For 2D data sets, spectra can be displayed from either the f_1 or f_2 domain by setting the parameter trace equal to 'f1' or 'f2', respectively. After entering ft1d, interferograms can be viewed by setting trace='f1' and then entering dss. Multiple spectra can be displayed by supplying indexes of the first and last spectra.

The position of the first spectrum is governed by the parameters wc, sc, and vp. For 1D data, subsequent spectra are positioned relative to the preceding spectrum by the parameters vo (vertical offset) and ho (horizontal offset). For 2D data, ho defines the total horizontal offset between the first and last spectrum. Also for 2D data, vo is inactive while the parameter wc2 defines the total vertical offset between the first and last spectrum.

The parameter cutoff, if it exists and is active, defines the distance above and below the current vertical position vp at which peaks are truncated. By arraying cutoff to have two different values, the truncation limits above and below the current vertical position can be controlled independently. For example,

`cutoff`=50 truncates peaks at `vp`+50 mm and `vp`–50 mm.
`cutoff`=50,10 truncates peaks at `vp`+50 mm and `vp`–10 mm.

Arguments: `start` is the index of the first spectra when displaying multiple spectra. It is also the index number of a particular trace to be viewed when displaying arrayed 1D spectra or 2D spectra.

`finish` is the index of the last spectra when displaying multiple spectra. Since the parameter `arraydim` is automatically set to the total number of spectra, it can be used to set `finish` to include all spectra (e.g., `dss(1,arraydim,3)`).

`step` is the increment for the spectral index when displaying multiple spectra. The default is 1.

`options` can be any of the following:

- `'all'` is a keyword to display all of the spectra.
- `'int'` is a keyword to only display the integral, independently of the value of the parameter `intmod`
- `'top'` or `'side'` are keywords that cause the spectrum to be displayed either above or at the left edge, respectively, of a contour plot. This assumes that the parameters `sc`, `wc`, `sc2`, and `wc2` are those used to position the contour plot.
- `'dodc'` is a keyword for all spectra to be drift corrected independently.
- `'red'`, `'green'`, `'blue'`, `'cyan'`, `'magenta'`, `'yellow'`, `'black'`, and `'white'` are keywords that select a color.

Examples:
```
dss(1,3)
dss(1,12,3,'green')
```

See also: *User Guide: Liquids NMR*

Related:

`cutoff`	Data truncation limit (P)
`dssa`	Display stacked spectra automatically (C
`dssan`	Display stacked spectra automatically without erasing (C)
`dssh`	Display stacked spectra horizontally (C)
`dsshn`	Display stacked spectra horizontally without erasing (C)
`dssn`	Display stacked spectra without screen erase (C)
`dsww`	Display spectra in whitewash mode (C)
`ft1d`	Fourier transform along f_2 dimension (C)
`ho`	Horizontal offset (P)
`intmod`	Integral display mode (P)
`pl`	Plot spectra (C)
`plww`	Plot spectra in whitewash mode (C)
`sc`	Start of chart (P)
`sc2`	Start of chart in second direction (P)
`trace`	Mode for 2D data display (P)
`vo`	Vertical offset (P)
`vp`	Vertical position of spectrum (P)
`wc`	Width of chart (P)
`wc2`	Width of chart in second direction (P)

dssa — Display stacked spectra automatically (C)

Syntax: `dssa<(<start,finish<,step>><,options>)>`

Description: Displays one or more spectra automatically. When a single spectrum is displayed, integral display is controlled by the parameter `intmod`, which has the following values:

- intmod='off' turns off the integral display.
- intmod='full' displays the entire integral.
- intmod='partial' displays every other integral region.

For arrayed 1D spectra or for 2D spectra, a particular trace can be viewed by supplying the index number. For 2D data sets, spectra can be displayed from either the f_1 or f_2 domain by setting the parameter trace equal to 'f1' or 'f2', respectively. Following the command ft1d, interferograms may be viewed by setting trace='f1' and then entering dssa. Multiple spectra can be displayed by supplying indexes of the first and last spectra.

The position of the first spectrum is governed by the parameters wc, sc, and vp. For 1D data, subsequent spectra are positioned relative to the preceding spectrum by the parameters vo (vertical offset) and ho (horizontal offset). For 2D data, ho defines the total horizontal offset between the first and last spectrum. Also for 2D data, vo is inactive while the parameter wc2 defines the total vertical offset between the first and last spectrum. To display spectra "automatically," the command dssa adjusts the parameters vo and ho to fill the screen in a lower left to upper right presentation (wc must be set to less than full screen width for this to work)

The parameter cutoff, if it exists and is active, defines the distance above and below the current vertical position vp at which peaks are truncated. By arraying cutoff to have two different values, the truncation limits above and below the current vertical position can be controlled independently. For example, cutoff=50 truncates peaks at vp+50 mm and vp–50 mm. cutoff=50,10 truncates peaks at vp+50 mm and vp–10 mm.

Arguments: start is the index of the first spectra when displaying multiple spectra. It is also the index number of a particular trace to be viewed when displaying arrayed 1D spectra or 2D spectra.

finish is the index of the last spectra when displaying multiple spectra.

step is the increment for the spectral index when displaying multiple spectra. The default is 1.

options can be any of the following:

- 'all' is a keyword to display all of the spectra.
- 'int' is a keyword to only display the integral, independently of the value of the parameter intmod
- 'dodc' is a keyword for all spectra to be drift corrected independently.

Examples: dssa(1,3)

See also: *User Guide: Liquids NMR*

Related:

cutoff	Data truncation limit (P)
dss	Display stacked spectra (C)
dssan	Display stacked spectra automatically without erasing (C)
dssh	Display stacked spectra horizontally (C)
dsshn	Display stacked spectra horizontally without erasing (C)
dssn	Display stacked spectra without screen erase (C)
dsww	Display spectra in whitewash mode (C)
ft1d	Fourier transform along f_2 dimension (C)
ho	Horizontal offset (P)
intmod	Integral display mode (P)
pl	Plot spectra (C)
plww	Plot spectra in whitewash mode (C)
sc	Start of chart (P)

sc2	Start of chart in second direction (P)
trace	Mode for 2D data display (P)
vo	Vertical offset (P)
vp	Vertical position of spectrum (P)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)

dssan — Display stacked spectra automatically without erasing (C)

Syntax: `dssan<(<start,finish<,step>><,options>)>`

Description: Functions the same as the command dssa except the graphics window is not erased before starting the display. This allows composite displays of many spectra to be created. The arguments are the same as dssa.

Examples: `dssan(1,3)`

See also: *User Guide: Liquids NMR*

Related:

dssa	Display stacked spectra automatically (C)

dssh — Display stacked spectra horizontally (C)

Syntax: `dssh<(<start,finish<,step>><,options>)>`

Description: Displays one or more spectra horizontally. When a single spectrum is displayed, integral display is controlled by the parameter intmod., which can have the following values:

- `intmod='off'` turns off the integral display.
- `intmod='full'` displays the entire integral.
- `intmod='partial'` displays every other integral region.

For arrayed 1D spectra or for 2D spectra, a particular trace can be viewed by supplying the index number as an argument. For 2D data sets, spectra can be displayed from either the f_1 or f_2 domain by setting the parameter trace equal to `'f1'` or `'f2'`, respectively. After entering ft1d, interferograms can be viewed by setting `trace='f1'` and then entering dss. Multiple spectra can be displayed by supplying indexes of the first and last spectra.

The position of the first spectrum is governed by the parameters wc, sc, and vp. For 1D data, subsequent spectra are positioned relative to the preceding spectrum by the parameters vo (vertical offset) and ho (horizontal offset). For 2D data, ho defines the total horizontal offset between the first and last spectrum. Also for 2D data, vo is inactive while the parameter wc2 defines the total vertical offset between the first and last spectrum. To display spectra horizontally, the command `dssh` causes vo to be set to zero and for ho, sc, and wc to be adjusted to fill the screen from left to right with the entire array.

The parameter cutoff, if it exists and is active, defines the distance above and below the current vertical position vp at which peaks are truncated. By arraying cutoff to have two different values, the truncation limits above and below the current vertical position may be controlled independently. For example, `cutoff=50` truncates peaks at `vp+50` mm and `vp–50` mm, and `cutoff=50,10` truncates peaks at `vp+50` mm and `vp–10` mm.

Arguments: `start` is the index of the first spectra when displaying multiple spectra. It is also the index number of a particular trace to be viewed when displaying arrayed 1D spectra or 2D spectra.

`finish` is the index of the last spectra when displaying multiple spectra.

`step` is the increment for the spectral index when displaying multiple spectra. The default is 1.

`options` can be any of the following:

- `'all'` is a keyword to display all of the spectra.
- `'int'` is a keyword to only display the integral, independently of the value of the parameter `intmod`
- `'dodc'` is a keyword that causes all spectra to be drift corrected independently.

Examples: `dssh(1,3)`

See also: *User Guide: Liquids NMR*

Related:

`cutoff`	Data truncation limit (P)
`dss`	Display stacked spectra (C)
`dssa`	Display stacked spectra automatically (C)
`dssan`	Display stacked spectra automatically without erasing (C)
`dsshn`	Display stacked spectra horizontally without erasing (C)
`dssn`	Display stacked spectra without screen erase (C)
`dsww`	Display spectra in whitewash mode (C)
`ft1d`	Fourier transform along f_2 dimension (C)
`ho`	Horizontal offset (P)
`intmod`	Integral display mode (P)
`pl`	Plot spectra (C)
`plww`	Plot spectra in whitewash mode (C)
`sc`	Start of chart (P)
`sc2`	Start of chart in second direction (P)
`trace`	Mode for 2D data display (P)
`vo`	Vertical offset (P)
`vp`	Vertical position of spectrum (P)
`wc`	Width of chart (P)
`wc2`	Width of chart in second direction (P)

dsshn — Display stacked spectra horizontally without erasing (C)

Syntax: `dsshn<(<start,finish<,step>><,options>)>`

Description: Functions the same as the command `dssh` except the graphics window is not erased before starting the display. This allows composite displays of many spectra to be created. The arguments are the same as `dssh`.

Examples: `dssh(1,3)`

See also: *User Guide: Liquids NMR*

Related:

`dssh`	Display stacked spectra horizontally (C)

dssl — Label a display of stacked spectra (M)

Syntax: `dssl(<options>)`

Description: Displays a label for each element in a set of stacked spectra. The label is an integer value from 1 up to the number of spectra in the display.

Note that if `wysiwyg='n'`, labels can appear at incorrect positions. The positions were empirically determined for a large screen display and are not guaranteed to be correct for all displays.

Arguments: `options` control the display (more than one option can be entered as long as the options do not conflict with each other):

- 'center', 'left', 'right', 'top', 'bottom', 'above', and 'below' are keywords setting the position of the displayed index relative to each spectrum.
- 'value' is a keyword that produces a display of the values of each array element, instead of an integer index.
- 'list=xxx' produces a display of the values contained in the arrayed parameter xxx.
- 'format=yyy' uses the format yyy to control the display of each label. See the write command for information about formats.

Examples:
```
dssl
dssl('top','left')
dssl('value','format=%3.1f')
```

See also: *User Guide: Liquids NMR*

Related:

dss	Display stacked spectra (C)
write	Write formatted text to a device (C)

dssn — Display stacked spectra without screen erase (C)

Syntax: `dssn<(<start,finish<,step>><,options>)>`

Description: Functions the same as the command dss except the graphics window is not erased before starting the display. This allows composite displays of many spectra to be created. The arguments are the same as dss.

Examples:
```
dssn(1,3)
```

See also: *User Guide: Liquids NMR*

Related:

dss	Display stacked spectra (C)

dsvast — Display VAST data in a stacked 1D-NMR matrix format (M)

Applicability: Systems with the VAST accessory.

Syntax: `dsvast<(display order,number of columns displayed)>`

Description: dsvast will arrange and display the traces from a reconstructed 2D data set (see (see vastglue)as an array of 1D spectra in a matrix of 1D spectra. If no arguments are provided, the number of rows and columns will be determined by the periodicity of the display order based on the doneQ. For example, if a block of 96 spectra (typical for a microtiter-plate) have been acquired using VAST automation, the spectra will be displayed in a matrix 8 rows and 12 columns with the well label using the format [A->H][1->12].

The spectra can be plotted using the macro plvast.

Arguments: display order is optional and its default value is the glue order as listed in glueorderarray. A display order can be defined using the plate_glue program.

number of columns displayed. The default value of is deduced by examining the periodicity of the requested display order. The number of columns displayed can entered as the second argument or as the first argument if the default display order is used.

Examples:
```
dsvast
dsvast(12)
dsvast('glue_file', 4)User Guide: Liquids NMR
```

Related:

dsast2d	Display VAST data in a pseudo-2D format (M)
plvast	Plot VAST data in a stacked 1D-NMR matrix (M)

plvast2d	Plot VAST data in a pseudo-2D format (M)
plate_glue	Define a display order (U)

dsvast2d — Display VAST data in a pseudo-2D format (M)

Applicability: Systems with the VAST accessory.

Syntax: `dsvast2d(number)`

Description: If an array of 1D spectra have been acquired (in particular if a block of 96 spectra has been acquired using VAST automation, especially in a microtiter-plate format), and if these spectra have been glued into a reconstructed 2D dataset (see vastglue), this macro will arrange and display them (on the screen) in a convenient pseudo-2D format (almost like an LC-NMR chromatogram).Well labels are not attached to the spectra and spectra are plotted with 8 spectra per row.

Arguments: The default is to display all the spectra (from 1 through `arraydim`) with 8 columns (spectra) and 12 rows. An optional argument `dsvast2d(number)`) allows one to specify that only spectra from *1* through *number* should be plotted. The number of spectra displayed is rounded up to the nearest multiple of 8.

See also: *User Guide: Liquids NMR*

Related:

dsast	Display VAST data in a 1D-NMR matrix format (M)
plvast	Plot VAST data in a stacked 1D-NMR matrix (M)
plvast2d	Plot VAST data in a pseudo-2D format (M)

dsww — Display spectra in whitewash mode (C)

Syntax: `dsww<(<start,finish<,step>><,'int'>)>`

Description: Displays one or more spectra in whitewash mode (after the first spectra, each spectra is blanked out in regions in which it is behind a prior spectra).

Arguments: `start` is the index of the first spectra when displaying multiple spectra. It is also the index number of a particular trace to be viewed when displaying arrayed 1D spectra or 2D spectra; default is to display all spectra.

`finish` is the index of the last spectra when displaying multiple spectra.

`step` is the increment for the spectral index when displaying multiple spectra. The default is 1.

`'int'` is a keyword to display only the integral, independently of the value of the parameter intmod

Examples: `dsww(1,3)`

See also: *User Guide: Liquids NMR*

Related:

dss	Display stacked spectra (C)
dssa	Display stacked spectra automatically (C)
dssan	Display stacked spectra automatically without erasing (C)
dssh	Display stacked spectra horizontally (C)
dsshn	Display stacked spectra horizontally without erasing (C)
dssn	Display stacked spectra without screen erase (C)
pl	Plot spectra (C)
plww	Plot spectra in whitewash mode (C)

dtext — Display a text file in graphics window (M)

Syntax: `dtext<(file,x,y)><:$x_next,$y_next,$increment>`

Description: Displays a text file in the graphics window.

Arguments: `file` is the name of a text file. The default is the current experiment text file.

`x` and `y` are coordinates of the first line of text. This positions the location of the output. The default is the upper left-hand corner of the screen.

`$x_next` and `$y_next` are the coordinates where the start of the next line would have been displayed. This is useful for subsequent character display.

`$increment` is the increment between lines.

Examples:
```
dtext
dtext(userdir+'/exp3/text')
dtext(100,100)
dtext:$x,$y,$dy
```

See also: *Getting Started*

Related:

`pltext`	Plot a text file (M)
`ptext`	Print out a text file (M)
`text`	Display text or set new text for current experiment (C)
`write`	Write formatted text to a device (C)

`dtrig` Delay to wait for another trigger or acquire a spectrum (P)

Applicability: Systems with LC-NMR accessory.

Description: If `ntrig` is greater than 0 after a trigger is detected, a pulse sequence waits for `dtrig` seconds before either waiting for another trigger or acquiring a spectrum. Typically, after the LC has positioned the sample in the NMR probe and stopped the pump, there is a small time (30 seconds) during which conditions (pressure, etc.) in the NMR probe are still settling; better NMR performance is obtained if an appropriate delay is inserted using `dtrig`. If `dtrig` does not exist, a value of 0 is assumed. If `dtrig` does not exist, the `parlc` macro can create it.

See also: *User Guide: Liquids NMR*

Related:

`ntrig`	Number of trigger signals to wait before acquisition (P)
`parlc`	Create LC-NMR parameters (M)

`dtune` Tune lock channel on GEMINI 2000 (M)

Applicability: *GEMINI 2000* systems

Syntax: `dtune`

Description: Turns on the lock (^{2}H) transmitter, directing about 0.5 watts of rf to the probe coil. Before entering `dtune`, be sure to move the proper cable on the back of the left-hand magnet leg to the BNC connector labeled TUNE, and also to move the proper cable leading to the probe to the BNC connector labeled TUNE. Enter `tuneoff` to turn off the transmitter. `dtune` cannot be executed while the console is acquiring or interactive acquisition (`acqi`) is connected.

CAUTION: An incorrectly tuned lock channel can damage equipment and cause erratic results. Only qualified service personnel should tune the lock channel.

See also: *Getting Started*.

Related:

`acqi`	Interactive acquisition display process (C)
`btune`	Tune broadband channel on broadband *GEMINI 2000* (M)
`ctune`	Tune carbon channel on ^{1}H/^{13}C *GEMINI 2000* (M)

`htune`	Tune proton channel on *GEMINI 2000* (M)
`tuneoff`	Turn off probe tuning mode, *MERCURY* series, *GEMINI 2000* (M)

E

e — Eject sample (M)

Applicability: Systems (including *MERCURY* and *GEMINI 2000)* with spin control hardware.

Syntax: `e`

Description: Ejects the sample from the probe by turning on the eject air and the slow drop air. The `e` macro functions the same as the `eject` macro.

See also: *Getting Started*

Related:

`eject`	Eject sample (M)
`i`	Insert sample (M)
`insert`	Insert sample (M)

eaddr — Display Ethernet address (M,U)

Syntax: `eaddr`

Description: Displays the name of the local host and its hardware Ethernet address. The 48-bit address is presented in octal, decimal, and hexadecimal formats.

See also: *Getting Started*

Related:

`dnode`	Display list of valid limNET nodes (M,U)

ecc — Set up parameters to get eddy current compensation data (M)

Applicability: Systems with the imaging module.

Syntax: `ecc`

Description: Loads parameter sets during imaging installation for a pulse sequence to obtain eddy current compensation data using balance gradients.

See also: *Imaging Module Installation Manual*

Related:

`eddyout`	Data analysis of eddy current compensation (M)

ecctabl — Put gcal value and ecc file into table (M)

Applicability: Systems with the imaging module.

Syntax: `ecctabl<(ecc_file><,gcal>)>`

Description: Moves the `gcal` value and `ecc` file into the reference table `ecctabl` in `$vnmrsystem/imaging/eddylib`. If the `gcal` value or file name would overwrite data already in the table, the monitor displays a prompt to confirm the overwrite.

Arguments: `ecc_file` specifies the name of the `ecc` file to be placed in the `ecctabl` reference table. The default value is the file name `'curecc'`.

`gcal` specifies the `gcal` value to be placed in the `ecctabl` reference table. The default is the current `gcal` value.

Examples:

```
ecctabl
ecctabl('test1',0.001)
```

See also: *User Guide: Imaging*

Related:
- `ecc` Set up parameters to obtain compensation data (M)
- `gcal` Gradient calibration constant (P)
- `getgcal` Get gcal value from table (M)

ecctool — Open eccTool window (M)

Applicability: Systems with imaging capabilities.

Syntax: `ecctool`

Description: Opens the `eccTool` window to adjust eddy current compensation parameters.

See also: *User Guide: Imaging*

echo — Display strings and parameter values in text window (C)

Syntax: `echo<(<'-n',>string1,string2, ....)>`

Description: Displays strings and parameter values in the text window similar to the UNIX `echo` command.

Arguments: `'-n'` is a keyword that suppresses advancing to the next line. The default is to advance to the next line.

`string1,string2,...` are one or more strings (surrounded with single quote marks) or parameters. The format used for numbers is identical to the `%g` format described for the `write` command.

Examples:
```
echo
echo('This is a string')
echo('Pulse Width is: ',pwr)
echo('-n','No new line')
```

See also: *VNMR User Programming*

Related:
- `write` Write formatted text to a device (C)

echo — Current echo index for transformed image (P)

Applicability: Systems with imaging capabilities.

Description: Stores the current echo index for the transformed image.

See also: *User Guide: Imaging*

Related:
- `element` Current array index for transformed image (P)

eddyout — Data analysis of eddy current compensation (M)

Applicability: Systems with the imaging module.

Syntax: `eddyout(start,stop)`

Description: Analyzes the data obtained with the pulse sequence set up by `ecc` for a series of acquisitions obtained after varying delays following shut off of a gradient. `eddyout` calculates the time constants and amplitudes of the eddy currents and recommends new time constants and amplitudes to be set into the compensation networks.

Arguments: `start` specifies the number of starting array of spectra acquired by `ecc`.

`stop` specifies the number of the ending array of spectra acquired by `ecc`.

Examples: `eddyout(1,16)`

See also: *User Guide: Imaging*

Related: `ecc` Set up parameters to obtain compensation data (M)

eddysend — Update acquisition eddy current settings (M)

Applicability: Systems with the imaging module.

Syntax: `eddysend<(file)>`

Description: Assigns the compensation data from `eccTool` to the current eddy current compensation file specified by `curecc`, then sets the compensation data into the acquisition system. `eccTool` uses `eddysend` to automatically track the file(s) in use by `eccTool`.

Arguments: `file` is the file name of data from `eccTool`. If that file exists, that data is assigned to the current compensation file and becomes `curecc`. The default is the data in the current compensation file is loaded from `curecc`.

Examples:
```
eddysend
eddysend('data04')
```

See also: *User Guide: Imaging*

Related:
`curecc` Name of eddy current compensation file (P)
`eccTool` Pop up eccTool window (M)

edit — Edit a file with user-selectable editor (M)

Syntax: `edit(file)`

Description: Opens a file for editing using a text editor. The default editor is `vi`. To select another editor, set the UNIX environmental variable `vnmreditor` to the name of the editor (change the line `setenv vnmreditor old_editor` in `.login` to become `setenv vnmreditor new_editor`, e.g., `setenv vnmreditor emacs`) and make sure a script with the prefix `vnmr_` followed by the name of the editor (e.g., `vnmr_emacs`) is placed in the `bin` subdirectory of the VNMR system directory. The script file makes adjustments for the type of graphic interface in use.

Scripts provided with VNMR include `vnmr_vi` and `vnmr_textedit`. To create other scripts, see the `vnmr_vi` script for non-window editor interfaces and the `vnmr_textedit` script for window-based editor interfaces.

Arguments: `file` is the name of the file you wish to edit.

Examples: `edit('myfile')`

See also: *VNMR User Programming*

Related:
`paramedit` Edit a parameter and its attributes with user-selected editor (C)
`paramvi` Edit a parameter and its attributes with `vi` editor (M)
`macroedit` Edit a user macro with user-selectable editor (C)
`macrovi` Edit a user macro with `vi` editor (C)
`menuvi` Edit a menu with the `vi` editor (M)
`textvi` Edit text file of current experiment with `vi` editor (M)

eff_echo — Effective echo position in EPI experiments (P)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Description: Refers to the echo showing the highest signal in an EPI echo-train. The readout gradient dephaser is adjusted so that the maximum signal occurs at `eff_echo`.

Values: Usually set to `nv/2`.

See also: *User Guide: Imaging*

Related: `nv` Number of phase encode steps for 1st indirectly detected dim. (P)

`eject` Eject sample (M)

Applicability: Systems (including *MERCURY* and *GEMINI 2000)* with spin control hardware.

Syntax: `eject`

Description: Ejects the sample from the probe by turning on the eject air and the slow drop air. The `e` macro functions the same as the `e` macro.

See also: *Getting Started*

Related:
`e` Eject sample (M)
`i` Insert sample (M)
`insert` Insert sample (M)

`elist` Display directory on remote VXR-style system (M,U)

Syntax: (From VNMR) `elist(remote_node,remote_directory)`
(From UNIX) `elist remote_node remote_directory`

Description: Lists directory contents on a remote VXR-style (Gemini, VXR-4000, or XL) system.

Arguments: `remote_node` is the name of the remote VXR-style system.

`remote_directory` is the name of the directory on the remote system.

Examples: (From VNMR) `elist('gemini','fidlib')`
(From UNIX) `elist gemini fidlib`

See also: *Getting Started*

Related: `dnode` Display list of valid limNET nodes (M,U)

`element` Current array index for transformed image (P)

Applicability: Systems with imaging capabilities.

Description: Stores the current array index for the transformed image.

See also: *User Guide: Imaging*

Related: `echo` Current echo index for transformed image (P)

`enter` Enter sample information for automation run (M,U)

Applicability: Systems with an automatic sample changer.

Syntax: (From VNMR) `enter<(file<,configuration_file>)>`
(From UNIX) `enter <file> <configuration_file>`

Description: Enables entry of sample information for automation runs, including the sample location, user information, solvent used, experiment or experiments to run, and arbitrary text information. `enter` can also access *GLIDE* experiments. `enter('abc')` creates a directory named `abc`. In this directory is a file named `abc`, which contains experiment information. Also in the directory is a directory named `abc.macdir`, which contains *GLIDE*-related information for an automation run.

Arguments: `file` is the name of the file to be edited. The default is that `enter` prompts for this information. If the file already exists, new entries are appended to it.

`configuration_file` is the name of a user-supplied file that customizes `enter` for local use. Several configuration files are provided:

- `enter.conf` is used when defining an experiment when an automation run is not currently active.
- `auto.conf` is used when defining an experiment for a current automation run. The `walkup` macro is provided for this style of entering samples.
- `gilson.conf` is used with the VAST accessory.

Examples: (From VNMR or UNIX) `enter`
(From VNMR) `enter('mysamples')`
(From UNIX) `enter MySamples`
(From VNMR) `enter('mysamples','auto.conf')`

See also: *User Guide: Liquids NMR; VNMR User Programming, Walkup NMR Using GLIDE*

Related:

`auto`	Set up an automation directory (C)
`autogo`	Start an automation run (C)
`autoname`	Prefix for automation data file (P)
`autora`	Resume a suspended automation run (C)
`autosa`	Suspend current automation run (C)
`printer`	Printer device (P)
`status`	Display status of all experiments (C)
`walkup`	Walkup automation (M)

`enterdialog` Start a dialog window using enterexp file (M)

Applicability: Systems with automation.

Syntax: `enterdialog`

Description: Internal macro used by `enter` to start a dialog window using the `enterexp` file in the `dialoglib` directory.

Related:

`enter`	Enter sample information for automation run (M,U)

`epift` Process and display image in EPI experiments (M)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `epift(index)`

Description: Processes and displays an image in array number `index`. The first data array must contain the reference scan. The phase correction information saved in the file `phasemap` is used to correct phase errors in EPI data. `phasemap` must be present in the current experiment directory. Use `dconi` to view the data.

Arguments: `index` is the array number of the image.

See also: *User Guide: Imaging*

Related:

`dconi`	Interactive 2D data display (C)
`epiph`	Generate phase correction map in EPI experiments (M)
`pcmapapply`	Apply phase correction map to data in EPI experiments (C)

`epiph` Generate phasemap file in EPI experiments (M)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `epiph`

Description: Generates the `phasemap` file from the EPI reference scan. The file is generated in the current experiment directory for EPI processing. The first data array must

correspond to the reference scan, which is collected with the phase-encode gradient turned off (`image=0`).

See also: *User Guide: Imaging*

Related:

`episet`	Set up parameters for EPI experiments (M)
`image`	Control phase encoding gradient in EPI experiments (P)
`pcmapgen`	Generate phase correction map in EPI experiments (M)

`epirs` Reverse spectral data in EPI experiments (C)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `epirs`

Description: Reverses spectral data. It is used by `epift`.

See also: *User Guide: Imaging*

Related:

`epift`	Process and display images in EPI experiments (M)

`epirun` Collect, process, and display EPI data (M)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `epirun`

Description: Collects, process, and displays EPI data. It is used to obtain a single EPI image. The `phasemap` file must be present in the current experiment directory.

See also: *User Guide: Imaging*

Related:

`epiph`	Generate phasemap file in EPI experiments (M)
`episet`	Set up parameters for EPI experiments (M)

`episet` Set up parameters for EPI experiments (M)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `episet`

Description: Collects an EPI dataset with the phase-encode gradient turned off (`image=0`). It optimizes parameters for EPI, collects a reference scan, and allows you to adjust the gradient parameters `groa` and `grora` and the timing parameter `tep`. The `phasemap` file is generated in the current experiment directory.

See also: *User Guide: Imaging*

Related:

`epiph`	Generate phasemap file in EPI experiments (M)
`groa`	Readout gradient adjuster in EPI experiments (P)
`grora`	Readout dephasing gradient adjuster in EPI experiments (P)
`image`	Control phase encoding gradient in EPI experiments (P)
`tep`	Post-acquisition delay in EPI experiment (P)

`episvib` Save EPI images in FDF for ImageBrowser (M)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `episvib`

Description: Saves images in Flexible Data Format (FDF) for viewing with ImageBrowser. The first image in an arrayed dataset must contain the reference scan. This scan must be acquired with the phase encode gradient turned off.

See also: *User Guide: Imaging*

Related:

`browser`	Start ImageBrowser application (U)

eread — Transfer file from remote source (M,U)

Applicability: Systems with limNET protocol software installed.

Syntax: (From VNMR) `eread(local_file,remote_node,remote_file)`
(From UNIX) `eread local_file remote_node remote_file`

Description: Copies a remote file to the local host. It will not overwrite a preexisting file.

Arguments: `local_file` is the file name of the local host. If `local_file` is not a dot file (i.e., starts with "."), `eread` uses the "I1" and "I2" values of the remote file to create an extension and then append it to the local file name.

`remote_node` is a symbolic node name for a specified node file. Use the command `dnode` to list nodes defined on your system. The names of the remote computers or "nodes" available to the limNET protocol are contained in the file `/vnmr/nodes`. *Note that this is not the same file as the name of the remote computers available to the Internet protocol (IP), which are contained in the file* `/etc/hosts`. Each user only needs to know the "names" of relevant nodes.

`remote_file` is the name of file to be transferred from the remote host.

Examples: (From VNMR) `eread('osv700','VXR4000','dsk1.osv700')`
(From UNIX) `eread osv700 VXR4000 dsk1.osv700`

See also: *Getting Started*

Related:

`dnode`	Display list of valid limNET nodes (M,U)
`ewrite`	Transfer file to remote destination (M,U)

ernst — Calculate the Ernst angle pulse (C)

Syntax: `ernst(t1_estimate<,90_pulse_width>)`

Description: Calculates the optimum ("Ernst") pulse width according to the formula

$$pw = \cos^{-1}\left(\exp^{-(at+d1)/t1\_estimate}\right) \bullet (pw90/360)$$

The new `pw` value is entered in the parameter table.

Arguments: `t1_estimate` is an estimate of the T_1 for a peak of interest.

`90_pulse_width` is a 90° pulse width determined by the parameter `pw90`. The default is the current value of parameter `pw90` if `pw90` exists.

Examples:
```
ernst(5)
ernst(3,12.6)
```

See also: *Getting Started*

Related:

`pw`	Pulse width (P)
`pw90`	90° pulse width (P)

errlog — Display recent VNMR error messages (C)

Syntax: `errlog`

Description: Displays in the text window the most recent VNMR error messages. The global parameter `errloglen` controls the number of lines displayed. If `errloglen` is not defined, `errlog` displays 10 lines by default.

See also: *Getting Started*

Related:

`acqstatus`	Acquisition status (P)
`errloglen`	Number of lines in VNMR error message display (P)

errloglen — Number of lines in VNMR error message display (P)

Description: Sets the number of lines in the display of VNMR error messages by the errlog command.

Values: Integer, default is 10.

See also: *Getting Started*

Related: errlog — Display recent VNMR error messages (P)

ewrite — Transfer file to remote destination (M,U)

Applicability: Systems with limNET protocol software installed.

Syntax: (From VNMR) ewrite(local_file,remote_node,remote_file)
(From UNIX) ewrite local_file remote_node remote_file

Description: Takes a preexisting local file and copies it to a remote host. The file cannot preexist on the remote host.

Arguments: local_file is the file name of the local host.

remote_node is a symbolic node name for a specified node file. Use the command dnode to list nodes defined on your system. The names of the remote computers or "nodes" available to the limNET protocol are contained in the file /vnmr/nodes. *Note that this is not the same file as the name of the remote computers available to the Internet Protocol (IP), which are contained in the file* /etc/hosts. Each user only needs to know the "names" of relevant nodes.

remote_file is the name of file to be transferred from the remote host.

Examples: (From VNMR) ewrite('osv700','VXR4000','dsk1.osv700')
(From UNIX) ewrite osv700 VXR4000 dsk1.osv700

See also: *Getting Started*

Related: dnode — Display list of valid limNET nodes (M,U)
eread — Transfer file from remote source (M,U)

exec — Execute a VNMR command (C)

Syntax: exec(command_string)

Description: Executes the VNMR command given by the string argument.

Arguments: command_string is a character string constructed from a macro.

Examples:
```
exec($cmdstr)
exec(parstyle)
```

See also: *VNMR User Programming*

exists — Checks if parameter, file, or macro exists and file type (C)

Syntax:
(1) exists(name,'parameter'<,tree>):$exists
(2) exists(name,'file'<,permission>):$exists
(3) exists(name,'maclib'):$exists
(4) exists(name,'command'):$exists
(5) exists(name,'ascii'):$exists
(6) exists(name,'directory'):$exists

Description: Checks for the existence of a parameter, file, command, or a macro from within a macro. It also checks if a file is an ASCII text file or a directory.

Arguments: name is the name of a parameter, file, command, or macro.

'parameter' checks if the parameter specified by name exists.

tree is 'global', 'current', 'processed', or 'systemglobal'. The default is 'current'. Refer to the create command for a more information on the types of parameter trees.

'file' checks if the file specified by name exists.

permission is a string to be used with an access permission test on the file specified by name. The default is to check only the simple existence of the file. Access permission can be identified by passing the character r for read permission, w for write permission, and x for execute permission. One, two, or three characters can be passed in a single argument. For example, the command exists('/vnmr/conpar','file','rw') checks not only that the file /vnmr/conpar exists, but also whether the current user has read and write access to that file.

'maclib' checks if the macro specified by name exists.

'command' checks if the command or macro specified by name exists.

'ascii' checks if the file specified by name is an ASCII text file.

'directory' checks if the file specified by name is a directory.

$exists is the return variable that changes according to the second argument:

- For 'parameter', exists returns 1 if the parameter specified by name exists in the tree specified by tree; otherwise, it returns 0.
- For 'file', exists returns 1 if the file specified by name exists with the file permission specified by permission; otherwise, it returns 0.
- For 'maclib', exists searches the macro libraries in the following order for the macro specified in name and returns 1 if the macro is in the user's maclib directory, returns 2 if in a directory defined by maclibpath, returns 3 if in a directory defined by sysmaclibpath, returns 4 if in the system maclib directory, or returns 0 if not found in any of these libraries. Only the value of the first location found is returned.
- For 'command', exists searches the command list and macro libraries in the following order and returns 1 if name is a VNMR command, returns 2 if it is in the user's maclib directory, returns 3 if in a directory defined by maclibpath, returns 4 if in a directory defined by sysmaclibpath, returns 5 if in the system maclib directory, or returns 0 if not found in any of these libraries. Only the value of the first location found is returned.
- For 'ascii', exists returns 1 if the file specified in name is an ASCII text file; otherwise it returns 0.
- For 'directory', exists returns 1 if the file specified in name is a directory; otherwise it returns 0.

Examples:

```
exists('ni','parameter'):$twod
exists('/vnmr/conpar','file','rw')
exists('wft','command'):$num
```

See also: *VNMR User Programming*

Related:

create	Create new parameter in a parameter tree (C)
hidecommand	Execute macro instead of command with same name (C)
maclibpath	Path to user's macro directory (P)
which	Display which macro or command is used (M)

exit — Call the vnmrexit command (M)

Syntax: `exit`

Description: Calls the `vnmrexit` command to exit from VNMR. As a macro, `exit` provides a user some flexibility in defining other things to do when exiting.

CAUTION: When you exit from the VNMR user interface on your X display system, whether you are using an X terminal or a Sun computer, and whether you are using OpenWindows, CDE, or Motif, you must first exit from any copy of VNMR running on your system. Failure to do this can cause current parameter values and even current data to be lost.

Alternate: Exit VNMR button in the Secondary Main Menu.

See also: *Getting Started*

Related:

`vnmrexit`	Exit from the VNMR system (C)

exp — Find exponential value of a number (C)

Syntax: `exp(value)<:n>`

Description: Finds the exponential value (base *e*) of a number.

Arguments: `value` is a number.

`n` is the return value giving the exponential value of `value`. The default is to display the exponential value in the status window.

Examples:

```
exp(.5)
exp(val):exp_val
```

See also: *VNMR User Programming*

Related:

`arccos`	Calculate arc cosine of real number (M)
`arcsin`	Calculate arc sine of real number (M)
`arctan`	Calculate arc tangent of real number (M)
`atan`	Find arc tangent of a number (C)
`cos`	Find cosine value of an angle (C)
`ln`	Find natural logarithm of a number (C)
`sin`	Find sine value of an angle (C)
`tan`	Find tangent value of an angle (C)

expactive — Determine if experiment has active acquisition (C)

Syntax:

(1) `expactive<(exp_number)><:$answer>`
(2) `expactive('auto')<:$mode>`
(3) `expactive('current')<:$exp><,$user>`

Description: Determines whether an acquisition is active or pending in an experiment.

Arguments: `exp_number` is the number, from 1 to 9999, of the experiment to be checked. The default is the current experiment.

`$answer` is a return value: `-1` if an acquisition is not possible (e.g., the system is a data station), `0` if no acquisition active in the requested experiment, `1` if an acquisition active in that experiment, and `2` or larger if an acquisition is queued in the requested experiment (subtract 1 from the value to determine its position in the acquisition queue). With no return argument, the result is displayed on line 3.

`'auto'` is a keyword to check if the system is in automation mode.

`$mode` is a return value: 1 if the system is in automation mode, or 0 if otherwise. With no return argument, the result is displayed on line 3.

`'current'` is a keyword that determines whether an active experiment has an active acquisition command running. An experiment is still considered active if it holds up additional acquisitions during its `wexp` processing by the `'wait'` flag. If `expactive('current')` does not have a return argument, results are displayed on line 3.

`$exp` is a return value indicating the current active experiment number: –1 if no acquisition is possible, or 0 if no acquisition is active.

`$user` is a return value indicating the user who started the acquisition. If the system is running in automation mode, `$user` is set to "auto." If no acquisition is running, `$user` is set to "nobody."

Examples:
```
expactive
expactive(3)
expactive(2):$active
expactive('auto'):$automode
```

See also: *Getting Started*

expfit — Make least-squares fit to polynomial or exponential curve (U)

Syntax: (From UNIX) `expfit options <analyze.inp >analyze.list`

Description: Makes a least-squares curve fitting to the data supplied in the file `analyze.inp`. For the specialized uses of `analyze`, VNMR macros (e.g., `t1`, `t2`, `kind`) are available that provide the correct file format and avoid the need for the user to select options.

In the regression mode, the type of curve fitting, (`'poly1',...`) must be selected. For regression (generalized curve fitting), the regression section in the manual *User Guide: Liquids NMR* shows the input file format and describes the menus that permit option choices indirectly through menu buttons.

The following text file is an example of the file `analyze.inp` (for options `T1`, `T2`, `kinetics`, `contact_time`, and `regression`). (1), (2), etc. do not actually appear in the file but are used to identify lines in the description presented below the file.

```
(1)  time
(2)    <amp>
(3)      2  4  linear linear

(4)       NEXT  4
(5)    1
(6)       1  1
          2  4
          3  9
          4  16
(4)       NEXT  3
(5)    2
(6)       2  5
          3  10
          4  17
```

This file contains the following information:

(1) Optional *x*-axis title.

(2) Optional *y*-axis title, for regression only.

(3) Line containing an integer for the number of peaks, followed by another integer for the number of pairs per peak. If regression, the *x*-scale type and *y*-scale type are also listed.

(4) In the regression mode, a line beginning with the keyword NEXT is inserted at the start of each data set when the number of pairs per peak is variable, followed by an integer for the number of pairs for the peak.

(5) An integer that indexes the peaks.

(6) Data pairs, one to a line, listed by peak.

For options `T1`, `T2`, `kinetics`, and `contact_time`, information from the file `fp.out` and from the array `xarray` are used to construct this file; therefore, it is necessary to run `fp` prior to `analyze`. For regression, this file is made by running `expl('regression')`.

For `diffusion`, `contact_time`, and, if not in regression mode, `poly1` and `poly2`, the `analyze.inp` file is slightly different:

```
(1)   List of n x-y data pairs
(2)   <text line>
(3)   <x-values>  <y-values>
(4)   x  y
      . . .
```

(1) Title line.

(2) Descriptive text line.

(3) Number of `x` values and `y` values.

(4) Data pairs, one to a line, are listed by peak in the following order:

```
x  y   (first peak, first pair)
x  y   (first peak, second pair)
...
x  y   (second peak, first pair)
...
```

`expfit` also makes a file `analyze.out` that is used by `expl` to display the results of the analysis in addition to output to the standard output, which is usually directed to `analyze.list`.

Arguments: `options` can be any of the following:

`T1` sets T_1 analysis. This value is the default.

`T2` sets T_2 analysis.

`kinetics` sets kinetics analysis with decreasing peak height.

`increment` sets kinetics analysis with increasing peak height.

`list` sets an extended listing for each peak.

`diffusion` sets a special analysis for diffusion experiments.

`contact_time` sets a special analysis for solids cross-polarization spin-lock experiments.

`regression` sets regression mode, providing generalized curve fitting with choices `poly1`, `poly2`, `poly3`, and `exp`:

- `poly0` calculates the mean.
- `poly1` sets a linear fitting.
- `poly2` sets a quadratic fitting.
- `poly3` sets a cubic curve fitting.
- `exp` sets an exponential curve fitting.

Examples: (From UNIX) `expfit d2 T1 list <analyze.inp >analyze.out`
(From UNIX) `expfit regression exp list <analyze.inp >analyze.out`

See also: *User Guide: Liquids NMR*

Related:

`analyze`	Generalized curve fitting (C)
`expl`	Display exponential or polynomial curves (C)
`fp`	Find peak heights (C)
`kind`	Kinetics analysis, decreasing intensity (M)
`t1`	T_1 exponential analysis (M)
`t2`	T_2 exponential analysis (M)

`expl` Display exponential or polynomial curves (C)

Syntax: `expl<(<options,>line1,line2,...)>`

Description: Displays exponential curves resulting from T_1, T_2, or kinetic analyses. Also displays polynomial curves from diffusion or other types of analysis. The parameters `sc`, `wc`, `sc2`, and `wc2` control the size of the display.

In general, the first time `expl` is displayed, it calculates appropriate limits for the two axes. A subsequent call to `expl`, while a previous `expl` is displayed on the graphics screen, uses the axis scaling that displayed `expl`. To have the new `expl` recalculate its own axis limits and not use those currently displayed, call the `autoscale` macro before executing `expl`. Alternately, the axis limit for the `expl` display can be specified using the `scalelimits` macro.

Arguments: `options` can be any of the following:

- `'regression'` is a keyword signifying the beginning of generalized curve fitting. `expl` displays the data in the file `regression.inp` as unconnected points and also uses `regression.inp` to create the file `analyze.inp`, which serves as input to `analyze` for curve fitting.
- `'linear'`, `'square'`, and `'log'` are keywords for display of the data points against a square or logarithmic axis scale, with the exception of the results from regression. The first keyword controls the *x*-axis scale, the second the *y*-axis. The default is `'linear'`.
- `'link'` is a keyword to link the data points rather than a display of the theoretical curve.
- `'nocurve'` is a keyword to produce a plot of data points only.
- `'tinysymbol'` is a keyword to display small-scale data point symbols.
- `'nosymbol'` is a keyword to produce a plot of the curve only.
- `'noclear'` is a keyword to not erase the graphics screen before drawing the plot. This prevents the graphics screen from being cleared of data.
- `'oldbox'` is a keyword to plot an additional curve on an existing plot. Only the first data set in the file `analyze.out` is plotted. The box and scale description is derived from the file `expl.out` in the current experiment. When the `'oldbox'` option is used, a second argument is necessary to identify the curve number and data point symbol to represent the data. This second argument is a number from 1 to 6.
- `'file'` is a keyword that, when followed by a file name, makes that file replace the file `analyze.out` as the input to `expl`.

`line1, line2,...` specify the curves to be displayed. The default is to display the first eight curves (if that many exist) along with data points.

Examples:
```
expl
expl(1,3,6)
expl('oldbox',5)
expl('regression')
expl('regression',4,5)
```

See also: *User Guide: Liquids NMR*

Related:

analyze	Generalized curve fitting (C)
autoscale	Resume autoscaling after limits set by scalelimits (M)
expfit	Make least squares fit to polynomial or exponential curve (C)
pexpl	Plot exponential or polynomial curves (C)
sc	Start of chart (P)
sc2	Start of chart in second direction (P)
scalelimits	Set limits for scales in regression (M)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)

expladd — Add another diffusion analysis to current display (M)

Applicability: Systems with the diffusion option.

Syntax: `expladd(integral_region)`

Description: Adds results of another diffusion analysis to the currently displayed results.

Arguments: `integral_region` specifies the number of the region whose results are to be added to the existing graph.

Examples:
```
expladd(1)
```

See also: *User Guide: Liquids NMR*

Related:

expl	Display exponential or polynomial curves (C)
pexpl	Plot exponential or polynomial curves (C)
pexpladd	Add another diffusion analysis to current plot (M)

explib — Display experiment library (M)

Syntax: `explib`

Description: Displays the currently available experiment files. For each experiment, `explib` displays the name of the experiment and its subexperiments, whether an acquisition is active or its position in the acquisition queue, the current size of the experiments, the pulse sequence currently active in the experiments, and the first 50 characters of the text file in the experiment. `explib` also displays a message if the system is in automation mode.

Alternate: Librar**y** button in the Workspace Menu.

See also: *Getting Started; User Guide: Liquids NMR*

explist — Display current experiment chain and approx. time for each (M)

Syntax: `explist`

See also: Displays approximate time for each experiment in a chained experiment.

Related:

autotime	Display approximate time for automation (M)

explog — Display log file for experiment (M)

Syntax: `explog`

Description: Displays the log file for an experiment. This file includes when the experiment started, any acquisition errors that may have occurred, and when the experiment finished. Each acquisition generates this information, which is stored in the experiment's `acqfil` directory in a text file named `log`.

See also: *Getting Started*

exptime — Display experiment time (C)

Syntax: `exptime<(sequence)><:$seconds>`

Description: Estimates the acquisition time for an experiment, based on the parameters used in the current experiment, and displays the time in the format `hh:mm:ss`. The `time` macro uses `exptime` to determine the time of an experiment.

Arguments: `sequence` is a pulse sequence that exists in the `seqlib` directory. If this argument is used, `exptime` estimates the acquisition time for the specified sequence. The default is the current value of `seqlib`.

`$seconds` is a return argument with the number of seconds estimated for the experiment. If this argument is used, the time display is suppressed.

Examples:

```
exptime
exptime('apt')
exptime:$etime
exptime('noesy'):$est_time
```

See also: *Getting Started*

Related: `time` Display experiment time or recalculate number of transients (M)

F

f — Set display parameters to full spectrum (C)

Syntax: `f`

Description: Sets up the `sp` and `wp` display parameters for a full display of a 1D spectrum. If an FID is displayed, the parameters `sf` and `wf` are set for a full display. In multidimensional data sets, the parameters for both displayed dimensions are set up. For 2D data sets, the parameters `sp`, `wp`, `sp1`, and `wp1` would be set. For planes of higher dimensional data sets, the appropriate two groups of `sp`-`wp`, `sp1`-`wp1`, and `sp2`-`wp2`, parameter pairs are set.

See also: *Getting Started*

Related:

`sf`	Start of FID (P)
`sp`	Start of plot in directly detected dimension (P)
`sp1`	Start of plot in 1st indirectly detected dimension (P)
`sp2`	Start of plot in 2nd indirectly detected dimension (P)
`wf`	Width of FID (P)
`wp`	Width of plot in directly detected dimension (P)
`wp1`	Width of plot in 1st indirectly detected dimension (P)
`wp2`	Width of plot in 2nd indirectly detected dimension (P)

f19 — Automated fluorine acquisition (M)

Syntax: `f19<(solvent)>`

Description: Prepares parameters for automatically acquiring a standard ^{19}F spectrum. The parameter `wexp` is set to `'procplot'` for standard processing. If `f19` is used as the command for automation via the `enter` program, then the macro `au` is supplied automatically and should not be entered on the MACRO line of the `enter` program. However, it is possible to customize the standard `f19` macro on the MACRO line by following it with additional commands and parameters. For example, `f19 nt=1` uses the standard `f19` setup but with only one transient.

Arguments: `solvent` is the name of the solvent. In automation mode, the solvent is supplied by the `enter` program. The default is `'CDCl3'`

Examples:

```
f19
f19('DMSO')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`au`	Submit experiment to acquisition and process data (M)
`enter`	Enter sample information for automation run (C)
`f19p`	Process 1D fluorine spectra (M)
`proc1d`	Processing macro for simple (non-arrayed) 1D spectra (M)
`procplot`	Automatically process FIDs (M)
`wexp`	When experiment completes (P)

f19p — Process 1D fluorine spectra (M)

Syntax: `f19p`

Description: Processes non-arrayed 1D fluorine spectra using a set of standard macros. `f19p` is called by `proc1d`, but can also be used directly. Fully automatic processing

(up to a point where a spectrum could be plotted) is provided: Fourier transformation (using preset weighting functions), automatic phasing (aphx macro), select integral regions (hregions macro), adjust integral size (integrate macro), vertical scale adjustment (vsadjc macro), avoiding excessive noise (noislm macro), threshold adjustment (if required, thadj macro), and referencing to the TMS signal, if present (tmsref macro).

See also: *Getting Started; User Guide: Liquids NMR*

Related:

aphx	Perform optimized automatic phasing (M)
f19	Automated fluorine acquisition (M)
hregions	Select integral regions for proton spectra (M)
integrate	Automatically integrate 1D spectrum (M)
noislm	Avoids excessive noise (M)
proc1d	Processing macro for simple (non-arrayed) 1D spectra (M)
thadj	Adjust threshold (M)
tmsref	Reference spectrum to TMS line (M)
vsadjh	Adjust vertical scale for proton spectra (M)

f1coef — Coefficient to construct F1 interferogram (P)

Description: Holds the coefficient to construct an F1 interferogram for 2D and 3D transformation. Coefficients are used by the ft2da and ft3d macros. If f1coef has a null value, ft2da uses the "standard" coefficients. f1coef is created by the par2d macro.

Values: Series of coefficients, separated by spaces (not a comma), and stored as a string variable. For example, the coefficient for standard States-Hypercomplex data set is `f1coef='1 0 0 0 0 0 -1 0'`.

See also: *User Guide: Liquids NMR*

Related:

f2coef	Coefficient to construct F2 interferogram (P)
ft2da	Fourier transform phase-sensitive data (M)
ft3d	Perform a 3D Fourier transform on a 3D FID data set (M,U)
make3dcoef	Make 3D coefficients file from 2D coefficients (M)
par2d	Create 2D acquisition, processing, display parameters (M)

f2coef — Coefficient to construct F2 interferogram (P)

Description: Holds the coefficient to construct an F2 interferogram for 2D and 3D transformation. Coefficients are used by the ft2da('ni2') and ft3d macros. If f2coef has a null value, ft2da('ni2') uses the "standard" coefficients. f2coef is created by the par3d macro.

Values: Series of coefficients, separated by spaces (not a comma), and stored as a string variable. For example, the coefficient for standard States-Hypercomplex data set is `f2coef='1 0 0 0 0 0 -1 0'`.

fattn — Fine attenuator (P)

Applicability: All systems except *GEMINI 2000*.

Description: Configuration parameter for whether the current rf channel has a fine attenuator. The value is set using the label Fine Attenuator in the CONFIG window (opened from config).

On *MERCURYplus* and *MERCURY-Vx* systems, fattn indicates if a fine attenuator is present. It is implicitly set by config.

Values: 0 specifies the fine attenuator is not present on the channel (Not Present choice in CONFIG window).

4095 specifies the fine attenuator is present on the channel (Present choice in CONFIG window).

On *MERCURYplus* and *MERCURY-Vx* systems, `fattn` should be set to an array value of 0,0.

See also: *VNMR and Solaris Software Installation; User Guide: Solids; MERCURYplus and MERCURY-Vx CP/MAS Installation, Testing, and Operation*

Related:

`config`	Display current configuration and possibly change it (M)
`dpwrf`	First decoupler fine power (P)
`tpwrf`	Observe transmitter fine power (P)

`fb` Filter bandwidth (P)

Description: Sets the bandwidth of the audio filters, which prevents noise of higher frequency than the spectral limits from "folding in" to the spectrum. Because the transmitter is in the center of the spectrum, the range of audio frequencies that must be filtered out is half the spectral width `sw` (e.g., for a spectral width of 4000 Hz, frequencies higher than ±2000 Hz should be filtered out). The audio filters have some attenuation at frequencies lower than their nominal cutoff frequency, which is the frequency at which signals have been attenuated by 3 dB (50%). This impacts on quantitative accuracy near the edges of the spectrum so that, except on *GEMINI 2000* $^{1}H/^{13}C$ systems, the standard value of `fb` is 10% more than half of `sw`.

`fb` is automatically changed whenever the spectral width `sw` is changed and thus is normally not a user-entered parameter. For example, typing `sw=4000` automatically sets `fb=2200`, which is 10% more than 2000 Hz. After changing the value of `sw`, `fb` can be changed.

Values: On UNITY*INOVA*, if `sw` is 500,000 or less: 1000 to 256000 Hz, 1000-Hz steps.

On UNITY*INOVA*, if `sw` is greater than 500,000: 256 kHz, 1 MHz.

On *MERCURY-VX* and *MERCURY*: 1 to 25 kHz and 55 kHz. Actual values are a non-linear set, entered in steps of 200, and rounded to the larger available value.

On UNITY*plus*, UNITY, and VXR-S, if `sw` is 100,000 or less:

- For UNITY*plus*, UNITY, most VXR-S: 200 to 51200 Hz, 200-Hz steps.
- For some VXR-S systems: 100 to 49500 Hz, 100-Hz steps.

On UNITY*plus*, UNITY, and VXR-S, if `sw` is greater than 100,000:

- For UNITY*plus*: 256 kHz, 1 MHz.
- For UNITY and VXR-S: 170 kHz, 300 kHz, 700 kHz, 1 MHz, 2 MHz.

On the $^{1}H/^{13}C$ *GEMINI 2000* (`pfiltr='n'`), programmable filters on the observe receiver are not present. `fb` is set to 1500 or 7500 on a 200-MHz *GEMINI 2000*, or set to 2250 or 9000 on a 300-MHz *GEMINI 2000*.

On the broadband *GEMINI 2000* (`pfiltr='y'`), programmable filters on the observe receiver are present. `fb` ranges from 200 Hz to 51.2 kHz, in 200-Hz steps.

See also: *Getting Started*

Related:

`pfiltr`	Programmable filters (P)
`sw`	Spectral width in directly detected dimension (P)
`mrfb`	Set the filter bandwidths for multiple receivers (P)

fbc — Apply baseline correction for each spectrum in an array (M)

Syntax: `fbc`

Description: Applies `bc` -type baseline correction to all the spectra in an array. The partial integral mode should be used to set integral regions to include all significant signals, while leaving blank as large an area of baseline as is possible.

See also: *User Guide: Liquids NMR*

Related: `dosy` Process DOSY experiments (M)

fdfgluer — Make FDF file from header and data parts (U)

Syntax:

(1) `fdfgluer <-align> header_file <data_file <output_file>>`

(2) `fdfgluer -infiles template <-offset n> <-align> header_file`

(3) `fdfgluer -vnmrfile fname -outfiles template <-traces n> <-align> header_file`

Description: Takes an FDF (flexible data format) header file defining a set of data and data from a file, files, or standard input, and combines them to form an FDF data file.

Using syntax 1 attaches a header to a raw data file. If the `data_file` argument is given (rather than being taken from standard input), a checksum is calculated and appended to the header.

Using syntax 2 takes the data from a group of raw data files whose names are `template1`, `template2`, etc. These data files can have fixed length headers, which will be ignored.

Using syntax 3 takes data from a VNMR format data file, such as a FID file.

Arguments: `header_file` is the name of the header file created or edited by the user.

`data_file` is the name of file containing data for a FDF file If this argument is not present, `fdfgluer` takes the data from the standard input.

`output_file` is the name of the FDF file created. If this argument is not present, `fdfgluer` puts the FDF file to the standard output.

`-align` is a numerical argument giving the size of words that the data should be aligned on. For example, `-8` ensures that the length of the header is a multiple of 8 bytes.

`-infiles template` gives the base name of the group of files from which to take data. `template` can be a path. `fdfgluer` will read data from files named `template1`, `template2`, `template3`, etc. in numerical order until the next sequential file name is not found.

`-offset n` gives the number of bytes of header in the data files. The first `n` bytes of each data file are ignored.

`-vnmrfile fname` specifies the name of a VNMR format data file to use for the input data.

`-outfiles template` specifies the base name of output files to be written using syntax 3. The template should have a "#" somewhere in it. The output files will substitute a serial number (`0001`, `0002`,...) for the #. For example, `-outfiles myrat#.fdf` writes data to output files `myrat0001.fdf`, etc.

`-traces n` gives the number of traces to put in each output file in syntax 3.

See also: *User Guide: Imaging, VNMR User Programming*

Related: `fdfsplit` Divide FDF file into header and data parts (U)

fdfsplit — Divide FDF file into header and data parts (U)

Applicability: Systems with imaging capabilities.

Syntax: `fdfsplit output_file data_file header_file`

Description: Takes an FDF (Flexible Data Format) file and splits it into its data and header parts. Note that the header may still have a checksum value—that value should be removed after the split has completed.

Arguments: `output_file` is the name of the FDF file to be split.

`data_file` is the file name to be given to the data part.

`header_file` is the file name to be given to the header part.

See also: *VNMR User Programming, User Guide: Liquids*

Related: `fdfgluer` Make FDF file from header and data parts (C)

fdm1 — Set, write 1D FDM parameters, run FDM (M)

Syntax: `fdm1<(filename<,n1, v1<, n2, v2<...>>>)>`
or
`fdm1 (i)` for the i-th trace

Description: Sets 1D Filter Diagonalization Method (FDM) parameters to the default values, writes the parameters to the `curexp/datdir/fdm1.inparm` file, and runs a stand-alone C++ program (`/vnmr/bin/fdm1d`).

Arguments: `filename` is the FID file; the default is `curexp+'acqfil/fid'`.

`n1, n2...` is one or more following variable names (the order is arbitrary):

`axis`	–1 (default) to reverse the spec.
`cheat`	No cheat if `cheat=1`, lines are narrower if `cheat<1`.
`cheatmore`	No cheatmore if `cheatmore=0`.
`error`	Error threshold for throwing away poles.
`fidfmt`	FID format: VNMR or ASCII.
`fdm`	1 for FDM; –1 for Digital or Discrete Fourier Transform.
`fn_Sp1D`	Spectrum file; default is `curexp/datadir/fdm1.parm`.
`Gamm`	Smoothing width (line broadening).
`Gcut`	Maximum width for a pole.
`idat`	Data type of ASCII FID file –4 for complex data, ignored if data is in VNMR format.
`i_fid`	The i-th trace of the FID.
`kcoef`	If `kcoef` > 0, use `'complicated' dk(k)`. –1 is always preferred.
`Nb`	Number of basis functions in a single window.
`Nbc`	Number of coarse basis vectors.
`Npower`	Number of spectrum data points.
`Nsig`	Number of points to use.
`Nskip`	Number of points to skip.
`par`	Line list file; default is `curexp/datadir/fdm1.parm`
`rho`	`rho=1` is optimal.
`specfmt`	Spec format: VNMR or ASCII.

`spectyp`	Spectrum type: complex (default), real imag, or abs.
`ssw`	A test parameter.
`t0`	Delay of the first point.
`theta`	Overall phase of FID (rp in radians).
`wmax`	Maximum spectrum frequency in hertz.
`wmin`	Minimum spectrum frequency in hertz.

`v1, v2...` is the value for the variable(s).

Examples:
```
fdm1('cheat',0.8)
fdm1('Nsig',3000,'Nb',20,1'Gamm',0.5)
```

See also: *User Guide: Liquids*

`fiddc3d` 3D time-domain dc correction (P)

Applicability: All systems; however, although `fiddc3d` is available on *MERCURY-VX*, *MERCURY*, and *GEMINI 2000* systems, such systems can only process 3D data and cannot acquire 3D data.

Description: Sets whether a 3D time-domain dc correction occurs. If `fiddc3d` does not exist, it is created by the macro `par3d`. The time-domain dc correction occurs immediately after any linear prediction operations and before all other operations on time-domain data.

Values: A three-character string. The default value is `'nnn'`.

- The first character refers to the f_3 dimension (`sw`, `np`, `fn`), the second character refers to the f_1 dimension (`sw1`, `ni`, `fn1`), and the third character refers to the f_2 dimension (`sw2`, `ni2`, `fn2`).
- Each character may take one of two values: `'n'` for no time-domain dc correction along the relevant dimension, and `'y'` for time-domain dc correction along the relevant dimension.

See also: *User Guide: Liquids NMR*

Related:

`fn`	Fourier number in directly detected dimension (P)
`fn1`	Fourier number in 1st indirectly detected dimension (P)
`fn2`	Fourier number in 2nd indirectly detected dimension (P)
`ft3d`	Perform a 3D Fourier transform (M)
`ni`	Number of increments in 1st indirectly detected dimension (P)
`ni2`	Number of increments in 2nd indirectly detected dimension (P)
`np`	Number of data points (P)
`par3d`	Create 3D acquisition, processing, display parameters (C)
`ptspec3d`	Region-selective 3D processing (P)
`specdc3d`	3D spectral dc correction (P)
`sw`	Spectral width in directly detected dimension (P)
`sw1`	Spectral width in 1st indirectly detected dimension (P)
`sw2`	Spectral width in 2nd indirectly detected dimension (P)

`fiddle` Perform reference deconvolution (M)

Syntax:
```
fiddle(option<,file><,option<,file>><,start>
   <,finish><,increment>)
```

Description: Performs reference deconvolution using a reference signal with known characteristics to correct instrumental errors in experimental 1D or 2D spectra.

Arguments: `option` can be any of the following:

- 'alternate' is a keyword specifying the alternate reference phase +- (+ - means? – Editor) (for phase sensitive gradient 2D data).
- 'autophase' is a keyword specifying to automatically adjust the phase of the reference signal.
- 'displaycf' is a keyword specifying to stop at the display of the correction function.
- 'fittedbaseline' is a keyword specifying to use cubic spline baseline correction defined by the choice of integral regions.
- 'invert' is a keyword specifying to invert the corrected difference spectrum/spectra.
- 'noaph' is a keyword specifying not to automatically adjust zero order phase of the reference region.
- 'nodc' is a keyword specifying not to use dc correction of reference region.
- 'noextrap' is a keyword specifying not to use extrapolated dispersion mode.
- 'nohilbert' is a keyword specifying not to use Hilbert transform algorithm and to use extrapolated dispersion mode reference signal unless 'noextrap' is also used as an option.
- 'normalise' is a keyword specifying to keep corrected spectrum integrals equal to that of the first spectrum.
- 'satellites' is a keyword specifying to use satellites defined in file in ideal reference region; file should be in /vnmr/satellites, and should immediately follow 'satellites' in the argument list.
- 'stop1' is a keyword specifying to stop at display of experimental reference FID.
- 'stop2' is a keyword specifying to stop at display of correction function.
- 'stop3' is a keyword specifying to stop at display of corrected FID.
- 'stop4' is a keyword specifying to stop at display of first corrected FID.
- 'verbose' is a specifying keyword to display information about processing in the main window.
- 'writecf' is a keyword specifying to write the correction function to file; the argument file must immediately follow 'writecf'.
- 'writefid' is a keyword specifying to write out corrected FID to file; if file does not begin with /, it is assumed to be in the current working directory. In the argument list, file should immediately follow 'writefid'.

file is the name of the file used with the 'satellites' and 'writefid' options.

start and finish are the indices of the first and last array elements to be processed. increment specifies the steps in which the index is to be incremented. The default is to process all the transformed spectra in an array.

See also: *User Guide: Liquids NMR*

Related:		
	fiddled	Perform reference deconvolution subtracting alternate FIDs
	fiddleu	Perform reference deconvolution subtracting successive FIDs
	fiddle2d	Perform 2D reference deconvolution
	fiddle2D	Perform 2D reference deconvolution

fiddle2dd	Perform 2D reference deconvolution subtracting alternate FIDs
fiddle2Dd	Perform 2D reference deconvolution subtracting alternate FIDs

fiddled — Perform reference deconvolution subtracting alternate FIDs (C)

Description: Produces the corrected difference between successive spectra. Refer to the description of fiddle for details.

See also: *User Guide: Liquids NMR*

Related: fiddle — Perform reference deconvolution

fiddleu — Perform reference deconvolution subtracting successive FIDs (C)

Description: Produces corrected differences between successive FIDs and the first FID. Refer to the description of fiddle for details.

See also: *User Guide: Liquids NMR*

Related: fiddle — Perform reference deconvolution

fiddle2d — Perform 2D reference deconvolution (C)

Description: Functions the same as the fiddle program except fiddle2d performs 2D reference deconvolution. Refer to the description of fiddle for details.

See also: *User Guide: Liquids NMR*

Related: fiddle — Perform reference deconvolution

fiddle2D — Perform 2D reference deconvolution (C)

Description: Functions the same as the fiddle program except fiddle2D performs 2D reference deconvolution. Refer to the description of fiddle for details.

See also: *User Guide: Liquids NMR*

Related: fiddle — Perform reference deconvolution

fiddle2dd — Perform 2D reference deconvolution subtracting alternate FIDs (C)

Description: Functions the same as the fiddle program except fiddle2dd performs 2D reference deconvolution. Refer to the description of fiddle for details.

See also: *User Guide: Liquids NMR*

Related: fiddle — Perform reference deconvolution

fiddle2Dd — Perform 2D reference deconvolution subtracting alternate FIDs (C)

Description: Functions the same as the fiddle program except fiddle2Dd performs 2D reference deconvolution. Refer to the description of fiddle for details.

See also: *User Guide: Liquids NMR*

Related: fiddle — Perform reference deconvolution

fidpar — Add parameters for FID display in current experiment (M)

Syntax: fidpar

Description: Creates the FID display parameters axisf, crf, deltaf, dotflag, vpf, and vpfi in the current experiment. Use fidpar to define these parameters in old parameter sets (they are already defined in new parameter sets).

See also: *Getting Started*

Related:

addpar	Add selected parameters to current experiment (M)
axisf	Axis label for FID displays and plots (P)
crf	Current time domain cursor position (P)
deltaf	Difference of two time cursors (P)
dotflag	Display FID as connected dots (P)
vpf	Current vertical position of FID (P)
vpfi	Current vertical position of imaginary FID (P)

fifolpsize — FIFO loop size (P)

Applicability: All systems except *MERCURY-VX*, *MERCURY*, and *GEMINI 2000*. `fifolpsize` is not used on *MERCURY-VX*, *MERCURY*, and *GEMINI 2000*. The correct value is for `512` the *GEMINI 2000* and `2048` for the *MERCURY-VX* and *MERCURY*. The `config` program sets this value.

Description: Configuration parameter for the size of the FIFO loop. The size depends on which controller board is present on the system—the Output board, the Acquisition Controller board, or the Pulse Sequence Controller board (refer to the description of the `acquire` statement in the manual *VNMR User Programming* for information on identifying the boards). The value is set using the label Fifo Loop Size in the CONFIG window (opened by `config`).

Values: 63 is used with the Output board (Part No. 953520).

1024 is used with the Acquisition Controller board (Part No. 969204).

2048 is used with the Pulse Sequence Controller board (Part No. 992560).

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M)

fixgrd — Convert gauss/cm value to DAC (M)

Syntax: `fixgrd(gradient_value):parameter`

Description: Uses the `gcal` value in the probe table to return the DAC value for a specified gradient strength.

Arguments: `gradient_value` is the required gradient strength in gauss/cm.

`parameter` is any local variable or VNMR variable.

Examples: `fixgrd(20):gzlvl`

Related:

gcal	Gradient calibration constant (P)

file — File name of parameter set (P)

Description: Contains the file name of the parameter set returned by a `rt` or `rtp` command. This parameter is reset when the `go` command is issued. If the system is not in automation mode (`auto='n'`), `file` is reset to the `'exp'` value. If the system is in automation mode (`auto='y'`), `file` is set to the path of the directory where the data is stored.

See also: *Getting Started*

Related:

auto	Automation mode active (P)
go	Submit experiment to acquisition (C)
rt	Retrieve FID (C)
rtp	Retrieve parameters (C)

files — Interactively handle files (C)

Syntax: `files<(files_menu)>`

Description: Brings up the interactive file handling program. With this program, the mouse and keyboard are used to copy, delete, rename, change directories, and load and save experiment data. The `files` command uses the graphics window to display file names. A mouse clicked on a file name selects it and the file name is displayed in reverse video. Various operations can be conducted on one or more selected files. The menus used for the `files` program are placed in the standard `menulib` directories. Refer to the manual *Getting Started* for more information on using menus, and refer to the manual *VNMR User Programming* for information on programming menus.

Arguments: `files_menu` is the `files` menu to control the menu buttons; the default menu is `'files_main'` or the last active `files` menu.

Alternate: File button in the Main Menu.

Examples:
```
files
files('files_dir')
```

See also: *VNMR User Programming*

Related:
- `filesinfo` — Return `files` display information (C)
- `tape` — Control tape options of `files` program (P)

filesinfo — Return file information for files display (C)

Syntax:
(1) `filesinfo('number'):$number_files`
(2) `filesinfo('name'<,file_number>):$file`
(3) `filesinfo('redisplay')`

Description: Allows access to the list of files selected from the `files` interactive display. `filesinfo` is normally used only by the macros that implement the menu functions of the file system and not entered from the keyboard. The command will not execute unless the `files` program is active.

Arguments: `'number'` is a keyword to return the number of files selected in the `files` display, or 0 if no files have been selected.

`$number_files` is the return variable when `'number'` is used.

`'name'` is a keyword to return a list of file names selected in the `files` display.

`file_number` is a number following the `'name'` keyword to return only the file name in the list given by `file_number`.

`$file` is a string variable that returns the file name when `'name'` is used.

`'redisplay'` is a keyword that causes the current contents of the directory to be displayed. This display is useful after making changes in the directory, such as deleting or creating a file.

See also: *VNMR User Programming*

Related:
- `files` — Interactively handle files (C)

filter — Gaussian low-pass filter for image processing (M)

Applicability: Systems with imaging capabilities.

Syntax: `filter(strength)`

Description: Sets the processing parameters `gf`, `gfs`, `gf1`, and `gfs1` to create a low-pass filter for improving the signal-to-noise (S/N) ratio in images. S/N improvement

is achieved at the expense of resolution. The results of the parameter setting performed by `filter` can be applied to the image using the `wft2d` command. The parameters `gf`, `gfs`, `gf1`, and `gfs1` are calculated to center the filter in both the t_1 and t_2 dimensions. The filter setting can be bypassed with the `ft2d` command. A side effect of `filter` is to reset the maximum, minimum and step values for all of the Gaussian processing parameters. This is to allow precise setting of the filter.

Arguments: `strength` is a number from 0 to 100 that represents the attenuation, in dB, applied to the signal at the edges of the sampling windows in the t_1 and t_2 dimensions. For example, `strength` set to 6 produces a Gaussian filter for t_1 and t_2 that reduces the signal at the edge of the sampling window by half (i.e., a 6-dB attenuation). If `strength` is set to 0, `gf`, `gfs`, `gf1`, and `gfs1` are set to `'n'`, effective turning the parameters off.

Examples: `filter(10)`

See also: *User Guide: Imaging*

Related:

`ft2d`	Fourier transform 2D data (C)
`gf`	Gaussian function on directly detected dimension (P)
`gf1`	Gaussian function on 1st indirectly detected dimension (P)
`gfs`	Gaussian shift constant on directly detected dimension (P)
`gfs1`	Gaussian shift constant on 1st indirectly detected dimension (P)
`wft2d`	Weight and Fourier transform 2D data (C)

`filtfile` File of FIR digital filter coefficients (P)

Description: Specifies name of a file of FIR (finite impulse response) digital filter coefficients. This file is a text file with one real filter coefficient per line (complex filters are not supported). If the parameter `filtfile` does not exist in the current experiment, enter `addpar('downsamp')` or `addpar('oversamp')` to add it. Entering `addpar('downsamp')` creates the digital filtering and downsampling parameters `downsamp`, `dscoef`, `dsfb`, `dslsfrq`, and `filtfile`. Similarly, entering `addpar('oversamp')` creates digital filtering and oversampling parameters `def_osfilt`, `filtfile`, `oscoef`, `osfb`, `osfilt`, `oslsfrq`, and `oversamp`.

Values: File name. The file must be in the user's `vnmrsys/filtlib` directory.

See also: *Getting Started*

Related:

`addpar`	Add selected parameters to current experiment (M)
`def_osfilt`	Default value of `osfilt` (P)
`downsamp`	Downsampling factor applied after digital filtering (P)
`dscoef`	Digital filter coefficients for downsampling (P)
`dsfb`	Digital filter bandwidth for downsampling (P)
`dslsfrq`	Bandpass filter offset for downsampling (P)
`oscoef`	Digital filter coefficients for oversampling (P)
`osfb`	Digital filter bandwidth for oversampling (P)
`osfilt`	Oversampling filter for real-time DSP (P)
`oslsfrq`	Bandpass filter offset for oversampling (P)
`oversamp`	Oversampling factor for acquisition (P)
`pards`	Create additional parameters used for downsampling (M)
`paros`	Create additional parameters used for oversampling (M)

`fitplot` Adjust plot parameters (M)

Applicability: Systems with imaging capabilities.

Syntax: `fitplot`

Description: If the parameter `axis` is set to `'cc'`, `fitplot` uses an algorithm that adjusts the display and subsequent plot to present the image in the largest possible format for the current conditions specified by the `wcmax`, `wc2max`, and `trace` parameters. For example, `fitplot` could be entered as `fitplot imageprint page` for plotting. This algorithm leaves a column of 50 mm for plotting parameters down the left-hand edge of the paper. `fitplot` also has other algorithms for different settings of the `axis` and `ni` parameters.

See also: *User Guide: Imaging*

Related:

`axis`	Axis labels for displays and plots (P)
`imageprint`	Plot noninteractive gray scale image (M)
`ni`	Number of increments in 1st indirectly detected dimension (P)
`page`	Submit plot and change plotter page (C)
`trace`	Mode for *n*-dimensional data display (P)
`wcmax`	Maximum width of chart (P)
`wc2max`	Maximum width of chart in second direction (P)

`fitspec` Perform spectrum deconvolution (C, U)

Syntax: (From VNMR) `fitspec<(<'usell'><,><'setsfreq'>)>`
(From UNIX) `fitspec`

Description: Fits experimental data to Lorentzian and/or Gaussian lineshapes. `fitspec` uses as a starting point data in a file `fitspec.inpar`, which must be prepared prior to performing the calculation. This file contains the frequency, intensity, linewidth, and (optionally) the Gaussian fraction of the lineshape. Any number followed by an asterisk (*) is held fixed during the calculation; all other parameters are varied to obtain the best fit. `fitspec` creates a file `fitspec.data`, which is a text representation of the spectral data (that part of the spectrum between `sp` and `sp`+`wp`). After the calculation is finished, the results of the fit are contained in a file `fitspec.outpar`, with a format identical to `fitspec.inpar`.

It is often useful to use the output from a deconvolution as the input to a spin simulation to ensure the most accurate possible frequencies for the spin simulation calculation. For this reason, the frequencies and amplitudes of the calculated lines in a deconvolution are automatically stored in the parameters `slfreq` and `slamp`, respectively, from where they can serve as input to an iterative spin simulation. If the spin system is defined *after* a deconvolution is performed, this information is lost (`slfreq` and `slamp` are reset). In this case, `fitspec('setslfreq')` can be used to copy the information from `fitspec.outpar` back into `slfreq` *and* `slamp`. This is not necessary if you define the spin system before performing the deconvolution (you need not perform the entire spin simulation, only define the spin system).

Arguments: `'usell'` is a keyword to prepare the file `fitspec.inpar` from the last line listing (stored in `llfrq` and `llamp`). All lines are set to have a linewidth of `slw` and a fixed Gaussian fraction of 0. If another starting point is desired, this file can be edited with a text editor. Alternatively, the macro `usemark` may be used.

`'setslfreq'` is a keyword to copy the information from the file `fitspec.outpar` back into the parameters `slfreq` and `slamp`.

Examples:

```
fitspec
fitspec('usell')
fitspec('setslfreq')
```

See also: *User Guide: Liquids NMR*

Related:

`llamp`	List of line amplitudes (P)
`llfrq`	List of line frequencies (P)
`setgauss`	Set a Gaussian fraction for lineshape (M)
`slamp`	Measured line amplitudes (P)
`slfreq`	Measured line frequencies (P)
`sp`	Start of plot (P)
`usemark`	Use “mark” output as deconvolution starting point (M)
`wp`	Width of plot (P)

`fixpar` Correct parameter characteristics in experiment (M)

Syntax: `fixpar`

Description: After bringing parameters into the current experiment with `convert`, `rt`, `rtp`, or `rtv`, `fixpar` is automatically executed. `fixpar` updates old parameter characteristics and reconciles parameter differences due to the hardware on the spectrometer. If a macro `userfixpar` exists, `fixpar` runs it also. This allows an easy mechanism to customize parameter sets.

See also: *Getting Started*

Related:

`convert`	Convert data set from a VXR-style system (C)
`fixpar3rf`	Create parameters for third rf channel (M)
`fixpar4rf`	Create parameters for fourth rf channel (M)
`parfix`	Update parameter set (M)
`parversion`	Version of parameter set (P)
`rt`	Retrieve FIDs (C)
`rtp`	Retrieve parameters (C)
`rtv`	Retrieve individual parameters (C)
`updatepars`	Update all parameter sets saved in a directory (M)
`userfixpar`	Macro called by `fixpar` (M)

`fixpar3rf` Create parameters for third rf channel (M)

Applicability: Systems with a second decoupler.

Syntax: `fixpar3rf`

Description: Checks for the existence of all acquisition parameters related to the second decoupler. Any parameters found to be absent are created, characterized, and initialized by the macro. `fixpar3rf` is run as a part of the standard `fixpar` macro if the system configuration parameter `numrfch` is greater than 2 (i.e., the number of rf channels on the system is set at 3 or more).

See also: *Getting Started*

Related:

`fixpar`	Correct parameter characteristics in experiment (M)
`fixpar4rf`	Create parameters for fourth rf channel (M)
`numrfch`	Number of rf channels (P)

`fixpar4rf` Create parameters for fourth rf channel (M)

Applicability: Systems with a third decoupler.

Syntax: `fixpar4rf`

Description: Checks for the existence of all acquisition parameters related to the third decoupler. Any parameters found to be absent are created, characterized, and initialized. `fixpar4rf` is run as a part of the standard `fixpar` macro if the

system configuration parameter numrfch is greater than 3 (i.e., the number of rf channels on the system is set at 4).

See also: *Getting Started*

Related:

fixpar	Correct parameter characteristics in experiment (M)
fixpar3rf	Create parameters for third rf channel (M)
numrfch	Number of rf channels (P)

fixpar5rf — Create parameters for fifth rf channel (M)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Syntax: fixpar5rf

Description: Checks for the existence of all acquisition parameters related to the fourth decoupler. Any parameters found to be absent are created, characterized, and initialized. fixpar5rf is run as a part of the standard fixpar macro if the system configuration parameter numrfch is greater than 4 (i.e., the number of rf channels on the system is set at 5).

See also: *Getting Started*

Related:

fixpar	Correct parameter characteristics in experiment (M)
fixpar4rf	Create parameters for fourth rf channel (M)
numrfch	Number of rf channels (P)

fixup — Adjust parameter values selected by setup macros (M)

Syntax: fixup

Description: Called by the experiment setup macros h1, c13, hc, hcapt, capt, and hcosy. As provided, the text of fixup is all in quotes so that it does nothing. It is intended to provide each user with a mechanism to make adjustments to values selected by the setup macros.

See also: *User Guide: Liquids NMR*

flashc — Convert compressed 2D data to standard 2D format (C)

Syntax: flashc(<'nf'>,'ms'|'mi'|'rare',ns,traces,echoes)

Description: Converts 2D FID data files from compressed formats (seqcon='nncsn', seqcon='nccnn', seqcon='nnccn') to standard format (seqcon='ncsnn') or from standard format to compressed format. Compressed data is taken by using the nf parameter; that is, compressed data is acquired as one large uninterrupted "multiFID" acquisition.

flashc reads the file fid in the acqfil subdirectory of the current experiment.

flashc can convert a compressed-compressed multislice, multiecho, or multi-image sequence. It can also convert a "rare" type sequence with a compressed phase-encode echo train.

flashc changes the values of the following VNMR parameters:

Compressed-compressed or standard format to compressed format

- ni is set to 1 if no argument is provided.
- nf is set to the value of nf divided by the multislice, ms, or multi-image, mi, value.
- arraydim is set to the product of its original value and the value of the traces argument.

- `arrayelemts` is set to 1 if no parameters were arrayed during data acquisition or to 2 if any parameter was arrayed during data acquisition.

Compressed format to standard format

- `nf` is set to the value of the `traces` argument, or to 1 if no argument is provided.
- `ni` is set to the value of `nf` divided by the multislice, `ms`, or multi-image, `mi`, value.
- `arraydim` is set to the product of its original value and the original value of `nf`.
- `arrayelemts` is set to 1 if no parameters were arrayed during data acquisition or to 2 if any parameter was arrayed during data acquisition.

Arguments: `nf` is the number of FIDs in the second dimension of a 2D experiment. When converting data in the standard format to a compressed format, `nf` must always be the first argument.

When converting compressed-compressed or "rare" type sequences, the first argument must be a string defining the type of compression:

- `'mi'` is a keyword for the multi-image type of compression.
- `'ms'` is a keyword for the multislice type of compression.
- `'rare'` is a keyword for the "rare" multiecho, rare type, fast-imaging data sets.

(Standard to compressed) `ns` is the number of images slices or array elements to be retained.

(Compressed-compressed or rare to standard) `traces` is the number of compressed traces to retain for each `ni`. The parameter `nf` is set to this number after `flashc` has run.

(Compressed-compressed or rare to standard) `echoes` is the number of compressed echoes, used with "rare" type formatting.

Examples: *Compressed-compressed or standard format to compressed format*
`flashc('nf')` (standard to compressed)
`flashc('nf','ms',ns)` (compressed phase-encode and multislice)
`flashc('nf','mi',ns)` (compressed multi-image and phase-encode)

Compressed-compressed format or rare format to standard format
`flashc` (simple compressed phase-encode)
`flashc('ms',ns)`(compressed phase-encode and multislice)
`flashc('mi',ns)` (compressed multi-image and phase-encode)
`flashc('rare',ns,etl)`

See also: *User Guide: Imaging*

Related:

`arraydim`	Dimension of experiment (P)
`ft2d`	Fourier transform 2D data (C)
`ft3d`	Fourier transform 3D data (C)
`nf`	Number of FIDs (P)
`ni`	Number of increments in 1st indirectly detected dimension (P)
`seqcon`	Acquisition loop control (P)

`flip` Flip between graphics and text windows (C)

Syntax:
```
flip<('graphics'|'text'   \
      <,'off'|'on'|'autooff'|'autoon'>)>
```

Description: Windows on the display screen often overlap, with some windows on top or in front of other windows. `flip` brings the graphics window or text window to the top of the screen. It can also control under what circumstances the graphics or text windows will come to the front due to a parameter change or by the actions of certain interactive programs (`dg`, `dg1`, `ds`, etc.) that send commands to write or draw in a window.

Arguments: `'graphics'` is a keyword to bring the graphics window to the front.

`'text'` is a keyword to bring the text window to the front.

`'off'` is a keyword that the window specified by the first argument will not come to the front due to parameter changes or from commands that write to the window. After `'off'` is set, entering `flip`, `flip('text')`, or `flip('graphics')` will bring the window to the front.

`'on'` is a keyword to reset the action of the `'off'` keyword.

`'autooff'` is a keyword that the window specified by the first argument will not come up to the front due to parameter changes, but specific commands that write or draw to the window (`dg`, `dg1`, `ds`, etc. and `flip`, `flip('text')`, `flip('graphics')`) will still bring the window to the front.

`'autoon'` is a keyword to reset the action of the `'autooff'` keyword.

Alternate: Flip button in the Permanent menu.

Examples:
```
flip
flip('graphics')
flip('text','autooff')
```

See also: *Getting Started, VNMR User Programming*

Related:

`large`	Use large graphics window (C)
`small`	Use small graphics window (C)

`flipflop` Set up parameters for FLIPFLOP pulse sequence (M)

Applicability: Systems with solids module. Sequence is not supplied on *MERCURY-VX*, *MERCURY,* and *GEMINI 2000.*

Syntax: `flipflop`

Description: Sets up a multipulse parameter set for tuning out “phase glitch” in the probe and pulse amplifier.

See also: *User Guide: Solid-State NMR*

`fliplist` Standard flip angle list (P)

Applicability: Systems with imaging capabilities.

Description: Contains an array of real values defining values of the standard flip angles used for the pulses in the `plist` array (e.g., `fliplist=180,90,180`). The `nD`, `seqcon`, `plist`, `patlist`, `pwrlist`, `fliplist,` and `sslist` parameters configure a particular parameter set for an application sequence defined by the value of the `seqfil` parameter. The `plist`, `patlist`, `pwrlist`, `fliplist,` and `sslist` parameters provide information concerning the rf pulse and conjugate gradients used by the sequence.

See also: *User Guide: Imaging*

Related:

`nD`	Application dimension (P
`patlist`	Active pulse template parameter list (P)
`plist`	Active pulse length parameter list (P)
`pwrlist`	Active pulse power level parameter list (P)

seqcon	Acquisition loop control (P)
seqfil	Application object code name (P)
sslist	Conjugate gradient list (P)

FLUORINE — Set up parameters for fluorine spectrum (M)

Applicability: *GLIDE* only

Syntax: FLUORINE

Description: Internal macro that sets up a fluorine spectrum in *GLIDE*. This macro is not used if fluorine is the first experiment in the chain.

flush — Write out data in VNMR memory (C)

Syntax: flush

Description: Writes out the current data and parameters in memory buffers. Normally, this information is not written to disk until exiting VNMR or joining another experiment. One reason to use flush is to be able to access experimental data from a program separate from the VNMR program.

See also: *VNMR User Programming*

fn — Fourier number in directly detected dimension (P)

Description: Selects the Fourier number for the Fourier transformation along the directly detected dimension. This dimension is often referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, etc.

Values: 'n' or a number equal to a power of 2 (minimum is 32). If fn is not *entered* exactly as a power of 2, it is automatically rounded to the nearest higher power of 2 (e.g., setting fn=32000 gives fn=32768). fn can be less than, equal to, or greater than np, the number of directly detected data points:

- If fn is less than np, only fn points are transformed.
- If fn is greater than np, fn minus np zeros are added to the data table ("zero-filling").
- If fn='n', fn is automatically set to the power of 2 greater than or equal to np.

See also: *Getting Started*

Related:

fn1	Fourier number in 1st indirectly detected dimension (P)
fn2	Fourier number in 2nd indirectly detected dimension (P)
np	Number of data points (P)

fn1 — Fourier number in 1st indirectly detected dimension (P)

Description: Selects the Fourier number for the Fourier transformation along the first indirectly detected dimension. This dimension is often referred to as the f_1 dimension of a multi-dimensional data set. The number of increments along this dimension is controlled by the parameter ni.

Values: fn1 is set in a manner analogous to the parameter fn, with np being substituted by 2*ni.

See also: *User Guide: Liquids NMR*

Related:

fn	Fourier number in directly detected dimension (P)
fn2	Fourier number in 2nd indirectly detected dimension (P)

ni	Number of increments in 1st indirectly detected dimension (P)
np	Number of data points (P)

fn2 — Fourier number in 2nd indirectly detected dimension (P)

Description: Selects the Fourier number for the Fourier transformation along the second indirectly detected dimension. This dimension is often referred to as the f_2 dimension of a multidimensional data set. The number of increments along this dimension is controlled by the parameter ni2. fn2 is set in a manner analogous to the parameter fn, with np being substituted by 2*ni2.

See also: *User Guide: Liquids NMR*

Related:

fn	Fourier number in directly detected dimension (P)
fn1	Fourier number in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
np	Number of data points (P)

fn2D — Fourier number to build up 2D DOSY display in frequency domain (P)

Description: In 2D DOSY sequences (Dbppste, DgcsteSL, Doneshot, Dbppsteinept), replaces fn when setting up the 2D display.

See also: *User Guide: Liquids NMR*

Related:

ddif	Synthesize and display DOSY plot (C)
dosy	Process DOSY experiments (M)

focus — Send keyboard focus to VNMR input window (C)

Syntax: focus

Description: Sends keyboard focus to the VNMR input window. This is only useful for macro programming.

See also: *VNMR User Programming*

foldcc — Fold INADEQUATE data about two-quantum axis (C)

Syntax: foldcc

Description: Symmetrizes 2D INADEQUATE data along the P-type double-quantum axis and applies an automatic dc baseline correction. foldcc functions for both hypercomplex and complex 2D data.

See also: *User Guide: Liquids NMR*

Related:

dc	Calculate spectral drift correction (C)
foldj	Fold J-resolved 2D spectrum about f_1=0 axis (C)
foldt	Fold COSY-like spectrum along diagonal axis (C)
rotate	Rotate 2D data (C)

foldj — Fold J-resolved 2D spectrum about f_1=0 axis (C)

Syntax: foldj

Description: Symmetrizes heteronuclear 2D-J or rotated homonuclear 2D-J experiments about the f_1=0 axis. foldj functions with both complex and hypercomplex 2D data.

See also: *User Guide: Liquids NMR*

Related:

foldcc	Fold INADEQUATE data about 2-quantum axis (C)
foldt	Fold COSY-like spectrum along diagonal axis (C)
rotate	Rotate 2D data (C)

foldt — Fold COSY-like spectrum along diagonal axis (C)

Syntax: `foldt<('symm'|'triang')>`

Description: Folds COSY-like correlation spectra about the diagonal. The 2D spectrum must exhibit a *P-type diagonal* for `foldt` to work properly (a P-type diagonal goes from the bottom left-hand side to the top right-hand side of the contour display.) `foldt` functions for both hypercomplex and complex 2D data but requires that `fn`=`fn1` and `sw`=`sw1`.

Arguments: `'symm'` is a keyword for the folding process to perform a symmetrization of the data by replacing every two symmetry-related points with the one point therein that has the least magnitude. This value is the default.

`'triang'` is a keyword for the folding process to perform a triangularization of the data by replacing every two symmetry-related points with their geometric mean.

See also: *User Guide: Liquids NMR*

Related:

fn	Fourier number in directly detected dimension (P)
fn1	Fourier number in 1st indirectly detected dimension (P)
foldcc	Fold INADEQUATE data about 2-quantum axis (C)
foldj	Fold J-resolved 2D spectrum about f_1=0 axis (C)
rotate	Rotate 2D data (C)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)

fontselect — Open FontSelect window (C)

Syntax: `fontselect`

Description: Opens the FontSelect window for defining fonts in window panes created by `setgrid`. A different font can be selected for every window pane combination of rows and columns. Separate fonts can also be selected for a large or small overall graphic window.

Alternate: FontSelect button in the Windows menu.

See also: *Getting Started*

Related:

curwin	Current window (P)
jwin	Activate current window (M)
mapwin	List of experiment numbers (P)
setgrid	Activate selected window (M)
setwin	Activate selected window (C)

format — Format a real number or convert a string for output (C)

Syntax: (1) `format(real_number,length,precision):return`
(2) `format(string,'upper'|'lower'|'isreal'):return`

Description: Using syntax 1, `format` takes a real number or real type variable and formats it into a string with given length and precision and rounds it off if necessary (see examples 1 to 4 below). `format` can also be used to format a real type variable as a real number (see example 5).

Using syntax 2, `format` converts a string variable into a new string of characters either all upper case or all lowercase (see examples 6 and 7) or tests the string to determine if it represents a real number (see example 8).

Arguments: `real_number` is the real type variable containing the value to be formatted.

`length` is the length of for formatted real number. If `length` is set to 0, just enough places are used to hold the number.

`precision` is the precision (i.e., the number of places to the right of the decimal point) of the formatted real number. If `precision` is set to 0, output is an integer.

`string` is the string variable to be converted into upper or lower case.

`'upper'` is a keyword to convert the string variable given by `string` into all upper case characters.

`'lower'` is a keyword to convert `string` into all lower case characters.

`'isreal'` is a keyword that tests the first argument to verify that the argument satisfies the rules for a real number. When given, `format` returns a 1 in the first argument and can represent a real number and a zero otherwise.

`return` is the return string variable, real number, or integer.

Examples:

```
1. format(a,5,2):n1      If a=24.1264 then n1='24.13'
2. format(a,9,4):n2      If a=24.1264 then n2='24.1264'
3. format(a,0,3):n3      If a=24.1264 then n3='24.126'
4. format(a,2,0):n1      If a=24.1264 then n1='24'
5. format(a,2,0):r1      If a=24.1264 then r1=24
6. format(solvent,'upper'):n2 If solvent='CDCl3'
   then n2='cdcl3'
7. format(solvent,'lower'):n3 If solvent='CDCl3'
   then n3='CDCDL3'
8. format($1,'isreal'):$a  If $1=1 then $a=1
```

See also: *VNMR User Programming*

Related:

`n1,n2,n3`	Name storage for macros (P)
`r1–r7`	Real-value storage for macros (P)

fp — Find peak heights or phases (C)

Syntax: `fp<(<'phase',><index1,index2,...>)>`

Description: Following a line listing (either `dll` or `nll`), `fp` measures the peak height of each peak in an array of spectra. The results of the analysis are written to a text file `fp.out` in the current experiment directory. If the `npoint` parameter is defined in the current parameter set and this parameter is "on," it determines the range of data points over which a maximum is searched when determining peak heights. The possible values of `npoint` are `1` to `fn/4`. The default is `2`.

Arguments: `'phase'` is a keyword to measure the phase of each peak instead of height.

`index1,index2,...` restricts measuring peak heights or phases to the lines listed.

Examples:

```
fp
fp(1,3)
fp('phase')
```

See also: *User Guide: Liquids NMR*

Related:

`dll`	Display listed line frequencies and intensities (C)
`fn`	Fourier number in directly detected dimension (P)
`getll`	Get line frequency and intensity from line list (C)

nl	Position cursor at the nearest line (C)
nll	Find line frequencies and intensities (C)
npoint	Number of points for fp peak search (P)

fpmult First point multiplier for np FID data (P)

Description: Allows error correction if the first point of an FID is misadjusted. In a 1D experiment, this adjustment influences the overall integral of the spectrum. For *n*-dimensional experiments, if the correction is not made, "ridges" can appear. In 2D experiments, the ridges appear as "f_2 ridges." In 3D experiments, the ridges appear as "f_3 ridges." These ridges can clearly be seen in the noise region on the top and bottom of a 2D spectrum (when trace='f1') as a low-intensity profile of the diagonal. The sign and intensity of the ridges is controlled by the magnitude of fpmult.

It has been recognized that the first point of a FID that is sampled at exactly time equal to zero must be multiplied by 0.5 for the Fourier transform to function properly. The fpmult parameter gives you a method to fine-tune the actual correction factor.

Values: Default is 1.0, except that if the processing involves backward extension of the time-domain data with linear prediction, the default changes to 0.5. If fpmult is set to 'n', fpmult takes on its default value.

See also: *User Guide: Liquids NMR*

Related:		
	fpmult1	First point multiplier for ni interferogram data (P)
	fpmult2	First point multiplier for ni2 interferogram data (P)
	np	Number of data points (P)
	trace	Mode for *n*-dimensional data display (P)
	wft2da	Weight and Fourier transform phase-sensitive data (M)

fpmult1 First point multiplier for ni interferogram data (P)

Description: Operates on ni hypercomplex or complex interferogram data in a manner analogous to fpmult. In many 2D experiments, the t_1 values are adjusted so there is no first-order phasing in the f_1 and f_2 dimensions. In this case, fpmult1 should be 0.5. If the t_1 value is adjusted so that there is a 180° first-order phase correction, fpmult1 should be 1.0.

Values: Default value is 0.5. If fpmult1 is set to 'n', it takes on its default value.

See also: *User Guide: Liquids NMR*

Related:		
	fpmult	First point multiplier for np FID data (P)
	fpmult2	First point multiplier for ni2 interferogram data (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

fpmult2 First point multiplier for ni2 interferogram data (P)

Description: Operates on ni2 hypercomplex or complex interferogram data in a manner analogous to fpmult. In many 3D experiments, the t_2 value is adjusted so that there is no first-order phasing in the f_1 and f_2 dimensions. In this case, fpmult2 should be 0.5. If the t_2 value is adjusted so that there is a 180° first-order phase correction, fpmult2 should be 1.0.

Values: Default value is 0.5. If fpmult2 is set to 'n', it takes on its default value.

See also: *User Guide: Liquids NMR*

Related:		
	fpmult	First point multiplier for np FID data (P)

fpmult1	First point multiplier for ni interferogram data (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)

fr — Full recall of a display parameter set (M)

Syntax: (1) frset_number
(2) fr(set_number)

Description: Performs a full recall of a display parameter set, setting all parameters to exactly as they were when the corresponding s command was entered.

Arguments: set_number is the number of the display parameter set.

Examples:
```
fr2
fr(3)
```

See also: *Getting Started*

Related:

r	Recall display parameter set (M)
s	Save display parameters as a set (M)

fread — Read parameters from file and load them into a tree (C)

Syntax: fread(file<,tree<,'reset|'value'>>)

Description: Reads VNMR parameters from a file and loads the parameters into a tree. The tree can be global, current, processed, or systemglobal. fread can read from any file that has parameters stored in the correct VNMR format.

Note that if parameters are read into the global tree, certain important system parameters are not loaded because these parameters should not be changed. The parameters that are not loaded are userdir, systemdir, curexp, autodir, auto, vnmraddr, and acqaddr.

Arguments: file is the name of the file containing parameters stored in VNMR format.

tree is one of the keywords 'global', 'current', 'processed', or 'systemglobal'. The default is 'current'. This argument specifies the type of tree into which the parameters are loaded. Refer to the create command for more information on types of trees.

'reset' is a keyword that causes the parameter tree to be cleared before the new parameter file is read. Without this option, parameters read from a file are added to the existing preloaded parameters. To use this option, tree must also be specified.

'value' is a keyword that causes only the values of the parameters in the file to be loaded. If a preloaded variable does not already exist, a new one is not created. Parameter attributes are not changed, and enumerated values are not changed. To use this option, tree must also be specified.

Examples:
```
fread('/vnmr/stdpar/H1.par/procpar')
fread('sampvar','global')
fread('setvar','current','reset')
fread('var1','processed','value')
```

See also: *VNMR User Programming*

Related:

auto	Automation mode active (P)
autodir	Automation directory absolute path (P)
create	Create new parameter in a parameter tree (C)
curexp	Current experiment directory (P)
destroy	Destroy a parameter (C)
display	Display parameters and their attributes (C)
fsave	Save parameters from a tree to a file (C)

rtp	Retrieve parameters (C)
systemdir	VNMR system directory (P)
userdir	VNMR user directory (P)

fsave — Save parameters from a tree to a file (C)

Syntax: `fsave(file<,tree>)`

Description: Writes parameters from a parameter tree to a file.

Arguments: `file` is the name of the file, which can be any valid file for which the user has write permission. If the file already exists, it will be overwritten.

`tree` is one of the keywords `'global'`, `'current'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on types of trees.

Examples:
```
fsave('var1')
fsave('sampvar','global')
```

See also: *VNMR User Programming*

Related:

create	Create new parameter in a parameter tree (C)
destroy	Destroy a parameter (C)
display	Display parameters and their attributes (C)
fread	Read parameters from file and load them into a tree (C)
svp	Save parameters from current experiment (C)

fsq — Frequency-shifted quadrature detection (P)

Description: On UNITY*INOVA*, *MERCURY-VX*, and *MERCURY* systems, selects whether to use frequency-shifted quadrature detection. When `fsq` is turned on, if `dsp` is on, the observe frequency is offset by `oslsfrq`, and the digital filter is also offset by `oslsfrq`. The default value of `oslsfrq` is `1.25*sw`.

On systems other than UNITY*INOVA*, *MERCURY-VX*, and *MERCURY*, frequency-shifted quadrature detection can be done using inline DSP. The effect of `fsq` is to offset only the digital filter by `oslsfrq`. The observe frequency must be offset by `oslsfrq` by modifying the pulse sequence as described in the manual *Getting Started*.

Values: `'n'` turns frequency-shifted quadrature detection off. `'y'` turns it on.

See also: *Getting Started*

Related:

dsp	Type of DSP for data acquisition (P)
oslsfrq	Bandpass filter offset for oversampling (P)
oversamp	Oversampling factor for acquisition (P)
sw	Spectral width in directly detected dimension (P)

ft — Fourier transform 1D data (C)

Syntax:
(1) `ft<(<options,><'nf'><,start><,finish><,step>)>`
(2) `ft('inverse',exp_number,expansion_factor)`

Description: In syntax 1, performs a Fourier transform on one or more 1D FIDs without weighting applied to the FID. `ft` executes a left-shift, zero-order phase rotation, and a frequency shift (first-order phase rotation) according to the parameters `lsfid`, `phfid`, and `lsfrq`, respectively, on the time-domain data, prior to Fourier transformation. The type of Fourier transform to be performed is determined by the parameter `proc`. Solvent suppression is turned on or off with the parameters `ssfilter` and `ssorder`. For arrayed data sets, `ft` Fourier

transforms all of the array elements. To Fourier transform selected array elements, `ft` can be passed numeric arguments.

In syntax 2, `ft` performs an inverse Fourier transform of the entire spectrum. (VNMR does not currently support inverse Fourier transformation of arrayed 1D or 2D data sets.)

Arguments: `options` can be any of the following (all string arguments must precede the numeric arguments):

- `'acq'` is a keyword to check if any elements of a multi-FID experiment have already been transformed. If so, these previously transformed elements will not be retransformed.
- `'nodc'` is a keyword to not perform the usual FID drift correction.
- `'nods'` is a keyword to prevent an automatic spectral display (`ds`) from occurring. This outcome is useful for various plotting macros.
- `'noft'` is a keyword to skip the Fourier transform, thereby allowing use of all spectral manipulation and plotting commands on FIDs.
- `'zero'` is a keyword to zero the imaginary channel of the FID prior to the Fourier transform. This zeroing occurs after any FID phasing. Its use is generally limited to wideline solids applications.

`'nf'` is a keyword that makes a single FID element containing `nf` traces to be transformed as if it were `nf` separate FID elements. If `'nf'` precedes the list of numeric arguments, the rules for interpreting the numeric arguments change slightly. Passing no numeric arguments results in the transformation of all `nf` traces in the first FID element. Passing a single numeric argument results in the transformation of all `nf` traces in the requested FID element (e.g., `ft('nf',3)` transforms all `nf` traces for element 3). Regardless of the requested FID element, the resulting spectra are labeled as 1 to `nf` because multiple elements cannot be transformed using `ft('nf')`. Subsequent numeric arguments are interpreted as previously described.

`start` is the index of a particular element to be transformed. For an array, `start` is the index of the first element to be transformed.

`finish` is the index of the last element to be transformed for an array.

`step` specifies the increment between successive elements that are to be transformed for an array. The default is 1.

`'inverse'` is a keyword specifying an inverse Fourier transform.

`exp_number` is the number of the experiment, from 1 to 9, for storing the resulting FID from the inverse Fourier transform.

`expansion_factor` defines the expansion of the spectrum before the inverse Fourier transform is performed. This argument is equivalent to a multiplier for the `fn` parameter. The multiplier is restricted to between 1 and 32 and is rounded up internally to the nearest power of 2.

Examples:

```
ft
ft(1)
ft(3,7)
ft(2,10,2)
ft('nf',3)
```

Alternate: Transform button in the 1D Data Processing Menu.

See also: *Getting Started*

Related:		
	`dcrmv`	Remove dc offsets from FIDs in special cases (P)
	`fn`	Fourier number in directly detected dimension (P)

lsfid	Number of points to left-shift the np FID (P)
lsfrq	Frequency shift of the fn spectrum in Hz (P)
nf	Number of FIDs (P)
phfid	Zero-order phasing constant for np FID (P)
proc	Type of processing on the np FID (P)
ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
ssorder	Order of polynomial to fit digitally filtered FID (P)
wft	Weight and Fourier transform 1D data (C)

ft1d — Fourier transform along f_2 dimension (C)

Syntax:
(1) `ft1d(element_number)`
(2) `ft1d<('nf',element_number)`
(3) `ft1d<(<options,><coefficients>)>`

Description: Performs the first Fourier transformation along the f_2 dimension, without weighting, and matrix transposition. `ft1d` allows the display of t_1 interferograms with the `dcon` and `dconi` commands. For arrayed 2D FID data, a single array element can be weighted and transformed using syntax 1 or 2. The keyword `'nf'` is used in syntax 2 to specify that the 2D data is collected in the compressed form using `'nf'`. Complex and hypercomplex interferograms can be constructed explicitly by supplying a series of options and coefficients using syntax 3.

For information on real as opposed to complex Fourier transforms, see the descriptions of the `proc`, `proc1`, and `proc2` parameters. For information on left-shifting, zero-order phase rotation, and frequency shifting of the FID and interferogram time-domain data during the 2D Fourier transformation, see the descriptions of the parameters `lsfid`, `lsfid1`, `lsfid2`, `phfid`, `phfid1`, `phfid2`, `lsfrq`, `lsfrq1`, and `lsfrq2`, as appropriate. For information on the lfs (low-frequency suppression) and zfs (zero-frequency suppression) solvent suppression options, see the description of the parameters `ssfilter` and `ssorder`, and the macro `parfidss`.

Arguments: `element_number` is a single array element to be weighted and transformed.

`options` can be the keywords `'ptype'` or `'ntype'` but neither serve a useful function because the differential effect of these arguments is applied only during the course of the second Fourier transformation. The default is `'ntype'`.

`coefficients` are a series of coefficients according to the following scheme: `RR1` is the coefficient used to multiply the real part (first `R`) of spectra set 1 before it is added to the real part (second `R`) of the interferogram. `IR2` would thus represent the contribution from the imaginary part of spectra set 2 to the real part of the interferogram, and so on. The scheme is depicted below.

```
ft1d(RR1,IR1,RR2,IR2,...,RI1,II1,RI2,II2,...)
```

where:

```
RR1*REAL(w2,element=1) ->  REAL(t1)
IR1*IMAG(w2,element=1) -> + REAL(t1)
RR2*REAL(w2,element=2) -> + REAL(t1)
IR2*IMAG(w2,element=2) -> + REAL(t1)
. . .
RI1*REAL(w2,element=1) ->  IMAG(t1)
II1*IMAG(w2,element=1) -> + IMAG(t1)
RI2*REAL(w2,element=2) -> + IMAG(t1)
II2*IMAG(w2,element=2) -> + IMAG(t1)
...
```

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D data display (C)
ft2d	Fourier transform 2D data (C)
lsfid	Number of complex points to left-shift np FID (P)
lsfid1	Number of complex points to left-shift ni interferogram (P)
lsfid2	Number of complex points to left-shift ni2 interferogram (P)
lsfrq	Frequency shift of the fn spectrum (P)
lsfrq1	Frequency shift of the fn1 spectrum (P)
lsfrq2	Frequency shift of the fn2 spectrum (P)
parfidss	Create parameters for time-domain solvent subtraction (M)
phfid	Zero-order phasing constant for np FID (P)
phfid1	Zero-order phasing constant for ni interferogram (P)
phfid2	Zero-order phasing constant for ni interferogram (P)
proc	Type of processing on np FID (P)
proc1	Type of processing on ni interferogram (P)
proc2	Type of processing on ni2 interferogram (P)
pmode	Processing mode for 2D data (P)
ssorder	Order of polynomial to fit digitally filtered FID (P)
ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
wft2d	Weight and Fourier transform 2D data (C)

ft1da — Fourier transform phase-sensitive data (M)

Syntax: `ft1da<(options)>`

Description: Performs the first (f_2) transform of a 2D transform or the first part of a 3D transform. Otherwise, ft1da has the same functionality as the ft2da command. See the description of ft2da for further information.

Arguments: options are the same as used with ft2da. See ft2da for details.

See also: *User Guide: Liquids NMR*

Related:

ft2d	Fourier transform 2D data (C)
ft2da	Fourier transform phase-sensitive data (M)
wft1da	Weight and Fourier transform phase-sensitive data (M)
wft2da	Weight and Fourier transform phase-sensitive data (M)

ft1dac — Combine arrayed 2D FID matrices (M)

Syntax: `ft1dac<(<mult1><,mult2>,...<,multn>)>`

Description: Allows ready combination of 2D FID matrices within the framework of the 2D Fourier transformation program. No weighting is performed. ft1dac requires that the data be acquired either without f_1 quadrature or with f_1 quadrature using the TPPI method. This macro is used for TOCSY (with multiple mixing times).

Arguments: mult1,mult2,...,multn are multiplicative coefficients. The nth argument is a real number and specifies the multiplicative coefficient for the nth 2D FID matrix.

See also: *User Guide: Liquids NMR*

Related:

ft2dac	Combine arrayed 2D FID matrices (M)
tocsy	Set up parameters for TOCSY pulse sequence (M)
wft1da	Weight and Fourier transform phase-sensitive data (M)
wft1dac	Combine arrayed 2D FID matrices (M)

ft2d — Fourier transform 2D data (C)

Syntax:
(1) `ft2d(array_element)`
(2) `ft2d('nf'<array_element>)`
(3) `ft2d<(<options,><plane_number,><coefficients>)>`
(4) `ft2d('ni'|'ni2',element_number,increment)`
(5) `ft2d('ni'|'ni2',increment,<coefficients>)`

Description: Performs the complete 2D Fourier transformation, without weighting, in both dimensions. If the first Fourier transformation has already been done using ft1d, wft1d, ft1da, or wft1da, the ft2d command performs only the second (t_1) transform.

For arrayed 2D FID data, a single array element can be weighted and transformed using syntax 1. If the data is collected in "compressed" form using 'nf', syntax 2 must be used. Complex and hypercomplex interferograms can be constructed explicitly by supplying a series of coefficients using syntax 3. If an arrayed 3D data set is to be selectively processed, the format of the arguments to ft2d changes to syntax 4. For example, ft2d('ni',1,2) performs a 2D transform along np and ni of the second ni2 increment and the first element within the explicit array. This command yields a 2D np–ni frequency plane.

Arrayed 3D data sets can also be subjected to 2D processing to yield 2D absorptive spectra. If the States-Haberkorn method is used along both f_1 (ni dimension) and f_2 (ni2 dimension), there are generally 4 spectra per (ni,ni2) 3D element. In this case, using syntax 5, entering ft2d('ni2',2,<16 coefficients>) performs a 2D transform along np and ni2 of the second ni increment using the ensuing 16 coefficients to construct the 2D t_1-interferogram from appropriate combinations of the 4 spectra per (ni,ni2) 3D element.

If there are n data sets to be transformed, as in typical phase-sensitive experiments, 4*n coefficients must be supplied. The first 2*n coefficients are the contributions to the real part of the interferogram, alternating between absorptive and dispersive parts of the successive data sets. The next 2*n coefficients are the contributions to the imaginary part of the interferogram, in the same order. Thus, using the definition that the first letter refers to the source data set, the second letter refers to the interferogram, and the number identifies the source data set, we have the following cases:

Data sets	*Coefficient order*
1	RR1, IR1, RI1, II1
2	RR1, IR1, RR2, IR2, RI1, II1, RI2, II2
3	RR1, IR1, RR2, IR2, RR3, IR3, RI1, II1, RI2, II2, RI3, II3
. . .	. . .

The coefficients are often 1, 0, or -1, but this is not always the case. Any non-integral coefficient can be used, and as many coefficients can be nonzero as is desired. Up to 32 coefficients can be supplied, which at 4 per data set allows the addition, subtraction, etc., of eight 2D data sets (e.g., 8 different phase cycles).

For information on real as opposed to complex Fourier transforms, see the descriptions of the proc, proc1, and proc2 parameters. For information on left-shifting, zero-order phase rotation, and frequency shifting of the FID and interferogram time-domain data during the 2D Fourier transformation, see the descriptions of the parameters lsfid, lsfid1, lsfid2, phfid, phfid1, phfid2, lsfrq, lsfrq1, and lsfrq2, as appropriate. For information on

the lfs (low-frequency suppression) and zfs (zero-frequency suppression) solvent suppression options, see the description of parameters ssfilter and ssorder, and macro parfidss.

Arguments: array_element is a single array element to be transformed.

options can be any of the following (all string arguments must precede the numeric arguments):

- 'ptype' is a keyword to transform P-type data to yield a P-type contour display.
- 'ntype' is a keyword to transform N-type data to yield a P-type contour display. This is the default.
- 't2dc' is a keyword to apply a dc correction to each t_2 FID prior to the first Fourier transform. The last 1/16-th of the time domain data is used to calculate the dc level.
- 't1dc' is a keyword to apply a dc correction to each t_1 interferogram prior to the second Fourier transform. The last 1/16-th of the time domain data is used to calculate the dc level.
- 'f2sel' is a keyword to allow only preselected f_2 regions to be transformed along t_1. The t_1 interferograms in the non-selected f_2 regions are zeroed but *not* transformed. The same mechanism used to select baseline regions for baseline correction (bc) is used to select the f_2 regions to be transformed along t_1. Set intmod='partial' and partition the integral of the spectrum into several regions. The even numbered f_2 regions (e.g., 2, 4, 6) are transformed along t_1; the odd numbered regions are not transformed along t_1.
- 'nf' is a keyword to transform arrayed or multi-slice 2D data that has been collected in the compressed form as single 2D FIDs with multiple (nf) traces.
- 'ni2' is a keyword to transform non-arrayed 2D data that have been collected with ni2 and sw2 (instead of ni and sw1). addpar('3d') creates the necessary processing parameters for the 'ni2' operation.
- 'noop' is a keyword to not perform any operation on the FID data. This option is used mainly to allow macros, such as wft2da, to have the same flexibility as commands.

coefficients are a series of coefficients according to the following scheme: RR1 is the coefficient used to multiply the real part (first R) of spectra set 1 before it is added to the real part (second R) of the interferogram. IR2 would thus represent the contribution from the imaginary part of spectra set 2 to the real part of the interferogram, and so forth. The scheme is depicted below.

```
ft2d(RR1,IR1,RR2,IR2,...,RI1,II1,RI2,II2,...)
```

where:

```
RR1*REAL(w2,element=1) ->   REAL(t1)
IR1*IMAG(w2,element=1) -> + REAL(t1)
RR2*REAL(w2,element=2) -> + REAL(t1)
IR2*IMAG(w2,element=2) -> + REAL(t1)
. . .
RI1*REAL(w2,element=1) ->   IMAG(t1)
II1*IMAG(w2,element=1) -> + IMAG(t1)
RI2*REAL(w2,element=2) -> + IMAG(t1)
II2*IMAG(w2,element=2) -> + IMAG(t1)
```

'ni' is a keyword to selectively transform a particular np–ni 2D plane within a non-arrayed 3D data set. To identify the plane, 'ni' is followed by the plane_number argument, an integer from 1 through ni2.

'ni2' is a keyword to selectively transform a particular np–ni2 2D plane within a non-arrayed 3D data set. To identify the plane, 'ni2' is followed by the plane_number argument, an integer from 1 through ni.

element_number is the number of an element within the explicit array when selectively processing an arrayed 3D data set; it ranges from 1 to ni2

increment is the increment within the explicit array when selectively processing an arrayed 3D data set; it ranges 1 to arraydim/(ni*ni2).

Examples:
```
ft2d(1,0,0,0,0,0,1,0)
ft2d(1)
ft2d('nf',3)
ft2d('ptype',...)
```

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D data display (C)
dcrmv	Remove dc offsets from FIDs in special cases (P)
fpmult	First point multiplier for np FID data (P)
fpmult1	First point multiplier for ni interferogram data (P)
ft1d	Fourier transform along f_2 dimension (C)
lsfid	Number of complex points to left-shift np FID (P)
lsfid1	Number of complex points to left-shift ni interferogram (P)
lsfid2	Number of complex points to left-shift ni2 interferogram (P)
lsfrq	Frequency shift of the fn spectrum (P)
lsfrq1	Frequency shift of the fn1 spectrum (P)
lsfrq2	Frequency shift of the fn2 spectrum (P)
parfidss	Create parameters for time-domain solvent subtraction (M)
phfid	Zero-order phasing constant for np FID (P)
phfid1	Zero-order phasing constant for ni interferogram (P)
phfid2	Zero-order phasing constant for ni2 interferogram (P)
proc	Type of processing on np FID (P)
proc1	Type of processing on ni interferogram (P)
proc2	Type of processing on ni2 interferogram (P)
pmode	Processing mode for 2D data (P)
ssorder	Order of polynomial to fit digitally filtered FID (P)
ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
wft1d	Weight and Fourier transform f_2 for 2D data (C)
wft2d	Weight and Fourier transform 2D data (C)

ft2da — Fourier transform phase-sensitive data (M)

Syntax: ft2da<(options)>

Description: Processes 2D FID data and 2D planes at particular t_1 or t_2 times from a 3D data set for a pure absorptive display. ft2da differs from wft2da only in that, in the case of wft1da, weighting of the time-domain data is performed prior to the FT. ft2da functions analogously to ft1da and wft1da, except that ft2da and wft2da perform only the f_2 Fourier transform.

Macros ft1da, wft1da, ft2da, and wft2da function for hypercomplex 2D FID data (phase=1,2) and for TPPI 2D FID data (phase=3 or phase=1,4) acquired either with ni or ni2. If the data were acquired with ni, no additional arguments need be used with the macros. If the data were acquired with ni2, the keyword 'ni2' must be used.

For phase=1,2:
wft2da=wft2d('ptype',1,0,0,0,0,0,1,0)

For phase=3: wft2da=wft2d(1,0,0,0)

For phase=1,4:
wft2da=wft2d('ptype',1,0,0,0,0,0,1,0)

Macros ft1da, wft1da, ft2da, and wft2da support selective 2D processing within a 3D FID data set. All permutations of hyercomplex and TPPI modes of data acquisition in t_1 and t_2 can be handled. For selective f_2f_3 processing, the numeric argument immediately following the 'ni2' keyword is interpreted to be the t_1 increment number, which specifies the particular f_2f_3 plane (plane_number, see below) to be processed. For selective f_1f_3 processing, the t_2 increment number either follows the keyword 'ni', which is optional, or is associated with the first numeric argument that does not immediately follow a 'bc' keyword.

For information on real as compared to complex Fourier transformation, see the description of proc or proc1. For information on the lfs (low-frequency suppression) and zfs (zero-frequency suppression) solvent suppression options, see the description of parameters ssfilter and ssorder, and the macro parfidss.

Arguments: options can be any of the following (the order is not important):

- 'ntype', 't2dc', 't1dc', and 'f2sel' are keywords that function the same as when supplied to the ft2d and wft2d commands. Refer to the ft2d command for a description of these options.
- 'bc' is a keyword for a baseline correction of the phase-corrected f_2 spectra prior to the f_1 Fourier transform. The baseline regions must have been previously determined. The default polynomial order is 1, which leads to a spline fit. A different polynomial order can be specified by inserting a numerical argument following 'bc'.
- 'dc' is a keyword for a drift correction (dc) of the f_2 spectra prior to the f_1 Fourier transformation.
- 'ni' is a keyword to selectively transform a particular np–ni 2D plane within a non-arrayed 3D data set. To identify the plane, 'ni' is followed by plane_number, an integer from 1 through ni2.
- 'ni2' is a keyword to selectively transform a particular np–ni2 2D plane within a non-arrayed 3D data set. To identify the plane, 'ni2' is followed by plane_number, an integer from 1 through ni.
- 'old' is a keyword to allow data acquired before the February 25, 1988, VNMR software release to be processed correctly but not to allow a bc2d between the f_2 and f_1 Fourier transforms. 'old' does not function for selective 2D processing within 3D data sets. If no ni2 or ni plane_number is given, it is assumed that the data set is only 2D in either ni2 or ni, respectively.

See also: *User Guide: Liquids NMR*

Related:		
	f1coef	Coefficient to construct F1 interferogram (P)
	f2coef	Coefficient to construct F2 interferogram (P)
	ft1da	Fourier transform phase-sensitive data (M)
	parfidss	Create parameters for time-domain solvent subtraction (M)
	phase	Phase selection (P)
	proc	Type of processing on the np FID (P)
	proc1	Type of processing on the ni interferogram (P)
	ssorder	Order of polynomial to fit digitally filtered FID (P)

ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
wft1da	Weight and Fourier transform phase-sensitive data (M)
wft2da	Weight and Fourier transform phase-sensitive data (M)

ft2dac — Combine arrayed 2D FID matrices (M)

Syntax: `ft2dac<(<mult1><,mult2>,...<,multn>)>`

Description: Allows ready combination of 2D FID matrices within the framework of the 2D FT program. No weighting is performed. Data must be acquired either without f_1 quadrature or with f_1 quadrature using the TPPI method. `ft2dac` is used with TOCSY (with multiple mixing times).

Arguments: `mult1,mult2,...,multn` are multiplicative coefficients. The nth argument is a real number and specifies the coefficient for the nth 2D FID matrix.

See also: *User Guide: Liquids NMR*

Related:

ft1dac	Combine arrayed 2D FID matrices (M)
tocsy	Set up parameters for a TOCSY pulse sequence (M)
wft1dac	Combine arrayed 2D FID matrices (M)
wft2dac	Combine arrayed 2D FID matrices (M)

ft3d — Perform a 3D Fourier transform on a 3D FID data set (M,U)

Description: Transforms 3D FID data into 3D spectral data. `ft3d` can be entered from a VNMR macro or directly from UNIX. Each type of entry is described below. A final section explains the `ft3d` coefficient file.

Additional parameter control for the operation of `ft3d` is available. This allows drift corrections and partial Fourier transformation. See the descriptions of `specdc3d`, `fiddc3d`, and `ptspec3d` for information.

ft3d Entered from VNMR

Syntax: (From VNMR) `ft3d<(<data_directory><,number_files>`
`<,'nocoef'><,'t1t2'|'t2t1'><,'fdf'><,'nofdf'>`
`<,plane_type>)>`

Description: Executes the program `ft3d` in the VNMR system `bin` directory. The 3D FID data must be loaded into the experiment in which the `ft3d` macro is to be run. `ft3d` is started up in background mode by this macro so that VNMR remains free for interactive processing. You can start a 3D transform from within `exp4` and, at the same time, continue with any 1D or 2D processing of the 3D FID data within the same experiment using VNMR.

Distributed f_1f_2 processing has the following system and network requirements:

- The master host system (the system on which the macro `ft3d` is executed from within VNMR) must define the names of the networked computers that are to participate in the distributed processing. The file `/etc/hosts.3D` must contain these names in the following format:

```
unity1
unity2
datastation1
datastation2
```

- Each participating computer must recognize the name of the user that started up the master `ft3d` program as a valid user name on its system. For example, if user steve issues the `ft3d` command within VNMR running

on computer `unity0`, steve must be a valid user on all other computer systems that are to be used in the distributed f_1f_2 processing.

- Each computer system must have NFS access to the 3D data directory.

Arguments: The order of the arguments is not important.

`data_directory` (without the `/data` subdirectory appended) specifies the output directory for the 3D spectral data file(s). The default directory for the 3D spectral data is `curexp/datadir3d`.

`number_files` sets the number of 3D data files (`data1, data2, ... datan,` where *n* is `number_files`) used to store the transformed 3D data. `number_files` must be an integer and be 32 or less. When `number_files` is entered, distributed f_1f_2 processing is performed by `ft3d` if possible.

`'nocoef'` is a keyword for the `set3dproc` command within the `ft3d` macro to not create a 3D coefficient file prior to invoking the `ft3d` program. This option is useful if you have modified an existing 3D coefficient file and do not want it to be overwritten prior to the 3D transform. See below for information on coefficient files. By default, `ft3d` calls the `make3dcoef` macro to create a coefficient file using the `f1coef` and `f2coef` string parameter values.

`'t1t2'` and `'t2t1'` are keywords to explicitly define the order of the `t1` and `t2` arrays (other than `ni` and `ni2`). By default, `ft3d` looks at the `array` parameter and if any parameter other than `phase` and `phase2` are arrayed, the macro aborts.

`'fdf'` indicates that the output of `ft3d` is to be an FDF (Flexible Data Format) file named `data.fdf`. This is the default if the parameter `appmode` is set to `'imaging'`. Distributed processing can still be performed if `number_files` is set appropriately. 3D FDF files can be viewed with the `disp3d` program, or selected slices can be extracted with ImageBrowser (started by the `browser` command from UNIX).

`'nofdf'` indicates that the final output is the group of `data1`, `data2`, ... files, and that no FDF format file should be produced. This is the default if the parameter `appmode` is *not* set to `'imaging'`.

`plane_type` sets plane extraction following the complete 3D FT with the following keywords:

- `'xall'` indicates that all three 2D plane types, f_1f_3, f_2f_3, and f_1f_2, are to be automatically extracted at the end of the 3D Fourier transform.
- `'f1f3'`, `'f2f3'`, and `'f1f2'` can be used to select any combination of plane types to be extracted.

Any of these options can be submitted more than once to the `ft3d` program, but the `getplane` program will display an error and abort if any one plane type is defined for extraction more than once.

Examples: (From VNMR) `ft3d`
(From VNMR) `ft3d('nocoef','f1f3','f2f3')`

ft3d Entered from UNIX

Syntax: (From UNIX) `ft3d -e exp_number -f -r <options>`

Description: The `ft3d` program can also be run directly from the UNIX environment on the host computer. An information file must be present before `ft3d` can execute successfully but it need contain only valid processing information for the t_3 dimension and valid Fourier numbers for the t_1 and t_2 transforms. Valid weighting and phasing parameters for the f_1 and f_2 dimension do not need to be set while `wftt3` executes. After several FIDs have been collected, you can

determine acceptable f_3 weighting and phasing parameters. After setting `fn1` and `fn2` to the desired values, the 3D processing information file can be created by typing `set3dproc` in the VNMR command line. At that point, the next invocation of `ft3d` by the macro `wftt3` causes all (t_1,t_2) increment sets up to and including the current increment in t_3 to be processed.

To start `ft3d` on a remote computer running as a data station for the system, log in as `root` *and enter one of the following commands* so that the master `ft3d` program can properly communicate with the computer*:*

- On UNITY*INOVA* systems, enter `/vnmr/acqbin/Infoprc &`
- On *GEMINI 2000*, UNITY*plus*, UNITY, and VXR-S systems, enter `/vnmr/acqbin/acqinfo_svc &`

With the `Infoprc` or `acqinfo_svc` program running, enter `ft3d` with the `-h` option and the necessary arguments. The `ft3d` program invoked with the `-h` option is considered to be the master program and is responsible for spawning additional remote `ft3d` processes.

Each remote computer must be able to access the 3D data directory as if it were stored on a local disk, must recognize the user name under which the master `ft3d` program is being run, and must also have permission to read from and write to that directory. If the 3D data directory contains four f_3 transformed data files (`data1`– `data4`), the master `ft3d` program uses the first three remote computer systems listed in file `hosts.3D` that respond.

If the multihost processing option is selected, the number of computers involved will be no more than the number of sets the f_3 spectral data is partitioned into. This number is selected with the `-m` option (see below).

If you are unsure of whether to use `Infoprc` or `acqinfo_svc` on the remote computer, change directories to `/vnmr/acqbin`, enter `lf`, and check which program is present.

Note that if the host computer is rebooted, the background command (`Infoprc` or `acqinfo_svc`) has to be entered again.

Arguments: Note that entering `ft3d` with an ampersand (`&`) after the arguments makes the command execute in the background. As a result, the UNIX prompt reappears after the command is entered and further commands can be entered and executed while the `ft3d` command is processing.

- `-e exp_number` is the experiment number where 3D processing is to occur. This argument is required. It must be written as a minus sign, the letter `e`, a space, and a valid experiment number from 1 to 9 (e.g., `-e 3` sets experiment 3). The experiment must already exist.

The following two options should always be set for reliable operation:

- `-f` specifies that any existing 3D data sets in the experiment should be deleted. This option requires no additional value.
- `-r` calls for explicit data reduction after the 3D Fourier transform. Data reduction consists of retaining only the “real-real-real” part of the completely transformed 3D data set. The `-r` option is mandatory and is enforced within `ft3d` regardless of the user command line input.

`options` can be any of the following:

- `-F header_file` indicates that an FDF (Flexible Data Format) output file should be produced, using the FDF header found in `header_file`. The output file will be named `data.fdf`, and the `data1`, `data2`, ... files will not be produced.

- `-h` selects the multihost processing option. The `/etc/hosts.3D` file must exist and contain the names of the remote hosts, one host name per line. Each remote host must also have either the program `Infoprc` or the program `acqinfo_svc` running in the background (one of these programs is already running on any computer being used as a spectrometer host).
- `-l` specifies that a log file be generated in the data subdirectory of the `datadir3d` directory.
- `-m` partitions the f_3 transformed spectral data over more than one data file. This partitioning is necessary if the distributed processing capability of `ft3d` is to be used in performing the remaining f_1 and f_2 transforms. The syntax `-mnfiles` is used to specify `nfiles`, the number of data files into which the 3D spectral data is to be divided (e.g., `-m4` specifies 4 data files). Each such data file contains an f_3 subset of the f_1f_2 spectral planes. If `nfiles` is not specified, `ft3d` reports an error and aborts. If `nfiles` is less than an internally calculated value (based on `memsize` and the maximum size for a single 2D transform), the number of data files is set to the internally calculated value; otherwise, `nfiles` determines the number of data files to be used. The maximum number of such files is currently defined to be 32. These 3D data files are labeled `data1,deta2,...,datan`.
- `-o` specifies an alternative output directory for the processed 3D data. The default directory is `datadir3d` within the current experiment. A full UNIX path must follow the `-o` option.
- `-p` specifies the time-domain dimensions to be processed. If `-p` is used, the processed dimensions can be specified as `f3f2f1`, `f3f2`, `f2f3`, `f2f1`, `f1f2`, `f3`, `f2`, and `f1`. The values `f3f1` and `f1f3` are not allowed because processing must be done sequentially in the order f_3, then f_2, and then f_1. If the `-p` option is not invoked, `ft3d` defaults to `f3f2f1`, resulting in a completely transformed 3D data set.
- `-s` specifies processing of the f_3 dimension of the 3D FID data concurrently with data acquisition. In practice, concurrent f_3 processing is realized by setting `wnt='wftt3'` in the VNMR parameter set and starting the 3D acquisition by entering `au`. The macro `wftt3` handles the call to `ft3d` at the appropriate times during data collection.
- `-x` specifies that plane extractions be performed at the end of 3D processing. The available planes are defined as `f1f2`, `f1f3`, and `f2f3`. If more than one plane extraction is desired, the planes are separated by a colon. For example, `-x f1f2:f1f3:f2f3` would extract all three planes. The planes are placed in the `extr` subdirectory of `datadir3d`.

Examples: (From UNIX) `ft3d -r -f -l -e 2 &`
(From UNIX) `ft3d -r -f -l -e 2 -x f1f2:f1f3:f2f3 &`

See also: *User Guide: Liquids NMR*

Related:

`appmode`	Application mode (P)
`browser`	Start ImageBrowser application (U)
`dconi`	Interactive 2D data display (C)
`disp3d`	Display 3D data (U)
`fiddc3d`	3D time-domain dc correction (P)
`f1coef`	Coefficient to construct F1 interferogram (P)
`f2coef`	Coefficient to construct F2 interferogram (P)
`getplane`	Extract planes from a 3D spectral data set (M)
`killft3d`	Terminate any `ft3d` process started in an experiment (M,U)

make3dcoef	Make 3D coefficients file from 2D coefficients (M)
ptspec3d	Region-selective 3D processing (P)
set3dproc	Set 3D processing (C)
specdc3d	3D spectral dc correction (P)
wftt3	Process f_3 dimension during 3D acquisition (M)

full — Set display limits for a full screen (C)

Syntax: full

Description: Sets the horizontal control parameters (sc and wc) and the vertical control parameters (sc2 and wc2) to produce a display (and subsequent plot) on the entire screen (and page). For 2D data, space is left for the scales. If a 1D interactive spectral display is active, the display is automatically updated; for 2D displays, an appropriate command or the Menu button must be used to cause redisplay to occur.

Alternate: Full Screen button on the1D Display Size Selection Menu, or
Full Screen button on the 2D Display Size Selection Menu.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

center	Set display limits for center of screen (C)
fullt	Set display limits for full screen with room for traces (C)
left	Set display limits for left half of screen (C)
right	Set display limits for right half of screen (C)
sc	Start of chart (P)
sc2	Start of chart in second direction (P)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)

fullsq — Display largest square 2D display (M)

Syntax: fullsq

Description: Adjusts sc, sc2, wc, and wc2 parameters to show the largest possible square 2D display.

Related:

full	Set display limits for a full screen (C)
fullt	Set display limits for a full screen with room for traces (C)
sc	Start of chart (P)
sc2	Start of chart in second direction (P)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)

fullt — Set display limits for a full screen with room for traces (C)

Syntax: fullt

Description: Sets the horizontal control parameters (sc and wc) and the vertical control parameters (sc2 and wc2) to produce a display (and subsequent plot) in the entire screen (and page) with room for traces (dconi). For 2D data, space is left for the scales.

Alternate: Full with Traces button in the 2D Display Size Selection Menu.

See also: *User Guide: Liquids NMR*

Related:

center	Set display limits for center of screen (C)
full	Set display limits for a full screen (C)
left	Set display limits for left half of screen (C)
right	Set display limits for right half of screen (C)

G

g2pul — Set up pulse sequence for gradient evaluation (M)

Applicability: Systems with the pulsed field gradient or imaging module.

Syntax: g2pul

Description: Performs gradient recovery measurements. With gzlvl1 on during gt1, the system recovery to homogeneity can be measured after delay d2. Typical values are gt1=0.040 (40 ms) and gradient strength on full (gzlvl=32767). g2pul sets an experiment environment suitable for these tests. The gradaxis parameter is used by g2pul to select the x, y, or z gradient axis.

See also: *VNMR User Programming*

Related:

gradaxis	Select gradient axis (P)

ga — Submit experiment to acquisition and FT the result (M)

Syntax: ga<(<'nocheck'><,'next'><,'wait'>)>

Description: Performs experiment described by the current acquisition parameters, checking parameters loc, spin, gain, wshim, load, and method to determine the necessity to perform various actions in addition to simple data acquisition. This may involve a single FID or multiple FIDs, as in the case of arrays or 2D experiments. ga causes the data to be automatically weighted and Fourier transformed (wft) at the end of each FID data acquisition.

Before starting the experiment, ga executes two user-created macros if they exist. The first is usergo, a macro that allows the user to set up general conditions for the experiment. The second is a macro whose name is formed by go_ followed by the name of the pulse sequence (from seqfil) to be used (e.g., go_s2pul, go_dept). The second macro allows a user to set up experiment conditions suited to a particular sequence.

Arguments: 'nocheck' is a keyword to override checking if there is insufficient free disk space for the complete 1D or 2D FID data set to be acquired.

'next' is a keyword to put the experiment started with ga('next') at the head of the queue of experiments to be submitted to acquisition.

'wait' is a keyword to stop submission of experiments to acquisition until wexp processing of the experiment, started with ga('wait'), is finished.

Alternate: Go,Wft button in the Acquire Menu.

See also: *Getting Started*

Related:

au	Submit experiment to acquisition and process data (M)
change	Submit a change sample experiment to acquisition (M)
gain	Receiver gain (P)
go	Submit experiment to acquisition (M)
go_	Pulse sequence setup macro called by go, ga, and au (M)
load	Load status of displayed shims (P)
loc	Location of sample in tray (P)
lock	Submit an Autolock experiment to acquisition (C)
method	Autoshim method (P)
sample	Submit change sample, Autoshim experiment to acquisition (M)
seqfil	Pulse sequence name (P)

shim	Submit an Autoshim experiment to acquisition (C)
spin	Submit a spin setup experiment to acquisition (C)
spin	Sample spin rate (P)
su	Submit a setup experiment to acquisition (M)
usergo	Experiment setup macro called by go, ga, and au (M)
wft	Weight and Fourier transform 1D data (C)
wshim	Conditions when shimming is performed (P)

gadm — Display *GLIDE* administration tool (C)

Syntax: gadm

Description: Displays an administration tool for users to create their own experiment and solvent lists in the *GLIDE* interactive window. The VNMR administrator can use gadm to create groups of users, with each group assigned different experiment lists and solvent lists, as well as to allow or disallow users saving data to disk.

See also: *Walkup NMR Using GLIDE*

Related: glide — Interactive window data acquisition and processing (C)

gain — Receiver gain (P)

Description: Sets receiver gain or, by setting gain='n', enables Autogain for automatic adjustment of gain. Low gain in multiline, high-dynamic-range samples can cause a number of problems, including intermodulation distortions and extra lines in the spectrum. Too high a gain, on the other hand, can cause receiver overload and consequent baseline distortions. Autogain capability allows the observe channel to be set optimally for detecting and digitizing NMR signals from a wide variety of samples.

Autogain adjusts the observe channel gain such that the NMR signal takes about 50 percent of the maximum range of the ADC. This setting allows a comfortable leeway for variations in signal. The program begins acquisition in the normal manner but the first transient (after any requested steady state transients) is examined for signal level. If the intensity is too low or too high, the gain is changed and the process is repeated until the intensity is within the proper range, and then normal acquisition commences. The final gain value used for the experiment is stored and when the experiment is finished, setting gain='y' results in the value being displayed in the dgs parameter group.

If the gain is reduced by the Autogain procedure such that the noise does not trigger the least significant 1 or 2 bits in the ADC and the signal still overloads either the receiver or ADC, the system stops and displays a message indicating Autogain failure.

Values: On *MERCURY-Vx* and *MERCURY* systems, 0 to 38, in steps of 2 dB (38 represents the highest possible receiver gain and 0 the lowest).

On *GEMINI 2000* systems, 0 to 40, in steps of 2 dB (40 represents the highest possible receiver gain and 0 the lowest).

On systems other than *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, 0 to 60, in steps of 2 dB (60 represents highest possible receiver gain and 0 lowest). On 500-, 600-, and 750-MHz UNITY*INOVA* and UNITY*plus*, low-band gain is limited from 18 to 60.

'n' enables Autogain, in which the gain is automatically adjusted at the start of acquisition for an optimum value. After the acquisition is finished, setting

gain='y' then allows the value of gain to be read. gain='n' may not be used for arrayed experiments.

See also: *Getting Started*

Related:

dgs	Display group of special/automation parameters (M)
gf	Prepare parameters for FID/spectrum display in acqi (M)

gap — Find gap in the current spectrum (M)

Syntax: gap(gap,height):found,position,width

Description: Looks for a gap between the lines of the currently displayed spectrum. It can be used to automatically place inserts, parameter printouts, trace labels, etc. The search starts on the left side (low-field end) of the spectrum.

Arguments: gap is the width of the desired gap.

height is the starting height (same as the lower limit for the insert).

found is a return value that is set to 1 if the search is successful, or set to 0 if unsuccessful.

position is a return value that is set to the distance from the left edge of the chart (not the plot) to the left end of the gap (3 mm from the nearest peak to the left, positioning with “left gravity”) if the search is successful, or set to the position (no spacing to the nearest line) of the largest gap found if unsuccessful.

width is a return value set to the total width of the first gap if the search is successful, or set to the width of largest gap found if unsuccessful.

Examples: gap(120,80);$1,$2,$3

See also: *VNMR User Programming*

gaussian — Set up unshifted Gaussian window function (M)

Syntax: gaussian<(<t1_inc><,t2_inc>)>

Description: Sets up an unshifted Gaussian window function in 1, 2, or 3 dimensions. The macro checks whether the data is 1D, 2D, and 3D.

Arguments: t1_inc is the number of t1 increments. The default is ni.

t2_inc is the number of t2 increments. The default is ni2.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
pi3ssbsq	Set up pi/3 shifted sinebell-squared window function (M)
pi4ssbsq	Set up pi/4 shifted sinebell-squared window function (M)
sqcosine	Set up unshifted cosine-squared window function (M)
sqsinebell	Set up unshifted sinebell-squared window function (M)

gcal — Gradient calibration constant (P)

Applicability: Systems with the pulsed field gradient or the imaging module.

Description: Stores the proportionality constant between the parameter values (DAC units) controlling the desired gradient and the intensity of the gradient expressed in gauss/cm. The gradients generated in the magnet require calibration of the gain on the gradient compensation board so that coordinate data, slice positions, and the field of view can be set up accurately. gcal should be located in each user's vnmrsys/global file.

Values: Number that is probe dependent, in gauss/cm-DAC unit. On the Performa I PFG module, 0.00028 to 0.00055 gauss/cm-DAC unit is nominal; On the Performa II, 0.0014 to 0.0025 gauss/cm-DAC unit is nominal.

See also: *User Guide: Imaging*

Related:

ecctabl	Put gcal value and ecc file into table (M)
getgcal	Get gcal value from table (M)
setgcal	Set gradient calibration constant (M)

gcoil — Current gradient coil (P)

Description: Reserved parameter that specifies which physical gradient set is currently installed. This allows convenient updating of important gradient characteristics when one gradient set is interchanged for another. When set, gcoil reads the gradient table file of the same name in /vnmr/imaging/gradtables and sets the gradient calibration parameters.

gcoil is local to each individual experiment. It is normally set the same as sysgcoil for acquiring new data, but can be set to other gradient names when working with saved data or data from another instrument. Each possible gradient name should have an associated file of that name located in the directory /vnmr/imaging/gradtables. Look at any file in this directory for an example of the proper gradtable format, or use the macro creategtable to make new gradtables entries.

If the parameter gcoil does not exist in a parameter set and a user wants to create it, you must set the protection bit that causes the macro _gcoil to be executed when the value for gcoil is changed. There are two ways to create gcoil:

- Use the macro updtgcoil, which will create the gcoil parameter if it does not exist and set the correct protection bits.
- Enter the following commands:

```
create('gcoil','string')
setprotect('gcoil','set',9)
```

gcoil and the associated gradient calibration parameters boresize, gmax, and trise are updated with the values listed in the table on the right each time a parameter set is retrieved, or when an experiment is joined. In the rare case that a gradtables file is modified, but the value of gcoil is not changed, manually force an update of the calibration parameters. Updating may be accomplished either by setting gcoil to itself, for example, gcoil=gcoil, or by using the macro _gcoil.

Variable Name	*Value*
boresize	22.50 cm
gmax	5.00 gauss/cm
trise	0.000500 sec

Be aware that if an old dataset is returned and processed, gradient parameters associated with that dataset will replace any new gcoil *parameters.*

The table above is a gradient table (gradient coil name: asg33) for a horizontal imaging system with all three axes set to the same maximum gradient strength.

On the right is a gradient table (gradient coil name: tc203) for a three-axis gradient set with unequal maximum gradient strength.

Variable Name	*Value*
`boresize`	5.10 cm
`trise`	0.000200 sec
`gxmax`	29.00 gauss/cm
`gymax`	27.00 gauss/cm
`gzmax`	70.00 gauss/cm

Related:

`boresize`	Magnet bore size (P)
`creategtable`	Generate new gradient calibration file (M)
`gmax`	Maximum gradient strength (P)
`setgcoil`	Assign sysgcoil configuration parameter (M)
`sysgcoil`	System gradient coil (P)
`trise`	Gradient rise time (P)
`updtgcoil`	Update gradient coil (M)

See also: *User Programming*

gCOSY — Change parameters for gCOSY experiment (M)

Syntax: `gCOSY<('GLIDE')>`

Description: Converts the current parameter set to a gCOSY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

`COSY`	Change parameters for COSY experiment (M)

gcosy — Set up pulse sequence for gradient COSY (M)

Applicability: Systems with the pulsed field gradient or the imaging module.

Syntax: `gcosy`

Description: Converts a 1D standard two-pulse sequence parameter set into a set ready to run a PFG (pulsed field gradient) absolute-value COSY experiment.

See also: *User Guide: Liquids NMR*

gcrush — Crusher gradient level (P)

Description: Predefined parameter available for use in setting a crusher gradient level, often paired with the timing parameter `tcrush`.

See also: *User Guide: Imaging*

Related:

`gspoil`	Spoiler gradient level (P)
`tspoil`	Gradient spoiling time (P)

gdiff — Diffusion gradient level (P)

Description: Predefined parameter available for use in setting a diffusion gradient level, often paired with the timing parameters `tdiff` or `tdelta`.

get1d — Select a 1D experiment for processing (M)

Syntax: `get1d<(experiment)>`

Description: In nonautomation mode, the macros hcosy, hcapt, capt, hcdept, and cdept all acquire two or more data sets in the experiment in which the macro was executed. These data sets are stored, complete with Fourier transformed data. The data sets are also stored directly in the experiment. The get1d macro is used to select which data set should be active for processing in that experiment. After get1d is executed, data can be stored in the conventional way with the svf command (e.g., when hcosy completes, get1d can be used to process the 1D data set).

Arguments: experiment is the 1D data set to be used for processing. The default is the 'H1' experiment.

Examples:
```
get1d
get1d('apt')
```

See also: *Getting Started*

Related:

capt	Automated carbon and APT acquisition (M)
cdept	Automated carbon and DEPT acquisition (M)
get2d	Select a 2D experiment for processing (M)
hcapt	Automated proton, carbon, and APT acquisition (M)
hcdept	Automated proton, carbon, and DEPT acquisition (M)
hcosy	Automated proton and COSY acquisition (M)
svf	Save FIDs in current experiment (C)

get2d — Select a 2D experiment for processing (M)

Syntax: get2d<(experiment)>

Description: In nonautomation mode, the macros hcosy, hcapt, capt, hcdept, and cdept all acquire two or more data sets in the experiment in which the macro was executed. These data sets are stored complete with Fourier transformed data. The data sets are also stored directly in the experiment. The get2d macro is used to select which data set should be active for processing in that experiment. After entering get2d, data may be stored in the conventional way with the svf command. For example, following completion of hcosy, get2d can be used to process the 2D data set.

Arguments: experiment is the 2D data set that should be used for processing. The default is the 'relayh' experiment.

Examples:
```
get2d('hetcor')
```

See also: *Getting Started*

Related:

get1d	Select a 1D experiment for processing (M)
svf	Save FIDs in current experiment (C)

getdim — Return dimensionality of experiment (M)

Syntax: getdim:dimensions

Description: Used in other macros to determine the number of dimensions of the current data set. Many macros make decisions based on whether a data set is multidimensional or 1D. getdim makes it easier to access this information.

Arguments: dimensions is a return variable giving the number of dimensions of the data. If ni3 is 2 or greater, dimensions is set to 4; if ni2 is 2 or greater, dimensions is set to 3; if ni is 2 or greater, dimensions is set to 2; and if ni is less than 2 or undefined, dimensions is 1.

Examples:
```
getdim:r1
```

See also: *Getting Started*

Related:

`ni`	Number of increments in 1st indirectly detected dimension (P)
`ni2`	Number of increments in 2nd indirectly detected dimension (P)
`ni3`	Number of increments in 3rd indirectly detected dimension (P)

`getfile` Get information about directories and files (C)

Syntax:
(1) `getfile(directory):$number_files`
(2) `getfile(directory,file_index):$file,$extension`

Description: Returns information about the number of files in a directory or about a particular file in a directory.

Arguments: `directory` is the name of the directory for which information is desired.

`number_files` is the number of files in the directory, with dot files (e.g., `.login`) ignored.

`file_index` is the number of file for which information is desired (the order is UNIX-dependent).

`file` is the name of the file, excluding any extension, identified by the `index` (see examples below).

`extension` is the extension of the file name identified by the `file_index`. For example, if `file_index` points to the file named `s2pul.fid`, `getfile` returns the string `s2pul` to `$file` and the string `fid` to `$extension`. If the file name pointed to has no extension (e.g., `dummy`), no value is returned to `$extension`. If the file name has more than one extension, only the last extension is returned to `$extension` (e.g., the file `fid.tmp.par` returns `fid.tmp` to `$file` and `par` to `$extension`).

Complete paths (full file names) can be reconstructed like this:

```
getfile('dir',i):$filename,$ext
if ($ext='') then $path='dir'+'/'+$filename
else $path='dir'+'/'+$filename+'.'+$ext
endif
```

Paths for the `rt` command can be reconstructed like this:

```
$path='dir'+'/'+$filename.
```

Examples:

```
getfile('dir'):$entries
$temp = 0
while ($temp < $entries)
   $temp = $temp + 1
   getfile('dir',$temp):$filename,$ext
   ...
endwhile
```

See also: *VNMR User Programming*

`getgcal` Get gcal value from table (M)

Applicability: Systems with the imaging module.

Syntax: `getgcal<(ecc_file)>`

Description: Retrieves value of the gradient calibration constant `gcal` from the reference table `ecctabl` in the directory `$vnmrsystem/imaging/eddylib`. If the value would overwrite the current value of `gcal`, the monitor displays a prompt to confirm the overwrite.

Arguments: `ecc_file` specifies the name of the `ecc` file in the reference table `ecctabl`. The default value is `'curecc'`.

Examples:
```
getgcal
getgcal('test1')
```

See also: *User Guide: Liquids NMR*

Related:

`ecc`	Set up parameters to obtain compensation data (M)
`ecctabl`	Put `gcal` value and `ecc` file into table (M)
`gcal`	Gradient calibration constant (P)

getll — Get intensity and line frequency of line (C)

Syntax: `getll(line_number)<:height,frequency>`

Description: Finds the height and frequency of line from a line listing. It assumes a previous line list using `dll`.

Arguments: `line_number` is the number of the line in the line list.

`height` is the intensity of the specified line.

`frequency` is the line frequency with units defined by the parameter `axis`.

See also: *VNMR User Programming*

Related:

`axis`	Axis label for displays and plots (P)
`dll`	Display listed line frequencies and intensities (C)
`fp`	Find peak heights (C)
`nll`	Find line frequencies and intensities (C)

getparam — Retrieve parameter from probe file (M)

Syntax: `getparam(param<,nucleus>):$value`

Description: Retrieves the value of a parameter from the current probe file. The name of the probe file is referenced from the parameter `probe`.

Arguments: `param` is the name of the parameter to be retrieved.

`nucleus` is the nucleus to be retrieved from the probe file. The default is the current value of the parameter `tn`

`value` is a return variable with the value of the retrieved parameter.

Examples:
```
getparam('tpwr'):tpwr
getparam('dmf','H1'):$dmf
```

See also: *Getting Started*

Related:

`addnucleus`	Add new nucleus to existing probe file (M)
`addparams`	Add parameter to current probe file (M)
`addprobe`	Create new probe directory and probe file (M)
`probe`	Probe type (P)
`setparams`	Write parameter to current probe file (M)
`tn`	Nucleus for the observe transmitter (P)
`updateprobe`	Update probe file (M)

getplane — Extract planes from a 3D spectral data set (M)

Applicability: All systems; however, although `getplane` is available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems, such systems can only process 3D data and cannot acquire 3D data.

Syntax: `getplane<(<data_dir><,plane_dir><,plane_type>)>`

Description: Executes the program `getplane` in the VNMR system `bin` directory (`$vnmrsystem/bin`). `getplane` checks whether there is sufficient file space on the disk partition to accommodate the extracted planes. If space is insufficient, `getplane` writes an error to the VNMR text window and aborts. `getplane` does not delete the output plane directory if it is run multiple times to individually extract different plane types.

Arguments: `data_dir` specifies the directory (without the `/data` subdirectory) containing the input 3D spectral data. The first non-keyword argument to `getplane` is always taken to be `data_dir`.

`plane_dir` specifies the directory (without the `/extr` subdirectory) in which the extracted planes are to be stored. The second non-keyword argument to `getplane` is always taken to be `plane_dir`. If `plane_dir` is not specified, `data_dir` also specifies the output plane directory. If both `data_dir` and `plane_dir` are not specified, the input data directory and the output plane directory are set to `curexp/datadir3d`. The parameter `plane` is always set equal to the output plane directory.

`plane_type` can be any of the following keywords:

- `'xall'` is a keyword to extract all three 2D plane types: f1f3, f2f3, f1f2.
- '`f1f3`', `'f2f3'`, `'f1f2'` are keywords to extract their respective 2D planes.
- Any of these keywords can be submitted more than once to the `getplane` macro, but the `getplane` program displays an error and aborts if any one plane type is defined for extraction more than once.

Examples:
```
getplane
getplane('data3d.inp,'data3d.planes','f1f3','f2f3')
```

See also: *User Guide: Liquids NMR*

Related:

`dplane`	Display a 3D plane (M)
`dproj`	Display a 3D plane projection (M)
`dsplanes`	Display a series of 3D planes (M)
`ft3d`	Perform a 3D Fourier transform (M)
`nextpl`	Display the next 3D plane (M)
`path3d`	Path to currently displayed 2D planes from a 3D data set (P)
`plane`	Currently displayed 3D plane type (P)
`plplanes`	Plot a series of 3D planes (M)
`prevpl`	Display the previous 3D plane (M)

`getreg` Get frequency limits of a specified region (C)

Syntax: `getreg(region_number)<:minimum,maximum>`

Description: Returns the frequency limits of a region. The spectrum should have been previously divided into regions with the `region` command or by manually using a cursor and the `z` command or Resets menu button.

Arguments: `region_number` specifies the number of the region.

`minimum`,`maximum` are return values set to the frequency limits, in Hz, of the specified region.

Examples:
```
getreg(1):$a,$b
getreg($4):cr,$lo
getreg(R1–1):r2,r3
```

See also: *VNMR User Programming*

Related:

cz	Clear integral reset points (C)
ds	Display a spectrum (C)
numreg	Return the number of regions in a spectrum (C)
region	Divide spectrum into regions (C)
z	Add integral reset point at cursor position (C)

getsn — Get signal-to-noise estimate of a spectrum (M)

Syntax: `getsn:current_sn,predicted_sn`

Description: Estimates spectrum signal-to-noise using the following algorithm:

- Measures four adjacent 5-percent portions at the left edge of the spectrum, finding the root-mean-square noise, and taking the smallest of the four values. By measuring four different values and finding root-mean- square noise instead of peak noise, the result should be reliable even if several signals are present in the selected regions.
- Next, estimates the signal level using the vertical scale adjustment macros: vsadjh for proton, vsadjc for carbon, and vsadj for other nuclei. For carbon spectra, this algorithm ignores solvent lines and TMS. For proton spectra, in addition to ignoring the largest line in the spectrum, if the tallest line is greater than three times the height of the second tallest line, the second highest line is be used instead. For other nuclei, getsn uses the tallest line in the spectrum.
- Finally, estimates the signal-to-noise at the end of the experiment by a simple extrapolation (multiplying by the square root of nt/ct).

Arguments: `current_sn` is a return value set to the current signal-to-noise level.

`predicted_sn` is a return value set to the predicted signal-to-noise level at the end of the experiment.

See also: *User Guide: Liquids NMR*

Related:

ct	Completed transients (P)
nt	Number of transients (P)
testsn	Test signal-to-noise ratio (M)
vsadj	Adjust vertical scale (M)
vsadjc	Adjust vertical scale for carbon spectra (M)
vsadjh	Adjust vertical scale for proton spectra (M)

gettxt — Get text file from VNMR data file (C)

Syntax: `gettxt(file)`

Description: Copies text from a data file to the current experiment.

Arguments: `file` is the name of a VNMR data file saved from an experiment (i.e., a directory with a `.fid` or `.par` suffix). Do not include the file name suffix.

Examples: `gettxt('/vnmr/fidlib/fid1d')`

See also: *Getting Started*

Related:

puttxt	Put text file into another file (C)

getvalue — Get value of parameter in a tree (C)

Syntax: `getvalue(parameter<,index><,tree>)`

Description: Gets the value of any parameter in a tree. The value of most parameters can be accessed simply by using their name in an expression. For example, `sw?` or `r1=np` accesses the value of `sw` and `np`, respectively. However, parameters in the processed tree cannot be accessed that way; `getvalue` can be used to get the value of a parameter in the processed tree.

Arguments: `parameter` is the name of an existing parameter.

`index` is the number of a single element in an arrayed parameter. Default is 1.

`tree` is one of the keywords `'global'`, `'current'`, `'processed'`, or `'systemglobal'`. The default is `'processed'`. Refer to the `create` command for more information on the types of parameter trees.

Examples: `getvalue('arraydim')`

See also: *VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C)
`display`	Display parameters and their attributes (C)
`setgroup`	Set group of a parameter in a tree (C)
`setlimit`	Set limits of a parameter in a tree (C)
`setprotect`	Set protection mode of a parameter (C)
`settype`	Change type of a parameter (C)
`setvalue`	Set value of any parameter in a tree (C)

gf — Prepare parameters for FID/spectrum display in acqi (M)

Syntax: `gf`

Description: Provided as a model for preparing parameters for the FID and spectrum display in `acqi`. The unmodified version of this macro turns off phase cycling, autoshimming, autolocking, spin control, temperature control, sample changer control, and autogain. It also selects the current pulse sequence and parameter set by issuing the command `go('acqi')` and the command `acqi('par')`. The automation parameters `cp`, `wshim`, `alock`, `spin`, `temp`, `loc`, and `gain` are then reset to their original values. Users can customize `gf` by copying it into their private `maclib` directory and editing that version to suit their needs.

See also: *Getting Started*

Related:

`acqi`	Interactive acquisition display process (C)
`alock`	Automatic lock status (P)
`cp`	Cycle phase (P)
`dmgf`	Absolute-value display of FID data and spectrum in `acqi` (P)
`gain`	Receiver gain (P)
`go`	Submit an experiment to acquisition (C)
`loc`	Location of sample in tray (P)
`spin`	Sample spin rate (P)
`temp`	Sample temperature (P)
`wshim`	Conditions when shimming performed (P)

gf — Gaussian function in directly detected dimension (P)

Description: Defines a Gaussian time constant of the form `exp(-(t/gf)2)` along the directly detected dimension. This dimension is referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, etc.

Values: Number, in seconds. Typical value is `gf='n'`.

See also: *Getting Started*

Related:

gf1	Gaussian function in 1st indirectly detected dimension (P)
gf2	Gaussian function in 2nd indirectly detected dimension (P)
gfs	Gaussian shift constant in directly detected dimension (P)

gf1 — Gaussian function in 1st indirectly detected dimension (P)

Description: Defines a Gaussian time constant of the form `exp(-(t/gf1)2)` along the first indirectly detected dimension. This dimension is referred to as the f_1 dimension of a multidimensional data set. gf1 works analogously to the parameter gf. The "conventional" parameters, such as lb and gf, operate on the detected FIDs, while this "2D" parameter is used during processing of the interferograms.

Values: Number, in seconds.

See also: *User Guide: Liquids NMR*

Related:

gf	Gaussian function in directly detected dimension (P)

gf2 — Gaussian function in 2nd indirectly detected dimension (P)

Description: Defines a Gaussian time constant of the form `exp(-(t/gf2)2)` along the second indirectly detected dimension. This dimension is referred to as the f_2 dimension of a multidimensional data set. gf2 works analogously to the parameter gf. The wti program can be used to set gf2 on the 2D interferogram data.

Values: Number, in seconds.

See also: *User Guide: Liquids NMR*

Related:

gf	Gaussian function in directly detected dimension (P)
wti	Interactive weighting (C)

gflow — Flow encoding gradient level (P)

Description: Predefined parameter available for use in setting a flow encoding gradient level, often paired with the timing parameter `tflow`.

See also: *User Guide: Imaging*

gfs — Gaussian shift const. in directly detected dimension (P)

Description: Working in combination with the gf parameter, `gfs` allows shifting the center of the Gaussian function `exp(-((t-gfs)/gf)2)` along the directly detected dimension. This dimension is referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, etc. Typical value is `gfs='n'`.

See also: *Getting Started*

Related:

gf	Gaussian function in directly detected dimension (P)
gfs1	Gaussian shift const. in 1st indirectly detected dimension (P)
gfs2	Gaussian shift const. in 2nd indirectly detected dimension (P)

gfs1 — Gaussian shift const. in 1st indirectly detected dimension (P)

Description: Working in combination with the gf1 parameter, `gfs1` allows shifting the center of the Gaussian function `exp(-((t-gfs1)/gf1)2)` along the first indirectly detected dimension. This dimension is referred to as the f_1 dimension in multidimensional data sets. `gfs1` works analogously to the parameter gfs.

The “conventional” parameters (i.e., lb, gf, etc.) operate on the detected FIDs, while this “2D” parameter is used during processing of the interferograms.

See also: *User Guide: Liquids NMR*

Related:

gf	Gaussian function in directly detected dimension (P)
gf1	Gaussian function in 1st indirectly detected dimension (P)
gfs	Gaussian shift const. in directly detected dimension (P)

gfs2 — Gaussian shift const. in 2nd indirectly detected dimension (P)

Description: Working in combination with the gf2 parameter, gfs2 allows shifting the center of the Gaussian function exp(–((t–gfs2)/gf2)2) along the second indirectly detected dimension. This dimension is referred to as the f_2 dimension in multidimensional data sets. gfs2 works analogously to the parameter gfs. The wti program can be used to set gfs2 on the 2D interferogram data.

See also: *User Guide: Liquids NMR*

Related:

gf	Gaussian function in directly detected dimension (P)
gf2	Gaussian function in 2nd indirectly detected dimension (P)
gfs	Gaussian shift const. in directly detected dimension (P)
wti	Interactive weighting (C)

gHMBC — Change parameters for gHMBC experiment (M)

Syntax: gHMBC<('GLIDE')>

Description: Converts the current parameter set to a gHMBC experiment.

Arguments: 'GLIDE' is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

HMBC	Change parameters for HMBC experiment (M)

ghmqc — Set up a PFG HMQC pulse sequence (M)

Applicability: Systems with a pulsed field gradient module.

Syntax: ghmqc

Description: Prepares an experiment for a PFG (pulsed field gradient) HMQC using the sequence GHMQC. The sequence sets three gradients, all separately.

Arguments: *User Guide: Liquids NMR*

gHMQC — Set up parameters for gHMQC experiment (M)

Syntax: gHMQC<('GLIDE')>

Description: Converts the current parameter set to a ^{13}C gHMQC experiment.

Arguments: 'GLIDE' is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

HMQC	Change parameters for HMQC experiment (M)
gHMQC15	Set up parameters for ^{15}N gHMQC experiment (M)
gHMQC_d2	Set up parameters for ^{15}N gHMQC using decoupler 2 (M)
gHMQC_d213	Set up parameters for ^{13}C gHMQC using decoupler 2 (M)

gHMQC15 — Set up parameters for ^{15}N gHMQC experiment (M)

Syntax: gHMQC15<('GLIDE')>

Description: Converts the current parameter set to a gHMQC experiment for ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the particular sample.

Related: gHMQC Set up parameters for gHMQC experiment (M)

gHMQC_d2 Set up parameters for ^{15}N gHMQC experiment using decoupler 2 (M)

Syntax: `gHMQC_d2<('GLIDE')>`

Description: Converts the current parameter set to a gHMQC experiment for ^{15}N with decoupler 2 as ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the particular sample.

Related: gHMQC Set up parameters for gHMQC experiment (M)

gHMQC_d213 Set up parameters for ^{13}C gHMQC experiment using decoupler 2 (M)

Syntax: `gHMQC_d213<('GLIDE')>`

Description: Converts the current parameter set to a gHMQC experiment for ^{13}C with decoupler 2 as ^{13}C.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the particular sample.

Related: gHMQC Set up parameters for gHMQC experiment (M)

ghmqcps Set up a PFG HMQC phase-sensitive pulse sequence (M)

Applicability: Systems with a pulsed field gradient module. Not available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `ghmqcps`

Description: Prepares an experiment for a PFG (pulsed field gradient) HMQC, phase-sensitive version.

See also: *User Guide: Liquids NMR*

gHMQCTOXY Change parameters for gHMQCTOXY experiment (M)

Syntax: `gHMQCTOXY<('GLIDE')>`

Description: Converts the current parameter set to a gHMQCTOXY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:
- gHMQC Change parameters for gHMQC experiment (M)
- HMQC Change parameters for HMQC experiment (M)
- HMQCTOXY Change parameters for HMQCTOXY experiment (M)

ghsqc Set up a PFG HSQC pulse sequence (M)

Applicability: Systems with a pulsed field gradient module (except *MERCURY* and *GEMINI 2000*).

Syntax: `ghsqc<(nucleus)>`

Description: Converts a 1D standard two-pulse sequence parameter set into a parameter set ready to run a PFG (pulsed field gradient) HSQC experiment, either absolute value or phase sensitive.

Arguments: `nucleus` is 13C or 15N. The default is 13C.

See also: *User Guide: Liquids NMR*

gHSQC — Set up parameters for gHSQC experiment (M)

Syntax: `gHSQC<('GLIDE')>`

Description: Converts the current parameter set to a ^{13}C gHSQC experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

HSQC	Change parameters for HSQC experiment (M)
gHSQC15	Set up parameters for ^{15}N gHSQC experiment (M)
gHSQC_d2	Set up parameters for ^{15}N gHSQC using decoupler 2 (M)
gHSQC_d2	Set up parameters for ^{13}C gHSQC using decoupler 2 (M)

gHSQC15 — Set up parameters for ^{15}N gHSQC experiment (M)

Syntax: `gHSQC15<('GLIDE')>`

Description: Converts the current parameter set to a gHSQC experiment for ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for that particular sample.

Related:

gHSQC	Set up parameters for gHSQC experiment (M)

gHSQC_d2 — Set up parameters for ^{15}N gHSQC experiment using decoupler 2 (M)

Syntax: `gHSQC_d2<('GLIDE')>`

Description: Converts the current parameter set to a gHSQC experiment for ^{15}N with decoupler 2 as ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for that particular sample.

Related:

gHSQC	Set up parameters for gHSQC experiment (M)

gHSQC_d213 — Set up parameters for ^{13}C gHSQC experiment using decoupler 2 (M)

Syntax: `gHSQC_d213<('GLIDE')>`

Description: Converts the current parameter set to a gHSQC experiment for ^{13}C with decoupler 2 as ^{13}C.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for that particular sample.

Related:

gHSQC	Set up parameters for gHSQC experiment (M)

gHSQCTOXY — Set up parameters for gHSQCTOXY experiment (M)

Syntax: `gHSQCTOXY<('GLIDE')>`

Converts the current parameter set to a gHSQCTOXY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

gHSQC	Change parameters for gHSQC experiment (M)
HSQC	Change parameters for HSQC experiment (M)
HSQCTOXY	Change parameters for HSQCTOXY experiment (M)

gilson — Open the Gilson Control window (C)

Applicability: UNITY*INOVA* and *MERCURY-Vx* only.

Syntax: `gilson`

Description: Opens the Gilson Control window, which enables setup, configuration, and operation of the VAST automatic sampler changer accessory.

See also: *User Guide: Liquids NMR; Sample Management Systems Installation*

gin — Return current mouse position and button values (C)

Syntax: `gin<(<'Bn_press'><,'Bn_release'>)>:$x,$y,$b1,$b2,$b3`

Description: Returns the mouse pointer position and button values. `gin` is most often used with the `draw`, `move`, and `box` commands.

Arguments: `'Bn_press'` is a keyword for the mouse button pressed: `'B1_press'` for the left button, `'B2_press'` for the middle button, or `'B3_press'` for the right button. `gin` waits until a button is pressed. For example, given `'B1_press'`, `gin` waits until button 1 or any key is pressed. If `gin` is waiting for a button press and a keyboard key is pressed, all buttons are set to released (0). The default is to immediately report the mouse position.

`'Bn_release'` is a keyword for the mouse button released: `'B1_release'` for the left button, `'B2_release'` for the middle button, or `'B3_release'` for the right button. `gin` waits until a button is released. For example, given `'B1_release'`, `gin` waits until button 1 or any key is released. If `gin` is waiting for a release, all buttons are set to pressed (1). The default is to immediately report the mouse position.

`$x` is the value in the *x* direction, in millimeters, of the pointer. The range of `x` is 0 at the left edge of the chart and `wcmax` at the right edge. If the pointer position is outside the graphics window in the *x* direction, `x` returns –1.

`$y` is the value in the *y* direction, in millimeters, of the pointer. The range of `y` is –20 at the bottom of the chart and `wc2max` at the top. If the pointer position is outside the graphics window in the y direction, `y` returns –10000.

`$b1,$b2,$b3` report the state of the left, middle, and right mouse buttons, respectively. The value is 1 if the corresponding mouse button is down; 0 if the corresponding mouse button is up.

Examples:

```
gin:$x,$y,$b1,$b2
gin('B2_press'):$x,$y,$b1,$b2,$b3
gin('B1_release'):$x,$y,$b1
```

See also: *VNMR User Programming*

Related:

`box`	Draw a box on a plotter or graphics display (C)
`draw`	Draw line from current location to another location (C)
`move`	Move to an absolute location to start a line (C)

glide — Interactive windows for data acquisition and processing (C)

Syntax: `glide<('exit')>`

Description: Provides a mouse-driven method for data acquisition, processing, plotting, and storage. For a general description of how to use *GLIDE*, refer to the manual *Getting Started*. For information on setting up experiments as well as how to adjust icons, text, buttons, and colors, see the manual *Walkup NMR Using GLIDE*.

Arguments: `'exit'` is a keyword to exit *GLIDE*.

Examples: `glide`
`glide('exit')`

Alternate: GLIDE button in the Permanent Menu.

See also: *Getting Started, Walkup NMR Using GLIDE*

Related:
`AC1–AC9` Automated calibration (M)
`gadm` Display *GLIDE* administrative tool (C)

`globalauto` Automation directory name (P)

Description: A global parameter that specifies the name of a directory in which the daily automation directories are saved. This parameter is created and used by the `walkup` macro.

See also: *User Guide: Liquids NMR*

Related:
`walkup` Walkup automation (M)

`glue` Create a pseudo-2D dataset (M)

Applicability: Systems with the LC-NMR accessory.

Syntax: `glue<(num_scans)>`

Description: Steps through the series of FIDs, putting them into `exp5` one by one as an array, and then jumps to `exp5` and changes the parameters `arraydim`, `ni`, and `fn1`, so that the data appear to the user to be a 2D experiment, which can then be processed and displayed with standard 2D commands (`wft2d`, `dconi`, etc.). The parameter `savefile` should exist and should contain the base file name to which a series of FIDs have been saved as `savefile.001`, `savefile.002`, etc.

Arguments: `num_scans` is the number of FIDs copied into the `exp5` array. The default is that `glue` looks for a parameter `nscans` and assumes that all experiments are to be used. Typically, `num_scans` is used if the experiment was aborted prematurely, so that the complete `num_scans` worth of FIDs were not actually acquired.

See also: *User Guide: Liquids NMR*

Related:
`nscans` Number of scout/real scan repetitions (P)
`savefile` Base file name for saving FIDs or data sets (P)

`gmapshim` Start gradient autoshimming (M)

Applicability: Systems with gradient shimming installed.

Syntax: `gmapshim<('files'|'mapname'|'quit')>`

Description: Starts gradient autoshimming if no arguments are used. It can also retrieve a shimmap file or quit gradient autoshimming. When the `gmapshim` program is done, it automatically exits, and the previous data set is retrieved.

CAUTION: Do not spin the sample during gradient shimming.

Arguments: `'files'` is a keyword to enter the gradient autoshimming files menu.

`'mapname'` is a keyword to display the current mapname.

`'quit'` is a keyword to exit from gradient autoshimming and retrieve the previous data set.

Alternate: Gradient Autoshim on Z button in the user gradient shimming menu.

See also: *Getting Started*

Related:

`gmapsys`	Run gradient autoshimming, set parameters, map shims (M)
`gmapz`	Get parameters and files for `gmapz` pulse sequence (M)

`gmapshim_au` Start acquisition with gradient shimming (M)

Applicability: Systems with gradient shimming installed.

Syntax: `gmapshim_au`

Description: If `wshim` is not set to `'n'`, `gmapshim_au` checks the probe file for a lock gradient map name. If the name exists, `gmapshim_au` executes `gmapshim('glideau')` to start gradient shimming followed by acquisition. If the map name does not exist, `gmapshim_au` starts acquisition by running `au('wait')`.

See also: *Getting Started*

Related:

`au`	Submit experiment to acquisition and process data (M)
`gmapshim`	Start gradient autoshimming (M)
`wshim`	Conditions when shimming is performed (P)

`gmapsys` Run gradient autoshimming, set parameters, map shims (M)

Applicability: Systems with gradient shimming installed.

Syntax: (1) `gmapsys<(option)>`
(2) `gmapsys('shimmap'<,shimmap_option>)`

Description: Enters the Gradient Shimming System menu for setting parameters, mapping the shims, and performing autoshimming. This is the only entry point to the gradient shimming system menu.

If the `gmapz` pulse sequence is not loaded, retrieve parameters from the last shimmap used (see current mapname) or from `gmapz.par` if no shimmap exists.

CAUTION: Do not spin the sample during gradient shimming.

Arguments: `option` is one of the following keywords:

- `'addpar'` adds gradient shimming parameters to the current parameter set.
- `'findgzlvl'` runs an experiment to calibrate `gzlvl`, `gzwin`, and `tof` to optimize the spectral window.
- `'findgzwin'` runs an experiment to calibrate `gzwin` and `tof` to optimize the spectral window.
- `'findtof'` runs an experiment to center `tof` to optimize the spectral window.
- `'rec'` displays the record of shim adjustments from the previous gradient shimming run.
- `'shim'` start autoshimming (same as Autoshim on Z button).
- `'vi'` edits the file `gshim.list`, which is used for editing shim offsets, `mapname`, or selecting coarse and fine shims.
- `'writeb0'` displays the `b0` plot calculated from the first two array elements.

`'shimmap'` is a keyword to run a shim mapping experiment and save the results (same as Make Shimmap button).

`shimmap_option` is one of the following values:

- 'auto' is a keyword to calibrate gzwin and then make a shimmap (same as Automake Shimmap button).
- 'manual' is a keyword to use shim offset values set manually from the file gshim.list and not the default values to make a shimmap.
- 'overwrite' is a keyword to make a shimmap and overwrite the current mapname if it exists.
- mapname is the prefix of the shimmap file name. The default is the user is queried for mapname before running the experiment.

See also: *User Guide: Liquids NMR*

Related:

gmapshim	Start gradient autoshimming (M)
gmapz	Get parameters and files for gmapz pulse sequence (M)
gradtype	Gradients for X, Y, Z axes (P)
gzwin	Spectral width percentage used for gradient shimming (P)
seqfil	Pulse sequence name (P)
gmap_findtof	Gradient shimming flag to first find tof (P)
gmap_z1z4	Gradient shimming flag to first shim z1-z4 (P)

gmapuser — Run gradient autoshimming and set parameters (obsolete)

Description: This macro is no longer used. The gmapshim macro has replaced it.

Related:

gmapshim	Start gradient autoshimming (M)

gmapz — Get parameters and files for gmapz pulse sequence (M)

Applicability: Systems with gradient shimming installed.

Syntax: gmapz<(mapname)>

Description: Retrieves gradient shimming parameters to set up a gradient shimming experiment.

Arguments: mapname is the name of a gradient shimmap file that must exist in the shimmaps directory. gmapz retrieves parameters and loads the shimmap file from mapname. The default is to retrieve standard gradient shimming parameters from the file gmapz.par.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

gmapshim	Start gradient autoshimming (M)
gmapsys	Run gradient autoshimming, set parameters, map shims (M)
gmap_findtof	Gradient shimming flag to first find tof (P)

gmap_findtof — Gradient shimming flag to first find tof (P)

Applicability: Systems with gradient shimming installed.

Description: When the flag is set to 'y', gradient shimming first performs a calibration to find tof before the start of shimming. This action is recommended for only homospoil deuterium gradient shimming with different solvents. The default value is 'n'.

Values: 'y' turns on the flag.
'n' turns off the flag.

See also: *Getting Started*

Related:

gmapshim	Start gradient autoshimming (M)
gmapsys	Run gradient autoshimming, set parameters, map shims (M)

gmapz	Get parameters and files for gmapz pulse sequence (M)
tof	Frequency offset for observe transmitter (P)

gmap_z1z4 Gradient shimming flag to first shim z1-z4 (P)

Applicability: Systems with gradient shimming installed.

Description: When the flag is set to 'y', if gzsize is greater than 4, gradient shimming first shims on z1-z4, and then uses all shims specified by gzsize. When the flag is set to 'n' (default), all shims specified by gzsize are used.

Values: 'y' turns on the flag.
'n' turns off the flag.

See also: *Getting Started*

Related:

gmapshim	Start gradient autoshimming (M)
gmapsys	Run gradient autoshimming, set parameters, map shims (M)
gmapz	Get parameters and files for gmapz pulse sequence (M)
gzsize	Number of z-axis shims used by gradient shimming (P)

gmax Maximum gradient strength (P)

Description: The allowed maximum gradient level (absolute value) in gauss/cm. gmax is one of the calibration entries in a gradtables file. gxmax, gymax, and gzmax are used when the maximum gradient level is different for each axis in gauss/cm, which is the case for triple-axis PFG coils.

See also: *VNMR and Solaris Software Installation*; *User Guide: Imaging*

Related:

boresize	Magnet bore size (P)
createtable	Generate new gradient calibration file (M)
gcoil	Current gradient coil (P)
gxmax,gymax,gzmax	Maximum gradient strength for each axis (P)
sysgcoil	System gradient coil (P)
trise	Gradient rise time (P)

gmqcosy Set up PFG absolute-value MQF COSY parameter set (M)

Applicability: Systems with the pulsed field gradient module.

Syntax: gmqcosy

Description: Converts a 1D standard two-pulse sequence parameter set into a parameter set ready to run a PFG (pulsed field gradient) absolute-value MQF COSY experiment.

See also: *User Guide: Liquids NMR*

gnoesy Set up a PFG NOESY parameter set (M)

Applicability: Systems with the pulsed field gradient module.

Syntax: gnoesy

Description: Converts a 1D standard two-pulse sequence parameter set into a parameter set ready to run a PFG (pulsed field gradient) NOESY experiment, either absolute value or phase sensitive.

See also: *User Guide: Liquids NMR*

go — Submit experiment to acquisition (M)

Syntax: `go<(<'acqi'><,'nocheck'><,'nosafe'><,'next'><,'sync'><,'wait'>)>`

Description: Performs the experiment described by the current acquisition parameters, checking parameters `loc`, `spin`, `gain`, `wshim`, `load`, and `method` to determine the necessity to perform various actions in addition to data acquisition. This may involve a single FID or multiple FIDs, as in the case of arrays or 2D experiments. `go` acquires the FID and performs no processing. If free disk space is insufficient for the complete 1D or 2D FID data set to be acquired, `go` prompts the user with an appropriate message and aborts the acquisition initiation process.

Before starting the experiment, `go` executes two user-created macros if they exist. The first is `usergo`, a macro that allows the user to set up general conditions for the experiment. The second is a macro whose name is formed by `go_` followed by the name of the pulse sequence (from `seqfil`) to be used (e.g., `go_s2pul`, `go_dept`). The second macro allows a user to set up experiment conditions suited to a particular sequence.

Arguments: `'acqi'` is a keyword to submit an experiment for display by the `acqi` program. All operations explained above are performed, except acquisition of data is not initiated. The instructions to control data acquisition are stored so that `acqi` can acquire the data when the FID button is clicked. The `gf` macro is recommended instead of running `go('acqi')` directly. Using `gf` prevents certain acquisition events from occurring, such as spin control and temperature change. See the description of `gf` for more information.

`'nocheck'` is a keyword to override checking if there is not enough free disk space for the complete 1D or 2D FID data set to be acquired.

`'nosafe'` is a keyword to disable probe protection during the experiment.

`'next'` is a keyword to put the experiment started with `go('next')` at the head of the queue of experiments to be submitted to the acquisition system. If `go('next')` is entered, the `go` macro remains active until the experiment is submitted to the acquisition system, and no other VNMR commands are processed until the `go` macro finishes.

`'sync'` is a keyword in nonautomation mode that accomplishes the same effect as `go('next')` in synchronizing VNMR command execution with the submission of experiments to the acquisition system. The difference is that `'sync'` does not put the experiment at the head of the queue.

`'wait'` is a keyword to stop submission of experiments to acquisition until `wexp` processing of the experiment, started with `go('wait')`, is finished.

Examples:

```
go
go('nosafe')
go('next')
```

Alternate: Go button in the Acquire Menu.

See also: *Getting Started*

Related:

`acqi`	Interactive acquisition display process (C)
`au`	Submit experiment to acquisition and process data
`change`	Submit a change sample experiment to acquisition (M)
`gain`	Receiver gain (P)
`ga`	Submit experiment to acquisition and FT the result (C)
`gf`	Prepare parameters for FID/spectrum display in acqi (M)
`go_`	Pulse sequence setup macro called by `go`, `ga`, and `au` (M)
`load`	Load status of displayed shims (P)

loc	Location of sample in tray (P)
lock	Submit an Autolock experiment to acquisition (C)
method	Autoshim method (P)
probe_protection	Probe protection control (P)
sample	Submit change sample, Autoshim exp. to acquisition (M)
seqfil	Pulse sequence name (P)
shim	Submit an Autoshim experiment to acquisition (C)
spin	Submit a spin setup experiment to acquisition (C)
spin	Sample spin rate (P)
su	Submit a setup experiment to acquisition (M)
usergo	Experiment setup macro called by go, ga, and au (M)
wshim	Conditions when shimming is performed (P)

go_ Pulse sequence setup macro called by go, ga, and au (M)

Syntax: go_*macro*

Description: Called by the macros go, ga, or au before starting an experiment. The user typically creates this macro to set up general experiment conditions. The name of the macro is formed by combining go_ with the name of the pulse sequence macro (from seqfil) to be used.

Examples:
```
go_dept
go_noesy
go_s2pul
```

See also: *Getting Started*

Related:

au	Submit experiment to acquisition and process data (M)
ga	Submit experiment to acquisition and FT the result (M)
go	Submit experiment to acquisition (M)
seqfil	Pulse sequence name (P)
usergo	Experimental setup macro called by go, ga, and au (M)

gpat-gpat3 Gradient shape (P)

Description: Predefined string parameters available to specify gradient shapes.

See also: *User Guide: Imaging*

gpe Phase encoding gradient increment (P)

Applicability: Systems with imaging capabilities.

Description: Value of the change in phase encode gradient level from one phase encode step to the next. More precisely, the product of the parameters gpe and tpe is used internally within the pulse sequence to determine the phase encode gradient increment based on the computed refocusing time for readout and slice selection. gpe depends on the field of view and the phase encode gradient duration according to the expression $\gamma \cdot gpe * tpe * lpe = 1$ and is set by either the imprep or setgpe macros.

See also: *User Guide: Imaging*

Related:

imprep	Set up rf pulses, imaging and voxel selection gradients (M)
gmax	Maximum gradient strength (P)
gpe2	Second phase encoding gradient increment (P)
gpe3	Third phase encoding gradient increment (P)
lpe	Field of view parameter for phase encode in cm (P)
nv	Number of 2D phase encode steps to be acquired (P)

setgpe	Set phase encode gradient levels (M)
tpe	Duration of the phase encoding gradient pulse (P)

gped — Phase encode dephasing gradient in the EPI sequence (P)

Applicability: Systems with imaging capabilities.

Description: Determines echo position in the phase-encode direction. A blipped gradient phase encodes the signal with respect to the phase-encode direction. gped determines the center of the k-space along the phase-encode direction. gped is usually set so that eff_echo appears at the center of the phase encode dimension, t1.

Related:

eff_echo	Effective echo position in EPI experiments (P)

gpemult — Phase encode gradient increment multiplier (P)

Applicability: Systems with imaging capabilities.

Description: Multiplier used to correct phase encode gradient increment when using a non-rectangular phase encode gradient shape. For example, a rectangular shaped phase encode gradient has a gradient-time integral equal to 1.571 that of a half-sine gradient of equal duration and peak amplitude. In this case, set gpemult to 1.571 to yield the expected field of view.

See also: *User Guide: Imaging*

gradaxis — Gradient axis (P)

Applicability: Systems with imaging capabilities.

Description: Selects the gradient axis in macros such as g2pul and profile.

Values: 'x', 'y', 'z'

See also: *User Guide: Imaging*

Related:

g2pul	Set up pulse sequence for gradient evaluation (M)
profile	Set up pulse sequence for gradient calibration (M)

gradstepsz — Gradient step size (P)

Description: The maximum gradient DAC value. gradstepsz determines the type of gradient DAC board used in the system: 12-bit or 16-bit. It is used internally to convert gauss/cm gradient levels to the proper hardware DAC level.

Values: Systems with 12-bit DACs (older SISCO spectrometers without gradient waveform capabilities): –2047 to +2047 units, in integer steps.

Systems with 16-bit DACs (all UNITY*plus* and beyond, and SISCO spectrometers with gradient waveform capabilities): –32767 to +32767 units, in integer steps.

See also: *VNMR and Solaris Software Installation*; *User Guide: Imaging*

gradtype — Gradients for X, Y, and Z axes (P)

Applicability: Systems with pulsed field gradient (PFG) or imaging capability.

Description: Configuration parameter for systems with optional gradients for axes. The value is set using the label X Axis, Y Axis, Z Axis in the CONFIG window (opened from config). The values available for each axis are None, WFG + GCU, Performa I, Performa II/III, Performa II/III + WFG, Performa XYZ, Performa

XYZ + WFG, SIS (12 bit), Homospoil, and Shim DAC. WFG stands for the waveform generator; GCU stands for the gradient compensation unit; and Performa I, II, III, and XYZ are types of PFG modules.

Values: String of three characters (e.g., `'nnp'`). The first character is the gradient for the X axis, second for the Y axis, and third for the Z axis. Each axis has value `'n'` (None choice in CONFIG window), `'w'` (WFG+GCU), `'l'` (Performa I), `'p'` (Performa II/III), `'q'` (Performa II/III + WFG), `'t'` (Performa XYZ), `'u'` (Performa XYZ + WFG), `'s'` (SIS (12 bit), or `'h'` (Homospoil). Homospoil is functional only for the Z axis.

See also: *VNMR and Solaris Software Installation; Getting Started*

Related:

`config`	Display current configuration and possibly change it (M)
`pfgon`	PFG amplifiers on/off control (P)

`graphis` Return the current graphics display status (C)

Syntax:
(1) `graphis:$display_command`
(2) `graphis(command):$yes_no`

Description: Determines what command currently controls the graphics window.

Arguments: `$display_command` is a return value set to the name of the currently controlling command.

`command` is the name of a command to be checked.

`$yes_no` is a return value set to 1 if the command name given by the `command` argument is controlling the graphics window, or set to 0 if it is not controlling the window.

Examples:

```
graphis:$display
if ($display='ds') then
...
endif
```

```
graphis('ds'):$ds_on
if ($ds_on) then
...
endif
```

See also: *VNMR User Programming*

Related:

`textis`	Return the current text display status (C)

`grayctr` Gray level window adjustment (P)

Description: Controls the grayscale display available in `dcon`. In the `dconi` program, the center mouse button controls the grayscale bar, which changes the mean gray level and hence the value of `grayctr`. The `grayctr` parameter (along with the parameter `graysl`) records the current settings of the gray bar as the interaction changes; the value can also be set directly. The right mouse button controls the data level of the maximum data intensity. To create `grayctr`, enter

```
create('grayctr','real')
setgroup('grayctr','display')
setlimit('grayctr',64,0,1).
```

To create the set of imaging parameters `grayctr`, `dcrmv` and `graysl`, and in the current experiment, enter `addpar('image')`.

Values: 0 to 64 (typically 32)

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
dcon	Display noninteractive color intensity map (C)
dconi	Interactive 2D contour display (C)
graysl	Gray level slope (contrast) adjustment (P)

graysl — Gray level slope (contrast) adjustment (P)

Description: Controls the grayscale display available in dcon. In the dconi program, the center mouse button controls the grayscale slope as applied to the data changes and hence the value of graysl. Negative values of graysl will invert black and white; however, negative values can be set only from the keyboard. graysl (along with the parameter grayctr) records the current settings of the gray bar as the interaction changes; the value can also be set directly. The right mouse button controls the data level of the maximum data intensity. To create graysl, enter the following command:

```
create('graysl','real') setgroup('graysl','display')
setlimit('graysl',10,-10,0.1)
```

To create the set of imaging parameters graysl, dcrmv, and grayctr in the current experiment, enter addpar('image').

Values: –10 to +10 (–100 to +100, typically 1)

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
dcon	Display noninteractive color intensity map (C)
dconi	Interactive 2D contour display (C)
grayctr	Gray level window adjustment (P)

grecovery — Eddy current testing (M)

Applicability: Systems with pulsed field gradient.

Syntax: grecovery

Description: Conditions an experiment for eddy current testing so that it is compatible with standard installation procedures.

See also: *Pulsed Field Gradient Modules Installation, VNMR User Guide: Liquids NMR*

grid — Draw a grid on a 2D display (M)

Syntax: (1) grid<(<spacing><,><color>)>
(2) grid<(start_f2,incr_f2,start_f1,incr_f1<,color>)>

Description: Draws grid lines over a 2D display. Grid lines are drawn on the graphics screen in the XOR mode—entering a second grid command with identical arguments erases (not redraws) the grid displayed by the first command.

Arguments: spacing specifies the approximate spacing of the grid lines, in cm. The default is intervals of approximately 1 cm, rounded so that the intervals fall at a multiple of 1, 2, or 5 (in Hz), or 1p, 2p, or 5p (in ppm).

color specifies the color of the grid lines and is one of the following keywords: 'red', 'green', 'blue', 'cyan', 'magenta', 'yellow', 'black', or 'white'. The default is 'blue'.

start_f2, incr_f2, start_f1, incr_f1 define a grid by supplying the starting and increment frequencies for f2 and f1. Add the p suffix to a value to enter it in ppm (see third example below).

Examples:
```
grid
grid(1.5,'red')
grid(1p,0.5p,3p,0.5p)
```

See also: *User Guide: Liquids NMR*

Related:

`plgrid`	Plot a grid on a 2D plot (M)

griserate — Gradient rise rate (P)

Applicability: Systems with imaging capabilities.

Description: Sets the gradient rise rate.

See also: *User Guide: Imaging*

Related:

`gcoil`	Read data from gradient calibration tables (P)
`gxcal,gycal,gzcal`	Gradient calibration constants (P)

gro — Readout gradient strength (P)

Applicability: Systems with the or imaging capabilities.

Description: Controls the level of the readout gradient, if present. `imprep` sets `gro` based on its internal algorithm; or use `setgro(value)`, which sets `gro` to a specific value and updates `at` and `sw`. `gro`, `sw`, and `at` are related by the expression `sw=g*lro*gro`, but a change in `lro` does not automatically update `gro` and `sw`.

See also: *User Guide: Imaging*

Related:

`at`	Acquisition time (P)
`gmax`	Maximum gradient strength (P)
`grof`	Read out fractional compensation (P)
`gror`	Read out compensation gradient (P)
`imprep`	Set up rf pulses, imaging and voxel selection gradients (M)
`lro`	Field of view size for readout axis (P)
`setgro`	Set readout gradient (M)
`sw`	Spectral width in directly directed dimension (P)

groa — Readout gradient adjuster in EPI experiment (P)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Description: Corrects readout gradient imperfections in EPI experiment by adding an offset (G/cm) to the odd readgradient.

See also: *User Guide: Imaging*

Related:

`episet`	Set up parameters for EPI experiment (M)
`grora`	Readout refocusing gradient adjuster in EPI experiment (P)
`tep`	Post-acquisition delay in EPI experiment (P)

gropat — Readout gradient shape (P)

Applicability: Systems with imaging capabilities.

Description: Predefined string parameter to specify a readout gradient shape.

See also: *User Guide: Imaging*

gror — Read out compensation gradient (P)

Applicability: Systems with imaging capabilities.

Description: Controls the level of the readout refocusing gradient when pilot='n'. When pilot='y', gror is ignored by the pulse sequence, and computed internally. In this case the internal value is printed in the window used to start VNMR.

gror is opposite in sign to gro for gradient echo experiments (e.g., FLASH), and has the same sign as gro for spin-echo experiments (e.g. SEMS).

Values: Sequence dependent, specified in gauss/cm up to ±gmax.

See also: *User Guide: Imaging*

Related:

gmax	Maximum gradient strength (P)
gro	Read out fractional compensation (P)
gssr	Slice selection refocusing gradient (P)
pilot	Automatic sequence setup (P)

grora — Readout dephasing gradient adjuster in EPI experiment (P)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Description: Correction gradient value added to the readout refocusing gradient (G/cm) in EPI experiments to center the echo position in the acquisition window.

See also: *User Guide: Imaging*

Related:

episet	Set up parameters in EPI experiment (M
groa	Readout gradient adjuster in EPI experiment (P)
tep	Post-acquisition delay in EPI experiment (P)

groupcopy — Copy parameters of group from one tree to another (C)

Syntax: groupcopy(from_tree,to_tree,group)

Description: Copies a set of parameters of a group from one parameter tree to another.

Arguments: from_tree, to_tree are two different parameter trees, each given by the one of the keywords 'global', 'current', or 'processed'. Refer to the create command for more information on trees.

group is the set of parameters to be copied and is one of the keywords 'all', 'sample', 'acquisition', 'processing', and 'display'.

Examples: groupcopy('processed','current','acquisition')

See also: *VNMR User Programming*

Related:

create	Create new parameter in a parameter tree (C)
destroy	Destroy a parameter (C)
destroygroup	Destroy parameters of a group in a tree (C)
display	Display parameters and their attributes (C)
setgroup	Set group of a parameter in a tree (C)

gsh2pul — Set up parameters for shaped gradients tests (M)

Applicability: Systems with the imaging module.

Syntax: gsh2pul

Description: During imaging installation, gsh2pul is used to load parameters sets for shaped gsh2Dpul gradients tests. gsh2Dpul steps the amplifier with the value of ni.

Description: *User Guide: Imaging*

Related:

ni	Number of increments in 1st indirectly detected dimension (P)

gspoil — Spoiler gradient level (P)

Description: Predefined parameter to set a spoiler gradient level. It is often paired with the timing parameter tspoil.

Related:
- tspoil — Spoiling gradient control (P)

gss — Slice selection gradient strength (P)

Applicability: Systems with imaging capabilities.

Description: Controls the level of the slice-select gradient, if present. imprep will set gss based on the slice thickness and rf pulse bandwidths; or use setgss to update only gss.

Values: Number less than ±gmax., in gauss/cm.

See also: *User Guide: Imaging*

Related:
- gmax — Maximum gradient strength (P)
- gssf — Slice selection fractional gradient (P)
- gssr — Slice selection refocusing gradient (P)
- imprep — Set up rf pulses, imaging and voxel selection gradients (M)
- setgss — Select slice or voxel selection gradient levels (M))
- thk — 2D imaging plane slice thickness (P)

gssf — Slice selection fractional refocusing (P)

Applicability: Systems with imaging capabilities.

Description: Fractional multiplier used as a fine tuning adjustment for the gssr slice refocusing gradient level.

Values: 1.0, when the theoretical gradient calculations are correct.

See also: *User Guide: Imaging*

Related:
- grof — Read out fractional compensation (P)
- gss — Slice selection gradient strength (P)
- gssr — Slice selection refocusing gradient (P)

gsspat — Slice-select gradient shape (P)

Description: Predefined string parameter to specify a slice-select gradient shape.

See also: *User Guide: Imaging*

gssr — Slice selection refocusing gradient (P)

Applicability: Systems with imaging capabilities.

Description: Controls the level of the slice-select refocusing gradient when pilot='n'. When pilot='y', gssr is ignored by the pulse sequence, and internally computed. The internal value is printed in the window used to start VNMR.

gssr is normally be opposite in sign to gss.

Values: Number in gauss/cm up to ±gmax. Nominal value is gssr=–0.5*gss.

See also: *User Guide: Imaging*

Related:
- gmax — Maximum gradient strength (P)
- gss — Slice selection gradient strength (P)
- gssf — Slice selection fractional gradient (P)
- gror — Read out compensation gradient (P)
- pilot — Automatic sequence setup (P)

gss2,gss3 Slice selection gradient level (P)

Description: Predefined parameters for specifying gradient levels for different slice selection events in an imaging pulse sequence.

See also: *User Guide: Imaging*

Related: gss Slice selection gradient strength (P)

gtnnoesy Set up a PFG TNNOESY parameter set (M)

Applicability: Systems with the pulsed field gradient (PFG) module. Not available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: gtnnoesy

Description: Converts a 1D standard two-pulse sequence parameter set into a parameter set ready to run a PFG NOESY experiment (either absolute value or phase sensitive) or a gtnnoesy experiment.

See also: U*ser Guide: Liquids NMR*

gtnroesy Set up a PFG absolute-value ROESY parameter set (M)

Applicability: Systems with the pulsed field gradient (PFG) module. Not available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: gtnroesy

Description: Converts a 1D standard two-pulse sequence parameter set into a parameter set ready to run a PFG absolute-value ROESY experiment or a gtnroesy experiment.

See also: *User Guide: Liquids NMR*

gtotlimit Gradient total limit (P)

Applicability: Systems with three-axis gradients

Description: Sets the gradient limit, in gauss/cm, of the *x*, *y*, and *z* axes, summed together. This parameter is taken from an entry of the same name in a gradient table and should only exist if a gradient amplifier limits the combined output of all three gradient axis.

See also: *User Guide: Imaging*

Related: createtable Generate system gradient table (M)
gcoil Read data from gradient calibration tables (P)

gtrim Trim gradient level (P)

Description: Predefined parameter to set a trim gradient level.

See also: *User Guide: Imaging*

gvx1-gvox3 Gradient strength for voxel selection (P)

Applicability: Systems with imaging capabilities.

Description: Voxel-select gradient levels for the first, second, and third dimensions of a voxel in a localized spectroscopy experiment. For example, imprep sets gvox1 based on the corresponding voxel dimension vox1, and rf pulse bandwidth. For nonoblique voxels, the orientation of gvox1 lies along one of the three main gradient axes, X, Y, or Z. Oblique angle voxel orientation is also available, and for this reason the name gvox1 is used instead of, for example, gx.

Values: Number less than ±gmax, in gauss/cm.

See also: *User Guide: Imaging*

Related:

gmax	Maximum gradient strength (P)
gss	Slice selection gradient strength (P)
gx	Gradient strength for X, Y, and Z gradients (P)
vox1,vox2,vox3	Voxel dimension (P)

gx, gy, gz Gradient strength for X, Y, and Z gradients (P)

Applicability: Systems with imaging capabilities.

Description: Defines the gradient strength of the X, Y, and Z gradients, respectively, for localized spectroscopy experiments such as ISIS and VOSY. The gradient strength in conjunction with the length of the selective pulse defines the size of the region of interest.

Values: Number less than to ±gmax, in gauss/cm (older pulse sequences, such as isis.c and vosy.c, use DAC units). The sign is often not important.

See also: *User Guide: Imaging*

Related:

gmax	Maximum gradient strength (P)
gxcal,gycal,gzcal	Gradient calibration constants (P)

gxcal,gycal,gzcal Gradient calibration constants (P)

Applicability: Systems with the older SISCO imaging module.

Description: Stores the proportionality constant for each gradient. The gradients generated in the magnet require calibration so that coordinate data, slice positions, and the field of view can be set up correctly.

Values: Number less than to ±gmax, in gauss/cm/DAC (on older SISCO systems).

See also: *User Guide: Imaging*

Related:

gcoil	Read data from gradient calibration tables (P)
gmax	Maximum gradient strength (P)
setgcoil	Update system gcoil configuration (M)

gxmax,gymax,gzmax Maximum gradient strength for each axis (P)

Applicability: Systems with three-axis gradients.

Description: Defines the maximum gradient strength, in gauss/cm, for each gradient axis. These values are read in from the selected system gradient table whenever the parameter set is retrieved or the gradient coil defined by gcoil has changed. When the values are read in, gmax is set to the lowest value of the three.

The parameters gxmax, gymax, and gzmax are used instead of gmax when the gradients strengths are not equal for each axis. Unequal gradient strengths per axis are generally true for systems with three-axis PFG coils, which have a strong *z* gradient, and can be true for microimaging systems. Horizontal-bore imaging systems usually have gradients set to the same maximum value, and gmax can be used.

See also: *Getting Started; VNMR User Programming, User Guide: Imaging*

Related:

createtable	Generate system gradient table (M)
gcoil	Read data from gradient calibration tables (P)
gmax	Maximum gradient strength (P)

gzlvl — Pulsed field gradient strength (P)

Applicability: All systems with pulsed field gradient modules.

Description: Specifies the pulsed field gradient DAC value.

Values: Range from +2047 to –2048 for 12-bit gradient module, and from +32767 to –32768 for a 16-bit gradient module.

See also: *Getting Started*

Related:

gzsize	Number of z-axis shims used by gradient shimming (P)
gzwin	Spectral window percentage used for gradient shimming (P)

gzsize — Number of z-axis shims used by gradient shimming (P)

Applicability: Systems with the pulsed field gradient module.

Description: Specifies the number of z-axis shims used by gradient shimming. For example, gzsize set to 4 means that gradient shimming uses shims z1 to z4. By default, coarse shims are used if present, as determined by the shimset value

Values: Integer from 1 to 8.

See also: *Getting Started*

Related:

gmapshim	Start gradient autoshimming (M)
gmapsys	Run gradient autoshimming, set parameters, map shims (M)
gmapz	Get parameters and files for gmapz pulse sequence (M)
gzlvl	Pulsed field gradient strength (P)
gzwin	Spectral width percentage used by gradient shimming (P)
shimset	Type of shimset (P)
gmap_z1z4	Gradient shimming flag to first shim z1-z4 (P)

gzwin — Spectral width percentage used for gradient shimming (P)

Applicability: Systems with the pulsed field gradient module.

Description: Specifies the percentage of the spectral width sw used by gradient shimming for shimmap calculations. The value is set automatically with the buttons Find gzlvl/gzwin and Find gzwin in the gradient shimming system menu opened by gmapsys.

Values: A real number between 0 and 100. The typical value is 50.

See also: *Getting Started*

Related:

gmapshim	Start gradient autoshimming (M)
gmapsys	Run gradient autoshimming, set parameters, map shims (M)
gmapz	Get parameters and files for gmapz pulse sequence (M)
gzlvl	Pulsed field gradient strength (P)
gzsize	Number of z-axis shims used by gradient shimming (P)
sw	Spectral width in directly detected dimension (P)
tof	Frequency offset for observe transmitter (P)

H

h1 — Automated proton acquisition (M)

Syntax: `h1<(solvent)>`

Description: Prepares parameters for automatically acquiring a standard ^{1}H spectrum. The parameter `wexp` is set to `'procplot'` for standard processing. If `h1` is used as the command for automation via the `enter` command, then `au` is supplied automatically and should not be entered on the MACRO line of the `enter` program. However, it is possible to customize `h1` on the MACRO line by following it with additional commands and parameters. (e.g., entering `h1 nt=1` uses the standard `h1` setup but with only one transient).

Arguments: `solvent` is the name of the solvent. In automation mode, the solvent is supplied by the `enter` program. The default is `'CDCl3'`.

Examples:
```
h1
h1('DMSO')
```

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`au`	Submit experiment to acquisition and process data (M)
`enter`	Enter sample information for automation run (C)
`h1p`	Process 1D proton spectra (M)
`procplot`	Automatically process FIDs (M)
`wexp`	When experiment completes (P)

h1freq — Proton frequency of spectrometer (P)

Description: Configuration parameter for the resonance frequency of ^{1}H as determined by the field strength of the magnet. The value is set using the label Proton Frequency in the CONFIG window (opened from `config`.)

Values: 085, 100, 200, 300, 400, 500, 600, 750, 800, 900 (in MHz); 3T, 4T.

See also: *VNMR and Solaris Software Installation*

Related:

`config`	Display current configuration and possibly change it (M)

h1p — Process 1D proton spectra (M)

Syntax: `h1p`

Description: Processes non-arrayed 1D proton spectra using standard macros. `h1p` is called by `proc1d`, but can also be used directly. Fully automatic processing (up to a point where a spectrum could be plotted) is provided: Fourier transformation (using preset weighting functions), automatic phasing (`aphx` macro), select integral regions (`hregions` macro), adjust integral size (`integrate` macro), vertical scale adjustment (`vsadjc` macro), avoiding excessive noise (`noislm` macro), threshold adjustment (if required, `thadj` macro), and referencing to the TMS signal if present (`setref` macro, then `tmsref` macro).

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`aphx`	Perform optimized automatic phasing (M)
`h1`	Automated proton acquisition (M)
`hregions`	Select integral regions for proton spectra (M)

integrate	Automatically integrate 1D spectrum (M)
noislm	Avoids excessive noise (M)
proc1d	Processing macro for simple (non-arrayed) spectra (M)
setref	Set frequency referencing for proton spectra (M)
thadj	Adjust threshold (M)
tmsref	Reference spectrum to TMS line (M)
vsadjh	Adjust vertical scale for proton spectra (M)

h2cal — Calculate strength of the decoupler field (C)

Syntax: `h2cal<(j1r,j2r<,j0>)><:gammah2,pw90,frequency>`

Description: Calculates the strength of the decoupler field. It uses the results from two experiments: one with the decoupler off-resonance at a lower frequency and the other with the decoupler off-resonance at a higher frequency than the frequency of the peak being decoupled.

Arguments: `j1r` is the frequency of the decoupler during these two experiments;. The default is that `h2cal` prompts for a value. If the parameter `dof` is arrayed and has two values, `h2cal` assumes these two values represent the decoupler frequencies; if `dof` is arrayed and has more than two values, `h2cal` prompts for the two decoupler frequencies.

`j2r` is the reduced coupling constants from the two experiments. The default is that `h2cal` prompts for a value

`j0` is the full coupling constant that results when no decoupling is done. The default is a value of 142 Hz, the constant for the standard sample dioxane, or 15 Hz for the methyl iodide sample.

`gammah2` is a return value set to the strength of the decoupler field.

`pw90` is a return value set to the pulse width of a 90° pulse from the decoupler. It is related to the value of parameter `dmf` through the equation `dmf=1/pw90`.

`frequency` is a return value set to the coalescence point (i.e., frequency at which single-frequency decoupling would collapse the dioxane to a singlet).

See also: *Getting Started*

Related:

dmf	Decoupler modulation frequency for first decoupler (P)
dof	Frequency offset for first decoupler (P)

halt — Abort acquisition with no error (C)

Syntax: `halt`

Description: Aborts an experiment that has been submitted to acquisition. If the experiment is active, it is aborted immediately, all data is discarded, and the experiment is interpreted as complete. Any data collected from an earlier block size transfer is retained. If any `wexp` processing is defined, that processing then occurs, followed by any queued experiments. The login name, and the FID directory path in `file` are used as keys to find the proper experiment to abort.

Under some circumstances, there is a delay between the time `go` is entered and the acquisition is started. During this time, instructions based on the selected pulse sequence are being generated. This is signified by the letters “PSG” appearing in the upper left corner of the status window. A `halt` command issued under these circumstances reports that no acquisition is active but it instead stops the instruction generation process and the message “PSG aborted” appears.

See also: *Getting Started*

Related:

aa	Abort acquisition with error (C)
file	File name of parameter set (P)
go	Submit experiment to acquisition (C)
wexp	Specify action when experiment completes (C)
wexp	When experiment completes (P)

hc — Automated proton and carbon acquisition (M)

Syntax: `hc<(solvent)>`

Description: Combines the operation of the h1 and c13 macros. In non-automation mode, both spectra are acquired in the experiment in which the hc macro was entered. After the completion of the acquisition, rttmp can be used for further processing of the two spectra.

Arguments: `solvent` is the solvent name In automation mode, the enter program supplies the value. In non-automation mode, the default is `'cdcl3'`.

Examples:
```
hc
hc('dmso')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

c13	Automatic carbon acquisition (M)
enter	Enter sample information for automation run (M,U)
h1	Automated proton acquisition (M)
rttmp	Retrieve experiment data from experiment subfile (M)

hcapt — Automated proton, carbon, and APT acquisition (M)

Syntax: `hcapt<(solvent)>`

Description: Combines the operation of the h1 and c13 macros and the APT experiment. In non-automation mode, all spectra are acquired in the experiment in which the hcapt macro was entered. After acquisition completes, rttmp can be used for further processing of the three spectra.

Arguments: `solvent` is the solvent name. In automation mode, the enter program supplies the value. In non-automation mode, the default is `'cdcl3'`.

Examples:
```
hcapt
hcapt('dmso')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

apt	Set up parameters for APT experiment (M)
c13	Automatic carbon acquisition (M)
enter	Enter sample information for automation run (M,U)
h1	Automated proton acquisition (M)
rttmp	Retrieve experiment data from experiment subfile (M)

hcchtocsy — Set up parameters for HCCHTOCSY pulse sequence (M)

Applicability: Sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `hcchtocsy`

Description: Used for sidechain assignments in fully ^{13}C-enriched molecules.

See also: *User Guide: Liquids NMR*

hccorr — Automated proton, carbon, and HETCOR acquisition (M)

Syntax: `hccorr<(solvent)>`

Description: Combines the operation of the `h1` and `c13` macros and the HETCOR experiment. In non-automation mode, all spectra are acquired in the experiment in which `hccorr` is entered. After acquisition completes, `rttmp` can be used for further processing of the three spectra.

Arguments: `solvent` is the solvent name. In automation mode, the `enter` program supplies the value. In non-automation mode, the default is `'cdcl3'`.

Examples:
```
hccorr
hccorr('dmso')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`c13`	Automated carbon acquisition (M)
`enter`	Enter sample information for automation run (M,U)
`h1`	Automated proton acquisition (M)
`hetcor`	Set up parameters for HETCOR experiment (M)
`rttmp`	Retrieve experiment data from experiment subfile (M)

hcdept — Automated proton, carbon, and DEPT acquisition (M)

Syntax: `hcdept<(solvent)>`

Description: Combines the operation of the `h1` and `c13` macros and the DEPT experiment. In non-automation mode, all spectra are acquired in the experiment in which `hcdept` was entered. After the completion of the acquisition, `rttmp` can be used for further processing of the three spectra.

Arguments: `solvent` is the solvent name. In automation mode, the `enter` program supplies the value. In non-automation mode, the default is `'cdcl3'`.

Examples:
```
hcdept
hcdept('dmso')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`c13`	Automatic carbon acquisition (M)
`dept`	Set up parameters for DEPT experiment (M)
`enter`	Enter sample information for automation run (M,U)
`h1`	Automated proton acquisition (M)
`rttmp`	Retrieve experiment data from experiment subfile (M)

hcosy — Automated proton and COSY acquisition (M)

Syntax: `hcosy<(solvent)>`

Description: Combines the operation of the `h1` macro and the COSY experiment. In non-automation mode, both spectra are acquired in the experiment in which `hcosy` is entered. After acquisition completes, `rttmp` can be used for further processing of the two spectra.

Arguments: `solvent` is the solvent name. In automation mode, the `enter` program supplies the value. In non-automation mode, the default is `'cdcl3'`.

Examples:
```
hcosy
hcosy('dmso')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`enter`	Enter sample information for automation run (C)
`h1`	Automated proton acquisition (M)
`rttmp`	Retrieve experiment data from experiment subfile (M)

hdofst — Proton homonuclear decoupler offset (P)

Applicability: *GEMINI 2000* $^{1}H/^{13}C$ systems.

Description: Configuration parameter that normalizes homonuclear decoupler power output by shifting the range of the parameter dlp to compensate for differences in individual decoupler boards. The value of hdofst is set using the label Homo Dec. Offset in the CONFIG window (opened from config). The installation engineer sets this parameter during system installation and users should not need to change the value.

Values: 0 to 2048. Recommended range is 750 to 1200. The default is 1000. *Lower numbers cause increased power output.*

See also: *VNMR and Solaris Software Installation; Getting Started*

Related:

config	Display current configuration and possibly change it (M)
dlp	Decoupler low power control (P)
dm	Decoupler mode (P)
dmm	Decoupler modulation mode (P)
homdec	Proton homonuclear decoupler present (P)

hdwshim — Hardware shimming (P)

Applicability: UNITY*INOVA* systems, and UNITY and VXR-S systems with additional Z1 shimming hardware.

Description: Allows go, su, au, etc., to turn on and off UNITY and VXR-S shimming hardware. Hardware shimming is automatically suspended during software autoshimming. On UNITY*INOVA*, hardware shimming is only active during acquisition (go, ga, au). hdwshim is a global parameter, so it affects all experiments.

Values: 'y' turns hardware shimming on (only during a delay on UNITYINOVA).

'p' turns hardware shimming on during presaturation pulse (power level change followed by pulse). Available on UNITYINOVA only.

'n' turns shimming off.

See also: *Getting Started*

Related:

au	Submit experiment to acquisition and process data (C)
go	Submit experiment to acquisition (C)
su	Submit a setup experiment to acquisition (M)
ga	Submit experiment to acquisition and FT the result (M)

hdwshimlist — List of shims for hardware shimming (P)

Applicability: UNITY*INOVA* systems

Description: A global parameter that sets the shims to use during hardware shimming. If it does not exist, hardware shimming uses z1 by default. To create the parameter, use create('hdwshimlist','string','global').

Values: Any string composed of z1, z1c, z2, z2c, x1, y1. Commas and blank space are ignored. Shimming is done in the order z1, z2, x1, y1, regardless of the order in the string.

Examples:

```
hdwshimlist='z1'
hdwshimlist='z1z2x1y1'
```

See also: *Getting Started*

Related:

create	Create new parameter in a parameter tree (C)
hdwshim	Hardware shimming (P)

help — Display current help file (C)

Syntax: `help`

Description: Displays help information that explains the functions of the menu buttons and current utility that is active. This information is presented in the text window. The order of search for the `help` information file is first in the user's `vnmrsys` directory, next in the directory whose path is given by the `helppath` global parameter, and finally in the system `help` directory.

Alternate: Help button in the Permanent Menu.

See also: *VNMR User Programming*

Related: `helppath` User help directory absolute path (P)

helppath — Path to user's help directory (P)

Description: Contains absolute path to a user's `help` files directory. If `helppath` exists for a user, it must be defined in the user's global parameter file. To create `helppath`, enter `create('helppath','string','global')`.

See also: *VNMR User Programming*

Related: `help` Display current help file (C)

het2dj — Set up parameters for HET2DJ pulse sequence (M)

Syntax: `het2dj`

Description: Sets up a HET2DJ (heteronuclear 2D-J) experiment.

Alternate: HET2DJ button in the 2D Pulse Sequence Setup Secondary Menu.

See also: *User Guide: Liquids NMR*

Related: `foldj` Fold J-resolved 2D spectrum about *f1=0* axis (C)

HETCOR — Change parameters for HETCOR experiment (M)

Syntax: `HETCOR<('GLIDE')>`

Description: Converts the current parameter set to a HETCOR experiment. This is a phase-sensitive, multiplicity-selected experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding carbon spectrum for the experiment.

Related: `hetcor` Set up parameters for HETCOR experiment (M)

hetcor — Set up parameters for HETCOR pulse sequence (M)

Syntax: `hetcor<(exp_number)>`

Description: Sets up a HETCOR (heteronuclear chemical shift correlation) experiment.

Arguments: `exp_number` is the number of the experiment, from 1 to 9, in which a proton spectrum of the sample already exists.

Alternate: HETCOR button in the 2D Pulse Sequence Setup Secondary Menu.

See also: *User Guide: Liquids NMR*

Related: `plhxcor` Plot X,H-correlation 2D spectrum (M)
`ppcal` Proton decoupler pulse calibration (M)

hetcorcp1 — Set up parameters for solids HETCOR pulse sequence (M)

Applicability: Systems with the solids module.

Syntax: `hetcorcp1`

Description: Sets up a parameter set, obtained with XPOLAR or XPOLAR1, for HETCORCP1, the solid-state heteronuclear correlation experiment.

See also: *User Guide: Solid-State NMR*

Related:

`xpolar`	Set up parameters for XPOLAR pulse sequence (M)
`xpolar1`	Set up parameters for XPOLAR1 pulse sequence (M)

hetcorps — Set up parameters for HETCORPS pulse sequence (M)

Applicability: Not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems.

Syntax: `hetcorps`

Description: Sets up parameters for a heteronuclear chemical shift correlation experiment (absolute value and phase sensitive).

See also: *User Guide: Liquids NMR*

hidecommand — Execute macro instead of command with same name (C)

Syntax: (1) `hidecommand(command_name)<:$new_name>`
(2) `hidecommand('?')`

Description: Renames (or hides) a built-in VNMR command so that a macro with the same name as the built-in command is executed instead of the built-in command.

Arguments: `command_name` is the name of the command to be renamed. To reset the built-in command back to its original name, enter `hidecommand` with the hidden name as the argument.

`$new_name` returns the new name of the built-in command. By using this new name, access is still available to the built-in command.

`'?'` is a keyword to display a list of all of the renamed built-in commands and their original names.

Examples:

```
hidecommand('sys'):$newname
hidecommand('Sys')
hidecommand('?')
```

See also: *System Administration; VNMR User Programming*

Related:

`exists`	Set up parameters for XPOLAR pulse sequence (M)
`which`	Display which macro or command is used (M)

HMBC — Change parameters for HMBC experiment (M)

Syntax: `HMBC<('GLIDE')>`

Description: Converts the current parameter set to a HMBC experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

`gHMBC`	Change parameters for gHMBC experiment (M)

hmqc — Set up parameters for HMQC pulse sequence (M)

Applicability: All systems, except that presaturation or homospoil are not available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems. Homospoil is not available on *GEMINI 2000* systems.

Syntax: `hmqc<(isotope)>`

Description: Sets up a HMQC heteronuclear multiple-quantum coherence) experiment.

Arguments: `isotope` is the isotope number for the heteronucleus of interest (e.g., 13 for ^{13}C).

See also: *User Guide: Liquids NMR*

HMQC — Set up parameters for HMQC experiment (M)

Syntax: `HMQC<('GLIDE')>`

Description: Converts the current parameter set to a ^{13}C HMQC experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding carbon spectrum for the experiment.

Related:

gHMQC	Set up parameters for gHMQC experiment (M)
HMQC15	Set up parameters for ^{15}N HMQC experiment (M)
HMQC_d2	Set up parameters for ^{15}N HMQC using decoupler 2 (M)
HMQC_d213	Set up parameters for ^{13}C HMQC using decoupler 2 (M)

HMQC15 — Set up parameters for ^{15}N HMQC experiment (M)

Syntax: `HMQC15<('GLIDE')>`

Description: Converts the current parameter set to a HMQC experiment for ^{15}N.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding carbon spectrum for the experiment.

Related:

HMQC	Set up parameters for HMQC experiment (M)

HMQC_d2 — Set up parameters for ^{15}N HMQC experiment using decoupler 2 (M)

Syntax: `HMQC_d2<('GLIDE')>`

Description: Converts the current parameter set to a HMQC experiment for ^{15}N with decoupler 2 as ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the particular sample.

Related:

HMQC	Set up parameters for HMQC experiment (M)

HMQC_d213 — Set up parameters for ^{13}C HMQC experiment using decoupler 2 (M)

Syntax: `HMQC_d213<('GLIDE')>`

Description: Converts the current parameter set to a HMQC experiment for ^{13}C with decoupler 2 as ^{13}C.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the particular sample.

Related:

HMQC	Set up parameters for HMQC experiment (M)

hmqcr — Set up parameters for HMQCR pulse sequence (M)

Applicability: Not needed in current systems. Normally was used in systems with a ^{1}H only decoupler.

Syntax: `hmqcr`

Description: Sets up a HMQC (heteronuclear multiple-quantum coherence) experiment with "reverse" configuration.

See also: *User Guide: Liquids NMR*

hmqctocsy — Set up parameters for HMQCTOCSY pulse sequence (M)

Applicability: Sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `hmqctocsy`

Description: Sets up a HMQCTOCSY experiment with an option to null or invert the direct responses.

See also: *User Guide: Liquids NMR*

HMQCTOXY — Set up parameters for HMQCTOXY experiment (M)

Syntax: `HMQCTOXY<('GLIDE')>`

Description: Converts the current parameter set to a ^{13}C HMQCTOXY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

gHMQC	Set up parameters for gHMQC experiment (M)
HMQC	Set up parameters for HMQC experiment (M)
HMQCTOXY15	Set up parameters for ^{15}N HMQCTOXY experiment (M)
HMQCTOXY_d2	Set up parameters for ^{15}N HMQCTOXY using decoupler 2 (M)
HMQCTOXY_d213	Set up parameters for ^{13}C HMQCTOXY using decoupler 2 (M)

HMQCTOXY15 — Set up parameters for ^{15}N HMQCTOXY experiment (M)

Syntax: `HMQCTOXY15<('GLIDE')>`

Description: Converts the current parameter set to a HMQCTOXY experiment for ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for that particular sample.

Related:

HMQCTOXY	Set up parameters for HMQCTOXY experiment (M)

HMQCTOXY_d2 — Set up parameters for ^{15}N HMQCTOXY using decoupler 2 (M)

Syntax: `HMQCTOXY_d2<('GLIDE')>`

Description: Converts the current parameter set to a HMQCTOXY experiment for ^{15}N with decoupler 2 as ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for that particular sample.

Related:

HMQCTOXY	Set up parameters for HMQCTOXY experiment (M)

HMQCTOXY_d213 — Set up parameters for ^{13}C HMQCTOXY using decoupler 2 (M)

Syntax: `HMQCTOXY+d213<('GLIDE')>`

Description: Converts the current parameter set to a HMQCTOXY experiment for ^{13}C with decoupler 2 as ^{13}C.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for that particular sample.

Related: `HMQCTOXY` Set up parameters for HMQCTOXY experiment (M)

hmqctoxy3d — Set up parameters for HMQC-TOCSY 3D pulse sequence (M)

Applicability: Not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems.

Syntax: `hmqctoxy3d`

Description: Sets up parameters for a HMQC-TOCSY 3D experiment with a presaturation option.

See also: *User Guide: Liquids NMR*

ho — Horizontal offset (P)

Description: Horizontal offset of the each spectrum in a "stacked display" with respect to the previous spectrum,. For 1D data sets, the parameter `vo` sets the vertical offset. For 2D data sets, the parameter `wc2` sets the vertical distance (in mm) between the first and last traces.

Values: Number, in mm, for offset size. For a "left-to-right" presentation, `ho` is typically negative; for "bottom-to-top" presentation, `vo` or `wc2` is positive.

See also: *Getting Started*

Related:
- `vo` Vertical offset (P)
- `wc2` Width of chart in second direction (P)

hold — Post-trigger delay (P)

Applicability: Systems with imaging capabilities.

Description: Specifies a hold time between an external trigger and the start of the actual pulse sequence events. For example, in cardiac triggered imaging, `hold` provides a mechanism for offsetting the start of the sequence by a variable amount to obtain images at different times in the cardiac cycle.

See also: *User Guide: Imaging*

Related:
- `ticks` Number of trigger pulses (P)

hom2dj — Set up parameters for HOM2DJ pulse sequence (M)

Syntax: `hom2dj`

Description: Sets up a HOM2DJ (homonuclear J-resolved 2D) experiment.

Alternate: HOM2DJ button in the 2D Pulse Sequence Setup Secondary Menu.

See also: *User Guide: Liquids NMR*

HOMODEC — Change parameters for HOMODEC experiment (M)

Syntax: `HOMODEC('GLIDE')`

Description: Converts the current parameter set to a HOMODEC experiment. A 1D proton spectrum is displayed with `ds_selfrq` menu to do peak selection.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:
- `NOESY1D` Change parameters for NOESY1D experiment (M)
- `TOCSY1D` Change parameters for TOCSY1D experiment (M)

homdec — Proton homonuclear decoupler present (P)

Applicability: All *MERCURY* series systems and *GEMINI 2000* $^{1}H/^{13}C$ systems. On *GEMINI 2000* and *MERCURY-Vx* broadband systems, homonuclear decoupling is standard and this parameter must be set to `'y'`.

Description: Sets whether the optional proton homonuclear decoupler board is present. The value is set using the Homodecoupler label in the CONFIG window (opened from `config`).

Values: `'n'` indicates the board is not on the system (Not Present choice from the CONFIG window). If `homdec ='n'`, no communication with the board is possible: if the board is on, it will stay on, and if it is off, it will stay off.

`'y'` indicates the board is in the system (Present choice from the CONFIG window). This is the default. `homdec` must be set to `'y'` if the homonuclear decoupler board is present, even to turn off the homodecoupler.

See also: *VNMR and Solaris Software Installation*; *Getting Started*

Related:

`config`	Display current configuration and possibly change it (M)
`dlp`	Decoupler low power control (P)
`hdofst`	Proton homonuclear decoupler offset (P)

homo — Homodecoupling control for first decoupler (P)

Applicability: All systems except *MERCURY-Vx*, *MERCURY,* and *GEMINI 2000;* however, *MERCURY* and *GEMINI 2000* automatically use gated decoupling when `tn` and `dn` are both in the high band (i.e., if `tn` and `dn` is ^{1}H or ^{19}F, and `dm='y'`).

Description: Enables time-shared decoupling. Unlike the `dm`, `dmm`, and `hs` parameters, `homo` is not under "status" control. On systems with type 2 or 3 interface board (`apinterface=2` or `apinterface=3`), `homo` does not control any signal routing; the position of the relevant relays is controlled by whether homonuclear decoupling (`tn` equals `dn`) or heteronuclear decoupling (`tn` not equal to `dn`) is in effect.

Values: On UNITY*INOVA* and UNITYplus, the values are `'n'` or `'y'`, where:

- `'n'` specifies no gating.
- `'y'` specifies that the receiver is gated, which is done by controlling the observe L.O. (local oscillator) line. If `dm ='y'`, first decoupler rf, amplifier (blanked/unblanked), and preamplifier are gated. If `dm='n'`, no gating of these signals takes place. When `homo` is set to `'y'`, `dmm` should be set to `'c'` for continuous wave (CW) modulation.

On UNITY and VXR-S, the values are `'n'` or `'y'`, where:

- `'n'` disables decoupler time-sharing, which is appropriate for heteronuclear decoupling or for cases in which the decoupler is off during acquisition.
- `'y'` selects time-shared decoupling, which is appropriate for homonuclear decoupling in which the receiver is gated off when the decoupler is on. On systems with the type 1 interface board (`apinterface=1`), `homo='y'` also causes the decoupler signal to be combined with the observe signal before being sent to the probe.

See also: *Getting Started*

Related:

`apinterface`	AP Interface board type (P)
`dn`	Nucleus for first decoupler (P)
`homo2`	Homodecoupling control for second decoupler (P)

homo3	Homodecoupling control for third decoupler (P)
tn	Nucleus for observe transmitter (P)

homo2 Homodecoupling control for second decoupler (P)

Applicability: Systems with a second decoupler.

Description: Equivalent to the parameter homo. It works in conjunction with the parameters dm2 and dmm2.

Values: 'n', 'y'

See also: *Getting Started*

Related:

dm2	Decoupler mode for second decoupler (P)
dmm2	Decoupler modulation mode for second decoupler (P)
dn2	Nucleus for second decoupler (P)
homo	Homodecoupling control for first decoupler (P)

homo3 Homodecoupling control for third decoupler (P)

Applicability: Systems with a third decoupler.

Description: Equivalent to the parameter homo. It works in conjunction with the parameters dm3 and dmm3.

Values: 'n', 'y'

See also: *Getting Started*

Related:

dm3	Decoupler mode for third decoupler (P)
dmm3	Decoupler modulation mode for third decoupler (P)
dn3	Nucleus for third decoupler (P)
homo	Homodecoupling control for first decoupler (P)

homo4 Homodecoupling control for fourth decoupler (P)

Applicability: Systems with a deuterium decoupler channel as the fourth decoupler.

Description: Equivalent to the parameter homo. It works in conjunction with the parameters dm4 and dmm4.

Values: 'n', 'y'

See also: *Getting Started*

Related:

dm4	Decoupler mode for fourth decoupler (P)
dmm4	Decoupler modulation mode for fourth decoupler (P)
dn4	Nucleus for fourth decoupler (P)
homo	Homodecoupling control for first decoupler (P)

hoult Set parameters alfa and rof2 according to Hoult (M)

Syntax: hoult

Description: Sets the values of alfa and rof2 according to a prescription advanced by D. I. Hoult (*J. Magn. Reson.* **51**, 110 (1983)). These parameters set the times that follow the final pulse, which can be important where the flatness of the baseline is of concern.

See also: *Getting Started*

Related:

alfa	Set alfa delay before acquisition (P)
calfa	Recalculate alfa so that first-order phase is zero (M)
rof2	Receiver gating time following pulse (P)

hpa — Plot parameters on special preprinted chart paper (C)

Syntax: `hpa`

Description: Plots a predetermined list of parameters by “filling in the blanks” at the bottom of the preprinted chart paper available for Hewlett-Packard 7475- and 7550-series plotters.

Alternate: HP Params button in the 1D Plotting Menu (the plotter must installed as a Hewlett-Packard system for the HP Params button to appear).

See also: *Getting Started*

Related:

`apa`	Plot parameters automatically (M)
`x0`	X-zero position of HP plotter or Postscript device (P)
`y0`	Y-zero position of HP plotter or Postscript device (P)

hregions — Select integral regions in proton spectrum (M)

Syntax: `hregions`

Description: Selects integral regions, a critical step in automatic processing of proton spectra. It is critical not only because of aesthetic reasons (some people like many small integrals, others prefer a few large regions), but also because other commands, such as `bc`, depend on the correct integration: `bc` can either fail or it can make broad, unintegrated lines disappear from the spectrum. `hregions` was specifically designed for proton spectra and should not be used for other types of spectra. The result of `hregions` also depends on the lineshape and the signal-to-noise ratio of a spectrum

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`bc`	1D and 2D baseline correction (C)
`integrate`	Automatically integrate 1D spectrum (M)

hs — Homospoil pulses (P)

Applicability: All systems except *GEMINI 2000* (homospoil is not available on *GEMINI 2000* and, therefore, `hs` should be set to `'nn'`).

Description: Turns on homospoil pulses at various times in different pulse sequences. Homospoil is a process by which the homogeneity is temporarily made very bad (“spoiled”) to cause any transverse magnetizations present at that time to decay rapidly to zero. `hst` controls the length of any homospoil pulse.

Values: In a standard two-pulse sequence, homospoil pulses can be inserted during periods A and B (delays `d1` and `d2`): `hs='yn'` gives a homospoil pulse at the beginning of `d1`, `hs='ny'` gives a pulse during `d2`, and `hs='yy'` gives homospoil pulses during both `d1` and `d2`. The desired value is generally `hs='nn'`.

See also: *Getting Started*

Related:

`d1`	First delay (P)
`d2`	Incremented delay in 1st indirectly detected dimension (P)
`hst`	Homospoil time (P)

hsqc — Set up parameters for HSQC pulse sequence (M)

Applicability: Not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems.

Syntax: `hsqc`

Description: Sets up parameters for a heteronuclear Overbodenhausen experiment using reverse INEPT.

See also: *User Guide: Liquids NMR*

HSQC **Set up parameters for HSQC experiment (M)**

Syntax: `HSQC<('GLIDE')>`

Description: Converts the current parameter set to a ^{13}C HSQC experiment.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related:

`gHSQC`	Change parameters for gHSQC experiment (M)
`HSQC15`	Change parameters for ^{15}N HSQC experiment (M)
`HSQC_d2`	Change parameters for ^{15}N HSQC with decoupler 2 (M)
`HSQC_d213`	Change parameters for ^{13}C HSQC with decoupler 2 (M)

HSQC15 **Set up parameters for ^{15}N HSQC experiment (M)**

Syntax: `HSQC15<('GLIDE')>`

Description: Converts the current parameter set to a HSQC experiment for ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related:

`HSQC`	Change parameters for HSQC experiment (M)

HSQC_d2 **Set up parameters for ^{15}N HSQC experiment using decoupler 2 (M)**

Syntax: `HSQC_d2<('GLIDE')>`

Description: Converts the current parameter set to a HSQC experiment for ^{15}N with decoupler 2 as ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related:

`HSQC`	Change parameters for HSQC experiment (M)

HSQC_d213 **Set up parameters for ^{13}C HSQC experiment using decoupler 2 (M)**

Syntax: `HSQC_d213<('GLIDE')>`

Description: Converts the current parameter set to a HSQC experiment for ^{13}C with decoupler 2 as ^{13}C.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related:

`HSQC`	Change parameters for HSQC experiment (M)

HSQCTOXY **Set up parameters for HSQCTOXY experiment (M)**

Syntax: `HSQCTOXY<('GLIDE')>`

Description: Converts the current parameter set to a ^{13}C HSQCTOXY experiment.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related:

`gHSQCTOXY`	Change parameters for gHSQCTOXY experiment (M)
`HSQCTOXY15`	Change parameters for ^{15}N HSQCTOXY experiment (M)
`HSQCTOXY_d2`	Change parameters for ^{15}N HSQCTOXY with decoupler 2 (M)
`HSQCTOXY_d213`	Change parameters for ^{13}C HSQCTOXY with decoupler 2 (M)

HSQCTOXY15 **Set up parameters for ^{15}N HSQCTOXY experiment (M)**

Syntax: `HSQCTOXY15<('GLIDE')>`

Description: Converts the current parameter set to a HSQCTOXY experiment for ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related: HSQCTOXY Change parameters for HSQCTOXY experiment (M)

HSQCTOXY_d2 **Set up parameters for ^{15}N HSQCTOXY using decoupler 2 (M)**

Syntax: `HSQCTOXY_d2<('GLIDE')>`

Description: Converts the current parameter set to a HSQCTOXY experiment for ^{15}N with decoupler 2 as ^{15}N.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related: HSQCTOXY Change parameters for HSQCTOXY experiment (M)

HSQCTOXY_d213 **Set up parameters for ^{13}C HSQCTOXY using decoupler 2 (M)**

Syntax: `HSQCTOXY_d213<('GLIDE')>`

Description: Converts the current parameter set to a HSQCTOXY experiment for ^{13}C with decoupler 2 as ^{13}C.

Arguments: `'GLIDE'` is a keyword to first retrieve the PROTON parameter set for the experiment.

Related: HSQCTOXY Change parameters for HSQCTOXY experiment (M)

hsqctoxySE **Set up parameters for HSQC-TOCSY 3D pulse sequence (M)**

Applicability: Not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems.

Syntax: `hsqctoxySE`

Description: Sets up parameters for a HSQC -TOCSY 3D experiment.

See also: *User Guide: Liquids NMR*

hsrotor **Display rotor speed for solids operation (P)**

Applicability: Systems equipped with the rotor synchronization module.

Description: Controls display of rotor speed. Depending on whether the rotor synchronization module is present (set by the Rotor Synchronization label in the CONFIG window opened from `config`), parameter `rotorsync` is set to 1 or 0. The `xpolar` macro in turn uses this to create `hsrotor`, which is set to `'y'` if rotor synchronization is present. If the parameter `srate` exists, it is updated to the spin speed of the rotor at the end of the experiment. The interlock function specified by parameter `in` also changes. If `hsrotor='y'` and `in='y'`, the experiment is terminated if the rotor speed deviates more than 100 Hz.

Values: `'n'` makes `srate` unmodified by acquisition and turns off the rotor speed display in `Acqstat`.

`'y'` makes the hardware information from the rotor synchronization board update `srate` and displays the rotor speed in the `Acqstat` status display.

See also: *User Guide: Solid-State NMR*

Related:

Acqstat	Bring up the acquisition status display (U)
config	Display current configuration and possibly change it (M)
in	Interlock (P)
rotorsync	Rotor synchronization (P)
srate	Spinning speed (P)
xpolar	Set up parameters for XPOLAR pulse sequence (M)

hst — Homospoil time (P)

Applicability: All systems except *GEMINI 2000*.

Description: Controls pulse length if homospoil is activated by the hs parameter.

Values: On UNITY*INOVA* and UNITY*plus*, 0 to 20 ms (limited by hardware).

On *MERCURY-Vx* and *MERCURY*, 0 to 20 ms (limited by software, 8 ms is standard).

On UNITY and VXR-S, 0 to 20 ms (limited by software, 8 ms is standard).

See also: *Getting Started*

Related:

hs	Homospoil pulses (P)

htune — Tune proton channel on GEMINI 2000 (M)

Applicability: *GEMINI 2000* $^{1}H/^{13}C$ systems.

Syntax: `htune`

Description: Turns on the ^{1}H transmitter, directing about 0.5 watts of rf to the probe coil. Before entering `htune`, be sure to move the proper cable on the back of the left-hand magnet leg to the BNC connector labeled TUNE, and also to move the proper cable leading to the probe to the BNC connector labeled TUNE. Enter tuneoff to turn off the transmitter. `htune` cannot be executed while the console is acquiring or interactive acquisition (acqi) is connected. For the full tuning procedure, see the manual *Autoswitchable NMR Probes Installation*.

See also: *Getting Started*; *Autoswitchable NMR Probes Installation*

Related:

acqi	Interactive acquisition display process (C)
btune	Tune broadband channel on *MERCURY* series, *GEMINI 2000* (M)
ctune	Tune carbon channel on $^{1}H/^{13}C$ *GEMINI 2000* (M)
dtune	Tune lock channel on *GEMINI 2000* (M)
sethw	Set values for hardware in acquisition system (C)
su	Submit a setup experiment to acquisition (M)
tuneoff	Turn off probe tuning mode, *MERCURY* series, *GEMINI 2000* (M)

hzmm — Scaling factor for plots (P)

Description: Contains the quotient of wp divided by wc, a scaling factor useful for plotting. `hzmm` applies to 1D only.

See also: *Getting Started*

Related:

wc	Width of chart (P)
wp	Width of plot (P)

hztomm — Convert locations from Hz or ppm to plotter units (C)

Syntax: (1) `hztomm(x_position)<:xmm>`
(2) `hztomm(x_position,y_position)<:xmm,ymm>`

(3) `hztomm(<'box',><'plotter'|'graphics',>x_left, x_right,y_bottom,y_top)<:x1mm,x2mm,y1mm,y2mm>`

Description: Converts locations from Hz, or ppm, to plotter units.

Arguments: `x_position` in syntax 1 is a location along the 1D axis, in Hz or ppm, to be converted to plotter units using the current values of parameters `sp` and `wp`. Plotter units are mm on most plots and are scaled for graphics display. For ppm entries, use the `p` suffix following numerical values (see first example below).

`x_position,y_position` in syntax 2 is a coordinate, in Hz or ppm, on a 2D plot to be converted to plotter units, using the parameters `sp` and `wp` to convert the horizontal position and the parameters `sp1` and `wp1` to convert the vertical position.

`x_left,x_right,y_bottom,y_top` in syntax 3 are box edges, in Hz or ppm, on a 2D plot to be converted to plotter units, using the parameters `sp` and `wp` to convert the left and right edges, and parameters `sp1` and `wp1` to convert the top and bottom edges.

`'box'` is a keyword to draw a box and to make the first two return arguments, if supplied, give the location of the upper left corner of the box, in plotter units.

`'plotter'` is a keyword to select the plotter. The default is `'graphics'`.

`'graphics'` is a keyword to select the graphics screen. This is the default.

`x1mm,x2mm,y1mm,y2mm` are return arguments giving values in plotter units. If return arguments are not supplied, the results are displayed instead.

Examples:
```
hztomm(20p)
hztomm(xpos,ypos):xmm,ymm
hztomm('box','plotter',20,50,10,30)
```

See also: *Getting Started*

Related:

`box`	Draw a box on a plotter or graphics display (C)
`sp`	Start of plot in directly detected dimension (P)
`sp1`	Start of plot in 1st indirectly detected dimension (P)
`wp`	Width of plot in directly detected dimension (P)
`wp1`	Width of plot in 1st indirectly detected dimension (P)

I

i — Insert sample (M)

Applicability: All systems (including *MERCURY* and *GEMINI 2000*) if spin control hardware is installed.

Syntax: `i`

Description: Turns off the eject air, waits for sample to slowly drop, and then turns off the slow drop air. The macro `insert` functions the same as `i`.

See also: *Getting Started*

Related:

`e`	Eject sample (M)
`eject`	Eject sample (M)
`insert`	Insert sample (M)

ihwinfo — Hardware status of UNITY*INOVA* console (U)

Applicability: UNITY*INOVA* consoles (not available for any other type of console).

Syntax: (From UNIX) `ihwinfo('startup'|'abort')`

Description: Displays status of digital hardware in the UNITY*INOVA* console. The output is intended for service personnel and probably not meaningful to users.

Arguments: `'startup'` is a keyword to display the status at the conclusion of the last console startup (powerup, reboot, etc.).

`'abort'` is a keyword to display the status the last time an acquisition was aborted or the console rebooted from the host computer (`abortallacqs`). In this context, exiting from either the FID display or lock display of `acqi` counts as an abort. Only the status from the last abort can be displayed.

Examples:

```
ihwinfo('startup')
ihwinfo('abort')
```

See also: *Getting Started*

Related:

`abortallacqs`	Reset acquisition computer in a drastic situation (C)
`showconsole`	Show UNITY*INOVA* console configuration parameters (U)

il — Interleave arrayed and 2D experiments (P)

Description: Controls experimental interleaving in arrayed experiments. When interleaving is active, `bs` transients are performed for each member of the array, followed by `bs` more transients for each member of the array, and so on, until `nt` transients have been collected for each member of the array. Thus, `il` is only relevant if `bs` is less than `nt`.

Values: `'y'` turns on interleaving and `'n'` turns off interleaving.

See also: *User Guide: Liquids NMR*

Related:

`bs`	Block size (P)
`nt`	Number of transients (P)

ilfid — Interleave FIDs during data processing (C)

Syntax: `ilfid`

Description: Converts a multiple FID element into a single FID. It is possible to effectively extend the Nyquist frequency (i.e., increase the effective spectral width sw) by acquiring a number of FIDs with different *tau2* values and then reprocessing the data. `ilfid` does the necessary processing of time-domain data to achieve this extension, assuming that a pulse sequence (not supplied) has been written to generate the required data.

When invoked in an experiment of nf FIDs, each of np points, `ilfid` sorts the data into a single FID of np*nf points that can then be transformed. The interleaving takes the first complex point of each of the nf FIDs and places them in sequential order in the new FID. It then takes the second complex point from each of the nf FIDs and appends them sequentially to the new FID. This operation is repeated for all complex points. Although `ilfid` adjusts np and nf, it does not alter other parameters such as sw.

CAUTION: Because `ilfid` alters the data irrevocably, it is strongly recommended that you save the FID before using `ilfid`.

Examples: Illustrated below is the interleaving of an FID with nf=3 and np=4. Each point is represented by two digits. The first digit is the nf number and the second digit is the sequential point for that nf value. Data before the `ilfid` command:

```
11, 12, 13, 14; 21, 22, 23, 24; 31, 32, 33, 34
```

Data after the `ilfid` command:

```
11, 21, 31, 12, 22, 32, 13, 23, 33, 14, 24, 34
```

See also: *Getting Started*

Related:

nf	Number of FIDs (P)
np	Number of data points (P)
sw	Spectral width in directly detected dimension (P)

`image` Display noninteractive gray scale image (M)

Applicability: Systems with imaging capabilities.

Syntax: `image`

Description: Brings up a dcon 2D display of an image (using grayscale and linear scaling of the intensity) that can be used for adjusting the display while using dconi.

See also: *User Guide: Imaging*

Related:

dcon	Display noninteractive color intensity map (C)
dconi	Interactive 2D data display (C)
dconn	Display color intensity map without erasing screen (C)

`image` Control phase encoding gradient in EPI experiments (P)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Description: Turns on and off the phase encoding gradient in EPI experiments. `image` also specifies the number of EPI images to collect in an arrayed experiment.

Values: 0 specifies that the phase encoding gradient is turned off.

1 specifies that the phase encoding gradient is turned on.

Examples: `image=0,1,1,1` collects a set of four EPI images. The first dataset refers to the reference scan.

See also: *User Guide: Imaging*

imageprint — Plot noninteractive gray scale image (M)

Syntax: `imageprint`

Description: Sends to the plotter a `dcon` color intensity map with linear instead of logarithmic increments and with grayscale instead of colors.

Alternate: Image button on the 2D Plotting Menu.

See also: *User Guide: Liquids NMR*

Related:

`dcon`	Display noninteractive color intensity map (C)
`image`	Display noninteractive gray scale image (M)

imark — Annotate an image display (M)

Applicability: Systems with imaging capabilities.

Syntax: `imark(string<,color>)`

Description: Used to label an image display with characters or strings in any color provided by the `write` command. The labeling is only available inside the axis box of the image and is directed by the 2D cursors.

Arguments: `string` is a text string.

`color` is color of the text on a color display: `'red'`, `'yellow'`, `'green'`, `'cyan'`, `'blue'`, `'magenta'`, and `'white'`. The default is `'yellow'`.

Examples: `imark('Muscle','red')`

See also: *User Guide: Imaging*

Related:

`write`	Write formatted text to a device (C)

imcalc — Calculate 2D phasefiles (M,U)

Applicability: Systems with imaging capabilities.

Syntax: (From VNMR) `imcalc(optype,phf1,<phf2,outphf,args>)`
(From UNIX) `imcalc optype phf1 <phf2 outphf args>`

Description: Provides a means, along with the supporting macros, of performing arithmetic operations at a pixel-by-pixel basis on images. As operands, phasefiles are required that have been previously saved with the VNMR command `svphf`. A new phasefile is generated that represents the result of the selected action.

The UNIX program `imcalc` may be called from a UNIX shell using syntax 1, or called from VNMR with the macro `imcalc` using syntax 2. The macro `imcalci` serves as an interactive interface to the `imcalc` macro by prompting for any required inputs, which vary with the operation type. For unary operations, such as `log`, `imcalci` uses the phasefile resident in the current experiment by default

Arguments: `optype` can be any of the following keywords (place single quotes around the keyword when entering `imcalc` from VNMR):

- `abs` takes the absolute value of an image.
- `add` adds two images.
- `addc` adds a constant value to each pixel in an image.
- `clipmax` sets pixel values above a user-supplied maximum to zero.
- `clipmin` sets pixel values below a user-supplied minimum to zero.
- `div` divides the first image by the second.
- `exp` sets the antilog of an image: (10^{image}).

- `f1roll` wraps an image in the f_1 direction a selected number of pixels.
- `f2roll` wraps an image in the f_2 direction a selected number of pixels.
- `flip_diag` flips an image about `x=y` diagonal (square images only).
- `flip_horiz` flips an image about the central horizontal axis.
- `flip_vert` flips an image about the central vertical axis.
- `gmean` sets the geometric mean of two images: $\sqrt{image1 \times image2}$.
- `hline` replaces a selected horizontal trace by the average of the two adjacent traces.
- `log` sets a logarithm of an image: $log|image|$.
- `mean` sets the arithmetic mean of two images: $\frac{image1 + image2}{2}$.
- `mult` multiplies two images.
- `multc` multiplies each pixel in an image by a constant value.
- `phase` computes a resultant image from the phase angle determined by the arctangent of two orthogonal component images.
- `pow` sets exponentiation of an image ($image^{constant}$). To invert an image (1/pixel), use `pow` with an exponent of `-1`. To get a square root image, use `pow` with an exponent of `1/2`.
- `reverse` sets linear inversion of pixel intensities in an image.
- `rotate_90` rotates an image clockwise 90° (square images only).
- `rotate_180` rotates an image 180°.
- `sub` subtracts the second image from the first (use `add` with a negative multiplier in direct call to UNIX `imcalc` program)
- `thresh` compresses all pixel values above a selected threshold to 1, and below to 0.
- `thresh2` compresses all pixel values above a user-supplied minimum and below a user-supplied maximum to 1, all others to 0.
- `vadd` adds two orthogonal "component" images to form the vector sum: $\sqrt{image1^2 + image2^2}$.
- `vline` replaces a selected vertical trace by the average of the two adjacent traces.

Examples: (From UNIX) `imcalc add phf1 phf2 outphf 0.5`
(From VNMR) `imcalc('add','phf1','phf2','destphf' 0.5)`

See also: *User Guide: Imaging*

Related:

`add`	Add current FID to add/subtract experiment (C)
`makephf`	Transform and save images as phasefiles (M)
`spadd`	Add current spectrum to add/subtract experiment (C)
`svphf`	Save phasefiles (C)

`imcalci` Format arguments for imcalc macro (M)

Applicability: Systems with imaging capabilities.

Syntax: `imcalci(optype)`

Description: Interactively formats arguments for the `imcalc` macro from prompted user inputs. The macro `imcalci` can be run from the VNMR command line or be accessed through the menu system by selecting the ImageCalc option in the Analyze menu.

Arguments: `optype` has the same values as `optype` for the `imcalc` macro.

Examples: `imcalci('add')`

See also: *User Guide: Imaging*

Related: `imcalc` Calculate 2D phasefiles (M,U)

imconi — Display 2D data in interactive grayscale mode (M)

Syntax: `imconi`

Description: Calls the `dconi` program with the arguments required for grayscale image display: `dconi('dcon','gray','linear')`.

Related: `dconi` Interactive 2D contour display (C)

imfit — Fit arrayed imaging data to T_1 or T_2 exponential data (M,U)

Applicability: Systems with imaging capabilities.

Syntax: (From VNMR) `imfit('t1'|'t2',basename,min_threshold)`
(From UNIX) `imfit t1|t2 basename min_threshold time1 time2 ... timeN`

Description: Performs fitting at each pixel to exponential T_1 or T_2 data. The `imfit` macro from VNMR provides a convenient link to the UNIX `imfit` fitting procedure by setting up and passing the correct arguments to the external program. If data cannot be handled by the VNMR macro, the UNIX `imfit` command can be called directly.

Three synthetic images are created by the `imfit` program, and placed in the `planes` directory of the current experiment. The T_1 or T_2 image are named `basename1` or `basenamet2`. An error image `basenamesigma` represents the standard deviation of the fit at each pixel, and a *t=0* image, `basenamem0`, represent the intercept of the original data at zero time.

The `imfit` macro automatically extracts the timing values for each array element in the data set from whichever parameter has been arrayed, providing these times to the fitting routine. For this reason, the `imfit` macro does not function properly if more than one parameter is arrayed.

Two macros, `t1image` and `t2image`, are provided to do all of the preprocessing required for fitting. They query for the base phasefile names and lower-limit noise threshold, transform and save all of the images, and call the `imfit` macro to complete the fitting process.

T_1 fitting type requires phase-sensitive images progressing from negative to positive in the normal inversion-recovery model.

Arguments: `'t1'` and `'t2'` are keywords for the fitting type, either `'t1'` for inversion-recovery or `'t2'` for decaying exponential (`'t2'` can also be used for saturation-recovery data).

`basename` is the name of a phasefile that represents the arrayed set of images. The phasefile should reside in the `planes` directory and must end in consecutive integer extensions, starting with `1`.

`min_threshold` is a value for the lower limit for the fitting program. Pixels whose values in the first image are less than this threshold will not be fit and will be assigned values of zero in the synthesized resultant images.

See also: *User Guide: Imaging*

Related: `makephf` Transform and save images as phasefiles (M)
`t1image` Fit arrayed imaging data to T_1 exponential data (M)

	t2image	Fit arrayed imaging data to T_2 exponential data (M)
	vs	Vertical scale (P)

imprep — Set up rf pulses, imaging and voxel selection gradients (M)

Applicability: Systems with imaging capabilities.

Syntax: imprep

Description: Sets up rf pulses, imaging gradients, and voxel selection gradients as required by the application, thus providing a universal "one pass" set up of rf power and gradient levels after sequence timing, field of view, and voxel selection parameters have been chosen. imprep scans the configuration parameter lists plist and sslist to determine which rf pulse parameters and gradients are active and then proceeds to set up parameter values.

See also: *User Guide: Imaging*

Related:		
	plist	Active pulse length parameter list (P)
	sslist	Conjugate gradient list (P)

in — Lock and spin interlock (P)

Description: Controls error handling based on lock level and spin speed, and specifies action to be taken based on lock level failure or spinner failure. The action can be to generate an error and halt acquisition, or to generate a warning and continue acquisition.

Values: Can be set to one or two characters:

- If set to two characters, the first character specifies the action for lock failure and the second character specifies the action for spinner failure.
- If set to only one character, that character specifies the same action for either lock or spinner failure.

'n' stops any system checking so that acquisition continues regardless of the lock level or spin speed.

'w' makes the system check the lock level and the spin speed. A warning message is added to the log file if the lock level falls below a preset hardware level (about 20 on the lock meter) or if spin is set to a particular value and the spin speed goes out of regulation; however, acquisition is not stopped.

'y' makes the system check the lock level and spin speed. Acquisition is halted if the lock level falls below a preset hardware level (about 20 on the lock meter) or if spin is set to a particular value and the spin speed goes out of regulation.

See also: *Getting Started*

Related:		
	spin	Sample spin rate (P)

inadqt — Set up parameters for INADEQUATE pulse sequence (M)

Applicability: All systems except *GEMINI 2000*.

Syntax: inadqt

Description: Sets up parameters for 2D INADEQUATE (Incredible Natural Abundance Double-Quantum Transfer Experiment).

Alternate: INADQT button in the 2D Pulse Sequence Setup Secondary Menu.

See also: *User Guide: Liquids NMR*

Related:		
	foldcc	Fold INADEQUATE data about 2-quantum axis (C)

index2 — Projection or 3D plane index selected (P)

Applicability: All systems; however, although `index2` is available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, such systems can only process 3D data and cannot acquire 3D data.

Description: Stores whether a projection or 3D plane index is selected. It shows the current status only and cannot be used to select a plane or projection. This parameter is also displayed in the Status window below "Index."

Values: 0 indicates a projection is selected.

1 to the half the Fourier number of the normal axis indicates a 3D plane is selected; the number is the index of the 3D plane.

See also: *User Guide: Liquids NMR*

Related:

`dplane`	Display a 3D plane (M)
`dproj`	Display a 3D plane projection (M)
`nextpl`	Display the next 3D plane (M)
`prevpl`	Display the previous 3D plane (M)
`select`	Select a spectrum or 2D plane without displaying it (C)

inept — Set up parameters for INEPT pulse sequence (M)

Syntax: `inept`

Description: Sets up parameters for the INEPT (Insensitive Nuclei Enhanced by Polarization Transfer) experiment.

Alternate: *INEPT* button in the 1D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

Related:

`ppcal`	Proton decoupler pulse calibration (M)

initialize_iterate — Set iterate string to contain relevant parameters (M)

Syntax: `initialize_iterate`

Description: Takes the current spin system (contained in `spinsys`) and derives from it relevant parameters. This can be used to control which parameters are iterated during a spin simulation iteration (e.g., for an ABC spin system, `iterate` is set to `'A,JAB,JAC,B,JBC,C'`).

Alternate: Set Params button in the Spin Simulation Main Menu

See also: *User Guide: Liquids NMR*

Related:

`iterate`	Parameters to be iterated (P)

input — Receive input from keyboard (C)

Syntax: `input<(<prompt><,delimiter>)>:var1,var2,...`

Description: Receives fields of characters from the keyboard and stores them into one or more variables.

Arguments: `prompt` is a string displayed on the command line.

`delimiter` is a character separating input fields. The default is a comma.

`var1,var2,...` are return values. `input` stores the values into as many of these arguments as given and ignores the rest of the input line.

Examples:

```
input:$b
input('Enter pulse width:'):pw
```

```
input('x and y coordinates'):cr,cr1
input('Enter lastname:firstname',':'):$last,$first
```

See also: *VNMR User Programming*

Related:		
	string	Create a string variable (C)

ins — Integral normalization scale (P)

Description: Sets the integral value, independent of is and vs. Reported integral values are scaled by fn; that is, the reported integral of a given region is independent of fn. The insref parameter is also used to determine a reference integral value. The setint macro sets integral value.

See also: *Getting Started*

Related:		
	dlni	Display list of normalized integrals (M)
	fn	Fourier number in directly detected dimension (P)
	is	Integral scale (P)
	insref	Fourier number scaled value of an integral (P)
	mark	Determine intensity of spectrum at a point (C)
	setint	Set value of an integral (M)
	vs	Vertical scale (P)

ins2 — 2D volume value (P)

Description: Adjusts the 2D volume value, independent of is and vs. The volume is scaled by Fourier numbers for the two dimensions.

See also: *User Guide: Liquids NMR*

Related:		
	is	Integral scale (P
	ins2ref	Fourier number scaled volume of a peak (P)
	ll2d	Automatic and interactive 2D peak peaking (C)
	vs	Vertical scale (P)

insref — Fourier number scaled value of an integral (P)

Description: Set to the Fourier number scaled value of a selected integral. The reported integral values will be *(integral value)**ins/insref/fn. If insref is "not used", the sum of all integrals will be ins. The "not used" mode is the equivalent of the normalized integral mode. If insref is zero or not defined, the reported integrals will be *(integral value)**ins/fn.

See also: *Getting Started*

Related:		
	fn	Fourier number in directly detected dimension (P)
	ins	Integral normalization scale (P)
	liamp	Amplitudes of integral reset points (P)
	setint	Set value of an integral (M)

ins2ref — Fourier number scaled volume of a peak (P)

Description: Set to the Fourier number scaled volume of the selected peak. The reported volume is *volume**ins2/ins2ref/fn/fn1. If ins2ref is "not used", sum of all volumes is ins2. The "not used" mode is equivalent to a normalized volume mode. If ins2ref is zero or not defined, the reported volume is *volume**ins2/fn/fn1.

See also: *User Guide: Liquids NMR*

Related:

`fn`	Fourier number in directly detected dimension (P)
`fn1`	Fourier number in first indirectly detected dimension (P)
`ins2`	2D volume value (P)
`ll2d`	Automation and interactive 2D peak picking (C)

`insert` Insert sample (M)

Applicability: All systems (including *MERCURY* and *GEMINI 2000*) if spin control hardware is installed.

Syntax: `insert`

Description: Turns off the eject air, waits for the sample to slowly drop, and then turns off the slow drop air. The macro `i` is identical in function to `insert`.

See also: *Getting Started*

Related:

`e`	Eject sample (M)
`eject`	Eject sample (M)
`i`	Insert sample (M)

`inset` Display an inset spectrum (C)

Syntax: `inset`

Description: Displays the part of the spectrum between the two cursors as an inset. Before entering `inset`, run the `ds` command and display two cursors. The vertical position is shifted up about one-quarter of the height of the whole display canvas. The old spectrum remains on the screen, but the parameters shown at the bottom are relevant to the new display. If present, the integral trace is duplicated. The scale is also duplicated if it is present. After running `inset`, you can shift the displayed spectrum, expand it, or even contract it with the left and right mouse buttons.

See also: *Getting Started*

Related:

`ds`	Display a spectrum FID (C)

`integ` Find largest integral in a specified region (C)

Syntax: `integ<(highfield,lowfield)><:size,value>`

Description: Finds the largest absolute-value integral in the specified region, or the total integral if no reset points are present between the specified limits.

Arguments: `highfield` and `lowfield` are the limits of the region. The default values are the parameters `sp` and `sp`+`wp`, respectively.

`size` is a return value with the size of the largest integral. The size depends on the value of the parameter `is` and can be positive or negative.

`value` is a return argument with the value of the largest integral. This value depends on `ins`, `insref`, and `fn`, and is independent of `is`.

Examples:

```
integ:r1,r2
integ(500,1000):$height
integ(100+sp,300+sp):$ht,$val
```

See also: *VNMR User Programming*

Related:

`fn`	Fourier number in directly detected dimension (P)
`ins`	Integral normalization scale (P)
`insref`	Fourier number scaled value of an integral (P)

is	Integral scale (P)
rp	Zero-order phase in directly detected dimension (P)
sp	Start of plot in directly detected dimension (P)
wp	Width of plot in directly detected dimension (P)

integrate — Automatically integrate 1D spectrum (M)

Syntax: integrate

Description: A universal macro for selecting integral regions and adjusting the integrals in size and offset. Only if regions are not already selected, and if intmod is set to 'partial', will integrate call region to select integral regions. For proton spectra, the selection is done through the hregions macro; for ^{19}F and ^{31}P spectra (for wide spectral windows, multiplet spectra), region is called with optimized arguments, and for other nuclei (mostly decoupled, single-line spectra) other optimized parameters are used with region, such that lines consisting of a few data points only are recognized.

See also: *Getting Started*

Related:

hregions	Select integral regions in proton spectrum (M)
intmod	Integral display mode (P)
isadj	Adjust integral scale (M)
region	Automatically select integral regions (C)

intmod — Integral display mode (P)

Description: Controls display and plotting of the spectral integral.

Values: 'off' indicates that no integrals are displayed or plotted.

'full' indicates that all integral regions are displayed or plotted.

'partial' indicates that every other integral region is plotted (typically used to display integrals of only peaks and not of the baseline region).

See also: *Getting Started; User Guide: Liquids NMR*

Related:

plc	Plot carbon spectrum (M)
plh	Plot proton spectrum (M)
plp	Plot phosphorus spectrum (M)

intvast — Produces a text file of integral regions (M)

Applicability: Systems with VAST accessory.

Syntax: intvast(last)

Description: intvast produces a text file, integ.out in the current experiment, containing the integrals of the partial regions of each spectra from wells 0 to last.

Arguments: last is the number last sample well. The default is 96.

See also: *User Guide: Liquids NMR*

Related:

pintvast	Plot the integrals (M)

iplan — Open interactive image planning tools (M)

Applicability: Systems with imaging capabilities.

Description: iplan is an interactive image planning server loop with drawn-on screen control buttons. It captures mouse control in VNMR so that you click the screen Exit button to leave. The server opens the tbox transverse slice specification tool. By choosing a button in the graphics area, tbox can be stretched, tilted,

and moved. The number of slices and the area that they cover can also be adjusted. The Exit button calls the `rsliceplan` macro to load these setting for the next images.

See also: *User Guide: Imaging*

Related:		
	`sliceplan`	Set slice parameters for target slice (M)
	`tbox`	Draw a tilted box (C)

`io` Integral offset (P)

Description: Offset of the integral with respect to the spectrum.

Values: 0 to 200, in mm.

See also: *Getting Started*

`ir` Inversion recovery mode (P)

Applicability: Systems with imaging capabilities.

Description: Specifies whether to run in inversion recovery mode or in normal mode. In inversion recovery mode, the parameters `pipat`, `tpwri`, `pi`, and `ti` become active, providing a prepulse and delay for inversion recovery experiments.

Values: `'n'` specifies normal mode and `'y'` specifies inversion recovery mode.

See also: *User Guide: Imaging*

Related:		
	`pi`	Width of an inversion pulse (P)
	`pipat`	Shape of an inversion pulse (P)
	`ti`	Second delay in an inversion recovery sequence (P)
	`tpwri`	Intensity of an inversion pulse in dB (P)

`is` Integral scale (P)

Description: Multiplier that adjusts height of the displayed integral trace. Note that the `ins` parameter controls the integral value, and that `is` has no effect on integral value.

Values: 1 to 1e9

See also: *Getting Started*

Related:		
	`ins`	Integral normalization scale (P)
	`ins2`	2D volume value (P)
	`insref`	Fourier number scaled value of an integral (P)
	`integ`	Find largest integral in a specified region (C)

`isadj` Automatic integral scale adjustment (M)

Syntax: `isadj<(height<,neg_height>)>`

Description: Adjusts the height of the integrals in a display to make the tallest integral fit the paper. Optionally, the height of the maximum integral can be specified by an argument. Negative integrals, if present, are given a limit of 10 mm if parameter `io` is less than 10; otherwise, they are set so they end 5 mm above the spectrum. Negative integrals can also be given a height. Whichever part of the integrals (positive or negative) runs into the given limit will be used to scale `is`.

Arguments: `height` is the size, in mm, of the maximum integral on display. The default is the height that makes the tallest integral fit the paper.

`neg_height` is the desired height, in mm, of the largest negative integral. If `io` is less than 10, the default is 10; otherwise, the default height is 5 mm above the spectrum.

Examples:
```
isadj
isadj(100)
isadj(100,100)
```

See also: *Getting Started*

Related:

`io`	Integral offset (P)
`is`	Integral scale (P)
`isadj2`	Automatic integral scale adjustment by powers of two (M)

`isadj2` Automatic integral scale adjustment by powers of two (M)

Syntax: `isadj2<(height<,neg_height>)>:scaling_factor`

Description: Functionally the same as `isadj` except that `isadj2` adjusts the integral height by powers of two and returns the scaling factor to the calling macro.

Arguments: `height` is the size, in mm, of the maximum integral on display.

`neg_height` is the desired height, in mm, of the maximum negative integral on display.

`scaling_factor` is a return value giving the ratio of the new integral size to the old value (`new_is/old_is`).

Examples:
```
isadj2
isadj2(100)
isadj2(100,100)
isadj2(50):r1
```

See also: *Getting Started*

Related:

`is`	Integral scale (P)
`isadj`	Automatic integral scale adjustment (M)

`iterate` Parameters to be iterated (P)

Description: Contains parameters to be iterated during iterative spin simulations. If the Set Params button is used in setting up spin simulation parameters, `iterate` is initialized to a string containing all parameters appropriate to the current spin system.

Values: List of parameters, separated by commas (e.g., `iterate='A,B,JAB'`).

See also: *User Guide: Liquids NMR*

Related:

`initialize_iterate`	Set `iterate` string to contain relevant parameters (M)

J

jdesign — Start Plot Designer Program (M)

Syntax: `jdesign`

Description: Opens the Plot Designer program, which provides mechanisms for positioning spectra, parameters, axes, and other plot output on a page. Text annotation and drawing features are available.

See also: *Getting Started*

Related:

`jplot`	Plot from Plot Designer program (C)

jexp — Join existing experiment (C)

Syntax:
(1) `jexp(exp_number)`
(2) `jexp:$current_exp_number,$current_exp_name`

Description: Joins an existing experiment (syntax 1) or returns the current experiment number and experiment name (syntax 2). After entering this command, until another "join experiment" command or macro is entered, all actions (including changes of parameters, acquisition of data, and display of data) apply to the parameters and data of the experiment joined.

The `jexp` command does not refresh the display or display new experiment parameters. Use one of the macros `jexp1`, `jexp2`, etc. to join an experiment and have the screen refreshed and new parameters displayed.

Arguments: `exp_number` is a number from 1 to 9999 for existing experiment to be joined.

`$current_exp_number` is a return value with the current experiment number.

`$current_exp_name` is a return value with the current experiment name.

Examples:

```
jexp(3)
jexp:$expp
jexp:r1,n1
```

Alternate: Exp# button (for example, Exp1) in the Workspace Menu.

See also: *Getting Started*, *User Guide: Liquids NMR*

Related:

`cexp`	Create an experiment (M)
`delexp`	Delete an experiment (M)
`jexp1–jexp9`	Join existing experiment and display new parameters (M)
`unlock`	Remove inactive lock and join experiment (C)

jexp1–jexp9999 — Join existing experiment and display new parameters (M)

Syntax: `jexp1`, `jexp2`, `jexp3`, ...,`jexp9999`

Description: Joins an existing experiment, refreshes the screen, and displays the main menu and the new experiment parameters. After entering this macro, until another "join experiment" command or macro is entered, all actions (including changes of parameters, acquisition of data, and display of data) apply to the parameters and data of the experiment joined.

To join an experiment without refreshing the screen and displaying new parameters, use the `jexp` command.

Examples:
```
jexp8
jexp354
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

cexp	Create an experiment (M)
delexp	Delete an experiment (M)
jexp	Join existing experiment (C)
unlock	Remove inactive lock and join experiment (C)

jplot — Plot from Plot Designer program (C)

Syntax: `jplot<('-setup'><,template)>`

Description: Starts plotting from the Plot Designer program to the current plotter.

Arguments: `'-setup'` is a keyword to start `jdesign`, the Plot Designer program, to allow interactive design and plotting.

`template` is the name of a file that will be used to make a plot of the current experiment. The default is a saved file chosen by the user.

Examples:
```
jplot
jplot('t1')
```

See also: *Getting Started*

Related:

jdesign	Start Plot Designer program (M)
jplotscale	Scale plot parameters (M)
jplotunscale	Restore current experiment parameters (M)

jplotscale — Scale plot parameters (M)

Applicability: Plot Designer program

Syntax: `jplotscale`

Description: Scales parameters of plotting area and an imported plot. When a region is drawn in Plot Designer, `jplotscale` automatically changes the plotting area parameters `wcmax` and `wc2max`. The parameters `io`, `is`, `vs`, `wc`, and `wc2` of a plot imported into a region are adjusted according to `wcmax` and `wc2max`.

See also: *Getting Started*

Related:

jplot	Plot from Plot Designer program (C)
jplotunscale	Restore current experiment parameters (M)

jplotunscale — Restore current experiment parameters (M)

Applicability: Plot Designer program

Syntax: `jplotunscale`

Description: Restores the current experiment parameters (`io`, `is`, `vs`, `wc`, and `wc2`) to a plot within a region that was created in Plot Designer. For example, entering `jplotunscale jexp2 jplotscale` restores the parameters of experiment 2 to a plot and then `jplotscale` applies the adjusted parameters to the plot.

See also: *Getting Started*

Related:

jplot	Plot from Plot Designer program (C)
jplotscale	Scale plot parameters (M)

jumpret **Set up parameters for JUMPRET pulse sequence (M)**

Applicability: Sequence is not supplied with *MERCURY-Vx*, *MERCURY* and *GEMINI 2000*.

Syntax: `jumpret`

Description: Sets up parameters for a jump-and-return water suppression sequence.

See also: *User Guide: Liquids NMR*

jwin **Activate and record activity in current window (M)**

Syntax: `jwin(pane_number)`

Description: Activates and records the activity in a specific window pane, created by `setgrid`, in the VNMR graphics window. `jwin` is executed when you double-click the left mouse button in a multiple-paned graphics window.

Arguments: `pane_number` is the number of the pane to join.

Examples: `jwin(2)`

See also: *Getting Started*

Related:

`curwin`	Current window (P)
`fontselect`	Open FontSelect window (C)
`mapwin`	List of experiment numbers (P)
`setgrid`	Activate selected window (M)
`setwin`	Activate selected window (C)

K

killft3d — Terminate any ft3d process started in an experiment (M,U)

Syntax: `killft3d(exp_number)`

Description: Terminates any `ft3d` program that has been started in the specified VNMR experiment. `killft3d` can be executed from any experiment. For each `ft3d` process terminated, the relevant 3D data subdirectory is also deleted. Remote `ft3d` processes, denoted by the call name `ftr3d` in the process table (displayed by the UNIX command `ps -azx`), are not directly terminated by `killft3d` but die of their own accord due to the deletion of the 3D data subdirectory.

The `killft3d` command can also be run as a shellscript from UNIX. Its function is analogous to the associated VNMR macro.

Arguments: `exp_number` is a number from 1 to 9 that identifies the experiment that started the `ft3d` program.

Examples: `killft3d(4)`

See also: *User Guide: Liquids NMR*

Related:

`ft3d`	Perform a 3D Fourier transform (M,U)

killplot — Stop plot jobs and remove from plot queue (M)

Syntax: `killplot`

Description: Kills all current plot jobs in the plot queue for the active plotter in VNMR, then removes the jobs from the plot queue. Unless the user executing `killplot` is `root`, only that user's plot jobs are deleted from the plot queue. To kill a plot that is in progress (i.e., a plot in which you have not entered `page`), use the `page('clear')` command.

The plotter may have to be reinitialized after `killplot` is executed. To reinitialize the plotter, turn it off and then back on after a few seconds. Hewlett-Packard (HP) pen plotters appear to be more susceptible to this problem than the other HP output devices supported by VNMR.

If one port is configured to be both a printer and a plotter, `killplot` can cause both plot *and* print jobs to that port to be deleted. For example, if `printer='LaserJet_300'`, `plotter='LaserJet_300R'`, and a plot command `pl pscale page` is followed by a print command `ptext(vnmruser+'/psglib/noesy.c')`, entering `killplot` deletes both jobs.

See also: *Getting Started*

Related:

`killprint`	Stop print jobs and remove from print queue (M)
`page`	Move plotter forward one or more pages (C)
`pl`	Plot spectra (C)
`pscale`	Plot scale below spectrum or FID (C)
`ptext`	Print out a text file (M)
`showplotq`	Display plot jobs in plot queue (M)

killprint — Stop print jobs and remove from print queue (M)

Syntax: killprint

Description: Kills all current print jobs in the print queue for the active printer in VNMR, then removes the jobs from the print queue. Unless the user executing killprint is root, only that user's print job is deleted from the print queue. It is slightly possible that the printer may have to be reinitialized after the execution of this macro. To reinitalize the printer, turn it off, wait a few seconds, and then turn it back on.

If one port is configured to be both a printer and a plotter, killprint can cause both print *and* plot jobs to that port to be deleted. For example, if printer='LaserJet_300', plotter='LaserJet_300R', and a plot command pl pscale page is followed by a print command ptext(vnmruser+'/psglib/noesy.c'), entering killprint deletes both jobs.

See also: *Getting Started*

Related:

killplot	Stop plot jobs and remove from plot queue (M)
ptext	Print out a text file (M)
showprintq	Display print jobs in print queue (M)

kind — Kinetics analysis, decreasing intensity (M)

Syntax: kind

Description: If the signal decreases exponentially toward a limit, the output is matched by *I = A1 * EXP(–T/TAU) + A3*. This macro supplies the necessary keywords to the analyze command, which uses the output of fp (i.e., the file fp.out) as input. The results can be displayed with expl.

See also: *User Guide: Liquids NMR*

Related:

analyze	Generalized curve fitting (C)
expl	Display exponential/polynomial curves (C)
fp	Find peak heights (C)
kinds	Kinetic analysis, decreasing intensity, short form (M)
kini	Kinetics analysis, increasing intensity (M)
kinis	Kinetic analysis, increasing intensity, short form (M)

kinds — Kinetics analysis, decreasing intensity, short form (M)

Syntax: kinds

Description: Produces a summary of the results from kind.

See also: *User Guide: Liquids NMR*

Related:

kind	Kinetics analysis, decreasing intensity (M)

kini — Kinetics analysis, increasing intensity (M)

Syntax: kini

Description: If the signal increases exponentially toward a limit, the output is matched by *I = –A1 * EXP(–T/TAU) + A3 – A1*. This macro supplies the necessary keywords to the analyze command, which uses the output of fp (i.e., the file fp.out) as input. The results can be displayed with expl.

See also: *User Guide: Liquids NMR*

Related:

kind	Kinetics analysis, decreasing intensity (M)
kinis	Kinetic analysis, increasing intensity, short form (M)

kinis — Kinetics analysis, increasing intensity, short form (M)

Syntax: `kinis`

Description: Produces a summary of the results from `kini`.

See also: *User Guide: Liquids NMR*

Related:

`kind`	Kinetics analysis, decreasing intensity (M)
`kini`	Kinetics analysis, increasing intensity (M)

L

large — Use large graphics window (C)

Syntax: `large`

Description: Sets the Sun graphics window to use the full screen with the text window overlaid. The `large` command is only executed after any other commands have been processed; any current display is lost and has to be recalculated.

Alternate: Large button in the Permanent Menu.

See also: *Getting Started*

Related:
- `flip` — Flip between large and small windows (C)
- `small` — Use small graphics window (C)

lastlk — Last lock solvent used (P)

Description: Contains the name of the last lock solvent. Intended for use with the optional sample changer, this parameter is a user global variable (stored in the user's `global` file) and is not accessible to multiple users simultaneously. On a multiuser automation run, you should preferably access the last lock solvent from the file `/vnmr/acqqueue/lastlk`.

Values: String containing the name of the solvent.

See also: *User Guide: Liquids NMR*

Related:
- `solvent` — Lock solvent (P)

lastmenu — Menu to display when Return button is selected (P)

Description: Contains the name of the menu to display when the Return button is clicked on certain menus. For example, if the Phase F2 button in the 2D Processing menu (controlled by the file `process_2D`) is clicked, `lastmenu` is set to `'process_2D'`, the `ft` and `aph` commands are executed, the `ds` window is opened, and the Interactive 1D Spectrum Display menu (`ds_1` file) is displayed. Appearing in this menu is a Return button. Because `lastmenu` is still set to `'process_2D'`, clicking on the Return button redisplays the 2D Processing menu. `lastmenu` is stored in the `$vnmrsys/global` file.

Values: String containing the name of a menu (e.g., `'process_2D'`).

See also: *VNMR User Programming*

Related:
- `menu` — Change status of menu system (C)
- `newmenu` — Select a menu without immediate activation (C)

latch — Frequency synthesizer latching (P)

Applicability: All systems except *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Description: Configuration parameter for whether the PTS frequency synthesizer has latching capabilities (all digits of the frequency value are sent to the synthesizer at once). The value for each channel is by the Latching label in the CONFIG window (opened from `config`).

Values: `'n'` indicates the synthesizers do not have latching capabilities (Not Present choice from the CONFIG window).

'y' indicates the synthesizers have latching capabilities (Present choice from the CONFIG window). This value is used with all UNITY*INOVA* and UNITY*plus* systems (all synthesizers on these systems have latching capabilities) and with UNITY and VXR-S systems with synthesizers that have latching capability.

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M)

lb — Line broadening in directly detected dimension (P)

Description: Sets line broadening and exponential weighting along the directly detected dimension. This dimension is often referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, etc.

Values: A positive value gives the desired line broadening, in Hz, which is then used to calculate a decaying exponential function of the form exp(-t*π*lb).

A negative value gives a resolution enhancement function (increasing exponential) of the form exp(-t*π*lb).

'n' turns off line broadening and exponential weighting.

See also: *Getting Started*

Related:

exp	Find exponential value of a number (C)
lb1	Line broadening in 1st indirectly detected dimension (P)
lb2	Line broadening in 2nd indirectly detected dimension (P)

lb1 — Line broadening in 1st indirectly detected dimension (P)

Description: Sets line broadening and exponential weighting along the first indirectly detected dimension. This dimension is often referred to as the f_1 dimension in multidimensional data sets. lb1 works analogously to the parameter lb. The "conventional" parameters (lb, gf, etc.) operate on the detected FIDs, while this "2D" parameter is used during processing of the interferograms.

Values: A positive value gives the desired line broadening, in Hz, which is then used to calculate a decaying exponential function of the form exp(-t*π*lb1). A typical value is between 0.0001 to 1000 Hz.

A negative value gives a resolution enhancement function (increasing exponential) of the form exp(-t*p*lb1).

'n' turns off line broadening and exponential weighting.

See also: *User Guide: Liquids NMR*

Related:

exp	Find exponential value of a number (C)
lb	Line broadening in directly detected dimension (P)
lb2	Line broadening in 2nd indirectly detected dimension (P)

lb2 — Line broadening in 2nd indirectly detected dimension (P)

Description: Sets line broadening and exponential weighting along the second indirectly detected dimension. This dimension is often referred to as the f_2 dimension in multidimensional data sets. lb2 works analogously to the parameter lb. lb2 can be set with wti on the 2D interferogram data.

Values: A positive value gives the desired line broadening, in Hz, which is then used to calculate a decaying exponential function of the form exp(-t*π*lb2).

A negative value gives a resolution enhancement function (increasing exponential) of the form exp(-t*π*lb2).

'n' turns off line broadening and exponential weighting.

See also: *User Guide: Liquids NMR*

Related:

exp	Find exponential value of a number (C)
lb	Line broadening in directly detected dimension (P)
wti	Interactive weighting (C)

lc1d — Pulse sequence for LC-NMR (M)

Applicability: Systems with LC-NMR accessory.

Syntax: lc1d

Description: Creates parameters to set up a pulse sequence that can be used to start an LC-NMR run, including triggering the injection of a sample, and can be used also to obtain multiple solvent-suppressed spectra using multifrequency Shifted Laminar Pulses (SLP) and gradients. The sequence is coded without a d2 variable, thus allowing ni to be used to obtain a series of spectra without resulting in any delay in the sequence being incremented.

The sequence requires a phase table, lc1d, to be found in the tablib directory. Phases of the selective pulses, the observe pulse, and the receiver and separately controlled by phase variables.

Note that the lc1d sequence uses power scaling of shaped pulses, which is supported starting in VNMR 5.2. Because of this feature, this sequence *will not run* in earlier versions of VNMR.

See also: *User Guide: Liquids NMR*

lcpar2d — Create 2D LC-NMR acquisition parameters (M)

Applicability: Systems with LC-NMR accessory.

Syntax: lcpar2d

Description: Creates the acquisition parameters ni, sw1, and phase, which can be used to acquire a 2D LC-NMR data set. lcpar2d is functionally the same as addpar('2d').

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to current experiment (M)
lcset2d	General setup for 2D LC-NMR experiments (M)

lcpeak — Peak number (P)

Applicability: Systems with LC-NMR accessory.

Description: Contains the number of the peak being sensed or the loop being flushed.

See also: *User Guide: Liquids NMR*

lcplot — Plot LC-NMR data (M)

Applicability: Systems with LC-NMR accessory.

Syntax: lcplot

Description: Plots LC-NMR data. This macro is executed with the Plot LC-NMR button on the Spare pane when LC-NMR is active.

See also: *User Guide: Liquids NMR*

lcpsgset — Set up parameters for various LC-NMR pulse sequences (M)

Applicability: Systems with LC-NMR accessory.

Syntax: `lcpsgset(file,parameter1,parameter2,...,parameterN)`

Description: Sets up parameters for various LC-NMR pulse sequences using information in a `parlib` file. Rather than returning the entire parameter file, `lcpsgset` returns the parameters listed. `lcpsgset`, in general, is never entered from the keyboard but is used as part of experiment setup macros.

Arguments: `file` is the file from the user or system `parlib` that provides information on setting up parameters listed. The parameters `seqfil` and `pslabel` are set to the supplied file name.

`parameter1,parameter1,...,parameterN` are 1 to 11 parameters to be returned from the `parlib` file.

Examples: `lcpsgset('lccosy','ds','ap','ss','d1','axis','phase')`

See also: *User Guide: Liquids NMR*

Related:

`pslabel`	Pulse sequence label (P)
`seqfil`	Pulse sequence name (P)

lcset2d — General setup for 2D LC-NMR experiments (M)

Applicability: Systems with LC-NMR accessory.

Syntax: `lcset2d(experiment<,F2_dig_res<,F1_dig_res>>)`

Description: Runs the macro `lcpar2d` to create new parameters needed for 2D LC-NMR experiments, then selects starting values for a number of parameters. The `lcset2d` macro is "internal" and not normally entered directly by the user.

Arguments: `experiment` is the name of a 2D LC-NMR experiment.

`F2_dig_res` is the f_2 digital resolution desired, in Hz/pt.

`F1_dig_res` is the f_1 digital resolution desired, in Hz/pt.

Examples: `lcset2d('lcnoesy')`

See also: *User Guide: Liquids NMR*

Related:

`lcpar2d`	Create 2D LC-NMR acquisition parameters (M)

left — Set display limits to left half of screen (C)

Syntax: `left`

Description: Sets the horizontal control parameters `sc` and `wc` to produce a display (and subsequent plot) in the left half of a screen (and page). For 2D data, space is left for the scales.

Alternate: Left button on the 1D Display Size Selection Menu, or
Left button on the 2D Display Size Selection Menu.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`center`	Set display limits for center of screen (C)
`full`	Set display limits for a full screen (C)
`fullt`	Set display limits for full screen with room for traces (C)
`right`	Set display limits for right half of screen (C)
`sc`	Start of chart (P)
`wc`	Width of chart (P)

legrelay — Independent control of magnet leg relay (P)

Applicability: All systems except *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Description: Gives override capability over the magnetic leg high and low (broad) band rf signal routing. This parameter does not normally exist but can be created by the user with the command `create('legrelay','string')`.

The `legrelay` override is operational only on standard systems shipped starting in November 1990 and on certain special systems shipped before that date. A system includes the override capability if it uses N-type connectors instead by BNC connectors on the magnet leg.

Values: `'n'` indicates normal logic is used to set the leg relay.

`'h'` indicates the leg relay is set to the high band

`'l'` indicates the leg relay is set to the low (broad) band.

Any other value results in an error message and an abort of pulse sequence generation.

See also: *VNMR User Programming*

Related: `create` Create new parameter in a parameter tree (C)

length — Determine length of a string (C)

Syntax:
```
length(string):$string_length
```

Description: Returns the length in characters of a specified string.

Arguments: `string` is zero or more characters enclosed in single quotes.

`string_length` is the number of characters (a real number) in `string`.

Examples:
```
length('abc'):r1
length(solvent):$len
```

See also: *VNMR User Programming*

Related: `substr` Select a substring from a string (C)

lf — List files in directory (C)

Syntax:
```
lf<(directory)>
```

Description: Lists the files in a directory, with output on the text output window. Directories are suffixed by "/", executable files by "*", and links by "@".

Arguments: `directory` is the name of a directory. The default is the current working directory. `lf` is equivalent to the UNIX command `ls -F` and uses the same options (e.g., `-l` for a long listing such as `lf('-l *.fid')`).

Examples:
```
lf
lf('data'))
lf('-l *.fid')
```

See also: *Getting Started*

Related: `dir` List files in directory (C)
`ls` List files in directory (C)

liamp — Amplitudes of integral reset points (P)

Description: Stores the integral amplitudes at the integral reset points for a list of integrals. To display the values of `liamp`, enter `display('liamp')`. Values of `liamp` can also be accessed in MAGICAL macros using, for example, `liamp[$i]`. Values are stored as absolute numbers (summations of data point

values) and, as such, are a function of the parameter fn. The values displayed by the dli, pir, and dpir programs are related to liamp values by the relationship:

Displayed or plotted integral = liamp[i]*is/(fn/128)*ins)

See also: *Getting Started*

Related:

display	Display parameters and their attributes (C)
dli	Display list of integrals (C)
dpir	Display integral amplitudes below spectrum (C)
fn	Fourier number in directly detected dimension (P)
lifrq	Frequencies of integral reset points (P)
pir	Plot integral amplitudes below spectrum (C)

lifrq — Frequencies of integral reset points (P)

Description: Stores the frequencies of integral reset points for a list of integrals. The frequencies are stored in Hz and are *not* adjusted by the reference parameters rfl and rfp.

See also: *Getting Started*

Related:

liamp	Amplitudes of integral reset points (P)
rfl	Ref. peak position in directly detected dimension (P)
rfp	Ref. peak frequency in directly detected dimension (P)

listenoff — Disable receipt of messages from send2Vnmr (M)

Syntax: listenoff

Description: Deletes the file $vnmruser/.talk, thereby disallowing send2Vnmr to send commands to VNMR

See also: *VNMR User Programming*

Related:

listenon	Enable receipt of messages from send2Vnmr (M)
send2vnmr	Send a command to VNMR (U)

listenon — Enable receipt of messages from send2Vnmr (M)

Syntax: listenon

Description: Writes files with the VNMR port number that /vnmr/bin/send2Vnmr needs to talk to VNMR. The command then to send commands to VNMR is /vnmr/bin/send2Vnmr $vnmruser/.talk command.

See also: *VNMR User Programming*

Related:

listenoff	Disable receipt of messages from send2Vnmr (M)
send2vnmr	Send a command to VNMR (U)

lkof — Track changes in lock frequency (P)

Description: Tracks changes in the lock frequency resulting from changes in the solvent, and minor changes caused by the magnet drifting. The frequency units for lkof are in Hz, analogous to sfrq and tof, or dfrq and dof. lkof affects two components of the system: autolock on the console and acqi on the host computer. On UNITY*INOVA* systems, if lkof exists, it offsets the current value of the lockfreq parameter.

See also: *Getting Started*

Related:

lockfreq	Lock frequency (P)

ll2d — Automatic and interactive 2D peak picking (C)

Syntax: (1) `ll2d<(options)><:$num>`

(2) `ll2d('info'<,#>):$peak_number,$f1,$f2,$amplitude, $volume,$label,$comment,$FWHH1,$FWHH2,$f1_min, $f1_max,$f2_min,$f2_max`

Description: Automatically finds and integrates peaks that are above the threshold `th` in a 2D spectrum or a 2D plane of a 3D spectrum, and writes the peak location, volume, full-width at half-height (FWHH), volume, and the boundaries of the integrated region to a file in the `ll2d` subdirectory of the current experiment directory. For 2D spectra, the file name is `peaks.bin`, and for 2D planes of 3D spectra, the file name is `peaks_f#f#_#.bin`, where `f#f#` gives the plane direction (e.g., `f1f3`) and the final # gives the number of the plane. For easy import and export of peak data, `ll2d` also allows insertion and deletion of peaks interactively as well as reading and writing of text peak files.

Two-dimensional volumes are scaled in a manner analogous to 1D integrals, using the parameters `ins2` and `ins2ref`. The `ins2ref` parameter is the Fourier number scaled value of a selected volume. The reported value of a peak volume is (*unscaled volume*) × `ins2/ins2ref/fn/fn1`. The unscaled volume of a peak can be obtained from the command `ll2d('info',peak#)`. `ins2ref` can be set to the unscaled value divided by `fn` and `fn1`. The report volume for that peak is then the value of `ins2`.

Arguments: `options` (syntax 1) are any of the following (`dconi` is not necessarily active):

- `'adjust'` is a keyword to adjust the bounds of all peaks in the displayed area so that no boundaries overlap, and then to recalculate peak volumes.
- `'draw'` is a keyword to draw the peaks, boxes, numbers, and labels on the spectrum based on the value of the parameter `ll2dmode`.
- `'info','total'` displays the total number of peaks in the current peak table. If a single return value is requested, printing is suppressed and the total number of peaks is returned.
- `'peaks'` is a keyword to find all peaks in the displayed area above a threshold `th`. If `dconi` is active and in the box mode, `ll2d` finds peaks only in the area defined by the cursors. The `'peaks'` option is the default if no arguments are entered.
- `'pos'` or `'neg'` keywords can be used in addition to `'peak'`, `'volume'`, or `'clear'` to operate only on positive or negative peaks.
- `'read'<,file >` reads in a binary peak file, where `file` is the name of the peak file. If a full path is not specified, the file is searched for first in the current working directory and then in the `ll2d` subdirectory of the current experiment directory.
- `'readtext'<,file>` reads in a text peak file, where `file` is the name of the peak file. If a full path is not specified, the file is searched for first in the current working directory and then in the `ll2d` subdirectory of the current experiment directory.
- `'reset'` is a keyword to delete all peaks in the peak table.
- `'volume'` is a keyword to find the bounds of each peak in the displayed area and integrate this area.
- `'writetext'<,file>` writes a peak file to a text file, where `file` is the name of the text file written. If a full path is not specified, the file is written in the current working directory.

`options` (syntax 1) can also be any of the following (`dconi` must be active):

- `'clear'` is a keyword to delete all peaks in the displayed region if in the `dconi` cursor mode, or to delete all peaks within the cursors if in the `dconi` box mode.
- `'combine'` is a keyword to combine all peaks within the area defined by the cursors into a single peak (in `dconi` box mode only). The center of the new peak is at the average of all combined peaks' centers, and the bounds of this peak contains the maximum extents of the combined peaks' bounds. If all combined peaks have the same label, this label is assigned to the new peak. ***CAUTION:*** **All individual peaks to be combined are deleted prior to the creation of the new combination peak, and there is no automatic way to restore the original peaks. Therefore, it is recommended that you make a backup copy of the peak file prior to using this option.**
- `'comment'` is a keyword to prompt for an 80-character comment. The comment is assigned to the nearest peak in the `dconi` cursor mode or to all peaks within the cursors in the `dconi` box mode.
- `'comment',text` executes the `'comment'` option using the string entered for `text` instead of prompting for a comment.
- `'label'` is a keyword to prompt for a 15-character label. The label is assigned to the nearest peak in `dconi` cursor mode or assigned to all peaks within the cursors in `dconi` box mode. To erase an existing label, enter a label consisting of one or more spaces.
- `'label',text` executes the `'label'` option using the string entered for `text` instead of prompting for a label.
- `'mark'` is a keyword to insert a peak at the current cursor position if in the `dconi` cursor mode. If in the `dconi` box mode, `'mark'` is a keyword to integrate the area within the cursors and assign that area to all peaks within the cursors that do not have their bounds already defined. If there are no peaks within the area defined by the cursors, using `'mark'` finds the highest point within this area, marks that as a peak, integrates the area within the cursors, and assigns that area to the peak. The displayed values of the volume integrals are scaled by `ins2` and `ins2ref` and the Fourier number of the 2D experiment.
- `'unmark'` is a keyword to delete the nearest peak if in `dconi` cursor mode. If in the `dconi` box mode, `'unmark'` deletes all peak bounds that are completely within the area defined by the cursors. Peaks are not deleted in the box mode.

`options` (syntax 1) also can be any of the following (`dconi` does not have to be active because `ll2d` is executed on a peak number):

- `'combine',#1,#2,...` executes the `'combine'` option on the list of peak numbers that follow the `'combine'` keyword. If a single return value is requested, the peak number of the new combination peak is returned.
- `'comment',text,#` executes the `'comment'` option on peak # using the string entered for `text` instead of prompting for a comment.
- `'label',text,#` executes the `'label'` option on peak # using the string entered for `text` instead of prompting for a label.
- `'unmark',#` deletes peak number #.

$num (syntax 1) is a return value set to the total number of peaks that have been picked unless the arguments 'combine',#1,#2,... are used, in which case $num is the number of the newly created combination peak.

Syntax 2 arguments are the following:

- 'info'<,#> displays information in the text window about peak number #. If no peak number is included, dconi must be active and the default is the peak nearest to the cursor. If return values are requested, the display is suppressed.
- $peak_number is a return value set to the number of the peak, either the second argument # or, if no value is given for #, the peak nearest to the cursor in dconi.
- $f1 and $f2 are return values set to the peak frequencies in f_1 and f_2 of peak $peak_number.
- $amp is a return value set to the amplitude of peak $peak_number.
- $vol is a return value set to the unscaled volume of $peak_number. peak. This value can be used to set the ins2ref parameter.
- $label is a return value set to the label of peak $peak_number.
- $comment is a return value set to the comment about $peak_number.
- $FWHH1 and $FWHH2 are return values set to full-width at half-height of $peak_number.
- $f1_min,$f1_max,$f2_min,$f2_max are return values set to the bounds of $peak_number.

Examples:

```
ll2d
ll2d:$npeaks
ll2d('volume')
ll2d('read','peaklist.inp')
ll2d('mark')
ll2d('label','Peak 1')
ll2d('info','total'):$npeaks
ll2d('combine',3,4,5,6):$cpn
ll2d('info',3):$num,$f1,$f2,$amp,$vol,$label
```

Alternate: 2D Line List button in the Automatic COSY Analysis Menu.

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D contour display (C)
ins2	2D volume value (P)
ins2ref	Fourier number scaled volume of a peak (P)
ll2dbackup	Copy current ll2d peak file to another file (M)
ll2dmode	Control display of peaks picked by ll2d (P)
parll2d	Create parameters for 2D peak picking (M)
pll2d	Plot results of 2D peak picking (C)
th	Threshold (P)
th2d	Threshold for integrating peaks in 2D spectra (P)
xdiag	Threshold for excluding diagonal peaks when peak picking (P)

ll2dbackup — Copy current ll2d peak file to another file (M)

Syntax: ll2dbackup<(file)>

Description: Backs up the current ll2d peak file by copying it to a file with a different file name. The default ll2d peak file is peaks.bin for 2D data.

Arguments: `file` is the name to be given to the backup file. If a full path is not specified, the file is written to the current working directory. If no argument is provided, the system prompts for a file name. If no file name is specified at the prompt, the default `ll2d` peak file name with `.bck` appended is used.

See also: *User Guide: Liquids NMR*

Related: `ll2d` Automatic and interactive 2D peak picking (C)

`ll2dmode` Control display of peaks picked by ll2d (P)

Description: Sets the display attributes of peaks picked by the `ll2d` command

Values: A string variable composed of 4 characters, with each character taking the value `'y'` (display the peak attribute) or `'n'` (do not display the attribute). The first character determines if a "+" is drawn on the screen in `dconi` displays to mark peaks, the second character controls the drawing of the peak number, the third character controls drawing of the peak bounds box, and the last character controls drawing of the peak label.

See also: *User Guide: Liquids NMR*

Related: `ll2d` Automatic and interactive 2D peak picking (C)

`llamp` List of line amplitudes (P)

Description: Stores a list of line amplitudes above the threshold set by `th`.

See also: *Getting Started*

Related:
`dll` Display listed line frequencies and intensities (C
`llfrq` List of line frequencies (P)
`th` Threshold (P)

`llfrq` List of line frequencies (P)

Description: Stores a list of line frequencies above the threshold set by `th`. Frequencies are stored in Hz and are *not* adjusted by reference parameters `rfl` and `rfp`.

See also: *Getting Started*

Related:
`llamp` List of line amplitudes (P)
`rfl` Ref. peak position in directly detected dimension (P)
`rfp` Ref. peak frequency in directly detected dimension (P)
`th` Threshold (P)

`ln` Find natural logarithm of a number (C)

Syntax: `ln(value)<:n>`

Description: Finds the natural logarithm (base e) of a number. To convert the value to base 10, use $log_{10}x = 0.43429*ln(x)$.

Arguments: `value` is a number.

`n` is the return value giving the logarithm of `value`. The default is to display the logarithmic value in the status window.

Examples:
```
ln(.5)
ln(val):ln_val
```

See also: *VNMR User Programming*

Related:
`atan` Find arc tangent of a number (C)
`cos` Find cosine value of an angle (C)

exp	Find exponential value of a number (C)
sin	Find sine value of an angle (C)
tan	Find tangent value of an angle (C)

load — Load status of displayed shims (P)

Description: Sets whether shim values are used. load is automatically set to 'y' by the rts and is automatically set to 'n' by su, go, au, and shim. On UNITY*INOVA* systems, shim DAC values are automatically loaded after the console is rebooted (the last values returned before the console was rebooted).

Values: 'y' begins any noninteractive shimming process or data acquisition after loading the shim DACs with the shim values from the current experiment. It also prevents acqi from delivering shim values to that experiment.

'n' begins any noninteractive shimming process or data acquisition with the current values stored in the shim DACs. Shim values in the current experiment are ignored.

See also: *Getting Started*

Related:

acqi	Interactive acquisition display process (C)
au	Submit experiment to acquisition and process data (C)
go	Submit experiment to acquisition (C)
rts	Retrieve shim coil settings (C)
shim	Submit an autoshim experiment to acquisition (C)
su	Submit a setup experiment to acquisition (M)

loadcolors — Load colors for graphics window and plotters (M)

Syntax: loadcolors<(color_file)>

Description: Loads the color table for VNMR graphics window and plotters. loadcolors is generated by the color program and includes a series of setcolor commands. On bootup, the bootup macro calls loadcolors to set the graphics and plotter colors.

The loadcolors macro checks the value of maxpen to decide if the plotter supports colors. If maxpen is greater than 1, a color printer is configured.

Arguments: color_file is the name of the file to load. loadcolors first searches for this file in the directory $vnmruser/templates/ directory. If not found there, loadcolors then searches the user_templates/vnmr directory. The default is a color table with the same name as the value of the plotter parameter that loadcolors searches for in the same two directories.

Examples:

```
loadcolors
loadcolors('mycolortable')
```

See also: *User Guide: Imaging*

Related:

bootup	Macro executed automatically when VNMR activated (M)
color	Select plotting colors from a graphic interface (M)
maxpen	Maximum number of pens to use (P)
setcolor	Set colors for graphics window and for plotters (C)

loc — Location of sample in tray (P)

Description: Indicates whether a sample changer is present and enabled, present but disabled, or not present. If the changer is present and enabled, the value of loc sets the location in the tray of the sample in use or to be used. The loc parameter is stored in the global tree. When an acquisition is started, certain global

parameters, including `loc`, are saved with the experiment parameters. The `saveglobal` parameter specifies which global parameters are saved.

The `auto_au` macro controls most of the automation features, including setting the value of `loc`.

Values: A number between 1 and `traymax` indicates the sample location.

0 indicates the changer is not present or disabled.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`auto_au`	Controlling macro for automation (M)
`saveglobal`	Save selected parameters from global tree (P)
`traymax`	Sample changer tray size (P)

`location` Get coordinate information from an image display (M)

Applicability: Systems with imaging capabilities.

Syntax: `location`

Description: Provides coordinate information from an image display using the 2D cursor package. This program can be used, along with the interactive image viewing program `dconi`, to provide coordinate data. You should position the 2D cursor at the desired point and enter `location` in the input window. Coordinates are printed on line 3 in the VNMR status window. Coordinate values are supplied in both the magnet frame (X, Y, Z) and logical frame (R, P, S), where the letters R, P, and S denote read, phase encode, and slice select axes, respectively. A typical use for `location` is to set the value of the parameter `pro` for FOV position of the image center. Position the cursor at the point desired to become the new image center, enter `location`, and set the value of `pro` to the R coordinate for the logical frame.

See also: *User Guide: Imaging*

Related:

`dconi`	Interactive 2D contour display (C)
`pro`	Position of image center on the readout axis (P)

`lock` Submit an Autolock experiment to acquisition (C)

Syntax: `lock`

Description: Performs an automatic locking operation using the acquisition computer, optimizing lock power, phase, and gain. If necessary, `lock` obtains lock through a software-controlled search (required on UNITY*INOVA*, *MERCURY-Vx*, *MERCURY*, UNITY*plus*, and *GEMINI 2000*). `lock` is the only method to automatically adjust lock phase (usually needed only after probe change or lock channel tuning). `lock` also sets the rf frequencies, decoupler status, and temperature.

See also: *Getting Started*

Related:

`au`	Submit experiment to acquisition and process data (C)
`change`	Submit a change sample experiment to acquisition (M)
`ga`	Submit experiment to acquisition and FT the result (C)
`go`	Submit experiment to acquisition (C)
`sample`	Submit change sample, autoshim experiment to acquisition (M)
`shim`	Submit an Autoshim experiment to acquisition (C)
`spin`	Submit a spin setup experiment to acquisition (C)
`su`	Submit a setup experiment to acquisition (M)

lockacqtc — Lock loop time constant during acquisition (P)

Applicability: All systems except *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Description: Controls time constant of lock loop during acquisition (i.e., time constant by which the lock feedback corrects disturbances of the magnetic field).

Values: On UNITY*INOVA* and UNITY*plus*: 1, 2, 3, or 4 (where 1 sets 1.2 seconds, 2 sets 4.7 seconds, 3 sets 12 seconds, and 4 sets 48 seconds).
On UNITY and VXR-S: 1 or 2 (where 1 sets 1 second and 2 sets 200 seconds).
If `lockacqtc` does not exist, it is set to 48 seconds on a UNITY*INOVA* or UNITY*plus*, and 200 seconds on a UNITY or VXR-S. All systems are designed to work well with the default settings, and there should rarely be a reason to alter the lock time constant. However, to experiment with other values, create `lockacqtc` and set a new value:

```
create('lockacqtc','integer','global')
setlimit('lockacqtc',4,1,1,'global') lockacqtc=n
```

where *n* is the new value.

See also: *Getting Started*

Related:

`create`	Create new parameter in a parameter tree (C)
`locktc`	Lock time constant (P)
`setlimit`	Set limits of a parameter in a tree (C)

lockfreq — Lock frequency (P)

Description: Sets system lock frequency. The value is entered using the Lock Frequency label in CONFIG window (opened from `config`). **The value of lockfreq must be set correctly in order to observe NMR signals.**

On UNITY*INOVA* systems, `lockfreq` can find the lock signal or resonance. Traditionally, Varian spectrometers have used the parameter `z0` for this purpose; however, using `lockfreq` can require less shimming when switching solvents and less adjustment to the lock phase. To use `lockfreq`, set `z0='n'`.

Values: 1 to 160 (in MHz), `'n'`

UNITY*INOVA*, *MERCURY-Vx*, *MERCURY*, UNITY*plus*, and *GEMINI 2000* use the true ^{2}H frequency. Typical values of `lockfreq` are shown in the chart below. On UNITY*INOVA* and UNITY*plus*, step size is approximately 2.384 Hz; on *MERCURY-Vx* and *MERCURY*, step size is 0.05 Hz; on *GEMINI 2000*, step size is about 76 Hz.

On UNITY and VXR-S (except 200-MHz systems), the lock transmitter is equipped with a series of thumbwheel switches that adjust the lock frequency if the field drifts out of the range of the field offset control (the `z0` parameter). Typical starting values of the switches are shown in the chart. As the field decays, the number is set downward to lower the lock frequency.

^{1}H Frequency	UNITY*INOVA*, UNITY*plus*	*MERCURY*	*GEMINI 2000*	*UNITY, VXR-S*
200	30.710	30.6976	30.697612	...
300	46.044	46.0625	46.062489	1.206
400	61.395	61.471	61.463000	1.145
500	76.729	...	...	1.479
600	92.095	...	...	153.845
750	115.250	...	...	...

For all systems, refer to the manual *VNMR and Solaris Software Installation* for details on finding the correct lock frequency.

Commands such as `go`, `lock`, `shim`, and `su` reset the lock frequency in the console to the current value of `lockfreq`. On UNITY*INOVA*, *MERCURY-Vx* and *MERCURY*, lock frequency in the console can be set with the `sethw` command.

Note that on the UNITY*INOVA* only, `lockfreq` is offset by the value of `lkof`, if that parameter exists, but `sethw` directly uses its numeric argument, without any offset by `lkof`.

See also: *VNMR and Solaris Software Installation*; *Getting Started*

Related:

`config`	Display current configuration and possibly change it (M)
`go`	Submit experiment to acquisition (M)
`lkof`	Track changes in lock frequency (P)
`lock`	Submit an Autolock experiment to acquisition (C)
`sethw`	Set values for hardware in acquisition system (C)
`setlockfreq`	Set lock frequency on a UNITY*INOVA* or UNITY*plus* system (C)
`shim`	Submit an Autoshim experiment to acquisition (C)
`su`	Submit a setup experiment to acquisition (M)
`z0`	Z0 field position (P)

`lockgain` Lock gain (P)

Description: Contains the current lock gain value as set by computer control. The value is stored in `vnmrsys/global` and can be examined by typing `lockgain?`.

Values: On UNITY*INOVA* and UNITY*plus*, 0 to 48 dB, in 1-dB steps.

On *MERCURY-Vx* and *MERCURY*, 0 to 38 dB, in 1-dB steps.

On *GEMINI 2000*, 0 to 30 dB, in 10-dB steps.

On UNITY and VXR-S, 0 to 70 dB, in 1-dB steps.

See also: *Getting Started*

`lockphase` Lock phase (P)

Description: Contains the current lock phase. The value is stored in `vnmrsys/global` and can be examined by typing `lockphase?`.

Values: 0 to 360, in degrees, in 1.4-degree steps.

See also: *Getting Started*

`lockpower` Lock power (P)

Description: Contains the current lock power value as set by computer control. The value is stored in `vnmrsys/global` and can be examined by typing `lockpower?`.

Values: On UNITY*INOVA* and UNITY*plus*, 0 to 68 dB, in 1-dB steps, 68 is full power.

On *MERCURY-Vx* and *MERCURY*, 0 to 48 dB, in 1-dB steps, 48 is full power.

On *GEMINI 2000*, 0 to 40 dB, in 1-dB steps.

On UNITY and VXR-S: 0 to 63 dB, in 1-dB steps, 63 is full power

See also: *Getting Started*

`locktc` Lock time constant (P)

Applicability: All systems except *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Description: Controls lock loop time constant when system is not performing acquisition (idle, lock display, shim display, FID display, autoshim, autolock, etc.).

Values: On UNITY*INOVA* and UNITY*plus*: 1, 2, 3, or 4 (where 1 corresponds to 1.2 seconds, 2 to 4.7 seconds, 3 to 12 seconds, and 4 to 48 seconds). On UNITY and VXR-S: 1 or 2 (where 1 corresponds to 1 second and 2 to 200 seconds). If `locktc` does not exist, the system uses a value of 1, the fastest value. To experiment with other value, create `locktc` and set a value (e.g., `create('locktc','integer','global')` `setlimit('locktc',4,1,'global') locktc=2`).

See also: *Getting Started*

Related:

`create`	Create new parameter in a parameter tree (C)
`lockacqtc`	Lock acquisition time constant (P)
`setlimit`	Set limits of a parameter in a tree (C)

`logate` Transmitter local oscillator gate (P)

Applicability: UNITY*INOVA* and UNITY*plus* systems.

Description: Specifies whether the transmitter local oscillator (L.O.) is gated with the transmitter rf output or with the transmitter I.F. (intermediate frequency).

The `logate` parameter does not exist in most parameter sets; the system internally sets it to `'l'`. To use the value `'s'`, create `logate` and change the value by entering: `create('logate','string')` `setenumeral('logate',2,'l','s') logate='s'`.

Values: `'l'` makes the transmitter L.O. gate with the rf output, producing better signal-to-noise, usually most important in liquids NMR.

`'s'` makes the transmitter L.O. gate with the I.F. signal, producing sharper pulses, especially important in solid-state NMR.

See also: *User Guide: Solid-State NMR*

Related:

`create`	Create new parameter in a parameter tree (C)
`setenumeral`	Set values of a string variable in a tree (C)

`lookup` Look up words and lines from a text file (C)

Syntax: `lookup(options):return1,return2,...,number_returned`

Description: Searches a text file from top to bottom for a word and returns to the user subsequent words or lines. In this context, *word* is defined as any string of characters delimited by "whitespace." By default, *whitespace* includes the space character, a tab, a newline, a carriage return, and a comma. The whitespace characters can also be specified. Therefore, a word can be a string a digits, a string of letters, or a combination of letters and digits. Punctuation marks, unless defined as whitespace (as the comma is by default), can also form words or be part of a word. A *line* is any string of characters from the current word to the next carriage return. A line includes all whitespace characters except the carriage return. Note that word searches are case-insensitive.

Arguments: `options` is one or more of the seven keywords (`'file'`, `'seek'`, `'skip'`, `'read'`, `'readline'`, `'count'`, and `'delimiter'`) and other arguments used as follows:

- `'file'` is a keyword to specify that the next argument is the name of the text file to be searched. If the `'file'` keyword is used, it *must* be the first argument and the name of the file *must* be the second argument. `'file'` resets the start of a search to the top of the text file, and subsequent searches

through the file continue from where the previous search stopped, provided the `'file'` keyword is not used again. Using `'file'` as an argument also resets the whitespace characters back to default values.

- `'seek'` is a keyword to search the text file for words that match those supplied as arguments following the `'seek'` argument. When `lookup` is executed the first time, an implicit `'seek'` is assumed as an argument. `lookup` maintains a pointer to the word following the last successful `'seek'`. The first argument following an explicit `'seek'` argument is interpreted as a word to search for, not a potential keyword. The second or later argument following an explicit `'seek'` is interpreted as a keyword if it matches one of the seven `lookup` keywords. For example, you can search for the word `file` without having it interpreted as a keyword by having `'file'` immediately follow the `'seek'` keyword in the argument list.
- `'skip'` is a keyword to move the word pointer to the next word in the text file. 'skip' can optionally be followed by a number specifying how many words to skip.
- `'read'` is a keyword to return to the user the word currently being pointed to and then move the pointer to the next word. `'read'` can optionally be followed by a number specifying how many words to return.
- `'readline'` is a keyword to return to the user the word currently being pointed to and all the following words until the end of the current line. The pointer is then moved to the first word of the next line. `'readline'` can optionally be followed by a number specifying how many lines to return.
- `'count'` is a keyword to return to the user the number of times words in the text file match the subsequent argument. The count starts at the current word pointer and proceeds to the end of the file.
- `'delimiter'` is a keyword to specify that the next supplied argument is a list of characters identifying the whitespace used to delimit words. Characters are specified by `\n` (newline), `\t` (tab), `\r` (carriage return), `\\` (backslash), and `\'` (single quote). The arguments `'delimiter', ' \t\n\r,'` reselect the default whitespace. The `'file'` keyword also reselects the default whitespace. The distinction is that using `'file'` restarts the search from the beginning of the file while using `'delimiter'` continues from the current search position. Following the `'delimiter'` keyword and its argument, an implicit `'seek'` is assumed.

`return1,return2,...` are words or lines returned from the search.

`number_returned` is the number of arguments returned from the file.

Examples:

```
lookup('file',systemdir + '/manual/lookup')

lookup('user','skip',2,'read',2,'readline')
   :$n1,$n2,$n3,$ret

lookup('skip',8,'read','skip',3,'read',2,'seek',
   'comma'):$n3,$n4,$n5

lookup('delimiter',',\'.\n\t"','seek','file',
   'must','skip',6,'read'):$n
```

For a more detailed example of using lookup, see the text file `/manual/lookup` in the VNMR system directory (`systemdir`).

See also: *VNMR User Programming*

Related:

dialog	Display a dialog box from a macro (C)
systemdir	VNMR system directory (P)

lp — First-order phase in directly detected dimension (P)

Description: Specifies the first-order phase-correction angles along the directly detected dimension according to the formula

absorption spectrum(ω) =
real channel(ω) * *sin* θ + *imaginary channel(ω)* * *cos* θ

where the phase angle θ is a function of frequency, i.e.

$\theta = rp + (\omega - \omega_o) * lp$

ω_o is defined to be the right end of the spectrum (i.e., lp has zero effect at the right edge of the spectrum and a linearly increasing effect going to the left). In multidimensional data sets, lp controls the phase of the directly detected dimension: f_2 dimension in 2D data sets, f_3 dimension in 3D data sets, etc.

Values: –3600 to +3600, in degrees. Typical values are between 0 and –180.

See also: *Getting Started*

Related:

aph	Automatic phase adjustment of spectra (C)
lp1	First-order phase in 1st indirectly detected dimension (P)
lp2	First-order phase in 2nd indirectly detected dimension (P)
rp	Zero-order phase in directly detected dimension (P)

lp1 — First-order phase in 1st indirectly detected dimension (P)

Description: Controls the first-order phase constant along the first indirectly detected dimension during the process of phase-sensitive 2D transformation. The first indirectly detected dimension is often referred to as the f_1 dimension of a multidimensional data set.

See also: *User Guide: Liquids NMR*

Related:

lp	First-order phase in directly detected dimension (P)
lp2	First-order phase in 2nd indirectly detected dimension (P)
rp1	Zero-order phase in 1st indirectly detected dimension (P)

lp2 — First-order phase in 2nd indirectly detected dimension (P)

Description: Controls the first-order phase constant along the second indirectly detected dimension during a ds, dconi, or equivalent display operation on the 2D data or a 1D trace therein. The second indirectly detected dimension is often referred to as the f_2 dimension of a 3D (or higher dimensionality) data set.

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D contour display (C)
ds	Display a spectrum (C)
lp	First-order phase in directly detected dimension (P)
rp2	Zero-order phase in 2nd indirectly detected dimension (P)

lpalg — LP algorithm in np dimension (P)

Description: Specifies the linear prediction (LP) algorithm to use in the np dimension. The resulting LP coefficients are used to appropriately extend the complex time-domain data prior to a normal Fourier transform. The LP algorithms work both

on complex t_2 FIDs and on hypercomplex or complex t_1 interferograms. Enter `addpar('lp')` to create `lpalg` and other `np` dimension LP parameters in the current experiment

Values: `'lpfft'` does a least-squares calculation of `lpfilt` complex LP coefficients using `lpnupts` complex time-domain data points. Eigenvalue decomposition of the least-squares matrix is done using Householder tridiagonalization followed by the QL method with implicit shifts.

`'lparfft'` does a non-least-squares calculation of `lpfilt` complex LP coefficients using (`lpfilt`+1) complex, autoregressive (AR) matrix elements. These AR matrix elements are calculated from the raw, complex time-domain data using `lpnupts` points.

Note that the `'lpfft'` algorithm is preferred by far. While `'lparfft'` can model broad lines and can extend data sets when mostly noise exists, it cannot model narrow lines.

See also: *Getting Started*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`dglp`	Display group of linear prediction parameters (M)
`lpalg1`	LP algorithm in `ni` dimension (P)
`lpalg2`	LP algorithm in `ni2` dimension (P)
`lpext`	LP data extension in `np` dimension (P)
`lpfilt`	LP coefficients to calculate in `np` dimension (P)
`lpnupts`	LP number of data points in `np` dimension (P)
`lpopt`	LP algorithm data extension in `np` dimension (P)
`lpprint`	LP print output in `np` dimension (P)
`lptrace`	LP output spectrum in `np` dimension (P)
`np`	Number of data points (P)
`proc`	Type of processing on `np` FID (P)
`strtlp`	Starting point for LP calculation in `np` dimension (P)
`strtext`	Starting point for LP data extension in `np` dimension (P)

`lpalg1` LP algorithm in ni dimension (P)

Description: Specifies the LP (linear prediction) algorithm to use in the `ni` dimension. `lpalg1` functions analogously to `lpalg`. Enter `addpar('lp',1)` to create `lpalg1` and other `ni` dimension LP parameters in the current experiment.

Values: `'lpfft'` or `'lparfft'`

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`lpalg`	LP algorithm in `np` dimension (P)
`ni`	Number of increments in 1st indirectly detected dimension (P)

`lpalg2` LP algorithm in ni2 dimension (P)

Description: Specifies the LP (linear prediction) algorithm to use in the `ni2` dimension. `lpalg2` functions analogously to `lpalg`. Enter `addpar('lp',2)` to create `lpalg2` and other `ni2` dimension LP parameters in the current experiment.

Values: `'lpfft'` or `'lparfft'`

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M
`lpalg`	LP algorithm in `np` dimension (P)
`ni2`	Number of increments in 2nd indirectly detected dimension (P)

lpe — Field of view size for phase-encode axis (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the actual size of the image field of view (FOV) for phase encode axis, in cm. The size and shape of the FOV is set through the selection of the parameters sw, gro, lro, sw1, gpe, and lpe. The size of the FOV in frequency units is sw*sw1, in terms of distance measure (in cm) is lro*lpe. The values of these parameters are related by the following equalities, where gcal is the appropriate calibration constant.

```
sw  = (gcal*sfrq*1000000*gro*lro)
sw1 = (gcal*sfrq*1000000*gpe*lpe)
```

See also: *User Guide: Imaging*

Related:

gcal	Gradient calibration constant (P)
gpe	Phase encoding gradient increment (P)
gro	Readout gradient strength (P)
lpe2	Field of view size for 2nd phase-encode axis (P)
lro	Field of view parameter for read out in cm (P)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)

lpe2 — Field of view size for 2nd phase-encode axis (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the size of the field of view (FOV) along a second phase-encode dimension, in cm. Higher order phase-encode dimensions are found in 3D volume imaging, and Chemical Shift Imaging (CSI) experiments with two spatial dimensions.

See also: *User Guide: Imaging*

Related:

lpe	Field of view size for phase-encode axis (P)

lpext — LP data extension in np dimension (P)

Description: Specifies number of complex time-domain data points for LP (linear prediction) in the np dimension by which the original data is to be extended (or altered) in either the forward or backward direction. lpext is constrained by (strtext-lpext)>= ≥0 for lpopt='b' and by (strtext+lpext-1)<=fn/2 for lpopt='f'. In the np direction, if (strtext-lpext)=0 and lpopt='b' (backwards linear prediction with calculation of the first point), fpmult defaults to the theoretical value of 0.5 instead of 1.0. Enter addpar('lp') to create lpext and other np dimension LP parameters in the current experiment.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
lpalg	LP algorithm in np dimension (P)
lpext1	LP data extension in ni dimension (P)
lpext2	LP data extension in ni2 dimension (P)
lpopt	LP algorithm data extension in np dimension (P)
np	Number of data points (P)
strtext	Starting point for LP data extension in np dimension (P)

lpext1 — LP data extension in ni dimension (P)

Description: Specifies number of complex time-domain data points for LP (linear prediction) in the ni dimension by which the original data is to be extended (or altered) in either the forward or backward direction. lpext1 functions analogously to lpext. Enter addpar('lp',1) to create lpext1 and other ni dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpext	LP data extension in np dimension (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

lpext2 — LP data extension in ni2 dimension (P)

Description: Specifies number of complex time-domain data points for LP (linear prediction) in the ni2 dimension by which the original data is to be extended (or altered) in either the forward or backward direction. lpext2 functions analogously to lpext. Enter addpar('lp',2) to create lpext2 and other ni2 dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpext	LP data extension in np dimension (P)
	ni2	Number of increments in 2nd indirectly detected dimension (P)

lpfilt — LP coefficients to calculate in np dimension (P)

Description: Specifies number of complex LP (linear prediction) coefficients in the np dimension to be calculated from a specified region of the time-domain data. lpfilt should be greater than nsignals, where nsignals is the number of sinusoidal signals contained in that FID (or interferogram). Enter addpar('lp') to create lpfilt and other np dimension LP parameters in the current experiment.

See also: *Getting Started*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpalg	LP algorithm in np dimension (P)
	lpfilt1	LP coefficients to calculate in ni dimension (P)
	lpfilt2	LP coefficients to calculate in ni2 dimension (P)
	np	Number of data points (P)

lpfilt1 — LP coefficients to calculate in ni dimension (P)

Description: Specifies number of complex LP (linear prediction) coefficients in the ni dimension to be calculated from a specified region of the time-domain data. lpfilt1 functions analogously to lpfilt. Enter addpar('lp',1) to create lpfilt1 and other ni dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpfilt	LP coefficients to calculate in np dimension (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

lpfilt2 — LP coefficients to calculate in ni2 dimension (P)

Description: Specifies number of complex LP (linear prediction) coefficients in the ni2 dimension to be calculated from a specified region of the time-domain data. lpfilt2 functions analogously to lpfilt. Enter addpar('lp',2) to create lpfilt1 and other ni2 dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpfilt	LP coefficients to calculate in np dimension (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

lpnupts — LP number of data points in np dimension (P)

Description: Specifies number of complex time-domain data points in the np dimension to be used in constructing the autoregressive (lpalg='lparfft') or least-squares (lpalg='lpnefft') matrix from which the complex LP (linear prediction) coefficients are calculated. Note that lpnupts greater than or equal to 2*lpfilt is required for both algorithms. Enter addpar('lp') to create lpnupts and other np dimension LP parameters in the current experiment.

See also: *Getting Started*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpalg	LP algorithm in np dimension (P)
	lpfilt	LP coefficients to calculate in np dimension (P)
	lpnupts1	LP number of data points in ni dimension (P)
	lpnupts2	LP number of data points in ni2 dimension (P)
	np	Number of data points (P)

lpnupts1 — LP number of data points in ni dimension (P)

Description: Specifies number of complex time-domain data points in the ni dimension to be used in constructing the autoregressive (lpalg1='lparfft') or least-squares (lpalg1='lpnefft') matrix from which the complex LP (linear prediction) coefficients are calculated. lpnupts1 functions analogously to lpnupts. Enter addpar('lp',1) to create lpnupts1 and other ni dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpalg1	LP algorithm in ni dimension (P)
	lpnupts	LP number of data points in np dimension (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

lpnupts2 — LP number of data points in ni2 dimension (P)

Description: Specifies number of complex time-domain data points in the ni2 dimension to be used in constructing the autoregressive (lpalg2='lparfft') or least-squares (lpalg2='lpnefft') matrix from which the complex LP (linear prediction) coefficients are calculated. lpnupts2 functions analogously to lpnupts. Enter addpar('lp',2) to create lpnupts2 and other ni2 dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpalg2	LP algorithm in ni2 dimension (P)
	lpnupts	LP number of data points in np dimension (P)
	ni2	Number of increments in 2nd indirectly detected dimension (P)

lpopt — LP algorithm data extension in np dimension (P)

Description: Specifies how the specific LP (linear prediction) algorithm is to extend (or alter) forward or backward the time-domain data in the np dimension. Enter addpar('lp') to create lpopt and other np dimension LP parameters in the current experiment.

Multiple LP operations, extended forward or backward, can be performed on each FID or interferogram. This is accomplished by arraying the LP processing parameters (e.g., lpopt='b','f','b'). The number of LP operations is determined by the LP processing parameter with the largest array size. LP parameters having a smaller array size are padded out with their last value. The most common use for this capability is to back-calculate the first 1 to 2 points in an FID or interferogram and subsequently to extend the length of the time-domain data by LP.

A printout can be obtained for each LP operation on an individually definable FID or interferogram. For example, if lpprint=30,30 and lptrace=1,2, the text file lpanalyz.out.1 contains the LP printout for the first LP operation on FID 1 and lpanalyz.out.2 contains the LP printout for the second LP operation on FID 2.

Values: 'b' indicates the LP coefficients are to be used in the back-calculation of a specified number of time-domain data points.

'f' indicates the LP coefficients are to be used in the forward extension of the time-domain data by a specified number of points. The characteristic polynomial in z space, derived from the complex LP coefficients, is set up and rooted. Any root found to lie outside the unit circle is reflected back into the unit circle. New complex LP coefficients are then calculated from these adjusted complex roots.

See also: *Getting Started*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpalg	LP algorithm in np dimension (P)
	lpopt1	LP algorithm data extension for ni dimension (P)
	lpopt2	LP algorithm data extension for ni2 dimension (P)
	lpprint	LP print output for np dimension (P)
	lptrace	LP output spectrum for np dimension (P)
	np	Number of data points (P)

lpopt1 — LP algorithm data extension in ni dimension (P)

Description: Specifies how the specific LP (linear prediction) algorithm is to extend (or alter) forward or backward the time-domain data in the ni dimension. lpopt1 functions analogously to lpopt. Enter addpar('lp',1) to create lpopt1 and other ni dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpopt	LP algorithm data extension for np dimension (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

lpopt2 — LP algorithm data extension in ni2 dimension (P)

Description: Specifies how the specific LP (linear prediction) algorithm is to extend (or alter) forward or backward the time-domain data in the ni2 dimension. lpopt2 functions analogously to lpopt. Enter addpar('lp',2) to create lpopt2 and other ni2 dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpopt	LP algorithm data extension for np dimension (P)
	ni2	Number of increments in 2nd indirectly detected dimension (P)

lpprint — LP print output for np dimension (P)

Description: Controls LP (linear prediction) print output for the np dimension and creates an output file in the current experiment directory (curexp) with the name lpanalyz.out.1. Enter addpar('lp') to create lpprint and other np dimension LP parameters in the current experiment.

Values: Comprised of sum of decimal values of the following bit fields, in which each bit field controls an independent output option:

- Bit 0 (decimal value 1) writes out the LP matrix and Y vector from which the LP coefficients are calculated.
- Bit 1 (decimal value 2) writes out the LP coefficients that have been obtained using either of the two supported algorithms.
- Bit 2 (decimal value 4) writes out the LP roots obtained from the characteristic polynomial derived from the LP coefficients; this only applies for lpalg='lpfft' and lpopt='f'.
- Bit 3 (decimal value 8) writes out the original and recalculated values for each LP extended (or altered) complex time-domain data point.
- Bit 4 (decimal value 16) writes out the internal LP parameter structure.

For example, lpprint=12 and lptrace=1 yields the following information in the file curexp/lpanalyz.out.1 for spectrum 1 along f_2: the values for all lpfilt complex LP coefficients and the original and recalculated values for each of the lpext LP extended (or altered) complex time-domain data points.

See also: *Getting Started*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	curexp	Current experiment directory (P)
	lpalg	LP algorithm in np dimension (P)
	lpext	LP data extension in np dimension (P)
	lpfilt	LP coefficients to calculate in np dimension (P)
	lpopt	LP algorithm data extension for np dimension (P)
	lpprint1	LP print output for ni dimension (P)
	lpprint2	LP print output for ni2 dimension (P)
	lptrace	LP output spectrum in np dimension (P)
	np	Number of data points (P)

lpprint1 — LP print output for ni dimension (P)

Description: Controls LP (linear prediction) print output for the ni dimension and creates an output file in the current experiment directory (curexp) with the name lpanalyz1.out.1. lpprint1 functions analogously to lpprint. Enter

addpar('lp',1) to create lpprint1 and other ni dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpprint	LP print output for np dimension (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

lpprint2 LP print output for ni2 dimension (P)

Description: Controls LP (linear prediction) print output for the ni2 dimension and creates an output file in the current experiment directory (curexp) with the name lpanalyz2.out.1. lpprint2 functions analogously to lpprint. Enter addpar('lp',2) to create lpprint2 and other ni2 dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpprint	LP print output for np dimension (P)
	ni2	Number of increments in 2nd indirectly detected dimension (P)

lptrace LP output spectrum in np dimension (P)

Description: Specifies for which spectrum LP (linear prediction) output in the np dimension is produced in accordance with the parameter lpprint. Enter addpar('lp') to create lptrace and other np dimension LP parameters in the current experiment.

See also: *Getting Started*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpalg	LP algorithm in np dimension (P)
	lpprint	LP print output in np dimension (P)
	lptrace1	LP output spectrum in ni dimension (P)
	lptrace2	LP output spectrum in ni2 dimension (P)
	np	Number of data points (P)

lptrace1 LP output spectrum in ni dimension (P)

Description: Specifies for which spectrum or trace LP (linear prediction) output in the ni dimension is produced in accordance with the parameter lpprint1. lptrace1 functions analogously to lptrace. Enter addpar('lp',1) to create t lpprint2 and other ni dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	lpprint1	LP print output in ni dimension (P)
	lptrace	LP output spectrum in np dimension (P)
	ni	Number of increments in 1st indirectly detected dimension (P)

lptrace2 LP output spectrum in ni2 dimension (P)

Description: Specifies for which spectrum or trace LP (linear prediction) output in the ni2 dimension is produced in accordance with the parameter lpprint2. lptrace2 functions analogously to lptrace. Enter addpar('lp',2) to create lptrace2 and other ni2 dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
lpprint2	LP print output in ni2 dimension (P)
lptrace	LP output spectrum in np dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)

lro — Field of view size for readout axis (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the actual size of the image field of view (FOV) for readout axis, in cm. The size and shape of the image FOV is set through the selection of the parameters sw, gro, lro, sw1, gpe, and lpe. The size of the FOV in frequency units is sw*sw1, or in terms of distance measure (cm) is lro*lpe. The values of these parameters are related by the following equalities, where gcal is the appropriate calibration constant:

```
sw  = (gcal*sfrq*1000000*gro*lro)
sw1 = (gcal*sfrq*1000000*gpe*lpe)
```

See also: *User Guide: Imaging*

Related:

gcal	Gradient calibration constant (P)
gpe	Phase encoding gradient increment (P)
gro	Readout gradient strength (P)
lpe	Field of view size for phase encode axis (P)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)

ls — List files in directory (C)

Syntax: `ls<(directory)>`

Description: Lists the names of files in a directory on the text output window. ls is identical to dir and lf.

Arguments: directory is the name of a directory. The default is the current working directory. ls is equivalent to the UNIX command ls and uses the same options (e.g., -l for a long listing such as ls('-l *.fid')).

Examples:

```
ls
ls('data')
ls('-l *.fid')
```

See also: *Getting Started*

Related:

dir	List files in directory (C)
lf	List files in directory (C)

lsfid — Number of complex points to left-shift the np FID (P)

Description: Specifies number of complex points (not real points) that the np FID is to be either left-shifted (lsfid>0) or right-shifted (lsfid<0). A right shift adds zeros to the front of the FID. lsfid (and related parameters phfid and lsfrq) operate on complex np FID data, referred to as the t_2 dimension in a 2D experiment or as the t_3 dimension in a 3D experiment. lsfid is in the processing group and is properly handled by a wti operation (display).

Values: -fn/2 to np/2 (or -fn/2 to fn/2 if fn<np), 'n'

See also: *Getting Started*

Related:		
	dfid	Display a single FID (C)
	ds	Display a spectrum FID (C)
	fn	Fourier number in directly detected dimension (P)
	ft	Fourier transform 1D data (C)
	ft1d	Fourier transform along f_2 dimension (C)
	ft2d	Fourier transform 2D data (C)
	lsfid1	Number of complex points to left-shift ni interferogram(P)
	lsfid2	Number of complex points to left-shift ni2 interferogram (P)
	lsfrq	Frequency shift of the fn spectrum in Hz (P)
	np	Number of data points (P)
	phfid	Zero-order phasing constant for the np FID (P)
	wft	Weight and Fourier transform 1D data (C)
	wft1d	Weight and Fourier transform f_2 of 2D data (C)
	wft2d	Weight and Fourier transform 2D data (C)
	wti	Interactive weighting (C)

lsfid1 — Number of complex points to left-shift ni interferogram (P)

Description: Specifies number of hypercomplex (for hypercomplex interferogram data) or complex (for complex interferogram data) points that the ni interferogram is to be either left-shifted (lsfid1>0) or right-shifted (lsfid1<0). A right shift adds zeros to the front of the FID. lsfid1 (and related parameters phfid1 and lsfrq1) operate on ni interferogram data, both hypercomplex and complex. ni interferogram data are referred to as the t_1 dimension in both a 2D and a 3D experiment. lsfid1 is in the processing group and is properly handled by a wti operation (display); that is, a wti operation on an ni interferogram applies the parameters phfid1, lsfid1, and lsfrq1, if selected, to the time-domain data prior to the Fourier transformation.

Values: –fn1/2 to ni (or –fn1/2 to fn1/2 if fn1<2*ni), 'n'

See also: *User Guide: Liquids NMR*

Related:		
	fn1	Fourier number in 1st indirectly detected dimension (P)
	lsfid	Number of complex points to left-shift np FID (P)
	lsfid2	Number of complex points to left-shift ni2 interferogram (P)
	lsfrq1	Frequency shift of the fn1 spectrum in Hz (P)
	ni	Number of increments in 1st indirectly detected dimension (P)
	phfid1	Zero-order phasing constant for ni interferogram (P)
	wti	Interactive weighting (C)

lsfid2 — Number of complex points to left-shift ni2 interferogram (P)

Description: Specifies the number of hypercomplex (for hypercomplex interferogram data) or complex (for complex interferogram data) points that the ni2 interferogram is to be either left-shifted (lsfid2>0) or right-shifted (lsfid2<0). A right shift adds zeros to the front of the FID. lsfid2 (and related parameters phfid2 and lsfrq2) operate on ni2 interferogram data, both hypercomplex and complex. ni2 interferogram data are referred to as the t_2 dimension in a 3D experiment. lsfid2 is in the processing group and is properly handled by a wti operation (display).

Values: –fn2/2 to ni2 (or –fn2/2 to fn2/2 if fn2<2*ni2), 'n'

See also: *User Guide: Liquids NMR*

Related:		
	fn2	Fourier number in 2nd indirectly detected dimension (P)
	lsfid	Number of complex points to left-shift np FID (P)

lsfid1	Number of complex points to left-shift ni interferogram(P)
lsfrq2	Frequency shift of the fn2 spectrum in Hz (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
phfid2	Zero-order phasing constant for ni2 interferogram (P)
wti	Interactive weighting (C)

lsfrq — Frequency shift of the fn spectrum (P)

Description: Sets a frequency shift of spectral data, in Hz. lsfrq is the time-domain equivalent of lp within VNMR. lsfrq (and related parameters phfid and lsfid) operate on complex np FID data, referred to as the t_2 dimension in a 2D experiment or as the t_3 dimension in a 3D experiment. lsfrq is in the processing group and is properly handled by a wti operation (display).

Values: A positive value results in peaks being shifted downfield (to the left). A negative value results in peaks being shifted upfield (to the right).

See also: *Getting Started*

Related:

dfid	Display a single FID (C)
ds	Display a spectrum FID (C)
fn	Fourier number in directly detected dimension (P)
ft	Fourier transform 1D data (C)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
lp	First-order phase in directly detected dimension (P)
lsfid	Number of complex points to left-shift np FID (P)
lsfrq1	Frequency shift of the fn1 spectrum in Hz (P)
lsfrq2	Frequency shift of the fn2 spectrum in Hz (P)
phfid	Zero-order phasing constant for np FID (P)
wft	Weight and Fourier transform 1D data (C)
wft1d	Weight and Fourier transform f_2 of 2D data (C)
wft2d	Weight and Fourier transform 2D data (C)
wti	Interactive weighting (C)

lsfrq1 — Frequency shift of the fn1 spectrum (P)

Description: Sets a frequency shift of spectral data, in Hz. lsfrq1 is the time-domain equivalent of lp1 within VNMR. lsfrq1 (and related parameters phfid1 and lsfid1) operate on ni interferogram data, both hypercomplex and complex. ni interferogram data are referred to as the t_1 dimension in both a 2D and a 3D experiment. lsfrq1 is in the processing group and is properly handled by a wti operation (display); that is, a wti operation on an ni interferogram applies the parameters phfid1, lsfid1, and lsfrq1, if selected, to the time-domain data prior to the Fourier transformation.

Values: A positive value results in peaks being shifted downfield (to the left).

A negative value results in peaks being shifted upfield (to the right).

See also: *User Guide: Liquids NMR*

Related:

fn1	Fourier number in 1st indirectly detected dimension (P)
lp1	First-order phase in 1st indirectly detected dimension (P)
lsfid1	Number of complex points to left-shift ni interferogram(P)
lsfrq	Frequency shift of the fn spectrum in Hz (P)
lsfrq2	Frequency shift of the fn2 spectrum in Hz (P)
ni	Number of increments in 1st indirectly detected dimension (P)
phfid1	Zero-order phasing constant for ni interferogram (P)
wti	Interactive weighting (C)

lsfrq2 — Frequency shift of the fn2 spectrum (P)

Description: Sets a frequency shift of spectral data in Hz. lsfrq2 is the time-domain equivalent of lp2 within VNMR. lsfrq2 (and related parameters phfid2 and lsfid2) operate on ni2 interferogram data, both hypercomplex and complex. ni2 interferogram data is referred to as the t_2 dimension in a 3D experiment. lsfrq2 is in the processing group and is properly handled by a wti operation (display).

Values: A positive value results in peaks being shifted downfield (to the left).

A negative value results in peaks being shifted upfield (to the right).

See also: *User Guide: Liquids NMR*

Related:

fn2	Fourier number in 2nd indirectly detected dimension (P)
lp2	First-order phase in 2nd indirectly detected dimension (P)
lsfid1	Number of complex points to left-shift ni interferogram (P)
lsfid2	Number of complex points to left-shift ni2 interferogram (P)
lsfrq	Frequency shift of the fn spectrum in Hz (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
phfid2	Zero-order phasing constant for ni2 interferogram (P)
wti	Interactive weighting (C)

lvl — Zero-order baseline correction (P)

Description: When spectral display is active, the command dc turns on a linear drift correction (baseline correction). The result of this operation includes calculating a zero-order baseline correction parameter lvl. This is done by averaging of a small number of points at either end of the display and drawing a straight line baseline between them.

See also: *Getting Started*

Related:

cdc	Cancel drift correction (C)
dc	Calculate spectral drift correction (C)
lvltlt	Control sensitivity of lvl and tlt adjustments (P)
tlt	First-order baseline correction (P)

lvltlt — Control sensitivity of lvl and tlt adjustments (P)

Description: Controls the sensitivity of the interactive lvl and tlt adjustments. lvltlt is in the "current" parameter set and is basically a multiplier for the sensitivity. If this parameter does not exist, it can be created by commands create('lvltlt') setgroup('lvltlt','display').

Values: The default value is 1.0. Larger values make the adjustments larger. Smaller values make the adjustments smaller.

See also: *Getting Started*

Related:

create	Create new parameter in a parameter tree (C)
ds	Display a spectrum (C)
lvl	Zero-order baseline correction (P)
setgroup	Set group of a variable in a tree (C)
tlt	First-order baseline correction (P)

M

maclibpath — Path to user's macro directory (P)

Description: Contains an absolute path to a user's macro files directory. If `maclibpath` exists for a user, it must be defined in the global parameter file for the user. Enter the command `create('maclibpath','string','global')` to create `maclibpath`.

See also: *VNMR User Programming*

Related:
- `create` — Create new parameter in a parameter tree (C)
- `exists` — Determine if a parameter, file, or macro exists (C)

macro — Macro name (P)

Description: A string parameter, available in each experiment, similar to the `n1`, `n2`, and `n3` parameters. Certain macros, such as `h1p`, need to know which macro invoked them. This parameter is used to pass that information.

See also: *VNMR User Programming*

Related:
- `h1p` — Process simple proton spectra from `h1` macro (M)
- `n1,n2,n3` — Name storage for macros (P)

macrocat — Display a user macro file in text window (C)

Syntax: `macrocat(file1<,file2><,...>)`

Description: Displays one or more user macro files in the text window.

Arguments: `file1, file2, ...` are the names of macros in the user macro library.

Examples:
```
macrocat('build')
macrocat('dan','george')
```

See also: *VNMR User Programming*

Related:
- `macrodir` — List user macros (C)
- `macrosyscat` — Display a system macro file in text window (C)

macrocp — Copy a user macro file (C)

Syntax: `macrocp(from_file,to_file)`

Description: Makes a copy of the existing user macro file and places the copy in the user's macro library. Using `macrocp` to make a backup copy is the recommended procedure to modify a macro but still be able to revert to the previous version if you are unsure about the modification. `macrocp` can also be useful for writing a new macro that is very similar to an existing macro.

Arguments: `from_file` is the name of an existing user macro file to be copied. The file must be in the user's macro library.

`to_file` is the file name to be given to the copy. This name must be different from the name of the original macro.

Examples: `macrocp('dan','dan.old')`

See also: *VNMR User Programming*

Related:
- `macrocat` Display a user macro file in text window (C)
- `macrodir` List user macros (C)
- `macrosyscp` Copy a system macro to become a user macro (C)

`macrodir` List user macro files (C)

Syntax: `macrodir`

Description: Lists the names of user macro files in the user's macro library.

See also: *VNMR User Programming*

Related:
- `macrosysdir` Lists system macros (C)

`macroedit` Edit a macro with user-selectable editor (M)

Syntax: `macroedit(file)`

Description: Opens a MAGICAL macro file from a user's personal macro library for editing (if you want to edit a system macro, copy it to a personal library and then use `macroedit`).

The default editor is `vi`. To select another editor, first set UNIX environmental variable `vnmreditor` to the name of the editor; that is, in the `.login` file, change the line

```
setenv vnmreditor old_ed
```

to become

`setenv vnmreditor new_ed` (e.g., `setenv vnmreditor emacs`).

Second, make sure a script with the prefix `vnmr_` followed by the name of the editor is placed in the `bin` subdirectory of the VNMR system directory (e.g., `vnmr_emacs`).

The script file makes adjustments for the type of graphic interface in use. Scripts provided in the software include *v*`nmr_vi` and `vnmr_textedit`. To create other scripts, refer to the `vnmr_vi` script for non-window editor interfaces or refer to `vnmr_textedit` for window-based editor interfaces.

Arguments: `file` is the name of the macro file you wish to edit.

Examples: `macroedit('pa')`

See also: *VNMR User Programming*

Related:
- `paramedit` Edit a parameter and its attributes with user-selected editor (C)
- `paramvi` Edit a parameter and its attributes with *vi* editor (M)
- `edit` Edit a file with user-selectable editor (C)
- `macrovi` Edit a user macro with `vi` editor (M)
- `menuvi` Edit a menu with the `vi` editor (M)
- `textvi` Edit text file of current experiment with *vi* editor (M)

`macrold` Load a macro into memory (C)

Syntax: `macrold(file)<:dummy>`

Description: Loads a macro, user or system, into memory. If the macro already exists in memory, it is overwritten by the new macro. Loading a macro into memory increases the execution speed of the macro. The trade-off is that the macro uses memory. The `mstat` command displays macros that have been loaded into memory. One or more individual macros, or all the macros loaded in memory, can be removed from memory with the `purge` command.

If a macro already loaded into memory is edited using macrovi or macroedit, the changed macro automatically is loaded by those macros. This overwrites the previous macro. However, if a macro is edited or created some other way (with macrocp perhaps), the changed version is not automatically loaded. If the macro already exists in memory, the previous version executes unless the user runs macrold.

Arguments: file is the name of the macro file to be loaded into memory. For loading macros, the same search path is used as when deciding which macro to execute. That is, the user's private maclib directory is searched first, then a directory specified by maclibpath, and finally the system maclib. If an absolute path is supplied as the file argument, that macro is loaded. This allows macros not in a maclib to be loaded and executed from VNMR.

dummy is any throwaway variable. Requesting a return value suppresses the message in the status window (line 3) that the macro is loaded.

Examples:
```
macrold('pa')
macrold('_sw'):$noline3
```

See also: *VNMR User Programming*

Related:

maclibpath	Path to user's macro directory (P)
macrocp	Copy a user macro file (C)
macroedit	Edit a macro with user-selectable editor (M)
macrovi	Edit a user macro with the vi text editor (M)
mstat	Display memory usage statistics (C)
purge	Remove macros from memory (C)

macrorm — Remove a user macro (C)

Syntax: `macrorm(file)`

Description: Removes a user macro from the user's macro directory. If the macro has already been loaded in memory, it remains in memory until a new macro of the same name is loaded or the program exits.

Arguments: file is the name of the user macro to be removed.

Examples:
```
macrorm('pa')
```

See also: *VNMR User Programming*

Related:

delcom	Delete a user macro (M)
macrodir	List user macros (C)
macrosysrm	Remove a system macro (C)
purge	Remove all macros from memory (C)

macrosyscat — Display a system macro file in text window (C)

Syntax: `macrosyscat(file1<,file2><,...>)`

Description: Displays one or more system macro files in the text window.

Arguments: file1, file2, ... are names of macros in the system macro library.

Examples:
```
macrosyscat('build')
macrosyscat('dan','george')
```

See also: *VNMR User Programming*

Related:

macrocat	Display a user macro file in text window (C)
macrosysdir	Lists system macros (C)

macrosyscp — Copy a system macro to become a user macro (C)

Syntax: `macrosyscp(from_file,to_file)`

Description: Makes a copy of the existing system macro file and places the copy in the user's macro library. This is the recommended way to modify a system macro for personal use.

Arguments: `from_file` is the name of an existing system macro file to be copied. The file must be in the system macro library.

`to_file` is the file name to be given to the copy. In this case, the name of the copied macro can be the same as the original macro. In many cases, it is the same, allowing the user to have a personal macro of the same name as the system macro but which will override the system macro.

Examples:
```
macrosyscp('pa','pa')
macrosyscp('pa','mypa')
```

See also: *VNMR User Programming*

Related:

macrocp	Copy a user macro file (C)
macrosyscat	Display a system macro file in text window (C)
macrosysdir	Lists system macros (C)

macrosysdir — List system macros (C)

Syntax: `macrosysdir`

Description: Lists the names of system macros in the system macro library.

See also: *VNMR User Programming*

Related:

macrodir	List user macros (C)

macrosysld — Load a system macro into memory (obsolete)

Description: This command is no longer part of VNMR. It has been replaced by the `macrold` command, which has been changed to load both user and system macros into memory.

Related:

macrold	Load a user macro into memory (C)

macrosysrm — Remove a system macro (C)

Syntax: `macrosysrm(file)`

Description: Removes a system macro file from the system macro directory. If the macro has already been loaded in memory, it remains in memory until a new macro of the same name is loaded or the program exits.

Arguments: `file` is the name of the system macro file to be removed.

Examples: `macrosysrm('pa')`

See also: *VNMR User Programming*

Related:

macrorm	Remove a user macro (C)
macrosysdir	Lists system macros (C)
purge	Remove all macros from memory (C)

macrosysvi — Edit a system macro with the vi text editor (obsolete)

Description: This macro is no longer part of VNMR. To edit a system macro, first copy it to a personal library, and then edit it using macroedit or macrovi.

Related:
- macroedit — Edit a macro with a user-selectable editor (M)
- macrovi — Edit a user macro with the *vi* text editor (M)

macrovi — Edit a user macro with the vi text editor (M)

Syntax: macrovi(file)

Description: Initiates creating a new user macro or modifying an existing user macro using the UNIX vi text editor. On the Sun workstation, a pop-up window contains the edit. On the GraphOn, the edit is done on the entire terminal. To edit a system macro, first copy the macro to a personal library and then edit it using macroedit or macrovi.

Arguments: file is the name of an existing user's macro to be edited or the name of a new user's macro to be created.

Examples: macrovi('pa')

See also: *VNMR User Programming*

Related:
- macroedit — Edit a macro with a user-selectable editor (C)
- vi — Edit text file with *vi* text editor (C)

make3dcoef — Make a 3D coefficients file from 2D coefficients (M)

Syntax: make3dcoef<('t1t2'|'t2t1')>

Description: Makes a 3D coefficients file from 2D coefficients and writes the file in the path stored by curexp. 2D coefficients are supplied as strings in the parameters f2coef and f1coef. This macro is capable of handling 3D data collected with any number of data sets (e.g., TPPI, Hypercomplex, Rance SE, Kay SE, and phase-sensitive gradient in one or both dimensions). make3dcoef is called by the ft3d macro.

The 2D coefficients are supplied as strings in f1coef and f2coef. These coefficients are the same as found by processing with wft2d(2dcoefs). Note that wft2da (for States-Hypercomplex method) is equivalent to wft2d(1,0,0,0,0,-1,0), and that wft2d (for absolute-value mode) is equivalent to wft2d(1,0,-1).

Coefficients are separated by spaces and not commas. For example, if a 3D data set collected by the States-Hypercomplex method in both ni and ni2 dimensions, f1coef='1 0 0 0 0 -1 0' and f2coef='1 0 0 0 0 -1 0'. And if a 3D data set collected in absolute-value mode in both ni and ni2 dimensions, f1coef='1 0 -1' and f2coef='1 0 -1'.

The f1coef and f2coef parameters are created by the par3d macro. Execution of make3dcoef when f1coef and f2coef have no value or inconsistent values causes the macro to abort, which enables the user to enter these values and reexecute the macro. For example, the value of f1coef when the F1 dimension can be processed with wft2da is '1 0 0 0 0 0 -1 0'. The value of f2coef when the F2 dimension can be processed with wft2d(1,0,1,0,0,-1,0,1) is '1 0 1 0 0 -1 0 1'.

The parameters f1coef and f2coef must be 2D coefficients that give proper ni and ni2 first planes with the same rp (assuming lp is 0 by using calfa) values. For example, processing the phase-sensitive gradient dimension should not be done with 1 0 0 1 0 1 1 0 and applying 45° phase shifts to rp, but with

1 0 1 0 0 1 0 -1, or its variant, that gives the same rp value as the other dimension. This also applies to Rance-type or Kay-type sensitivity-enhanced dimensions.

Note that sensitivity-enhanced sequences (gradient or otherwise) can be processed two different ways to give "orthogonal" data sets. The coefficients must be picked so that they have the same rp as the other dimension.

This macro can also handle coefficients that are not 1s or 0s. For example, if processing requires that a data set contributes to the interferogram after a 30°phase shift, cos(30) and sin(30) can be selected as the real and imaginary contributions, respectively, during the construction of the interferogram.

Arguments: 't1t2' means array='phase,phase2' in simple hypercomplex data sets. It means array='t1related','t2related' with multiple sets in general.

't2t1' means array='phase2,phase' in simple hypercomplex data sets. It means array='t2related','t1related' with multiple sets in general.

If no argument is used and if array='phase,phase2' or array='phase2,phase, the macro automatically decides on 't1t2' or 't2t1', respectively.

See also: *User Guide: Liquids NMR*

Related:

array	Parameter order and precedence (P)
calfa	Recalculate alfa so that first-order phase is zero (M)
curexp	Current experiment directory (P)
f1coef	Coefficient to construct F1 interferogram (P)
f2coef	Coefficient to construct F2 interferogram (P)
ft3d	Perform a 3D Fourier transform on a 3D FID data set (M)
lp	First-order phase in directly detected dimension (P)
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
ntype3d	Specify whether f_1 or f_2 display expected to be N-type (P)
rp	Zero-order phase in directly detected dimension (P)
wft2d	Weight and Fourier transform 2D data (C)
wft2da	Weight and Fourier transform phase-sensitive data (M)

makedosyparamsCreate parameters for DOSY processing (M)

Syntax: makedosyparams(dosytimecubed,dosyfrq)

Description: This macro is automatically called by the Dbppste, DgcsteSL, Doneshot, Dbppsteinept, Dgcstecosy, and Dgcstehmqc sequences to create the parameters dosyfrq, dosygamma, and dosytimecubed, which are necessary for the dosy analysis. Do not manually run makedosyparams.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)
dosyfrq	Larmor frequency of phase encoded nucleus in DOSY (P)
dosygamma	Gyromagnetic constant of phase encoded nucleus in DOSY (P)
dosytimecubed	Gyromagnetic constant of phase encoded nucleus in DOSY (P)

makefid Make a FID element using numeric text input (C)

Syntax: makefid(file<,element_number<,format>)

Description: Creates FID files that can be used to introduce computed data into an experiment. The number of points comes from the number of numeric values

read from the input file. If the current experiment already contains a FID, you will not be able to change either the format or the number of points from that present in the FID file. Use `rm(curexp+'/acqfil/fid')` to remove the FID.

`The makefid` command does not look at parameter values when establishing the format of the data or the number of points in an element. Thus, if the FID file is not present, it is possible for `makefid` to write a FID file with a header that does not match the value of `dp` or `np`. Because the active value is in the processed tree, you need to use the `setvalue` command if any changes are required.

Arguments: `file` is the name of the input file. It contains numeric values, two per line. The first value is assigned to the X (or real) channel; the second value on the line is assigned to the Y (or imaginary) channel.

`element_number` is the number of the element or FID and is any integer larger than 0. The default is the first element or FID. If the FID element already exists in the FID file, the program overwrites the old data.

`format` is a character string with the precision of the resulting FID file and can be specified by one of the following strings:

`'dp=n'`	single-precision (16-bit) data
`'dp=y'`	double-precision (32-bit) data
`'16-bit'`	single-precision (16-bit) data
`'32-bit'`	double-precision (32-bit) data

If an FID file exists, `makefid` uses the same `format` string for precision; otherwise, the default is double-precision (32-bit) data.

`element_number` and `format` arguments can be entered in any order.

Examples: `makfid('fid.in',2,'32-bit')`

See also: *Getting Started*; *VNMR User Programming*

Related:

`cp`	Copy a file (C)
`curexp`	Current experiment directory
`dp`	Double precision (P)
`mv`	Move and/or rename a file (C)
`np`	Number of data points (P)
`rm`	Delete file (C)
`setvalue`	Set value of any parameter in a tree (C)
`writefid`	Write numeric text file using a FID element (C)

`makephf` Transform and save images as phasefiles (M)

Applicability: Systems with imaging capabilities.

Syntax: `makephf`

Description: Transforms and saves images as phasefiles.

See also: *User Guide: Imaging*

Related:

`imcalc`	Calculate 2D phasefiles (M,U)
`imfit`	Fit arrayed imaging data to T_1 or T_2 exponential data (M,U)

`makeslice` Synthesize 2D projection of 3D DOSY experiment (C)

Syntax: `makeslice(<option>,lowerlimit,upperlimit)`

Arguments: `option` is either `'i'` or `'s'`.

`'i'` includes the "tails" of diffusion peaks that lie outside the range between `lowerlimit` and `upperlimit`. The default is `'i'`.

`'s'` only includes the integration peaks whose diffusion coefficient lies between the specified limits.

`lowerlimit` is the lower diffusion limit (in units of 10^{-10} m^2/s) to be displayed.

`upperlimit` is the upper diffusion limit (in units of 10^{-10} m^2/s) to be displayed

Description: Synthesizes an integral projection between specified diffusion limits of a 3D DOSY spectrum onto the frequency-frequency plane. `makeslice` requires the first 2D increment of the 3D DOSY data to have been transformed.

See also: *User Guide: Liquids NMR*

Related:

`dosy`	Process DOSY experiments (M)
`showoriginal`	Restore first 2D spectrum in 3D DOSY spectrum (M)

`mkvnmrjadmin` Create and update user account (C)

Syntax: `mkvnmrjadmin username`

Description: Logged in as `root`, `mkvnmrjadmin` creates and updates user accounts.

Arguments: `username` is the name of the accountholder.

`man` Display online description of command or macro (M)

Syntax: `man(file)`

Description: Displays in the text window a description of commands and system macros from files in the directory `/vnmr/manual`.

Arguments: `file` is the name of a command or system macro in `/vnmr/manual`.

Examples: `man('mark')`

See also: *Getting Started; VNMR User Programming*

Related:

`manvi`	Edit online description of a command or macro (M)
`manualpath`	Path to user's manual directory (P)

`manualpath` Path to user's manual directory (P)

Description: Contains the absolute path to a user's directory of VNMR manual entries. If `manualpath` exists for a user, it must be defined in the user's global parameter file. Enter `create('manualpath','string','global')` to create the `manualpath` parameter.

See also: *VNMR User Programming*

Related:

`man`	Display online description of a command or macro (M)

`manvi` Edit online description of a command or macro (M)

Syntax: `manvi(file)`

Description: Enables editing the online description of commands and system macros stored in the directory `/vnmr/manual`. You must have write permission to this directory in order to edit the files.

Arguments: `file` is the name of a command or system macro in `/vnmr/manual`.

Examples: `manvi('mark')`

See also: *VNMR User Programming*

Related: `man` Display online description of command or macro (M)

mapwin — List of experiment numbers (P)

Syntax: `mapwin`

Description: Arrayed global parameter that maintains a list of experiment numbers for the window panes in the VNMR graphics window.

See also: *Getting Started*

Related:

`curwin`	Current window (P)
`fontselect`	Open FontSelect window (C)
`jwin`	Activate current window (M)
`setgrid`	Activate selected window (M)
`setwin`	Activate selected window (C)

mark — Determine intensity of spectrum at a point (C)

Syntax:

(1) `mark<(f1_position)><:intensity>`

(2) `mark<(left_edge,region_width)><:intensity, integral>`

(3) `mark<(f1_position,f2_position)><:intensity>`

(4) `mark<(f1_start,f1_end,f2_start,f2_end)> <:intensity,integral,c1,c2>`

(5) `mark<('trace',<options>)><:intensity,integral, c1,c2>`

(6) `mark('reset')`

Description: Find the intensity of a spectrum at a point. Either 1D or 2D operations can be performed in the cursor or box mode for a total of four separate functions: 1D operations in cursor mode (syntax 1), 1D operations in box mode (syntax 2), 2D operations in cursor mode (syntax 3) and 2D operations in box mode (syntax 4).

In the *cursor mode*, the intensity at a particular point is found. In the *box mode*, the integral over a region is calculated. The displayed integral is scaled in the same way as output from `dli` is scaled; that is, by the `ins` and `insref` parameters. For 2D operations, this is the volume integral and the volume is scaled by `ins2` and `ins2ref`. In addition, the `mark` command in the box mode finds the maximum intensity and the coordinate(s) of the maximum intensity.

The `mark` command requires that transformed data be present in the current experiment. If required, it recomputes the phase file from the complex data (i.e., it rephases the data if required); however, the `mark` command requires parameters from the command line if no data is displayed (i.e., if `ds` or `dconi` has not been executed).

Note that 2D operations require that 2D data be present. This not only means that `ni` must be larger than 1, but also that the data was transformed using `ft1d`, `ft2d` or an equivalent (and not `ft` or its equivalents).

The `mark` command, as well as the MARK button of `ds`, writes output to a file in the current experiment. For 1D operations, the file is named `mark1d.out`; for 2D operations, it is `mark2d.out`. If this file already exits, VNMR appends output from the current `mark` operation to the end of the file. (Older versions of VNMR used `ds.out` and `dconi.out` as files for output from the MARK

button). Either file can be read by other programs at any time between operations.

The following criteria establish the exact function. The command checks them in the following order until it determines the exact function:

1. Number of numeric parameters.

2. Number of return values called out.

3. Which display command (ds or dconi) was last used.

4. Nature of the data in the experiment.

The first two criteria only serve to distinguish between box mode and cursor mode. The nature of the data in the experiment and the last display command entered determines whether a 1D or a 2D operation is selected.

Arguments: f1_position defines the position, in Hz, along the f_1 axis in the 1D and 2D cursor modes. The default is cr (1D) or cr1 (2D).

left_edge defines the position of the left edge of the region, in Hz, to be integrated in 1D box mode. The default is cr.

region_width defines the width, in Hz, of the region, which extends to the right of left_edge, in 1D box mode. The default is delta.

f2_position defines the position, in Hz, along the f_2 axis in the 2D cursor mode. The default is delta1.

f1_start and f1_end define region along the f_1 axis in the 2D box mode.

f2_start and f2_end define region along the f_2 axis in the 2D box mode.

'trace' is a keyword to select a 1D operation if 2D data is present. It must be either the first or the last argument (e.g., mark('trace',400) determines the intensity at 400 Hz in the current trace).

'reset' is a keyword to erase the output files from the mark command. No other argument can be used with this keyword. Use rename to rename the current mark output files (e.g., rename(curexp+'/mark1d.out', curexp+'/mark.16.01.89')

intensity is a return value set to the intensity of the spectrum at the point for either 1D or 2D operations (the maximum if cursor mode was selected).

integral is a return value set to the integral of the spectrum at the point. integral is not returned in the cursor mode.

c1,c2 are return values set to the coordinates where the maximum intensity was found in 2D mode. c1 and c2 are not returned in the cursor mode.

Examples: 1D data sets:

mark(cr)	cursor mode for 1D data
mark(cr,delta)	box mode for 1D data

2D data sets (2D mode): In this mode, the order of the arguments to mark is independent of the trace parameter.

mark(cr1,cr)	cursor mode for 2D data
mark(cr1,delta1,cr,delta)	box mode for 2D data

2D data sets (1D mode): In this mode, the selection of the arguments to mark is dependent on the trace parameter. If trace='f2', then cr, delta, sp, or

wp are appropriate. If trace='f1', then cr1, delta1, sp1, and wp1 are appropriate.

mark('trace',cr)	cursor mode for selected 2D trace
mark('trace',cr1,delta1)	box mode for selected 2D trace

Alternate: MARK button in the ds program.

See also: *User Guide: Liquids NMR; VNMR User Programming*

Related:

cr	Cursor position in directly detected dimension (P)
cr1	Cursor position in 1st indirectly detected dimension (P)
curexp	Current experiment directory (P)
dconi	Interactive 2D contour display (C)
delta	Difference of two frequency cursors (P)
dli	Display list of integrals (C)
ds	Display a spectrum (C)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
ins	Integral normalization scale (P)
ins2	2D volume value (P)
insref	Fourier number scaled value of an integral (P)
ins2ref	Fourier number scaled volume of a peak (P)
mv	Move and/or rename a file (C)
ni	Number of increments in 1st indirectly detected dimension (P)

masvt — Type of variable temperature system (P)

Applicability: All systems except *MERCURY-Vx*, *MERCURY,* and *GEMINI 2000*.

Description: Identifies the type of VT system in use: the standard Oxford VT controller or the Oxford-Sorenson or solids VT controller system (used with the Varian VT CP/MAS probe). masvt is a global parameter that is active on all of each user's experiments on a per user account basis. The current value of the parameter can be displayed by typing masvt?.

Note that the VT Controller option displayed by config must be set to Present for either VT controller system to be active. If masvt does not exist, it can be created with the command create('masvt','string','global').

The new Highland VT controller is autosensing, making masvt superfluous for systems with this controller.

Values: 'y' indicates the solids VT system is in use.

'n', any other value but 'n' and 'y', or if masvt does not exist, indicate that the OxfordVarian VT controller, if present, is in use.

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change values (M)
create	Create a new parameter in a parameter tree (C)
vttype	Variable temperature controller present (P)

math — Fourier transform mathematics (obsolete)

Description: This parameter is no longer part of VNMR. Fourier transform math is now always done in floating point.

maxpen — Maximum number of pens to use (P)

Description: Controls the maximum number of pens that will be used.

Values: 1 to the number of pens in the system plotter. If `maxpen=x` and the software attempts to use pen `x+y`, it uses pen `y` instead.

See also: *Getting Started*

Related:

`pen`	Select a pen or color for drawing (C)
`setpen`	Set maximum number of HP plotter pens (M)

`maxsw_loband` Maximum spectral width of Input board (P)

Applicability: Systems with imaging capabilities.

Description: Stores the maximum spectral width of the Input board. The system value is set using the Max. Narrowband Width label in the CONFIG window (opened from `config`).

See also: *VNMR and Solaris Software Installation*; *User Guide: Imaging*

Related:

`config`	Display current configuration and possibly change it (M)

`md` Move display parameters between experiments (C)

Syntax: `md(<from_exp,>to_exp)`

Description: Moves the saved display parameters from one experiment to another. These parameters must have been saved with the `s` command (e.g., `s2`).

Arguments: `from_exp` specifies the number of the experiment, 1 through 9, from which the parameters are to be taken. The default is that the parameters are moved from the currently active experiment.

`to_exp` specifies to which experiment the parameters are to be moved.

Examples:
```
md(4)
md(2,3)
```

See also: *User Guide: Liquids NMR*

Related:

`mf`	Move FIDs between experiments (C)
`mp`	Move parameters between experiments (C)
`s`	Save display parameters as a set (M)

`menu` Change status of menu system (C)

Syntax:
(1) `menu(menu_name)`
(2) `menu<('off')>`

Description: TheVNMR menu system allows up to eight buttons to be active at a time, enabling the user to perform most actions with the mouse rather than typing in commands. All menus are stored in the library `menulib` in the system directory or in the user's `menulib`. See `menuvi` to change these menus.

If the menu system becomes deactivated for some reason, select the Menu On button in the Permanent Menu to reactivate it. Entering `menu('main')` also works.

Arguments: `menu_name` is the name of the file controlling the menu (e.g., `'main'`). Including this argument activates the menu system and displays the menu controlled by `menu_name`.

`'off'` is a keyword to turn off the menu system.

Examples:
```
menu
menu('fitspec')
menu('off')
```

See also: *Getting Started; VNMR User Programming*

Related:

menuvi	Edit a menu with the *vi* text editor (M)
mlabel	Menu label (P)
newmenu	Select a menu without immediate activation (C)

menulibpath — Path to user's menu directory (P)

Description: Contains an absolute path to a user's directory of VNMR menu files. If menulibpath exists for a user, it must be defined in the user's global parameter file. To create menulibpath, enter the command create('menulibpath','string','global').

See also: *VNMR User Programming*

menuvi — Edit a menu with vi text editor (M)

Syntax: menuvi(menu)

Description: Edits a VNMR menu file using the UNIX vi text editor. On the Sun workstation, a pop-up window contains the edit. On the GraphOn, the edit is done on the entire terminal.

Arguments: menu is the name of file controlling a menu.

Examples: menuvi('display_1D')

See also: *VNMR User Programming*

Related:

menu	Change status of menu system (C)
newmenu	Select a menu without immediate activation (C)
vi	Edit text file with vi text editor (C)

method — Autoshim method (P)

Description: Selects the method for automatic shimming. Refer to the manual *Getting Started* for information on how to write or alter methods.

Values: Name of file in the /vnmr/shimmethods library for one of the defined shim methods in the system. To display all available methods, enter ls('/vnmr/shimmethods'). Standard methods include 'z1z2' (selects shimming of the Z1 and Z2 gradients) and 'allzs' (selects shimming all spinning gradients, Z1 to Z4 or Z5, depending on the magnet type). Shim methods can also be stored in a user's shimmethods directory (e.g., /home/vnmr1/vnmrsys/shimmethods).

See also: *Getting Started*

Related:

ls	List files in current directory (C)
newshm	Interactively create a shim method with options (M)
stdshm	Interactively create a shim method (M)

mf — Move FIDs between experiments (C)

Syntax: mf(<from_exp,>to_exp)

Description: Moves the last acquired FID, as well as its associated parameters, from one experiment to another. The text, the processed acquisition parameters and the current display and processing parameters are also moved to the specified experiment.

Arguments: from_exp specifies number of the experiment from which the FID is to be taken. The default is the FID is moved from the currently active experiment.

`to_exp` specifies to which experiment the FID is to be moved.

Examples:
```
mf(4)
mf(3,2)
```

See also: *User Guide: Liquids NMR*

Related:
- `md` Move display parameters between experiments (C)
- `mp` Move parameters between experiments (C)

`mfblk` Copy FID block (C)

Syntax: `mfblk(<src_expno,>src_blk_no,dest_expno,dest_blk_no)`

Description: Copies data from a source FID block specified by `src_blk_no` to a destination FID block specified by `dest_expno` and `dest_blk_no`, using memory-mapped input and output.

`mfblk` searches for the source and destination FID file in the directory `$vnmruser/expN/acqfil`, where `N` is the requested experiment number or the current experiment number. If the FID file is not open, `mfblk` opens the file, copies the data, and closes the file. If a number of blocks need to be copied, explicitly opening and closing the files with the commands `mfopen` and `mfclose` can significantly speed up the data reformatting process.

`mfblk` can also be used to append blocks of data to a FID file by specifying that the `dest_blk_no` is greater than the number of blocks in a file.

Be aware that `mfblk` can modify data returned to an experiment with the `rt` command. To avoid modification, enter the following sequence of VNMR commands before running `mfblk`:

```
cp(curexp+'/acqfil/fid',curexp+'/acqfil/fidtmp')
rm(curexp+'/acqfil/fid')
mv(curexp+'/acqfil/fidtmp',curexp+'/acqfil/fid')
```

Arguments: `src_expno` specifies the experiment number of the source FID file. The default is the FID file of the current experiment.

`src_blk_no` specifies the source block of data to be copied. Block numbers start at 1 and run from 1 to the number of blocks in a file.

`dest_expno` specifies the experiment number of the destination FID file.

`dest_blk_no` specifies the destination block to send the copied data.

Examples:
`mfblk(1,2,1)` copies current experiment, block 1 to exp 2, block 1.
`mfblk(3,2,6,2)` copies exp 2, block 2 to exp 6, block 2.

See also: *VNMR User Programming*

Related:
- `mfclose` Memory map close FID file (C)
- `mfdata` Move FID data (C)
- `mfopen` Memory map open FID file (C)
- `mftrace` Move FID trace (C)

`mfclose` Close memory map FID (C)

Syntax: `mfclose`

Description: Closes experiment source and destination FID files that have been explicitly opened with `mfopen`.

See also: *VNMR User Programming*

Related:
- `mfblk` Move FID block (C)
- `mfdata` Move FID data (C)

mfopen	Memory map open FID file (C)
mftrace	Move FID trace (C)
rfblk	Reverse FID block (C)
rfdata	Reverse FID data (C)
rftrace	Reverse FID trace (C)

mfdata — Move FID data (C)

Syntax:
```
mfdata(<src_expno,>src_blk_no,src_start_loc,  \
  dest_expno,dest_blk_no,dest_start_loc,num_points)
```

Description: Copies data specified by `src_start_loc` from a FID block specified by `src_blk_no` to a destination location specified by `dest_expno`, `dest_blk_no`, and `dest_start_lo`, using memory-mapped input and output. The data point locations and the `num_points` to be copied are specified by data points corresponding to the `np` parameter, not bytes or complex points.

`mfdata` searches for the source and destination FID file in th directory `$vnmruser/expN/acqfil`, where `N` is the requested experiment number or the current experiment number. If the FID file is not open, `mfdata` opens the file, copies the data, and closes the file. If a number of blocks need to be copied, explicitly opening and closing the files with the commands `mfopen` and `mfclose` can significantly speed up the data reformatting process.

Be aware that `mfdata` can modify data returned to an experiment with the `rt` command. To avoid modification, enter the following sequence of VNMR commands before running `mfdata`:

```
cp(curexp+'/acqfil/fid',curexp+'/acqfil/fidtmp')
rm(curexp+'/acqfil/fid')
mv(curexp+'/acqfil/fidtmp',curexp+'/acqfil/fid')
```

Arguments: `src_expno` specifies the experiment number of the source FID file. The default is the FID file of the current experiment.

`src_blk_no` specifies the source block of data to be copied. Block numbers start at 1 and run from 1 to the number of blocks in a file.

`src_start_loc` specifies the starting data location within the specified block to copy the data. Data locations start from 0 and are specified as data points corresponding to the `np` parameter.

`dest_expno` specifies the experiment number of the destination FID file.

`dest_blk_no` specifies the destination block to send the copied data.

`dest_start_loc` specifies the starting data destination location within the specified block to send the copied data.

Examples: `mfdata(1,0,2,1,(nv-1)*np,np)` copies `np` points of data from the starting location 0 of block 1 of the current experiment to the data location `(nv-1)*np` of block 1 of experiment 2.

See also: *VNMR User Programming*

Related:

mfblk	Move FID block (C)
mfclose	Memory map close FID file (C)
mfdata	Move FID data (C)
mfopen	Memory map open FID file (C)
mftrace	Move FID trace (C)
rfblk	Reverse FID block (C)
rftrace	Reverse FID trace (C)

mfopen — Memory map open FID file (C)

Syntax: `mfopen<(<src_expno,>dest_expno)>`

Description: Explicitly opens experiment source and destination FID files for using memory-mapped input and output. Opening a file explicitly can significantly speed up the data reformatting process.

`mfopen` searches for the FID file to be opened in the directory `$vnmruser/expN/acqfil`, where `N` is the requested experiment number or the current experiment number. Without arguments, `mfopen` assumes the source and destination files are the same and are in the current experiment.

After a file is open, the data reformatting commands `mfblk`, `mfdata`, `mftrace`, `rfblk`, `rfdata`, and `rftrace` can be used for moving around data. The `mfclose` must be used to close the file when data reformatting has been completed.

Arguments: `src_expno` specifies the experiment number of the source FID file. The default is the FID file of the current experiment.

`dest_expno` specifies the experiment number of the destination FID file.The default is the FID file of the current experiment.

If only one argument is provided, `mfopen` uses that as the experiment number of the destination FID file and assumes the source is the FID file of the current experiment.

Examples:

```
mfopen
mfopen(3)
mfopen(1,2)
```

See also: *VNMR User Programming*

Related:

`mfblk`	Move FID block (C)
`mfclose`	Memory map close FID file (C)
`mfdata`	Move FID data (C)
`mftrace`	Move FID trace (C)
`rfblk`	Reverse FID block (C)
`rfdata`	Reverse FID data (C)
`rftrace`	Reverse FID trace (C)

mftrace — Move FID trace (C)

Syntax:

```
mftrace(<src_expno,>src_blk_no,src_trace_no,  \
  dest_expno,dest_blk_no,dest_trace_no)
```

Description: Copies FID traces specified by `src_trace_no` from a FID block specified by `src_blk_no` to a destination location specified by `dest_expno`, `dest_blk_no`, and `dest_trace_no`, using memory-mapped input and output. If a number of blocks need to be copied, explicitly opening and closing the files with the commands `mfopen` and `mfclose` can significantly speed up the data reformatting process.

`mftrace` searches for the source and destination FID file in the directory `$vnmruser/expN/acqfil`, where `N` is the requested experiment number or the current experiment number. If the FID file is not open, `mftrace` opens the file, copies the data, and closes the file.

`mftrace` cannot be used to append data to a FID file. Its purpose is for moving around data.

Be aware that `mftrace` can modify data returned to an experiment with the `rt` command. To avoid modification, enter the following sequence of VNMR commands before running `mftrace`:

```
cp(curexp+'/acqfil/fid',curexp+'/acqfil/fidtmp')
rm(curexp+'/acqfil/fid')
mv(curexp+'/acqfil/fidtmp',curexp+'/acqfil/fid')
```

Arguments: `src_expno` specifies the experiment number of the source FID file. The default is the FID file of the current experiment.

`src_blk_no` specifies the source block of data to be copied. Block numbers start at 1 and run to the number of blocks in a file.

`src_trace_no` specifies the source trace of data within the specified block to be copied. Trace numbers run from 1 to number of traces in a file.

`dest_expno` specifies the experiment number of the destination FID file.

`dest_blk_no` specifies the destination block to send the copied data.

`src_trace_no` specifies the destination trace of data within the specified block to be copied. Trace numbers run from 1 to the number of traces in a file.

Examples: `mftrace(1,1,2,1,nv)` copies trace 1 from block 1 of the current experiment to trace `nv` of block 1 of experiment 2.

See also: *VNMR User Programming*

Related:

`mfblk`	Move FID block (C)
`mfclose`	Memory map close FID file (C)
`mfdata`	Move FID data (C)
`mfopen`	Memory map open FID file (C)
`rftrace`	Reverse FID trace (C)
`rfblk`	Reverse FID block (C)
`rfdata`	Reverse FID data (C)

`minsw` Reduce spectral width to minimum required (M)

Syntax: `minsw`

Description: Searches the spectrum for peaks, sets new limits accordingly, and then calls `movesw` to calculate a new transmitter offset `tof` and spectral width `sw`.

See also: *Getting Started*

Related:

`movesw`	Move spectral window according to cursors (M)
`movetof`	Move transmitter offset (M)
`sw`	Spectral width in directly detected dimension (P)
`tof`	Frequency offset for transmitter offset (P)

`mkdir` Create new directory (C)

Syntax: `mkdir(directory)`

Description: Creates a new UNIX directory. The function of the VNMR `mkdir` command is similar to the UNIX `mkdir` command.

Arguments: `directory` is the name of the new directory to be created.

Examples:

```
mkdir('tests')
mkdir('/home/george')
```

See also: *Getting Started*

Related:

`rmdir`	Remove directory (C)

mlabel — Menu label (P)

Description: Stores the label for a menu button. Usually this parameter is arrayed, with one label for each button in the menu. This parameter is stored in a user's global file and is set whenever a menu is called.

See also: *VNMR User Programming*

Related:

menu	Change status of menu system (C)
mstring	Menu string (P)

move — Move to an absolute location to start a line (C)

Syntax: `move(<'graphics'|'plotter'>,x,y)`

Description: Moves the start of a line to an absolute location with the coordinates given as an argument. `move` is part of a line drawing capability that includes the `pen` and `draw` commands. `pen` selects the pen number of the plotter (`'pen1'`, `'pen2'`, etc.) or the color (`'red'`, `'green'`, `'blue'`, etc.). `move` sets the point from which to start drawing the line. `draw` draws a line from that point to the point given by the `draw` arguments. Refer to the description of the `draw` command for examples of using the line drawing capability.

Arguments: `'graphics'` and `'plotter'` are keywords selecting output to the graphics window or a plotter device. The default is `'plotter'`. The output selected is passed to subsequent `pen`, `move`, or `draw` commands, remaining unchanged until different output is specified.

`x,y` are the absolute coordinates, in mm, of a point to move to. The range of `x` is 0 at the left edge of the chart and `wcmax` at the right edge of the chart. The range of `y` is `-20` at the bottom of the chart and `wc2max` at the top.

See also: *Getting Started*

Related:

draw	Draw line from current location to another location (C)
gin	Return current mouse position and button values (C)
pen	Select a pen or color for drawing (C)
wcmax	Maximum width of chart (P)
wc2max	Maximum width of chart in second direction (P)

movedssw — Set downsampling parameters for selected spectral region (M)

Syntax: `movedssw`

Description: Sets the parameters `dslsfrq` and `downsamp` to appropriate values for digital filtering and downsampling in a cursor-selected spectral region. To accomplish this, Fourier transform an oversampled data set, and then run the `ds` program. In the resulting spectral display, enclose the desired region with the cursors, and then run `movedssw`.

See also: *Getting Started*

Related:

downsamp	Downsampling factor applied after digital filtering (P)
ds	Display a spectrum (C)
dslsfrq	Bandpass filter offset for downsampling (P)

moveossw — Set oversampling parameters for selected spectral region (M)

Syntax: `moveossw`

Description: Sets the parameters `oslsfrq` and `sw` to appropriate values for oversampling and digital filtering in a cursor-selected spectral region. To accomplish this, acquire a data set without digital filtering, and then run the `ds` program. In the

resulting spectral display, enclose the desired region with the cursors, and then run moveossw. The value of oversamp is manually set.

See also: *Getting Started*

Related:

ds	Display a spectrum (C)
oslsfrq	Bandpass filter offset for oversampling (P)
oversamp	Oversampling factor for acquisition (P)
sw	Spectral width in directly detected dimension (P)

movepro — Move the imaging readout position (C)

Syntax: movepro

Description: Sets the readout position for an image or image projection to a point defined by the position of the cursor (the cr parameter).

movepro works with a 1D display (a projection or trace along F2) or 2D display, in either single cursor or box modes (only the position of the cursor in the F2 readout dimension is used; the position of the cursor in the F1 phase-encode dimension does not matter).

movepro determines the position of the cursor relative to the gradient origin and sets the parameter pro to this value, independent of image orientation. Because pro is measured in dimensional units like mm or cm, and the cursor position is stored internally in hertz, movepro works in Hz, accounting for any spectral referencing that may have been set, and converts to cm or mm to assign the value of pro.

To use movepro, display an image, image projection or trace, move the cursor to the position along the readout axis you desire to be at the center of the next image acquisition, and type movepro. This command has no effect on the value of tof (which is normally not used to define any positional information in imaging). Unlike movetof, the image or projection display will be unchanged, and no redisplay in “full” mode should be necessary.

To accurately center an image or projection, move the box cursors to the edges of the imaged object. Then use the macro split to place the cursor at the exact midpoint of the box, and type movepro.

See also: *User Guide: Imaging*

Related:

cr	Cursor position in directly detected dimension (P)
lro	Field of view parameter for read out in cm (P)
movetof	Move transmitter offset (M)
pro	Position of image center on the readout axis (P)
resto	NMR resonance offset frequency (P)
tof	Frequency offset for observe transmitter (P)

movesw — Move spectral window according to cursors (M)

Syntax: movesw<(width)>

Description: Uses the parameters cr and delta to calculate a new transmitter offset tof and a new spectral width sw. If referencing was used, it is also adjusted. The movesw macro also sets sp and wp to display the spectral window.

Arguments: width specifies the spectral width sw. The default is to use a value calculated from the parameter delta.

Examples:

```
movesw
movesw(5000)
```

See also: *Getting Started*

Related:

cr	Cursor position in directly detected dimension (P)
delta	Cursor difference in directly detected dimension (P)
minsw	Reduce spectral width to minimum required (M)
movetof	Move transmitter offset (M)
sp	Start of plot (P)
sw	Spectral width in directly detected dimension (P)
tof	Frequency offset for observe transmitter (P)
wp	Width of plot (P)

movetof — Move transmitter offset (M)

Syntax: `movetof<(frequency)>`

Description: Moves the transmitter offset parameter `tof` so that the current cursor position, defined by `cr`, becomes the center of the spectrum. If referencing was used, `movetof` maintains the referencing.

Arguments: `frequency` specifies the transmitter frequency rather than using the cursor position to define the frequency. This provides a convenient method of moving the transmitter frequency outside the current spectral window.

See also: *Getting Started*

Related:

cr	Cursor position in directly detected dimension (P)
minsw	Reduce spectral width to minimum required (M)
movesw	Move spectral window according to cursors (M)
tof	Frequency offset for observe transmitter (P)

mp — Move parameters between experiments (C)

Syntax: `mp(<from_exp,>to_exp)`

Description: Moves text and the current display, processing, and acquisition parameters from one experiment to another. No FID is transferred.

Arguments: `from_exp` specifies the number of the experiment from which the parameters are to be taken; default is the parameters are moved from the currently active experiment.

`to_exp` specifies to which experiment the parameters are to be moved.

Examples:
```
mp(4)
mp(2,3)
```

See also: *User Guide: Liquids NMR*

Related:

md	Move display parameters between experiments (C)
mf	Move FIDs between experiments (C)

mqcosy — Set up parameters for MQCOSY pulse sequence (M)

Applicability: All systems, except sequence not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `mqcosy<(level)>`

Description: Sets up a multiple-quantum filtered COSY experiment.

Arguments: `level` is the desired quantum level of filtration.

Examples:
```
mqcosy
mqcosy(3)
```

See also: *User Guide: Liquids NMR*

mrev8 — Set up parameters for MREV8 pulse sequence (M)

Applicability: Systems with a solids module. This sequence not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `mrev8`

Description: Converts FLIPFLOP, BR24, or S2PUL parameter set into the MREV8 multiple-pulse line narrowing sequence.

See also: *User Guide: Solid-State NMR*

Related:

`br24`	Set up parameters for BR24 pulse sequence (M)
`cylmrev`	Set up parameters for cycled MREV8 pulse sequence (M)
`flipflop`	Set up parameters for FLIPFLOP pulse sequence (M)
`s2pul`	Set up parameters for standard two-pulse sequence (M)

mrfb — Set the filter bandwidths for multiple receivers (P)

Applicability: Systems with multiple receivers

Description: An array of `'fb'` settings to apply to individual receivers in a multiple receiver system. If it exists and is active, these settings override the setting specified by the `'fb'` parameter; otherwise, `'fb'` is used as the filter bandwidth setting for all receivers.
Note that not all multiple receiver systems have the hardware set up to provide individual receiver control. In that case, the filter setting for receiver 1 is used on receivers 1 and 2 and the setting for receiver 3 is used on receivers 3 and 4.
Also note that `'mrfb'` is not set automatically when `'sw'` is changed. Normally, you can leave `'mrfb'` inactive and let `'fb'` be used for all receivers.

Examples: `mrfb=fb,fb/2` sets the filter bandwidth of the first receiver to `fb` and of the rest to `fb/2`.

Related:

`fb`	Filter bandwidth (P)
`sw`	Spectral width in directly detected dimension (P)

mrgain — Set the gain for multiple receivers (P)

Applicability: Systems with multiple receivers

Description: An array of `'gain'` settings to apply to individual receivers in a multiple receiver system. If it exists and is active, these settings override the setting specified by the `'gain'` parameter; otherwise, `'gain'` is used as the gain setting for all receivers.
Note that not all multiple receiver systems have the hardware set up to provide individual receiver control. In that case, the gain setting for receiver 1 is used on receivers 1 and 2 and the setting for receiver 3 is used on receivers 3 and 4.

Examples: `mrgain=30,40,20` sets the gains of receiver 1 to 30, receiver 2 to 40 and receivers 3 and 4 to 20.

Related:

`gain`	Receiver gain (P)

mstat — Display memory usage statistics (C)

Syntax: `mstat<(program_id)>`

Description: Displays statistics on memory usage by programs that use the procedures `allocateWithId` and `release`.

Arguments: `program_id` is the program ID, usually the same name as the program. The default is to display all program IDs and associated memory statistics.

Examples:
```
mstat
mstat('proc2d')
```

See also: *VNMR User Programming*

mstring — Menu string (P)

Description: Stores command strings to be executed when a VNMR menu button is clicked. Usually the `mstring` parameter is arrayed, with one string for each button in the menu. The string can be any string of commands that can otherwise appear in a macro or on the command line. This parameter is stored in a user's global file and is set whenever a menu is called.

See also: *VNMR User Programming*

Related:

`menu`	Change status of menu system (C)
`mlabel`	Menu label (P)

mv — Move and/or rename a file (C)

Syntax: `mv(from_file,to_file)`

Description: Renames and/or moves a file or directory. `mv` functions the same as the command `rename`.

Arguments: `from_file` is the name of the file to be moved and/or renamed.

`to_file` is the new name of the file and/or the new location. If the `from_file` argument has an extension such as `.fid` or `.par`, be sure the `to_file` argument has the same extension.

Examples:
```
mv('/home/vnmr1/vnmrsys/seqlib/d2pul',
   '/vnmr/seqlib/d2pul')
```

See also: *Getting Started*

Related:

`copy`	Copy a file (C)
`cp`	Copy a file (C)
`delete`	Delete a file, parameter directory, or FID directory (C)
`rename`	Move and/or rename a file (C)
`rm`	Delete a file (C)

mxconst — Maximum scaling constant (P)

Description: Before the start of data acquisition, noise is sampled to determine the number of bits of noise present. This number is used to set the maximum number of scaling operations on the data that can occur (essentially relevant only if `dp='n'`). `mxconst` is used to adjust this amount of scaling.

Increasing `mxconst` to 1, for example, permits additional scaling operations, allowing acquisition to proceed slightly longer in single-precision mode. Decreasing `mxconst` to `-1` allows fewer scaling operations before reaching the message "maximum transients accumulated".

One special case exists. If `mxconst` is set to less than `-90` and single-precision acquisition is used (`dp='n'`), then scaling of the data is disabled. In this mode, reports of data overflowing the 16 bits is also disabled.

`mxconst` does not exist in standard parameter sets. If it does not exist, its value defaults to 0. To modify `mxconst`, first create it by entering `create('mxconst','integer')` and then enter the desired value.

CAUTION: Do not change `mxconst` unless you are fully aware of the consequences.

See also: *Getting Started*

Related:	`create`	Create new parameter in a parameter tree (C)
	`dp`	Double precision (P)

N

n1,n2,n3 — Name storage for macros (P)

Description: Stores arbitrary character strings for macros. Each experiment has these three string parameters available.

See also: *VNMR User Programming*

Related:

dgs	Display group of special/automation parameters (M)
r1–r7	Real value storage for macros (P)

nactivercvrs — Return number of receivers currently active (M)

Applicability: Systems with multiple receivers.

Syntax: `nactivercvrs`

Description: Calculates and returns the number of receivers currently active, based on the values of the `'rcvrs'` and `'numrcvrs'` parameters.

Examples: `nactivercvrs:$nact` sets `'$nact'` to the number of currently active receivers.

Related:

rcvrs	Which receivers to use (P)
numrcvrs	Number of receivers in the system (P)

nD — Application dimension (P)

Applicability: Systems with the imaging capabilities.

Description: Defines the dimension of the experiment performed by the application code. The value of nD is the number of FFT (fast Fourier transform) operations used to reconstruct the data or the number of independent k space coordinates encoded in the data. The nD, seqcon, plist, patlist, pwrlist, fliplist and sslist parameters configure a particular parameter set for an application sequence defined by the value of the seqfil parameter.

Values: 1, 2, 3, or 4.

See also: *User Guide: Imaging*

Related:

fliplist	Standard flip angle list (P)
patlist	Active pulse template parameter list (P)
plist	Active pulse length parameter list (P)
pwrlist	Active pulse power level parameter list (P)
seqcon	Acquisition loop control (P)
seqfil	Application object code name (P)
sslist	Conjugate gradient list (P)

ne — Number of echoes to be acquired (P)

Applicability: Systems with the imaging capabilities.

Description: Sets number of echoes to be acquired for multiecho sequences.

Values: 1 to desired number, in integer steps.

See also: *User Guide: Imaging*

Related:

ns	Number of slices to be acquired (P)

newmenu — Select a menu without immediate activation (C)

Syntax: (1) `newmenu(menu_name)`
(2) `newmenu:$current_menu`

Description: Selects a menu but does not activate it (syntax 1). This is most useful when picking which menu will be active when an interactive command exits. `newmenu` can also return the name of the currently active menu (syntax 2).

Arguments: `menu_name` is the name of the file controlling the menu selected. For example, the command string `newmenu('manipulate_1D') ds` causes the menu controlled by `manipulate_1D` to be displayed when the Return button in the `ds` menu is selected.

`$current_menu` returns the file name of the currently active menu.

Examples:
```
newmenu('display_1D')
newmenu:$name1
```

See also: *VNMR User Programming*

Related:

`menu`	Change status of menu system (C)
`menuvi`	Edit a menu with the *vi* text editor (M)

newshm — Interactively create a shim method with options (M)

Syntax: `newshm`

Description: Interactively creates a *method* string to be used in autoshimming of the magnetic field homogeneity. The string may consist of a series of shimming operations. The command `dshim('method')` describes method strings. Any text editor may be used to make and modify the strings.

`newshm` provides for either lock shimming or FID shimming, permitting the user to choose whichever is best (FID shimming is not supported by the *GEMINI 2000*). Lock shimming is much faster, but FID shimming is frequently much more effective in improving the field. With FID shimming, the FID evaluation range limits are requested. The full range is 0 to 100. Sensitivity to higher order gradients is greatly increased by setting the finish limit to about 5 or 10 with the start limit at 0.

`newshm` begins by asking for the name of the user's new shim method. If the non-spin (transverse) controls are chosen for adjustment, the spinner is turned off; otherwise, it is turned on. If uncertain about the shim criteria, the “medium to medium” choice is suitable in most circumstances. The new method is found in `curexp+'/.../shimmethods.`

To shim after running `newshm`, type `method='methodname'` and then enter `shim` or set the `wshim` parameter to shim before the start of acquisition. `'methodname'` is the name supplied to `newshm`. For more information on shimming, see the manual *Getting Started*.

Compared to `stdshm`, the `newshm` macro is more flexible and provides for a shimming time and FID evaluation limits supplied by the user. The primary difference between the macros is that `stdshm` provides for determining an estimated shimming time for the selected shim controls. When no time limit is supplied, autoshim continues until the exit criteria is met or the number of cycles reaches a limit.

See also: *Getting Started*

Related:

`curexp`	Current experiment directory (P)
`dshim`	Display a shim method string (M)
`method`	Autoshim method (P)
`shim`	Submit an Autoshim experiment to acquisition (C)
`stdshm`	Interactively create a shim method (M)

wshim	Conditions when shimming is performed (P)
vi	Edit text file with vi text editor (C)

nextpl — Display the next 3D plane (M)

Applicability: All systems; however, although nextpl is available on *GEMINI 2000* systems, such systems can only process 3D data and cannot acquire 3D data.

Syntax: nextpl

Description: Displays the 2D color map of the next 3D plane in the set of planes defined by the parameters plane and path3d. If nextpl immediately follows the command dproj, nextpl results in the display of the first 3D plane within that specified set and is therefore equivalent to the command dplane(1). For example, if dplane(40) has just been executed, nextpl results in the display of 3D plane 41 of that set. The nextpl macro is more efficient than dplane or dproj because the 3D parameter set (procpar3d) is not loaded into VNMR—it is assumed to have already been loaded by dplane or dproj, for example.

See also: *User Guide: Liquids NMR*

Related:

dplane	Display a 3D plane (M)
dproj	Display a 3D plane projection (M)
dsplanes	Display a series of 3D planes (M)
getplane	Extract planes from a 3D spectral data set (M)
path3d	Path to currently displayed 2D planes from a 3D data set (P)
plane	Currently displayed 3D plane type (P)
plplanes	Plot a series of 3D planes (M)
prevpl	Display the previous 3D plane (M)

nf — Number of FIDs (P)

Applicability: Systems with imaging capabilities.

Description: Number of FIDs acquired by explicit acquisition.

Values: Positive integer. For example, in the COSY-NOESY experiment, nf is 2.

See also: *User Guide Imaging*

Related:

cf	Current FID (P)

ni — Number of increments in 1st indirectly detected dimension (P)

Description: Number of increments of the evolution time d2, and thus the number of FIDs that will comprise the first indirectly detected dimension of a multidimensional data set. To create parameters ni, phase, and sw1 to acquire a 2D data set in the current experiment, enter addpar('2d').

Values: 8 is minimum; typical values range from 32 to 512. In microimaging, ni greater than 0 is the imaging mode and ni equal to 0 is the projection mode.

See also: *User Guide: Liquids NMR; User Guide: Imaging*

Related:

addpar	Add selected parameters to the current experiment (M)
celem	Completed FID elements (P)
d2	Incremented delay in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)

ni2 — Number of increments in 2nd indirectly detected dimension (P)

Description: Number of increments of the evolution time d3, and thus the number of FIDs that will comprise the second indirectly detected dimension of a multidimensional data set. To create parameters d3, ni2, phase2, and sw2 to acquire a 3D data set in the current experiment, enter addpar('3d').

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
d3	Incremented delay in 2nd indirectly detected dimension (P)
ni	Number of increments in 1st indirectly detected dimension (P)
par3d	Create 3D acquisition, processing, and display parameters (M)
phase2	Phase selection for 3D acquisition (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)

ni3 — Number of increments in 3rd indirectly detected dimension (P)

Description: Number of increments of the evolution time d4, and thus the number of FIDs that will comprise the third indirectly detected dimension of a multidimensional data set. To create parameters d4, ni3, phase3. and sw3 to acquire a 4D data set in the current experiment, enter addpar('4d').

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
d4	Incremented delay in 3rd indirectly detected dimension (P)
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
par4d	Create 4D acquisition parameters (M)
phase3	Phase selection for 4D acquisition (P)
sw3	Spectral width in 3rd indirectly detected dimension (P)

niter — Number of iterations (P)

Description: Sets the maximum number of iterations in an iterative simulation.

Values: 1 to 9999. The value is initialized to 20 if the Set Params button is used in setting up spin simulation parameters.

See also: *User Guide: Liquids NMR*

nl — Position cursor at the nearest line (C)

Syntax: nl<:height<,frequency>>

Description: Moves the cursor to the nearest calculated line position.

Arguments: height is a return value set to the height of the line.

frequency is a return value set to the frequency of the line.

Examples:
```
nl
nl:r1,r2
```

See also: *Getting Started*

nli — Find integral values (C)

Syntax: nli

Description: Equivalent to the dli command except that no screen display is produced. For a list of integrals, nli stores the reset points in the parameter lifrq and stores the amplitudes in the parameter liamp.

See also: *Getting Started*

Related:

cz	Clear integral reset points (C)
dli	Display list of integrals (C)
dlni	Display list of normalized integrals (M)
liamp	Amplitudes of integral reset points (P)
lifrq	Frequencies of integral reset points (P)
z	Add integral reset point at cursor position (C)

nlivast — Produces a text file of integral regions without a sum region (M)

Applicability: Systems with VAST accessory.

Syntax: `nlivast(last)`

Description: Using predefined integral regions from the spectra for each well, `nlivast` writes a text file, integ.out, containing the integrals of the regions. The file is written into the current experiment. Does not add an additional region that is the sum of all the defined regions for each well (see dlivast).

Arguments: `last` is the number of the last well. The default is 96.

See also: *User Guide: Liquids NMR*

nlivast2 — Produces a text file with normalized integral regions (M)

Applicability: Systems with VAST accessory.

Syntax: `nlivast(well)`

Description: Using predefined integral regions from the spectra for each well, `nlivast2` writes a text file, integ.out, containing the integrals of the regions. The file is written into the current experiment. Integrals are normalized to the integral specified by the argument `well`.The macro `nlivast2` does not add an additional region that is the sum of all the defined regions for each well (see dlivast). All of the spectra are integrated.

Arguments: `well` is the number of the reference sample well. The default reference is well 96.

See also: *User Guide: Liquids NMR*

nlivast3 — Produces a text file with normalized integral regions (M)

Applicability: Systems with VAST accessory.

Syntax: `nlivast(well)`

Description: Using predefined integral regions from the spectra for each well, `nlivast3` writes a text file, integ.out, containing the integrals of the regions. The file is written into the current experiment. Integrals are referenced to the integral specified by the argument `well`. The integral of spectrum from the sample specified by `well` is set to 1000. The macro `nlivast3` does not add an additional region that is the sum of all the defined regions for each well (see dlivast). All of the spectra are integrated.

Arguments: `well` is the number of the reference sample well. Reference integral set to 1000. The default reference is well 96.

See also: *User Guide: Liquids NMR*

nll — Find line frequencies and intensities (C)

Syntax: `nll<('pos'<,noise_mult>)><:number_lines,scale>`

Description: Equivalent to the command dll except that the line listing is not displayed or printed. The results of this calculation are stored in llfrq and llamp. The frequencies are stored as Hz and are not referenced to rfl and rfp. Amplitudes are stored as the actual data point value; they are not scaled by vs.

Arguments: 'pos' is a keyword that causes only positive lines to be listed.

noise_mult is a numerical value that determines the number of noise peaks listed for broad, noisy peak. The default is 3. A smaller value results in more peaks, a larger value results in fewer peaks, and a value of 0.0 results in a line listing containing all peaks above the threshold th. Negative values of noise_mult are changed to 3.

number_lines is a return argument with the number of lines in the line list.

scale is a return argument with a scaling factor for line amplitudes. This scaling factor accounts for vs and whether the lines are listed in absolute intensity mode or normalized mode.

Examples:
```
nll:n1
nll('pos'):pn
nll(2.5),sc
```

See also: *VNMR User Programming*

Related:

dll	Display listed line frequencies and intensities (C)
llamp	List of line amplitudes (P)
llfrq	List of line frequencies (P)

nlni — Find normalized integral values (obsolete)

Description: Macro no longer used in VNMR

nm — Select normalized intensity mode (C)

Syntax: nm

Description: Selects the normalized intensity mode in which spectra are scaled so that the largest peak in the spectrum is vs mm high. The alternative is the absolute intensity mode (selected by the ai command) in which the scale is kept constant from spectrum to spectrum to allow comparison of peak heights from one spectrum to another. The modes are mutually exclusive (i.e., the system is always in either nm or ai mode). Enter aig? to show which mode is currently active.

See also: *Getting Started*

Related:

ai	Select absolute intensity mode (C)
aig	Absolute intensity group (P)
vs	Vertical scale (P)

nm2d — Select Automatic 2D normalization (M)

Syntax: nm2d<(noisemult)>

Description: Sets up parameters th and vs2d automatically for a 2D contour plot and color map display. nm2d measures the highest signal in the spectrum and sets vs2d so that the highest signal is in the range of the highest color level. It then calculates the noise threshold so that the number of points above the noise threshold is between 10% and 30% of all the points. At the same time, the difference between the mean value of all the points above the threshold (peak points) and the mean value of all the points under the threshold (noise points) is maximized. This noise threshold is then multiplied by the noise multiplier.

`nm2d` works both with absolute-value and phase-sensitive spectra. `trace` can be set to `'f1'` or `'f2'`.

Arguments: `noisemult` specifies the noise multiplier number that multiplies the noise threshold:

- For ^{1}H, ^{19}F and ^{31}P (high dynamic range nuclei), and homonuclear spectra in general, the default value is 4.
- For HMQC/HSQC type spectra, the default value is also 4 but noise multipliers of 3 to 5 are often more adequate.
- For HETCOR and 2D-INADEQUATE spectra, the default value is 2.
- For "quick & dirty" COSY spectra with lots of t1 noise and other artifacts, a value of 8 and higher may be adequate for suppressing the artifacts.
- For 2D-INADEQUATE spectra, a value below 3 is appropriate to catch signals right above the noise level.
- If the multiplied noise threshold is below `th`=1, `vs2d` is scaled up; otherwise, `th` is increased to the desired level.
- Minimum value is 1.5 (if a lower value is entered, the value is set to 1.5).

Examples:
```
nm2d
nm2d(3)
```

See also: *Getting Started*

Related:

`dconi`	Interactive 2D contour display (C)
`noisemult`	Control noise multiplier for automatic 2D processing (M)
`proc2d`	Process 2D spectra (M)
`th`	Threshold (P)
`trace`	Mode for *n*-dimensional data display (P)
`vs2d`	Vertical scale for 2D displays (P)

noedif — Convert parameters for NOE difference experiment (M)

Applicability: *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems only.

Syntax: `noedif`

Description: Converts a ^{1}H parameter set to perform the NOE (Nuclear Overhauser Enhancement) difference experiment.

See also: *User Guide: Liquids NMR*

Related:

`setup`	Set up parameters for basic experiments (M)
`cyclenoe`	Set up parameters for CYCLENOE pulse sequence (M)

NOESY — Change parameters for NOESY experiment (M)

Syntax: `NOESY<('GLIDE')>`

Description: Converts the current parameter set to a NOESY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:

`noesy`	Set up parameters for NOESY experiment (M)

noesy — Set up parameters for NOESY pulse sequence (M)

Syntax: `noesy`

Description: Sets up parameters for the laboratory frame Overhauser experiment or the 2D exchange experiment.

Alternate: NOESY button in the 2D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

Related: `foldt` Fold COSY-like spectrum along diagonal axis (C)

NOESY1D — Change parameters for NOESY1D experiment (M)

Syntax: `NOESY1D<('GLIDE')>`

Description: Converts the current parameter set to a NOESY1D (also known as DPFGSE-noe) experiment. A 1D proton spectrum is displayed with the `ds_selfrq` menu to do peak selection.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related: `TOCSY1D` Change parameters for TOCSY1D experiment (M)

noise — Measure noise level of FID (C)

Syntax:
```
noise<(excess_noise<,last_noise<,block_number>>)>
   :r1,r2,r3,r4,r5,r6
```

Description: Measures the noise level of a FID. By using `pw=0` so that no real signal is accumulated, one or more transients can be acquired. The value of `np` must be greater than 4096. `noise` then performs a statistical analysis of the noise, providing noise level, dc level, etc., for each channel. The noise level measurement can be repeated at various settings of `gain` and various settings of `fb`, etc., for a full system diagnosis.

Arguments: `excess_noise` is excess noise and is used to calculate the noise figure.

`last_noise` is the last measured mean square noise and is used to calculate the noise figure.

`block_number` is the block number. The default is 1.

`r1` returns the real dc offset.

`r2` returns the imaginary dc offset.

`r3` returns the real rms noise.

`r4` returns the imaginary rms noise.

`r5` returns the average rms noise.

`r6` returns the percentage channel imbalance.

`r7` returns the noise figure.

See also: *Getting Started*

Related:

`ddf`	Display data file in current experiment (C)
`ddff`	Display FID file in current experiment (C)
`ddfp`	Display phase file in current experiment (C)
`fb`	Filter bandwidth (P)
`gain`	Receiver gain (P)
`np`	Number of data points (P)
`pw`	Pulse width (P)

noisemult — Control noise multiplier for automatic 2D processing (M)

Syntax: `noisemult<(noise_multiplier)>`

Description: Predetermines the noise multiplier used by the `nm2d` macro when starting automatic 2D experiments. This multiplier determines the threshold level in 2D spectra.

Arguments: `noise_multiplier` is a noise multiplier, the same as used in the `nm2d` macro. The default is 8 for homonuclear 2D spectra or 4 for other spectra.

Examples:
```
noisemult
noisemult(10)
```

See also: *User Guide: Liquids NMR*

Related:

`nm2d`	Automatic 2D normalization (M)
`proc2d`	Process 2D spectra (M)

noislm — Limit noise in spectrum (M)

Syntax: `noislm<(max_noise)>`

Description: Limits the noise present in a spectrum by reducing the vertical scale `vs`. If the noise is smaller than the noise limit, `vs` is left untouched. The noise limit is in single root-mean-square noise size; the peak-to-peak noise (width of the noise band) is about twice that value. The noise is determined by taking the smallest value from four 5% regions at the left end of the spectrum. Any filter cutoff at the end will decrease the apparent noise in the spectrum, and therefore increase the noise limit in the central part of the spectrum. Because of the particular algorithm used in this macro, signals at the left end of the spectrum should not affect the result of `noislm`.

Arguments: `max_noise` is the maximum root-mean-square size, in mm, of the noise. The default is 2.

Examples:
```
noislm
noislm(5)
```

See also: *Getting Started*

Related:

`vs`	Vertical scale (P)
`vsadj`	Automatic vertical scale adjustment (M)
`vsadjc`	Automatic vertical scale adjustment for ^{13}C spectra (M)
`vsadjh`	Automatic vertical scale adjustment for ^{1}H spectra (M)

np — Number of data points (P)

Description: Sets number of data points to be acquired. Generally, `np` is a *dependent* parameter and is calculated automatically when `sw` or `at` is changed. If a particular number of data points is desired, `np` can be entered, in which case `at` becomes the dependent parameter and is calculated based on `sw` and `np`.

Values: On *GEMINI 2000*, `np` is constrained to be a multiple of 64. Upper limit for `np` on broadband systems is 128,000, the limit on ^{1}H/^{13}C systems is 64,000. These limits can be doubled with the `setlimit` command if `dp='n'`.

On *MERCURY-Vx* and *MERCURY*, 64 to 128,000, in steps of 64 (`dp` does not affect the limit because on *MERCURY-Vx* and *MERCURY* `dp` is always `'y'`).

On systems other than the *GEMINI 2000*, `np` is constrained to be a multiple of 2 (Acquisition Controller or Pulse Sequence Controller board) or a multiple of 64 (Output board). (See the `acquire` statement in the manual *VNMR User Programming* for a description of these boards.)

See also: *Getting Started*

Related:

`at`	Acquisition time (P)
`dp`	Double precision (P)
`setlimit`	Set limits of a parameter in a tree (C)
`sw`	Spectral width in directly detected dimension (P)

npoint — Number of points for fp peak search (P)

Description: If `npoint` is defined in the current parameter set and has a value, it determines the range of data points over which the `fp` command searches for a maximum for each peak. To create `npoint` and give it a value other than the default, enter `create('npoint','integer') npoint=x`, where `x` is the new value.

Values: 1 to fn/4. The default is 2.

See also: *User Guide: Liquids NMR*

Related:

`create`	Create new parameter in a parameter tree (C)
`fn`	Fourier number in directly detected dimension (P)
`fp`	Find peak heights (C)

nrecords — Determine number of lines in a file (M)

Syntax: `nrecords(file):$number_lines`

Description: Returns the number of lines (or records) in a file.

Arguments: `file` is the name of the file.

`$number_lines` returns the number of lines in the named file.

Examples: `nrecords(userdir+'/mark1d.out'):$num`

See also: *VNMR User Programming*

ns — Number of slices to be acquired (P)

Applicability: Systems with imaging capabilities.

Description: Sets the number of slices to be acquired for multislice sequences.

Values: 1 to desired number, in integer steps.

See also: *User Guide: Imaging*

`ne`	Number of echoes to be acquired (P)

nscans — Number of scout scan or real scan repetitions (P)

Applicability: Systems with LC-NMR accessory.

Description: For on-flow applications, `nscans` is set to the number of repetitions of the scout scan or real scan process to be performed (based on the time duration of the LC run). In stopped-flow applications, `nscans` must be set to a number that is greater than or equal to the number of peaks to be analyzed or detected. If `nscans` does not exist, the `parlc` macro can create it.

See also: *User Guide: Liquids NMR*

Related:

`curscan`	Scan currently in progress (P)
`parlc`	Create LC-NMR parameters (M)

nt — Number of transients (P)

Description: Sets the number of transients to be acquired (i.e., the number of repetitions or scans performed to make up the experiment or FID).

Values: 1 to 1e9 (for *MERCURY-Vx* and *MERCURY*, the hardware limits `nt` to 16e6). For an indefinite acquisition, set `nt` to a very large number such as 1e9.

See also: *Getting Started; User Guide: Imaging*

ntrig — Number of trigger signals to wait before acquisition (P)

Applicability: Systems with LC-NMR accessory.

Description: Sets the number of trigger signals from the LC to wait for on the external gate line before beginning acquisition. If `ntrig` is 0 or the parameter does not exist, the external gate signal is ignored. If `ntrig` noes not exist, the `parlc` macro can create it. `ntrig` is not normally entered by the user.

See also: *User Guide: Liquids NMR*

Related:

`parlc`	Create LC-NMR parameters (M)

ntype3d — Specify whether f_1 or f_2 display expected to be N-type (P)

Applicability: All systems; however, although `ntype3d` is available on *GEMINI 2000* systems, such systems can only process 3D data and cannot acquire 3D data.

Description: Indicates whether the f_1 or f_2 display is expected to be N-type, that is, opposite to the sense of precession defined by f_3, under normal 3D processing conditions.

Values: `'yn'` specifies that f_1 is expected to have an N-type display under normal 3D processing conditions.

`'ny'` specifies that f_2 is expected to have an N-type display under normal 3D processing conditions.

`'yy'` specifies that both f_1 and f_2 are expected to have N-type displays under normal 3D processing conditions. Setting `ntype3d` = `'yy'` changes the sense of precession in f_1 and f_2 by negating the imaginary portion of the t_1 and t_2 interferograms prior to Fourier transformation.

See also: *Getting Started*

Related:

`fiddc3d`	3D time-domain dc correction (P)
`ft3d`	Perform a 3D Fourier transform on a 3D FID data set (M,U)
`ptspec3d`	Region-selective 3D processing (P)
`specdc3d`	3D spectral dc correction (P)
`ssfilter`	Full bandwidth of digital filter to yield a filtered FID (P)
`ssorder`	Order of polynomial to fit digitally filtered FID (P)
`rftype`	Type of rf generation

numrcvrs — Number of receivers in the system (P)

Applicability: Systems with multiple receivers.

Description: An integer giving the number of receivers installed in the system. `numrcvrs` is set from the config panel by the vnmr1 user.

Related:

`rcvrs`	Which receivers to use (P)

numreg — Return the number of regions in a spectrum (C)

Syntax: `numreg:number_regions`

Description: Returns the number of regions in a spectrum previously divided by the `region` command, by manual means using the `z` command, or by the Resets button in `ds`. A *region* is the area between two reset points in integral mode, with every other reset point designating the start of a *baseline* region and not included in the count of regions.

Arguments: `number_regions` returns the number of peak regions in the spectrum.

Examples: `numreg:$num`

See also: *VNMR User Programming*

Related:

ds	Display a spectrum (C)
getreg	Get frequency limits of a specified region (C)
region	Divide spectrum into regions (C)
z	Add integral reset point at cursor position (C)

numrfch — Number of rf channels (P)

Description: Holds the number of rf channels available. The value is set with the Number of RF Channels label in the CONFIG window (opened from config). numrfch represents the hardware in the system. For example, if the last experiment used the second decoupler, numrfch is set to 2. The software then leaves the second decoupler on if it was on and leaves it off if it was off.

CAUTION: Do not reset numrfch to eliminate the use of a channel. See the description of dn2 and dn3 for the method to disable channels.

Values: On *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*: 2. On other systems: 1, 2, 3, 4, or 5. The value does not include the lock channel. For UNITY*INOVA*, the fifth channel can only be used with the deuterium decoupler channel.

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M)
dn2	Nucleus for the second decoupler (P)
dn3	Nucleus for the third decoupler (P)
dn4	Nucleus for the fourth decoupler (P)

nv — Number of phase encode steps (P)

Applicability: Systems with imaging capabilities.

Description: The number of phase encode steps for the first indirectly detected dimension in a multidimensional imaging or CSI experiment.

Values: 0 to the desired number, in powers of 2. Typical values are 0, 64, 128, and 256.

See also: *User Guide: Imaging*

O

off — Make a parameter inactive (C)

Syntax: `off(parameter<,tree>)`

Description: Turns off an active parameter in any tree.

Arguments: `parameter` is the name of the parameter.

`tree` is type of parameter tree: `'current'`, `'global'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on the types of trees.

Examples:
```
off('gf')
off('n','global')
```

See also: *VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C)
`on`	Make a parameter active or test its state (C)

offset — Calculate frequency offset of cursor (M)

Applicability: Systems with imaging capabilities.

Syntax: `offset<('silent')><:parameter>`

Description: Reads value of the cursor parameter `cr`, and then calculates and displays the transmitter offset value, in Hz, that places the cursor position on resonance.

Arguments: `'silent'` is a keyword to not display the frequency offset value. The default is to display the value.

`parameter` is a variable (such as the parameter `tof` in the example below) that, if present, is loaded with the calculated offset frequency value.

Examples:
```
offset
offset('silent'):tof
```

See also: *User Guide: Imaging*

Related:

`cr`	Current cursor position (P)

on — Make a parameter active or test its state (C)

Syntax: `on(parameter<,tree>)<:$active>`

Description: Turns on an inactive parameter in any tree or tests if a parameter is active.

Arguments: `parameter` is the name of the parameter to make active or to test.

`tree` is type of parameter tree: `'current'`, `'global'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on the types of trees.

`$active` is 1 if the parameter is active, or is 0 if it is not active. Adding a return argument makes `on` conduct only a test of whether the specified parameter is active and does *not* turn on the parameter if it is inactive.

Examples:
```
on('lb'):$ison
on('gain','global')
```

See also: *VNMR User Programming*

Related:
- `create` — Create new parameter in a parameter tree (C)
- `off` — Make a parameter inactive (C)

opx — Open shape definition file for Pbox (M)

Syntax: `opx<(name<.ext>)>`

Description: Opens the pulse shape/pattern definition input file `shapelib/Pbox.inp` for the Pbox software and writes the file header.

Arguments: `name` is the name of the output shape file.

`ext` is a file name extension that specifies the file type.

Examples:
```
opx
opx('newfile.DEC')
```

See also: *User Guide: Liquids NMR*

Related:
- `Pbox` — Pulse shaping software (U)

orient — Slice plane orientation (P)

Applicability: Systems with imaging capabilities.

Description: Controls the orientation of the slice plane in the gradient reference frame.

Values: A three-character string with any permutation of the letters `x`, `y`, `z`, and `n`: `'xyz'`, `'zyx'`, `'nzx'`, etc. The permutation chosen determines the orientation of the slice plane. The first character is the identity of the readout gradient, the second character is the identity of the phase encoding gradient, and the third character is the identity of the slice selection gradient. The character `n` causes no gradient to be sent, which is used to avoid zeroing values.

For imaging modules, only `'sag'` (sagittal), `'trans'` (transverse), `'cor'`, and `'oblique'` are used. The choice `'oblique'` is not user-enterable. Only the macro `imprep` can set up oblique imaging.

See also: *User Guide: Imaging*

Related:
- `imprep` — Set up rf pulses, imaging, and voxel selection gradients (M)

oscoef — Digital filter coefficients for oversampling (P)

Description: Specifies number of coefficients used in the digital filter. If `oscoef` does not exist in the current experiment, enter `addpar('oversamp')` to add it. `addpar('oversamp')` creates digital filtering and oversampling parameters `def_osfilt`, `filtfile`, `oscoef`, `osfb`, `osfilt`, `oslsfrq`, and `oversamp`.

Values: For inline DSP (`dsp='i'`), the default is `7.5*oversamp`. A larger number of coefficients gives a filter with sharper cutoffs; a smaller number gives a filter with more gradual cutoffs. The value of `oscoef` does not need to be changed when `oversamp` is changed because `oscoef` is automatically adjusted by VNMR to give filter cutoffs that are the same regardless of the value of `oversamp`.

For real-time DSP (`dsp='r'`), the number of coefficients is not adjustable but is determined by the hardware.

See also: *Getting Started*

Related:
- `addpar` — Add selected parameters to current experiment (M)
- `dsp` — Type of DSP for data acquisition (P)

filtfile	File of FIR digital filter coefficients (P)
osfb	Digital filter bandwidth for oversampling (P)
oslsfrq	Bandpass filter offset for oversampling (P)
oversamp	Oversampling factor for acquisition (P)
paros	Create additional parameters used by oversampling (M)

osfb — Digital filter bandwidth for oversampling (P)

Description: Specifies bandwidth of the digital filter used for oversampling. If osfb does not exist in the current experiment, enter addpar('oversamp') to add it. addpar('oversamp') creates digital filtering and oversampling parameters def_osfilt, filtfile, oscoef, osfb, osfilt, oslsfrq, and oversamp.

Values: Number, in Hz. A value less than sw/2 rejects frequencies at the edges of the spectrum; a value greater than sw/2 aliases noise and signals at frequencies outside of ±sw/2.

'n' sets the bandwidth to sw/2.

See also: *Getting Started*

Related:	
addpar	Add selected parameters to current experiment (M)
def_osfilt	Default value of osfilt (P)
filtfile	File of FIR digital filter coefficients (P)
oscoef	Digital filter coefficients for oversampling (P)
osfilt	Oversampling filter for real-time DSP (P)
oslsfrq	Bandpass filter offset for oversampling (P)
oversamp	Oversampling factor for acquisition (P)
paros	Create additional parameters used by oversampling (M)
sw	Spectral width in directly detected dimension (P)

osfilt — Oversampling filter for real-time DSP (P)

Applicability: Systems with real-time DSP.

Description: Sets the type of real-time digital filter to be used on systems equipped with the real-time DSP hardware option. osfilt is normally set automatically by the software based on the user's global parameter def_osfilt, so that osfilt only needs to be changed if a particular experiment is to be run with a different digital filter than the default.

Values: 'a' or 'A' for the Analog*Plus*™ digital filter.

'b' or 'B' for the brickwall digital filter.

'' (null string) causes osfilt to be set to the value contained in the def_osfilt when an acquisition is initiated (with go, for example).

See also: *Getting Started*

Related:	
def_osfilt	Default value of osfilt (P)
dsp	Type of DSP for data acquisition (P)

oslsfrq — Bandpass filter offset for oversampling (P)

Description: Selects a bandpass filter that is not centered about the transmitter frequency. In this way, oslsfrq works much like lsfrq. If oslsfrq does not exist in the current experiment, enter addpar('oversamp') to add it. addpar('oversamp') creates digital filtering and oversampling parameters def_osfilt, filtfile, oscoef, osfb, osfilt, oslsfrq, and oversamp.

Values: Number, in Hz. A positive value selects a region upfield from the transmitter frequency; a negative value selects a downfield region.

See also: *Getting Started*

Related:

addpar	Add selected parameters to current experiment (M)
def_osfilt	Default value of osfilt (P)
filtfile	File of FIR digital filter coefficients (P)
fsq	Frequency-shifted quadrature detection(P)
lsfrq	Frequency shift of the fn spectrum in Hz (P)
oscoef	Digital filter coefficients for oversampling (P)
osfb	Digital filter bandwidth for oversampling (P)
osfilt	Oversampling filter for real-time DSP (P)
oversamp	Oversampling factor for acquisition (P)
paros	Create additional parameters used for oversampling (M)

overrange — Frequency synthesizer overrange (P)

Applicability: UNITY*INOVA*, UNITY*plus*, UNITY, and VXR-S systems with optional version X46 of the PTS frequency synthesizer.

Description: Configures whether an rf channel has version X46 of the PTS frequency synthesizer. The value for each channel is set using the label Frequency Overrange in the CONFIG window (opened from config).

Values: Not Present, 10000 Hz, or 100000 Hz

In CONFIG, Not Present indicates that this RF channel does not have the frequency overrange option.

10000 or 100000 indicate that this RF channel has the frequency overrange option. In the CONFIG window the **10000 Hz** or **100000 Hz** choices are determined by the letters *H*, *J*, or *K* found in the PTS Synthesizers model number. In CONFIG, the normal value for overrange is 10000 Hz. If **Frequency Overrange** is set to 10000 Hz or 100000 Hz, the **Latching** value for that RF channel must also be set to **Present** in the CONFIG window. When set to either 10000 Hz or 100000 Hz, overrange guarantees a range of phase-continuous frequency jumps of at least 10 kHz or 100 kHz in each jump direction.

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M)
latch	Frequency synthesizer latching (P)

oversamp — Oversampling factor for acquisition (P)

Description: Specifies the oversampling factor for the acquisition. With inline digital filtering (dsp='i'), np*oversamp data points are acquired at a rate of sw*oversamp. The data is then transferred to the host computer, digitally filtered, and downsampled to give np points and a spectral width of sw.

With real-time digital filtering (dsp='r'), the oversampling, digital filtering, and downsampling all occur as each data point is collected, so that only np data points are ever stored in the acquisition computer memory and subsequently transferred to the host computer.

If oversamp does not exist in the current experiment, enter the command addpar('oversamp') to add it. addpar('oversamp') creates digital filtering and oversampling parameters def_osfilt, filtfile, oscoef, osfb, osfilt, oslsfrq, and oversamp.

If oversamp is set to a number, then that number represents the amount of oversampling to apply when collecting the data. The oversamp value is automatically calculated whenever sw is changed, provided oversamp is not set to 'n'. That is the distinction between oversamp='n' and oversamp=1. In both cases, no oversampling will be used. This occurs, for example, if the sw parameter is greater than half the maximum spectral width. However, if sw is reduced so that oversampling is possible, then if oversamp is set to 'n', oversamp will remain set to 'n' and oversampling will not occur. On the other hand, if oversamp is set to 1, then oversamp is recalculated and oversampling will occur. Therefore, the oversamp parameter accurately represents whether oversampling is performed for a data set. When oversamp is automatically determined based on a change to sw, it is set to the maximum possible oversampling factor. The value of oversamp can be manually reset.

Note that setting oversamp greater than 1 means oversampling is selected for the experiment. However, if the oversampling facility is not present in the system (i.e., dsp='n'), then the oversamp parameter is automatically reset to 1, indicating that no oversampling will be performed.

Two other experiment local parameters reflect whether DSP is used during the acquisition of a data set:

- fb is set to Not Active if DSP is used.
- oscoef reflects whether real-time (dsp='r') or inline (dsp='i') DSP was used. If real-time, oscoef is set to Not Active. If inline, oscoef is set to the value used by the inline algorithm.

Values: Number less than or equal to 68. For inline DSP, sw*oversamp and np*oversamp are limited by the values in the following table:

System	*Maximum* sw*oversamp	*Maximum* np*oversamp
UNITY*INOVA*	500 kHz	2M
MERCURY-Vx & *MERCURY*	100 kHz	128K
UNITY*plus*, UNITY, VXR-S	100 kHz	512K
GEMINI 2000 Broadband	100 kHz	128K
GEMINI 2000 $^{1}H/^{13}C$	23 kHz	64K

The maximum np*oversamp is given for double precision data (dp='y'). For dp='n', multiply this value by 2.

'n' causes normal acquisition to be done without digital filtering.

See also: *Getting Started*

Related:

addpar	Add selected parameters to current experiment (M)
def_osfilt	Default value of osfilt parameter (P)
dp	Double precision (P)
dsp	Type of DSP for data acquisition (P)
fb	Filter bandwidth (P)
filtfile	File of FIR digital filter coefficients (P)
fsq	Frequency-shifted quadrature detection (P)
np	Number of data points (P)
oscoef	Digital filter coefficients for oversampling (P)
osfb	Digital filter bandwidth for oversampling (P
osfilt	Oversampling filter for real-time DSP (P)
oslsfrq	Bandpass filter offset for oversampling (P)

paros	Create additional parameters used by oversampling (M)
sw	Spectral width in directly detected dimension (P)

P

p1 — Enter pulse width for p1 in degrees (C)

Syntax: `p1(flip_angle<,90_pulse_width>)`

Description: Calculates the flip time, in µs, given a desired flip angle and the 90° pulse. The value is entered into the pulse width parameter `p1`.

Arguments: `flip_angle` is the desired flip angle, in degrees.

`90_pulse_width` is the 90° pulse, in µs. The default is the value of parameter `pw90` if it exists.

Examples:
```
p1(30)
p1(90,12.8)
```

See also: *Getting Started*

Related:

`ernst`	Calculate the Ernst angle pulse (C)
`p1`	First pulse width (P)
`pw90`	90° pulse width (P)

p1 — First pulse width (P)

Description: Length of first pulse in the standard two-pulse sequence.

Values: On *MERCURY-Vx* and *MERCURY* systems: 0, 0.2 µs to 4095 µs. On *GEMINI 2000* systems: 0, 0.2 to 4095 µs, in 100-ns steps. On systems with a Data Acquisition Controller board: 0, 0.1 to 8190 µs, in 12.5-ns steps. On systems with Pulse Sequence Controller or Acquisition Controller boards: 0, 0.2 to 8190 µs, in 25-ns steps. On systems with Output boards: 0, 0.2 to 8190 µs, in 0.1-µs steps. (Refer to the `acquire` statement in the manual *VNMR User Programming* for a description of these boards.)

See also: *Getting Started*

Related:

`p1`	Enter pulse width *p1* in degrees (C)

p1pat — Shape of excitation pulse (P)

Description: Specifies the shape of pulse `p1` when used in imaging experiments.

Values: `'hard'`, `'sinc'`, `'gauss'`, `'sech'`, `'sine'`, or any shape resident in the system pulse shape library or libraries.

See also: *User Guide: Imaging*

Related:

`p1`	First pulse width (P)
`pwpat`	Shape of refocusing pulse (P)

p2 — 180° refocus pulse width (P)

Applicability: Systems with imaging capabilities.

Description: Sets the length of the 180° refocus rf pulse.

Values: Number, in µs.

See also: *User Guide: Imaging*

Related:

`p1`	First pulse width (P)
`p2pat`	RF pulse pattern of pulse `p2` (P)

p2pat — RF pulse pattern of 180° refocus pulse p2 (P)

Applicability: Systems with imaging capabilities.

Description: Contains a string for the shape of the 180° refocus pulse p2.

See also: *User Guide: Imaging*

Related:

p2	180° refocus pulse width (P)

p2pul — Set up sequence for PFG testing (M)

Applicability: Systems with the pulsed field gradient (PFG) module. *This sequence is not for NMR applications.*

Syntax: `p2pul`

Description: Sets up the PFG two-pulse sequence, a system checkout sequence for PFG installation. Several modes are controlled by the `cmd` parameter.

- `cmd='twinkle'` sequentially addresses DACs 0 through 4. On the gradient channel interface, lights become a slow binary counter.
- `cmd='pulse'` makes a pulse of value `gzlvl1` for a time `gt1`.
- `cmd='bipulse'` makes a pulse of value `gzlvl1` for a time `gt1` followed by a pulse of value `-gzlvl1` for a time `gzlvl1`.

For other modes, see the PFG installation manual.

See also: *Pulsed Field Gradient Modules Installation*

p31 — Automated phosphorus acquisition (M)

Syntax: `p31<(solvent)>`

Description: Prepares parameters for automatically acquiring a standard ^{31}P spectrum. The parameter wexp is set to `'procplot'` for standard processing. If p31 is used as the command for automation via the enter command, then the macro au is supplied automatically and should not be entered on the MACRO line of the enter program. However, it is possible to customize the standard `p31` macro on the MACRO line by following it with additional commands and parameters. For example, `p31 nt=1` will use the standard `p31` setup but with only one transient.

Arguments: `solvent` is the name of the solvent. The default is `CDCl3`. In automation mode, the solvent is supplied by the enter program.

Examples:

```
p31
p31('DMSO')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

au	Submit experiment to acquisition and process data (M)
enter	Enter sample information for automation run (C)
p31p	Process 1D phosphorus spectra (M)
proc1d	Processing macro for simple, non-arrayed 1D spectra (M)
procplot	Automatically process FIDs (M)
wexp	When experiment completes (P)

p31p — Process 1D phosphorus spectra (M)

Syntax: `p31p`

Description: Processes non-arrayed 1D ^{31}P spectra using a set of standard macros. `p31p` is called by the proc1d macro but can also be used directly. Fully automatic processing (up to a point where a spectrum could be plotted) is provided:

Fourier transformation (using preset weighting functions), automatic phasing (aphx macro), automatic integration (integrate macro, if required only), vertical scale adjustment (vsadjc macro), avoiding excessive noise (noislm macro), threshold adjustment (thadj macro), and referencing to the TMS signal, if present (tmsref macro).

See also: *Getting Started; User Guide: Liquids NMR*

Related:

aphx	Perform and check automatic phasing (M)
integrate	Automatically integrate 1D spectrum (M)
noislm	Avoids excessive noise (M)
p31	Automated phosphorus acquisition (M)
proc1d	Automatically process non-arrayed 1D fids (M)
thadj	Adjust threshold (M)
tmsref	Reference spectrum to TMS line (M)
vsadjc	Adjust vertical scale for carbon spectra (M)

pa — Set phase angle mode in directly detected dimension (C)

Syntax: pa

Description: Selects the phase angle mode by setting the parameter dmg='pa'. In the *phase angle display mode*, each real point in the displayed spectrum is calculated from the phase angle of the real and imaginary points comprising each respective complex data point. The phase angle also takes into account the phase parameters rp and lp.

For 2D data, if pmode='partial' or pmode='' (two single quotes with no space in between), pa has an effect on the data prior to the second Fourier transform. If pmode='full', pa acts in concert with the commands pa1, av1, pwr1, or ph1 to yield the resultant contour display for the 2D data.

See also: *User Guide: Liquids*

Related:

av	Set abs. value mode in directly detected dimension (C)
dmg	Data display mode in directly detected dimension (P)
ft	Fourier transform 1D data (C)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
lp	First-order phase in directly detected dimension (P)
pa1	Set phase angle mode in 1st indirectly detected dimension (C)
ph	Set phased mode in directly detected dimension (C)
pmode	Processing mode for 2D data (P)
pwr	Set power mode in directly detected dimension (C)
pwr1	Set power mode in 1st indirectly detected dimension (C)
rp	Zero-order phase in directly detected dimension (P)
wft	Weight and Fourier transform 1D data (C)
wft1d	Weight and Fourier transform f_2 of 2D data (M)
wft2d	Weight and Fourier transform 2D data (M)

pa1 — Set phase angle mode in 1st indirectly detected dimension (C)

Syntax: pa1

Description: Selects the phase angle spectra display mode along the first indirectly detected dimension by setting the parameter dmg1 to the string value 'pa1'. If the parameter dmg1 does not exist, pa1 will create it and set it to 'pa1'.

In the phase angle mode, each real point in the displayed trace is calculated from the phase angle of the real and imaginary points comprising each respective complex data point. For hypercomplex data, the phase angle uses the real-real

and imaginary-real points from each respective hypercomplex data point. The phase angle also takes into account the phase parameters rp1 and lp1.

The pa1 command is only needed if mixed-mode display is desired. If the parameter dmg1 does not exist or is set to the null string, the display mode along the first indirectly detected dimension defaults to the display mode of the directly detected dimension (characterized by the parameter dmg). For the contour display of multidimensional data, the result of pa1 is the same as for traces provided that pmode='partial' or pmode=''.

See also: *User Guide: Liquids*

Related:

av1	Set abs. value mode in 1st indirectly detected dimension (C)
dmg1	Data display mode in 1st indirectly detected dimension (P)
lp1	First-order phase in 1st indirectly detected dimension (P)
pa	Set phase angle mode in directly detected dimension (C)
ph1	Set phased mode in 1st indirectly detected dimension (C)
pmode	Processing mode for 2D data (P)
pwr1	Set power mode in 1st indirectly detected dimension (C)
rp1	Zero-order phase in 1st indirectly detected dimension (P)

pacosy — Plot automatic COSY analysis (C)

Syntax: pacosy

Description: Automatically analyzes and plots a COSY data set with fn=fn1 and sw=sw1. Symmetrization of the data with the command foldt is recommended, but not required. First, select a proper threshold and perform a 2D line listing with the command ll2d. Next, plot the 2D data with the contour plot command pcon; leaving enough room at the left side of the plot for the connectivity table. Then, pacosy will analyze the data and plot the connectivities on the plotter. pacosy gets its input from the file ll2d.out in the current experiment directory. The command acosy performs the same analysis and displays the connectivities on the screen.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

acosy	Automatic analysis of COSY data (C)
fn	Fourier number in directly detected dimension (P)
fn1	Fourier number in 1st indirectly detected dimension (P)
foldt	Fold COSY-like spectrum along diagonal axis (C)
hcosy	Automated proton and COSY acquisition (M)
ll2d	Automatic and interactive 2D peak picking (C)
pcon	Plot contours on plotter (C)
relayh	Set up parameters for COSY pulse sequence (M)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)

pad — Preacquisition delay (P)

Description: Each NMR experiment starts with a single delay time equal to pad over and above the delay d1 that occurs before each transient. Normally, pad is set to a small, nominal time (0.5 seconds) to allow any hardware changes that may be required at the start of the acquisition to “settle in.” During experiments in which the temperature is changed, the acquisition starts pad seconds after the temperature regulation system comes to regulation. Since the sample temperature does not actually come to equilibrium for some time after that, it is generally desirable to increase pad to perhaps 300 seconds. This is especially true when running experiments involving arrays of temperatures. The pad

parameter is most useful for running kinetics experiments. For example, `pad=0,3600,3600,3600,3600` will run an experiment immediately when `go` is typed (`pad=0`), then wait an hour (3600 seconds), run the second experiment, etc.

Values: On *GEMINI 2000* systems: 0 to 4095, in seconds.

On systems other than *GEMINI 2000*: 0 to 8190, in seconds.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`d1`	First delay (P)
`go`	Submit experiment to acquisition (C)

padept — Perform adept analysis and plot resulting spectra (C)

Syntax: `padept<(<'noll'><,'coef'><,'theory'>)>`

Description: Performs the `adept` analysis and plots the resulting spectra with a scale and the assigned line listing. Leave enough space at the left end of the display for the line list.

Arguments: The following arguments can be supplied in any order:

`'noll'` is a keyword that specifies no line listing.

`'coef'` is a keyword that causes the combination coefficients to be printed.

`'theory'` is a keyword that causes the theoretical coefficients rather than optimized coefficients to be used.

Examples:

```
padept('noll','coef')
```

See also: *User Guide: Liquids NMR*

Related:

`adept`	Automatic DEPT analysis and spectrum editing (C)
`autodept`	Automated complete analysis of DEPT data (M)
`cdept`	Automated carbon and DEPT acquisition (C)
`deptproc`	Process DEPT data (M)
`hcdept`	Automated proton, carbon, and DEPT acquisition (C)
`pldept`	Plot DEPT data, edited or unedited (M)

page — Submit plot and change plotter page (C)

Syntax: `page<(number_pages<,'clear'|file>)>`

Description: Submits the current plotter file, which has been created by all previous plotter commands, and changes the paper after the plot has been completed. Actual plotting is controlled by the `vnmrplot` script in the `bin` subdirectory of the VNMR system directory. The `page` command can also clear the current plotter file or save the data to a specified file name.

Arguments: `number_pages` is the number of pages to move the plotter forward. The default is 1. If `number_pages` is 0, `page` submits the plot but does not change the paper.

`'clear'` is a keyword to clear the plot made thus far; that is, clear the data in the current plotter file.

`file` is the name of a file to save the plot for import into a document. If the file already exists, it is overwritten.

Alternate: Page button in the 1D Plotting Menu.

Examples:

```
page
page(0)
```

```
page('clear')
page('myplotfile')
```

See also: *Getting Started*

Related: vnmrplot Plot files (U)

pap — Plot out "all" parameters (C)

Syntax: `pap<(<template><,><x><,y><,character_size>)>`

Description: Plots a parameter list containing "all" parameter names and values.

Arguments: `template` is the name of a template that controls the display. The default is the string parameter `ap`, which can be modified using `paramvi('ap')`. See the manual *VNMR User Programming* for rules on building a template.

`x` is the starting position in the *x* direction of the plot on the paper, in mm. The default is a preset value.

`y` is the starting position in the *y* direction of the plot on the paper, in mm. If `y` is specified, the `x` position must be also. The default is a preset value.

`character_size` is the character size of the list and is specified as a multiplier. The default is 0.70 (not available on all plotters or printers acting as plotters).

Alternate: All Params button in the 1D Plotting Menu, or
All Params button in the 2D Plotting Menu.

Examples:

```
pap
pap(wcmax-40)
pap(10,wc2max*.9)
pap('newpap',wcmax-50,100,1.4)
```

See also: *Getting Started, VNMR User Programming*

Related:

ap	Print out "all" parameters (C)
ap	"All" parameters display control (P)
hpa	Plot parameters on special preprinted chart paper (C)
paramvi	Edit a variable and its attributes using `vi` text editor (M)
ppa	Plot a parameter list in "English" (M)

par2d — Create 2D acquisition, processing, and display parameters (M)

Syntax: `par2d`

Description: Creates the acquisition parameters `ni`, `sw1`, and `phase`, which can be used to acquire a 2D data set. `par2d` also creates any missing processing and display parameters for the `ni` (or second) dimension, including `f1coef`, `reffrq1`, `refpos1`, and `refsource1`. The `par2d` macro is functionally the same as `addpar('2d')`.

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
f1coef	Coefficient to construct F1 interferogram (P)
ni	Number of increments in 1st indirectly detected dimension (P)
phase	Phase selection (P)
reffrq1	Reference frequency of reference line in 1st indirect dimension (P)
refpos1	Position of reference line in 1st indirect dimension (P)
refsource1	Center frequency in 1st indirect dimension (P)
set2d	General setup for 2D experiments (M)
sw1	Spectral width in 1st indirectly detected dimension (P)

par3d — Create 3D acquisition, processing, and display parameters (M)

Syntax: `par3d`

Description: Creates the acquisition parameters `ni2`, `sw2`, `d3`, and `phase2` that can be used to acquire a 3D data set. `par3d` also creates any missing processing or display parameters for the `ni2` (or third) dimension, including `f2coef`, `fiddc3d`, `specdc3d`, and `ptspec3d`. The `par3d` macro is functionally the same as `addpar('3d')`.

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`d3`	Incremented delay in 2nd indirectly detected dimension (P)
`f2coef`	Coefficient to construct F2 interferogram (P)
`fiddc3d`	3D time-domain dc correction (P)
`ni2`	Number of increments in 2nd indirectly detected dimension (P)
`phase2`	Phase selection for 3D acquisition (P)
`ptspec3d`	Region-selective 3D processing (P)
`specdc3d`	3D spectral dc correction (P)
`sw2`	Spectral width in 2nd indirectly detected dimension (P)

par3rf — Get display templates for 3rd rf channel parameters (M)

Applicability: Systems with a second decoupler.

Syntax: `par3rf`

Description: Retrieves the `dg2` and modified `ap` display templates from the parameter set `s2pul3rf` in the system `parlib` directory. These two templates support the display of second decoupler acquisition parameters and 3D acquisition and processing parameters.

See also: *VNMR User Programming*

Related:

`ap`	"All" parameters display control (P)
`dg2`	Control `dg2` parameter group display (P)

par4d — Create 4D acquisition parameters (M)

Applicability: Systems with a third decoupler.

Syntax: `par4d`

Description: Creates the acquisition parameters `ni3`, `sw3`, `d4`, and `phase3` that can be used to acquire a 4D data set. The `par4d` macro is functionally the same as `addpar('4d')`.

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`d4`	Incremented delay for 3rd indirectly detected dimension (P)
`ni3`	Number of increments in 3rd indirectly detected dimension (P)
`phase3`	Phase selection for 4D acquisition (P)
`sw3`	Spectral width in 3rd indirectly detected dimension (P)

paramedit — Edit a parameter and its attributes with user-selected editor (C)

Syntax: `paramedit(parameter<,tree>)`

Description: Opens a parameter file for editing with a user-selected text editor. The default editor is `vi`. If `vi` is used as the editor, `paramedit` is functionally the same as the `paramvi` command. To select another editor, set the UNIX environmental variable `vnmreditor` to the editor name (change `.login`

line `setenv vnmreditor old_editor` to become `setenv vnmreditor new_editor` *(e.g.*, `setenv vnmreditor emacs`*)* and make sure a script with the prefix `vnmr_` followed by the name of the editor is placed in the `bin` subdirectory of the VNMR system directory (e.g., `vnmr_emacs`). The script file makes adjustments for the type of graphic interface in use.

Scripts in the software release include `vnmr_vi` and `vnmr_textedit`. To create other scripts, refer to the `vnmr_vi` script for non-window editor interfaces and to `vnmr_textedit` for window-based editor interfaces. The `vnmreditor` variable must be set before starting VNMR.

Arguments: `parameter` is the name of the parameter file to be edited.

`tree` is a keyword for one of the parameter trees `'current'`, `'global'`, or `'processed'`. The default is `'current'`.

Examples:
```
paramedit('ap')
paramedit('b','global')
```

See also: *Getting Started; VNMR User Programming*

Related:

`paramvi`	Edit a parameter and its attributes with `vi` editor (M)
`vi`	Edit text file with the `vi` text editor (C)

`paramvi` Edit a parameter and its attributes with vi editor (M)

Syntax: `paramvi(parameter<,tree>)`

Description: Opens a parameter file for editing using the UNIX `vi` text editor. The parameter file contains various attributes of the parameter in a format documented in the manual *VNMR User Programming*. Be sure you understand the format before modifying the parameter because if an error in the format is made, the parameter will not load. When the editor is exited, the modified parameter is reloaded into the system.

Arguments: `parameter` is the name of the parameter file to be edited.

`tree` is a keyword for one of the parameter trees `'current'`, `'global'`, or `'processed'`. The default is `'current'`.

Examples:
```
paramvi('ap')
paramvi('b','global')
```

See also: *Getting Started, VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C)
`destroy`	Destroy a parameter (C)
`destroygroup`	Destroy parameters of a group in a tree (C)
`display`	Display parameters and their attributes (C)
`fread`	Read parameters from file and load them into a tree (C)
`fsave`	Save parameters from a tree to a file (C)
`groupcopy`	Copy parameters of group from one tree to another (C)
`paramedit`	Edit a parameter and its attributes with user-selected editor (C)
`prune`	Prune extra parameters from current tree (C)
`setgroup`	Set group of a parameter in a tree (C)
`setlimit`	Set limits of a parameter in a tree (C)
`setprotect`	Set protection mode of a parameter (C)
`vi`	Edit text file with the `vi` text editor (C)

`pards` Create additional parameters used by downsampling (M)

Syntax: `pards`

Description: Creates the parameters downsamp, dscoef, dsfb, dslsfrq, and filtfile necessary for digital filtering and downsampling. The pards macro is functionally the same as addpar('downsamp').

See also: *Getting Started*

Related:

addpar	Add selected parameters to current experiment (M)
downsamp	Downsampling factor applied after digital filtering (P)
dscoef	Digital filter coefficients for downsampling (P)
dsfb	Digital filter bandwidth for downsampling (P)
dslsfrq	Bandpass filter offset for downsampling (P)
filtfile	File of FIR digital filter coefficients (P)
movedssw	Set downsampling parameters for selected spectral region (M)

parfidss — Create parameters for time-domain solvent subtraction (M)

Syntax: parfidss

Description: Creates solvent subtraction parameters ssfilter, sslsfrq, ssntaps, and ssorder. Entering addpar('ss') is functionally equivalent to parfidss.

In a 1D transform, subtraction of the zero-frequency component from the time-domain data, usually in the context of solvent subtraction, is selected by setting ssorder and ssfilter to desired values and entering wft:

- The zfs (zero-frequency suppression) option is selected if both ssfilter and ssorder are set to a value other than "Not Used."
- The lfs (low-frequency suppression) option is selected if ssfilter is set to a value other than "Not Used" and ssorder is set to "Not Used."
- The zfs and lfs options are both turned off if ssfilter is set to "Not Used."

The zfs option leads to the following series of processing events: (1) the raw FID is frequency-shifted by sslsfrq Hz, (2) the raw FID is subjected to a low- pass digital filter, (3) the filtered FID is fit to a polynomial of order ssorder, (4) the polynomial function is subtracted from the raw FID, and (5) the resulting FID is frequency-shifted by –sslsfrq Hz.

The lfs option does not include a polynomial fit (step 3 of the zfs option), which leads to the following series of processing events: (1) the raw FID is frequency-shifted by sslsfrq Hz, (2) the raw FID is subjected to a low-pass digital filter, (3) the filtered FID is directly subtracted from the raw FID, (4) the resulting FID is frequency-shifted by –sslsfrq Hz.

The quality of filtering with zfs diminishes rapidly as the solvent peak moves off the exact center of the digital filter. It may be necessary to adjust lsfrq or sslsfrq to move the solvent peak to within ± 0.2 Hz of the center of the filter to obtain optimal solvent suppression. The lfs option is less sensitive to small offsets, but typically removes or distorts peaks near to the solvent peak.

In a 2D transform, solvent correction to the t_2 FIDs is invoked in the same manner with the ft1d, ft2d, wft1d, and wft2d commands and with the ft2da, ft1da, wft2da, and wft1da macros.

In a 3D transform, solvent suppression works on t_3 FIDs of 3D spectra just like in the 1D and 2D cases.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
ft	Fourier transform 1D data (C)
ft1d	Fourier transform along f_2 dimension (C)

ft2d	Fourier transform 2D data (C)
ft3d	Perform a 3D Fourier transform on a 3D FID data set (M,U)
lsfrq	Frequency shift of the fn spectrum in Hz (P)
ntype3d	N-type peak selection in f_1 or f_2 (P)
ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
sslsfrq	Center of solvent-suppressed region of spectrum (P)
ssorder	Order of polynomial to fit digitally filtered FID (P)
ssntaps	Number of coefficients to be used in the digital filter (P)
wft	Weight and Fourier transform 1D data (C)

parfix — Update parameter sets (M)

Syntax: parfix

Description: Corrects upper limits, lower limits, and step sizes of a number of parameters in the current experiment. In addition, the template parameter dgs is updated. This is automatically done via the macro fixpar if the parameter parversion is less than 4.3. parfix is used by the macro updatepars to correct saved data. This macro has been applied to all parameters as of VNMR version 4.3 and should be run on older parameter sets (e.g., rtp('pars') svp('pars') update a parameter set named pars).

See also: *Getting Started*

Related:

ap	"All" parameters display control (P)
dgs	Control dgs parameter group display (P)
fixpar	Correct parameter characteristics in experiment (M)
parversion	Version of parameter set (P)
updatepars	Update all parameter sets saved in a directory (M)

parlc — Create parameters for LC-NMR experiments (M)

Applicability: Systems with LC-NMR accessory.

Syntax: parlc

Description: Creates the following parameters used for a variety of LC-NMR experiments: curscan, dtrig, inject, nscans, ntrig, and savefile. The parlc macro also creates ni and sw1 (if they don't exist) for use in isocratic runs. Finally, it creates a display parameter dglc, so that the dg('dglc') command (or the equivalent macro dglc) can be used to display all the LC-related parameters.

Note that parlc can be used without worrying about losing existing values or attributes; if the parameters already exist, they are left untouched.

See also: *User Guide: Liquids NMR*

Related:

curscan	Scan currently in progress (P)
dglc	Control LC-NMR parameter display (P)
dtrig	Delay to wait for another trigger or acquire a spectrum (P)
inject	Trigger the injection of a sample (P)
nscans	Number of scout/real scan repetitions (P)
ntrig	Number of trigger signals to wait before acquisition (P)
savefile	Base file name for saving FIDs or data sets (P)

parll2d — Create parameters for 2D peak picking (M)

Syntax: parll2d

Description: Creates additional parameters th2d and xdiag for use with ll2d 2D peak picking program. parll2d is functionally the same as addpar('ll2d').

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	ll2d	Automatic and interactive 2D peak picking (C)
	th2d	Threshold for integrating peaks in 2D spectra (P)
	xdiag	Threshold for excluding diagonal peaks when peak picking (P)

parlp — Create parameters for linear prediction (M)

Syntax: parlp<(dimension)>

Description: Creates parametrized options for linear prediction (LP) in the current experiment. The display template for the dglp macro is also created if necessary. parlp is functionally the same as addpar('lp').

Arguments: dimension is the dimension of a multidimensional data set. The default is to create the LP parameters lpalg, lpopt, lpfilt, lpnupts, strtlp, lpext, strtext, lptrace, and lpprint.

parlp(1) creates LP parameters lpalg1, lpopt1, lpfilt1, lpnupts1, strtlp1, lpext1, strtext1, lptrace1, and lpprint1. addpar('lp',1) is functionally equivalent to parlp(1).

parlp(2) creates LP parameters lpalg2, lpopt2, lpfilt2, lpnupts2, strtlp2, lpext2, strtext2, lptrace2, and lpprint2. addpar('lp',2) is functionally equivalent to parlp(2).

Examples:
```
parlp
parlp(1)
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:		
	dglp	Display group of linear prediction parameters (M)
	lpalg	LP algorithm for np dimension (P)
	lpext	LP data extension for np dimension (P)
	lpfilt	LP coefficients to calculate for np dimension (P)
	lpnupts	LP number of data points for np dimension (P)
	lpopt	LP algorithm data extension for np dimension (P)
	lpprint	LP print output for np dimension (P)
	lptrace	LP output spectrum for np dimension (P)
	proc	Type of processing on np FID (P)
	proc1	Type of processing on ni interferogram (P)
	proc2	Type of processing on ni2 interferogram (P)
	strtext	Starting point for LP data extension for np dimension (P)
	strtlp	Starting point for LP calculation for np dimension (P)

parmax — Parameter maximum values (P)

Description: An array that holds the maximum values of other parameters. The maximum value of a parameter is an index into the array, and more than one parameter can have the same index into parmax. Several global parameters set in the CONFIG window (opened from config) are part of parmax. To display all parmax values, enter display('parmax','systemglobal').

See also: *VNMR and Solaris Software Installation; VNMR User Programming*

Related:		
	config	Display current configuration and possibly change it (M
	display	Display parameters and their attributes (C)
	paramedit	Edit a parameter and its attributes with user-selected editor (C)
	paramvi	Edit a parameter and its attributes using vi text editor (M)

parmin	Parameter minimum values (P)
parstep	Parameter step size values (P)

parmin — Parameter minimum values (P)

Description: An array that holds the minimum values for other parameters. The minimum value of a parameter is the index into the parmin array. More than one parameter may have the same index into the array. To display all the values in parmin, enter display('parmin','systemglobal').

See also: *VNMR User Programming*

Related:

paramvi	Edit a parameter and its attributes using vi text editor (M)
display	Display parameters and their attributes (C)
paramedit	Edit a parameter and its attributes with user-selected editor (C)
parmax	Parameter maximum values (P)
parstep	Parameter step size values (P)

paros — Create additional parameters used by oversampling (M)

Syntax: paros

Description: Creates the parameters def_osfilt, filtfile, oscoef, osfb, osfilt, oslsfrq, and oversamp for oversampling and digital filtering. paros is functionally the same as addpar('oversamp').

See also: *Getting Started*

Related:

addpar	Add selected parameters to current experiment (M
def_osfilt	Default value of osfilt parameter (P)
filtfile	File of FIR digital filter coefficients (P)
oscoef	Digital filter coefficients for oversampling (P)
osfb	Digital filter bandwidth for oversampling (P)
osfilt	Oversampling filter for real-time DSP (P)
oslsfrq	Bandpass filter offset for oversampling (P)
oversamp	Oversampling factor for acquisition (P)

parstep — Parameter step size values (P)

Description: An array that holds the step size values for other parameters. The step size value of a parameter is the index into the array. More than one parameter can have the same index into parstep. Several configuration parameters set in the CONFIG window (from config) are part of parstep. To display all parstep values, enter display('parstep','systemglobal').

See also: *VNMR and Solaris Software Installation; VNMR User Programming*

Related:

config	Display current configuration and possibly change it (M)
display	Display parameters and their attributes (C)
paramedit	Edit a parameter and its attributes with user-selected editor (C)
paramvi	Edit a parameter and its attributes using vi text editor (M)
parmax	Parameter maximum values (P)
parmin	Parameter minimum values (P)

parstyle — Parameter style for plotting (P)

Description: Stores a string command to plot parameters. parstyle is a string parameter set by the *GLIDE* interactive interface, stored in global, and then executed within macros. For example, setting parstyle='box' results in boxed parameters below the spectrum, setting parstyle='pap' results in

parameters listed to the left of the spectrum, and setting `parstyle=''` results in no parameters being plotted.

See also: *Getting Started*

Related:

`pkpick`	Peak pick (P)

`parversion` Version of parameter set (P)

Description: Stores the version of a parameter set. When a parameter set is updated with `updatepars` or `parfix`, `parversion` is set to 4.3 to indicate that fact. When a parameter set is retrieved into an experiment, `fixpar` checks `parversion` to determine if other parameters need to be updated using `parfix`.

See also: *Getting Started*

Related:

`fixpar`	Correct parameter characteristics in experiment (M)
`parfix`	Update parameter sets (M)
`updatepars`	Update all parameter sets saved in a directory (M)

`path3d` Path to currently displayed 2D planes from a 3D data set (P)

Applicability: All systems; however, although available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, such systems can only process 3D data and cannot acquire such data.

Description: Stores the absolute path to the current 3D data directory tree. If `path3d` does not exist, it is created by the macro `par3d`. The command `select`, as well as the many macros that make use of `select`, require `path3d` in order to know where the 2D planes extracted from a 3D data set can be found.

`path3d` is set automatically by the macros `ft3d` and `getplane`:

- `ft3d` sets `path3d` to `curexp/datadir3d` if `ft3d` is not supplied with a directory path for the transformed 3D data. If `ft3d` is supplied with such a directory path (e.g., `/home/data/test3D`), `path3d` is set equal to that directory path. In this case, the 3D spectral data would reside in the directory `/home/data/test3D/data`.
- `getplane` sets `path3d` to `curexp/datadir3d` if `getplane` is not supplied with a directory path to the transformed 3D data. If `getplane` is supplied with such a directory path (e.g., `/home/data/test3D`), `path3d` is set equal to that directory path. In this case, the extracted 3D planes would reside in the directory `/home/data/test3D/extr`.

See also: *User Guide: Liquids NMR*

Related:

`dplane`	Display a 3D plane (M)
`dproj`	Display a 3D plane projection (M)
`dsplanes`	Display a series of 3D planes (M)
`ft3d`	Perform a 3D Fourier transform on a 3D FID data set (M)
`getplane`	Extract planes from a 3D spectral set (M)
`nextpl`	Display the next 3D plane (M)
`par3d`	Create 3D acquisition, processing, display parameters (C)
`plane`	Currently displayed 3D plane type (P)
`plplanes`	Plot a series of 3D planes (M)
`prevpl`	Display the previous 3D plane (M)
`select`	Select a spectrum or 2D plane without displaying it (C)

patlist — Active pulse template parameter list (P)

Applicability: Systems with imaging capabilities.

Description: Contains an array of strings, whose values define the rf pattern parameters used in conjunction with the length parameters defined in `plist`, for example, `patlist='p1pat','p2pat','p3pat'`. The `nD`, `seqcon`, `plist`, `patlist`, `pwrlist`, `fliplist` and `sslist` parameters configure a particular parameter set for an application sequence defined by the value of the `seqfil` parameter. The `plist`, `patlist`, `pwrlist`, `fliplist` and `sslist` parameters provide information concerning the rf pulse and conjugate gradients used by the sequence.

See also: *User Guide: Imaging*

Related:

`fliplist`	Standard flip angle list (P)
`nD`	Application dimension (P)
`plist`	Active pulse length parameter list (P)
`pwrlist`	Active pulse power level parameter list (P)
`seqcon`	Acquisition loop control (P)
`seqfil`	Application object code name (P)
`sslist`	Conjugate gradient list (P)

paxis — Plot horizontal LC axis (M)

Applicability: Systems with the LC-NMR accessory.

Syntax: `paxis(time,major_tic,mino_tic)`

Description: Plots a horizontal LC axis. Horizontal axes are assumed to be used with “LC plots” of an entire LC run are labeled accordingly. It is assumed that relevant parameters (e.g., `sc`, `wc`, `vo`, `vp`) have not been changed after plotting the data.

Arguments: `time` is the time scale, in minutes (decimal values are fine), of the axis.

`major_tic` is spacing, in minutes (decimal values are fine), of major tics.

`minor_tic` is spacing, in minutes (decimal values are fine), of minor tics.

See also: *User Guide: Liquids NMR*

Pbox — Pulse shaping software (U)

Syntax: `Pbox file options`

Description: Main Pbox (Pandora’s Box) program for the generation of shape files for RF and gradients. (See *User Guide: Liquids* manual for description of interactive Pbox usage).

Arguments: `file` is the name of a shape file.

`options` is any of the Pbox parameters initialized by the `'-'` sign and followed by the parameter value. The following options can be in any order and combinations:

`-b time`	Activates Bloch simulator, sets `simtime`, in sec.
`-c`	Calibrate only, do not create a shape file.
`-f file`	Set name of the output file.
`-h wave`	Print wave file header.
`-i wave`	Print wave file parameters.
`-l ref_pw90`	Length, in µs, of reference pw90 pulse.
`-o`	List options.

`-p ref_pwr`	Reference power level, in dB.
`-r file`	Reshape Pbox pulse.
`-s stepsize`	Define length, in µs, of a single step in waveform.
`-t wave`	Print wave title.
`-w wavestr`	Set wave data string.
`-v`	Run in verbose mode. Also print Pbox version.
`-value`	Sets reps to value.

Examples:

```
Pbox -i eburp2
Pbox newshape -wc 'eburp1 450 -1280.0' -1
Pbox sel.RF -w 'eburp1 420 -800' 'eburp1 420 1200'
Pbox -w 'eburp1 200 -1200' -attn e -p1 45 54.2 -b
Pbox tst -w 'esnob 20p 170p' -sfrq 150.02 -refofs 55p
-ref_pwr 45 -ref_pw90 54.2
```

See also: *User Guide: Liquids NMR*

Related:

`cpx`	Create Pbox shape file (M)
`dprofile`	Display pulse excitation profile from Pbox software (M)
`dshape`	Display pulse shape (M)
`dshapef`	Display last generated pulse shape (M)
`dshapei`	Display pulse shape interactively (M)
`opx`	Open shape definition file for Pbox (M)
`pbox_bw`	Define excitation band (M)
`pbox_bws`	Define excitation band for solvent suppression (notch) pulses (M)
`pbox_dmf`	Extract dmf value from Pbox shape file (M)
`pbox_dres`	Extract dres value from Pbox shape file (M)
`pbox_name`	Extract name of last shape file generated by Pbox (M)
`pbox_pw`	Extract pulse length from Pbox shape file (M)
`pbox_pwr`	Extract pulse power from Pbox shape file (M)
`pbox_pwrf`	Extract pulse fine power from Pbox (M)
`pboxget`	Extract all calibration data from a Pbox shape file (M)
`pboxpar`	Add parameter definition to the pbox.inp file (M)
`pboxrst`	Reset temporary Pbox/VNMR variables (M)
`pboxunits`	Converts to Pbox default units (M)
`pph`	Print pulse header (M)
`pprofile`	Plot pulse excitation profile from Pbox software (M)
`pshape`	Plot pulse shape (M)
`pshapef`	Display pulse shape or modulation pattern interactively (M)
`putwave`	Write a wave into Pbox.inp file (M)
`pxset`	Assign Pbox calibration data to experimental parameters (M)
`pxshape`	Generates a single-band shape file (M)
`Pxsim`	Simulate Bloch profile for a shaped pulse (M)
`Pxspy`	Create shape definition using Fourier coefficients (U)
`selex`	Defines excitation band (M)
`setwave`	Sets a single excitation band in Pbox.inp file (M)
`shdec`	Shaped observe excitation sequence (M)

pbox_bw — Define excitation band (M)

Syntax: `pbox_bw<(shapename)>`

Description: Defines the excitation band from the position of cursors in the graphics window and reports them to user. It also sets `r1` to excitation bandwidth and `r2` to offset. This macro is used mainly in Pbox menus and macros.

Arguments: `shapename` is the name of a shape as in `wavelib`; mainly for use with menus.

See also: *User Guide: Liquids NMR*

Related: `Pbox` Pulse shaping software (U)

pbox_bws — Define excitation band for solvent suppression (notch) pulses (M)

Syntax: `pbox_bws<(shapename)>`

Description: Defines the excitation band from the position of cursors in the graphics window and reports them to user. It also sets `r1` to excitation bandwidth and `r2` to offset. Note, the left cursor should be placed on the left side of the excitation band and the right cursor on resonance of the solvent signal. This macro is mainly used in Pbox menus and macros.

Arguments: `shapename` is the name of a shape file as in `wavelib`, mainly for use with menus.

See also: *User Guide: Liquids NMR*

Related: `Pbox` Pulse shaping software (U)

pbox_dmf — Extract dmf value from pbox.cal or Pbox shape file (M)

Syntax: `pbox_dmf<(shapefile.DEC)>:exp_param`

Description: Extracts the `dmf` value from the file `shapefile.DEC` created by `Pbox` or, if file name is not provided, from the `pbox.cal` file containing parameters of the last created Pbox shape file.

Arguments: `shapefile.DEC` is the name of a shape file.

`exp_param` is a `dmf` type experiment parameter.

Examples:
```
pbox_dmf('myfile.DEC'):mydmf
pbox_dmf:dmf2
```

See also: *User Guide: Liquids NMR*

Related: `dmf` Decoupler modulation frequency for first decoupler (P)
`Pbox` Pulse shaping software (U)

pbox_dres — Extract dres value from pbox.cal or Pbox shape file (M)

Syntax: `pbox_dres<(shapefile.DEC)>:exp_param`

Description: Extracts the `dres` value from the file `shapefile.DEC` created by `Pbox` or, if file name is not provided, from the `Pbox.cal` file containing parameters of the last created Pbox shape file.

Arguments: `shapefile.DEC` is the name of a shape file.

`exp_param` is a `dres` type experiment parameter.

Examples:
```
pbox_dres('myfile.DEC'):mydres
pbox_dres:dres2
```

See also: *User Guide: Liquids NMR*

Related: `dres` Tip-angle resolution for first decoupler (P)
`Pbox` Pulse shaping software (U)

pbox_name — Extract name of last shape generated by Pbox from pbox.cal (M)

Syntax: `pbox_name:exp_name`

Description: Extracts name of the last shape file generated by Pbox and stored in the `Pbox.cal` file. Note, that the file name extension is not stored explicitly and is not provided by this macro.

Arguments: `exp_name` returns the name of last shape file.

Examples:
```
pbox_pw:shname
pbox_pw:pwpat
```

See also: *User Guide: Liquids NMR*

Related: Pbox Pulse shaping software (U)

pbox_pw — Extract pulse length from pbox.cal or Pbox shape file (M)

Syntax: `pbox_pw<(shapefile.RF)>:exp_param`

Description: Extracts pulse length from the file `shapefile.RF` generated by Pbox or, if file name is not provided, from `pbox.cal` file containing parameters of the last created Pbox shape file. Returns the pulse length, in µs.

Arguments: `shapefile.RF` is the shape file name, including the extension.

`exp_param` is a `pw` type experiment parameter.

Examples:
```
pbox_pw('myfile.RF'):softpw
pbox_pw:selpw
```

See also: *User Guide: Liquids NMR*

Related: Pbox Pulse shaping software (U)

pbox_pwr — Extract power level from Pbox.cal or Pbox shape file (M)

Syntax: `pbox_pwr<(shapefile.ext)>:exp_param`

Description: Extracts the power lever from the file `shapefile.ext` generated by Pbox or, if file name is not provided, from the `pbox.cal` file containing parameters of the last created Pbox shape file. Returns the power level, in dB. The `exp_param` parameter will not be changed by this macro if the parameter is previously set to `'n'` (not used).

Arguments: `shapefile.ext` is the name of the shape file.

`exp_param` is a power type experiment parameter.

Examples:
```
pbox_pwr('myfile.DEC'):mypwr
pbox_pwr:dpwr2
```

See also: *User Guide: Liquids NMR*

Related: Pbox Pulse shaping software (U)

pbox_pwrf — Extract fine power level from pbox.cal or Pbox shape file (M)

Syntax: `pbox_pwrf<(shapefile.ext)>:exp_param`

Description: Extracts the fine power lever from the file `shapefile.ext` generated by Pbox or, if file name is not provided, from the `pbox.cal` file containing parameters of the last created Pbox shape file. Returns the value of fine power, in dB. Note that the parameter will not be changed by this macro if it was previously set to `'n'` (not used).

Arguments: `shapefile.ext` is the name of the shape file.

`exp_param` is a fine power type experiment parameter.

Examples:
```
pbox_pwrf('myfile.DEC'):mypwrf
pbox_pwrf:dpwrf
```

See also: *User Guide: Liquids NMR*

Related: Pbox Pulse shaping software (U)

pboxget Extract Pbox calibration data (M)

Syntax: `pboxget<(shfile.ext)>:$name,$pw,$pwr,$pwrf,$dres,$dmf`

Description: Extracts calibration data from the file `shfile.ext` generated by Pbox or, if a file name is not provided, from the `pbox.cal` file containing parameters of the last created Pbox shape file. Returns shape name and the values of total pulse length (in µs), power (dB), fine power, `dres`, and `dmf`. The parameter will not be changed by this macro if the parameter was previously set to `'n'` (not used).

Arguments: `shfile.ext` is the name of the shape file, including the extension.

`name` is the experiment parameter receiving the shape name (without the extension).

`pw` is the experiment parameter receiving the total pulse length, in µs.

`pwr` is the experiment parameter receiving the power level, in dB.

`pwrf` is the experiment parameter receiving the fine power level.

`dres` is the experiment parameter receiving the decoupler resolution.

`dmf` is the experiment parameter receiving the decoupler modulation frequency.

Examples:
```
pboxget('myfile.DEC'):dseq,r1,dpwr,dpwrf,dres,dmf
pboxget('selshape.RF'):pwpat,selpw,selpwr
pboxget:dseq2,r1,dpwr2,dpwrf2,dres2,dmf2
```

See also: *User Guide: Liquids NMR*

Related: Pbox Pulse shaping software (U)

pboxpar Add parameter definition to the Pbox.inp file (M)

Syntax: `pboxpar(param,value)`

Description: Adds a parameter definition to the `Pbox.inp` file.

Arguments: `param` is the parameter name

`value` is the value of the parameter.

Examples:
```
pboxpar('name','myfile.DEC')
pboxpar('bsim','y')
pboxpar('T1', 0.24)
```

See also: *User Guide: Liquids NMR*

Related: Pbox Pulse shaping software (U)

pboxrst Reset temporary Pbox VNMR variables (M)

Syntax: `pbox_rst`

Description: Resets `r1=0`, `r2=0`, `r3=0`, `r4=0`, `n2='n'`, `n3=''`, and adds some standard comment lines to the `Pbox.inp` file. This macro is used in menus and other Pbox macros.

See also: *User Guide: Liquids NMR*

Related: Pbox Pulse shaping software (U)

pboxunits — Converts to Pbox default units (M)

Syntax: `pboxunits`

Description: Used by Pbox menus to scale parameters related to time or frequency down to Pbox default units (Hz or seconds) before the parameter is stored in the `Pbox.inp` file.

See also: *User Guide: Liquids NMR*

Related:
- `Pbox` — Pulse shaping software (U)

pcmapapply — Apply phase correction map to data in EPI experiments (C)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `pcmapapply(<file,>index)`

Description: Applies a pixel-by-pixel phase shift to the current data file using the complex phase correction values from the phase correction map file, which must exist in `$vnmruser/expN/datdir`, where `N` is the current experiment number. `pcmapapply` opens and closes a phase map file unless it has been explicitly opened with `pcmapopen`.

Arguments: `file` specifies a phase correction map file name that must reside in the directory `$vnmruser/expN/datdir`. The default file is `$vnmruser/expN/datdir/pcmap`.

`index` specifies which phase correction map to us in the file. The value is usually 1, but can range up to the number of map blocks in the file.

Examples:
```
pcmapapply(2)
pcmapapply('mypcmap',1)
```

See also: *User Guide: Imaging*

Related:
- `pcmapclose` — Apply phase correction map to data in EPI experiments (C)
- `pcmapgen` — Generate phase correction map in EPI experiments (C)
- `pcmapopen` — Open phase correction map file in EPI experiments (C)

pcmapclose — Close phase correction map in EPI experiments (C)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `pcmapclose`

Description: Closes a phase correction map file that was explicitly opened with the `pcmapopen` command.

See also: *User Guide: Imaging*

Related:
- `pcmapapply` — Apply phase correction map to data in EPI experiments (C)
- `pcmapgen` — Generate phase correction map in EPI experiments (C)
- `pcmapopen` — Open phase correction map file in EPI experiments (C)

pcmapgen — Generate phase correction map in EPI experiments (C)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `pcmapgen(<file,>index)`

Description: Generates pixel-by-pixel complex phase correction values from the current data file and stores them into the selected block in the phase correction map file. One or more phase correction maps can be generated. For multislice echo planar imaging experiments, there can be one phase correction map for each slice.

`pcmapgen` creates, opens, and closes a phase map file unless the file has been explicitly opened with the `pcmapopen` command.

Arguments: `file` specifies a phase correction map file name, which must reside in the directory `$vnmruser/expN/datdir`, where `N` is the current experiment number. The default file is `$vnmruser/expN/datdir/pcmap`.

`index` specifies which phase correction map to us in the file. The value is usually 1, but can range up to the number of map blocks in the file.

Examples:
```
pcmapgen(2)
pcmapgen(mypcmap,1)
```

See also: *User Guide: Imaging*

Related:

`pcmapapply`	Apply phase correction map to data in EPI experiments (C)
`pcmapclose`	Close phase correction map file in EPI experiments (C)
`pcmapopen`	Open phase correction map file in EPI experiments (C)

pcmapopen — Open phase correction map in EPI experiments (C)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `pcmapopen(<file,>max_index)`

Description: Explicitly opens a phase correction map file, which can significantly speed up data processing. After the map file is open, use `pcmapgen` and `pcmapapply` to generate maps and correct data. Use `pcmapclose` to close the file when you are finished with it.

Arguments: `file` specifies the phase correction map file name residing in the directory `$vnmruser/expN/datdir`, where `N` is the current experiment number. The default is the file `pcmap`.

`max_index` specifies the maximum number of phase correction maps in the file, which ensures that memory mapping extends to or past the end of the file. `max_index` must be greater than or equal to the maximum number of phase maps stored in the file.

Examples:
```
pcmapopen(2)
pcmapopen('mypcmap',1)
```

See also: *User Guide: Imaging*

Related:

`pcmapapply`	Apply phase correction map to data in EPI experiments (C)
`pcmapclose`	Close phase correction map file in EPI experiments (C)
`pcmapgen`	Generate phase correction map in EPI experiments C)

pcon — Plot contours on a plotter (C)

Syntax: `pcon<(<'pos'|'neg'><,'noaxis'><,levels><,spacing>)>`

Description: Plots positive and negative peaks of a contour plot display using different colors. Specifically, if `maxpen` is set for *n* pens, positive peaks are plotted using colors 1 through (*n*+1)/2, and negative peaks are plotted using colors ((*n*+1)/2)+1 through *n* (i.e., half the colors for each, plus one extra for positive if an odd number of pens is specified). Pen 1 is always used for the axes, and the lowest contour of the positive peaks is also plotted with pen1. In all cases, the pen colors are cycled if more contours are to be plotted than there are pens available.

To plot both negative and positive contours of a phase-sensitive spectrum on a monochrome device such as a LaserJet or a plotter with a single pen, different numbers of contours may be plotted for the different sign. For example, `pcon('pos',10,1.4) pcon('neg',1)` will plot ten closely spaced positive contours and one negative contour.

Arguments: `'pos'` is a keyword specifying that phase-sensitive spectra plot positive peaks only. The default is to plot both positive and negative peaks.

`'neg'` is a keyword specifying that phase-sensitive spectra plot negative peaks only. The default is to plot both positive and negative peaks.

`'noaxis'` is a keyword to omit outlining the plot and omit plotting the horizontal and vertical axes.

`levels` is maximum number of contour levels to plot. The default is 4.

`spacing` is relative intensity of successive contour levels. The default is 2.

Examples:
```
pcon
pcon(4,1.4)
pcon('pos','noaxis')
pcon('neg',3)
```

See also: *User Guide: Liquids NMR*

Related:

dpcon	Display plotted contours (C)
maxpen	Maximum number of pens to use (P)

pcss — Calculate and show proton chemical shifts spectrum (M)

Syntax: `pcss<(<threshold><,max_cc><,max_width>)>`

Description: Calculates and shows the proton chemical shifts spectrum. The `dsp` command is used to display the results. The list of chemical shifts is saved in the file `pcss.outpar`. The original spectrum can be calculated by the `wft` command.

Arguments: `threshold` sets the level whether a point belongs to a peak or is noise. The default is that `pcss` automatically calculates the threshold.

`max_cc` is the maximum allowable coupling constant in the spectrum. The default is 20 Hz.

`max_width` is the maximum width of a spin multiplet in the spectrum. The default is 60 Hz.

Examples:
```
pcss
pcss(10)
pcss(9,20,80)
```

See also: *User Guide: Liquids*

Related:

do_pcss	Calculate proton chemical shifts spectrum (C)
dsp	Display pulse sequence (C)
wft	Weight and Fourier transform 1D data (C)

peak — Find tallest peak in specified region (C)

Syntax: `peak<(min_freq,max_freq)><:height,freq>`

Description: Returns the height and frequency of the tallest peak in the selected region, including any referencing (i.e., the same frequency that you would measure by placing a cursor on the peak). A spectrum need not actually be displayed for `peak` to work.

Arguments: With no return arguments, `peak` displays on the screen information about peak height and frequency. If two cursors are displayed, `peak` without arguments finds the tallest peak between the cursors.

`min_freq` is minimum frequency limit of the region to be searched. The default value is `sp`.

`max_freq` is maximum frequency limit, in Hz, of the region to be searched. The default value is `sp + wp`.

`height` returns the height, in mm, of the tallest peak in the selected region.

`freq` returns the frequency, in Hz, of the tallest peak in the selected region.

Examples:
```
peak:$ht,$freq
peak(0,2000):r3
peak:$ht,cr
```

See also: *VNMR User Programming*

Related:

`sp`	Start of plot (P)
`wp`	Width of plot (P)

peak2d — Return information about maximum in 2D data (C)

Syntax: `peak2d:$maximum_intensity<,$trace,$point>`

Description: Searches the area defined by `sp`, `wp`, `sp1`, and `wp1` in a 2D data set for a maximum intensity.

Arguments: `$maximum_intensity` returns the maximum intensity value found.

`$trace` returns the trace number of the maximum. The parameter `trace` defines whether f_1 or f_2 traces are counted.

`$point` returns the data point number of the maximum on that trace.

See also: *User Guide: Liquids NMR*

Related:

`sp`	Start of plot (P)
`sp1`	Start of plot in 1st indirectly detected dimension (P)
`trace`	Mode for *n*-dimensional data display (P)
`wp`	Width of plot (P)
`wp1`	Width of plot in 1st indirectly detected dimension (P)

peccfile — Programmable eddy current compensation file (obsolete)

Description: An obsolete SIS parameter that used to specify the file that contained the current programmable eddy current compensation values for a gradient coil. The parameter may still exist in old SIS parameter sets and gradient tables but it is not used.

Related:

`gcoil`	Read data from gradient calibration tables (P)

pen — Select a pen or color for drawing (C)

Syntax:
```
pen(<'graphics'|'plotter',><'xor'|'normal',>
   pen|color)
```

Description: Selects the pen number for a plotter or the color for the graphics screen. This command is part of a line drawing capability that includes the `move` and `draw` commands. `move` sets the coordinates from which the line starts. `draw` draws a line from that point to the new coordinates specified by `draw`. Refer to the description of `draw` for examples of using the line drawing capability.

Arguments: `'graphics'` and `'plotter'` are keywords selecting the output device. The default is `'plotter'`. The output selected is passed to subsequent `pen`, `move`, or `draw` commands and remains active until a different output is specified.

`'xor'` and `'normal'` are keywords selecting the drawing mode for the `'graphics'` output device. In the `'xor'` mode, if a line is drawn such that

one or more points of the line are in common with a previously drawn line, the common points are erased. In the `'normal'` mode, the common points remain. The mode selected is passed to subsequent `pen`, `draw`, *or* `move` commands and remains active until a different mode is specified. The default mode is `'normal'`.

`pen` is the plotter pen number: `'pen1'`, `'pen2'`, `'pen3'`, etc.

`color` is the active color for the graphics screen: `'red'`, `'green'`, `'blue'`, `'cyan'`, `'magenta'`, `'yellow'`, `'black'`, or `'white'`.

Examples:
```
pen('pen2')
pen('graphics','red')
```

See also: *Getting Started*

Related:

`draw`	Draw line from current location to another location (C)
`move`	Move to an absolute location (C)

pexpl — Plot exponential or polynomial curves (C)

Syntax: `pexpl<(<options,><line1,line2, ...)>`

Description: Plots exponential curves resulting from T_1, T_2, or kinetics analysis. Also plots polynomial curves from diffusion or other types of analysis. The `analyze.out` file is the data input file used to make the plot. Refer to the `expl` entry for the format of this file. The parameters `sc`, `wc`, `sc2`, and `wc2` control the size of the plot.

Arguments: `options` are any of the following keywords:

- `'linear'`, `'square'`, and `'log'` provide for plotting of the data points against the square or log of the data. `'linear'` controls x-axis scale, `'square'` controls the y-axis. The default is `'linear'`.
- `'link'` causes the data points to be connected rather than a plot of the theoretical curve.
- `'nocurve'` produces a plot of data points only.
- `'oldbox'` plots an additional curve on an existing plot. Only the first data set in `analyze.out` is plotted. It causes the program to get box and scale description from `expfit.out` in the current experiment.
- `'file'` followed by a file name replaces `analyze.out` as the input.

`line1, line2,...` specify curves to be plotted. The default is to plot the first six curves (if that many exist) along with the data points.

Examples:
```
pexpl
pexpl(1,3,6)
```

See also: *User Guide: Liquids NMR, VNMR User Programming*

Related:

`expl`	Display exponential or polynomial curves (C)
`sc`	Start of chart (P)
`sc2`	Start of chart in second direction (P)
`wc`	Width of chart (P)
`wc2`	Width of chart in second direction (P)

pexpladd — Add another diffusion analysis to current plot (M)

Applicability: Systems with the diffusion option.

Syntax: `pexpladd(integral_region)`

Description: Adds results of another diffusion analysis to the currently plotted results.

Arguments: `integral_region` specifies the number of the region whose results are to be added to the existing plot.

Examples: `pexpladd(1)`

See also: *User Guide: Liquids NMR*

Related:

`expl`	Display exponential or polynomial curves (C)
`pexpl`	Plot exponential or polynomial curves (C)
`expladd`	Add another diffusion analysis to current display (M)

`pfgon` Pulsed field gradient amplifiers on/off control (P)

Applicability: Systems with pulsed field gradient (PFG) modules.

Description: A global string parameter controlling the X, Y, and Z gradients for the PFG current amplifiers. Entering `su` or `go` sets the amplifiers at the current value of `pfgon`. For `pfgon` to take effect, `gradtype` must equal `p`, `q`, `l`, `t`, or `u` for the corresponding X, Y, or Z gradient, and a `su` or a `go` must be issued.

Values: A three-character string, with the first character controlling the X gradient, the second the Y gradient, and the third the Z gradient. For each gradient, setting the value to `y` turns on an amplifier and setting the value to `n` turns it off. For example, `pfgon='nny'` turns on only the PFG amplifier on the Z channel, and `pfgon='nnn'` turns off the PFG amplifiers on all channels.

See also: *Getting Started; Performa I Pulsed Field Gradient Module Installation; Pulsed Field Gradient Modules Installation; VNMR User Guide: Liquids NMR*

Related:

`go`	Submit experiment to acquisition (M)
`gradtype`	Gradients for X, Y, and Z axes (P)
`setup`	Set up parameters for basic experiments (M)
`su`	Submit a setup experiment to acquisition (M)

`pfiltr` Programmable filters (P)

Applicability: *GEMINI 2000* systems.

Description: Specifies presence or absence of programmable filters on observe receiver. If this parameter is not present, it can be created by `vnmr1` with the command `create('pfiltr','string','systemglobal')`.

Values: `'y'` if the filters are present, `'n'` if the filters are not present.

See also: *VNMR and Solaris Software Installation*.

Related:

`attens`	Fast attenuators present (P)
`create`	Create new parameter in parameter tree (C)
`rcvr`	Receiver version in system (P)

`pfww` Plot FIDs in whitewash mode (C)

Syntax: `pfww<(<start><,finish><,step><,'all'|'imag'>)>`

Description: Plots FIDs in whitewash mode (after the first FID, each FID is blanked out in regions in which it is behind an earlier FID). The position of the first FID is governed by parameters `wc`, `sc`, and `vpf`.

Arguments: `start` is the index of a particular FID for arrayed 1D or 2D data sets. For multiple FIDs, `start` is the index of the first FID.

`finish` is the index of the last FID for multiple FIDs.

`step` specifies the increment for the FID index. The default is 1.

`'all'` is a keyword to plot all of the FIDs. This is the default.

`'imag'` is a keyword to plot only the imaginary FID channel. The default is `'all'`.

Examples:
```
pfww
pfww(4,10,2,'imag')
```

See also: *Getting Started*

Related:

`dfs`	Display stacked FIDs (C)
`dfww`	Display FIDs in whitewash mode (C)
`plfid`	Plot FIDs (C)
`sc`	Start of chart (P)
`vpf`	Current vertical position of FID (P)
`wc`	Width of chart (P)

pge — Convert parameter set to PGE pulse sequence (M)

Applicability: Systems with the diffusion option.

Syntax: `pge`

Description: Adds all necessary parameters to perform the PGE (Pulse Gradient Experiment) pulse sequence, taking those parameters from the file `/vnmr/parlib/pge`.

See also: *User Guide: Liquids NMR*

Related:

`pge_calib`	Calibrate gradient strengths for PGE pulse sequence (M)
`pge_data`	Extract data from single element of PGE pulse sequence (M)
`pge_output`	Output results from PGE pulse sequence (M)
`pge_process`	Automated processing of data from PGE pulse sequence (M)
`pge_results`	Calculate diffusion constant for integral region (M)
`pge_setup`	Set up gradient control parameters for PGE pulse sequence (M)

pge_calib — Calibrate gradient strengths for PGE pulse sequence (M)

Applicability: Systems with the diffusion option.

Syntax: `pge_calib`

Description: Calibrates the parameters `grad_cw_coef` and `grad_p_coef`, which relate the DAC values (in DAC units) to the gradient strengths (in gauss/cm). Given a diffusion constant measurement (made with `pge_results`) for a known diffusion constant, `pge_calib` then adjusts the calibration parameters to produce the correct diffusion constant.

See also: *User Guide: Liquids NMR*

Related:

`pge`	Calibrate gradient strengths for PGE pulse sequence (M)
`pge_results`	Calculate diffusion constant for integral region (M)

pge_data — Extract data from single element of PGE pulse sequence (M)

Applicability: Systems with the diffusion option.

Syntax: `pge_data(array_index)`

Description: Extracts integral information from a currently displayed element of a PGE (Pulse Gradient Experiment) and writes the results in the current experiment directory as the file `info_#`, where # is the value of the `array_index` argument (e.g., if `array_index` is 5, the file is `info_5`)

Arguments: `array_index` is the number of the array element from which the data is extracted.

Examples: `pge_data(5)`

See also: *User Guide: Liquids NMR*

Related: pge Calibrate gradient strengths for PGE pulse sequence (M)

pge_output Output results from PGE pulse sequence (M)

Applicability: Systems with the diffusion option.

Syntax: `pge_output`

Description: Prints the calculated results from the PGE (Pulse Gradient Experiment) pulse sequence on a printer and plots the graphs of calculated decay curves.

See also: *User Guide: Liquids NMR*

Related: pge Calibrate gradient strengths for PGE pulse sequence (M)

pge_process Automated processing of data from PGE pulse sequence (M)

Applicability: Systems with the diffusion option.

Syntax: `pge_process`

Description: Performs full automated processing of data from a PGE (Pulse Gradient Experiment) pulse sequence.

See also: *User Guide: Liquids NMR*

Related: pge Calibrate gradient strengths for PGE pulse sequence (M)

pge_results Calculate diffusion constant for integral region (M)

Applicability: Systems with the diffusion option.

Syntax: `pge_results(integral_region<,reference_region>)`

Description: Calculates a diffusion coefficient based on a single integral region in the spectrum (if one input argument) or calculates diffusion coefficient of an integral region consisting of two components (if two input arguments).

Arguments: `integral_region` is the number of the integral region on which to perform the analysis

`reference_region` is the number of the integral region used to get the value of the diffusion coefficient.

Examples:
```
pge_results(2)
pge_results(1,3)
```

See also: *User Guide: Liquids NMR*

Related: pge Calibrate gradient strengths for PGE pulse sequence (M)

pge_setup Set up gradient control parameters for PGE pulse sequence (M)

Applicability: Systems with the diffusion option.

Syntax: `pge_setup<('no')>`

Description: Prompts the user for the values of the `g_max`, `g_min`, `g_steps`, `g_array`, `nt_first`, `nt_aray`, and other parameters for the PGE (Pulse Gradient Experiment) pulse sequence. These parameters are then used to calculate the `grad_p1` and `nt` arrays.

Arguments: `'no'` is a keyword to turn off prompting the user and instead use the current values of the parameters to calculate the `grad_p1` and `nt` arrays.

Examples:
```
pge_setup
pge_setup('no')
```

See also: *User Guide: Liquids NMR*

Related:		
	pge	Calibrate gradient strengths for PGE pulse sequence (M)

ph — Set phased mode in directly detected dimension (C)

Syntax: ph

Description: Selects the phased mode by setting the parameter dmg='ph'. In the *phased spectra display mode*, each real point in the displayed spectrum is calculated from a linear combination of the real and imaginary points comprising each respective complex data point. The coefficients for this linear combination are derived from the phase parameters rp and lp.

For 2D data, if pmode='partial' or pmode='' (two single quotes with no space in between), ph has an effect on the data prior to the second Fourier transform. If pmode='full', ph acts in concert with the commands ph1, av1, or pwr1 to yield the resultant contour display for the 2D data.

See also: *Getting Started; User Guide: Liquids NMR*

Related:	
av	Set abs. value mode in directly detected dimension (C)
av1	Set abs. value mode in 1st indirectly detected dimension (C)
dmg	Data display mode in directly detected dimension (P)
ft	Fourier transform 1D data (C)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
lp	First-order phase in directly detected dimension (P)
pa	Set phase angle mode in directly detected dimension (C)
pa1	Set phase angle mode in 1st indirectly detected dimension (C)
ph1	Set phased mode in 1st indirectly detected dimension (C)
ph2	Set phased mode in 2nd indirectly detected dimension (C)
pmode	Processing mode for 2D data (P)
pwr	Set power mode in directly detected dimension (C)
pwr1	Set power mode in 1st indirectly detected dimension (C)
rp	Zero-order phase in directly detected dimension (P)
wft	Weight and Fourier transform 1D data (C)
wft1d	Weight and Fourier transform f_2 of 2D data (M)
wft2d	Weight and Fourier transform 2D data (M)

ph1 — Set phased mode in 1st indirectly detected dimension (C)

Syntax: ph1

Description: Selects the phased spectra display mode along the first indirectly detected dimension by setting the parameter dmg1 to the string value 'ph1'. If the parameter dmg1 does not exist, ph1 will create it and set it to 'ph1'.

In the phased mode, each real point in the displayed trace is calculated from a linear combination of the real and imaginary points comprising each respective complex data point. For hypercomplex data, the linear combination uses the real-real and imaginary-real points from each respective hypercomplex data point. The coefficients for this linear combination are derived from the phase parameters rp1 and lp1.

The ph1 command is only needed if mixed-mode display is desired. If the parameter dmg1 does not exist or is set to the null string, the display mode along the first indirectly detected dimension defaults to the display mode of the directly detected dimension (characterized by the parameter dmg). For the contour display of multidimensional data, the result of ph1 is the same as for traces provided that pmode='partial' or pmode=''.

See also: *User Guide: Liquids NMR*

Related:		
	av1	Set abs. value mode in 1st indirectly detected dimension (C)
	dmg1	Data display mode in 1st indirectly detected dimension (P)
	lp1	First-order phase in 1st indirectly detected dimension (P)
	pa	Set phase angle mode in directly detected dimension (C)
	pa1	Set phase angle mode in 1st indirectly detected dimension (C)
	ph	Set phased mode in directly detected dimension (C)
	pmode	Processing mode for 2D data (P)
	pwr1	Set power mode in 1st indirectly detected dimension (C)
	rp1	Zero-order phase in 1st indirectly detected dimension (P)

ph2 — Set phased mode in 2nd indirectly detected dimension (C)

Syntax: ph2

Description: Selects phased spectrum display mode processing along the second indirectly detected dimension by setting the parameter dmg2='ph2'. If dmg2 does not exist or is set to the null string, ph2 creates dmg2 and sets it to 'ph2'.

In the phased mode, each real point in the displayed trace is calculated from a linear combination of the real and imaginary points comprising each respective complex data point. For hypercomplex data, the linear combination uses the real-real and imaginary-real points from each respective hypercomplex data point. The coefficients for this linear combination are derived from the phase parameters rp2 and lp2.

The ph2 command is only needed if mixed-mode display is desired. If the parameter dmg2 does not exist or is set to the null string, the display mode along the second indirectly detected dimension defaults to the display mode of the directly detected dimension (characterized by the parameter dmg). For the contour display of multidimensional data, the result of ph2 is the same as for traces provided that pmode='partial' or pmode=''.

See also: *User Guide: Liquids NMR*

Related:		
	av2	Set abs. value mode in 2nd indirectly detected dimension (C)
	dmg2	Data display mode in 2nd indirectly detected dimension (P)
	ft1d	Fourier transform along f_2 dimension (C)
	ft2d	Fourier transform 2D data (C)
	lp2	First-order phase in 2nd indirectly detected dimension (P)
	ph	Set phased mode in directly detected dimension (C)
	pmode	Processing mode for 2D data (P)
	pwr2	Set power mode in 2nd indirectly detected dimension (C)
	rp2	Zero-order phase in 2nd indirectly detected dimension (P)

phase — Change frequency-independent phase rp (M)

Syntax: phase(phase_change)

Description: Changes the phase of all peaks in the spectrum by adding a value to the current rp value. Any excess over 360° is removed.

Arguments: phase_change is the value to be added to the current rp value (i.e., *new* rp = *old* rp + phase_change).

Examples: phase(45)

See also: *Getting Started*

Related:		
	rp	Zero-order phase in directly detected dimension (P)

phase — Phase selection (P)

Description: Selects the phase cycling that determines the experiment type. To create the parameters `phase`, `ni`, and `sw1` for acquisition of a 2D data set in the current experiment, enter `addpar('2d')`.

Values: The following values are generally used in experiments with phase cycling. For more details, see the specific pulse sequence.

`phase=0` selects an absolute-value 2D experiment.

`phase=1,2` selects the required two components of a hypercomplex (States-Haberkorn) experiment.

`phase=3` selects TPPI (Time Proportional Phase Incrementation).

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`cosyps`	Set up parameters for phase-sensitive COSY (M)
`dqcosy`	Set up parameters for double quantum filtered COSY (M)
`hmqc`	Set up parameters for HMQC pulse sequence (M)
`hmqcr`	Set up parameters for HMQCR pulse sequence (M)
`inadqt`	Set up parameters for INADEQUATE pulse sequence (M)
`mqcosy`	Set up parameters for MQCOSY pulse sequence (M)
`noesy`	Set up parameters for NOESY pulse sequence (M)
`roesy`	Set up parameters for ROESY pulse sequence (M)
`tocsy`	Set up parameters for TOCSY pulse sequence (M)

phase1 — Phase of first pulse (P)

Applicability: Systems with a solids module.

Description: Controls the first pulse phase in the cycle, in multipulse experiments.

See also: *User Guide: Solid-State NMR*

Related:

`br24`	Set up BR24 multiple pulse experiment (M)
`flipflop`	Set up sequences for multipulse (M)

phase2 — Phase selection for 3D acquisition (P)

Description: Selects phase cycling type for 3D data acquisitions. Also selects the phase of the second pulse in the sequence set up by `flipflop`. To create the parameters `phase2`, `d3`, `ni2`, and `sw2` for acquisition of a 3D data set in the current experiment, enter `addpar('3d')`.

See also: *User Guide: Liquids NMR; User Guide: Solid-State NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`d3`	Incremented delay for 2nd indirectly detected dimension (P)
`flipflop`	Set up sequences for multipulse (M)
`ni2`	Number of increments in 2nd indirectly detected dimension (P)
`par3d`	Create 3D acquisition, processing, display parameters (C)
`sw2`	Spectral width in 2nd indirectly detected dimension (P)

phase3 — Phase selection for 4D acquisition (P)

Description: Selects phase cycling type for 4D data acquisitions. To create the parameters `phase3`, `d4`, `ni3`, and `sw3` for acquisition of a 4D data set in the current experiment, enter `addpar('4d')`.

See also: *User Guide: Liquids NMR*

Related:		
	addpar	Add selected parameters to the current experiment (M)
	d4	Incremented delay for 3rd indirectly detected dimension (P)
	ni3	Number of increments in 3rd indirectly detected dimension (P)
	par4d	Create 4D acquisition parameters (C)
	sw3	Spectral width in 3rd indirectly detected dimension (P)

phasing — Control update region during interactive phasing (P)

Description: Controls the percentage of the spectrum updated during interactive phasing using the ds command.

Values: 10 to 100, in percent, where 100 causes the entire spectrum to be updated, and 20 causes the area between the two vertical cursors to be updated.

See also: *Getting Started*

Related:		
	ds	Display a spectrum (C)

phfid — Zero-order phasing constant for the np FID (P)

Description: Specifies the angle of zero-order rotation. This zero-order rotation is executed as a part of retrieving the time-domain data into the active region of the VNMR memory and can be used instead of the parameter rp applied to the frequency-domain data. phfid is used only in a complex phase rotation.

phfid (and related parameters lsfid and lsfrq) operate on complex np FID data, referred to as the t_2 dimension in a 2D experiment or as the t_3 dimension in a 3D experiment. phfid is in the processing group and is properly handled through the wti display.

Values: –360.0 to +360.0, in degrees; 'n'

See also: *Getting Started; User Guide: Liquids NMR*

Related:		
	dfid	Display a single FID (C)
	ds	Display a spectrum FID (C)
	ft	Fourier transform 1D data (C)
	ft1d	Fourier transform along f_2 dimension (C)
	ft2d	Fourier transform 2D data (C)
	lsfid	Number of complex points to left-shift the np FID (P)
	lsfrq	Frequency shift of the fn spectrum in Hz (P)
	np	Number of data points (P)
	phfid1	Zero-order phasing constant for ni interferogram (P)
	phfid2	Zero-order phasing constant for ni2 interferogram (P)
	rp	Zero-order phase in directly detected dimension (P)
	wft	Weight and Fourier transform 1D data (C)
	wft1d	Weight and Fourier transform f_2 of 2D data (M)
	wft2d	Weight and Fourier transform 2D data (M)
	wti	Interactive weighting (C)

phfid1 — Zero-order phasing constant for ni interferogram (P)

Description: Specifies the angle of zero-order rotation. This zero-order rotation is executed as a part of retrieving the time-domain data into the active region of the VNMR memory and can be used instead of the parameter rp1 applied to the frequency-domain data. phfid1 is used in a complex phase rotation for complex t_1/t_2 interferograms and in a hypercomplex phase rotation for hypercomplex t_1/t_2 interferograms.

phfid1 (and related parameters lsfid1 and lsfrq1) operate on ni interferogram data, both hypercomplex and complex. ni interferogram data are referred to as the t_1 dimension in both a 2D and a 3D experiment. phfid1 is in the processing group and is properly handled through the wti display; that is, a wti operation on an ni interferogram applies the parameters phfid1, lsfid1, and lsfrq1, if selected, to the time-domain data prior to the Fourier transformation.

Values: –360.0 to +360.0, in degrees; 'n'.

See also: *User Guide: Liquids NMR*

Related:

lsfid1	Number of complex points to left-shift the ni interferogram (P)
lsfrq1	Frequency shift of the fn1 spectrum in Hz (P)
ni	Number of increments in 1st indirectly detected dimension (P)
phfid	Zero-order phasing constant for np FID (P)
phfid2	Zero-order phasing constant for ni2 interferogram (P)
rp1	Zero-order phase in 1st indirectly detected dimension (P)
wti	Interactive weighting (C)

phfid2 Zero-order phasing constant for ni2 interferogram (P)

Description: Specifies the angle of zero-order rotation. This zero-order rotation is executed as a part of retrieving the time-domain data into the active region of the VNMR memory and can be used instead of the parameter rp2 applied to the frequency-domain data. phfid2 is used in a complex phase rotation for complex t_1/t_2 interferograms and in a hypercomplex phase rotation for hypercomplex t_1/t_2 interferograms.

phfid2 (and related parameters lsfid2 and lsfrq2) operate on ni2 interferogram data, both hypercomplex and complex. ni2 interferogram data are referred to as the t_2 dimension in a 3D experiment. phfid2 is in the processing group and is properly handled through the wti display.

Values: –360.0 to +360.0, in degrees; 'n'.

See also: *User Guide: Liquids NMR*

Related:

lsfid2	Number of complex points to left-shift ni2 interferogram (P)
lsfrq2	Frequency shift of the fn2 spectrum in Hz (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
phfid	Zero-order phasing constant for np FID (P)
phfid1	Zero-order phasing constant for ni interferogram (P)
rp2	Zero-order phase in 2nd indirectly detected dimension (P)
wti	Interactive weighting (C)

phi Euler angle phi from magnet frame (P)

Applicability: Systems with imaging capabilities.

Description: Euler angle phi from magnet frame.

Values: –180 to +180, in degrees.

See also: *User Guide: Imaging*

Related:

psi	Euler angle psi from magnet frame (P)
theta	Euler angle theta from magnet frame (P)

PHOSPHORUS Set up parameters for phosphorus spectrum (M)

Applicability: *GLIDE* only

Syntax: PHOSPHORUS

Description: Internal macro that sets up a phosphorus spectrum in *GLIDE*. This macro is not used if phosphorus is the first experiment in the chain.

pi — Inversion pulse length (P)

Applicability: Systems with imaging capabilities.

Description: Pulse length for an inversion pulse, often used as an optional first pulse preceding the main sequence to provide contrast based on T_1 relaxation.

A pi pulse will often be programmed so that it may be toggled on or off by the operator with the inversion-recovery flag ir.

See also: *User Guide: Imaging*

Related:

ir	Inversion recovery mode (P)
pipat	Shape of an inversion pulse (P)
ti	Second delay in an inversion recovery sequence (P)
tpwri	Intensity of an inversion pulse in dB (P)

pi3ssbsq — Set up pi/3 shifted sinebell-squared window function (M)

Syntax: pi3ssbsq<(<t1_inc><,t2_inc>)>

Description: Sets up a pi/3 unshifted sinebell-squared window function in 1, 2, or 3 dimensions. The macro checks whether the data is 1D, 2D, and 3D.

Arguments: t1_inc is the number of t1 increments. The default is ni.

t2_inc is the number of t2 increments. The default is ni2.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

gaussian	Set up unshifted Gaussian window function (M)
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
pi4ssbsq	Set up pi/4 shifted sinebell-squared window function (M)
sqcosine	Set up unshifted cosine-squared window function (M)
sqsinebell	Set up unshifted sinebell-squared window function (M)

pi4ssbsq — Set up pi/4 shifted sinebell-squared window function (M)

Syntax: pi4ssbsq<(<t1_inc><,t2_inc>)>

Description: Sets up a pi/4 unshifted sinebell-squared window function in 1, 2, or 3 dimensions. The macro checks whether the data is 1D, 2D, and 3D.

Arguments: t1_inc is the number of t1 increments. The default is ni.

t2_inc is the number of t2 increments. The default is ni2.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

gaussian	Set up unshifted Gaussian window function (M)
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
pi3ssbsq	Set up pi/3 shifted sinebell-squared window function (M)
sqcosine	Set up unshifted cosine-squared window function (M)
sqsinebell	Set up unshifted sinebell-squared window function (M)

pilot — Automatic sequence setup (P)

Applicability: Systems with imaging capabilities.

Description: Provides a degree of automatic setup of a sequence, where this capability is available. If `pilot='y'`, access is provided to automatic setting for the gradients `gssr` and `gror`. These gradient levels are then adjusted to compensate for gradient slew rate. The adjustments are made at the time of `go`; however, the values used are not returned to the parameter set.

Values: `'y'` means the automatic mode is on.
`'n'` means the manual mode is set.

See also: *User Guide: Imaging*

Related:

`go`	Submit experiment to acquisition (C)
`gror`	Readout compensation gradient (P)
`gssr`	Slice selection refocusing gradient (P)

`pintvast` Plots of integral regions (M)

Applicability: Systems with VAST accessory.

Syntax: `pintvast(last)`

Description: `pintvast` plots the integrals of the partial regions of each spectra from wells 0 to `last`.

Arguments: `last` is the number last sample well. The default is 96.

See also: *User Guide: Liquids NMR*

Related:

`intvast`	Builds text file the integral regions (M)

`pipat` Shape of an inversion pulse (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the shape of inversion pulse `pi`.

Values: `'hard'`, `'sinc'`, `'gauss'`, `'sech'`, `'sine'`, or any shape resident in the system pulse shape library or libraries.

See also: *User Guide: Imaging*

Related:

`ir`	Inversion recovery mode (P)
`pi`	Width of an inversion pulse (P)

`pir` Plot integral amplitudes below spectrum (C)

Syntax: `pir`

Description: Plots integral amplitudes below the appropriate spectral regions.

See also: *Getting Started*

Related:

`dpf`	Display peak frequencies over spectrum (C)
`dpir`	Display integral amplitudes below spectrum (C)
`dpirn`	Display normalized integral amplitudes below spectrum (M)
`pirn`	Plot normalized integral amplitudes below spectrum (M)
`ppf`	Plot peak frequencies over spectrum (M)

`pirn` Plot normalized integral amplitudes below spectrum (M)

Syntax: `pirn`

Description: Equivalent to the command `pir` except that the sum of the integrals is normalized to the value of the parameter `ins`.

See also: *Getting Started*

Related:

dpirn	Display normalized integral amplitudes below spectrum (M)
ins	Integral normalization scale (P)
pir	Plot integral amplitudes below spectrum (C)

pkpick — Peak pick (P)

Description: Stores the string command to do peak picking. pkpick is a string parameter set by the *GLIDE* interactive window tool, stored in global, and then executed within macros.

See also: *Getting Started*

Related:

parstyle	Parameter style (P)

pl — Plot spectra (C)

Syntax:
```
pl<(<start,finish<,step>><,'int'><,'all'>
   <,options>)>
```

Description: Plots one or more spectra. When a single spectrum is plotted, integral plotting is controlled by the parameter intmod as follows: intmod='off' turns off the integral plot, intmod='full' plots the entire integral, and intmod='partial' plots every other integral region.

For arrayed 1D spectra or for 2D spectra, a particular trace can be plotted by supplying the index number as an argument. For 2D data sets, spectra can be plotted from either the f_1 or f_2 domain by setting the parameter trace to 'f1' or 'f2', respectively. After the command ft1d, interferograms can be plotted by setting trace='f1' and then typing pl. Multiple spectra can be plotted by supplying the indexes of the first and last spectra.

The position of the first spectrum is governed by the parameters wc, sc, and vp. For 1D data, subsequent spectra are positioned relative to the preceding spectrum by the vertical and horizontal offset parameters vo and ho. For 2D data, ho defines the total horizontal offset between the first and last spectrum. Also for 2D data, vo is inactive while the parameter wc2 defines the total vertical offset between the first and last spectrum.

The parameter cutoff, if it exists and is active, defines the distance above and below the current vertical position vp at which peaks are truncated. By arraying cutoff to have two different values, truncation limits above and below the current vertical position can be controlled. For example, cutoff=50 truncates peaks at vp+50 mm and vp–50 mm. cutoff=50,10 truncates peaks at vp+50 mm and vp–10 mm.

Arguments: start is the index of a particular trace for arrayed 1D or 2D spectra. For multiple spectra, start is the index of the first spectrum.

finish is the index of the last spectrum for multiple spectra.

step specifies the increment for the spectral index. The default is 1.

'int' is a keyword that specifies displaying only the integral, independently of the value of intmod.

'all' is a keyword to plot all of the spectra. This value is the default.

options can be any of the following keywords:

- 'top' or 'side' cause the spectrum to be plotted either above or at the left edge of a contour plot. This assumes that the parameters sc, wc, sc2, and wc2 are those used to position the contour plot.

- 'dodc' causes all spectra to be drift corrected independently.
- 'pen1', 'pen2', 'pen3', etc. specify a pen number on a plotter.

Examples:
```
pl
pl(1,6,2)
```

Alternate: Plot button in the 1D Plotting Menu,

See also: *Getting Started; User Guide: Liquids NMR*

Related:

cutoff	Data truncation limit (P)
dssa	Display stacked spectra automatically (C)
dsww	Display spectra in whitewash mode (C)
ft1d	Fourier transform along f_2 dimension (C)
ho	Horizontal offset (P)
intmod	Integral display mode (P)
plww	Plot spectra in whitewash mode (C)
sc	Start of chart (P)
sc2	Start of chart in second direction (P)
trace	Mode for 2D data display (P)
vo	Vertical offset (P)
vp	Vertical position of spectrum (P)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)

pl2d — Plot 2D spectra in whitewash mode (C)

Syntax:
```
pl2d<('nobase'|'fill'|'fillnb')>
```

Description: Plots a stacked plot of 2D spectra in whitewash mode (after the first spectra, each spectra is blanked out in regions in which it is behind an earlier spectra). Color does not represent intensity (unlike dcon), since intensity can be seen visually, but instead successive traces are displayed in different colors so that color represents frequency. The horizontal offset parameter ho is not active for this command.

Arguments: 'nobase' is a keyword to activate th to suppress intensity below th.

'fill' is a keyword to fill in the peaks. Note that if 'fill' (or 'fillnb') is used, th operates linearly and not logarithmically (with factors of 2) as it does in contour or color intensity displays.

'fillnb' is a keyword to combine base suppression and peak filling.

Examples:
```
pl2d
pl2d('nobase')
```

See also: *User Guide: Liquids NMR*

Related:

dcon	Display noninteractive color intensity map (C)
ds2d	Display 2D spectra in whitewash mode (C)
dsww	Display spectra in whitewash mode (C)
ho	Horizontal offset (P)
plww	Plot spectra in whitewash mode (C)
th	Threshold (P)

plan — Display menu for planning a target scan (M)

Applicability: Systems with imaging capabilities.

Syntax:
```
plan
```

Description: Brings up a menu that provides access to the target scan planning utilities. The plan menu has three buttons: Slice, Voxel, and Exit.

The Slice button provides access to the slice planning menu. The user first clears the current experiment of any `mark2d.out` files using the Clear Marks button. The image display may then be made interactive using the Interactive View button. This activates the `dconi` program. The user should select and mark two points that lie on the edge of the desired target slice plane using the Mark button of the `dconi` menu. To write the mark data into the `mark2d.out` file, the user should exit `dconi` using the Return button. This exits to the slice planner menu.

The target slice selection can be shown graphically on the image display using the Show Target button of the slice planner menu. This button uses the `drawslice` macro. The slice parameters (`pss`, `psi`, `phi`, and `theta`) are calculated and set using the Calculate Target button of the slice planner menu. This button uses the `ssplan` macro. This program creates the string parameter `planlock` and assigns it the value `'ssplan'`. This prevents a user inadvertently performing a second planning operation without applying the `reset` command to restore the original parameters for the scout data.

At this point, the current parameters of the scout experiment contain the data needed to acquire the desired slice. The user can use these directly or use the `mp` or transfer commands to move the information to another experiment.

The Voxel button of the `plan` menu provides access to the voxel planning menu. The user may enter the interactive mode using the Interactive View button. This activates the `dconi` program. The user should clear any previous unwanted planning information before starting.

The size and position of the voxel face parallel to the image plane can be selected by positioning the 2D box cursor. Once this is done, the user leaves the interactive mode using the Return button of the `dconi` menu. This returns the user to the voxel planning menu. The user can plan for more than one voxel. These target voxel selections can be shown graphically on the image display using the Show Target button of the planner menu. This button uses the `drawvox` macro. The parameter for the voxel can be calculated and set using the Calculate Target button, which uses the `voxplan` macro.

The `voxplan` macro requests the user to enter the voxel size in the direction parallel to the scout image slice select axis.Voxel parameters are computed from the 2D box cursor data and user entry. The voxel center is taken to lie in the scout image plane at the center of the 2D box. `voxplan` also creates the string parameter `planlock` and assigns it the value `'voxplan'`. This provides an interlock against further planning operations. The `reset` command restores the original scout parameters and removes the `planlock` parameter.

The current parameters of the scout experiment contain the data needed to acquire the voxel. The user *must* use the transfer program to copy this data to the parameter set of a suitable voxel selective sequence.

See also: *User Guide: Imaging*

Related:

`drawslice`	Display target slices (M)
`drawvox`	Display target voxels (M)
`mp`	Move parameters between experiments (C)
`phi`	Euler angle phi from magnet frame (P)
`planlock`	Planner lockout (P)
`psi`	Euler angle psi from magnet frame (p)
`pss`	Slice position (P)
`ssplan`	Set slice parameters for target slice (M)
`theta`	Euler angle theta from magnet frame (P)
`voxplan`	Set voxel parameters for voxel defined by 2D box cursor (M)

plane — Currently displayed 3D plane type (P)

Applicability: All systems; however, although plane is available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, such systems can only process 3D data and cannot acquire 3D data.

Description: Stores the type of 3D plane currently displayed within VNMR. If plane does not exist, it is created by the macro par3d. The command select, as well as the many macros that make use of select, requires the parameter plane to exist for 3D data sets and to contain an appropriate value.

plane is set automatically by the macro getplane; it can also be set by the macro ft3d if automatic plane extraction is requested at the end of the 3D FT. The order of priority for the plane types is 'f1f3', 'f2f3', and then 'f1f2'. In other words, if getplane is requested to extract the f_1f_3 and the f_2f_3 planes, plane will be set to 'f1f3'. plane can also be set manually.

Values: 'f1f3', 'f3f1', 'f2f3', 'f3f2', 'f1f2', or 'f2f1'

See also: *User Guide: Liquids NMR*

Related:

dplane	Display a 3D plane (M)
dproj	Display a 3D plane projection (M)
dsplanes	Display a series of 3D planes (M)
ft3d	Perform a 3D Fourier transform on a 3D FID data set (M,U)
getplane	Extract planes from a 3D spectral set (M)
nextpl	Display the next 3D plane (M)
par3d	Create 3D acquisition, processing, display parameters (C)
path3d	Number of complex points to left-shift np FID (P)
plplanes	Plot a series of 3D planes (M)
prevpl	Display the previous 3D plane (M)
select	Select a spectrum or 2D plane without displaying it (C)

planlock — Planner lock (P)

Applicability: Systems with imaging capabilities.

Description: Created by voxplan and assigned the value 'voxplan' to provide an interlock against further planning operations. This parameter is also created by the ssplan macro and assigned the value 'ssplan' to prevents a user inadvertently performing a second planning operation. In both cases, the reset command removes the value assigned to planlock.

See also: *User Guide: Imaging*

Related:

plan	Display menu for planning a target scan (M)
ssplan	Set slice parameters for target slice (M)
voxplan	Set voxel parameters for voxel defined by 2D box cursor (M)

plapt — Plot APT-type spectra automatically (M)

Syntax: plapt<(13Cexp_number)>

Description: Automatically plots APT spectra. The APT spectrum is plotted on top of a standard carbon spectrum if either an experiment with such data is specified or if a file C13 is found in curexp+'/subexp'. If neither such a subfile is found nor an experiment with standard carbon data is specified, the APT spectrum is plotted alone.

Arguments: 13Cexp_number specifies the number, from 1 to 9, of an experiment with a standard ^{13}C spectrum.

Examples:
```
plapt
plapt(2)
```

See also: *Getting Started*

Related:

curexp	Current experiment directory (P)

plarray — Plotting macro for arrayed 1D spectra (M)

Syntax: `plarray`

Description: A generic macro for plotting arrayed 1D spectra. `plarray` is called by the `plot` macro, but can also be used directly. For the plot layout, `procarray` distinguishes between arrays with few elements (6 or less), which will be stacked vertically (no horizontal offset), and spectra with many (greater than 6) elements. Those are stacked horizontally by default, unless there are too many lines, in which case a diagonally stacked display is chosen. Horizontal stacking is mostly adequate for pulse and power calibrations, where there are usually few lines only; diagonally stacked displays/plots are frequently chosen for T_1 and T_2 experiments on entire spectra, often with many lines.

The automatic stacking mode can be overridden by creating and setting a string parameter `stackmode` in the startup macro or before calling `procplot` or `procarray`. Possible values for `stackmode` are `'horizontal'`, `'vertical'`, or `'diagonal'`. DEPT-type spectra can, in principle, also be processed with `procarray`, but no DEPT editing occurs, of course.

See also: *Getting Started*

Related:

aexppl	Automatic expansion plot (M)
plc	Plot carbon spectrum (M)
plh	Plot proton spectrum (M)
plot	Automatically plot spectra (M)
procarray	Process arrayed 1D spectra (M)
stackmode	Stack control for processing arrayed 1D spectra (P)

plate_glue — Define a glue order for plotting and display (U)

Applicability: Systems with VAST accessory

Syntax: `plate_glue`

Description: In a Unix terminal or shell window type plate_glue. The glue order is determined by clicking on the wells to be displayed. Save the glue order file in the user's vnmrsys/templates/glue directory.

See also: *User Guide: Liquids NMR*

Related:

dsvast2d	Display VAST data in a pseudo-2D format (M)
plvast	Plot VAST data in a stacked 1D-NMR matrix (M)
plvast2d	Plot VAST data in a pseudo-2D format (M)

plc — Plot a carbon spectrum (M)

Syntax: `plc<(pltmod)>`

Description: Plots a carbon spectrum based on the parameters `pltmod` (the options `'off'`, `'full'`, and `'fixed'` are implemented) and `intmod` (`'off'`, `'full'`, and `'partial'` are implemented). Peak frequency labels, in ppm, are usually plotted.

Arguments: `pltmod` is an alternate value of `pltmod` for this macro only. The value of the `pltmod` parameter is not changed.

Examples:
```
plc
plc('full')
```

See also: *Getting Started*

Related:

`intmod`	Integral display mode (P)
`pltmod`	Plotter display mode (P)

plcosy — Plot COSY- and NOESY-type spectra automatically (M)

Syntax: `plcosy(<'pos'|'neg'><,><levels<,spacing<,exp1D>>>)`

Description: Automatically plots 2D COSY- and NOESY-type spectra (homonuclear correlated spectra). Features include the following:

- Keeps the orientation (f_1, f_2) of the spectrum on the screen.
- Plot area is optimized.
- Number of contour levels and their spacing can be selected.
- Negative or positive contours can be suppressed.
- 1D traces can be plotted along both axes; such 1D traces are taken from a full (or reduced) 1D spectrum in an other experiment, or from a subfile from within the current experiment.
- Works correctly for expansions.
- 1D traces can be suppressed, allowing a larger area for the 2D spectrum.
- 1D spectrum can be in any experiment.
- With phase-sensitive spectra using a plotter with one pen or a printer such as a LaserJet, if `'pos'` or `'neg'` are not selected, seven positive levels (or the specified number of positive contours) and one negative level are plotted, to distinguish positive and negative signals.

In multiexperiment mode, for the first plot, the experiment with the 1D spectrum should be specified (at least if it is not in exp1). From then on, the 1D spectrum will be stored *within* the experiment with the 2D spectrum, which allows much faster switching between spectra and also frees the other (1D) experiment for other tasks. Because of this internal storage, the `exp1D` argument is not required for subsequent plots.

Arguments:

`'pos'` is a keyword to plot only positive contours.

`'neg'` is a keyword to plot only negative contours.

`levels` is the number of contour levels. The default is 7.

`spacing` is the spacing between the contours. The default is 2.

`exp1D` is the experiment in which the proton 1D spectrum resides. This can be a full 1D spectrum, but the referencing must be the same as for the 2D. A negative number suppresses the proton trace. The default is from a subfile.

Examples:
```
plcosy
plcosy(12,1.5)
plcosy('pos',7,2,3)
plcosy(7,2,-1)
plcosy('neg')
```

See also: *Getting Started*

pldept — Plot DEPT data, edited or unedited (M)

Syntax: `pldept`

Description: Plots out DEPT data, either edited or not edited.

Alternate: Plot button in the Automatic DEPT Analysis Menu.

See also: *User Guide: Liquids NMR*

Related:

adept	Automatic DEPT analysis and spectrum editing (C)
autodept	Automated complete analysis of DEPT data (M)
deptproc	Process DEPT data (M)
padept	Perform adept analysis and plot resulting spectra (C)

plfid — Plot FIDs (C)

Syntax:
```
plfid<(<start><,finish><,step><,'all'|'imag'>
   <,pen>)>
```

Description: Plots one or more FIDs. The position of the first FID is governed by the parameters wc, sc, and vpf. A subsequent FID is positioned relative to the preceding FID by the vertical and horizontal offset parameters vo and ho.

Arguments: start is the index of a particular FID for arrayed 1D or 2D data sets. For multiple FIDs, start is the index of the first FID.

finish is the index of the last FID for multiple FIDs. To include all FIDs, set start to 1 and finish to the parameter arraydim (see example).

step specifies the increment for the FID index. The default is 1.

'all' is a keyword to plot all of the FIDs. This is the default.

'imag' is a keyword to plot the imaginary FID channel only. The default is 'all'.

pen is a keyword with the plotter pen number: 'pen1', 'pen2', 'pen3', etc. The default is 'pen1'.

Examples:
```
plfid(1,arraydim,3)
```

See also: *Getting Started*

Related:

arraydim	Dimension of experiment (P)
dfs	Display stacked FIDs (C)
dfww	Display FIDs in whitewash mode (C)
ho	Horizontal offset (P)
sc	Start of chart (P)
vo	Vertical offset (P)
vpf	Current vertical position of FID (P)
wc	Width of chart (P)

plfit — Plot deconvolution analysis (M)

Syntax:
```
plfit
```

Description: Produces a complete output plot of a deconvolution analysis, plotting the observed spectrum, the full calculated spectrum, each individual component, as well as the numerical results of the analysis.

Alternate: Plot button in the Deconvolution Menu.

See also: *User Guide: Liquids NMR*

Related:

fitspec	Perform spectrum deconvolution (C)
showfit	Display numerical results of deconvolution (M)
usemark	Use “mark” output as deconvolution starting point (M)

plgrid — Plot a grid on a 2D plot (M)

Syntax: (1) `plgrid<(<spacing><,><pen>)>`
(2) `plgrid<(start_f2,incr_f2,start_f1,incr_f1<,pen>)>`

Description: Plots grid lines over a 2D plot.

Arguments: `spacing` specifies the approximate spacing of the grid lines, in cm. The default is intervals of approximately 1 cm, rounded so that the intervals fall at a multiple of 1, 2, or 5 (in Hz) or 1p, 2p, or 5p (in ppm).

`pen` is a keyword with the plotter pen number: `'pen1'`, `'pen2'`, `'pen3'`, etc. The default is `'pen1'`.

`start_f2, incr_f2, start_f1, incr_f1` define the starting and increment frequencies in both f_2 and f_1 for a grid. Add the `p` suffix to a value to enter it in ppm (see last example below).

Examples:
```
plgrid
plgrid(2)
plgrid('pen5')
plgrid(1.5,'pen2')
plgrid(1p,0.5p,3p,0.5p)
```

See also: *User Guide: Liquids NMR*

Related:

grid	Draw a grid on a 2D display (C)

plh — Plot proton spectrum (M)

Syntax: `plh<(pltmod)>`

Description: Plots a proton spectrum based on the parameters `pltmod` (the options `'off'`, `'fixed'`, `'full'`, and `'variable'` are implemented) and `intmod` (`'off'`, `'full'`, and `'partial'` are implemented).

Arguments: `pltmod` is an alternate value of the parameter `pltmod` for this macro only. The value of the `pltmod` parameter is not changed.

Examples:
```
plh
plh('full')
```

See also: *Getting Started*

Related:

intmod	Integral display mode (P)
pltmod	Plotter display mode (P)
sp	Start of plot (P)
wp	Width of plot (P)

plhet2dj — Plot heteronuclear J-resolved 2D spectra automatically (M)

Syntax: `plhet2dj<('pos'|'neg'<,levels<,spacing<,exp1D>>>)>`

Description: Automatically plots 2D spectra of type HET2DJ (heteronuclear J-resolved 2D spectra) with the following features:

- Displayed portion of the spectrum is plotted in f2-mode
- Plot area is optimized
- Number of contour levels and their spacing can be selected
- Negative or positive contours can be suppressed
- A 1D trace can be plotted along the f_2 axis; such a 1D trace is taken from a full (or reduced) 1D spectrum in an other experiment, or from a file from within the current experiment.
- Expansions are handled correctly

- The 1D trace can be suppressed, which allows using a larger area for the 2D spectrum
- The 1D spectrum can be in any experiment
- With phase-sensitive spectra, if `'pos'` or `'neg'` are not selected and the plotter has only one pen (also for printers like the LaserJet), the specified number of positive contours are plotted (default is 7), but only one negative level, to distinguish positive and negative signals.

In multiexperiment mode, for the first plot the experiment with the 1D spectrum should be specified (at least if it is not in exp1). From then on, the 1D spectrum is stored *within* the experiment with the 2D spectrum, which allows much faster switching between the spectra and also frees the other 1D experiment for other tasks. Because of this internal storage, the `exp1D` argument is not required for subsequent plots.

Arguments: `'pos'` is a keyword to only plot positive contours

`'neg'` is a keyword to only plot negative contours

`levels` is the number of contour levels. The default is 7.

`spacing` is the spacing between the contours. The default is 2.

`exp1D` is the number from 1 to 9 of the experiment in which the 1D spectrum resides. This can be a full 1D spectrum, but the referencing must be the same as for the 2D. A negative number will suppress the 1D trace. The default is 1 (for `exp1`).

Examples:
```
plhet2dj
plhet2dj(12,1.5)
plhet2dj('pos',7,2,3)
plhet2dj(7,2,-1)
```

See also: *Getting Started*

`plhom2dj` Plot homonuclear J-resolved 2D spectra automatically (M)

Syntax:
(1) `plhom2dj<(levels<,spacing<,exp1D>>)>`
(2) `plhom2dj('pos'|'neg'<,levels<,spacing<,exp1D>>>)`

Description: Automatically plots 2D spectra of type HOM2DJ (homonuclear J-resolved 2D spectra). Features include the following:

- The displayed portion of the spectrum is plotted in f2-mode
- The plot area is optimized
- Number of contour levels and their spacing can be selected
- Negative or positive contours can be suppressed
- A 1D trace can be plotted along the f_2 axis; such a 1D trace is taken from a full (or reduced) 1D spectrum in an other experiment, or from a file from within the current experiment.
- It also works correctly for expansions
- The 1D trace can be suppressed, which allows using a larger area for the 2D spectrum
- The 1D spectrum can be in any experiment
- With phase-sensitive spectra, if `'pos'` or `'neg'` are not selected and the plotter has only 1 pen (also for printers like the LaserJet) 7 or the specified number of positive contours are plotted, but only one negative level, to distinguish positive and negative signals.

In multiexperiment mode, for the first plot the experiment with the 1D spectrum should be specified (at least if it is not in `exp1`). From then on, the 1D spectrum will be stored *within* the experiment with the 2D spectrum, which allows much faster switching between the spectra and also frees the other (1D) experiment for other tasks. Because of this internal storage, the `exp1D` argument is not required for subsequent plots.

Arguments: `levels` is the number of contour levels. The default is 7.

`spacing` is the spacing between the contours. The default is 2.

`exp1D` is a number from 1 to 9 for the experiment in which the 1D spectrum resides. The spectrum can be a full 1D spectrum but the referencing must be the same as for the 2D. A negative number will suppress the 1D trace. The default is 1 (for `exp1`).

`'pos'` specifies only plot positive contours.

`'neg'` specifies only plot negative contours.

Examples:
```
plhom2dj
plhom2dj(25,1.2)
plhom2dj('pos',7,2,3)
plhom2dj(7,2,-1)
```

See also: *Getting Started*

plhxcor — Plot X,H-correlation 2D spectrum (M)

Syntax:
```
plhxcor(<'pos'|'neg'><,><levels<,spacing
   <,exp1D_H<,exp1D_X>>>>)
```

Description: Automatically plots 2D spectra of type HETCOR, COLOC, HMQC, HMBC (direct and indirect detection). Features include the following:

- Keeps the orientation (f_1, f_2) of the spectrum on the screen.
- Plot area is optimized.
- Number of contour levels and their spacing can be selected.
- Negative or positive contours can be suppressed.
- 1D proton and X traces can be plotted along both axes; such 1D traces are taken from full (or reduced) 1D spectra in other experiments or subfile within the current experiment.
- Works correctly for expansions.
- 1D traces can be suppressed, allowing a larger area for the 2D spectrum.
- 1D spectra can be in any experiment.

Arguments: `'pos'` is a keyword to plot only positive contours.

`'neg'` is a keyword to plot only negative contours.

`levels` is the number of contour levels. The default is 7.

`spacing` is the spacing between the contours. The default is 2.

`exp1D_H` is a number from 1 to 9 of the experiment in which the proton 1D spectrum resides; this can be a full 1D spectrum, but the referencing must be the same as for the 2D. A negative number will suppress the proton trace. The default is a subfile in the current experiment.

`exp1D_X` is a number from 1 to 9 of the experiment in which the X 1D spectrum resides. A negative number suppresses the X trace. the default is a subfile in the current experiment.

Examples:
```
plhxcor(12,1.5)
plhxcor(7,2,3)
plhxcor(7,2,1,3)
plhxcor('pos',7,2,-1,3)
plhxcor(7,2,-1,-1)
plhxcor('neg')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

hetcor	Set up parameters for HETCOR pulse sequence (M)

plist — Active pulse length parameter list (P)

Applicability: Systems with imaging capabilities.

Description: Contains an array of strings, whose values are the names of the rf pulse length parameters used by the sequence (e.g., `plist='p1','p2','p3'`). The nD, seqcon, plist, patlist, pwrlist, fliplist and sslist parameters configure a particular parameter set for an application sequence defined by the value of the seqfil parameter. The plist, patlist, pwrlist, fliplist and sslist parameters provide information concerning the rf pulse and conjugate gradients used by the sequence.

See also: *User Guide: Imaging*

Related:

fliplist	Standard flip angle list (P)
gcoil	Read data from gradient calibration tables (P)
nD	Application dimension (P)
patlist	Active pulse template parameter list (P)
pwrlist	Active pulse power level parameter list (P)
rfcoil	RF pulse calibration identity (P)
seqcon	Acquisition loop control (P)
seqfil	Application object code name (P)
sslist	Conjugate gradient list (P)

pll — Plot a line list (M)

Syntax: `pll<(x,y,minimum_y)>`

Description: Produces a columnar line list on a plotter, similar to what would appear on a printer. pll is quite different from the alternative method of plotting peak frequencies using ppf. The output of pll is automatically formatted into multiple columns, depending on the number of lines.

Arguments: x is the *x* position of the upper left of the line list.

y is the *y* position of the upper left of the line list.

minimum_y is the minimum *y* at which to reset back to top.

Examples:
```
pll
pll(20,150)
pll(5,wc2max*.8,wc2max*.5)
```

See also: *Getting Started*

Related:

ppf	Plot peak frequencies over spectrum (M)

pll2d — Plot results of 2D peak picking (C)

Syntax: `pll2d<(options)>`

Description: Plots the results of applying the ll2d command to pick 2D peaks in a 2D spectrum or a 2D plane of a 3D spectrum. Refer to the description of ll2d for a description of the process and the options available.

See also: *User Guide: Liquids NMR*

Related:

ll2d	Automatic and interactive 2D peak picking (C)

plot — Automatically plot spectra (M)

Syntax: plot

Description: A universal plotting macro normally called through the procplot macro (which by itself serves as processing and plotting facility for automatic experiments). plot can also be used directly by the user who then doesn't have to remember specific plotting macros. Of course, the specialized macros can still be called directly if the user know their names.

The main purpose of plot is to automatically call the correct specialized plotting macro, depending on the user definition or otherwise on the type of data in the experiment. A plotting macro is selected automatically as follows:

APT spectra:	plapt
other, non-arrayed 1D data:	plot1d
DEPT type arrayed spectra:	pldept
other arrayed 1D spectra:	plarray
J-resolved 2D spectra:	pl2dj
homonuclear correlation 2D spectra:	plcosy
heteronuclear correlation 2D spectra:	plhxcor

Other types of 2D spectra (mostly multiple-quantum 2D spectra such as 2D-INADEQUATE) are not plotted automatically at this time. For phase-sensitive 2D spectra, automatic plotting is only provided if they were acquired using the method described by States, Haberkorn, and others; TPPI spectra are not covered.

Note that plot macros in general should not adjust the phase, the vertical scale, or change the integral size and reset points; these are assumed to be adjusted either by hand or by a suitable processing macro like procplot and the macros called therein. The plotting macros only make adjustments in order to make spectrum and parameters fit onto the page the desired way.

See also: *Getting Started*

Related:

plapt	Plot APT spectra (M)
plarray	Plot arrays (M)
plcosy	Plot homonuclear 2D correlation spectra (M)
pldept	Plot DEPT type spectra (M)
plhxcor	Plot heteronuclear correlation spectra (M)
plot1d	Plot 1D spectra (M)
procplot	Automatically process FIDs (M)

plot1d — Plotting macro for simple (non-arrayed) 1D spectra (M)

Syntax: plot1d

Description: A generic macro for plotting non-arrayed 1D spectra using a set of standard macros. plot1d is called by the plot macro, but can also be used directly. plot1d first tries to find a specific macro (e.g., plh, plc, plp) for the current

observe nucleus. If such a macro exists, it is called. If a nucleus-specific macro is not found in the command path, a "minimal" 1D plot is produced.

See also: *Getting Started*

Related:

`plc`	Plot carbon spectrum (M)
`plh`	Plot proton spectrum (M)
`plp`	Plot phosphorus spectrum (M)
`plot`	Automatically plot spectra (M)

`plot2D` Plot 2D spectra (M)

Syntax:
```
plot2D('pos'|'neg'|'both',levels,spacing,   \
   'top'|'notop'|'proj','side'|'noside'|'proj')
```

Description: Checks for the presence of appropriate proton or carbon high-resolution spectra in the directory `userdir+'/data/'+sample` and decides to plot high resolution spectra or a projection depending on whether or not the proton or carbon spectrum exists.

Arguments:

`'pos'` is a keyword to plot positive contours.

`'neg'` is a keyword to plot negative contours.

`'both'` is a keyword to plot both positive and negative contours.

`levels` is the number of levels to be plotted.

`spacing` is the spacing between contour levels.

`'top'` is a keyword to plot a high-resolution spectrum on the top.

`'notop'` is a keyword to plot a non-high-resolution spectrum or projection.

`'proj'` is a keyword to plot a projection on top.

`'side'` is a keyword to plot a high-resolution spectrum on the side.

`'noside'` is a keyword to plot a non-high-resolution spectrum or projection.

`'proj'` is a keyword that plots a projection on the side.

Examples:
```
plot2D('pos',2,5,'top','side')
```

Related:

`Autoplot2D`	Check for *GLIDE*-selected plot options (M)
`plot`	Automatically plot spectra (M)
`plotside`	Plot spectrum on side (M)
`plottop`	Plot spectrum on top (M)
`plottopside`	Plot spectrum on top and side (M)

`plotside` Plot spectrum on side (M)

Syntax:
```
plotside
```

Description: Plots projection or high-resolution spectrum on the side of a 2D spectrum. `plotside` is used with `plot2D` and is not useful by itself.

Related:

`plot2D`	Plot 2D spectra (M)

`plotter` Plotter device (P)

Description: Sets the plotter in use on the system.

Values: A string with entries such as `'DraftPro'`, `'ThinkJet_96'`, `'LaserJet_300'`, `'jim'`, `'varian1'`, and `'Laser1'`.

See also: *Getting Started*

Related:
- `setplotdev` Return characteristics of a named plotter (C)
- `showplotter` Show list of currently defined plotters and printers (M)

plottop — Plot spectrum on top (M)

Syntax: `plottop`

Description: Plots projection or high resolution spectra on the top of a 2D spectrum. `plottop` is used with `plot2D` and is not useful by itself.

Related:
- `plot2D` Plot 2D spectra (M)

plottopside — Plot spectrum on top and side (M)

Syntax: `plottopside`

Description: Plots projection or high-resolution spectrum on the top and side of a 2D spectrum. `plottopside` is used with `plot2D` and is not useful by itself.

Related:
- `plot2D` Plot 2D spectra (M)

plp — Plot phosphorus spectrum (M)

Syntax: `plp<(pltmod)>`

Description: Plots a phosphorus spectrum based on the parameters `pltmod` (the options `'off'`, `'full'`, and `'fixed'` are implemented) and `intmod` (`'off'`, `'full'`, and `'partial'` are implemented). Peak frequency labels, in ppm, are usually plotted.

Arguments: `pltmod` is an alternate value of `pltmod` for this macro only. The value of the `pltmod` parameter is not changed.

Examples:
```
plp
plp('full')
```

See also: *Getting Started*

Related:
- `intmod` Integral display mode (P)
- `plh` Plot proton spectrum (M)
- `pltmod` Plotter display mode (P)

plplanes — Plot a series of 3D planes (M)

Applicability: All systems; however, although `plplanes` is available on *GEMINI 2000* systems, such systems can only process 3D data and cannot acquire 3D data.

Syntax:
```
plplanes(start_plot,stop_plot<,'pos'|'neg'>
   <,number_levels><,spacing>)
```

Description: Creates the 2D contour plots for a subset of the 3D planes specified by the parameter `plane`.

Arguments: `start_plot` specifies the number, greater than 0, of the 3D plane with which plotting is to begin.

`stop_plot` specifies the number of the 3D plane with which plotting is to end. If `start_plot` is greater than `stop_plot`, only the first plane, whose number is `start_plot`, is plotted. The range of `stop_plot` depends on the value of the parameter `plane`:

- if `plane='f1f3'`, `stop_plot` is between `0` and `fn2/2`
- if `plane='f2f3'`, `stop_plot` is between `0` and `fn1/2`

- if plane='f1f2', stop_plot is between 0 and fn/2

'pos' is a keyword specifying that phase-sensitive spectra plot positive peaks only. The default is to plot both positive and negative peaks.

'neg' is a keyword specifying that phase-sensitive spectra plot negative peaks only. The default is to plot both positive and negative peaks.

levels is maximum number of contour levels to plot. The default is 4.

spacing is relative intensity of successive contour levels. The default is 2.

Note that the optional arguments 'pos'|'neg', number_levels, and spacing are for the VNMR plotting command pcon.

Examples:
```
plplanes(1,3)
plplanes(2,3,'pos',4)
```

See also: *User Guide: Liquids NMR*

Related:

dplane	Display a 3D plane (M)
dproj	Display a 3D plane projection (M)
dsplanes	Display a series of 3D planes (M)
getplane	Extract planes from 3D spectral data set (M)
nextpl	Display the next 3D plane (M)
path3d	Path to currently displayed 2D planes from a 3D data set (P)
pcon	Plot contours on a plotter (C)
plane	Currently displayed 3D plane type (P)
prevpl	Display the previous 3D plane (M)

pltext — Plot text file (M)

Syntax:
```
pltext<(<file><,x<,y<,width>>>)>
  <:$x_next,$y_next,$y_increment>
```

Description: Plots a text file.

Arguments: file is the name of a text file. The default is the current experiment text file.

x and y are coordinates, in mm, of the first line of text. This positions the location of the output. The default is the upper left-hand corner of the page.

width is the maximum column text width, in characters. pltext uses a word wrap to make the text fit into the width specified.

$x_next and $y_next are the coordinates where the start of the next line would have been plotting. This is useful for subsequent character plotting.

$y_increment is the vertical increment between lines.

Examples:
```
pltext
pltext(wcmax-70)
pltext(userdir+'/exp3/text')
pltext(100,100)
pltext(userdir+'/exp4/text',200,200,24)
pltext:$x,$y,$dy
```

See also: *Getting Started*

Related:

dtext	Display a text file in the graphics window (C
ptext	Print out a text file (M)
text	Display text or set new text for current experiment (C)
userdir	VNMR user directory (P)

pltmod — Plotter display mode (P)

Description: Controls plotting of a proton, carbon, or phosphorus spectrum.

Values: `'off'` sets no plotting.

`'fixed'` takes `sp` and `wp` as is.

`'full'` adjusts `sp` and `wp` to plot the full spectrum.

`'variable'` adjusts `sp` and `wp` to plot only the region of interest.

See also: *Getting Started*

Related:

`plc`	Plot carbon spectrum (M)
`plh`	Plot proton spectrum (M)
`plp`	Plot phosphorus spectrum (M)
`sp`	Start plot (P)
`wp`	Width of plot (P)

`plvast` Plot VAST data in a stacked 1D-NMR matrix format (M)

Applicability: Systems with the VAST accessory.

Syntax: `plvast<(display order, number of columns plotted)>`

Description: `plvast` arranges and plots the traces from a reconstructed 2D data set (see `vastglue`)as an array of 1D spectra in a convenient format (as a matrix of 1D spectra). If no arguments are provided, the number of rows and columns are determined by the periodicity of the display order. For example, if a block of 96 spectra, as is typical for a microtiter-plate, have been acquired using VAST automation, the spectra is plotted in a matrix 8 rows and 12 columns.

The default is to plot the spectra from 1 through `arraydim` (the number of spectra in the 2D data set). An optional argument (`plvast(##)`) allows one to specify that only spectra from 1 through ## should be plotted.

Arguments: `display order` is optional and its default value is the glue order as listed in `glueorderarray`.

`number of columns plotted`. The default value of is deduced by examining the periodicity of the requested display order. The `number of columns plotted` can entered as the second argument or as the first argument if the default `display order` is used.

Examples:

```
plvast
plvast(12)
plvast('glue_file', 4)
```

See also: *User Guide: Liquids NMR*

Related:

`dsast2d`	Display VAST data in a pseudo-2D format (M)
`dsvast`	Display VAST data in a stacked 1D-NMR matrix (M)
`plvast2d`	Plot VAST data in a pseudo-2D format (M)
`plate_glue`	define a display order (U)

`plvast2d` Plot VAST data in a stacked pseudo-2D format (M)

Applicability: Systems with the VAST accessory.

Syntax: `plvast2d<(number)>`

Description: If an array of 1D spectra have been acquired (in particular if a block of 96 spectra has been acquired using VAST automation, especially in a microtiter-plate format) and if these spectra have been glued into a reconstructed 2D dataset (see `vastglue`), `plvast2d` will arrange and plot them (on the plotter) in a convenient pseudo-2D format (almost like an LC-NMR chromatogram). Well labels are not attached to the spectra and spectra are plotted with 12 spectra per row.

Arguments: `number` specifies that only spectra from 1 through `number` should be plotted. The default is to plot all the spectra (from 1 through `arraydim`).

See also: *User Guide: Liquids NMR*

Related:

`dsast2d`	Display VAST data in a pseudo-2D format (M)
`dsvast`	Display VAST data in a stacked 1D-NMR matrix (M)
`plvast`	Plot VAST data in a stacked 1D-NMR matrix (M)

plww — Plot spectra in whitewash mode (C)

Syntax: `plww<(start,finish,step><,'all'>)>`

Description: Plots one or more spectra in whitewash mode (after the first spectra, each spectra is blanked out in regions in which it is behind an earlier spectra).

Arguments: `start` is the index of the first spectra when plotting multiple spectra. It is also the index number of a particular trace to be plotted when plotting arrayed 1D spectra or 2D spectra. The default is to plot all spectra.

`finish` is the index of the last spectra when plotting multiple spectra.

`step` is the increment for the spectral index when plotting multiple spectra. The default is 1.

`'all'` is a keyword to plot all spectra in the array. This is the default.

See also: *User Guide: Liquids NMR*

Related:

`dss`	Display stacked spectra (C)
`dsww`	Display spectra in whitewash mode (C)
`pl`	Plot spectra (C)

pmode — Processing mode for 2D data (P)

Description: Specifies the type of 2D spectral data that the 2D Fourier transform (FT) will yield. `pmode` is in the processing group.

Values: `''` (null string, shown by two single quotes with no space in between) specifies a processing mode in which it is not possible to change either the f_2 or f_1 display mode after the 2D FT. If the f_2 display mode has been set to phased (`dmg='ph'`), each f_2 spectrum is phase rotated using the phase constants `rp` and `lp` prior to the FT along the second dimension. If the f_2 display mode has been set to power (`dmg='pwr'`) or absolute-value (`dmg='av'`), however, the f_2 spectrum is not processed any further after the first FT. The complex t_1 interferograms are handled in a similar manner. If the f_1 display mode has been set to phased *(*`dmg1='ph1'`), each f_1 spectrum is phased using the phase constants `rp1` and `lp1`. If the display mode has been set to power (`dmg1='pwr1'`) or to absolute value (`dmg1='av1'`), the appropriate magnitude calculation is performed, with the result being placed in the real part of the appropriate complex datum and a 0 being placed in the imaginary part. At the end of the 2D transform, the spectral data file `datdir/data` is reduced from complex data to real data ("VNMR REDUCE" display message).

`'partial'` specifies a processing mode in which it is not possible to change the f_2 display mode after the 2D FT. It is possible, however, to select between the three f_1 display modes without having to reprocess the 2D data. If the f_2 display mode has been set to phased (`dmg='ph'`), each f_2 spectrum is phase rotated using the phase constants `rp` and `lp` prior to FT along the second dimension. If the f_2 display mode is set to power (`dmg='pwr'`) or absolute value (`dmg='av'`), the f_2 spectrum is not processed any further after the first FT. Regardless of the requested f_1 display mode, no further processing is performed by `ft2d` on the f_1 spectra after the second FT. The calculations on

2D spectral data necessary to achieve the requested f_1 display mode are performed by dcon or dconi. If pmode does not exist, it is assigned a value of 'partial' internal to VNMR.

'full' specifies a processing mode in which it is possible to select between the three display modes for each dimension without having to reprocess the 2D data. Regardless of any requested display mode, no display mode processing is performed by ft2d on the f_2 spectra after the first or second FT. Display mode processing is performed exclusively by dcon or dconi.

The hypercomplex data structure for the 2D time domain data is

```
{Re(t1)Re(t2), Re(t1)Im(t2), Im(t1)Re(t2),
   Im(t1)Im(t2)}
```

and is experimentally composed by the pulse sequence generation arraying mechanism. The hypercomplex data structure for the t_1 interferograms is

```
{Re(t1)Re(F2), Re(t1)Im(F2), Im(t1)Re(F2),
   Im(t1)Im(F2)}
```

where Re represents the real part and Im represents the imaginary part. A hypercomplex FT along t_1 yields a hypercomplex 2D spectrum with the following data structure per hypercomplex point:

```
{Re(F1)Re(F2), Re(F1)Im(F2), Im(F1)Re(F2),
   Im(F1)Im(F2)}
```

Note that if pmode='full', the ft2d program will require an array index or coefficients for the construction of the t_1 interferograms.

See also: *User Guide: Liquids NMR*

Related:

av	Set abs. value mode in directly detected dimension (C)
av1	Set abs. value mode in 1st indirectly detected dimension (C)
dcon	Display noninteractive color intensity map (C)
dconi	Interactive 2D data display (C)
dmg	Data display mode in directly detected dimension (P)
dmg1	Data display mode in 1st indirectly detected dimension (P)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
ph	Set phased mode in directly detected dimension (C)
ph1	Set phased mode in indirectly detected dimension (C)
pwr	Set power mode in directly detected dimension (C)
pwr1	Set power mode in 1st indirectly detected dimension (C)
wft1d	Weight and Fourier transform 2D data (C)
wft2d	Weight and Fourier transform 2D data (C)

poly0 Display mean of the data in regression.inp file (M)

Syntax: poly0

Description: Calculates and displays the mean of data in the file regression.inp.

See also: *VNMR User Programming*

Related:

averag	Calculate average and standard deviation of input (C)
expl	Display exponential or polynomial curves (C)

pos1, pos2, pos3 Position of voxel center (P)

Applicability: Systems with imaging capabilities.

Description: Define the center position, in cm, of the desired voxel for localized spectroscopy experiments.

See also: *User Guide: Imaging*

Related:

`transfer`	Move parameters to target experiment (M)
`vox1,vox2,vox3`	Voxel dimensions (P)

pp — Decoupler pulse length (P)

Description: Sets the decoupler pulse length for use by pulse sequences such as DEPT, HET2DJ, and HETCOR.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`AC1–AC9`	Automatic calibration (M)
`dept`	Set up parameters for DEPT pulse sequence (M)
`dhp`	Decoupler high-power control with class C amplifier (P)
`dpwr`	Power level for first decoupler with linear amplifier (P)
`hetcor`	Set up parameters for HETCOR pulse sequence (M)
`p1`	First pulse width (P)
`pplvl`	Pulse power level (P)
`pw`	Pulse width (P)

ppa — Plot a parameter list in plain English (M)

Syntax: `ppa<(x<,y>)>`

Description: Plots parameters in plain English (instead of in a table with parameter names and their values as plotted by the parameter `pap`).

Arguments: `x` controls the *x* offset, in mm, from the lower left of the plot to the starting position (upper left) of the parameter list. The default is a preset position on the page (upper left corner).

`y` controls the *y* offset, in mm, from the lower left of the plot to the starting position (upper left) of the parameter list. Default is a preset position on the page (upper left corner).

Examples:

```
ppa
ppa(10)
ppa(wcmax-80,wc2max*.9)
```

Alternate: Params button in the 1D Plotting Menu, or
Params button in the 2D Plotting Menu.

See also: *Getting Started*

Related:

`bpa`	Plot boxed parameters (M)
`hpa`	Plot parameters on special preprinted chart paper (C)
`pap`	Plot out “all” parameters (C)
`pltext`	Plot a text file (M)

ppcal — Proton decoupler pulse calibration (M)

Syntax: `ppcal`

Description: Proton decoupler pulse calibration for DEPT, HETCOR, INEPT, etc.

See also: *Getting Started*

Related:

`AC1–AC9`	Automatic calibration (M)
`d2pul`	Set up parameters for D2PUL pulse sequence (M)
`dept`	Set up parameters for DEPT pulse sequence (M)
`hetcor`	Set up parameters for HETCOR pulse sequence (M)
`inept`	Set up parameters for INEPT pulse sequence (M)

ppe — Position of image center on 2D phase encode axis (P)

Applicability: Systems with imaging capabilities.

Description: Position of image center on 2D phase encode axis, in cm.

See also: *User Guide: Imaging*

Related:

pro	Position of image center on the readout axis (P)

ppf — Plot peak frequencies over spectrum (C)

Syntax:
(1) `ppf<(<'noll'><,'pos'><,noise_mult><,'top'>)>`
(2) `ppf<(<'noll'><,'pos'><,noise_mult><,'leader'><,length>)>`

Description: Plots peak frequencies, in units specified by the `axis` parameter, in the plotter device. Only those peaks greater than `th` high are selected. Two basic modes of label positioning are available: labels placed at the top, with long "leaders" extending down to the tops of the lines (syntax 1 using the `'top'` keyword), or labels positioned just above each peak, with short leaders (syntax 2 using the `'leader'` keyword). The default is short leaders.

Arguments: `'noll'` is a keyword to plot frequencies using the last previous line listing.

`'pos'` is a keyword to plot positive peaks only (`'noneg'` is the same as `'pos'`).

`noise_mult` is a numerical value that determines the number of noise peaks plotted for broad, noisy peaks. The default is 3. A smaller value results in more peaks, a larger value results in fewer peaks, and a value of 0.0 results in a line listing containing all peaks above the threshold `th`. Negative values of `noise_mult` default to 3. The `noise_mult` argument is inactive when the `'noll'` keyword is specified.

`'top'` is a keyword to plot labels at the top with long leaders. In this mode, the height of labels is varied by changing the parameter `wc2`.

`'leader'` is a keyword to plot labels positioned just above each peak with short leaders.

`length` specifies the leader length, in mm, if labels are positioned just above each peak. The default length is 20 mm.

Examples:

```
ppf('pos')
ppf('leader',30)
ppf('top','noll')
ppf('pos',0.0,'leader',30)
```

Alternate: Peaks button in the 1D Plotting Menu.

See also: *Getting Started*

Related:

axis	Axis label for displays and plots (P)
dpf	Display peak frequencies over spectrum (C)
dpir	Display integral amplitudes below spectrum (C)
dpirn	Display normalized integral amplitudes below spectrum (M)
pir	Plot integral amplitudes below spectrum (C)
pirn	Plot normalized integral amplitudes below spectrum (M)
th	Threshold (P)

pph — Print pulse header (M)

Syntax: `pph(file)`

Description: Prints out the shape file header (i.e., all lines starting with #).

Arguments: `file` is the name of the shape file, including the extension.

Examples: `pph('shgrad.GRD')`

See also: *User Guide: Liquids NMR*

Related:

`Pbox`	Pulse shaping software (U)

pplvl — Proton pulse power level (P)

Applicability: *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* broadband systems with the diode switching version of RF Control board (refer to the description of the `attens` parameter to identify the types of RF Control boards) and systems with `amptype='a'`.

Description: Sets the pulse power level. `pplvl` is only a relevant parameter in sequences that use decoupler pulses, such as DEPT, HET2DJ, and HETCOR.

Values: On *MERCURY-Vx* and *MERCURY*, 0 to 63, in dB, steps of 1 dB. On *GEMINI 2000*: 0 to 63, in dB, steps of 0.5 dB.

When used with a 5-mm Gen. III switchable probe, typical value is 54 or 56.

See also: *Getting Started*; *User Guide: Liquids NMR*

Related:

`amptype`	Amplifier type (P)
`attens`	Fast attenuators present (P)
`d2pul`	Set up parameters for D2PUL pulse sequence (M)
`dept`	Set up parameters for DEPT pulse sequence (M)
`het2dj`	Set up parameters for HET2DJ pulse sequence (M)
`hetcor`	Set up parameters for HETCOR pulse sequence (M)

ppmm — Resolution on printers and plotters (P)

Description: An internal software parameter, selected automatically based on the plotter configuration, that contains the resolution in dots/mm on raster graphics printers. On pen plotters, `ppmm` contains the resolution of points drawn. On PostScript printers, `ppmm` adjusts linewidths.

pprofile — Plot pulse excitation profile (M)

Syntax: `pprofile<(axisflag<,profile<,shapefile>>)>`

Description: Plots the X, Y and Z excitation (inversion) profile for a pulse shape that has been generated with the Pbox software. If shape names is not provided, the last simulation data stored in the `shapelib/pbox.sim` file are plotted.

Arguments: The `axisflag` and `profile` arguments can be given in any order.

`axisflag` is `'y'` to display the full spectrum and a frequency scale, or `'n'` to suppress the scale and spectrum. The default is `'n'`.

`profile` is a character string identifying the desired profile. `'xyz'` selects X, Y, and Z (inversion) profiles; `'xy'` selects only the excitation (transverse) profiles; `'x'` selects only the X transverse excitation profile; and `'z'` selects only the inversion profile. The default is `'xyz'`.

`shapefile` is the name of a *.RF or *.DEC file, including the extension.

Examples:

```
pprofile
pprofile('y','x')
pprofile('xy','n','softpls.RF')
```

See also: *User Guide: Liquids NMR*

Related:

`dprofile`	Display pulse excitation profile (M)
`Pbox`	Pulse shaping software (U)

pps — Plot pulse sequence (C)

Syntax: `pps<(file<,x,y,width,height>)>`

Description: Plots pulse sequences. The plotted picture consists of three to five parts. At the top is the transmitter pulse sequence. Below that is the decoupler pulse sequence. Next is the second decoupler pulse sequence or gradients, depending on the program. At the bottom is the status.

The parameter of each pulse is plotted if its length is less than 30 letters. The value of each pulse is also plotted. If its value is less than zero, a question mark "?" is plotted. The time units are displayed as letters (`s`, `m`, or `u`). The height of pulses are plotted according to their power level.

Arguments: `file` specifies the pulse sequence to be plotted. The default is `seqfil`.

`x,y` specifies the start of the plotting position with respect to the lower-left corner of the plotter.

`width,height` are in proportion to `wcmax` and `wc2max`.

Examples:

```
pps
pps('s2pul')
pps(3,50)
```

See also: *Getting Started*

Related:

`dps`	Display pulse sequence (C)
`seqfil`	Pulse sequence name (P)
`wcmax`	Maximum width of chart (P)
`wc2max`	Maximum width of chart in second direction (P)

presat — Set up parameters for PRESAT pulse sequence (M)

Applicability: This sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `presat`

Description: Sets up a 1D water suppression experiment.

See also: *User Guide: Liquids NMR*

presig — Preamplifier signal level selection (P)

Applicability: UNITY*INOVA* and UNITY*plus* imaging systems, or UNITY*INOVA* and UNITY*plus* spectrometers with selectable large-signal mode preamplifiers.

Description: Allows the user to select either high or low signal handling on preamplifiers that support this capability:

- UNITY*INOVA* and UNITY*plus* imaging systems support this capability by using attenuation and a current increase. This allows larger signals and results in a lower overall signal level.
- UNITY*INOVA* and UNITY*plus* spectrometers with selectable large-signal mode preamplifiers support this capability by allowing a current increase in the preamplifier. This allows larger signals so that the overall signal level is slightly higher.

Using presig to control the hardware depends on the Magnet Leg Driver Board Configuration ID being set to 16 for imaging systems, or to 1 for UNITY*INOVA* and UNITY*plus* spectrometers with the selectable large-signal mode preamplifier.

Values: 'h' signifies high-signal mode at the preamplifier.

'l' signifies low-signal mode at the preamplifier. The default is this mode at the preamplifier if the hardware is present

'n' signifies not used.

See also: *User Guide: Imaging*

Related:

gain	Receiver gain (P)

prevpl — Display the previous 3D plane (M)

Applicability: All systems; however, although prevpl is available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, such systems can only process 3D data and cannot acquire 3D data.

Syntax: prevpl

Description: Displays 2D color map of the previous 3D plane in the set of planes defined by the parameters plane and path3d. For example, if dplane(40) has just been executed, prevpl results in the display of 3D plane 39 of that set. (If prevpl immediately follows the command dproj, an error results because there is no 3D plane whose number is –1.) prevpl is more efficient than dplane or dproj because the 3D parameter set (procpar3d) is not loaded into VNMR. It is assumed to have already been loaded by, for example, dplane or dproj.

See also: *User Guide: Liquids NMR*

Related:

dplane	Display a 3D plane (M)
dproj	Display a 3D plane projection (M)
dsplanes	Display a series of 3D planes (M)
getplane	Extract planes from a 3D spectral data set (M)
nextpl	Display the next 3D plane (M)
path3d	Path to currently displayed 2D planes from a 3D data set (P)
plane	Currently displayed 3D plane type (P)
plplanes	Plot a series of 3D planes (M)

printer — Printer device (P)

Description: Selects the printer in use on the system.

Values: A string with entries such as 'ThinkJet_96', 'LaserJet_300', 'jim', 'varian1', and 'Laser1'.

See also: *Getting Started*

Related:

showplotter	Show list of currently defined plotters and printers (M)

printoff — Stop sending text to printer and start print operation (C)

Syntax: printoff<('clear'|file)>

Description: Stops redirection of output to printer caused by the printon command and starts the print operation. **The command printoff must be entered to obtain output on the printer.** Actual printing is controlled by the vnmrprint script in the bin subdirectory of the VNMR system directory.

`printoff` can also clear the data in the current print file or save data to a specified file name (i.e., print or plot to a file).

Arguments: `'clear'` is a keyword to clear the print file made so far.

`file` specifies the name of a file to save the printout. If the file already exists, it is overwritten.

Examples:
```
printoff
printoff('clear')
printoff('vnmrsys/papers/peaks.list')
```

See also: *Getting Started*

Related:

`printon`	Direct text output to printer (C)
`vnmrprint`	Print text files (U)

printon — Direct text output to printer (C)

Syntax: `printon`

Description: Sends information to the printer that is normally displayed in the text window. After using `printon`, output from commands that use the text window, such as `dg` and `cat`, is sent to the printer and does not appear on the VNMR screen. The value of the parameter `printer` is used to select which printer is used.

See also: *Getting Started*

Related:

`cat`	Output one or more files to output text window (C)
`dg`	Display group of acquisition/processing parameters (C)
`printer`	Printer device (P)
`printoff`	Stop sending text to printer and start print operation (C)

pro — Position of image center on the readout axis (P)

Applicability: Systems with imaging capabilities.

Description: Position of image center on readout axis, in cm.

See also: *User Guide: Imaging*

Related:

`ppe`	Position of image center on 2D phase encode axis (P)

probe — Probe type (P)

Description: Contains a string with the name of the probe currently in the magnet. This parameter is set automatically when the `addprobe` macro is entered. The `getparam` and `setparams` macros use `probe` to retrieve and write parameters into the current probe file.

See also: *Getting Started*

Related:

`addnucleus`	Add new nucleus to existing probe file (M)
`addprobe`	Create new probe directory and probe file (M)
`getparam`	Receive parameter from probe file (M)
`setparams`	Write parameter to current probe file (M)

Probe_edit — Edit probe for specific nucleus (U)

Syntax: (UNIX) `Probe_edit probe nucleus`

Description: Opens a dialog box showing all the parameters related to a specific nucleus from the probe table.

Arguments: `probe` is the name of the probe.

`nucleus` is the specified nucleus from the probe table.

Examples: `Probe_edit 5mmSW H1`

Related: `probe_edit` Edit probe for specific nucleus (M)

`probe_edit` Edit probe for specific nucleus (M)

Syntax: `probe_edit(probe,nucleus)`

Description: Opens a dialog box showing all the parameters related to a specific nucleus from the probe table.

Arguments: `probe` is the name of the probe.

`nucleus` is the specified nucleus from the probe table.

Examples: `probe_edit('5mmSW','H1')`

`probe_edit(probe,tn)`

Related: `Probe_edit` Edit probe for a specific nucleus (U)

`probe_protection` Probe protection control (P)

Description: Controls the power check for probe protection.

See also: *Getting Started*

`proc` Type of processing on np FID (P)

Description: Specifies the type of data processing to be performed upon the `np` (t_2) FID. Similarly, parameters `proc1` and `proc2` specify the type of data processing on the `ni` (t_1) and `ni2` interferograms, respectively.

All Varian data must be processed along `np` with a complex Fourier transform (FT). Sequentially sampled Bruker data (the usual case) must be processed along this dimension with a real FT, while simultaneously sampled Bruker data must be processed with a complex FT.

Pure absorptive 2D data collected by the States-Haberkorn (hypercomplex) method must be processed along `ni` or `ni2` with a complex FT.

Pure absorptive 2D data collected by the TPPI method on a Varian spectrometer can be processed in one of two ways, depending upon how the data was collected:

`phase=3`	Complex FT, i.e., `proc1='ft'` (standard way)
`phase=1,4`	Real FT, i.e., `proc1='rft'` (new way)
`phase2=3`	Complex FT, i.e., `proc2='ft'`
`phase2=1,4`	Real FT, i.e., `proc2='rft'`

Pure absorptive 2D data collected by TPPI method on a Bruker spectrometer must be processed along `ni` with a real FT (i.e., `proc1='rft'`).

Values: `'ft'` specifies complex FT data processing.

`'rft'` specifies real FT data processing.

`'lp'` specifies linear prediction processing on complex data. If `'lp'` is selected, additional parameters must be set to fully define how the time-domain data is to be processed; see the description of the `addpar` command.

See also: *Getting Started*

Related: `addpar` Add selected parameters to the current experiment (M)
`ni` Number of increments in 1st indirectly detected dimension (P)

np	Number of data points (P)
parlp	Create parameters for linear prediction (C)
phase	Phase selection (P)
phase2	Phase selection for 3D acquisition (P)
proc1	Type of processing on ni interferogram (P)
proc2	Type of processing on ni2 interferogram (P)

proc1 Type of processing on ni interferogram (P)

Description: Specifies the type of data processing to be performed upon the ni (t_1) interferogram (2D). Refer to the description of proc for further information.

Values: 'ft' specifies complex Fourier transform (FT) data processing.

'rft' specifies real FT data processing.

'lp' specifies linear prediction processing on complex data. If 'lp' is selected, additional parameters must be set to fully define how the time-domain data is to be processed; see the description of the addpar command.

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
ni	Number of increments in 1st indirectly detected dimension (P)
proc	Type of processing on np FID (P)

proc1d Processing macro for simple (non-arrayed) 1D spectra (M)

Syntax: proc1d

Description: A generic macro for processing non-arrayed 1D spectra using a set of standard macros. proc1d is called by the procplot macro, but can also be used directly. proc1d first tries to find a macro of the form {tn}p with the name of the observe nucleus in lower case (e.g., h1p, c13p). If such a macro exists, it is called. If such a nucleus-specific macro is not found in the command path, minimal 1D processing is performed (the intent is to provide a well-processed spectrum in most cases): Fourier transformation (using pre-set weighting functions), automatic phasing (aphx macro), automatic integration (integrate macro), vertical scale adjustment (vsadj macro), avoiding excessive noise (noislm macro), and threshold adjustment (thadj macro). proc1d does not work with arrayed 1D spectra: use deptproc (for DEPT-type spectra) or procarray (for all other arrayed 1D data).

See also: *Getting Started*

Related:

aphx	Perform optimized automatic phasing (M)
c13p	Process 1D carbon spectra (M)
deptproc	Process arrayed dept type spectra (M)
h1p	Process 1D proton spectra (M)
integrate	Automatically integrate 1D spectrum (M)
noislm	Avoids excessive noise (M)
procarray	Process arrayed 1D spectra (M)
procplot	Automatically process FIDs (M)
thadj	Adjust threshold (M)
vsadj	Adjust vertical scale (M)

proc2 Type of processing on ni2 interferogram (P)

Description: Specifies the type of data processing to be performed upon the ni2 interferogram (3D). Refer to the description of proc for further information.

Values: `'ft'` specifies complex Fourier transform (FT) data processing.

`'rft'` specifies real FT data processing.

`'lp'` specifies linear prediction processing on complex data. If `'lp'` is selected, additional parameters must be set to fully define how the time-domain data is to be processed; see the description of the `addpar` command.

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`ni2`	Number of increments in 2nd indirectly detected dimension (P)
`proc`	Type of processing on `np` FID (P)

`proc2d` Process 2D spectra (M)

Syntax: `proc2d`

Description: A general 2D processing macro that tries to do the appropriate processing for as many types of 2D experiments as possible. It uses `wft2da` for phase-sensitive spectra, `wft2d` for absolute-value 2D spectra, `wft2d('ptype')` for HOM2DJ and COSYPS (absolute value). Symmetric homonuclear correlation spectra (`fn`=`fn1`, `sw`=`sw1`) in absolute-value mode is symmetrized using `foldt`. The resulting spectrum is then normalized (adjustment of `vs` and `th`) using `nm2d` and displayed (if not in background mode). `proc2d` is called as part of the `procplot` macro, but can also be used directly by the user.

See also: *Getting Started*

Related:

`fn`	Fourier number in the directly detected dimension (P)
`fn1`	Fourier number in 1st indirectly detected dimension (P)
`foldt`	Fold COSY-like spectrum along diagonal axis (C)
`nm2d`	Normalize intensity of 2D spectrum (M)
`procplot`	Automatically process FIDs (M)
`sw`	Spectral width in the directly detected dimension (P)
`sw1`	Spectral width in the 1st indirectly detected dimension (P)
`th`	Threshold (P)
`vs`	Vertical scale (P)
`wft2d`	Weight and Fourier transform 2D data (C)
`wft2da`	Weight and Fourier transform for pure absorption 2D data (M)

`procarray` Process arrayed 1D spectra (M)

Syntax: `procarray`

Description: A generic macro for processing arrayed 1D data. It is called within the `procplot` macro, but can also be called directly. It transforms all traces, phase the trace with the largest signal, scale the traces appropriately, and set up the display parameters such that the data can be plotted directly. The plotting is done in a separate macro `plarray` that is also called in the `procplot` macro.

For the display setup, `procarray` distinguishes between arrays with 6 or less elements, which are stacked vertically (no horizontal offset), and spectra with greater than 6 elements, which are stacked horizontally by default, unless there are too many lines, in which case a diagonally stacked display is chosen.

Horizontal stacking is mostly adequate for pulse and power calibrations, where there are usually only a few lines. Diagonally stacked displays and plots are frequently chosen for T_1 and T_2 experiments on entire spectra, often with many lines. The automatic stacking mode can be overridden by creating and setting a string parameter `stackmode` in the startup macro, or before calling `procplot` or `procarray`. Possible values for `stackmode` are

'horizontal', 'vertical', and 'diagonal'. DEPT-type spectra can, in principle, be also processed with procarray but, of course, no DEPT editing occurs.

See also: *Getting Started*

Related:

deptproc	Process arrayed dept type spectra (M)
plarray	Plot arrayed 1D spectra (M)
proc1d	Processing macro for simple (non-arrayed) 1D spectra (M)
procplot	Automatically process FIDs (M)
stack	Set stacking control parameter (M)
stackmode	Stack control for processing arrayed 1D spectra (P)

process — Generic automatic processing (M)

Syntax: process

Description: Processes a wide range of data types. It selects a macro depending on the type of data. For simple 1D spectra, process looks for a macro of form {tn}p with the observe nucleus in lower case (e.g., h1p, c13p, f19p). If no such macro is found, process calls proc1d, a generic processing macro for 1D spectra. For DEPT type data, deptproc is called. For other arrays of 1D spectra, procarray is called. For 2D spectra, proc2d is called. process by itself is called within the procplot macro.

See also: *Getting Started*

Related:

c13p	Processing of 1D carbon spectra (M)
deptproc	Process array of DEPT spectra (M)
f19p	Processing of 1D fluorine spectra (M)
h1p	Processing of 1D proton spectra (M)
proc1d	Automatically process non-arrayed 1D fids (M)
proc2d	Process 2D spectra (M)
procarray	Process arrayed 1D spectra (M)
procplot	Automatically process FIDs (M)
tn	Nucleus for observe transmitter (P)

procplot — Automatically process FIDs (M)

Syntax: procplot<(pltmod_value)>

Description: Universal FID processing macro called usually with wexp='procplot' by automatic acquisition macros such as h1, c13, hcapt, and hcosy. The purpose of procplot is not the data processing itself, but rather the selection of the appropriate processing macro for a given data set.

First, procplot calls a macro process that calculates spectra; that macro by itself then selects an appropriate processing macro, like proc1d for non-arrayed 1D spectra. Depending whether the parameter pltmod is set to 'none' or not, procplot then calls plot, a universal plotting macro. The setting of the parameter pltmod can be temporarily overridden by specifying an alternative value as argument to procplot.

One of the concepts behind procplot is that the user should never have to modify any processing macro for customizing the processing or the output of automatic experiments or processing; this outcome can happen by selecting a parameter in the calling macro or before calling procplot.

Arguments: pltmod_value is an alternate value for the parameter pltmod that is only used for the current call. The values 'none' and 'off' suppress plotting. The range of possible (active) values for pltmod_value depends on the plotting

macros. Often, the parameter pltmod has no effect other than turning on or off plotting. Note that if only the calculation of a spectrum is desired, it is usually easier to call the process macro.

Examples:
```
procplot
procplot('none')
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

deptproc	Process arrayed dept type spectra (M)
plot	Automatically plot spectra (M)
pltmod	Determine plot mode (P)
proc1d	Processing macro for simple (non-arrayed) 1D spectra (M)
proc2d	Process 2D spectra (M)
procarray	Process arrayed 1D spectra (M)
process	Automatically calculate spectra (M)

profile — Set up pulse sequence for gradient calibration (M)

Applicability: Systems with the pulsed field gradients (PFG) module.

Syntax: `profile`

Description: Performs an rf and gradient echo sequence that gives a high quality profile of the sample. This sequence is used with the macro setgcal to provide gradient strength calibration. The gradaxis parameter is used by profile to select the x, y, or z gradient axis.

See also: *Performa I Pulsed Field Gradient Module Installation; Pulsed Field Gradient Modules Installation; VNMR User Programming*

Related:

gcal	Gradient calibration constant (P)
gradaxis	Gradient axis (P)
setgcal	Calibrate gradient strength from measured data (M)

proj — Project 2D data (C)

Syntax: `proj(exp_number<,'sum'><,start<,width>>)`

Description: Projects 2D data onto the axis parallel to the screen x-axis, which can be f_1 or f_2, depending upon the parameter trace. Two projections are available:

- *Summing projection.* The data at each frequency are summed and the result becomes the projection.
- *Skyline projection.* The data are searched and the maximum intensity at any given frequency becomes the intensity in the projection (similar to looking at the skyline of a city where only the largest building along any given line of sight is visible).

Phase-sensitive data can be projected, but the resulting projection can only be displayed in an absolute-value mode

Arguments: exp_number is the number of the experiment, from 1 through 9, in which the resulting spectrum is stored.

'sum' is a keyword to use the summing projection. The default is skyline.

start defines the starting trace, in Hz. The default is to project all data.

width defines the width of the traces, in Hz, to be projected. The default is to project all data. If width is supplied as zero, a single trace corresponding to the start frequency will be stored.

Examples:
```
proj(3)
proj(5,'sum')
proj(4,3*sfrq,6*sfrq)
```

See also: *User Guide: Liquids NMR*

Related:
- `trace` — Select mode for 2D data display (P)

PROTON — Set up parameters for proton spectrum (M)

Applicability: *GLIDE*

Syntax: `PROTON`

Description: Internal macro that sets up parameters for a proton spectrum in *GLIDE*. `PROTON` is used only when proton is selected in a carbon experiment.

prune — Prune extra parameters from current tree (C)

Syntax: `prune(file)`

Description: Destroys parameters in the current parameter tree that are not also defined in the supplied parameter file. `prune` is used to remove leftover parameters from previous experimental setups. Recalling a new parameter set into an experiment has a similar effect and, in general, `prune` is not required.

Arguments: `file` is the path of a parameter file.

Examples:
```
prune(systemdir+'/parlib/cosyps.par/procpar')
prune('/vnmr/par400/stdpar/H1.par/procpar')
prune(userdir+'/exp3/curpar')
```

See also: *VNMR User Programming*

Related:
- `create` — Create new parameter in a parameter tree (C)
- `destroy` — Destroy a parameter (C)
- `display` — Display parameters and their attributes (C)
- `fread` — Read parameters from file and load them into a tree (C)
- `fsave` — Save parameters from a tree to a file (C)

pscale — Plot scale below spectrum or FID (C)

Syntax:
```
pscale<(<'fid'><,axis><,vert_start><,plot_start>
   <,pen>)>
```

Description: Plots a scale under a spectrum or FID.

Arguments: `'fid'` is a keyword to plot a FID scale; if used, it must be the first argument.

`axis` is a letter to be used to label the axis. For a spectrum scale, if `'p'`, `'h'`, `'k'`, `'c'`, `'m'`, `'u'`, etc. is supplied, the letter within the single quotes is used instead of the current value of the `axis`. For an FID scale, if `'s'`, `'m'`, or `'u'` is supplied, it is used instead of the current value of the `axisf`.

`vert_start` is a real number that defines the vertical position where the scale is plotted. The default is 5 mm below the current value of the parameter `vp`.

`plot_start` is a real number that modifies the start of a plot. For example, if the plot is from 347 to 447 Hz, but a scale of 0 to 100 Hz is desired, `plot_start` would be 0. `pen` is a pen number: `'pen1'`, `'pen2'`, `'pen3'`, etc. The default is `'pen1'`.

Examples:
```
pscale
pscale(20)
pscale('h',0,'pen2')
```

```
pscale('fid','m')
pscale('h',vp-10,0)
```

Alternate: Scale button in the 1D Plotting Menu.

See also: *Getting Started*

Related:

axis	Axis label for displays and plots (P)
axisf	Axis label for FID displays and plots (P)
dscale	Display scale below spectrum or FID (C)
vp	Vertical position of spectrum (P)

pseudo — Set default parameters for pseudo-echo weighting (M)

Syntax: `pseudo<(C1,C2,C3,C4)>`

Description: Generates an initial guess at good weighting parameters for absolute-value 2D experiments. To generate modified guesses, four coefficients are allowed to set the values of the weighting functions.

Arguments: `C1` sets `lb=-0.318/(C1*at)`. The default value of `C1` is 0.0625.

`C2` sets `gf=C2*at`. The default value of `C2` is 0.25.

`C3` sets `lb1=-0.318/(C3*(ni/sw1))` but is used with 2D experiments only. The default value of `C3` is 0.0625.

`C4` sets `gf1=C4*(ni/sw1)` but is used with 2D experiments only. The default value of `C4` is 0.25.

Examples:

```
pseudo
pseudo(.1,.4,.2,.5)
```

Alternate: Pseudo button in the 2D Processing Parameter Setup Menu.

See also: *User Guide: Liquids NMR*

Related:

sinebell	Select default parameters for sinebell weighting (M)

psg — Display pulse sequence generation errors (M)

Syntax: `psg`

Description: Helps identify the problem if, after entering `go` or `su`, etc., the message is returned that pulse sequence generation (PSG) aborted abnormally. Any parameters that are not found are listed. This information is stored in the user's directory (`vnmrsys`) in a text file named `psg.error`. If the message "Maximum communication retries exceeded, Experiment unable to be sent" is displayed, a program communications problem is indicated. Consult the system operator for assistance.

See also: *VNMR User Programming*

Related:

go	Submit experiment to acquisition (C)
su	Submit a setup experiment to acquisition (M)

psggen — Compile a user PSG object library (M,U)

Syntax: `psggen`

Description: A user PSG (pulse sequence generation) kit is supplied that allows editing low-level pulse sequence code. `psggen` compiles these edits so that subsequent pulse sequence generation with the `seqgen` command uses the customized pulse sequence source.

See also: *VNMR User Programming*

Related: `seqgen` Initiate compilation of user's pulse sequence (M,U)

psgset — Set up parameters for various pulse sequences (M)

Syntax: `psgset(file,par1,par2,...,parN)`

Description: Sets up parameters for various pulse sequences using information in a `parlib` file. Rather than returning the entire parameter file, `psgset` returns the parameters listed. `psgset`, in general, is never entered from the keyboard but is used as part of experiment setup macros.

Arguments: `file` is the file from the user or system `parlib` that provides information on setting up the parameters listed. The parameters `seqfil` and `pslabel` are set to the supplied file name.

`par1,par2,...,pN` are 1 to 11 parameters to be returned from `parlib`.

Examples: `psgset('cosy','dg','ap','ss','d1','axis','phase')`

See also: *VNMR User Programming*

Related: `pslabel` Pulse sequence label (P)
`seqfil` Pulse sequence name (P)

psgupdateon — Enable update of acquisition parameters (C)

Syntax: `psgupdateon`

Description: Permits the interactive updating of acquisition parameters.

See also: *SpinCAD*

Related: `psgupdateoff` Prevent update of acquisition parameters (C)
`updtparam` Update specified acquisition parameters (C)

psgupdateoff — Prevent update of acquisition parameters (C)

Syntax: `psgupdateon`

Description: Prevents the interactive updating of acquisition parameters.

See also: *SpinCAD*

Related: `psgupdateon` Enable update of acquisition parameters (C)
`updtparam` Update specified acquisition parameters (C)

pshape — Plot pulse shape or modulation pattern (M)

Syntax: `pshape<(pattern.ext)>`

Description: Plots the real (X) and imaginary (Y) components of a shaped pulse. Any type of waveform (.RF, .DEC or ,GRD) can be plotted.

Arguments: `pattern` is the name of a shape or pattern file specified by an absolute file name, relative file name, or a simple pattern file name. `ext` is a file name extension that specifies the file type. In the case of a simple file name, `dshape` searches for the file in the local directory, then in the user's `shapelib`, and finally in the directory `/vnmr/shapelib`. If `pattern.ext` is not given, `pshape` displays the last created waveform stored in the `pbox.fid` file.

Examples:
```
pshape
pshape('my_shape.DEC')
```

See also: *User Guide: Liquids NMR*

Related:
- `dshape` Display the last created pulse shape (M)
- `Pbox` Pulse shaping software (U)

`pshapef` Plot the last created pulse shape (M)

Syntax: `pshapef`

Description: Plots real (X) and imaginary (Y) components of the last created shaped pulse.

See also: *User Guide: Liquids NMR*

Related:
- `dshape` Display the last created pulse shape (M)
- `Pbox` Pulse shaping software (U)

`psi` Euler angle psi from magnet frame (P)

Applicability: Systems with imaging capabilities.

Description: Euler angle psi from magnet frame.

Values: –90 to +90, in degrees

See also: *User Guide: Imaging*

Related:
- `phi` Euler angle phi from magnet frame (P)
- `theta` Euler angle theta from magnet frame (P)

`pslabel` Pulse sequence label (P)

Description: Contains the text to be displayed in the `Seq:` field on the top line of the screen. This string may be different from the pulse sequence name selected with `seqfil`. However, the string in `seqfil` is the name of the pulse sequence searched for when an experiment is started. Generally `seqfil=pslabel`, and when `seqfil` is set, the system sets `pslabel` to the same string.

See also: *Getting Started*

Related:
- `seqfil` Pulse sequence name (P)

`pss` Slice position (P)

Applicability: Systems with imaging capabilities.

Description: Position of slice, in cm.

See also: *User Guide: Imaging*

Related:
- `plan` Display menu for planning a target scan (M)

`ptext` Print out a text file (M)

Syntax: `ptext(file)`

Description: Prints out a text file.

Arguments: `file` is the name of the text file.

Examples:
```
ptext('/vnmr/maclib/ptext')
ptext(curexp+'/dept.out')
```

See also: *Getting Started*

Related:
- `curexp` Current experiment directory (P)
- `dtext` Display a text file in the graphics window (C)
- `lookup` Look up words and lines from a text file (C)

pltext	Plot a text file (C)
text	Display text or set new text for current experiment (C)
textvi	Edit text file of current experiment (M)
vi	Edit text file with vi text editor (C)

ptspec3d — Region-selective 3D processing (P)

Applicability: All systems; however, although ptspec3d is available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, such systems can only process 3D data and cannot acquire 3D data.

Description: Sets whether region-selective 3D processing occurs. If ptspec3d does not exist, it is created by the macro par3d. ptspec3d is functional at this time only for the f_3 dimension. If ptspec3d='ynn', only the currently displayed region of f_3 is retained as non-zero values after the f_3 transform in the 3D FT. A larger f_3 region may be kept to ensure that the number of hypercomplex f_3 points is a power of 2; but that portion of the f_3 spectrum that is retained outside of the currently displayed region contains only zeroes. This 3D utility can reduce the fully transformed 3D data size by factors of 2 to 4, especially in some of the triple resonance experiments.

Values: A three-character string such as 'nnn', 'nny', 'nyn', etc. The default is 'nnn'. The first character refers to the f_3 dimension (sw, np, fn); the second character, to the f_1 dimension (sw1, ni, fn1); and the third character, to the f_2 dimension (sw2, ni2, fn2). Each character may take one of two values: 'n' for no region-selective processing in the relevant dimension, or 'y' for region-selective processing in the relevant dimension.

See also: *User Guide: Liquids NMR*

Related:

fiddc3d	3D time-domain dc correction (P)
fn	Fourier number in directly detected dimension (P)
fn1	Fourier number in 1st indirectly detected dimension (P)
fn2	Fourier number in 2nd indirectly detected dimension (P)
ft3d	Perform a 3D Fourier transform (M)
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
np	Number of data points (P)
ntype3d	N-type peak selection in f_1 or f_2 (P)
par3d	Create 3D acquisition, processing, display parameters (C)
specdc3d	3D spectral dc correction (P)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)

ptsval — PTS frequency synthesizer value (P)

Description: Configuration parameter for the frequency of the PTS synthesizer on each channel. Every broadband system is equipped with a PTS frequency synthesizer as part of broadband frequency generation. The frequency of the unit is marked on its front panel. The value is set for each channel using the Synthesizer label in the CONFIG window (opened from config).

Values: On *MERCURY-Vx* and *MERCURY*, ptsval has no meaning. On *GEMINI 2000* broadband, the value is implicitly set (using config) to 160 or 250. On systems other than *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, 0 (Not Present choice in CONFIG window); 160, 200, 250, 320, 500, 620, 1000 (PTS 160, PTS 200, PTS 250, PTS 320, PTS 500, PTS 620, PTS 1000 choices in CONFIG window, respectively).

See also: *VNMR and Solaris Software Installation*.

Related:

`config`	Display current configuration and possibly change it (M)
`latch`	Frequency synthesizer latching (P)
`overrange`	Frequency synthesizer overrange (P)

`pulsecal` Update and display pulse calibration data file (M)

Applicability: Systems with the imaging capabilities.

Syntax: (1) `pulsecal<(name,pattern,length,flip,power)>`
(2) `pulsecal(name,'remove')`

Description: Creates and maintains a database file of rf coil calibration data. This database is accessed by the SEQD command `setflip` in order to automatically enter power level settings for various types of rf pulses.

If entered without arguments, `pulsecal` displays the current contents of the database file. Using `pulsecal` with syntax 1 creates an entry in the file `userdir+'/pulsecal'`. Using syntax 2 removes the entire line associated with the calibration name.

Arguments: `name` is the name of the rf coil or calibration.

`pattern` is the rf pattern used in the calibration experiment.

`length` is the length of the rf pulse, in µs, used for calibration.

`flip` is the flip angle calibrated, in degrees.

`power` is the calibrated power level, in attenuator units.

`'remove'` is a keyword to remove the line associated with the calibration name.

Examples:

```
pulsecal
pulsecal('small_coil','sinc',5000,180,88)
pulsecal('small_coil','remove')
```

See also: *User Guide: Imaging*

Related:

`setflip`	Set rf power levels for desired flip angle (M)
`userdir`	VNMR user directory (P)

`pulseinfo` Shaped pulse information for calibration (M)

Syntax:

```
pulseinfo<(shape,pulse_width<,reference_power>)>
   :width,power
```

Description: Returns or prints a table with the bandwidth and predicted pulse power settings for a given pulse shape. No parameter settings are changed. The necessary data is contained in the file `shapeinfo` in the VNMR system `shapelib` subdirectory.

Arguments: `shape` is the name of the pulse shape. The default is the system interactively prompts the operator for the name of the shape and the duration of the pulse and then prints a table containing the bandwidth of that pulse and the predicted pulse power settings.

`pulse_width` is the duration of the pulse, in µs.

`reference_power` is a value, in dB, for power calculations. The default is 55. This value replaces the assumption used for power calculation that `pw90` is set for a `tpwr` of 55.

`width` returns the bandwidth of that pulse, in Hz.

`power` returns the predicted 90° pulse power settings.

Examples: `pulseinfo('gauss',1000):bw,pwr`

See also: *VNMR User Programming*

Related:
- `bandinfo` Shaped pulse information for calibration (M)
- `pw90` 90° pulse width (P)
- `tpwr` Observe transmitter power level with linear amplifiers (P)

pulsetool — RF pulse shape analysis (U)

Syntax: `pulsetool <-shape filepath>`

Description: Enables examination of shaped rf pulses. It is started from a UNIX window.

Arguments: The optional `-shape filepath` specifies the name of an rf pulse template file that is displayed when `pulsetool` is started.

Examples:
```
pulsetool
pulsetool -shape /vnmr/shapelib/sinc.RF
```

See also: *User Guide: Liquids NMR*

purge — Remove macro from memory (C)

Syntax: `purge<(file)>`

Description: Removes one or more macros from memory, freeing extra memory space.

Arguments: `file` is the name of a macro file to be removed from memory. The default is to remove all macros that have been loaded into memory.

CAUTION: The `purge` command with no arguments should never be called from a macro. The `purge` command with an argument should never be called by the macro being purged.

Examples:
```
purge
purge('_sw')
```

See also: *VNMR User Programming*

Related:
- `macrold` Load a macro into memory (C)

puttxt — Put text file into VNMR data file (C)

Syntax: `puttxt(file)`

Description: Copies text from current experiment into a data file.

Arguments: `file` is the name of a VNMR data file (i.e., a directory with a `.fid` or `.par` suffix). Do not include the suffix in the name provided to `file`.

Examples: `puttxt('mydata')`

See also: *Getting Started*

Related:
- `gettxt` Get text file from another file (C)

putwave — Write a wave into Pbox.inp file (M)

Syntax: `putwave(sh,bw,pw,ofs,st,ph,fla,trev,d1,d2,d0)`

Description: Sets up a single excitation band in the `Pbox.inp` file. An unlimited number of waves can be combined by reapplying `putwave`.

Arguments: 1 to 11 wave parameters in the following predefined order:

`sh` is the name of a shape file.

`bw` is the bandwidth, in Hz.

`pw` is the pulsewidth, in sec.

`ofs` is the offset, in Hz.

`st` is a number specifying the spin status: 0 for Mz, or 1 for Mxy.

`ph` is the phase (or phase cycle, see `wavelib/supercycles`).

`fla` is the flip angle. Note that `fla` can override the default flip angle.

`trev` concerns time reversal. It can be used to cancel time reversal if spin status (`st`) is set to 1 for Mxy.

`d1` is the delay, in sec, prior the pulse.

`d2` is the delay, in sec, after the pulse.

`d0` is a delay or command prior to `d1`. If `d0=a`, the wave is appended to the previous wave.

Examples:
```
putwave('eburp1')
putwave('GARP',12000.0)
putwave('esnob',600,-1248.2,1,90.0,'n','n',0.001)
```

See also: *User Guide: Liquids NMR*

Related:		
	`Pbox`	Pulse shaping software (U)
	`setwave`	Write a wave definition string into the Pbox.inp file (M)

pw — Enter pulse width pw in degrees (C)

Syntax: `pw(flip_angle,<90_pulse_width>)`

Description: Calculates the flip tim, in µs, given a desired flip angle and 90° pulse. The value is entered into the parameter `pw`.

Arguments: `flip_angle` is the desired flip angle, in degrees.

`90_pulse_width` is the 90° pulse length, in µs. The default is the value of parameter `pw90`, if it exists.

Examples:
```
pw(30)
pw(90,12.8)
```

See also: *Getting Started*

Related:		
	`ernst`	Calculate the Ernst angle pulse (C)
	`pw`	Pulse width (P)
	`pw90`	90° pulse width (P)

pw — Pulse width (P)

Description: Length of the final pulse in the standard two-pulse sequence. In “normal” 1D experiments with a single pulse per transient, this length is the observe pulse width.

Values: On systems with Data Acquisition Controller boards: 0, 0.1 to 8190 µs, in 12.5-ns steps. On systems with Pulse Sequence Controller or Acquisition Controller boards: 0, 0.2 to 8190 µs, in 25-ns steps. On systems with Output boards: 0, 0.2 to 8190 µs, in 0.1-µs steps. (Refer to the `acquire` statement in the manual *VNMR User Programming* for a description of these boards.)

On *GEMINI 2000* systems: 0, 0.2 to 4095 µs, in 100-ns steps.

See also: *Getting Started*

Related:		
	`p1`	First pulse width (P)
	`pw`	Enter pulse width parameter `pw` in degrees (C)

pw90 — 90° pulse width (P)

Description: Length of the 90° pulse. pw90 is not used by pulse sequences directly, but is used by a number of commands to assist in setting up special experiments. pw90 is also used by certain output programs to be able to print the value of the pulse width in degrees instead of microseconds. Note that this parameter must be updated by the user and is not automatically determined or magically correct under all circumstances.

Values: On systems with Data Acquisition Controller boards: 0, 0.1 to 8190 µs, in 12.5-ns steps. On systems with Pulse Sequence Controller or Acquisition Controller boards: 0, 0.2 to 8190 µs, in 25-ns steps. On systems with Output boards: 0, 0.2 to 8190 µs, in 0.1-µs steps. (Refer to the acquire statement in the manual *VNMR User Programming* for a description of these boards.)

On *GEMINI 2000* systems: 0, 0.2 to 4095 µs, in 100-ns steps.

See also: *Getting Started*

Related:

AC1S–AC11S	Autocalibration macros (M)
pw	Enter pulse width parameter pw in degrees (C)

pwd — Display current working directory (C)

Syntax: pwd<:directory>

Description: Displays the path of the current working directory.

Arguments: directory is a string variable with the path of the current directory.

Examples: pwd:$name

See also: *Getting Started*

Related:

cd	Change working directory (C)
dir	List files in current directory (C)
lf	List files in current directory (C)
ls	List files in current directory (C)

pwpat — Shape of refocusing pulse (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the shape of the refocusing pulse pw in imaging experiments

Values: 'hard', 'sinc', 'gauss', 'sech', 'sine', or any shape resident in the system pulse shape library or libraries.

See also: *User Guide: Imaging*

Related:

p1pat	Shape of an excitation pulse (P)
pw	Pulse width (P)

pwr — Set power mode in directly detected dimension (C)

Syntax: pwr

Description: Selects the power spectra display mode by setting dmg='pwr'. In the *power mode*, each real point in the displayed spectrum is calculated as the sum of the squares of the real and imaginary points comprising each respective complex data point. All information, including noise, is positive and the relationship between signal and noise is non-linear.

For multidimensional data, pwr has no effect on data prior to the second Fourier transform. If pmode='full', pwr acts in concert with the commands ph1, av1 or pwr1 to yield the resultant contour display for the 2D data.

See also: *Getting Started*

Related:

av	Set abs. value mode in directly detected dimension (C)
av1	Set abs. value mode in 1st indirectly detected dimension (C)
dmg	Data display mode in directly detected dimension (P)
ft	Fourier transform 1D data (C)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
pa	Set phase angle mode in directly detected dimension (C)
pa1	Set phase angle mode in 1st indirectly detected dimension (C)
ph	Set phased mode in directly detected dimension (C)
ph1	Set phased mode in 1st indirectly detected dimension (C)
pmode	Processing mode for 2D data (P)
pwr1	Set power mode in 1st indirectly detected dimension (C)
pwr2	Set power mode in 2nd indirectly detected dimension (C)
wft	Weight and Fourier transform 1D data (C)
wft1d	Weight and Fourier transform f_2 of 2D data (M)
wft2d	Weight and Fourier transform 2D data (M)

pwr1 — Set power mode in 1st indirectly detected dimension (C)

Syntax: `pwr1`

Description: Selects the power spectra display mode along the first indirectly detected dimension by setting `dmg1='pwr1'`. If the parameter `dmg1` does not exist, `pwr1` creates it and sets it to `'pwr1'`. In the *power mode*, each real point in the displayed trace is calculated as the sum of the squares of the real and imaginary points comprising each respective complex data point. For hypercomplex data, the real-real and imaginary-real points from each respective hypercomplex data point are used in the summation. In this mode, all information, including noise, is positive and the relationship between signal and noise is non-linear.

The `pwr1` command is only needed if mixed-mode display is desired. If the parameter `dmg1` does not exist or is set to the null string, the display mode along the first indirectly detected dimension defaults to the display mode of the directly detected dimension (characterized by the parameter `dmg`). For the contour display of multidimensional data, the result of `pwr1` is the same as for traces, provided that `pmode='partial'` or `pmode=''`.

See also: *User Guide: Liquids NMR*

Related:

dmg1	Data display mode in 1st indirectly detected dimension (P)
pa	Set phase angle mode in directly detected dimension (C)
pa1	Set phase angle mode in 1st indirectly detected dimension (C)
pmode	Processing mode for 2D data (P)
pwr	Set power mode in directly detected dimension (C)
pwr2	Set power mode in 2nd indirectly detected dimension (C)

pwr2 — Set power mode in 2nd indirectly detected dimension (C)

Syntax: `pwr2`

Description: Selects the power spectra display mode along the second indirectly detected dimension by setting `dmg2='pwr2'`. If `dmg2` does not exist or is set to the null string, `pwr2` will create `dmg2` and set it equal to `'pwr2'`. In the *power mode*, all information, including noise, is positive and the relationship between signal and noise is non-linear. Each real point in the displayed trace is calculated as the sum of the squares of the real and imaginary points comprising each respective complex data point. For hypercomplex data, the real-real and

imaginary-real points from each respective hypercomplex data point are used in the summation.

The pwr2 command is only needed if mixed-mode display is desired. If the parameter dmg2 does not exist or is set to the null string, the display mode along the second indirectly detected dimension defaults to the display mode of the directly detected dimension (characterized by the parameter dmg). For the contour display of multidimensional data, the result of pwr2 is the same as for traces, provided that pmode='partial' or pmode=''.

See also: *User Guide: Liquids NMR*

Related:

av2	Set abs. value mode in 2nd indirectly detected dimension (C)
dmg2	Data display mode in 2nd indirectly detected dimension (P)
ft1d	Fourier transform along f_2 dimension (C)
ft2d	Fourier transform 2D data (C)
ph2	Set phased mode in 2nd indirectly detected dimension (C)
pmode	Processing mode for 2D data (P)
pwr	Set power mode in directly detected dimension (C)

pwrlist — Active pulse power level parameter list (P)

Applicability: Systems with imaging capabilities.

Description: Contains an array of strings that define the names of the power level parameters associated with plist and patlist. The nD, seqcon, plist, patlist, pwrlist, fliplist and sslist parameters configure a particular parameter set for an application sequence defined by the value of the seqfil parameter. The plist, patlist, pwrlist, fliplist and sslist parameters provide information concerning the rf pulse and conjugate gradients used by the sequence.

Values: String array such as pwrlist='tpwr1','tpwr2','tpwr3'.

See also: *User Guide: Imaging*

Related:

fliplist	Standard flip angle list (P)
nD	Application dimension (P)
patlist	Active pulse template parameter list (P)
plist	Active pulse length parameter list (P)
seqcon	Acquisition loop control (P)
seqfil	Application object code name (P)
sslist	Conjugate gradient list (P)

pwsadj — Adjust pulse interval time (M)

Applicability: Systems with waveform generators.

Syntax: pwsadj(shape_file,pulse_parameter)

Description: Adjusts the pulse interval time so that the pulse interval for the specified shape is an integral multiple of 100 ns. This ensures there is no time truncation error in executing the shaped pulse by waveform generators.

Arguments: shape_file is a file name of a shaped pulse file. The name can be specified with or without the .RF file extension. pwsadj first looks for the file name specified by shape_file in the user's shapelib directory. If the file specified is not found there, pwsadj then looks in the VNMR system shapelib directory.

pulse_parameter is a string containing the adjusted pulse interval time.

Examples: pwsadj('pulse12','pulseparam')

See also: *VNMR User Programming*

Related:
- `dmfadj` — Adjust decoupler tip-angle resolution time (M)
- `dmf2adj` — Adjust second decoupler tip-angle resolution time (M)

pwxcal — Decoupler pulse calibration (M)

Applicability: All systems except *MERCURY-Vx*, *MERCURY,* and *GEMINI 2000*.

Syntax: `pwxcal`

Description: Provides an interactive method of selecting the decoupler (first, second, or third) and the nucleus (^{13}C, ^{15}N, or ^{31}P) to calibrate. The `pwxcal` pulse sequence determines the pulse width characteristics of the probe's decoupler channel(s) in indirect detection or triple resonance experiments. `pwxcal` can also be used to determine the rf field homogeneity of the decoupler.

The parameter `pwx1` is arrayed to calibrate the 90° pulse width on the first decoupler. If a second decoupler is present, the parameter `pwx2` is arrayed to calibrate the 90° pulse width on that decoupler. If a third decoupler is present, the parameter `pwx3` is arrayed to calibrate the 90° pulse width on that decoupler. Other parameters include: `jC13` is the ^{13}C-^{1}H coupling, constant, `jN15` is the ^{15}N-^{1}H coupling constant, `jP31` is the ^{31}P-^{1}H coupling constant, and `jname` is a selected calibration nucleus.

See also: *Getting Started*

pxset — Assign Pbox calibration data to experimental parameters (M)

Syntax: `pxset<(file.ext)>`

Description: Retrieves experimental settings from a file and assigns them to corresponding experimental parameters using a dialog form. If no file name is provided, `pxset` extracts data from the `Pbox.cal` file that contains the output data of the last created waveform

Arguments: `file.ext` is the name of a shape or pattern file.

Examples:
```
pxset
pxset('Pbox.RF')
```

See also: *User Guide: Liquids NMR*

Related:
- `Pbox` — Pulse shaping software (U)
- `pboxget` — Extract Pbox calibration data (M)

pxshape — Generates a single-band shape file (M)

Syntax:
```
pxshape('sh bw/pw ofs st ph fla trev   \
   d1 d2 d0',name,disp)
```

Description: Generates a single-band waveform based on wave definition provided as a single string of wave parameters.

Arguments: A single string of 1 to 12 wave parameters in predefined order. Note that a single quote is required at the start and the end of the entire string, but no single quotes are required surrounding characters and strings inside the entire string.

`sh` is the name of a shape file.

`bw/pw` is either the bandwidth, in Hz, or the pulsewidth, in sec.

`ofs` is the offset, in Hz.

`st` is a number specifying the spin status: 0 for Mz, or 1 for Mxy.

`ph` is the phase (or phase cycle, see `wavelib/supercycles`).

`fla` is the flip angle. Note that `fla` can override the default flip angle.

`trev` is a time reversal. This can be used to cancel time reversal if spin status (`st`) is set to 1 for Mxy.

`d1` is the delay, in sec, prior the pulse.

`d2` is the delay, in sec, after the pulse.

`d0` is a delay or command prior to `d1`. If `d0=a`, the wave is appended to the previous wave.

`name` is the output file name. An extension is optional and can be used to override an internally defined shape type.

`disp` is the shape is displayed by default in the graphics window. If `disp` is set to `'n'`, the shape is not displayed.

Examples:
```
pxshape('eburp1','myshape.RF')
pxshape('GARP 12000.0','shape2','y')
pxshape('esnob 600.0 -1248.2 n 180.0 n n 0.001','xxx')
```

See also: *User Guide: Liquids NMR*

Related: Pbox — Pulse shaping software (U)

Pxsim — Simulate Bloch profile for a shaped pulse (U)

Syntax: `Pxsim file <simtime <num_steps <add/sub>>>`

Description: Used by the `dprofile` macro to simulate a Bloch profile for a shaped pulse. `Pxsim` extracts the information necessary for simulation from the shape header. Only shape files containing this information can be processed.

Arguments: `file` is the name of a shape or pattern file including an .RF or .DEC extension. `Pxsim` searches for the file in the user's `shapelib` (`~/vnmrsys/shapelib`), and if not found there, it searches in the system `shapelib` (`vnmr/shapelib`).

`simtime` is the maximum simulation time (in sec) that can be provided.

`num_steps` is the number of steps in the profile.

`add/sub` is add (a) or subtract (s) from the previous simulation.

Examples:
```
Pxsim myshape.RF
```

See also: *User Guide: Liquids NMR*

Related: Pbox — Pulse shaping software (U)

Pxspy — Create shape definition using Fourier coefficients (U)

Syntax: `Pxspy file`

Description: An interactive program that converts shaped pulse files into a Fourier series and produces an output file `pbox.cf` in the user's `shapelib` (`~/vnmrsys/shapelib`), which can be used to create a wave definition file in the `wavelib` directory. `Pxspy` can also be used to convert hard pulse decoupling sequences into soft (“cool”) decoupling waveforms. The resulting Fourier coefficients can depend on the number of points in the waveform.

Arguments: `file` is the name of a shape or pattern file, including an .RF, .DEC, or .GRD extension. The name can be given as a relative name, absolute name, or as a simple name (i.e., with a path). If given as a simple name, Pxspy searches for the file in the user’s `shapelib` (`~/vnmrsys/shapelib`), and then if not found there, it searches in the system `shapelib` (`vnmr/shapelib`).

Examples:
```
Pxspy myshape.RF
Pxspy /vnmr/shapelib/myshape.RF
Pxspy ~vnmrsys/shapelib/myshape.RF
```

See also: *User Guide: Liquids*

Related: Pbox Pulse shaping software (U)

Q

QKexp — Set up quick experiment (M)

Syntax: `QKexp(arguments)`

Description: Set up parameters for quick experiment for a chained acquisition. Multiple arguments can be given to define the chain. Default parameter values are used by the macro and or the probe file is used.

Examples:
```
QKexp('PROTON','COSY','HMQC')
QKexp('PROTON','CARBON','HETCOR','gCOSY')
```

qtune — Tune probe using swept-tune graphical tool (C)

Applicability: UNITY*INOVA* and UNITY*plus* systems.

Syntax: `qtune<(gain<,power>)>`

Description: Displays a real-time graph showing reflected power versus frequency for tuning probes. If the acquisition system has been recently rebooted, enter `su` before running `qtune`. Refer to the manual *Getting Started* for a detailed description of this tool.

Arguments: `gain` specifies the gain value, typically 20 to 50. The default is 50.

`power` specifies the power value, typically 60 to 70. The default is 60.

Examples:
```
qtune
qtune(20)
qtune(38,65)
```

See also: *Getting Started*

Related:

`tugain`	Amount of receiver gain used by qtune (P)
`su`	Submit a setup experiment to acquisition (M)
`tune`	Assign frequencies on UNITY*INOVA* and UNITY*plus* (C)

? (question mark) — Display individual parameter value (C)

Syntax: `parameter_name<[index]>?`

Description: Displays the current numerical or string value of a parameter when the parameter name is followed by a question mark. No change is made to the value of the parameter. To display an individual element of an parameter array, provide the index in square brackets (e.g., `nt[3]?` might display "`nt[3]=2`")

Certain parameters can be "turned off" by setting the parameter to `'n'`. The display of a parameter that is turned off will be the phrase "Not Used" followed by the actual value in parentheses. For example, if `lb` is set to 1.5 and then set to `'n'`, entering `lb?` will display `lb= Not Used (1.5)`. Such a parameter can be "turned on" by setting it to `'y'`. It will then have its prior value.

To show a parameter's array of values or learn about its attributes, use the `display` command.

Arguments: `index` is the integer for a selected member of an arrayed parameter.

Examples:
```
lb?
sw?
pw[2]?
```

See also: *Getting Started*

Related:	`display`	Display parameters and their attributes (C)
	`getvalue`	Get value of a parameter in a tree (C)

R

r — Recall display parameter set (M)

Syntax: (1) `rset_number`
(2) `r(set_number)`

Description: Recalls the parameters sp, wp, sp1, wp1, sp2, wp2, sc, wc, sc2, wc2, ho, vo, vs, and ai/nm of a selected display parameter set. Not recalled are phase parameters, drift correction parameters, integral reset parameters, and reference parameters. This allows, for example, saving a set of display parameters, adjusting the phase or drift correction, and later recalling the display parameters without und0oing the new phase or drift correction.

Arguments: `set_number` is the number, from 1 to 9, of a display parameter set.

Examples:
```
r2
r(3)
```

See also: *Getting Started*

Related:

ai	Select absolute intensity mode (C)
fr	Full recall of a display parameter set (M)
ho	Horizontal offset (P)
nm	Select normalized intensity mode (C)
s	Save display parameters as a set (M)
sc	Start of chart (P)
sc2	Start of chart in second direction (P)
sp	Start of plot in directly detected dimension (P)
sp1	Start of plot in 1st indirectly detected dimension (P)
sp2	Start of plot in 2nd indirectly detected dimension (P)
vo	Vertical offset (P)
vs	Vertical scale (P)
wc	Width of chart (P)
wc2	Width of chart in second direction (P)
wp	Width of plot in directly detected dimension (P)
wp1	Width of plot in 1st indirectly detected dimension (P)
wp2	Width of plot in 2nd indirectly detected dimension (P)

r1–r7 — Real-value storage for macros (P)

Description: The seven parameters `r1`, `r2`, `r3`, `r4`, `r5`, `r6`, and `r7` are available in each experiment for macros to store a real value.

See also: *VNMR User Programming*

Related:

dgs	Display group of special/automation parameters (M)
n1,n2,n3	Name storage for macros (P)

ra — Resume acquisition stopped with sa command (C)

Syntax: `ra`

Description: Resumes an experiment acquisition that was stopped with the sa command. `ra` is not permitted after any parameters have been brought into the stopped experiment with the rt or rtp macros. The parameters dp and np may not be altered.

`ra` applies to the experiment that you are joined to at the time the command is entered. If experiment 1 has been previously stopped with `sa`, you must be joined to experiment 1 for ra to resume that acquisition. If you are in experiment 2, entering `ra` has no effect on experiment 1.

If an experiment has been stopped with `sa`, you can increase the number of transients `nt` and resume the acquisition with `ra`. You cannot, however, increase `nt` and enter `ra` if the experiment had completed in a normal fashion (i.e., it was not stopped with `sa`).

Note that the completion time and remaining time shown in the Acquisition Status window are not accurate after `ra` is executed.

See also: *Getting Started*

Related:

`dp`	Double precision (P)
`np`	Number of data points (P)
`nt`	Number of transients (P)
`rt`	Retrieve FID (M)
`rtp`	Retrieve parameters (M)
`sa`	Stop acquisition (C)

`rcvr` Receiver version in system (P)

Applicability: *GEMINI 2000* systems only.

Description: Identifies the version of receiver in the system. To determine the receiver version in a particular system, open the back door and locate the Observe Receiver board in the rf card cage. If there are two small 4-turn potentiometers on the edge of the top half of the board, the system has the Part No. 00-991758-02 version of the board, standard on 400-MHz *GEMINI 2000* systems. If the potentiometers are not present, the system has the Part No. 00-966914-02 version, standard on 200- and 300-MHz *GEMINI 2000* broadband systems. `rcvr` is listed in the `conpar` file.

Values: 0 for the 00-966914-02 version; 1 for the 00-991758-02 version.

See also: *VNMR and Solaris Software Installation*

Related:

`attens`	Fast attenuators present (P)
`pfiltr`	Programmable filters (P)

`rcvrs` Which receivers to use (P)

Applicability: Systems with multiple receivers.

Description: A string of `'y'`s and `'n'`s that indicates which receivers should be used in a multiple receiver acquisition. Setting `rcvrs='y'` uses only the first receiver, and is equivalent to the parameter being absent.

Examples:
`rcvrs='ny'` uses only the second receiver.
`rcvrs='yyyy'` uses four receivers.

Related:

`numrcvrs`	Number of receivers in the system (P)

`rcvrwt` Weighting for different receivers (P)

Applicability: Systems with multiple receivers.

Description: An array of real numbers giving weighting factors to use when combining multiple receiver data. The i'th array element is used to weight data from the i'th receiver. Applying a weight factor is like increasing the gain of the receiver by

the same factor (but the weights are specified as numerical factors rather than in dB).

Examples: `rcvrwt=10,12,8`

Related:
- `addrcvrs` Combine data from multiple receivers (M)

rcvry — Pre-trigger delay (P)

Applicability: Systems with imaging capabilities.

Description: Delays the start of most Varian imaging sequences until after the external trigger (the parameter `ticks`) is received by the system. The delay is still active in the non-triggered mode (`ticks=0`). Setting `hold=0` removes the delay in the sequence. The delays `rcvry` and `hold` are executed once per scan in Varian-provided sequences. In multislice imaging mode, this occurs at the beginning of the multislice pass, but not between the acquisition of individual slices.

Values: 0.1 µs to 8192 sec, in units of seconds.

See also: *User Guide: Imaging*

Related:
- `hold` Post-trigger delay (P)
- `ticks` Number of trigger pulses (P)

react — Recover from error conditions during werr processing (M)

Syntax: `react<('wait')>`

Description: When an acquisition error occurs, any action specified by the `werr` parameter is executed. The `react` macro is a prototype for handling these errors. This macro can be invoked for error handling by setting `werr='react'`. The `acqstatus` parameter is provided so that `react` can determine which specific error has occurred.

Arguments: `'wait'` is a keyword for a special type of error handling during an automation run. The `react` macro always uses the `'next'` option when it calls the command `au`. Under certain conditions, it is also appropriate to use the `'wait'` option. `react` checks to see if an argument was passed to it; that is, `werr='werr(\'wait\')'` to determine whether to use the `'wait'` option of `au`.

See also: *Getting Started; User Guide: Liquids NMR*

Related:
- `acqstatus` Acquisition status (P)
- `au` Submit experiment to acquisition and process data (C)
- `werr` Specify action when error occurs (C)
- `werr` When error (P)

readallshims — Read all shims from hardware (M)

Applicability: Not available on *GEMINI 2000*.

Syntax: `readallshims`

Description: Reads all shims from the hardware and sets the values into the shim parameters in the current parameter tree. The shims used depend on the `shimset` configuration. For the shim set on the Ultra•nmr shim system, `readallshims` is active only if hardware-to-software shim communication is enabled.

See also: *Getting Started*

Related:
- `load` Load status of displayed shims (P)
- `readhw` Read current values of acquisition hardware (C)

setallshims	Set all shims into hardware (M)
sethw	Set values for hardware in acquisition system (C)
shimset	Type of shim set (P)
su	Submit a setup experiment to acquisition (M)

readbrutape — Read Bruker data files from 9-track tape (U)

Syntax: (From UNIX) `readbrutape file <number_skipped>`

Description: A shell script that reads one file from a Bruker tape into a UNIX file with the name specified. Bruker tapes are likely to be made at 1600 bpi, although 1600 bpi is not a requirement.

Arguments: `file` is the name of the file read into UNIX. For identification, the `.bru` extension is added to the file name.

`number_skipped` is the number of files skipped and *includes* the header file (which is assumed to be the first file on the tape). The default is the script reads the first file after the header file. If `number_skipped` equals 0, there is no rewinding and the first file (or the next file) on the tape is read.

See also: *Getting Started*

Related:

convertbru	Convert Bruker data (M,U)

readhw — Read current values of acquisition hardware (C)

Syntax: `readhw(param1,param2,...)<:value1,value2,...>`

Description: Returns or displays the current values of the lock system parameters lockpower, lockgain, lockphase, and z0.

The values of the shims can also be obtained. The particular shims that can be read depends upon the type of shim hardware present in the system. See the description of shimset for a list of the shim names for each type of shim hardware.

`readhw` cannot be used when an acquisition is in progress or when acqi is connected to the acquisition system.

Arguments: `param1, param2,...` are the names of the parameters to be read.

`value1,value2,...` are return variables to store the settings of the parameters specified. The default is to display the setting in the VNMR status window.

Examples:
```
readhw('z1c','z2c','z1','z2')
readhw('z1c','z2c','z1','z2'):r1,r2,r3,r4
```

See also: *Getting Started*

Related:

lockgain	Lock gain (P)
lockphase	Lock phase (P)
lockpower	Lock power (P)
readallshims	Read all shims from hardware (M)
sethw	Set values for hardware in the acquisition system (C)
shimset	Type of shim set (P)

readlk — Read current lock level (C)

Syntax: `readlk<:lock_level>`

Description: Returns the same information as would be displayed on the digital lock display using the manual shimming window. `readlk` can be used in developing

automatic shimming methods such as shimming via grid searching. It *cannot* be used during acquisition or manual shimming.

Arguments: `lock_level` returns the current lock level.

Examples:
```
readlk
readlk:$levell
```

See also: *VNMR User Programming*

Related: `alock` Automatic lock status (P)

readultra — Read shim coil setting for Ultra•nmr shim system (M)

Applicability: Systems with the Ultra•nmr shim system.

Syntax: `readultra<(file_number)>`

Description: Reads shim set files for a Ultra•nmr shim system from a Sun floppy disk into VNMR. The floppy disk for Ultra•nmr contains up to 63 shim sets named `file1.dac` to `file63.dac`.

Arguments: `file_number` is the number of the shim set file, from 1 to 63. The default is to read all of the shim set files.

Examples:
```
readultra
readultra(6)
```

See also: *Getting Started*

Related: `shimset` Type of shim set (P)
`svs` Save shim coil settings (C)

real — Create a real variable without a value (C)

Syntax: `real(variable)`

Description: Creates a real variable without a value.

Arguments: `variable` is the name of the variable to be created.

Examples: `real('realval1')`

See also: *VNMR User Programming*

Related: `create` Create a new parameter in a parameter tree (C)
`string` Create a string variable (C)

record — Record keyboard entries as a macro (M)

Syntax: `record<(file|'off')>`

Description: Records keyboard entries and stores the entries as a MAGICAL macro in the user's `maclib` directory. To start recording keyboard entries, enter `record`. You are prompted for a macro name (you can also give the name as an argument to `record`). The command line prompt then becomes "Command?" to indicate that the `record` macro is active. Type the MAGICAL commands to be recorded on the keyboard. Function keys can be included by entering `F1` to `F8` for function keys 1 to 8, respectively. Enter `off` or `record('off')` to finish the recording.

Arguments: `file` is the name of the macro file in which the entries are saved. The default is that the user is prompted for a file name. If the macro file name already exists, the user is asked if the file should be overwritten.

`'off'` is a keyword to stop recording the entries.

Examples:
```
record
record('mymacro')
record('off')
```

See also: *VNMR User Programming*

redor1 — Set up parameters for REDOR1 pulse sequence (M)

Applicability: Three-channel UNITY*INOVA* and UNITY*plus* systems with a triple-tuned MAS solids probe. This sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems.

Syntax: `redor1`

Description: Sets up a parameter set, obtained with XPOLAR or XPOLAR1, for REDOR (rotational echo double-resonance) experiment.

See also: *User Guide: Solid-State NMR*

Related:

xpolar	Set up parameters for XPOLAR pulse sequence (M)
xpolar1	Set up parameters for XPOLAR1 pulse sequence (M)

redosy — Restore 2D DOSY display from subexperiment (M)

Syntax: `redosy`

Description: Restores the previous 2D DOSY display (if one exists) by recalling the data stored by the dosy macro in the file `subexp/dosy2Ddisplay` in the current experiment. undosy and `redosy` enable easy switching between the 1D DOSY data (spectra as a function of gzlvl1) and the 2D DOSY display (signal as a function of frequency and diffusion coefficient).

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)
undosy	Restore original 1D NMR data from subexperiment (M)

reffrq — Reference frequency of reference line (P)

Description: Reference frequency, in MHz, of the reference line. This parameter is set by the rl macro. By defining `reffrq` as the conversion factor between Hz and ppm using the unit command, ppm calculations can be made.

If referencing is on (i.e., refpos is not set to `'n'`), the go, ga, and au macros calculate values of rfl and rfp based on `reffrq` and refpos. If referencing is off, go, ga, and au set `reffreq` to sfrq.

See also: *Getting Started*

Related:

au	Submit experiment to acquisition and process data (M)
crl	Clear reference line in directly detected dimension (M)
ga	Submit experiment to acquisition and FT the result (M)
go	Submit experiment to acquisition (M)
reffrq1	Ref. frequency of reference line in 1st indirect dimension (P)
reffrq2	Ref. frequency of reference line in 2nd indirect dimension (P)
refpos	Position of reference frequency (P)
rfl	Reference peak position in directly detected dimension (P)
rfp	Reference peak frequency in directly detected dimension (P)
rl	Set reference line in directly detected dimension (M)
sfrq	Transmitter frequency of observe nucleus (P)
unit	Define conversion units (C)

reffrq1 — Reference frequency of reference line in 1st indirect dimension (P)

Description: Reference frequency, in MHz, of the reference line in the first indirect dimension of a nD experiment. This parameter should be used as the conversion factor between hertz and ppm in the first indirect dimension.

See also: *User Guide: Liquids NMR*

Related:

crl1	Clear reference line in 1st indirectly detected dimension (M)
reffrq	Reference frequency of reference line (P)
refpos1	Position of reference frequency in 1st indirect dimension (P)

reffrq2 — Reference frequency of reference line in 2nd indirect dimension (P)

Description: Reference frequency, in MHz, of the reference line in the second indirect dimension of a 2D experiment. This parameter should be used as the conversion factor between hertz and ppm in the second indirect dimension.

See also: *User Guide: Liquids NMR*

Related:

crl2	Clear reference line in 2nd indirectly detected dimension (M)
reffrq	Reference frequency of reference line (P)
refpos2	Position of reference frequency in 2nd indirect dimension (P)

refpos — Position of reference frequency (P)

Description: Position of reference frequency, set by the setref and rl macros. Setting refpos='n' indicates that referencing has been turned off. The crl macro turns referencing off.

Values: Because all spectra are (by definition) referenced to a frequency at 0 ppm, refpos is either 0 or “not used”.

See also: *Getting Started*

Related:

crl	Clear reference line in directly detected dimension (M)
reffrq	Reference frequency of reference line (P)
refpos1	Position of reference frequency in 1st indirect dimension (P)
refpos2	Position of reference frequency in 2nd indirect dimension (P)
rl	Set reference line indirectly detected dimension (M)
setref	Set frequency referencing (M)

refpos1 — Position of reference frequency in 1st indirect dimension (P)

Description: Position of reference frequency in the first indirect dimension of a nD experiment, set by setref1 and rl1 macros. Setting refpos1='n' indicates that f1 referencing has been turned off. The crl1 macro turns f1 referencing off.

Values: Because all spectra are (by definition) referenced to a frequency at 0 ppm, refpos1 is either 0 or “not used”.

See also: *User Guide: Liquids NMR*

Related:

crl1	Clear reference line in 1st indirectly detected dimension (M)
reffrq1	Ref. frequency of reference line in 1st indirect dimension (P)
refpos	Position of reference frequency (P)
rl1	Set reference line in 1st indirect dimension (M)
setref1	Set frequency referencing for 1st indirectly detected dimension (M)

refpos2 — Position of reference frequency in 2nd indirect dimension (P)

Description: Position of reference frequency in the second indirect dimension of a 3D experiment, set by setref2 and rl2 macros. Setting refpos2='n' indicates that f2 referencing has been turned off in 3D spectra. The crl2 macro turns f2 referencing off.

Values: Because all spectra are (by definition) referenced to a frequency at 0 ppm, refpos2 is either 0 or "not used".

See also: *User Guide: Liquids NMR*

Related:

crl2	Clear reference line in 2nd indirectly detected dimension (M)
reffrq2	Ref. frequency of reference line in 2nd indirect dimension (P)
refpos	Position of reference frequency (P)
rl2	Set reference line in 2nd indirect dimension (M)
setref2	Set frequency referencing for 2nd indirectly detected dimension (M)

refsource1 — Center frequency in 1st indirect dimension (P)

Description: Holds a parameter name to be used as the center frequency in the first indirect dimension of 2D experiments. If refsource1 does not exist, the default is 'sfrq'.

For 2D experiments, the second dimension may be related to sfrq if it is a homonuclear experiment. The second dimension may also be related to dfrq if it is a heteronuclear experiment. refsource1 would then be set as refsource1='sfrq' and refsource1='dfrq', respectively.

See also: *User Guide: Liquids NMR*

Related:

dfrq	Transmitter frequency of first decoupler (P)
refsource2	Center frequency in 2nd indirect frequency (P)
sfrq	Transmitter frequency of observe nucleus (P)

refsource2 — Center frequency in 2nd indirect dimension (P)

Description: Holds a parameter name to be used as the center frequency in the second indirect dimension. refsource2 is analogous to refsource1

See also: *User Guide: Liquids NMR*

Related:

refsource1	Center frequency in 1st indirect dimension (P)

region — Divide spectrum into regions (C)

Syntax:
```
region<(tail_length,relative_number,threshold,
   number_points,tail_size)><:number_regions >
```

Description: Breaks a spectrum up into regions containing peaks.

Arguments: tail_length is the length from 0.0 to sw, in Hz, that is added to the start and end of each calculated peak region; default value is sw/10. The default value is used if a negative number is entered for this argument. If the addition of these wings would cause overlap between adjacent regions, the wings are reduced until the regions no longer overlap.

relative_number is a number that, in combination with other factors, governs the relative number of regions to be found. The default is 12, which is used if 0 is entered for this argument. relative_number is used as part of a test to determine whether two spectral areas containing peaks are close enough together to be represented as a single region. There are no strict rules that associate the value of relative_number to the total number of regions that

will be found. In general, increasing this number decreases the number of regions that will be found and increases the size of an individual region. A value of `1` would give more regions; a value of `100` would give fewer regions.

`threshold` is a sensitivity factor used to decide if a data point is large enough, relative to the noise level, to qualify it as part of a peak. The default value is `0.6`, which is used if `0` is entered for this argument. Smaller values of `threshold` make peak selection more sensitive; larger values make peak selection less sensitive.

`number_points` governs the number of successive data points, normally from `7` to `40`, that must qualify as part of a peak (see the description of `threshold` above) in order for that spectral area to be considered a real peak. The default value is a function of `fn`, `sw`, weighting functions, and other values. The default is used if `0` is entered for this argument. For carbon spectra with large spectral windows, experimental peaks often contain only one or two data points. Adjust `number_points` to `1` or `2` in those cases.

`tail_size` is a number that, in combination with `relative_number` and other factors, governs whether two spectral areas that contain peaks are close enough together to be represented as a single region. The default value is used if `0` is entered for this argument.

`number_regions` is the total number of regions determined by `region`.

Examples:
```
region
region:$1
region(50,0,1)
region(-1,0,0,2):r1
```

See also: *Getting Started*

Related:

`fn`	Fourier number in directly detection dimension (P)
`sw`	Spectral width in directly detected dimension (P)

`relayh` Set up parameters for RELAYH pulse sequence (M)

Syntax: `relayh`

Description: Sets up parameters for absolute-value COSY, or a single or double RELAY-COSY pulse sequence.

See also: *User Guide: Liquids NMR*

Related:

`cosy`	Set up parameters for COSY pulse sequence (M)
`cosyps`	Set up parameters for phase-sensitive COSY (M)
`dqcosy`	Set up parameters for double quantum filtered COSY (M)

`rename` Move and/or rename a file (C)

Syntax: `rename(from_file,to_file)`

Description: Renames and/or moves a file or directory. `rename` is identical in function to the command `mv`.

Arguments: `from_file` is the name of the file to be moved to renamed.

`to_file` is the name of the file after moving or renaming it. If the `from_file` argument has an extension such as `.fid` or `.par`, be sure the `to_file` argument has the same extension.

Examples:
```
rename('/home/vnmr1/vnmrsys/seqlib/d2pul',
   '/vnmr/seqlib/d2pul')
```

See also: *Getting Started*

Related:

copy	Copy a file (C)
cp	Copy a file (C)
delete	Delete a file, parameter directory, or FID directory (C)
mv	Move and/or rename a file (C)
rm	Delete file (C)

rescal — Calculate pixel size and spatial resolution (M)

Applicability: Systems with imaging capabilities.

Syntax: `rescal<('silent')><:pixrc,pixrd,pixpc,pixpd`

Description: Calculates the pixel sizes for the acquisition (spatial resolution) and display (digital resolution). The results are displayed in the text window. As an option, the results can be returned to variables, which allows the user to call `rescal` from within other macros and use it to calculate this basic information. This macro can be used before acquisition to check that the chosen conditions lead to the desired spatial resolution.

Arguments: `'silent'` is a keyword to suppress the text window output.

`pixrc` returns the readout pixel size (collected).

`pixrd` returns the readout pixel size (displayed).

`pixpc` returns the phase encode pixel size (collected).

`pixpd` returns the phase encode pixel size (displayed).

Examples:

```
rescal
rescal('silent'):r1,r2,r3,r4
```

See also: *User Guide: Imaging*

resetf3 — Reset parameters after a partial 3D Fourier transform (M)

Syntax: `resetf3`

Description: Restores the acquisition parameter sw, the processing parameter fn, and the display parameters sp, wp, rfl, and rfp in the 3D parameter set, which are read into VNMR by either the select command or the dplane or dproj macros. These parameters were modified due to the selection of regional f_3 processing (ptspec3d ='ynn'). The original value for each of these parameters is stored in the parameter $sv, where $ represents sw, fn, sp, wp, rfl, or rfp (e.g., swsv).

If a 2D plane into VNMR is retrieved from a 3D transformed data set that was processed with regional f_3 processing, `resetf3` must be run before executing ft3d in that particular VNMR environment.

See also: *User Guide: Liquids NMR*

Related:

dplane	Display a 3D plane (M)
dproj	Display a 3D plane projection (M)
fn	Fourier number in directly detected dimension (P)
ft3d	Perform a 3D Fourier transform (M)
ptspec3d	Region-selective 3D processing (P)
rfl	Ref. peak position in directly detected dimension (P)
rfp	Ref. peak frequency in directly detected dimension (P)
select	Select a spectrum or 2D plane without displaying it (C)
sp	Start of plot (P)
sw	Spectral width in directly detected dimension (P)
wp	Width of plot (P)

resolv — Set resolution enhancement parameters (M)

Syntax: `resolv<(a,b)>`

Description: Calculates a default resolution enhancement function, setting up `lb` and `gf` based on the acquisition time `at`. "Zero-filling" is also accomplished, if possible, by making `fn` ≥>=2*`np`.

Arguments: `a` sets a value of `lb` using `lb=-0.318/(a*sw)`. The default for `a` is `0.1`.

`b` sets a value of `gf` using `gf=b*sw`. The default for `b` is `0.3`.

Examples:
```
resolv
resolv(.2,.4)
```

See also: *Getting Started*

Related:

`at`	Acquisition time (P)
`fn`	Fourier number in directly detected dimension (P)
`gf`	Gaussian function in directly detected dimension (P)
`lb`	Line broadening in directly detected dimension (P)
`np`	Number of data points (P)
`sw`	Spectral width in directly detected dimension (P)

resto — NMR resonance offset frequency (P)

Applicability: Systems with imaging capabilities.

Description: NMR resonance offset frequency, in Hz.

See also: *User Guide: Imaging*

Related:

`tn`	Transmitter nucleus (P)
`sfrq`	Spectrometer frequency (P)

resume — Resume paused acquisition queue (C)

Syntax: `resume`

Description: Enables continuing submitting experiments to the acquisition system. For experiments initiated with the command `au('wait')`, the acquisition is paused during the time of data processing in order to prevent the acquisition from submitting new experiments that might be queued. `resume` then allows the data processing macro to initiate another acquisition with `au('next')`, which is then performed immediately instead of at the end of the queue.

See also: *User Guide: Liquids NMR*

Related:

`au`	Submit experiment to acquisition and process data (C)

return — Terminate execution of a macro (C)

Syntax: `return<(expression1,expression2,...)>`

Description: Terminates the execution of a macro and optionally returns values to another calling macro. This is usually used after testing some condition. `return` is used only in macros and not entered from the keyboard.

Arguments: `expression1,expression2,...` are return values to another calling macro.

See also: *VNMR User Programming*

Related:

`abort`	Terminate action of calling macro and all higher macros (C)

rev — System software revision level (P)

Description: Stores a string identifying the VNMR software version for the system. This parameter is not be entered by the user, but can be examined by typing `rev?`.

Values: `'VERSION 6.1 REVISION A'`, etc.

See also: *VNMR and Solaris Software Installation*

Related: `revdate` System software preparation date (P)

revdate — System software preparation date (P)

Description: Stores a string identifying the date the current VNMR software version was prepared. This parameter is not be entered by the user, but can be examined by typing `revdate?`.

Values: `'Jan 12, 1998'`, etc.

See also: *VNMR and Solaris Software Installation*

Related: `rev` System software revision level (P)

rfband — RF band in use (P)

Applicability: All systems except *MERCURY-Vx*, *MERCURY,* and *GEMINI 2000*.

Description: Indicates which rf band of the amplifier is in use for each channel.

Values: A string, such as `'hlc'`, in which the first channel is determined by the first character, the second channel is determined by the second character, and so forth. The following values are available for each channel:

`'h'` indicates the high rf band is in use on the channel.

`'l'` indicates the low rf band is in use on the channel.

`'c'` indicates the system software will calculate whether to use the high band or the low band for the channel.

See also: *Getting Started*

rfblk — Reverse FID block (C)

Syntax: `rfblk(<src_expno>,src_blk_no,dest_expno,dest_blk_no)`

Description: Reverses and copies data from a source FID block specified by `src_blk_no` to a destination FID block specified by `dest_expno` and `dest_blk_no`, using memory-mapped input and output. The file header determines the size and type of data to reverse.

`rfblk` searches for the source and destination FID file in the directory `$vnmruser/expN/acqfil`; `N` is the requested experiment number or the current experiment number. If the FID file is not open, `rfblk` opens the file, copies the data, and closes the file. If a number of blocks need to be copied, explicitly opening and closing the files with the commands `mfopen` and `mfclose` can significantly speed up the data reformatting process.

`rfblk` can also be used to append blocks of data to a FID file by specifying that the `dest_blk_no` is greater than the number of blocks in a file.

Be aware that `rfblk` can modify data returned to an experiment with the `rt` command. To avoid modification, enter the following sequence of VNMR commands before running `rfblk`:

```
cp(curexp+'/acqfil/fid',curexp+'/acqfil/fidtmp')
rm(curexp+'/acqfil/fid')
mv(curexp+'/acqfil/fidtmp',curexp+'/acqfil/fid')
```

Arguments: `src_expno` specifies the experiment number of the source FID file. The default is the FID file of the current experiment.

`src_blk_no` specifies the source block of data to be copied. Block numbers run from 1 to the number of blocks in a file.

`dest_expno` specifies the experiment number of the destination FID file.

`dest_blk_no` specifies the destination block to send the copied data.

Examples: `rfblk(1,2,1)` reverses and copies block 1 from the current experiment to block 1 of experiment 2.

See also: *VNMR User Programming*

Related:

`mfblk`	Move FID block (C)
`mfclose`	Memory map close FID file (C)
`mfdata`	Move FID data (C)
`mfopen`	Memory map open FID file (C)
`mftrace`	Move FID trace (C)
`rfdata`	Reverse FID data (C)
`rftrace`	Reverse FID trace (C)

`rfchannel` Independent control of rf channel selection (P)

Applicability: UNITY*INOVA* and UNITY*plus* systems.

Description: Gives override capability over the selection of rf channels. `rfchannel` does not normally exist but can be created by a user with the command `create('rfchannel','flag')`.

On UNITY*INOVA* and UNITY*plus* systems, the control of each rf channel is built around a collection of parameters and pulse sequence statements. The frequency of channel 1 is set by `sfrq` and `tof`, its power by `tpwr` and `tpwrf`. The first decoupler uses the corresponding parameters `dfrq`, `dof`, `dpwr`, and `dpwrf`, respectively. Furthermore, the decoupler can have modulation modes specified with the parameters `dmf`, `dm`, `dmm`, `dres`, `dseq`, and `homo`. The second decoupler has the same set of parameters as the first decoupler and they are distinguished by appending a 2 to each name. That is, the names are `dfrq2`, `dof2`, `dpwr2`, `dpwrf2`, `dmf2`, `dm2`, `dmm2`, `dres2`, `dseq2`, and `homo2`. The third decoupler would use parameters with a 3 appended: `dfrq3`, `dof3`, `dpwr3`, `dpwrf3`, `dmf3`, `dm3`, `dmm3`, `dres3`, `dseq3`, and `homo3`. The `rfchannel` parameter provides a mechanism to override the default parameter usage.

Values: A string of one to four characters in which the position of each character identifies the rf channel controlled.

- The first character selects which rf channel (1 to 4) the parameters `sfrq`, `tof`, `tpwr`, etc. control. The first character also identifies the rf channel used as the receiver.
- The second character selects which rf channel (1 to 4) the parameters `dfrq`, `dof`, `dpwr`, etc. control.
- The third character maps the parameter set `dfrq2`, `dof2`, `dpwr2`, etc. to an rf channel (1 to 4).
- The fourth character maps t`dfrq3`, `dof3`, `dpwr3`, etc. to an rf channel (1 to 4).

For example, `rfchannel='132'` would exchange control of the second and third rf channels from the default parameter usage.

The number of characters in the `rfchannel` parameter must match the number of real rf channels (defined by the parameter `numrfch`) and each rf channel must be selected by the parameter.

Besides remapping the parameters to different rf channels, pulse sequence statements are also remapped. For example, if `rfchannel='132'`, then statements `decpulse`, `decshaped_pulse`, `decoffset`, `decpower`, `decspinlock`, and so on are applied on rf channel 3 and `dec2pulse`, `dec2shaped_pulse`, and so on are applied on rf channel 2.

An obvious use for this remapping is on systems with the decoupler set to U+ H1 Only in the CONFIG window. On these systems, if multinuclear pulses are needed and ^{1}H needs to be observed, the parameter sets that assume a dual-broadband system can be used and the parameters remapped by setting `rfchannel='21'`. However, internal logic checks if the first decoupler is set to U+ H1 Only, `tn` is set to `'H1'`, and `dn` is not set to `'H1'`. If these settings are the case, the parameter mapping for rf channels 1 and 2 is exchanged automatically.

See also: *Getting Started; VNMR User Programming*

Related:

`create`	Create new parameter in parameter tree (C)
`dfrq`	Transmitter frequency for first decoupler (P)
`dm`	Decoupler mode for first decoupler (P)
`dmf`	Decoupler modulation frequency for first decoupler (P)
`dmm`	Decoupler modulation mode for first decoupler (P)
`dn`	Nucleus for first decoupler (P)
`dof`	Frequency offset for first decoupler (P)
`dpwr`	Power level for first decoupler with linear amplifier (P)
`dpwrf`	First decoupler fine power (P)
`dres`	Tip-angle resolution for first decoupler (P)
`dseq`	Decoupler sequence for first decoupler (P)
`homo`	Homodecoupling control for first decoupler (P)
`numrfch`	Number of rf channels (P)
`sfrq`	Transmitter frequency for observe nucleus (P)
`tn`	Nucleus for observe transmitter (P)
`tof`	Frequency offset for observe transmitter (P)
`tpwr`	Observe transmitter power level with linear amplifiers (P)
`tpwrf`	Observe transmitter fine power (P)

`rfchtype` Type of rf channel (P)

Applicability: UNITY*INOVA* and UNITY*plus* systems.

Description: Configuration parameter for type of rf on each channel. The value for a channel is set using the Type of RF label in the CONFIG window (opened by entering `config)`. Pulse sequence programs check `rfchtype` to determine if indirect detection should be used for some experiments. Indirect detection occurs automatically on a UNITY*INOVA* and UNITY*plus* if the decoupler is set to U+ H1 Only in the CONFIG window, `tn` is set to `'H1'`, and `dn` is not set to `'H1'`.

Values: The values of `rfchtype` parallel the `rftype` values. The only distinction is that the setting for `rftype` is `'d'` on the U+ Direct Synthesis and U+ H1 Only entries.

'U+ Direct Synthesis' is the setting for a UNITY*INOVA* or UNITY*plus* with direct synthesis (U+ Direct Synthesis in the CONFIG window).

'U+ H1 Only' is a fixed-frequency proton UNITY*INOVA* or UNITY*plus* (U+ H1 Only in CONFIG window).

'Deuterium Decoupler' is the setting for a UNITYINOVA deuterium decoupler channel.

'Direct Synthesis' is the setting for direct synthesis (Direct Synthesis in the CONFIG window).

'Broadband' is the setting for broadband (Broadband in the CONFIG window).

'Fixed Frequency' is the setting for fixed frequency (Fixed Frequency in the CONFIG window).

'SIS Modulator' is the setting for imaging modulator (SIS Modulator in the CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:

`config`	Display current configuration and possibly change it (M)
`dn`	Nucleus for first decoupler (P)
`rftype`	Type of rf generation (P)
`tn`	Nucleus for observe transmitter (P)

`rfcoil` RF pulse calibration identity (P)

Applicability: Systems with imaging capabilities.

Description: Contains a string identifying the rf pulse calibration.

See also: *User Guide: Imaging*

Related:

`gcoil`	Read data from gradient calibration tables (P)
`plist`	Active pulse length parameter list (P)

`rfdata` Reverse FID data (C)

Syntax:
```
rfdata(<src_expno,>src_blk_no,src_start_loc,  \
  dest_expno,dest_blk_no,dest_start_loc,num_points)
```

Description: Reverses and copies data specified by `src_start_loc` from a FID block specified by `src_blk_no` to a destination location specified by `dest_expno`, `dest_blk_no`, and `dest_start_loc`, using memory-mapped input and output. The data point locations and the `num_points` to be reversed are specified by data points corresponding to the `np` parameter, not bytes or complex points; however, when reversing the data, `rfdata` looks at the file header to determine the size and type of data to reverse.

`rfdata` searches for the source and destination FID file in the directory `$vnmruser/expN/acqfil`; `N` is the requested experiment number or the current experiment number. If the FID file is not open, `rfdata` opens the file, copies the data, and closes the file. If a number of blocks need to be copied, explicitly opening and closing the files with the commands `mfopen` and `mfclose` can significantly speed up the data reformatting process.

Be aware that `rfdata` can modify data returned to an experiment with the `rt` command. To avoid modification, enter the following sequence of VNMR commands before running `rfdata`:

```
cp(curexp+'/acqfil/fid',curexp+'/acqfil/fidtmp')
rm(curexp+'/acqfil/fid')
mv(curexp+'/acqfil/fidtmp',curexp+'/acqfil/fid')
```

Arguments: `src_expno` specifies the experiment number of the source FID file. The default is the FID file of the current experiment.

`src_blk_no` specifies the source block of data to be copied. Block numbers run from 1 to the number of blocks in a file.

`src_start_loc` specifies the starting data location within the specified block to copy the data. Data locations start from 0 and are specified as data points corresponding to the `np` parameter.

`dest_expno` specifies the experiment number of the destination FID file.

`dest_blk_no` specifies the destination block to send the copied data.

`dest_start_loc` specifies the starting data destination location within the specified block to send the copied data.

Examples: `rfdata(1,0,2,1,(nv-1)*np,np)` copies and reverses `np` points of data from the starting location 0 of block 1 of the current experiment to the data location `(nv-1)*np` of block 1 of experiment 2.

See also: *VNMR User Programming*

Related:

`mfblk`	Move FID block (C)
`mfclose`	Memory map close FID file (C)
`mfdata`	Move FID data (C)
`mfopen`	Memory map open FID file (C)
`mftrace`	Move FID trace (C)
`rfblk`	Reverse FID block (C)
`rftrace`	Reverse FID trace (C)

`rfl` Reference peak position in directly detected dimension (P)

Description: Actual position of the reference line in the spectrum (i.e., the distance from the right edge of the spectrum to the reference line). If there is no reference line in the spectrum, `rfl` can be used to enter the frequency where the reference line would appear if the line were present in the spectrum.

Values: Number, in Hz.

See also: *Getting Started*

Related:

`rfl1`	Reference peak position in 1st indirectly detected dimension (P)
`rfl2`	Reference peak position in 2nd indirectly detected dimension (P)
`rfp`	Reference peak frequency in directly detected dimension (P)

`rfl1` Reference peak position in 1st indirectly detected dimension (P)

Description: Analogous to the `rfl` parameter except that `rfl1` applies to the first indirectly detected dimension of a multidimensional data set. `rfl1` can either be set manually or be adjusted automatically when the macro `rl1` is used to assign a reference line.

Values: Number, in Hz.

See also: *User Guide: Liquids NMR*

Related:

`rfl`	Reference peak position in directly detected dimension (P)
`rfl2`	Reference peak position in 2nd indirectly detected dimension (P)
`rfp1`	Reference peak frequency in 1st indirectly detected dimension (P)

`rfl2` Reference peak position in 2nd indirectly detected dimension (P)

Description: Analogous to the `rfl` parameter except that `rfl2` applies to the second indirectly detected dimension of a multidimensional data set. `rfl2` can either be set manually or be adjusted automatically when the macro `rl2` is used to assign a reference line.

Values: Number, in Hz.

See also: *User Guide: Liquids NMR*

Related:

rfl	Reference peak position in directly detected position (P)
rfl1	Reference peak position in 1st indirectly detected dimension (P)
rfp2	Reference peak frequency in 2nd indirectly detected dimension (P)

rfp — Reference peak frequency in directly detected dimension (P)

Description: Sets the frequency to be assigned to the reference line in the spectrum. rfp is always stored in Hz, but can be entered in ppm by using the p suffix (e.g., rfp=2.1p).

Values: Number, in Hz.

See also: *Getting Started*

Related:

rfl	Reference peak position in directly detected dimension (P)
rfp1	Ref. peak frequency in 1st indirectly detected dimension (P)
rfp2	Ref. peak frequency in 2nd indirectly detected dimension (P)
rl	Set reference line in directly detected dimension (M)

rfp1 — Reference peak frequency in 1st indirectly detected dimension (P)

Description: Analogous to the rfp parameter except that rfp1 applies to the first indirectly detected dimension of a multidimensional data set. rfp1 can either be set manually or be assigned a value when rl1 is called with an argument (e.g., rl1(7.2p) assigns the value of 7.2 ppm to rfp1).

Values: Number, in Hz.

See also: *User Guide: Liquids NMR*

Related:

rfl1	Ref. peak position in 1st indirectly detected dimension (P)
rfp	Ref. peak frequency in directly detected dimension (P)
rfp2	Ref. peak frequency in 2nd indirectly detected dimension (P)
rl1	Set reference line in 1st indirectly detected dimension (M)

rfp2 — Reference peak frequency in 2nd indirectly detected dimension (P)

Description: Analogous to the rfp parameter except that rfp2 applies to the second indirectly detected dimension of a multidimensional data set. rfp2 can be set manually or be assigned a value when rl2 is called with an argument. For example, entering rl2(7.2p) assigns the value of 7.2 ppm to rfp2.

Values: Number, in Hz.

See also: *User Guide: Liquids NMR*

Related:

rfl2	Reference peak position in 2nd indirectly detected dimension (P)
rfp	Reference peak frequency in directly detected dimension (P)
rfp1	Reference peak frequency in 1st indirectly detected dimension (P)
rl2	Set reference line in 2nd indirectly detected dimension (C)

rftrace — Reverse FID trace (C)

Syntax:
```
rftrace(<src_expno,src_blk_no,src_trace_no,   \
  dest_expno,<dest_blk_no,dest_trace_no)
```

Description: Reverses and copies FID traces specified by src_trace_no from a FID block specified by src_blk_no to a destination location specified by dest_expno, dest_blk_no, and dest_trace_no, using memory-

mapped input and output. The file header determines the size and type of data to be reversed.

`rftrace` searches for the source and destination FID file in the directory `$vnmruser/expN/acqfil`; `N` is the requested experiment number or the current experiment number. If the FID file is not open, `rftrace` opens the file, copies the data, and closes the file. If a number of blocks need to be copied, explicitly opening and closing the files with the commands `mfopen` and `mfclose` can significantly speed up the data reformatting process.

You cannot use `rftrace` to append data to a FID file. Its purpose is for moving around data.

Be aware that `rftrace` can modify data returned to an experiment with the `rt` command. To avoid modification, enter the following sequence of VNMR commands before running `rftrace`:

```
cp(curexp+'/acqfil/fid',curexp+'/acqfil/fidtmp')
rm(curexp+'/acqfil/fid')
mv(curexp+'/acqfil/fidtmp',curexp+'/acqfil/fid')
```

Arguments: src_`expno` specifies the experiment number of the source FID file. The default is the FID file of the current experiment.

`src_blk_no` specifies the source block of data to be copied. Block numbers run from 1 to the number of blocks in a file.

`src_trace_no` specifies the source trace of data within the specified block to be copied. Trace numbers run from 1 to number of traces in a file.

`dest_expno` specifies the experiment number of the destination FID file.

`dest_blk_no` specifies the destination block to send the copied data.

`src_trace_no` specifies the destination trace of data within the specified block to be copied. Trace numbers run from 1 to the number of traces in a file.

Examples: `rftrace(1,1,2,1,nv)` copies and reverses trace 1 from block 1 of the current experiment to trace `nv` of block 1 of experiment 2.

See also: *VNMR User Programming*

Related:

`mfblk`	Move FID block (C)
`mfclose`	Memory map close FID file (C)
`mfdata`	Move FID data (C)
`mfopen`	Memory map open FID file (C)
`mftrace`	Move FID trace (C)
`rfblk`	Reverse FID block (C)
`rfdata`	Reverse FID data (C)

`rftype` Type of rf generation (P)

Description: Configuration parameter for type of rf generation on each rf channel. On the *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems, the value is set using the System Type label in the CONFIG window (opened by entering `config`). On other systems, the value is set using the Type of RF label in the CONFIG window.

Values: The values of `rftype` parallel the `rfchtype` values. The only distinction is that on UNITY*INOVA* and UNITY*plus*, the setting for `rftype` is `'d'` on the entries U+ Direct Synthesis and U+ H1 Only. On UNITY and VXR-S, `'b'`, `'a'`, or `'c'` can be used for each channel. On the *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, only `'ee'` or `'fe'` is used.

'd' is the setting for a UNITY*INOVA* or UNITY*plus* with direct synthesis (U+ Direct Synthesis in the CONFIG window) or a fixed-frequency proton UNITY*INOVA* or UNITY*plus* (U+ H1 Only in CONFIG window).

'l' is the setting for a UNITYINOVA deuterium decoupler channel.

'c' is the setting for direct synthesis (Direct Synthesis in the CONFIG window).

'b' is the setting for broadband (Broadband in the CONFIG window).

'a' is the setting for fixed frequency (Fixed Frequency in the CONFIG window).

'm' is the setting for imaging modulator (SIS Modulator in the CONFIG window).

'ee' is the setting for *MERCURY-Vx* 4-nucleus, *MERCURY* 4-nucleus, and *GEMINI 2000* ^{1}H/^{13}C systems (4 Nucleus or 1H/13C in the CONFIG window).

'fe' is the setting for *MERCURY-Vx* broadband, *MERCURY* broadband, and *GEMINI 2000* broadband systems (Broadband in the CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M)
rfchtype	Type of rf channel (P)

rfwg — RF waveform generator (P)

Applicability: Not available on *MERCURY* and *GEMINI 2000*.

Description: Configuration parameter for whether a waveform generator board is present or not on the current rf channel. The value for each channel is set using the Waveform Generator label in the CONFIG window (opened by entering config).

Values: 'n' is setting for no waveform generator board on the channel (Not Present choice in CONFIG window).

'y' is setting for a waveform generation board on the channel (Present choice in CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M)

right — Set display limits to right half of screen (C)

Syntax: right

Description: Sets the horizontal control parameters, sc and wc, to produce a display (and subsequent plot) in the right portion of the screen (and page). For 2D data, space is left for the scales.

Alternate: Right button on 1D Display Size Selection Menu.

See also: *User Guide: Liquids NMR*

Related:

center	Set display limits for center of screen (C)
full	Set display limits for a full screen (C)
fullt	Set display limits for full screen with room for traces (C)
left	Set display limits for left half of screen (C)
sc	Start of chart (P)
wc	Width of chart (P)

rinput — Input data for a regression analysis (M)

Syntax: `rinput`

Description: Formats data for regression analysis and places the data into the file `regression.inp`. The program is interactive. If a `regression.inp` already exists, `rinput` starts by asking if you want to overwrite the file. Type *y* and press the Return key. It then asks for an x-axis title and a y-axis title. Enter the titles as asked (for no title, simply press Return). Next, `rinput` asks you to input the data in pairs. Separate each pair of values with a blank and press Return after the second value. At the end of the data set, press Return in response to the request for data. If you have another data set, type *y* and press Return to the question and then type in the data when it is asked for.

See also: *User Guide: Liquids NMR; VNMR User Programming*

Related:

`expl`	Display exponential or polynomial curves (C)
`poly0`	Find mean of data in the file *regression.inp* (C)

rl — Set reference line in directly detected dimension (M)

Syntax: `rl<(frequency)>`

Description: Sets the direct dimension reference line, taking into account any frequency scaling with the `scalesw` parameter.

Arguments: `frequency` is a value, in Hz, to assign to the reference line. The default is the cursor position `cr`. To enter the value in ppm, add a `p` suffix.

Examples:

```
rl
rl(0)
rl(7.2p)
```

See also: *Getting Started*

Related:

`cr`	Current cursor position in directly detected dimension (P)
`crl`	Clear ref. line in directly detected dimension (C)
`reffrq`	Reference frequency of the reference line (P)
`rl1`	Set ref. line in 1st indirectly detected dimension (M)
`rl2`	Set ref. line in 2nd indirectly detected dimension (M)
`scalesw`	Scale spectral width in directly detected dimension (P)

rl1 — Set reference line in 1st indirectly detected dimension (M)

Syntax: `rl1<(frequency)>`

Description: Sets the first indirect dimension reference line, taking into account any frequency scaling with the `scalesw1` parameter.

Arguments: `frequency` is a value, in Hz, to assign to the reference line. The default is the cursor position `cr1`. You can enter the suffixes `p`, `d`, or `k` to mean ppm, decoupler ppm, and kilo, respectively. These suffixes are exactly equivalent to using `*sfrq`, `*dfrq`, and `*1000`. Thus, if you are doing a 2D experiment in which the indirect axis is determined by the decoupler channel, you might enter, for example, `rl1(10d)`, which is equivalent to `rl1(10*dfrq)`.

Examples:

```
rl1
rl1(0)
rl1(7.2p)
```

See also: *User Guide: Liquids NMR*

Related:

`cr1`	Cursor position in 1st indirectly detected dimension (P)
`crl1`	Clear ref. line in 1st indirectly detected dimension (M)
`dfrq`	Transmitter frequency of first decoupler (P)

refpos2d	Position of reference frequency in 1st indirect dimension (P)
rl	Set ref. line in directly detected dimension (M)
rl2	Set ref. line in 2nd indirectly detected dimension (M)
scalesw1	Scale spectral width in 1st indirectly detected dimension (P)
sfrq	Transmitter frequency of observe nucleus (P)

rl2 — Set reference line in 2nd indirectly detected dimension (M)

Applicability: All systems; however, although rl2 is available on *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*, such systems can only process 3D data and cannot acquire 3D data.

Syntax: rl2<(frequency)>

Description: Sets the second indirect dimension reference line, taking into account any frequency scaling with the scalesw2 parameter.

Arguments: frequency is a value, in Hz, to assign to the reference line. The default is the cursor position cr2. You can enter the suffixes p, d, or k to mean ppm, decoupler ppm, and kilo, respectively. These suffixes are exactly equivalent to using *sfrq, *dfrq, and *1000. Because there is no suffix for the second decoupler (i.e., the third channel), to reference the third axis using rl2 you might enter (e.g., rl2(45*dfrq2)).

Examples:
```
rl2
rl2(0)
rl2(7.2p)
```

See also: *User Guide: Liquids NMR*

Related:

cr2	Cursor position in 2nd indirectly detected dimension (P)
crl	Clear ref. line in directly detected dimension (C)
crl1	Clear ref. line in 1st indirectly detected dimension (C)
crl2	Clear ref. line in 2nd indirectly detected dimension (C)
dfrq	Transmitter frequency of first decoupler (P)
dfrq2	Transmitter frequency of second decoupler (P)
rl	Set ref. line in directly detected dimension (M)
rl1	Set ref. line in 1st indirectly detected dimension (M)
scalesw2	Scale spectral width in 2nd indirectly detected dimension (P)
sfrq	Transmitter frequency of observe nucleus (P)

rm — Delete file (C)

Syntax: rm(file1<,file2,...>)

Description: Removes one or more files from the file system, functioning like the UNIX command of the same name. Because it allows wildcard characters (* and ?) in the command argument and recursive file deletion with the –r option, rm is very powerful. But it can be quite dangerous—without warning important files can be inadvertently deleted, even by experienced users. **Using rm to delete files in VNMR is not recommended**. The delete command is provided as a safer alternative.

Arguments: file1,file2,... are names of files to delete.

See also: *Getting Started*

Related:

delete	Delete a file, parameter directory, or FID directory (C)
delexp	Delete an experiment (C)
exists	Determine if a parameter, file, or macro exists (C)
mv	Move and/or rename a file (C)
rename	Move and/or rename a file (C)

rmdir — Remove directory (C)

Syntax: `rmdir(directory)`

Description: Removes one or more empty directories (i.e., directories without files).

Arguments: `directory` is the name of the directory to be removed.

Examples: `rmdir('/home/dan/temp')`

See also: *Getting Started*

Related:
- `delete` — Delete a file, parameter directory, or FID directory (C)
- `dir` — List files in current directory (C)
- `lf` — List files in current directory (C)
- `ls` — List files in current directory (C)
- `mkdir` — Create new directory (C)

rmsAddData — Add transformed data files with weighting (U)

Applicability: Systems with multiple receivers.

Syntax: `rmsAddData`

Description: This command is not normally executed directly by the user, but is called by the `'addrcvrs'` macro.

Related:
- `addrcvrs` — Combine data from multiple receivers (M)

ROESY — Change parameters for ROESY experiment (M)

Syntax: `ROESY<('GLIDE')>`

Description: Converts the current parameter set to a ROESY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:
- `roesy` — Set up parameters for ROESY experiment (M)

roesy — Set up parameters for ROESY pulse sequence (M)

Applicability: All systems except *GEMINI 2000*.

Syntax: `roesy<(ratio)>`

Description: Sets up a rotating frame Overhauser effect spectroscopy experiment.

Arguments: `ratio` is the value of the parameter `ratio` used in the sequence (`ratio` is not used in the ROESY sequence provided with *MERCURY-Vx* and *MERCURY*).

Alternate: ROESY button in the 2D Pulse Sequence Setup Menu.

See also: *User Guide: Liquids NMR*

rof1 — Receiver gating time preceding pulse (P)

Description: Sets the period of time in most pulse sequences when the receiver is gated off before each pulse. This allows the amplifier to fully turn on before the start of the pulse. Such gating is needed on all 500-MHz and 600-MHz systems, systems with wideline solids, and systems with the most recent AP Interface board (with parameter `apinterface` greater than 1). Such systems are configured with linear amplifiers that are normally “blanked” to give the best possible signal-to-noise (i.e., the amplifiers are turned off when the receiver is turned on). The $^{1}H/^{19}F$ amplifiers have a short turn-on time, usually 1 to 5 µs

following the removal of blanking by turning the receiver off. The low-frequency amplifier modules have a longer turn-on time, about 40 to 60 µs.

Values: 0 to 8190, in µs, typically 10 for $^{1}H/^{19}F$ and 40 for ^{31}P and lower frequency nuclei. On *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems, 10 is recommended for both the high and the low band.

See also: *Getting Started*

Related:
- `apinterface` AP Interface board type (P)
- `rof2` Receiver gating time following pulse (P)

`rof2` Receiver gating time following pulse (P)

Description: Sets the time after the final pulse in each pulse sequence that the receiver is gated off before acquisition begins. If "pulse breakthrough" effects are seen (a spike in the beginning of the FID), increasing `rof2` can reduce or eliminate the problem, particularly for low-frequency nuclei.

Values: 0 to 8190, in µs, typically 10. On *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems, 10 is recommended for both the high and low band.

See also: *Getting Started*

Related:
- `rof1` Receiver gating time preceding pulse (P)

`rotate` Rotate 2D data (C)

Syntax: `rotate<(number_degrees)>`

Description: Rotates a 2D spectrum. Both complex and hypercomplex 2D data will work.

Arguments: `number_degrees` is the amount of counter-clockwise rotation, in degrees. The default is 45.

See also: *User Guide: Liquids NMR*

Related:
- `foldcc` Fold INADEQUATE data about 2-quantum axis (C)
- `foldj` Fold J-resolved 2D spectrum about *f1=0* axis (C)
- `foldt` Fold COSY-like spectrum along diagonal axis (C)

`rotorsync` Rotor synchronization (P)

Applicability: Systems with the solids rotor synchronization module.

Description: Configuration parameter that identifies if the system has the optional solids rotor synchronization module. The value of `rotorsync` is set using the Rotor Synchronization label in the CONFIG window (opened by entering `config`). Rotor synchronization requires either the Acquisition Controller board (Part No. 969204) or the Pulse Sequence Controller board (Part No. 992560) in the system.

Values: `1` is setting that system has solids rotor synchronization (Present choice in the CONFIG window).

`0` is setting that system does not have solid rotor synchronization (Not Present choice in the CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:
- `config` Display current configuration and possibly change it (M)

rp — Zero-order phase in directly detected dimension (P)

Description: Specifies the right phase-correction angles along the directly detected dimension according to

absorption spectrum(ω) =
real channel(ω) * *sin* θ + *imaginary channel(ω)* * *cos* θ

where the phase angle θ is a function of frequency:

$\theta = \texttt{rp} + (\omega - \omega_o) * \texttt{lp}$

ω_o is defined as the right end of the spectrum. This dimension is referred to as the f_2 dimension in 2D data sets, f_3 dimension in 3D data sets, and so on.

Values: –360 to +360, in degrees.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

aph	Automatic phase adjustment of spectra (C)
aph0	Automatic phase of zero-order term (C)
lp	First-order phase in directly detected dimension (P)
rp1	Zero-order phase in 1st indirectly detected dimension (P)
rp2	Zero-order phase in 2nd indirectly detected dimension (P)

rp1 — Zero-order phase in 1st indirectly detected dimension (P)

Description: Specifies the right phase parameter along the first indirectly detected dimension, in degrees, for the f_1 dimension of a multidimensional data set during the process of phase-sensitive 2D transformation.

See also: *User Guide: Liquids NMR*

Related:

lp1	First-order phase in 1st indirectly detected dimension (P)
rp	Zero-order phase in directly detected dimension (P)
rp2	Zero-order phase in 2nd indirectly detected dimension (P)

rp2 — Zero-order phase in 2nd indirectly detected dimension (P)

Description: Controls the zero-order phase constant along the second indirectly detected dimension during a ds, dconi, or equivalent display operation on the 2D data or a 1D trace therein. This dimension is often referred to as the f_2 dimension.

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D contour display (C)
ds	Display a spectrum (C)
lp2	First-order phase in 2nd indirectly detected dimension (P)
rp	Zero order phase in directly detected dimension (P)

rsliceplan — Generate absolute magnet frame data (M)

Applicability: Systems with imaging capabilities.

Description: rsliceplan is a helper macro to iplan image planning. It combines the iplan data with sequence parameters to generate the absolute magnet frame data. Users without imaging capabilities should use sliceplan.

See also: *User Guide: Imaging*

Related:

iplan	Open interactive image planning tools (M)
sliceplan	Set slice parameters for target slice (M)

rt — Retrieve FIDs (M)

Syntax: `rt<(file<,'nolog'>)>`

Description: Retrieves FIDs from a file into the current experiment.

The `rt` macro does not copy the FID into the experiment. Instead, it links access to the original FID from the experiment. Most of the time, this behavior is desired, because the FID file is seldom changed. By making a link, disk space is also conserved. However, if the FID file in the experiment is written to, the data in the original file is also written to. It is best to make a copy of a FID file before altering it. The `makefid` command alters the FID file. The manual entry for `makefid` gives details on how to make a copy of the FID.

As another somewhat subtle point, because the FID in the experiment is a link to another .fid file, if that .fid file is removed, the link from the experiment may be gone. If you expect the FID in the experiment to be there, even if you delete the .fid file from where it was retrieved using `rt`, you should explicitly copy the file into the experiment.

Arguments: `file` is the name of the file that, with the suffix `.fid` added, contains the FIDs to be retrieved. The default is that the system prompts for the name (in that case, the name can be given without single quotes). If `file.fid` does not exist and `file.par` does, `rt` retrieves the parameters from `file.par`.

`'nolog'` is a keyword specifying that the log file is not to be retrieved.

Examples:
```
rt
rt('/vnmr/fidlib/fid1d')
```

See also: *Getting Started*

Related:

`fixpar`	Correct parameter characteristics in experiment (M)
`makefid`	Make a FID element using numeric text input (C)
`rtp`	Retrieve parameters (M)
`rtv`	Retrieve individual parameters (C)
`svf`	Save FIDs in current experiment (M)

rtcmx — Return Spinsight data into current experiment (C)

Syntax: `rtcmx<(file)>`

Description: Retrieves Spinsight data into the current experiment.

Arguments: `file` is the name of the file. The default is that the macro prompts for the file name.

Alternate: Load button in the `files` program.

Examples:
```
rtcmx
rtcmx('redor.data')
```

See also: *Getting Started*

Related:

`files`	Interactively handle files (C)

rtp — Retrieve parameters (M)

Syntax: `rtp<(file)>`

Description: Retrieves parameters from a file into the current experiment.

Arguments: `file` is the name of the file that, with the suffix `.par` added, contains the parameters to be retrieved;. The default is that the system prompts for the name (in that case, the name can be given without single quotes). If `file.par` does not exist and `file.fid` does, `rtp` retrieves the parameters only from `file.fid`.

Examples: `rtp`
`rtp('/vnmr/stdpar/P31')`

See also: *Getting Started*

Related:

`fixpar`	Correct parameter characteristics in experiment (M)
`rt`	Retrieve FIDs (M)
`rtv`	Retrieve individual parameters (C)
`svp`	Save parameters from current experiment (M)

`rtphf` Return stored phasefile to current VNMR phasefile (C)

Applicability: Systems with imaging capabilities.

Syntax: `rtphf(file)`

Description: Copies a stored phasefile (`curexp+'/planes/file'`, where `file` is the file name given in the argument) into the phasefile of the current experiment (`curexp+'/datdir/phasefile'`). This allows the display and manipulation of previously transformed images, provided the parameter values in the current experiment are compatible with the parameter values present in the experiment that generated the stored phasefiles at the time they were stored.

Arguments: `file` is the file name of the stored phase file. Use only relative path names for `file`, not absolute path names (i.e., use path names beginning with "/").

Examples: `rtphf('waldo')`

See also: *User Guide: Imaging*

Related:

`curexp`	Current experiment directory (P)
`imcalc`	Calculate 2D phasefiles (M,U)
`makephf`	Transform and save images as phasefiles (M)
`svphf`	Save current VNMR phasefile (C)

`rts` Retrieve shim coil settings (C)

Syntax: `rts(file)<:status>`

Description: Locates a preexisting file of shim settings and copies the settings into the current parameter set of the current experiment and sets `load='y'` to facilitate subsequent loading of shims with `su` (or related commands or macros). If the shim file is not found, `rts` displays the file names it tried.

The `rts` command returns shims from a `.fid` file or a `.par` file, selecting the shim parameters from the parameters stored there.

Arguments: `file` is the name of a file containing the shim coil settings to be retrieved. If the file name is an absolute path, `rts` uses it with no modifications. Otherwise, `rts` searches up to three different directories, as follows:

- First, `rts` looks for a `shims` subdirectory in your VNMR user directory. If `shims` exists, it looks for the requested file name there.
- Next, if `shims` does not exist, `rts` then looks for the global parameter `shimspath`. If `shimspath` is present, it is expected to contain the name of a directory. If this directory exists, `rts` looks for the file in that directory.
- Finally, if this does not work, `rts` searches in the `shims` subdirectory of the VNMR system directory.

`status` is a return variable with one of the following values after `rts` finishes searching for the shim coil settings file:

- 0 indicates that `rts` failed to find requested file.

- 1 indicates that `rts` found the requested file, either as an absolute path or in the `shims` subdirectory of the VNMR user directory.
- 2 indicates that `rts` found the requested file using the global parameter `shimspath`.
- 3 indicates that `rts` found the requested file in `shims` subdirectory of the VNMR system directory.

Examples:
```
rts('acetone')
rts('bb10mm'):r1
```

See also: *Getting Started*

Related:

`load`	Load status of displayed shims (P)
`shimspath`	Path to user's `shims` directory (P)
`su`	Submit a setup experiment to acquisition (M)
`svs`	Save shim coil settings (C)

`rtshims` Extract shim parameter values (obsolete)

Description: The `rtshims` command is no longer in VNMR. It is replaced by the `rts` command.

Related:

`rts`	Retrieve shim coil settings (C)

`rttmp` Retrieve experiment data from experiment subfile (M)

Syntax: `rttmp(file)`

Description: Retrieves experiment data—parameters, FID, and transformed spectrum—from the file specified in a subdirectory inside `curexp+'/subexp'`.

Arguments: `file` is the name of the subfile from which to retrieve the experiment data.

Examples:
```
rttmp('H1')
rttmp('cosy')
```

See also: *Getting Started*

Related:

`captain`	Copy experiment data into experiment subfile (M)
`curexp`	Current experiment directory (P)
`svtmp`	Move experiment data into experiment subfile (M)

`rtv` Retrieve individual parameters (C)

Syntax: `rtv<(file,par1<,index1<,par2,index2...>>)><:val>`

Description: Retrieves one or more parameters from a parameter file. The file might have been made with `svf` or `svp` or `sd` commands, or it might be from another experiment. If no return argument is added, the parameters are copied into the experiment's current tree. If the parameter does not already exist in the current tree, it is created. If the returned parameter is an array, the entire array is returned.

If a return argument is added, `rtv` returns values into the macro. This form of `rtv` command, in which values are passed only to macro variables, is useful if you do not want additional parameters created in the experiment's current tree.

Arguments: `file` is the name of the directory or a VNMR parameter file. If the supplied value for `file` is a directory (with or without the `.fid` or `.par` extension), the parameters are retrieved from the `procpar` file in that directory. If the supplied value does not correspond to a directory but rather is a VNMR parameter file, that file is used. The default is that `rtv` prompts for a file name. In that case, the file name can be given without single quotes.

`par1,index1,par2,index2,...` are the name and array index of one or more parameters to be retrieved. The default for each array index argument is the first index. Including the array index for a parameter is only useful when returning values to the macro through a return argument.

`val` is a return argument for values to return to the macro.

Examples:

```
rtv
rtv('/vnmr/parlib/cosy.par','phase')
```

See also: *Getting Started*

Related:

`rt`	Retrieve FIDs (M)
`rtp`	Retrieve parameters (M)
`sd`	Set first decoupler frequency to cursor position (M)
`svf`	Save FIDs in current experiment (M)
`svp`	Save parameters from current experiment (M)

S

s — Save display parameters as a set (M)

Syntax: (1) `sset_number`
(2) `s(set_number)`

Description: Saves a copy of the current values of all display parameters. The set is data-independent because the parameters that govern a display (`sp`, `wp`, `vs`, etc.) are saved but no data is saved.

Arguments: `set_number` is number of the display parameter set to be saved.

Examples:
```
s2
s(3)
```

See also: *Getting Started*

Related:

`fr`	Full recall of display parameter set (M)
`r`	Recall display parameter set (M)

s2pul — Set up parameters for standard two-pulse sequence (M)

Syntax: `s2pul`

Description: Converts the current experiment to an experiment suitable for the standard two-pulse sequence (S2PUL).

Alternate: S2PUL button in the 1D Pulse Sequence Setup Menu.

See also: *Getting Started*

s2pulr — Set up parameters for standard 2-pulse sequence in “reverse” (M)

Applicability: UNITY and VXR-S systems only.

Syntax: `s2pulr`

Description: Sets up a standard two-pulse sequence in “reverse” configuration (S2PULR). In this setup, the observe channel uses the decoupler hardware and is controlled by the parameters `dn` (which must be set to `'H1'`), `dof`, `dpwr` (or `dhp`), `p1`, and `pw`. The local oscillator (L.O.) signal must be taken from the decoupler board. No decoupling is supported in this sequence.

Note that the macros `movetof` and `movesw` cannot be used with S2PULR except in the following way: `tof=dof movetof` (or `movesw`) `dof=tof`.

See also: *VNMR User Programming*

Related:

`dhp`	Decoupler high power with class C amplifier (P)
`dn`	Nucleus for first decoupler (P)
`dof`	Frequency offset for first decoupler (P)
`dpwr`	Power level for first decoupler with linear amplifiers (P)
`movesw`	Move spectral window according to cursors (M)
`movetof`	Move transmitter offset (M)
`p1`	First pulse width (P)
`pw`	Pulse width (P)
`tof`	Frequency offset for observe transmitter (P)

sa — Stop acquisition (C)

Applicability: All systems; however, the `option` and `number` arguments are unavailable on *MERCURY* and *GEMINI 2000* systems.

Syntax: `sa<(option|number)>`

Description: Stops an experiment that has been submitted to acquisition. If experiment is active, it is stopped. Data is retained. `sa` applies to the experiment that you are joined to at the time the `sa` command is entered. Thus, if experiment 1 is active, you must be joined to experiment 1 for `sa` to stop that acquisition. If you are in experiment 2, entering `sa` has no effect on experiment 1.

When experiments are queued, the behavior of `sa` is more complex. If an experiment is active in `exp1` and queued in `exp2`, entering `sa` from `exp1` stops that experiment and immediately begins acquisition on `exp2`. Entering `sa` from `exp2`, on the other hand, removes `exp2` from the queue, without affecting the active experiment 1.

Entering `sa` from an experiment that is not active or queued has no effect.

Arguments: `option` is one of the following:

- `'eos'`, `'ct'`, `'scan'` are keywords to stop at the next `ct`.
- `'eob'`, `'bs'` are keywords to stop at the next block size.
- `'eof'`, `'nt'`, `'fid'` are keywords to stop at the next complete FID.
- `'eoc'`, `'il'` are keywords to stop at next complete `il` cycle (i.e., the latest block size that has been completed for all FIDs in interleave cycle.

`number` is an integer number to stop at the next `ct`, where the value of `ct` is a multiple of `number`. This is useful when you want to complete a phasecycle before stopping.

Examples:
```
sa
sa('ct')
sa(4)
```

See also: *Getting Started*

Related:

`bs`	Block size (P)
`ct`	Completed transients (P)
`il`	Interleave arrayed and 2D experiments (P)
`nt`	Number of transients (P)
`ra`	Resume acquisition stopped with *sa* command (C)

sample — Submit change sample, Autoshim experiment to acquisition (M)

Applicability: Systems with a sample changer.

Syntax: `sample`

Description: Performs the combined operations `change`, `spin`, `lock`, and `shim`, making it a convenient setup command for a new sample.

See also: *Getting Started*

Related:

`au`	Submit experiment to acquisition and process data (C)
`change`	Submit a change sample experiment to acquisition (M)
`ga`	Submit experiment to acquisition and FT the result (C)
`go`	Submit experiment to acquisition (C)
`lock`	Submit an Autolock experiment to acquisition (C)
`shim`	Submit an Autoshim experiment to acquisition (C)
`spin`	Submit a spin setup experiment to acquisition (C)
`su`	Submit a setup experiment to acquisition (M)

savefile — Base file name for saving files (P)

Applicability: Systems with LC-NMR accessory.

Description: Contains the base file name using the format `savefile.001`, `savefile.002`, etc., to which a series of FIDs or data sets are saved. If `savefile` does not exist, the `parlc` macro can create it.

See also: *User Guide: Liquids NMR*

Related:

`parlc`	Create LC-NMR parameters (M)

saveglobal — Save selected parameters from global tree (P)

Description: Saves an array of parameter names from the global or systemglobal tree. Whenever `go` is executed, the parameters listed are saved in the current tree with an underscore (_) appended. These parameters are copied back into the global tree (without the underscore) whenever processing by `wbs`, `wnt`, `wexp`, or `werr` occurs.

See also: *User Guide: Liquids NMR*

Related:

`go`	Submit experiment to acquisition (C)
`loc`	Location of sample in tray (P)

sb — Sinebell constant in directly detected dimension (P)

Description: Applies a sinebell constant along the directly detected dimension. This dimension is often referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, etc.

Values: A positive value applies a sinebell of the form $\sin\left(\frac{t \cdot \pi}{2 \cdot sb}\right)$

A negative value applies a squared sinebell function of form $\sin^2\left(\frac{t \cdot \pi}{2 \cdot sb}\right)$

`sb` is given in seconds. Typical value is `sb='n'`.

See also: *Getting Started*

Related:

`sb1`	Sinebell constant in 1st indirectly detected dimension (P
`sb2`	Sinebell constant in 2nd indirectly detected dimension (P)
`sbs`	Sinebell shift constant in directly detected dimension (P)
`sine`	Find values for a sine window function (M)
`sinebell`	Select default parameters for sinebell weighting (M)
`sinesq`	Find values for a sine squared window function (M)

sb1 — Sinebell constant in 1st indirectly detected dimension (P)

Description: Applies a sinebell constant along the first indirectly detected dimension. This dimension is often referred to as the f_1 dimension in multidimensional data sets. `sb1` works analogously to the parameter `sb`. The “conventional” parameters, such as `lb` and `gf`, operate on the detected FIDs, while this “2D” parameter is used during processing of the interferograms.

Values: A positive value applies a sinebell of the form $\sin\left(\frac{t \cdot \pi}{2 \cdot sb1}\right)$

A negative value applies a squared sinebell function of form $\sin^2\left(\frac{t \cdot \pi}{2 \cdot sb1}\right)$

`sb1` is given in seconds. Typical value is `sb1='n'`.

See also: *User Guide: Liquids NMR*

Related:

`sb`	Sinebell constant in the directly detected dimension (P)
`sb2`	Sinebell constant in 2nd indirectly detected dimension (P)

sb2 — Sinebell constant in 2nd indirectly detected dimension (P)

Description: Applies a sinebell constant along the second indirectly detected dimension. This dimension is often referred to as the f_2 dimension in multidimensional data sets. sb2 works analogously to the parameter sb. The value of sb2 can be set with wti on the 2D interferogram data.

Values: A positive value applies a sinebell of the form $\sin\left(\frac{t \cdot \pi}{2 \cdot sb2}\right)$
A negative value applies a squared sinebell function of form $\sin^2\left(\frac{t \cdot \pi}{2 \cdot sb2}\right)$
sb2 is given in seconds. Typical value is sb2='n'.

See also: *User Guide: Liquids NMR*

Related:

sb	Sinebell constant in directly detected dimension (P)
sb1	Sinebell constant in 1st indirectly detected dimension (P)
wti	Interactive weighting (C)

sbs — Sinebell shift in directly detected dimension (P)

Description: Working in combination with the parameter sb, sbs allows shifting the origin of the sinebell function along the directly detected dimension. This dimension is often referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, etc.

Values: The origin is shifted according to the formula $\sin\left(\frac{(t - sbs) \cdot \pi}{2 \cdot sb}\right)$
The square of this function is applied if sb is negative. sbs is given in seconds. The typical value is sbs='n'.

See also: *Getting Started*

Related:

sb	Sinebell constant in directly detected dimension (P)
sbs1	Sinebell shift in 1st indirectly detected dimension (P)
sbs2	Sinebell shift in 2nd indirectly detected dimension (P)
sine	Find values for a sine window function (M)
sinesq	Find values for a sine squared window function (M)

sbs1 — Sinebell shift in 1st indirectly detected dimension (P)

Description: Working in combination with the parameter sb1, sbs1 allows shifting the origin of the sinebell function along the first indirectly detected dimension. This dimension is often referred to as the f_1 dimension in multidimensional data sets. sbs1 works analogously to parameter sbs. The "conventional" parameters, such as lb and gf, operate on the detected FIDs, while this "2D" parameter is used during processing of the interferograms.

Values: The origin is shifted according to the form $\sin\left(\frac{(t - sbs1) \cdot \pi}{2 \cdot sb1}\right)$
The square of this function is applied if sb1 is negative. sbs1 is given in seconds. The typical value is sbs1='n'.

See also: *User Guide: Liquids NMR*

Related:

sb1	Sinebell constant in 1st indirectly detected dimension (P)
sbs	Sinebell shift constant in directly detected dimension (P)
sb2	Sinebell constant in 2nd indirectly detected dimension (P)

sbs2 — Sinebell shift in 2nd indirectly detected dimension (P)

Description: Working in combination with the parameter sb2, sbs2 allows shifting the origin of the sinebell function along the second indirectly detected dimension. This dimension is often referred to as the f_2 dimension in multidimensional data

sets. sbs2 works analogously to parameter sbs. sbs2 can be set with wti on the 2D interferogram data.

Values: The origin is shifted according to the formula $\sin\left(\frac{(t - sbs2)\cdot\pi}{2\cdot sb2}\right)$

The square of this function is applied if sb2 is negative. sbs2 is given in seconds. The typical value is sbs2='n'.

See also: *User Guide: Liquids NMR*

Related:

sbs	Sinebell shift constant in directly detected dimension (P)
sb2	Sinebell constant in 2nd indirectly detected dimension (P)
wti	Interactive weighting (C)

sc Start of chart (P)

Description: Positions of the start of the plotting position (the "chart") with respect to the right edge of the plotter.

Values: 0 to wcmax, in mm

See also: *Getting Started; User Guide: Liquids NMR*

Related:

sc2	Start of chart in second direction (P)
wc	Width of chart (P)
wcmax	Maximum width of chart (P)

sc2 Start of chart in second direction (P)

Description: Controls the start of plotting position of the second axis (or *y* axis) of a 2D contour plot. The parameter wc2 controls the width of the chart.

Values: 0 to wc2max, in mm.

See also: *User Guide: Liquids NMR*

Related:

sc	Start of chart (P
wc2	Width of chart in second direction (P)
wc2max	Maximum width of chart in second direction (P)

scalelimits Set limits for scales in regression (M)

Syntax: scalelimits(x_start,x_end,y_start,y_end)

Description: Causes the command expl, which is used by regression to display data, to use typed-in scale limits. The limits are retained as long as an expl display is retained.

Arguments: x_start,x_end,y_start,y_end are *x*-axis and *y*-axis starting and ending limits. The default is that scalelimits prompts for the limits.

See also: *User Guide: Liquids NMR, VNMR User Programming*

Related:

autoscale	Resume autoscaling after limits set by scalelimits (M)
expl	Display exponential or polynomial curves (C)

scalesw Set scaling factor for multipulse experiments (M)

Syntax: scalesw

Description: Sets the spectral width scaling factor for the multipulse sequences set up by macros br24 and mrev8. The value of the scaling factor is stored in the parameter scalesw.

See also: *User Guide: solid-State NMR*

Related:

br24	Set up BR24 multiple pulse experiment (M)
mrev8	Set up MREV8 multiple pulse experiment (M)
scalesw	Scale spectral width in directly detected dimension (P)
scalesw1	Set f_1 scaling factor for 2D multipulse experiments (M)

scalesw — Scale spectral width in directly detected dimension (P)

Description: Adjusts the frequency scale dimension used with the parameter sets in the sequences set up by the br24, mrev8, ssecho, and xpolar macros. If scalesw is active, the labels for the frequency scales includes the letters sc in parentheses. A scaled frequency can be referenced using the rl macro.

Values: 'n', number greater than 0.0

See also: *User Guide: Solid-State NMR*

Related:

br24	Set up BR24 multiple pulse experiment (M)
mrev8	Set up MREV8 multiple pulse experiment (M)
rl	Set reference line (M)
scalesw	Set scaling factor for multipulse experiments (M)
scalesw1	Scale spectral width in 1st indirectly detected dimension (P)
scalesw2	Scale spectral width in 2nd indirectly detected dimension (P)
ssecho	Set up solid-state echo pulse sequence (M)
xpolar	Set up parameters for XPOLAR pulse sequence (M)

scalesw1 — Set f_1 scaling factor for 2D multipulse experiments (M)

Syntax: scalesw1

Description: Sets the f_1 spectral width scaling factor for the multipulse sequences set up by the br24 and mrev8 macros. The value of the scaling factor is stored in the parameter scalesw1.

See also: *User Guide: Solid-State NMR*

Related:

br24	Set up BR-24 multiple pulse experiment (M)
mrev8	Set up MREV8 multiple pulse experiment (M)
scalesw1	Scale spectral width in 1st indirectly detected dimension (P)

scalesw1 — Scale spectral width in 1st indirectly detected dimension (P)

Description: Analogous to the scalesw parameter except that scalesw1 applies to first indirectly detected dimension of a multidimensional data set. A scaled frequency along this dimension can be referenced using the rl1 macro.

Values: 'n', number greater than 0.0

See also: *User Guide: Solid-State NMR*

Related:

rl1	Set reference line in 1st indirectly detected dimension (M)
scalesw	Scale spectral width in directly detected dimension (P)
scalesw1	Set f_1 scaling factor for 2D multipulse experiments (M)
scalesw2	Scale spectral width in 2nd indirectly detected dimension (P)

scalesw2 — Scale spectral width in 2nd indirectly detected dimension (P)

Description: Analogous to the scalesw parameter except scalesw2 applies to second indirectly detected dimension of a multidimensional data set. A scaled frequency along this dimension can be referenced using the rl2 macro.

Values: 'n', number greater than 0.0

See also: *User Guide: Solid-State NMR*

Related:		
	rl2	Set reference line in 2nd indirectly detected dimension (M)
	scalesw	Set scaling factor for multipulse experiments (M)
	scalesw1	Set f_1 scaling factor for 2D multipulse experiments (M)

sd — Set first decoupler frequency to cursor position (M)

Syntax: sd

Description: Sets the first decoupler frequency offset parameter dof to place the first decoupler at the cursor position in the spectrum. This works only if the transmitter nucleus and first decoupler nucleus are the same (tn=dn).

See also: *Getting Started*

Related:		
	dof	Frequency offset for first decoupler (P)
	dn	Nucleus of first decoupler (P)
	sd2	Set second decoupler frequency to cursor position (M)
	sd3	Set third decoupler frequency to cursor position (M)
	sda	Set first decoupler frequency array (M)
	tn	Nucleus for observe transmitter (P)

sd2 — Set second decoupler frequency to cursor position (M)

Applicability: Systems with a second decoupler.

Syntax: sd2

Description: Sets the second decouple frequency offset parameter dof2 to place the second decoupler at the cursor position in the spectrum. This works only if the transmitter nucleus and second decoupler nucleus are the same (tn=dn2).

See also: *Getting Started*

Related:		
	dn2	Nucleus for second decoupler (P)
	dof2	Frequency offset for second decoupler (P)
	sd	Set first decoupler frequency to cursor position (M)
	sd2a	Set second decoupler frequency array (M)
	tn	Nucleus for observe transmitter (P)

sd3 — Set third decoupler frequency to cursor position (M)

Applicability: Systems with a third decoupler.

Syntax: sd3

Description: Sets the third decoupler frequency offset parameter dof3 to place the third decoupler at the cursor position in the spectrum. This works only if the transmitter nucleus and third decoupler nucleus are the same (tn=dn3).

See also: *Getting Started*

Related:		
	dn3	Nucleus for third decoupler (P)
	dof3	Frequency offset for third decoupler (P)
	sd	Set first decoupler frequency to cursor position (M)
	sd3a	Set third decoupler frequency array (M)
	tn	Nucleus for observe transmitter (P)

sda — Set first decoupler frequency array (M)

Syntax: sda

Description: Sets up an array of offset values for the first decoupler, using sd for the first decoupler position and sda for subsequent positions. This works only if the transmitter nucleus and first decoupler nucleus are the same (tn=dn).

See also: *Getting Started*

Related:

dn	Nucleus for first decoupler (P)
sd	Set first decoupler frequency to cursor position (M)
sd2a	Set frequency array for second decoupler (M)
sd3a	Set frequency array for third decoupler (M)
tn	Nucleus for observe transmitter (P)

sd2a — Set second decoupler frequency array (M)

Applicability: Systems with a second decoupler.

Syntax: sd2a

Description: Sets up an array of offset values for the second decoupler, using sd2 for the first position and sd2a for subsequent positions. This works only if the transmitter nucleus and second decoupler nucleus are the same (tn=dn2).

See also: *Getting Started*

Related:

dn2	Nucleus for second decoupler (P)
sd2	Set second decoupler frequency to cursor position (M)
sda	Set first decoupler frequency array (M)
tn	Nucleus for observe transmitter (P)

sd3a — Set third decoupler frequency array (M)

Applicability: Systems with a third decoupler.

Syntax: sd3a

Description: Sets up an array of offset values for the third decoupler, using sd3 for the first position and sd3a for subsequent positions. This works only if the transmitter nucleus and third decoupler nucleus are the same (tn=dn3).

See also: *Getting Started*

Related:

dn2	Nucleus for third decoupler (P)
sd3	Set third decoupler frequency to cursor position (M)
sda	Set first decoupler frequency array (M)
tn	Nucleus for observe transmitter (P)

sdp — Show diffusion projection (M)

Syntax: sdp

Description: Displays projection onto diffusion axis using the dsp facility. Use with 2D or 3D DOSY data after DOSY analysis. The unit of the resulting axis is D (10^{-10} m^2/sec). Because sdp overwrites the parameters in the current experiment, use it in only an experiment in which it is okay for existing data to be overwritten.

See also: *User Guide: Liquids NMR*

Related:

dosy	Process DOSY experiments (M)

sediff — Set up spin-echo diffusion imaging sequence (M)

Applicability: Systems with imaging capabilities.

Syntax: sediff

Description: Sets up a standard spin-echo diffusion weighted experiment using the new user interface for imaging.

See also: *User Guide: Imaging*

select — Select spectrum, FID, trace, or 2D plane without display (C)

Syntax:
(1) `select<('next'|'prev'|selection)><:index>`
(2) `select<(<'f1f3'|'f2f3'|'f1f2'><,'proj'><,'next'|'prev'|plane>)><:index>`

Description: Directs future actions to apply to a particular spectrum or FID in a 1D array, to a trace in 2D (syntax 1), or to a particular 2D plane from a 3D data set (syntax 2). If `select` is called with no arguments, it returns the current index. When VNMR is first booted up, `select` is in 1D mode. `select` enters the 2D mode if any of the keywords `'f1f3'`, `'f2f3'`, `'f1f2'`, or `'proj'` are present in the argument list. Entering the `ds` and `jexp` commands set `select` back in the 1D mode.

Arguments: For 1D operations (syntax 1):

- `'next'` is keyword to increment by 1 the 1D spectrum or trace index.
- `'prev'` is keyword to decrement by 1 the 1D spectrum or trace index.
- `selection` is a number selecting a 1D spectrum, FID, or trace.
- `index` returns the number of the current 1D spectrum, FID, or trace.

For selecting various 2D planes of a 3D data set (syntax 2):

- `'f1f3'`, `'f2f3'`, and `'f1f2'` are types of 2D planes. The parameters `plane` and `index2` serve to indicate the exact 2D plane that is currently viewable by VNMR. Note that `index2` cannot be entered from the keyboard (i.e., you cannot select a new 2D plane by changing the value of `index2`); you must use the `select` command instead.
- `'proj'` is keyword to use the 2D projection whose plane type is determined by the parameter `plane`.
- `'next'` is keyword to increment the parameter `index2` to its next value and sets up VNMR to be ready to display the 2D plane whose number is the new `index2` value.
- `'prev'` performs analogously except that `index2` is decremented.
- `plane` is a number selecting the plane.
- `index` returns the number of the current plane.

Examples:
```
select('next')
select(2):r1
select('f1f3')
```

See also: *User Guide: Liquids NMR, VNMR User Programming*

Related:

`arraydim`	Dimension of experiment (P)
`ds`	Display a spectrum (C)
`index2`	Projection or 3D plane index selected (P)
`jexp`	Join existing experiment (C)
`plane`	Currently displayed 3D plane type (P)

selex — Defines excitation band (M)

Syntax: `selex<(sh<,pw<,st<,ph<,fla<,trev>>>>>)>`

Description: Defines the excitation band from the position of cursors in the graphics window and reports them to user. It also sets `r1` to excitation bandwidth and `r2` to offset. `selex` is part of the Pbox software environment and uses the Pbox macros `pbox_bw` and `putwave`.

Arguments: `sh` is the name of a shape file.

`pw` is the pulsewidth, in sec.

`st` is the spin status: 0 for excitation, 0.5 for refocusing, or 1 for de-excitation.

`ph` is the phase (or phase cycle, see `wavelib/supercycles`).

`fla` is the flip angle.

`trev` is the time reversal. This argument can be used to cancel time reversal introduced by setting the spin status (`st`) to 1 for de-excitation.

Examples:
```
selex
selex('esnob',0.0,1,90.0)
```

See also: *User Guide: Liquids NMR*

Related: `Pbox` Pulse shaping software (U)

`selexcit` Set up PFG selective excitation pulse sequence (M)

Applicability: Systems with a pulsed field gradient module. Not available on *MERCURY-Vx*, *MERCURY* and *GEMINI 2000* systems.

Syntax: `selexcit`

Description: Prepares an experiment for PFG (pulsed field gradient) selective excitation, with presaturation option.

See also: *User Guide: Liquids NMR*

`sems` Set up basic imaging sequence with oblique capability (M)

Applicability: Systems with imaging capabilities.

Syntax: `sems`

Description: Sets up a standard multislice spin-echo imaging sequence with oblique imaging capability.

See also: *User Guide: Imaging*

`send2vnmr` Send a command to VNMR (U)

Syntax: `send2Vnmr $vnmruser/.talk command`

Description: Sends a command from UNIX to VNMR using the port number stored in the `$vnmruser/.talk` file. This file is created when the macro `listenon` is entered on the VNMR command line.

Arguments: `command` is any character string (commands, macros, or if statements) normally typed into the VNMR command line.

Examples: `send2Vnmr $vnmruser/.talk dg`

See also: *VNMR User Programming*

Related:
`bootup` Macro executed automatically when VNMR activated (M)
`listenon` Enable receipt of messages from `send2Vnmr` (M)
`listenoff` Disable receipt of messages from `send2Vnmr` (M)

seqcon — Acquisition loop control (P)

Applicability: Systems with imaging capabilities.

Description: Controls the status of various looping processes used during sequence acquisition. The nD, seqcon, plist, patlist, pwrlist, fliplist and sslist parameters configure a particular parameter set for an application sequence defined by the value of the seqfil parameter.

Values: String with five characters, consisting of the characters 'n', 's', and 'c', that control where and when the looping occurs:

- 'n' (null loop) specifies a sequence that has no such loop function.
- 's' (standard loop) sets the looping operation to occur during the execution of pulse sequence generation in the host computer. Each loop execution generates a new acode set for execution in the acquisition computer. Each acode set will ultimately give rise to its own data block in the FID file. A standard loop operation therefore lies outside the signal averaging (transient counter loop). Parameter arrays and use of the 2D implicit loop are standard loops. The multiecho loop *cannot* be a standard loop.
- 'c' (compressed loop) sets the looping operation to occur dynamically in the acquisition computer, and each loop execution generates a new data "trace" within the current data "block". This requires space in the on-board HAL memory. Compressed loops lie inside the signal averaging loop.

Each character position has place value and thus affects a different looping operation:

- First character: multiecho looping.
- Second character: multislice looping.
- Third character: 2D phase encode loop.
- Fourth character: 3D phase encode loop.
- Fifth character: 4D phase encode loop.

For example, seqcon='ncsnn' is 2D imaging with compressed multislice.

See also: *User Guide: Imaging*

Related:

fliplist	Standard flip angle list (P)
nD	Application dimension (P)
patlist	Active pulse template parameter list (P)
plist	Active pulse length parameter list (P)
pwrlist	Active pulse power level parameter list (P)
seqfil	Acquisition object code name (P)
sslist	Conjugate gradient list (P)

seqfil — Pulse sequence name (P)

Description: Identifies the name of the pulse sequence to be used. The value of seqfil is displayed on the top line of the screen after the "Seq:" label. Macros used to set up new pulse sequences, such as dept and apt, automatically change the seqfil parameter.

See also: *Getting Started*

Related:

pslabel	Pulse sequence label (P)

seqgen — Initiate compilation of user's pulse sequence (M,U)

Syntax: (From VNMR) `seqgen(<-static,>file<.c>)`
(From UNIX) `seqgen <–static> file<.c> <file1,...>`

Description: Begins compilation of a user pulse sequence. When used from VNMR, the VNMR macro `seqgen` calls the UNIX shellscript `seqgen`, which can also be called directly from UNIX, as shown above. The `seqgen` shellscript then calls the compilation makefile `seqgenmake`, located in the directory `/vnmr/acqbin`.

The specified pulse sequence can be located in `~/vnmrsys/psglib` or in `/vnmr/psglib`. If two files with the same name exist in these two directories, the local directory (`~/vnmrsys/psglib`) takes precedence. For sequences in `/vnmr/psglib`, `seqgen` first copies the file into the local directory `~/vnmrsys/psglib` and then compiles it there; the resulting executable is then placed in `~/vnmrsys/seqlib`. A copy of the pulse sequence is also copied into the `seqlib` directory along with the executable. As it is running, `seqgen` reports where it found the specified sequence(s).

`seqgen` uses library files (object modules) found in `/vnmr/lib`. If `setuserpsg` and `psggen` has been run, the library files in the local directory `~/vnmrsys/psg` take precedence of those in `/vnmr/lib`.

Error messages are written into the file `file.errors`, where `file` is the name of the pulse sequence in `psglib` in which compilation is performed.

Note that `seqgen` not only accepts file names with and without extensions, but also accepts files specified with wildcards and complex paths (`seqgen` strips the directory part, and `seqgen /vnmr/psglib/apt` will compile `~/vnmrsys/psglib/atp.c` if it exists).

Arguments: `–static` is a keyword for `seqgen` to use static rather than dynamic binding. Static binding results in larger executables in `seqlib` (several hundred Kbytes), but these sequences execute slightly faster (i.e., the `go` command). While insignificant generally, faster execution is helpful in some special applications such as the Scout Scan™ mode of LC-NMR, where the time spent on the `go` command becomes critical. Static binding results in a fixed-size time gain, regardless of the number of increments; for large multidimensional experiments, the speed difference is not noticeable.

`file` is the file name of a standard two-pulse sequence.

`.c` is the extension on the file name.

`file1,file2,...` are the names of files containing more sequences.

Examples: (From VNMR) `seqgen('/vnmr/psglib/*.c')`
(From UNIX) `seqgen /vnmr/psglib/*.c`
(From UNIX) `seqgen apt dept noesy`
(From UNIX) `seqgen -static lc1d`

See also: *VNMR User Programming*

Related:

`go`	Submit experiment to acquisition (M)
`psggen`	Compile a user PSG object library (M,U)

set2D — General setup for 2D experiments (M)

Syntax: `set2D<(F2_dig_res<,F1_dig_res>)>`

Description: Similar to `set2d` but does not execute `par2d` and does not make `sw1`, `rfl1`, and `rfp1` decisions based on `tn`=`dn` condition.

Arguments: `F2_dig_res` is the f_2 digital resolution desired, in Hz/pt. Default is 6.

`F1_dig_res` is the f_1 digital resolution desired, in Hz/pt. Default is 12.

Related:

`rfl1`	Reference peak position in 1st indirectly detected dimension (P)
`rfp1`	Reference peak frequency in 1st indirectly detected dimension (P)
`set2d`	General setup for 2D experiments (M)
`sw1`	Spectral width in 1st indirectly detected dimension (P)

`set2d` General setup for 2D experiments (M)

Syntax: `set2d(experiment<,F2_dig_res<,F1_dig_res>>)`

Description: Runs the macro `par2d` to create new parameters needed for 2D experiments, then selects starting values for a number of parameters. The `set2d` macro is "internal" and not normally typed directly by the user.

Arguments: `experiment` is the name of a 2D experiment (e.g., `'noesy'`).

`F2_dig_res` is the f_2 digital resolution desired, in Hz/pt.

`F1_dig_res` is the f_1 digital resolution desired, in Hz/pt.

Examples:

```
set2d('cosyps')
set2d('hetcor',16)
set2d('het2dj',16,(2*sw1)/fn1)
```

See also: *User Guide: Liquids NMR*

Related:

`par2d`	Create 2D acquisition parameters (M)

`set3dproc` Set 3D processing (C)

Syntax: `set3dproc<(<'nocoef'><,directory>)>`

Description: Creates the file `procdat` that contains binary 3D information used by `ft3d` in processing the 3D FID data. It also creates the 3D parameter set `procpar3d` that is used by the `select` command to display the 2D planes from the 3D transformed data. `set3dproc` can only create the proper 3D coefficient file if the parameters `phase` and `phase2` are used to generate States-Haberkorn (hypercomplex) or TPPI data along the t_1 and t_2 dimensions.

`set3dproc` creates the coefficient file for the following five values of `array` (where SH is States-Haberkorn):

- if `array=''` (null string), type of 3D data is TPPI(t_1) – TPPI(t_2)
- if `array='phase'`, type of 3D data is SH(t_1) – TPPI(t_2)
- if `array='phase2'`, type of 3D data is SH(t_2) – TPPI(t_1)
- if `array='phase2,phase'`, type of 3D data is SH(t_1) – SH(t_2)

If `array` is set to some other value, `set3dproc` cannot create the 3D coefficient file and an error is reported within VNMR.

Arguments: `'nocoef'` is a keyword that the 3D coefficient file `coef` is not to be created.

`directory` is the name of the directory for `procdat` and `procpar3d`. The default is the subdirectory `info` in the directory `curexp`.

Examples:

```
set3dproc
set3dproc('nocoef','curexp/info3d')
```

See also: *User Guide: Liquids NMR*

Related:

`array`	Parameter order and precedence (P)
`ft3d`	Perform a 3D Fourier transform (M,U)
`phase`	Phase selection (P)
`phase2`	Phase selection for 3D acquisition (P)

select	Select a spectrum or 2D plane without displaying it (C)
wftt3	Process f_3 dimension during 3D acquisition (M)

setallshims — Set all shims into hardware (M)

Syntax: setallshims

Description: Sets shims from the current parameter tree into hardware. setallshims is equivalent to entering load='y'su but without setting all the hardware parameters normally set by su (temperature, decoupling, transmitter initialization, etc.). The shims used depend on the shimset configuration. For the shim set on the Ultra•nmr shim system, setallshims is active only if hardware-to-software shim communication is enabled.

See also: *Getting Started*

Related:

load	Load status of displayed shims (P)
readallshims	Read all shims from hardware (M)
readhw	Read current values of acquisition hardware (C)
sethw	Set values for hardware in acquisition system (C)
shimset	Type of shim set (P)
su	Submit a setup experiment to acquisition (M)

setarray — Set up a parameter array (M)

Applicability: Systems with imaging capabilities.

Syntax: setarray<(name,start,step,elements)>

Description: Sets up an array of a numeric acquisition parameter in single-arrayed experiments.

Arguments: name is the name of the parameter to be arrayed. The default (not entering any arguments) is the system prompts for the argument values.

start is the starting value for the array.

step is the step value for the array.

elements is the number of elements in the array.

Examples:
```
setarray
setarray('d1',1,1,10)
```

See also: *User Guide: Imaging*

setcenter — Set up parameters for center sequence calibration (M)

Applicability: Systems with imaging capabilities.

Syntax: setcenter

Description: Loads parameter sets for center sequence calibration during imaging installation.

See also: *User Guide: Imaging*

setcolor — Set colors for graphics window and for plotters (C)

Applicability: UNITY*INOVA* and *MERCURY-Vx* and *MERCURY* systems

Syntax:
(1) setcolor('pcl',item_index,'color')
(2) setcolor('hpgl',item_index,'color')
(3) setcolor('pen',pen_number,'color')
(4) setcolor('graphics',item_index,red,green,blue)

(5) `setcolor('ps',item_index,red,green,blue)`
(6) `setcolor('plotter',black_plane,color_planes)`

Description: Sets colors used on the graphics window and on plotters. This command is a utility program used by the `color` macro and other macros. It is not expected that `setcolor` would be entered directly from the input window.

Arguments: `'pcl'` is a keyword to set colors on a plotter device that uses the PCL language. PCL plotters are the laser type of plotter.

`'hpgl'` is a keyword to set colors on a plotter device that uses the HPGL language. HPGL plotters are the pen type of plotter.

`'pen'` is a keyword that next two arguments set the color for a physical pen on a plotter device that uses the HPGL language.

`'graphics'` is a keyword to set colors on the graphics window.

`'ps'` is a keyword to set colors on a plotter using the PostScript language.

`red`, `green`, `blue` are three integers between `0` and `255` that set the amount of red, green, and blue color on the graphics window or PostScript plotter.

`'plotter'` is a keyword that the next two arguments set the black mode and number of colors available for a plotter device.

`item_index` is an index number from the following list that represents a specific drawing item.

`8`	background of images
`9`	real channel of an FID
`10`	imaginary channel of an FID
`11`	spectrum
`12`	integral
`13`	parameters
`14`	scale
`15`	threshold line (graphics device only)
`16`	second spectrum or FID in `addi` (graphics device only)
`17`	result spectrum or FID in `addi` (graphics device only)
`18`	cursors (graphics device only)
`19`	foreground of images
`20`	background color of graphics window (graphics device only)
`20-35`	contour 0 to contour 15 of absolute value 2D display
`36-42`	contours –7 to –1 of phased 2D display
`44-50`	contours 1 to 7 of phased 2D display

`pen_number` is an integer from `1` to `8` that specifies the physical pen used.

`color` is a string for the color set for the device: `'red'`, `'green'`, `'blue'`, `'cyan'`, `'magenta'`, `'yellow'`, `'white'`, or `'black'`.

`black_plane` is 1 or 0, specifying whether the plotter has a separate black mode. Because all currently supported plotters have this feature, the value is usually 1.

`color_planes` specifies how many colors are available. Use 3 for color plotters and `0` for black and white plotters.

Examples:
```
setcolor('pcl',11,'green')
setcolor('hpgl',11,'red')
setcolor('pen',2,'red')
```

```
setcolor('graphics',11,255,0,0)
setcolor('ps',11,255,255,0)
setcolor('plotter',1,0)
```

See also: *Getting Started*

Related:
- `addi` Start interactive add/subtract mode (C)
- `color` Select plotting colors from a graphical interface (M)

`setdecpars` Set decoupler parameter values from probe file (M)

Syntax: `setdecpars`

Description: Reads from the probe file `pwxlvl`, `pwx`, `pplvl`, `pp`, `dpwr`, `dmf`, `dmm`, `dres`, and `dseq` values, if they exist, and updates the current experiment parameters.

Related:
- `setdec2pars` Set decoupler 2 parameter values from probe file (M)

`setdec2pars` Set decoupler 2 parameter values from probe file (M)

Syntax: `setdec2pars`

Description: Reads from the probe file `pwx2lvl`, `pwx2`, `dpwr2`, `dmf2`, `dmm2`, `dres2`, and `dseq2` values, if they exist, and updates the current experiment parameters.

Related:
- `setdecpars` Set decoupler parameter values from probe file (M)

`setdgroup` Set the Dgroup of a parameter in a tree (C)

Syntax: `setdgroup(parameter,dgroup<,tree>)`

Description: Sets the Dgroup of a parameter in a tree. The application determines the usage of `setdgroup`. Only Tcl-dg currently uses this feature.

Arguments: `parameter` is the name of the parameter.

`dgroup` is an integer.

`tree` is `'current'`, `'global'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the description of the `create` command for more information on types of trees.

Examples:

```
setdgroup('a',1)
setdgroup('b',3,'global')
```

See also: *VNMR User Programming*

Related:
- `create` Create new parameter in a parameter tree (C)

`setenumeral` Set values of a string parameter in a tree (C)

Syntax: `setenumeral(parameter,N,enum1,enum2,...,enumN<,tree>)`

Description: Sets the possible values of a string parameter in a parameter tree. To remove enumerated values from a parameter, set argument `N` to `0` (see example below).

Arguments: `parameter` is the name of the parameter.

`N` is the number of enumeral values to be assigned to `parameter` (or removed from `parameter` if `N` is set to `0`).

`enum1` to `enumN` are the possible string values of the parameter.

`tree` is `'current'`, `'global'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the description of the `create` command for more information on types of trees.

Examples:
```
setenumeral('size',0)
setenumeral('size',2,'large','small')
setenumeral('user',3,'user','superuser','master',
   'global')
```

See also: *VNMR User Programming*

Related: `create` Create new parameter in a parameter tree (C)

setether — Connect or reconnect host computer to Ethernet (U)

Syntax: `setether`

Description: Connects or reconnects the host computer to the Ethernet network. Only `root` can execute this shellscript properly. If the system is already connected to the Ethernet network, `setether` does nothing.

On systems running Solaris, `setether` undoes the work of `setnoether`. You cannot use `setether` unless you previously entered the `setnoether` command. `setether` restores the files `hostname.le0`, `defaultdomain`, and `defaultrouter` so that Ethernet is activated on the host computer when UNIX is rebooted.

See also: *VNMR and Solaris Software Installation*

Related: `setnoether` Disconnect host computer from Ethernet (U)

setflip — Set rf power levels to desired flip angle (M)

Applicability: Systems with imaging capabilities.

Syntax: `setflip(name,patname,pwrname,flip)`

Description: Sets up the rf power levels for a given pulse to obtain a desired flip angle. Power levels are calculated from the calibration data for a square pulse. The calibration data should be located in the file `pulsecal`, which should reside in the `vnmrsys` directory. The macro `setflip` also looks for the `pulsecal` file in the system directory.

Arguments: `name` is the name of the pulse parameter.

`patname` is the name of the pattern parameter.

`pwrname` is the name of the power parameter.

`flip` is the flip angle, in degrees.

Examples: `setflip('pw','pwpat','tpwr',90)`

See also: *User Guide: Imaging*

Related: `pulsecal` Update and display pulse calibration data file (M)

setfrq — Set frequency of rf channels (C)

Syntax: `setfrq<(channel)><('nucleus')>`

Description: Calculates frequencies based on the nucleus (`tn`, `dn`, `dn2`, etc.), referencing (`lockfreq`), solvent, and the offset parameter (`tof`, `dof`, etc.). The result of the calculation is stored in parameters `sfrq`, `dfrq`, `dfrq2`, etc. The parameters are rounded to the resolution of the channel—either 0.1 Hz or 100 Hz (either 0.1 Hz or 0.0745... Hz on *GEMINI 2000* systems).

The `setfrq` command should never need to be entered from the keyboard. It is called automatically when the appropriate parameters are changed or a parameter set is returned. If a parameter is entered that affects a single frequency, `setfrq` is called from an internal underscore macro (e.g., `_tn`,

_tof, _dn, _dof) to recalculate the frequency for that channel. Likewise, if a parameter is entered that affects all frequencies, setfrq is called from an internal underscore macro (e.g., _solvent, _lockfreq) to recalculate the frequencies.

Arguments: channel is a single integer specifying the rf channel to be set. The default is to calculate the frequencies for all rf channels.

nucleus displays or returns the frequency of the supplied nucleus. Channel 1 is assumed for rounding information and an offset (e.g., tof or dof) is not added to the result.

Examples:
```
setfrq
setfrq(2)
setfrq('P31'):freq
```

See also: *Getting Started*

Related: spcfrq Display frequencies of rf channels (M)

setgauss Set a Gaussian fraction for lineshape (M)

Syntax: (1) setgauss(fraction)
(2) setgauss(fraction*)

Description: Modifies the output of a deconvolution using pure Lorentzian lineshape (fitspec.outpar) and makes it the input for a subsequent analysis (fitspec.inpar), after first modifying the Gaussian fraction. To allow this fraction to vary, use syntax 1; to fix the fraction, use syntax 2.

Arguments: fraction is the Gaussian fraction of the lineshape, a number from 0 to 1.To fix the fraction (syntax 2), suffix the value with an asterisk (*) and enclose the value in single quotes (see the second example below).

Examples:
```
setgauss(0.4)
setgauss('1.0*')
```

See also: *User Guide: Liquids NMR*

Related: fitspec Perform spectrum deconvolution (C)

setgcal Set the gradient calibration constant (M)

Applicability: Systems with pulsed field gradients (PFG) or imaging capabilities.

Syntax: setgcal

Description: Determines the gradient calibration constant gcal by using a proton phantom of known dimensions. setgcal requests the linear dimension of the phantom in the readout direction. It uses the value entered, together with cursor separation of this dimension from the image profile and the strength of the readout gradient gro, or gzlvl1 if pulsed field gradients, to calculate gcal in units of gauss/cm-DAC units. You are then prompted whether this value should be entered. If you answer yes, it is stored as a system constant in the your global file.

Note that a particular value of gcal is closely related to the current eddy current compensation settings. If these settings are changed (e.g., reading in a new curecc file), a different value of gcal should be expected.

Before running setgcal, use the pulse sequence set up by profile to acquire a signal from a known sized object while the gradient is on.

See also: *Pulsed Field Gradient Modules Installation; VNMR User Guide: Imaging*

Related:		
	gcal	Gradient calibration constant (P)
	gro	Readout gradient strength in DAC units (P)
	profile	Set up pulse sequence for gradient calibration (M)

setgcoil — Assign sysgcoil configuration parameter (M)

Syntax: `setgcoil<(file)>`

Description: Allows VNMR users to change the configured gcoil for the system. setgcoil updates the systemglobal parameter sysgcoil to the named table and updates the assignment values for the hardware-specific gradient calibration parameters gcoil, gxcal, gycal, gzcal, griserate, and boresize to their corresponding values, described in the named table. The directory $vnmrsystem/imaging/gradtables must have write permission for all VNMR users for the macro to be effective. This table now exists in the system local /var/VNMR/gradtables directory, with a soft link from $vnmrsystem/imaging/gradtables to that directory.

Arguments: file is the any legal file name defined for the parameter gcoil.

See also: *User Guide: Imaging*

Related:	
boresize	Magnet bore size (P)
config	Display current configuration and possible change it (M)
gcoil	Read data from gradient calibration tables (P)
griserate	Gradient rise rate (P)
gxcal,gycal,gzcal	Gradient strength for X, Y, Z gradients (P)
sysgcoil	System value for gcoil parameter (P)

setglideexp — Set up *GLIDE* experiment from command line (M)

Syntax: `setglideexp(experiment)`

Description: Sets up a *GLIDE* experiment from the command line or from Tcl-dg. The acquire def file is read from the glide/exp experiment directory and a dialog is opened.

Arguments: experiment is the name of the *GLIDE* experiment.

Examples:
```
setglideexp('AuH')
```

setGgrp — Add user to specific *GLIDE* group (U)

Syntax: (From UNIX) `setGgrp group user`

Description: Adds a user to a specific *GLIDE* group. If a group does not exist, setGgrp adds the new group name to the group file and puts the user in the new group. If a user does not belong to any group, setGgrp makes that user public. If a user belongs to another group, setGgrp moves the user to a specified group. setGgrp can be executed only by vnmr1.

Arguments: group is the name of a *GLIDE* group.

user is a name of the individual to be added to the *GLIDE* group.

Examples:
```
setGgrp glide1 mark
setGgrp public Sam
```

See also: *Getting Started*

setgpe — Set phase encode gradient levels (M)

Applicability: Systems with imaging capabilities.

Syntax: `setgpe`

Description: Provides for selection of the phase encode gradient step size levels (gpe, gpe2, gpe3) and gradient pulse timing (tpe, tpe2, tpe3) from the FOV parameters (lpe, lpe2, lpe3).

The program requires no inputs and automatically calculates the values of gpe and tpe (2D, 3D, 4D), gpe2 and tpe2 (3D and 4D), and gpe3 and tpe3 (4D) from the corresponding FOV parameters and requested acquisition matrix sizes (nv1, nv2, nv3). Defaults are supplied for 2D, 3D, and 4D matrix sizes if these have not been set by the user.

The result of the setgpe calculations results in setting the phase encode gradient levels so as to give the shortest possible phase encode timing. This prepares the sequence to collect data at the minimum te. Sequence applications, however, are free to rescale the values of the gradient level and timing parameters to meet their own requirements. Rescaling requires that:

gpe*tpe = gpe'*tpe'

The product of the gradient set size and phase encode pulse remain constant.

See also: *User Guide: Imaging*

Related:

gpe	Phase encoding gradient increment (P)
lpe	Field of view for phase encode axis (P)
tpe	Duration of phase encoding gradient pulse (P)

setgrid — Divide graphics window into rows and columns (C)

Syntax: `setgrid(row<,column>)`

Description: Divides VNMR graphics window into an array of rows and columns (or window panes). Only one pane is active at a time. An individual pane can be activated by double-clicking in it with the left mouse button or by entering setwin in the input window.

Arguments: row is the number of rows (maximum is 3) in the graphics window. If 0 is entered, the number of rows remains the same; e.g., in setgrid(0,2), the number of rows is unchanged and two columns are created in each row.

column is the number of columns (maximum is 3) in the graphics window.

Alternate: Buttons 1 Row, 2 Rows, 3 Rows, 1 Column, 2 Columns, and 3 Columns in the Windows menu.

Examples:

```
setgrid(3)
setgrid(3,3)
setgrid(0,2)
```

See also: *Getting Started*

Related:

curwin	Current window (P)
fontselect	Open FontSelect window (C)
jwin	Activate current window (M)
mapwin	List of experiment numbers (P)
setwin	Activate selected window (C)

setgro — Set readout gradient (M)

Applicability: Systems with imaging capabilities.

Syntax: `setgro<('min'|level)>`

Description: Sets the readout gradient by adjusting the values of gro, sw, and at. If entered without arguments, setgro operates in the automatic mode and uses a novel algorithm to estimate the maximum usable readout gradient. The algorithm is designed to provide a compromise between chemical shift artifact and S/N ratio in the image.

Arguments: 'min' is a keyword to operate setgro in the automatic mode, to use simple algorithms to estimate the maximum usable readout gradient, and to set gro, sw, and at based on the estimate. Typical usage would be when operating at the shortest practical echo time.

levels is a real number that is interpreted as a gradient level in gauss/cm. Provided that the number is in the range 0 to gmax, setgro then calculates sw and sets gro and at.

Examples:
```
setgro
setgro('min')
setgro(1.0)
```

See also: *User Guide: Imaging*

Related:

at	Acquisition time (P)
gmax	Maximum gradient strength (P)
gro	Readout gradient strength (P)
sw	Spectral width (P)

setgroup — Set group of a parameter in a tree (C)

Syntax: setgroup(parameter,group<,tree>)

Description: Sets the group of a parameter in a tree.

Arguments: parameter is the name of the parameter.

group is one of the following keywords: 'all', 'sample', 'acquisition', 'processing', 'display', or 'spin'.

tree is one of the keywords 'current', 'global', or 'processed'. The default is 'current'. See the create command for information on the types of trees.

Examples:
```
setgroup('a','sample')
setgroup('b','all','global')
```

See also: *VNMR User Programming*

Related:

create	Create new parameter in a parameter tree (C)
destroy	Destroy a parameter (C)
destroygroup	Destroy parameters of a group in a tree (C)
display	Display parameters and their attributes (C)
groupcopy	Copy parameters of group from one tree to another (C)
paramvi	Edit a parameter and its attributes using vi text editor (M)
setlimit	Set limits of a parameter in a tree (C)
setprotect	Set protection mode of a parameter (C)

setgss — Select slice or voxel selection gradient levels (M)

Applicability: Systems with imaging capabilities.

Syntax: setgss<(<gradient_name><,thickness_name>)>

Description: Sets slice or voxel selection gradient levels, given the gradient level parameter and the thickness parameter. setgss searches the configuration list sslist (conjugate gradients) for the desired gradient level name.

If the gradient name is found (possibly multiple times), `setgss` calculates the bandwidth, in Hz, "cut" by each corresponding rf template on the list (`patlist`), at the length pointed to by the list (`plist`), and for the flip angle on the list (`fliplist`). The minimum bandwidth is assumed to define the "thickness" of the "cut." The gradient level is then calculated from the minimum bandwidth selected by the rf pulses.

If `setgss` fails to find the supplied `gradient_name`, it returns the message "All RF templates used with gradient_name are nonselective."

Arguments: `gradient_name` is the name of the gradient level parameter whose value is to be set. The default is the user is prompted for the parameter name.

`thickness_name` is the name of the thickness parameter from which to compute the gradient level. The default is the user is prompted for the parameter name.

Examples:
```
setgss
setgss('gss','thk')
```

See also: *User Guide: Imaging*

Related:

`fliplist`	Standard flip angle list (P)
`patlist`	Active pulse template parameter list (P)
`sslist`	Conjugate gradient list (P)

`sethw` Set values for hardware in acquisition system (C)

Applicability: Syntax 1 through 5 apply to all systems (except that syntax 3, 4, and 5 are not available on *MERCURY-Vx* or *GEMINI 2000* systems that lack automated spinner control hardware). Syntax 6 applies only to systems with a sample changer. Syntax 7 and 8 apply only to systems with a variable temperature (VT) controller. Syntax 9 applies only to *MERCURY-VX*, *MERCURY*, and *GEMINI 2000*. Syntax 10 applies only to UNITY*INOVA*, *MERCURY-Vx*, and *MERCURY* systems.

Syntax:
```
(1)  sethw(<'wait'|'nowait',>par1,val1<,par2,val2,...)
(2)  sethw('lock','on'|'off')
(3)  sethw('spin',speed)
(4)  sethw('spinner','bump')
(5)  sethw('eject','on'|'off')
(6)  sethw('loc',location)
(7)  sethw('vt','reset'|'off')
(8)  sethw('temp',temperature)
(9)  sethw('tune',mode)
(10) sethw('lockfreq'<,lockfreq_value>)
```

Description: Sets acquisition system hardware values. `sethw` cannot be used when an acquisition is in progress or when the `acqi` program is active.

Syntax 1 can be used to set the lock system parameters `lockpower`, `lockgain`, `lockphase`, and `z0`. This syntax can also be used to set the values of the shims. The particular shim that can be set depends upon the type of shim hardware present in the system. See the description of `shimset` for a list of the shim names for each type of shim hardware.

Syntax 2 turns the hardware lock on or off.

Syntax 3 controls spinning speed.

Syntax 4 carries the sample to bump by giving it a short burst of eject air. This is sometimes useful to reseat the sample if it is failing to spin.

Syntax 5 ejects and inserts samples into the probe. Entering the command `sethw('eject','on')` is equivalent in function to macros `eject` and `e`; and `sethw('eject','off')` is equivalent to macros `insert` and `i`.

Syntax 6 sets a location for the sample currently in the magnet on a system with a sample changer. The parameter `loc` is updated.

Syntax 7 resets the VT controller, useful when changing the probe in a system with VT regulation. By entering `sethw('vt','reset')` after installing a new probe in the magnet and attaching the VT controller interface to the probe, the VT controller is ready to regulate the temperature. No other parameters can be modified by the command. As an alternate, you can manually turn the VT controller unit off and then back on. Syntax 7 also turns the VT controller off by entering `sethw('vt','off')`.

Syntax 8 sets the temperature in degrees celsius. The host computer does not wait for the temperature to regulate.

Syntax 9 places the *MERCURY-Vx*, *MERCURY*, or *GEMINI 2000* console into the tune mode. This syntax is used in the `btune`, `ctune`, `dtune`, `htune`, and `tuneoff` macros and normally is not entered by the user directly.

Syntax 10 sets the lock frequency, in MHz, on the UNITY*INOVA*, *MERCURY-Vx*, or *MERCURY*.

Arguments: `'wait'` or `'nowait'` keyword must be either the first or last argument.

- `'wait'` sends the new values to the acquisition console, verifies these values, and updates the corresponding parameters. This is the default.
- `'nowait'` sends the new values to the console without verifying them or changing VNMR parameters.

`parameter1,value1,parameter2,value2,...` are paris of parameter names and their values (see the first two examples below). At least one parameter name and its value must be specified. A maximum of ten parameters can be set.

`'lock','on'` is a keyword pair to turn the hardware lock on.

`'lock','off'` is a keyword pair to turn the hardware lock off.

`'spin'` is a keyword that identifies the next argument, `speed`, as the sample spinning speed, in Hz.

`'spinner','bump'` is a keyword pair to bump the sample.

`'eject','on'` is a keyword pair to eject the sample from the probe.

`'eject','off'` is a keyword pair to insert the sample into the probe.

`'loc'` is a keyword to identify that the next argument, `location,` is a number for the sample currently in the magnet (`'loc'` is unrelated to the `loc` parameter).

`'vt','reset'` is a keyword pair to reset the VT controller after the controller has been disconnected from the probe. This is equivalent to turning the VT controller power off and on.

`'vt','off'` is a keyword pair to turn the VT controller off.

`'temp'` is a keyword that identifies the next argument, `temperature`, as the requested sample temperature, in degrees celsius.

`'tune'` is a keyword that identifies the next argument, `mode`, as the tune mode to perform probe tuning on the *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*. On *MERCURY-VX* and *MERCURY*, `mode` is 1 for high band, 2 for low band, and 3 for off. On *GEMINI 2000*, `mode` is `1` for `htune`, `2` for `ctune`, `3` for `dtune`, `4` for `btune` (low band), `5` for `btune` (high band), `0` and `6` for off.

'lockfreq' is a keyword that the next argument is the lock frequency.

lockfreq_value is the lockfreq value, in MHz, for the lock frequency.

Examples:
```
sethw('z1c',30,'z2c',-50)
sethw('wait','z1',150,'z2',-400)
sethw('lock','on')
sethw('spin',20)
sethw('spinner','bump')
sethw('eject','on')
sethw('loc',5)
sethw('vt','reset')
sethw('lockfreq',46.042)
```

See also: *Getting Started; User Guide: Liquids NMR*

Related:

btune	Tune broadband channel on *MERCURY* series, *GEMINI 2000* (M)
ctune	Tune carbon channel on $^{1}H/^{13}C$ *GEMINI 2000* (M)
dtune	Tune lock channel on *GEMINI 2000* (M)
htune	Tune proton channel on *GEMINI 2000* (M)
loc	Location of sample in tray (P)
lockpower	Lock power (P)
lockfreq	Lock frequency (P)
lockgain	Lock gain (P)
lockphase	Lock phase (P)
readhw	Read current values of acquisition hardware (C)
spin	Sample spin rate (P)
tuneoff	Turn off probe tuning mode on *MERCURY* series, *GEMINI 2000* (M)
z0	Z0 field position (P)

setint — Set value of an integral (M)

Syntax: `setint(int_number<,value>)`

Description: Sets the value of an integral.

Arguments: int_number is the integral number. It corresponds to the index number displayed by dli if all integrals are shown (i.e., intmod='full') or the region if alternating integrals are shown (i.e., intmod='partial').

value sets the actual value of the selected integral. The default is ins.

Examples:
```
setint(2)
setint(1,3)
```

See also: *Getting Started*

Related:

dli	Display list of integrals (C)
ins	Integral normalization scale (P)
intmod	Integral display mode (P)

setlimit — Set limits of a parameter in a tree (C)

Syntax: (1) `setlimit(parameter,max,min,step_size<,tree>)`
(2) `setlimit(parameter,index<,tree>)`

Description: If syntax 1 is used, when a parameter value is changed, the new value is checked against the limits set by max and min. The new value must also be a multiple of step_size + min (e.g., setlimit('r1',80,10,20) allows the values 10, 30, 50, and 70). The value of the parameter can be further modified by a macro called _parameter if the proper protection bit is set (see the setprotect command).

If syntax 2 is used, the `max` `min`, and `step_size` for a parameter are obtained from the `index`-th entry of a table set for the parameter by `parmax`, `parmin`, and `parstep` in `conpar`.

Arguments: `parameter` is the name of the parameter.

`max` and `min` are the maximum and minimum limits on a parameter value. `step_size` is the size of the steps allowed for a parameter within the limits `max` and `min`.

`tree` is one of the keywords `'global'`, `'current'`, `'processed'`, or `'systemglobal`. The default is `'current'`. Refer to the `create` command for a more information on the types of parameter trees.

`index` is an index into a lookup table. When a single `index` argument is given, the parameter's protection bits (see the `setprotect` command) are set so that the table lookup is turned on.

Examples:
```
setlimit('a',80,10,20)
setlimit('b',1e5,-3e2,1,'global')
setlimit('dpwr',9)
```

See also: *VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C
`destroy`	Destroy a parameter (C)
`display`	Display parameters and their attributes (C)
`fread`	Read parameters from file and load them into a tree (C)
`fsave`	Save parameters from a tree to a file (C)
`paramvi`	Edit a parameter and its attributes using `vi` text editor (M)
`parmax`	Parameter maximum values (P)
`parmin`	Parameter minimum values (P)
`parstep`	Parameter step size values (P)
`prune`	Prune extra parameters from current tree (C)
`setgroup`	Set group of a parameter in a tree (C)
`setprotect`	Set protection mode of a parameter (C)
`settype`	Change type of a parameter (C)
`setvalue`	Set value of any parameter in a tree (C)

`setlk` Set up lock parameters (M)

Syntax: `setlk(solvent)`

Description: Called from other macros to provide adjustment of locking and shimming as a function of solvent. Removing quotation marks from around different parts of the text file of the macro places that particular section into effect. If the macro is left unchanged, setting `alock='s'` is required in the parameter sets where used.

Arguments: `solvent` is the solvent to be used.

See also: *User Guide: Liquids NMR*

Related:

`alock`	Automatic lock status (P)

`setlockfreq` Set lock frequency on systems other than UNITY and VXR-S (M)

Applicability: UNITY*INOVA*, *MERCURY-Vx*, *MERCURY*, UNITY*plus*, and *GEMINI 2000* systems.

Syntax: `setlockfreq`

Description: Calculates and sets the lock frequency parameter `lockfreq`. Before using `setlockfreq`, you must acquire a signal using ^{1}H as the transmitter nucleus

(tn='H1'). To avoid errors in calculating frequencies, set lockfreq='n' before starting the acquisition.

See also: *VNMR and Solaris Software Installation*

Related:

lockfreq	Lock frequency (P)
tn	Nucleus for observe transmitter (P)

setloop — Control arrayed and real-time looping (M)

Applicability: Systems with imaging capabilities.

Syntax: setloop

Description: Set the values for nf and ni to control arrayed and real-time looping.

Loop control in imaging experiments, such as multislice, multiecho, and phase encoding, is set through a series of parameters (ne, ns, nv, nv2, nv3) directly set by the user. Underlying these parameters are two lower level parameters, nf and ni, used during pulse sequence execution to determine the mode of data acquisition. setloop manages the values of nf and ni as required to be consistent with the experiment parameters ne, nv, etc.

Two modes of data acquisition are supported in VNMR: arrayed and compressed. The difference between the modes is mainly in the data flow timing between host and acquisition computers:

- Arrayed data acquisition involves continuous communications between host and acquisition computers as pulse sequence instructions are sent to the acquisition CPU and data is returned to the host Sun for each element in the arrayed experiment. All explicitly arrayed experiments (e.g., pw=10,20,30) run in this manner. 2D experiments, including most high-resolution liquids and many imaging experiments, also run as “implicit” arrays, with the array size set by the parameter ni. Although communications between acquisition and host computers are quite fast, a small delay (typically a few milliseconds) is required to accommodate the communications and reinitialization between array elements. Certain fast imaging experiments, such as turboflash, Echo Planar Imaging (EPI), or even conventional multislice, often require loop timing similar to this interelement delay. These experiments use a second mode of data acquisition: the compressed mode.
- In compressed data acquisition, a single pulse sequence instruction set is sent to the acquisition computer, which then manages the entire experiment through real-time loops and pulse sequence elements. All data accumulated in the real-time loops is retained in the acquisition data memory until the experiment or array element is complete, at which time the data is sent back to the host. No timing overhead is associated with a real-time loop, and extremely short timing intervals may therefore be achieved with the compressed mode. Compressed data acquisition is controlled by the parameter nf, which requires that the number of points acquired must be nf*np. Experiments may be run completely in arrayed acquisition mode, or completely in compressed acquisition mode, or in a combination of the two.

setloop uses the seqcon parameter to determine which acquisition loops, if present, are arrayed and which are compressed. It then computes nf as the product of all compressed loop counts, and sets ni appropriately as either nv in the case of uncompressed phase-encode, or zero in the case of compressed phase-encode.

Each of the parameters ne, ns, nv, nv2, and nv3 have corresponding underscore macros that execute setloop. Therefore, setloop is a lower level "management" macro that is run automatically each time one of these parameters is entered, and will not normally be run explicitly by the user. The comprehensive setup macro imprep also performs the setloop function. If imprep has been executed, there is no need to run setloop.

See also: *User Guide: Imaging*

Related:

d0	Overhead delay between FIDs (P)
flashc	Convert compressed 2D data to standard 2D format (C)
ne	Number of echoes to be acquired (P)
nf	Number of FIDs (P)
ns	Number of slices to be acquired (P)
nv	umber of 2D phase encode steps to be acquired (P)
seqcon	Acquisition loop control (P)

setLP1 — Set F1 linear prediction parameters (M)

Syntax: setLP1<(extended_length<,current_length>)>

Description: Sets F1 linear prediction parameters. If no arguments are specified, the interferograms are quadrupled in length.

Arguments: extended_length is the number of complex points now existing (ni).

current_length is the number of points desired after the (forward) linear prediction.

See also: *User Guide: Liquids*

Related:

ni	Number of increments in 1st indirectly detected dimension (P)

setnoether — Disconnect host computer from Ethernet (U)

Syntax: setnoether

Description: Disconnects the host computer from the Ethernet network. Only root can execute this shellscript properly. setnoether does nothing if the system is already disconnected from the Ethernet network.

On systems running Solaris, setnoether renames the hostname.le0, defaultdomain, and defaultrouter files so that Ethernet is not activated when the system is rebooted. setnoether does not affect the second Ethernet interface on *GEMINI 2000* systems.

See also: *VNMR and Solaris Software Installation*

Related:

setether	Connect or reconnect host computer to Ethernet (U)

setoffset — Calculate offset frequency for given nucleus and ppm (M)

Syntax: setoffset(nucleus,ppm):offsetfreq

Description: Using the setref macro, setoffset calculates the offset frequency for a given chemical shift and returns the value.

Arguments: nucleus is the given nucleus.

ppm is the chemical shift.

offsetfreq returns the offset frequency for the given chemical shift.

Examples:

```
setoffset(tn,5):tof
setoffset('C13',85):dof
```

See also: *Getting Started*

Related:
- `setref` — Set frequency referencing for proton spectra (M)

setparams — Write parameter to current probe file (M)

Syntax: `setparams(param,value<,nucleus>)`

Description: Writes the value of a parameter to the current probe file. The name of the probe file is referenced from the parameter `probe`.

Arguments: `param` is the name of the parameter to write.

`value` is a string with the value to be written for the parameter.

`nucleus` is the nucleus to write in the probe file. The default is the current value of the parameter `tn`.

Examples:
```
setparams('pw90','10')
setparams('pplvl','60')
setparams('dpwr',$strdpwr,'H1')
```

See also: *Getting Started*

Related:
- `addnucleus` — Add new nucleus to existing probe file (M)
- `addparams` — Add parameter to current probe file (M)
- `addprobe` — Create new probe directory and probe file (M)
- `getparam` — Retrieve parameter from probe file (M)
- `probe` — Probe type (P)
- `tn` — Nucleus for the observe transmitter (P)
- `updateprobe` — Update probe file (M)

setpen — Set maximum number of HP plotter pens (M)

Syntax: `setpen<(maxpen,max_number_pens)>`

Description: Allows the user to interactively define the maximum number of pens when changing to a Hewlett-Packard plotter.

Arguments: `maxpen` is the current value of the parameter `maxpen`.

`maximum_number_pens` is the maximum number of pens to be used. If the value of `max_number_pens` is less than or equal to the current value of the parameter `maxpen`, this value becomes the new value of `maxpen`.

See also: *Getting Started*

Related:
- `color` — Select plotting colors from a graphical interface (M)
- `maxpen` — Maximum number of pens to use (P)

setplotdev — Return characteristics of a named plotter (C)

Syntax: `setplotdev<:plotter_type>`

Description: Returns information from the `devicenames` and `devicetable` files to identify the characteristics of a plotter. This command need never be entered directly by a user because it is automatically called whenever the `plotter` parameter is set. Note that different “types” of plotters (and printers) are characterized in `devicetable`. The `devicenames` file associates different “names” to a given “type.”

Arguments: `plotter_type` returns the characteristics of the named plotter.

See also: *VNMR and Solaris Software Installation*

Related:
- `plotter` — Plotter device (P)

setpower — Set power and pulsewidth for a given γB1 value (M)

Syntax: `setpower(γB1,nucleus)`

Description: Sets power level and pw90 values. For tn, setpower uses ref_pwr and ref_pw90 from the parameter set or from the probe table. For dn, it uses ref_pwxlvl and ref_pwx90 from the parameter set or from the probe table. For dn2, it uses ref_pwx2lvl and ref_pwx290 from the parameter set or from the probe table. If the reference power levels and pulse width do not exist, setpower uses tpwr (pw90), dpwr (1/dmf) or dpwr2 (1/dmf2) (if the nucleus is tn, setpower uses tpwr; if the nucleus is dn, it uses dpwr; if the nucleus is dn2, it uses dpwr2).

Arguments: γB1 is a given γB1 value.

nucleus is a given nucleus.

Examples:
```
setpower(sw,tn)
setpower(5000,H1)
```

Related:

dn	Nucleus for first decoupler (P)
dn2	Nucleus for second decoupler (P)
dpwr	Power level for first decoupler with linear amplifiers (P)
dpwr2	Power level for second decoupler (P)
pw90	90° pulse width (P)
sw	Spectral width in directly detected dimension (P)
tpwr	Observe transmitter power level with linear amplifiers (P)

setprotect — Set protection mode of a parameter (C)

Syntax: `setprotect(parameter,'set'|'on'|'off',bit_vals<,tree>)`

Description: Enables changing the protection bits associated with a parameter.

Arguments: parameter is the name of the parameter.

'set' causes the current protection bits for the parameter to be completely replaced with the bits specified by bit_vals.

'on' causes the bits specified in bit_vals to be turned on without affecting any other protection bits.

'off' causes the bits specified in bit_vals to be turned off without affecting any other protection bits.

bit_vals is the *sum* of the *values* of bits selected from the following list:

Bit	*Value*	*Description*
0	1	Cannot array the parameter
1	2	Cannot change active/not active status
2	4	Cannot change the parameter value
3	8	Causes _parameter macro to be executed (e.g., if parameter is named Sw, macro _Sw is executed when Sw is changed)
4	16	Avoids automatic redisplay
5	32	Cannot delete parameter
6	64	System ID for spectrometer or data station
7	128	Cannot copy parameter from tree to tree
8	256	Will not set array parameter
9	512	Cannot set parameter enumeral values
10	1024	Cannot change the parameter's group
11	2048	Cannot change protection bits

Bit	Value	Description
12	4096	Cannot change the display group
13	8192	Look up minimum, maximum, step values in table

For example, to change the first two protection bits, with values 1 and 2, either enter `setprotect` twice (once for each value) with the keyword `'on'`, or enter `setprotect` once with `bit_vals` set to 3 (sum of 1 and 2) with the keyword `'set'`.

`tree` is one of the keywords `'global'`, `'current'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on the types of parameter trees.

Examples:
```
setprotect('syn','on',2)
setprotect('pslabel','on',8)
```

See also: *VNMR User Programming*

Related:

`array`	Parameter order and precedence (P)
`create`	Create new parameter in a parameter tree (C)
`destroy`	Destroy a parameter (C)
`display`	Display parameters and their attributes (C)
`fread`	Read parameters from file and load them into a tree (C)
`fsave`	Save parameters from a tree to a file (C)
`paramvi`	Edit a parameter and its attributes using `vi` text editor (M)
`prune`	Prune extra parameters from current tree (C)
`setlimit`	Set limits of a parameter in a tree (C)

`setref` Set frequency referencing (M)

Syntax: `setref<(nucleus)>:$rfl,$rfp,$reffrq,$refpos`

Description: Calculates the referencing for a given parameter or FID data set, for samples locked on deuterium, and based on the chemical shift of the lock solvent line. `setref` uses information in `/vnmr/solvents` (^{2}H chemical shift for current solvent) and `/vnmr/nuctables/nuctabref` (absolute reference frequencies for NMR nuclei) to predict the position of the reference frequency with the current solvent, spectral window, and spectrometer frequency. `setref` assumes a locked sample.

Arguments: An argument and return values are beneficial for the use of `setref` within other macros such as `setref1` and `setref2`. By default (i.e., without an argument), `setref` calculates the referencing for 1D spectra or for the directly detected dimension in nD spectra (f2 in 2D, f3 in 3D).

When only `nucleus` is used as an argument, `setref` returns values without setting parameters.

`$rfl,$rfp,$reffrq,$refpos` are return values for reference peak position, reference peak frequency, reference line frequency, and reference line position, respectively.

Examples:
```
setref
setref('C13'):$rfl,$rfp
```

See also: *Getting Started*

Related:

`reffrq`	Reference frequency of reference line (P)
`refpos`	Position of reference frequency (P)
`rfl`	Reference peak position (P)
`rfp`	Reference peak frequency (P)

rl	Set reference line in directly detected dimension (M)
setref1	Set frequency referencing for 1st indirectly detected dimension (M)
setref2	Set frequency referencing for 2nd indirectly detected dimension (M)
setup	Set up parameters for basic experiments (M)
tmsref	Reference 1D proton or carbon spectrum to TMS (M)

setref1 — Set frequency referencing for 1st indirectly detected dimension (M)

Syntax: `setref1(nucleus)`

Description: Calculates the referencing for the first indirect dimension (f1) in nD parameters and FID data sets, for samples locked on deuterium, and for the solvent specified by the solvent parameter. setref1 uses the setref macro to calculate the reference frequency and based on the chemical shift of the lock solvent line and /vnmr/nuctables/nuctabref (absolute reference frequencies for NMR nuclei) to predict the referencing in f1 (reffrq1, rfl1, rfp1) with the current solvent, sw1, and for the frequency of the specified nucleus.

Arguments: nucleus is the frequency-relevant nucleus in f1.

Examples:
```
setref1(tn)
setref1('C13')
```

See also: *User Guide: Liquids NMR*

Related:

reffrq1	Reference frequency of reference line in 1st indirect dimension (P)
refpos1	Position of reference frequency in 1st indirect dimension (P)
rfl	Reference peak position (P)
rfl1	Reference peak position in 1st indirectly detected dimension (P)
rfp1	Reference peak frequency in 1st indirectly detected dimension (P)
setref	Set frequency referencing (M)

setref2 — Set frequency referencing for 2nd indirect detected dimension (M)

Syntax: `setref1(nucleus)`

Description: Calculates the referencing for the second indirect dimension (f2) in nD parameters and FID data sets, for samples locked on deuterium, and for the solvent specified by the solvent parameter. setref2 uses setref to calculate the reference frequency and based on the chemical shift of the lock solvent line and /vnmr/nuctables/nuctabref (absolute reference frequencies for NMR nuclei) to predict the referencing in f2 (reffrq2, rfl2, rfp2) with the current solvent, sw2, and for the frequency of the specified nucleus.

Arguments: nucleus is the frequency-relevant nucleus in f2.

Examples:
```
setref2(tn)
setref2('C13')
```

See also: *User Guide: Liquids NMR*

Related:

reffrq2	Reference frequency of reference line in 2nd indirect dimension (P)
refpos2	Position of reference frequency in 2nd indirect dimension (P)
rfl2	Reference peak position in 2nd indirectly detected dimension (P)
rfp2	Reference peak frequency in 2nd indirectly detected dimension (P)
rl2	Set reference line in 2nd indirectly detected dimension (M)
setref	Set frequency referencing (M)

setscout — Set up a scout run (M)

Applicability: Systems with LC-NMR accessory.

Syntax: `setscout`

Description: Designed to help run simple experiments during the setup phase of LC-NMR or to be the first of two experiments run on peaks in a stopped-flow or loop-flushing mode. In the latter application, you can set `wexp='setwet au'` so that the scout run is analyzed, parameters adjusted, and an appropriate solvent-suppressed experiment run.

If parameters already exist in the current experiment for performing the `lc1d` pulse sequence, `setscout` turns off the solvent suppression portion of the sequence; if they do not exist, they are created and set to default values using `lc1d`.

See also: *User Guide: Liquids NMR*

Related:

`lc1d`	Pulse sequence for LC-NMR (M)
`setwet`	Set up a solvent-suppressed experiment (M)

setssfilter — Set sslsfrq to the frequencies of each of the suppressed solvents (M)

Applicability: Systems with LC-NMR accessory.

Syntax: `setssfilter`

Description: Sets `sslsfrq` to the frequencies of each of the suppressed solvents.

See also: *User Guide: Liquids NMR*

setsw — Set spectral width (M)

Syntax: `setsw(downfieldppm,upfieldppm)`

Description: Sets `sw` and `tof` for the given spectral window and also does referencing.

Arguments: `downfieldppm` is the downfield frequency, in ppm.

`upfieldppm` is the upfield frequency, in ppm.

Examples:

```
setsw(12,0)
setsw(235,-15)
```

See also: *Getting Started*

Related:

`setsw1`	Set spectral width in evolution dimension (M)
`setsw2`	Set spectral width in 2nd evolution dimension (M)
`sw`	Spectral width in directly detected dimension (P)
`tof`	Frequency offset for observe transmitter (P)

setsw1 — Set spectral width in evolution dimension (M)

Syntax: `setsw1(nucleus,downfieldppm,upfieldppm):offset`

Description: Sets `sw1` for the given spectral window and also does referencing.

Arguments: `nucleus` returns the nucleus.

`downfieldppm` is the downfield frequency, in ppm.

`upfieldppm` is the upfield frequency, in ppm.

`offset` returns the appropriate offset.

Examples:

```
setsw1(tn,12,0)
setsw1(dn,235,-15):dof
```

See also: *User Guide: Liquids NMR*

Related:
- `setsw` Set spectral width (M)
- `sw1` Spectral width in 1st indirectly detected dimension (P)

setsw2 Set spectral width in 2nd evolution dimension (M)

Syntax: `setsw2(nucleus,downfieldppm,upfieldppm):offset`

Description: Sets `sw2` for the given spectral window and also does referencing.

Arguments: `nucleus` returns the nucleus.

`downfieldppm` is the downfield frequency, in ppm.

`upfieldppm` is the upfield frequency, in ppm.

`offset` returns the appropriate offset.

Examples:
```
setsw2(tn,12,0)
setsw2(dn,235,-15):dof
```

See also: *User Guide: Liquids NMR*

Related:
- `setsw` Set spectral width (M)
- `sw2` Spectral width in 2nd indirectly detected dimension (P)

setselfrqc Set selective frequency and width (M)

Syntax: `setselfrqc`

Description: Sets selective frequency and width of the excitation bandwidth for selective excitation. Used after `TOCSY1D` and `NOESY1D` selection. Selected frequencies and widths of the excitation bandwidth are used by `suselfrq`.

Related:
- `NOESY1D` Change parameters for NOESY1D experiment (M)
- `suselfrq` Select peak, continue selective excitation experiment (M)
- `TOCSY1D` Change parameters for TOCSY1D experiment (M)

setselinv Set up selective inversion (M)

Syntax: `setselinv`

Description: Sets power, pulsewidth, and shape for selective inversion; used by `suselfrq`. By default, `setselinv` selects a q3 gaussian cascade pulse if a waveform generator or linear modulator is present (UNITY*INOVA* and UNITY*plus*). Otherwise, `setselinv` selects a "rectangular" pulse.

Related:
- `setselfrqc` Select selective frequency and width (M)
- `suselfrq` Select peak, continue selective excitation experiment (M)

settcldefault Select default display templates for pulse sequence (M)

Syntax: `settcldefault<(<default><,sequence>)>`

Description: Selects the display templates to use as the default for a pulse sequence.

Arguments: `default` is the name of the set of display templates to use for the default display of the current pulse sequence (defined by the parameter `seqfil`). If no arguments are given, the user is prompted for the name of the display templates.

`sequence` defines which pulse sequence will use the default displays of the pulse sequence given as the first argument. The default is the pulse sequence defined by the parameter `seqfil`.

Examples:
```
settcldefault
settcldefault('cosy')
settcldefault('default2d','HMQC8')
```

See also: *VNMR User Programming*

Related:

seqfil	Pulse sequence name (P)

settype — Change type of a parameter (C)

Syntax: `settype(parameter,type<,tree>)`

Description: Changes the type of an existing parameter. A string parameter can be changed into a string or flag type, or a real parameter can be changed into a real, delay, frequency, pulse, or integer type. Note that `settype` cannot change a string parameter into a real, or change a real into a string.

Arguments: `parameter` is the name of an existing parameter.

`type` is one of the keywords `'string'`, `'flag'`, `'real'`, `'delay'`, `'frequency'`, `'pulse'`, or `'integer'`.

`tree` is one of the keywords `'global'`, `'current'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on the types of parameter trees.

Examples:
```
settype('in','flag','global')
settype('p12','pulse')
```

See also: *VNMR User Programming*

Related:

create	Create new parameter in a parameter tree (C)
display	Display parameters and their attributes (C)
setgroup	Set group of a parameter in a tree (C)
setlimit	Set limits of a parameter in a tree (C)
setprotect	Set protection mode of a parameter (C)
setvalue	Set value of any parameter in a tree (C)

setup — Set up parameters for basic experiments (M)

Syntax: `setup<(nucleus<,solvent>)>`

Description: Returns a parameter set to do the experiment requested, complete with positioning of the transmitter and decoupler. Parameters set by `setup` are recalled from the `/vnmr/stdpar` directory or from the user's `stdpar` directory if the appropriate file exists there. Any changes made to the files in these directories are reflected in `setup`. The default parameters for carbon and proton survey spectra are in files `/vnmr/stdpar/C13.par` and `/vnmr/stdpar/H1.par`, respectively. These files should be modified as desired to produce spectra under desirable conditions.

Arguments: `nucleus` is a nucleus chosen from the files in `/vnmr/stdpar` or in the user's `stdpar` directory (e.g., `'H1'`, `'C13'`, `'P31'`). The default is the system displays a menu with choices of nuclei. After you chose a nucleus, the system displays a menu with choices of solvents, and you choose one.

`solvent` is a solvent chosen from the file `/vnmr/solvents` (e.g., `'CDCl3'`, `'C6D6'`, `'D2O'`). The default is `'CDCl3'`.

Alternate: Nucleus,Solvent button in the Setup Menu.

Examples:
```
setup
setup('H1')
setup('C13','DMSO')
```

See also: *Getting Started*

setup_dosy — Set up gradient levels for DOSY experiments (M)

Syntax: `setup_dosy`

Description: Initiates a dialogue to set up an array of `gzlvl1` values for DOSY experiments. `setup_dosy` requests the number of array increments and an initial and a final `gzlvl1` value and sets up an array that gives increments in `gzlvl1` squared between these limits. `setup_dosy` retrieves the gradient strength from the probe calibration file if `probe<>''` and stores it in the local experimental parameter `DAC_to_G`. If `probe=''` (i.e., the probe is not defined), then `DAC_to_G` is set to the current value of the global parameter `gcal`.

See also: *User Guide: Liquids NMR*

Related:

`dosy`	Process DOSY experiments (M)
`DAC_to_G`	Parameter to store gradient calibration value in DOSY sequences (P)
`setgcal`	Set the gradient calibration constant (M)

setvalue — Set value of any parameter in a tree (C)

Syntax: `setvalue(parameter,value<,index><,tree>)`

Description: Sets the value of any parameter in a tree. This command bypasses the normal range checking for parameter entry, as well as bypassing any action that would be invoked by the parameter's protection mode (see the `setprotect` command). If the parameter entry normally causes a `_parameter` macro to be executed, this action also is bypassed.

Arguments: `parameter` is the name of the parameter.

`value` is the value to set to the parameter.

`index` is the number of a single element in an arrayed parameter. The default is 1.

`tree` is one of the keywords `'global'`, `'current'`, `'processed'`, or `'systemglobal'`. The default is `'current'`. Refer to the `create` command for more information on the types of parameter trees.

Examples: `setvalue('arraydim',128,'processed')`

See also: *VNMR User Programming*

Related:

`create`	Create new parameter in a parameter tree (C)
`setprotect`	Set protection mode of a parameter (C)

setwave — Write a wave definition string into Pbox.inp file (M)

Syntax: `setwave('sh bw/pw ofs st ph fla trev d1 d2 d0')`

Description: Sets up a single excitation band in the `Pbox.inp` file. An unlimited number of waves can be combined by reapplying `setwave`.

Arguments: A single string of 1 to 10 wave parameters in predefined order. Note that a single quote is required at the start and the end of the entire string, but no single quotes are required surrounding characters and strings inside the entire string.

`sh` is the name of a shape file.

`bw/pw` is either the bandwidth, in Hz, or the pulsewidth, in sec.

`ofs` is the offset, in Hz.

`st` is a number specifying the spin status: 0 for excitation, 1 for de-excitation, or 0.5 for refocusing.

`ph` is the phase (or phase cycle, see `wavelib/supercycles`).

`fla` is the flip angle. Note that `fla` can override the default flip angle.

`trev` is a time reversal. This can be used to cancel time reversal if spin status (`st`) is set to 1 for Mxy.

`d1` is the delay, in sec, prior the pulse.

`d2` is the delay, in sec, after the pulse.

`d0` is a delay or command prior to `d1`. If `d0=a`, the wave is appended to the previous wave.

Examples:
```
setwave('eburp1')
setwave('GARP 12000.0')
setwave('esnob 600 -1248.2 1 90.0 n n 0.001')
```

See also: *User Guide: Liquids NMR*

Related:

`Pbox`	Pulse shaping software (U)

`setwin` Activate selected window (C)

Syntax: `setwin(row<,column>)`

Description: Activates a specific pane in the VNMR graphics window. Panes are numbered sequentially from left to right and top to bottom.

Arguments: `row` is the number of the row containing the pane to be activated.

`column` is the number of the column containing the pane to be activated.

Examples:
```
setwin(3)
setwin(1,2)
```

See also: *Getting Started*

Related:

`curwin`	Current window (P)
`fontselect`	Open FontSelect window (C)
`jwin`	Activate current window (M)
`mapwin`	List of experiment numbers (P)
`setgrid`	Activate selected window (M)

`sf` Start of FID (P)

Description: Sets the start of the FID display. This parameter can be entered in the usual way or interactively controlled by the sf wf button during a FID display.

Values: `0` to the value of `at`, in seconds.

See also: *Getting Started*

Related:

`at`	Acquisition time (P)
`dcon`	Display noninteractive color intensities map (C)
`dconi`	Interactive 2D data display (C)
`df`	Display a single FID (C)
`sf1`	Start of interferogram in 1st indirectly detected dimension (P)
`sf2`	Start of interferogram in 2nd indirectly detected dimension (P)
`vf`	Vertical scale of FID (P)
`wf`	Width of FID (P)

sf1 — Start of interferogram in 1st indirectly detected dimension (P)

Description: Sets the start of the interferogram display in the first indirectly detected dimension.

Values: 0 to (2 × ni)/sw1, in seconds.

See also: *User Guide: Liquids NMR*

Related:

ni	Number of increments in 1st indirectly detected dimension (P)
sf	Start of FID (P)
sw1	Spectral width in 1st indirectly detected dimension (P)
wf1	Width of interferogram in 1st indirectly detected dimension (P)

sf2 — Start of interferogram in 2nd indirectly detected dimension (P)

Description: Sets the start of the interferogram display in the second indirectly detected dimension.

Values: 0 to (2 × ni2)/sw2, in seconds.

See also: *User Guide: Liquids NMR*

Related:

ni2	Number of increments in 2nd indirectly detected dimension (P
sf	Start of FID (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)
wf2	Width of interferogram in 2nd indirectly detected dimension (P)

sfrq — Transmitter frequency of observe nucleus (P)

Description: Contains the frequency for the observe transmitter. sfrq is automatically set when tn is changed, and it should not be necessary for the user to manually set this parameter.

Values: Number, in MHz.

See also: *Getting Started*

Related:

dfrq	Transmitter frequency of first decoupler (P)
dfrq2	Transmitter frequency of second decoupler (P)
dfrq3	Transmitter frequency of third decoupler (P)
tn	Nucleus for observe transmitter (P)
tof	Frequency offset for observe transmitter (P)
spcfrq	Display frequencies of rf channels (M)

sh2pul — Set up for a shaped observe excitation sequence (M)

Applicability: Systems with waveform generators.

Syntax: sh2pul

Description: Behaves like standard two-pulse sequence S2PUL but with the normal hard pulses changed into shaped pulses from the waveform generator. The name of the shaped pulse associated with pw is pwpat and p1 is p1pat. Information about the specifics of power settings and bandwidths is available from the macros bandinfo and pulseinfo.

See also: *VNMR User Programming*

Related:

bandinfo	Shaped pulse information for calibration (M)
p1pat	Shape of an excitation pulse (P)
pwpat	Shape of refocusing pulse (P)
pulseinfo	Shaped pulse information for calibration (M)

shdec — Set up for shaped observe excitation sequence (M)

Applicability: Systems with waveform generators.

Syntax: `shdec`

Description: Sets up the SHDEC pulse sequence that generates a shaped pulse on the observe channel using the waveform generator. It also allows for programmed (e.g.: multiselective) homodecoupling or solvent presaturation using the observe transmitter, and an optional gradient pulse following the excitation pulse.

See also: *User Guide: Liquids NMR*

Related: `Pbox` Pulse shaping software (U)

shell — Start a UNIX shell (C)

Syntax: `shell<(command)>:$file1,$file2,...`

Description: Brings up a normal UNIX shell for the user. On the Sun, a pop-up window is created. On the GraphOn terminal, the entire terminal is used.

Arguments: `command` is a UNIX command line to be executed by `shell`. The default is to bring up a UNIX shell. If the last character in the command line is the symbol `&`, the command is executed in background, which allows VNMR commands to be entered and executed while the `shell` command is still running. Note that if this background feature is used, any printed output should be redirected to a file. Otherwise, the output may pop up in the text window at random times.

`$file1, $file2,...` are names of files to hold text lines generated as a result of the UNIX command. The default is to display the text lines. Each file receives a single display line.

Examples:

```
shell
shell('ps')
shell('ls –lt):$filelist
shell('ls –t | grep May')
shell('cd /vnmr/psglib; cat '+seqfil+'.c')
shell(systemdir+'/acqbin/Acqstat '+hostname+' &')
```

See also: *Getting Started, VNMR User Programming*

Related: `shelli` Start an interactive UNIX shell (C)

shelli — Start an interactive UNIX shell (C)

Syntax: `shelli(command)`

Description: On a terminal, runs interactively the UNIX command line given as the argument. No return or output variables are allowed. On window-based VNMR, `shelli` is identical to the `shell` command.

Arguments: `command` is a UNIX command line to be executed.

Examples: `shelli('vi myfile')`

See also: *Getting Started, VNMR User Programming*

Related: `shell` Start a UNIX shell (C)

shellreturn — Run UNIX shell program and return arguments (obsolete)

Description: This macro is no longer in VNMR. It is replaced by the `shell` command.

Related: `shell` Start a UNIX shell (C)

shim — Submit an Autoshim experiment to acquisition (C)

Syntax: `shim`

Description: Performs validity checks on the acquisition parameters and then submits an Autoshim experiment to acquisition.

See also: *Getting Started*

Related:

`au`	Submit experiment to acquisition and process data (C)
`change`	Submit a change sample experiment to acquisition (M)
`ga`	Submit experiment to acquisition and FT the result (C)
`go`	Submit experiment to acquisition (C)
`lock`	Submit an Autolock experiment to acquisition (C)
`sample`	Submit change sample, autoshim experiment to acquisition (M)
`spin`	Submit a spin setup experiment to acquisition (C)
`su`	Submit a setup experiment to acquisition (M)

shimset — Type of shim set (P)

Description: Configuration parameter for the type of shims on the system. The value of `shimset` is set using the Shimset label in the CONFIG window (opened from `config`).

Values: `1` to `14`, where the value identifies one of the following shim sets:

`1` is a shim set in a Varian 13-shim supply with computer-controlled axial shims z1, z1c, z2, z2c, z3, z4, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3. Shims can be adjusted from –2047 to +2047. This value is set implicitly for the *GEMINI 2000* and is also used with the Ultra•nmr shim system when operated from the HIM box (Varian 13 Shims choice in CONFIG window).

`2` is a shim set in a Oxford 18-shim supply with computer-controlled axial shims z1, z1c, z2, z2c, z3, z4, z5, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy, zx2y2. Shims can be adjusted from –2047 to +2047 (Oxford 18 Shims choice in CONFIG window).

`3` is a shim set in a Varian 23-shim supply with computer-controlled axial shims z1, z2, z3, z4, z5, z6, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy, zx2y2, z3x, z3y, z2x2y2, z2xy. Shims can be adjusted from –32767 to +32767 (Varian 23 Shims choice in CONFIG window).

`4` is a shim set in a Varian 28-shim supply with computer-controlled axial shims z1, z2, z3, z4, z5, z6, z7, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy, zx2y2, z3x, z3y, z2x2y2, z2xy, zx3, zy3, z4x, z4y. Shims can be adjusted from –32767 to +32767 (Varian 28 Shims choice in CONFIG window).

`5` is a shim set in an Ultra•nmr shim system (39 shim channels) with computer-controlled axial shims z1, z1c, z2, z2c, z3, z3c, z4, z4c, z5, z6, z7, z8, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy, zx2y2, z3x, z3y, z2x2y2, z2xy, zx3, zy3, z4x, z4y, z3x2y2, z3xy, z2x3, z2y3, z3x3, z3y3, z4x2y2, z4xy, z5x, z5y. Shims can be adjusted from –32767 to +32767 (Ultra Shims choice in CONFIG window).

`6` is a shim set in a Varian 18-shim supply with computer-controlled axial shims z1, z2, z3, z4, z5, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy, zx2y2. Shims can be adjusted from –32767 to +32767 (Varian 18 Shims choice in CONFIG window).

`7` is a shim set in a Varian 20-shim supply with computer-controlled axial shims z1, z2, z3, z4, z5, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy,

zx2y2, z3x, z3y. Shims can be adjusted from –32767 to +32767 (Varian 20 Shims choice in CONFIG window).

8 is a shim set in a Oxford 15-shim supply with computer-controlled axial shims z1, z2, z3, z4, and radial shims x1, y1, xz, yz, xy, x2y2, zx2y2, xz2, yz2, zxy. Shims can be adjusted from –2047 to +2047 (Oxford 15 Shims choice in CONFIG window).

9 is a shim set in a Varian Ultra•nmr shim system II (40 shim channels) with computer-controlled axial shims z1, z1c, z2, z2c, z3, z3c, z4, z4c, z5, z6, z7, z8, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, x4, y4, xz2, yz2, zxy, zx2y2, z3x, z3y, z2x2y2, z2xy, zx3, zy3, z4x, z4y, z3x2y2, z3xy, z2x3, z2y3, z3x3, z3y3, z4x2y2, z4xy, z5x, z5y. Shims can be adjusted from –32767 to +32767 (Varian 40 Shims choice in CONFIG window).

10 is a shim set in a Varian 14-shim supply with computer-controlled axial shims z1, z1c, z2, z2c, z3, z4, z5, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3. Shims can be adjusted from –2047 to +2047 (Varian 14 Shims choice in CONFIG window).

11 is a shim set in a Varian 8-shim supply with computer-controlled axial shims z1, z2, and radial shims x1, y1, xz, yz, xy, x2y2. Shims can be adjusted from –32767 to +32767 (Whole Body Shims choice in CONFIG window).

12 is a shim set in a Varian 26-shim supply with computer-controlled axial shims z1, z2, z3, z4, z5, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy, zx2y2, z3x, z3y, z2x2y2, z2xy, zx3, zy3, x4, y4. Shims can be adjusted from –32767 to +32767 (Varian 26 Shims choice in CONFIG window).

13 is a shim set in anVarian 29-shim supply with computer-controlled axial shims z1, z2, z3, z4, z5, z6, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, xz2, yz2, zxy, zx2y2, z3x, z3y, z2x2y2, z2xy, zx3, zy3, z4x, z4y, z5x, z5y. Shims can be adjusted from –32767 to +32767 (Varian 29 Shims choice in CONFIG window).

14 is a shim set in a Varian 35-shim supply with computer-controlled axial shims z1, z2, z3, z4, z5, z6, and radial shims x1, y1, xz, yz, xy, x2y2, x3, y3, x4, y4, xz2, yz2, zxy, zx2y2, z3x, z3y, z2x2y2, z2xy, zx3, zy3, z4x, z4y, z3x2y2, z3xy, z4x2y2, z4xy, z5x, z5y. Shims can be adjusted from –32767 to +32767 (Varian 35 Shims choice in CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M

shimspath — Path to user's shims directory (P)

Description: Contains an absolute path to a user's shims directory, which has files of shim settings. If shimspath exists for a user, it must be defined in the user's global parameter file, To create shimspath, enter.
create('shimspath','string','global').

See also: *Getting Started*

Related:

rts	Retrieve shim coil settings (C)
svs	Save shim coil settings (C)

showconsole — Show UNITY*INOVA* console configuration parameters (U)

Applicability: UNITY*INOVA* and *MERCURY-Vx* systems.

Syntax: (From UNIX) showconsole

Description: Displays console hardware configuration parameters and system versions. This information is recorded during console bootup and represents the system hardware options recognized by the acquisition computer. The command is used mainly when troubleshooting or performing diagnostics.

See also: *Getting Started*

Related:
- `ihwinfo` — Hardware status of UNITY*INOVA* console (C)

showfit — Display numerical results of deconvolution (M)

Syntax: `showfit`

Description: After a deconvolution, the results are written into file `fitspec.outpar` in an abbreviated format. `showfit` converts these data to an output format more suitable for examination and printing.

Alternate: Results button in the Deconvolution Menu.

See also: *User Guide: Liquids NMR*

Related:
- `fitspec` — Perform spectrum deconvolution (C)
- `plfit` — Plot deconvolution analysis (M)
- `usemark` — Use “mark” output as deconvolution starting point (M)

showoriginal — Restore first 2D spectrum in 3D DOSY experiment (M)

Syntax: `showoriginal`

Description: Restores the first 2D spectrum in a 3D DOSY experiment (if it has been saved by the `dosy` macro).

See also: *User Guide: Liquids NMR*

Related:
- `dosy` — Process DOSY experiments (M)

showplotter — Show list of currently defined plotters and printers (M)

Syntax: `showplotter`

Description: Shows a list of currently defined plotters and printers.

See also: *Getting Started*

Related:
- `plotter` — Plotter device (P)
- `printer` — Printer device (P)

showplotq — Display plot jobs in plot queue (M)

Syntax: `showplotq`

Description: Displays current plot jobs in the plot queue for the active plotter in VNMR.

See also: *Getting Started*

Related:
- `killplot` — Stop plot jobs and remove from plot queue (C
- `showprintq` — Display print jobs in print queue (C)

showprintq — Display print jobs in print queue (M)

Syntax: `showprintq`

Description: Displays current print jobs in the print queue for the active printer in VNMR.

See also: *Getting Started*

Related:

killprint	Stop print jobs and remove from print queue (C)
showplotq	Display plot jobs in plot queue (M)

showstat — Display information about status of acquisition (M,U)

Syntax: (From VNMR) `showstat<(remote_system)>`
(From UNIX) `showstat <remote_system>`

Description: Displays information in the text screen about the status of acquisition on a spectrometer. The command is similar to Acqstat, but displays the information in a non-graphical manner and only once.

Arguments: `remote_system` is the host name of a remote spectrometer. The default is to display information about acquisition on the local system.

See also: *Getting Started*

Related:

Acqstat	Bring up the acquisition status display (U)

sin — Find sine value of an angle (C)

Syntax: `sin(angle)<:n>`

Description: Finds the sine value of an angle.

Arguments: `angle` is the angle given in radians.

`n` is a return value giving the sine of `angle`. The default is to display the sine value in the status window.

Examples:
```
sin(.5)
sin(val):sin_val
```

See also: *VNMR User Programming*

Related:

acos	Find arc cosine of number (C)
arccos	Calculate arc cosine of real number (M)
arcsin	Calculate arc sine of real number (M)
arctan	Calculate arc tangent of real number (M)
asin	Find arc sine of number (C)
atan	Find arc tangent of a number (C)
cos	Find cosine value of an angle (C)
exp	Find exponential value (C)
ln	Find natural logarithm of a number (C)
tan	Find tangent value of an angle (C)

sine — Find values for a sine window function (M)

Syntax: `sine<(shift<,number_points<,domain>)>`

Description: Calculates appropriate values for parameters sb and sbs (if the `domain` argument is `'f2'`) or for parameters sb1 and sbs1 (if the `domain` argument is `'f1'`) in order to achieve a sine window function. The value of the parameter trace is used if the `domain` argument is not entered.

Arguments: If `shift` is greater than 1, the `sbs` parameter is calculated as `2*sb/shift` (`sbs1` is calculated as `2*sb1/shift`). `sine(2)` gives a "PI/2-shifted" sine window, i.e., cosine weighting. `sine(3)` gives a "PI/3" shifted sine window, etc. If `shift` is less than or equal to 1, an unshifted sine window is used (`sbs='n'` or `sbs1='n'`).

`number_points` specifies the number of real points that the window function spans. The value of the window function for subsequent points is 0.

number_points must be greater than 0 and a multiple of 2. The default is ni*2 if trace='f1', or np if trace='f2'.

domain is 'f1' or 'f2'. The default is the current setting of trace.

See also: *User Guide: Liquids NMR*

Related:

np	Number of data points (P)
sb	Sinebell const. in directly detected dimension (P)
sb1	Sinebell const. in 1st indirectly detected dimension (P)
sbs	Sinebell shift const. in directly detected dimension (P)
sbs1	Sinebell shift const. in 1st indirectly detected dimension (P)
sinesq	Find values for a sine squared window function (M)
trace	Mode for *n*-dimensional data display (P)

sinebell — Select default parameters for sinebell weighting (M)

Syntax: sinebell

Description: Generates initial guess at good sinebell weighting parameters by setting the sb and sb1 parameters to one-half the acquisition time and turning off all other weighting. Use sinebell in absolute-value 2D experiments only.

Alternate: Sinebell button in the 2D Processing Parameter Setup Menu.

See also: *User Guide: Liquids NMR*

Related:

pseudo	Set default parameters for pseudo-echo weighting (M)
sb	Sinebell const. in directly detected dimension (P)
sb1	Sinebell const. in 1st indirectly detected dimension (P)

sinesq — Find values for a sine-squared window function (M)

Syntax: sinesq<(shift<,number_points<,domain>)>

Description: Calculates appropriate values for parameters sb and sbs (if the domain argument is 'f2') or for parameters sb1 and sbs1 (if the domain argument is 'f1') in order to achieve a sine-squared window function. The value of parameter trace is used if the domain argument is not entered.

Arguments: shift sets the starting value for the window function. If shift is greater than 0, the starting value is given by sin p/shift; otherwise, if shift is less than or equal to 0, the starting value is 0. The default value is 0.

number_points specifies the number of real points that the window function spans. The value of the window function for subsequent points is 0. The number_points argument must be greater than 0 and a multiple of 2. The default is ni*2 if trace='f1', or np if trace='f2'.

domain is 'f1' or 'f2'. The default is the current setting of trace.

See also: *User Guide: Liquids NMR*

Related:

ni	Number of increments in 1st indirectly detected dimension (P)
np	Number of data points (P)
sb	Sinebell const. in directly detected dimension (P)
sb1	Sinebell const. in 1st indirectly detected dimension (P)
sbs	Sinebell shift const. in directly detected dimension (P)
sine	Find values for a sine window function (M)
trace	Mode for *n*-dimensional data display (P)

size — Returns the number of elements in an arrayed parameter (O)

Syntax: size

Description: In MAGICAL programming, an operator that returns the number of elements in an arrayed parameter.

Examples:
```
r1 = size('d2')
```

See also: *User Programming*

Related:

arraydim	Dimension of experiment (P)
typeof	Return identifier for argument type (O)
length	Determine length of a string (C)

slamp — Measured line amplitudes (obsolete)

Description: This parameter is no longer used.

slfreq — Measured line frequencies (P)

Description: Contains a list of measured line frequencies. In iterative spin simulation, a calculated spectrum is matched to the lines in the list. The spinll macro fills in slfreq from the last line listing or a mark operation. Use assign to make assignments between the measured lines and the calculated transitions. slfreq is a global parameter and is displayed by dla.

See also: *User Guide: Liquids NMR*

Related:

assign	Assign transitions to experimental lines (M)
cla	Clear all line assignments (M)
dla	Display spin simulation parameter arrays (M)
fitspec	Perform spectrum deconvolution (C)
mark	Determine intensity of a spectrum at a point (C)
spinll	Set up an slfreq array (M)

sliceorder — Reorder the slice position list (M)

Applicability: Systems with the imaging capabilities.

Syntax:
```
sliceorder<('a'|'d'|'i')>
```

Description: Reorders the slice position list, pss, in ascending, descending, or alternating odd/even order.

Alternating order is often used for multislice excitation to separate physically adjacent slices in time to reduce saturation effects. For example, if pss=-3,-2,-1,0,1,2,3 is reordered by alternating odd/even order, the result is pss=-3,-1,1,3,-2,0,2 so that the adjacent slices -1 and -2, for example, are separated by three time intervals instead of just one.

Arguments: 'a' is a keyword to reorder the list in alternating odd/even order. This is the default.

'd' is a keyword to reorder the list in descending order.

'i' is a keyword to reorder the list in ascending order.

Examples:
```
sliceorder('d')
```

See also: *User Guide: Imaging*

Related:

pss	Slice position (P)

sliceplan — Set slice parameters for target slice (M)

Applicability: Systems with imaging capabilities.

Syntax:
```
sliceplan
```

Description: Calculates and sets the slice parameters for the target slice defined in the file `curexp+'/mark2d.out'`. The slice parameters (i.e., `pss`, `psi`, `phi`, `theta`) are calculated and set by using `sliceplan`. The Calculate Target button of the slice planner menu also uses `sliceplan`. See the `plan` macro for further details.

See also: *User Guide: Imaging*

Related:

`curexp`	Current experiment directory (P)
`drawslice`	Display target slices (M)
`drawvox`	Display target voxels (M)
`plan`	Display menu for planning a target scan (M)
`voxplan`	Set voxel parameters for voxel defined by 2D box cursor (M)

`slp` Family of offset Frequencies of SLP shapes (P)

Applicability: Systems with LC-NMR or VAST accessory.

Syntax: `slp(frequency offset from the trans transmitter)`

Description: Specifies frequencies, in Hz, of Shifted Laminar Pulses (SLP) shapes used for suppression of solvent peaks. There are 6 members of the slp family, slp0 (solvent 1), slp (solvent 2), slp2 (solvent 3), slp3 (solvent 4), slp4 (solvent 5), slp6 (solvent 6), and slp6 (solvent 7). There is no slp1 parameter.

`slw` Spin simulation linewidth (P)

Description: Sets linewidth for individual transitions in the displayed spectrum. Only one linewidth is provided, so all transitions must be given the same linewidth. If the Set Params button is used in setting up spin simulation parameters, `slw` is automatically set to the measured linewidth of the tallest line displayed on the screen.

`slw` is also the starting default linewidth for deconvolution calculations. This linewidth will be set automatically when deconvolution is operated using the menu mode and is bypassed if the `usemark` command has been used in conjunction with two cursor input.

Values: 0.01 to 1e6. The typical value is 1.

See also: *User Guide: Liquids NMR*

Related:

`usemark`	Use “mark” output as deconvolution starting point (M)

`small` Use small graphics window (C)

Syntax: small

Description: Sets the Sun graphics window to a partial screen, which allows room for the text window and the acquisition window. `small` is only executed after any other commands have been processed, and any current display is lost and has to be recalculated.

Alternate: Small button in the Permanent Menu.

See also: *Getting Started*

Related:

`large`	Use large graphics window (C)

`smaxf` Maximum frequency of any transition (P)

Description: Sets the maximum frequency limit for the calculation of the final simulated spectrum. It should be set before the calculation is performed. If the Set Params

button is used in setting up spin simulation parameters, `smaxf` is initialized to `sp`+`wp`; which assumes that you have already expanded the region of the spectrum that you wish to simulate before beginning the spin simulation process.

Values: –1e10 to 1e10, in Hz. The typical value is the maximum chemical shift + 50.

See also: *User Guide: Liquids NMR*

Related:

`sminf`	Minimum frequency of any transition (P)
`sp`	Start of plot (P)
`wp`	Width of plot (P)

`sminf` Minimum frequency of any transition (P)

Description: Sets the minimum frequency limit for the calculation of the final simulated spectrum. It should be set before the calculation is performed. If the Set Params button is used in setting up spin simulation parameters, `sminf` is initialized to `sp`, which assumes that you have already expanded the region of the spectrum that you wish to simulate before beginning the spin simulation process.

Values: –1e10 to 1e10, in Hz. The typical value is 0.

See also: *User Guide: Liquids NMR*

Related:

`smaxf`	Maximum frequency of any transition (P)
`sp`	Start of plot (P)
`wp`	Width of plot (P)

`smsport` Sample Management System serial port connection (P)

Applicability: UNITY*INOVA* systems only.

Description: Sets which serial port on the host computer is connected to a Sample Management System (i.e., a sample changer). The value of `smsport` is set using the Sample Changer Serial Port label in the CONFIG window (opened from `config`).

Values: `'a'` sets the connection for serial port A. This value is the default.
`'b'` sets the connection for serial port B.

See also: *VNMR and Solaris Software Installation; User Guide: Liquids NMR*

Related:

`config`	Display current configuration and possibly change it (M)

`sn` Signal-to-noise ratio (P)

Description: Sets a ratio for testing signal-to-noise. The `testsn` macro checks whether a signal-to-noise ratio equal to `sn` has been achieved.

Values: Typical value is 35.

See also: *User Guide: Liquids NMR*

Related:

`dsn`	Measure signal-to-noise (C)
`getsn`	Get signal-to-noise estimate of a spectrum (M)
`testsn`	Test signal-to-noise of a spectrum (M)
`testct`	Check *ct* for resuming signal-to-noise testing (M)

`solppm` Return ppm and peak width of solvent resonances (M)

Syntax: `solppm:chemical_shift,peak_width`

Description: Returns to the calling macro information about the chemical shift and peak spread of solvent resonances in various solvents for either ^{1}H or ^{13}C, depending

on the observe nucleus `tn` and the parameter `solvent`. This macro is used "internally" by other macros only.

Arguments: `chemical_shift` returns the chemical shift of the solvent in ppm.

`peak_width` returns the approximate peak spread of solvent resonances.

See also: *VNMR User Programming*

Related:

`solvent`	Lock solvent (P)
`tn`	Nucleus for observe transmitter (P)

`solvent` Lock solvent (P)

Description: Contains one of a series of lock solvents from the `/vnmr/solvents` file, which contains the ^{2}H chemical shift of each lock solvent. By editing the file, additional solvents can be added.Values for `solvent` are not case- sensitive (e.g., `solvent='C6D6'` and `solvent='c6d6'` are identical)

The `auto_dir` macro now controls most of the automation features, including setting the value of `solvent`.

Values: Standard values in `/vnmr/solvents` include:

Deuterium Oxide	CDCl3	MethyleneChloride
D2O	Cyclohexane	MethylAlcohol-d4
Acetone	C6Dl2	CD2Cl2
CD3COCD3	Toluene	CD3OD
Benzene	C6D5CH3	Chloroform
C6D6	Acetic_Acid	
DMSO	CD3COOD	

See also: *Getting Started*

Related:

`auto_dir`	Controlling macro for automation (M)
`lastlk`	Last lock solvent used (P)
`solvinfo`	Retrieve information from solvent table (C)
`tof`	Frequency offset for observe transmitter (P)

`solvfactor` Solvent correction factor (obsolete)

Description: This parameter has been removed from VNMR because a change in the method of setting the frequency makes it unnecessary.

See also: *Getting Started*

Related:

`setfrq`	Set frequency of rf channels (C)

`solvinfo` Retrieve information from solvent table (C)

Syntax: `solvinfo(solvent):$chemical_shift,$name`

Description: Retrieves solvent shift and solvent name from the solvent table.

Arguments: `solvent` is the name of a solvent from the `/vnmr/solvents` file. This argument is not case-sensitive (e.g., `'c6d6'` is the same as `'C6D6'`).

`chemical_shift` returns the chemical shift of the solvent, in ppm.

`name` returns the name of the solvent. The name returned will match the case of the letters (upper or lower) in `/vnmr/solvents`.

Examples:

```
solvinfo('acetone'):$shift
solvinfo('d2o'):$shift,solvent
```

See also: *Getting Started*

Related:
- `lookup` Look up words and lines from a text file (C)
- `solvent` Lock solvent (P)

sp — Start of plot in directly detected dimension (P)

Description: Low-frequency limit of the display or plotted region of the spectrum. `sp` is always stored in Hz, but can be entered in ppm by using the `p` suffix (e.g., `sp=2p` sets the start of plot to 2 ppm).

See also: *Getting Started; User Guide: Liquids NMR*

Related:
- `sp1` Start of plot in 1st indirectly detected dimension (P)
- `sp2` Start of plot in 2nd indirectly detected dimension (P)

sp1 — Start of plot in 1st indirectly detected dimension (P)

Description: Analogous to the `sp` parameter except that `sp1` applies to the first indirectly detected dimension of a multidimensional data set.

See also: *User Guide: Liquids NMR*

Related:
- `sp` Start of plot in directly detected dimension (P)
- `sp2` Start of plot in 2nd indirectly detected dimension (P)

sp2 — Start of plot in 2nd indirectly detected dimension (P)

Description: Analogous to the `sp` parameter except that `sp2` applies to the second indirectly detected dimension of a multidimensional data set.

See also: *User Guide: Liquids NMR*

Related:
- `sp` Start of plot in directly detected dimension (P)

spadd — Add current spectrum to add/subtract experiment (C)

Syntax:
(1) `spadd<(multiplier<,shift>)>`
(2) `spadd('new')`
(3) `spadd('trace',index)`

Description: Performs noninteractive spectral addition. The last displayed or selected spectrum is added to the current contents of the add/subtract experiment (`exp5`). A multi-element add/subtract experiment can be created using the `'new'` keyword. Individual spectra in a multi-element add/subtract experiment can be subsequently added to using the `'trace'` keyword followed by an index number of the spectrum.

Arguments: `multiplier` is a value to multiply each spectrum being added to the add/subtract experiment (`exp5`). The normal range of `multiplier` would be `+1` to `–1` but the range is actually unlimited. The default is 1.0.

`shift` is the number of data points to shift each spectrum. A positive value shifts the spectrum being added to a higher frequency, or to the left. A negative value shifts the spectrum to a lower frequency, or to the right. The default is 0.

`'new'` is a keyword to create a new spectrum in the add/subtract experiment.

`'trace'` is a keyword to select the spectrum given by the index number argument (`index`) and add it to the add/subtract experiment. The default is to add to the first spectrum in the add/subtract experiment.

`index` is the index number of the spectrum to be used as a target in a multi-element add/subtract experiment.

Examples:
```
spadd
spadd(.5,25)
spadd('new')
spadd('trace',2)
```

Alternate: Add Spectrum button in the Add/Subtract Menu.

See also: *User Guide: Liquids NMR*

Related:		
	add	Add current FID to add/subtract experiment (C)
	addi	Start interactive add/subtract mode (C)
	clradd	Clear add/subtract experiment (C)
	ds	Display a spectrum (C)
	jexp	Join existing experiment (C)
	select	Select a spectrum without displaying it (C)
	spmin	Take minimum of two spectra in add/subtract experiment (C)
	spsub	Subtract current spectrum from add/subtract experiment (C)

spcfrq — Display frequencies of rf channels (M)

Description: Displays the parameters sfrq, dfrq, dfrq2, and dfrq3 with seven decimal points (to nearest 0.1) to provide the exact frequencies of each rf channel. The number of values displayed depends on numrfch.

Prior to VNMR version 4.3, spcfrq set the frequency of the observe channel. The parameter sfrq now sets the frequency instead of spcfrq.

See also: *Getting Started*

Related:		
	dfrq	Transmitter frequency of first decoupler (P)
	dfrq2	Transmitter frequency of second decoupler (P)
	dfrq3	Transmitter frequency of third decoupler (P)
	numrfch	Number of rf channels (P)
	setfrq	Set frequency of rf channels
	sfrq	Transmitter frequency of observe nucleus (P)

specdc3d — 3D spectral dc correction (P)

Description: Sets whether a 3D spectral dc correction occurs. The spectral dc correction is the last operation to be performed upon the data prior to forming linear combinations of the data, using the coefficients in the 3D coefficient file (coef), and then writing the data to disk. If specdc3d does not exist, it is created by the macro par3d.

Values: A three-character string selected from 'nnn', 'nny', 'nyn', etc. Each character may take one of two values: n for no spectral dc correction along the relevant dimension, and y for spectral dc correction along the relevant dimension. The first character refers to the f_3 dimension (sw, np, fn), the second character refers to the f_1 dimension (sw1, ni, fn1), and the third character refers to the f_2 dimension (sw2, ni2, fn2). The default is 'nnn'.

See also: *User Guide: Liquids NMR*

Related:		
	dc	Calculate spectral drift correction (C)
	fiddc3d	3D time-domain dc correction (P)
	fn	Fourier number in directly detected dimension (P)
	fn1	Fourier number in 1st indirectly detected dimension (P)
	fn2	Fourier number in 2nd indirectly detected dimension (P)
	ft3d	Perform a 3D Fourier transform (M)
	ni	Number of increments in 1st indirectly detected dimension (P)
	ni2	Number of increments in 2nd indirectly detected dimension (P)

np	Number of data points (P)
par3d	Create 3D acquisition, processing, display parameters (C)
ptspec3d	Region-selective 3D processing (P)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)

spin — Submit a spin setup experiment to acquisition (C)

Applicability: All systems; however, it applies to *GEMINI 2000* only if spin automation hardware is installed.

Syntax: `spin`

Description: Regulates sample spinning according to the *parameter* spin, using the acquisition computer. It also sets rf frequency, decoupler status, and temperature.

See also: *Getting Started*

Related:

au	Submit experiment to acquisition and process data (C)
change	Submit a change sample experiment to acquisition (M)
ga	Submit experiment to acquisition and FT the result (C)
go	Submit experiment to acquisition (C)
lock	Submit an Autolock experiment to acquisition (C)
sample	Submit change sample, autoshim experiment to acquisition (M)
shim	Submit an Autoshim experiment to acquisition (C)
spin	Sample spin rate (P)
su	Submit a setup experiment to acquisition (M)

spin — Sample spin rate (P)

Applicability: All systems; however, it applies to *GEMINI 2000* only if spin automation hardware is installed (if not installed, the value of `spin` is ignored).

Description: Selects a regulated spin rate. The rate is changed when a sample is inserted or spin, go, ga, au, or sample are entered.

Values: 0 indicates non-spinning operation.

5 to 39 are spinning rates.

`'n'` leaves the spin rate at the currently used value and does not wait for regulated spinning before performing acquisition.

See also: *Getting Started*

Related:

au	Submit experiment to acquisition and process data (C)
ga	Submit experiment to acquisition and FT the result (C)
go	Submit experiment to acquisition (C)
sample	Submit change sample, Autoshim experiment to acquisition (M)
sethw	Set values for hardware in acquisition system (C)
spin	Submit a spin setup experiment to acquisition (C)
spinopt	Spin automation (P)

spincad — Run SpinCAD program (C)

Description: Opens the graphical pulse sequence generation utility.

See also: *Getting Started*

Related:

vnmr2sc	VNMR to SpinCAD pulse sequence translator (M)

spinll — Set up a slfreq array (M)

Syntax: `spinll<('mark')>`

Description: Copies a list of frequencies to the `slfreq` parameter in iterative spin simulation and runs `dla`. This macro also clears previous line assignments.

Arguments: `'mark'` is a keyword to copy the list of frequencies from the `mark1d.out` file to `slfreq`. The default is to copy the frequencies from the last line listing by `nll` or `dll` to the `slfreq`. Use the cursor and the mark button to place the lines to be assigned in `mark1d.out`. Enter `mark('reset')` to clear the file, and use `nl` to move the cursor to the center of a selected line.

Alternate: use ll button in the Spin Simulation Line Assignment Menu.

See also: *User Guide: Liquids NMR*

Related:

`dla`	Display line assignments (M)
`dll`	Display listed line frequencies and intensities (C)
`mark`	Determine intensity of the spectrum at a point (C)
`nl`	Position the cursor at the nearest line (C)
`nll`	Find line frequencies and intensities (C)
`slfreq`	Measured line frequencies (P)

spinner — Open the Spinner Control window (C)

Applicability: All systems except *MERCURY-Vx*, *MERCURY,* and *GEMINI 2000*.

Syntax: `spinner`

Description: Opens the Spinner Control window. This window has the following capabilities:

- Turn the sample spinner off.
- Turn the sample spinner on at a specified speed, in Hz.
- Enable spinner control from within an experiment using the `spin` parameter and the `spin`, `go`, `ga`, or `au` commands. This mode is the default.
- Alternatively, turn off experiment control of the sample spinner and allow only the Spinner Control window (and `acqi` and `sethw`) to set the spinning speed. This mode has the advantage that, often times, the `spin` parameter is different between experiments. Joining a different experiment and entering `go` can unexpectedly change the spinning speed. This alternate mode prevents this problem. In this mode, when a `go`, `su`, `ga`, or `au` is entered, the `spin` parameter is first set to the speed selected in the Spinner Control window and then the `spin` parameter is set to "`Not Used`."
- Select the style of spinner: low-speed style or a high-speed style. If the high-speed style of spinner (used for solids) is selected, the choice of setting the spinning speed or the air flow rate is provided. Setting the air flow rate is useful when setting up the solids spinning apparatus.

If the spinning speed is controlled only through the Spinner Control window, the action to be taken after a spinner error can be selected:

- Display a warning but continue acquisition.
- Stop acquisition and display a warning.

If experiment control of spinning speed is selected, these selections are faded because they are inoperative, and the selection of the action to be taken after a spinning speed error is provided by the parameter `in`.

See also: *Getting Started*

Related:

acqi	Interactive acquisition display process (C)
au	Submit experiment to acquisition and process data (C)
change	Submit a change sample experiment to acquisition (M)
ga	Submit experiment to acquisition and FT the result (C)
go	Submit experiment to acquisition (C)
in	Lock and spin interlock (P)
lock	Submit an Autolock experiment to acquisition (C)
sample	Submit change sample, autoshim experiment to acquisition (M)
sethw	Set values for hardware in acquisition system (C)
shim	Submit an Autoshim experiment to acquisition (C)
spin	Sample spin rate (P)
su	Submit a setup experiment to acquisition (M)

spinopt — Spin automation (P)

Applicability: *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems.

Description: Specifies whether spin hardware is installed on the system. The value is set by the Auto Spinner label in the CONFIG window (opened from config). For *MERCURY-Vx*, the value must be 'y'.

Values: 'n' for no spin hardware is installed (Not Present choice in the CONFIG window).

'y' for spin hardware is installed (Present choice in the CONFIG window).

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possible change it (M)

spins — Perform spin simulation calculation (C)

Syntax: spins<(options)>

Description: Performs a spin simulation, using the current spin system parameters. Refer to the description of spsm for setting up the parameters. Use dsp to display the spectrum resulting from the simulation. The output file is spins.list in the current experiment. This file includes the calculated transitions ordered by frequency and is most easily displayed by the list button in the Spin Simulation Secondary menu.

Line assignments are required for the iteration. These consist of a list of observed frequencies, which is stored in the arrayed parameter slfreq, and the line assignments stored in the array clindex. spinll copies the frequencies from the last line listing by nll or dll into the parameter slfreq. The line listing can be from an observed spectrum or from the results of deconvolution. After spinll, line assignments are most easily made by entering assign or by using the Spin Simulation Line Assignment menu. dla displays the assignments. Single assignments can also be made by assign(transition_number,line_number), where transition_number is the index of a transition and line_number is the index of the measured line. Setting the line_number argument to 0 deletes assignments. dla('long') produces an expanded display of assignments.

Be aware that spin simulation line numbers and line list line numbers are *not* the same. Conventional line lists produced by dll number the lines from left to right (low- to high-field). The spin simulation software numbers lines according to a more complicated scheme, and these numbers are rarely if ever in frequency order.

The parameters to be iterated are chosen by setting the string parameter `iterate` (e.g, `iterate='A,B,JAB'`). If several parameters have the same value due to symmetry, use `iterate='A,B,C,JAB,JAC=JAB'`. This string sets the iterated parameter JAC to JAB during the iteration. JAB must be defined as an iterated parameter in the string before it can be used at the right side of the equal sign. Sets of parameters with up to six members may be set up in this way. The member in the set that is used on the right side of the equal sign must always come first in the parameter display (e.g., JAB=JAC would be wrong). A parameter is held constant during iteration if it is not included in the `iterate` string.

The command `initialize_iterate` sets `iterate` to iterate all spins not named X, Y, or Z and the associated coupling constants.

Following an iterative spin simulation, `dga` displays the new values of the coupling constants and chemical shifts. `undospins` restores a spin system as it was before the last iterative run. It returns the chemical shifts, coupling constants, and line assignments, making it possible to continue from this state with modified line assignments.

Note that major changes in the starting values of parameters may change the numbering of the energy levels and hence the line numbers. The line assignments would then be incorrect and would have to be reentered.

For a successful iteration, it is often necessary to keep some parameters fixed. For example, it is sometimes useful to alternately iterate couplings and shifts, keeping one group fixed while the other is iterated independently.

Arguments: The following variations of `spins` are available:

- `spins('calculate','energy')` puts an energy-level table in the output file.
- `spins('calculate','transitions')` puts a second table of transitions ordered by transition number in the output file.
- `spins('display')` and `dsp` are equivalent.
- `spins('system','spinsystemname')` and `spsm('spinsystemname')` are equivalent.
- `spins('iterate')` runs interactively to match experimental and calculated lines.
- `spins('iterate','iteration')` lists parameters after each iteration in the output file.
- `spins('iterate'<,options>)` provides for determining the chemical shifts and coupling constants to produce a spectrum that matches a table of observed lines. `spins` iterates until the rms (root-mean-square) error of the line matching meets a built-in test, unless it first reaches the value given by `number_iterations`. Iteration also stops if the rms error increases.
- Put multiple list options into the second argument, separated by a blank (e.g., `spins('calculate','transitions energy')`).

Examples:

```
spins
spins('calculate','energy')
spins('iterate')
```

See also: *User Guide: Liquids NMR*

Related:

`assign`	Assign transitions to experimental lines (M)
`clindex`	Index of experimental frequency of a transition (P)
`dga`	Display parameter groups (spin simulation) (C)

dla	Display line assignments (M)
dll	Display listed line frequencies and intensities (C)
dsp	Display calculated spectrum (C)
initialize_iterate	Set iterate to contain relevant parameters (M)
iterate	Parameters to be iterated (P)
niter	Number of iterations (P)
nll	Find line frequencies and intensities (C)
slfreq	Measured line frequencies (P)
spinll	Set up slfreq array (M)
spsm	Enter spin system (M)
undospins	Restore spin system as before last iterative run (M)

split — Split difference between two cursors (M)

Syntax: split

Description: Repositions the left-hand cursor halfway between its original position and the position of the other cursor. This macro is very useful for finding the center of a powder pattern: place the two cursors on the horns of the pattern and then enter split to give the center.

See also: *Getting Started; UNITYplus Solid-State NMR Hardware Installation;* UNITY*INOVA Solids Hardware Installation*

Related:

delta	Difference of two frequency cursors (P)

spmin — Take minimum of two spectra in add/subtract experiment (C)

Syntax: spmin

Description: Takes the minimum of two spectra, considered point-by-point in an absolute-value sense. For example, if the two corresponding values are -2 and +3, the spmin spectrum will have -2; if the two values are +2 and -3, the spmin spectrum will have +2 at that point.

The function of spmin is to essentially select for common features within two spectra while eliminating features that are not common between them. In particular, if two CP/MAS spectra are obtained at different spin rates, the peaks stay in the same place (and hence the spmin spectrum also contains the same peaks), but the sidebands move. If spectrum 1 has baseline where spectrum 2 has sideband, and spectrum 2 has baseline where spectrum 1 has sideband, then the spmin spectrum will contain only baseline in these regions, eliminating the spinning sidebands.

Alternate: Minimum button in the Add/Subtract Menu.

See also: *User Guide: Liquids NMR*

Related:

addi	Start interactive add/subtract mode (C)
spadd	Add current spectrum to add/subtract experiment (C)
spsub	Subtract current spectrum from add/subtract experiment (C)

spsm — Enter spin system (M)

Syntax: spsm(spin_system)

Description: Enables entry of the spin system for spin simulation and creates and initializes the appropriate parameters to describe the various chemical shifts and coupling constants. Chemical shifts can be entered for the X-nucleus, and the spectrum is calculated if that shift is in the window. Generally, however, it is not necessary

to enter the X-nucleus chemical shift, and its value has no effect on the spectrum of the remainder of the spin system.

Arguments: `spin_system` is an alphanumeric string of upper-case letters for chemical shift and coupling constant parameters. Chemical shifts are stored in parameters `A` through `Z`, and the coupling constants are stored in the parameters starting with `JAB` and ending with `JYZ`. Different nucleus types are handled by using letters starting with `A` for the first type, `X` for the second, and `M` for the third. Once created, these parameters are entered and modified in the usual way (e.g., `A=78.5 JAC=5.6`). Entry of chemical shifts in ppm is entered by using `sfrq` (e.g., `B=7.5*sfrq`).

Examples:
```
spsm('AB')
spsm('A3B2')
spsm('AB2CMXY')
```

See also: *User Guide: Liquids NMR*

Related:

`sfrq`	Transmitter frequency of observe nucleus (P)
`spins`	Perform spin simulation calculation (C)

spsub — Subtract current spectrum from add/subtract experiment (C)

Syntax:
(1) `spsub<(multiplier<,shift>)>`
(2) `spsub('new')`
(3) `spsub('trace',index)`

Description: Performs non-interactive spectral subtraction. The last displayed or selected spectrum is subtracted from the current contents of the add/subtract experiment (`exp5`). A multi-element add/subtract experiment can be created using the `'new'` keyword. Individual spectra in a multi-element add/subtract experiment can be subsequently subtracted from using the `'trace'` keyword followed by an index number of the spectrum.

Arguments: `multiplier` is a value to multiply each spectrum being subtracted from the add/subtract experiment (`exp5`). The normal range of `multiplier` would be `+1` to `–1` but is actually unlimited. The default is 1.0.

`shift` is the number of data points to shift each spectrum. A positive value shifts the spectrum being added to a higher frequency, or to the left. A negative value shifts the spectrum to a lower frequency, or to the right. The default is 0.

`'new'` is a keyword to create a new spectrum in the add/subtract experiment.

`'trace'` is a keyword to select the spectrum given by the index number argument (`index`) and subtract it from the add/subtract experiment. The default is to subtract from the first spectrum in the add/subtract experiment.

`index` is the index number of the spectrum to be used as a target in a multi-element add/subtract experiment.

Examples:
```
spsub
spsub(.5,25)
spsub('new')
spsub('trace',2)
```

Alternate: Subtract button in the Add/Subtract Menu.

See also: *User Guide: Liquids NMR*

Related:

`clradd`	Clear add/subtract experiment (C)
`ds`	Display a spectrum (C)
`jexp`	Join existing experiment (C)
`spadd`	Add current spectrum to add/subtract experiment (C)
`select`	Select a spectrum without displaying it (C)

spmin	Take minimum of two spectra in add/subtract experiment (C)
sub	Subtract current FID from add/subtract experiment (C)

sqcosine — Set up unshifted cosine-squared window function (M)

Syntax: `sqcosine<(<t1_inc><,t2_inc>)>`

Description: Sets up an unshifted cosine-squared window function in 1, 2, or 3 dimensions. The macro checks whether the data is 1D, 2D, and 3D.

Arguments: `t1_inc` is the number of t1 increments. The default is `ni`.

`t2_inc` is the number of t2 increments. The default is `ni2`.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

gaussian	Set up unshifted Gaussian window function (M)
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
pi3ssbsq	Set up pi/3 shifted sinebell-squared window function (M)
pi4ssbsq	Set up pi/4 shifted sinebell-squared window function (M)
sqsinebell	Set up unshifted sinebell-squared window function (M)

sqrt — Return square root of a real number (O)

Syntax: `sqrt`

Description: In MAGICAL programming, an operator that returns the square root of a real number. If the argument is negative, `sqrt` evaluates to 0.0.

Examples:

```
a = sqrt(b)
```

See also: *User Programming*

Related:

acos	Find arc cosine of number (C)
arccos	Calculate arc cosine of real number (M)
arcsin	Calculate arc sine of real number (M)
arctan	Calculate arc tangent of real number (M)
asin	Find arc sine of number (C)
atan	Find arc tangent of a number (C)
cos	Find cosine value of an angle (C)
exp	Find exponential value (C)
ln	Find natural logarithm of a number (C)
tan	Find tangent value of an angle (C)
trunc	Truncates real numbers (O)
typeof	Return identifier for argument type (O)

sqsinebell — Set up unshifted sinebell-squared window function (M)

Syntax: `sqsinebell<(<t1_inc><,t2_inc>)>`

Description: Sets up an unshifted sinebell-squared window function in 1, 2, or 3 dimensions. The macro checks whether the data is 1D, 2D, and 3D.

Arguments: `t1_inc` is the number of t1 increments. The default is `ni`.

`t2_inc` is the number of t2 increments. The default is `ni2`.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

gaussian	Set up unshifted Gaussian window function (M
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
pi3ssbsq	Set up pi/3 shifted sinebell-squared window function (M)

pi4ssbsq	Set up pi/4 shifted sinebell-squared window function (M)
sqcosine	Set up unshifted cosine-squared window function (M)

srate — Spinning rate for magic angle spinning (P)

Applicability: Systems with solids module.

Description: Set to the spinning speed for magic angle spinning (MAS). srate must be correct for the pulse sequence set up by xpolar to run TOSS or dipolar dephasing correctly. If hsrotor='y', the measured spinning speed is reported in srate for systems that have rotor synchronization.

Values: 0 to 10^7, in Hz.

See also: *User Guide: Solid-State NMR*

Related:

hsrotor	Display rotor speed for solids operation (P)
xpolar	Set up parameters for XPOLAR pulse sequence (M)

sread — Read converted data into VNMR (C)

Syntax: sread(file<,template>)

Description: Reads 32-bit data files into VNMR. For Bruker data files in the AMX and AM formats, each file must first be converted using the convertbru command before sread can read the data in the file into VNMR.

Arguments: file is the name of a file containing data converted using convertbru.

template is the full path of a parameter template file, but without appending the .par extension on the file name. The default is bruker.par. If no parameter template is specified and bruker.par cannot be found in the user or system parlib directory, sread aborts with an error message.

Examples: sread('brudata.cv','/vnmr/parlib/bruker')

See also: *Getting Started*

Related:

convertbru	Convert Bruker data (M,U)

ss — Steady-state transients (P)

Description: Sets the number of complete executions of the pulse sequence not accompanied by data collection prior to the acquisition of the real data (sometimes known as *dummy scans*). If ss is positive, ss steady-state transients are applied on the first increment only, and if ss is negative, –ss steady-state transients are applied at the start of each increment.

Values: 'n', –32768 to 32767

See also: *Getting Started; VNMR User Programming*

ss3d — f_3 solvent subtraction option (obsolete)

Description: Obsolete because solvent subtraction processing options zfs and lfs are now selected in 3D by setting ssorder and ssfilter, the same as in 1D and 2D.

Related:

ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
ssorder	Order of polynomial to fit digitally filtered FID (P)

ssecho — Set up solid-state echo pulse sequence (M)

Applicability: Systems with a solids module. Not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `ssecho`

Description: Converts a standard two-pulse experiment to a ready-to-run solid-state NMR echo (SSECHO) pulse sequence.

Alternate: SSECHO button in the 1D Pulse Sequence Setup Secondary menu.

See also: *User Guide: Solid-State NMR*

ssecho1 — Set up parameters for SSECHO1 pulse sequence (M)

Applicability: UNITY*INOVA* or UNITY*plus* system with a wideline solids module. Not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `ssecho1`

Description: Sets up a parameter set for the quadrupole echo pulse sequence SSECHO1.

See also: *User Guide: Solid-State NMR*

ssfilter — Full bandwidth of digital filter to yield a filtered FID (P)

Description: Specifies the full bandwidth of the digital filter applied to the original FID to yield a filtered FID for solvent subtraction. If `ssfilter` does not exist in the current experiment, enter `addpar('ss')` to add it. The command `addpar('ss')` creates additional time-domain solvent subtraction parameters `ssfilter`, `sslsfrq`, `ssntaps`, and `ssorder`.

Values: `'n'`, `10` to `sw/2`, in steps of 0.1 Hz. The default is 100 Hz.

If `ssfilter` is set to a value and `ssorder` is set to some value, the zfs (zero-frequency) option of solvent subtraction is selected.

If `ssfilter` is set to `'n'`, ("Not Used"), both the lfs (low-frequency suppression) and zfs options are turned off.

See also: *Getting Started*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`ft`	Fourier transform 1D data (C)
`parfidss`	Create parameters for time-domain solvent subtraction (M)
`ssntaps`	Number of coefficients in the digital filter (P)
`sslsfrq`	Center of solvent-subtracted region of spectrum (P)
`ssorder`	Order of polynomial to fit digitally filtered FID (P)
`sw`	Spectral width in directly detected dimension (P)
`wft`	Weight and Fourier transform 1D data (C)

sslsfrq — Center of solvent-suppressed region of spectrum (P)

Description: Specifies the location of the center of the solvent-suppressed region of the spectrum. If `sslsfrq` does not exist in the current experiment, enter `addpar('ss')` to add it. `addpar('ss')` also creates time-domain solvent subtraction parameters `ssfilter`, `ssntaps`, and `ssorder`.

Values: `'n'` (or `0`) specifies solvent suppresses a region centered about the transmitter frequency. This is the default

Non-zero value shifts the solvent-suppressed region by `sslsfrq` Hz. Multiple regions may be suppressed by arraying the value of `sslsfrq`. Up to 4 values are allowed.

See also: *Getting Started*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`parfidss`	Create parameters for time-domain solvent subtraction (M)

ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
ssntaps	Number of coefficients in the digital filter (P)
ssorder	Order of polynomial to fit digitally filtered FID (P)

ssntaps — Number of coefficients in digital filter (P)

Description: Specifies the number of taps (coefficients) to be used in the digital filter for solvent subtraction. If ssntaps does not exist in the current experiment, enter addpar('ss') to add it. addpar('ss') also creates time-domain solvent subtraction parameters ssfilter, sslsfrq, and ssorder.

Values: Integer from 1 to np/4. The default is 121. An odd number is usually best.

The more taps in a filter, the flatter the passband response and the steeper the transition from passband to stopband, giving a more rectangular filter.

For the lfs (low-frequency suppression) option, the default is suitable.

For the zfs (zero-frequency suppression) option, a value between 3 and 21 usually works better.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
ft	Fourier transform 1D data (C)
ni	Number of increments in 1st indirectly detected dimension (P)
np	Number of points (P)
parfidss	Create parameters for time-domain solvent subtraction (M)
ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
sslsfrq	Center of solvent-suppressed region of spectrum (P)
ssorder	Order of polynomial to fit digitally filtered FID (P)
wft	Weight and Fourier transform 1D data (C)

ssorder — Order of polynomial to fit digitally filtered FID (P)

Description: Specifies the order of the polynomial to fit the digitally filtered FID if the zfs (zero-frequency suppression) option is selected for solvent subtraction. ssorder is not used if the lfs (low-frequency suppression) option is selected. If ssorder does not exist in the current experiment, enter addpar('ss') to add it. addpar('ss') also creates time-domain solvent subtraction parameters ssfilter, sslsfrq, and ssntaps.

The solvent subtraction option (zfs or lfs) is selected as follows:

- If ssorder and ssfilter are both set to values, zfs is selected.
- If ssorder='n' and ssfilter is set to a value, lfs is selected.
- If ssorder='n' and ssfilter='n', zfs and lfs are both turned off.

Values: 'n', integer from 1 to 20. The default is 'n'.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
parfidss	Create parameters for time-domain solvent subtraction (M)
ssfilter	Full bandwidth of digital filter to yield a filtered FID (P)
sslsfrq	Center of solvent-suppressed region of spectrum (P)
ssntaps	Number of coefficients in the digital filter (P)
wft	Weight and Fourier transform 1D data (C)

ssplan — Set slice parameters for target slice (M)

Applicability: Systems with imaging capabilities.

Syntax: `ssplan`

Description: Used by the Calculate Target button of the slice planner menu to calculate and set the slice parameters `pss`, `psi`, `phi`, and `theta`. `ssplan` creates the string parameter `planlock` and assigns it the value `'ssplan'`. This prevents a user inadvertently performing a second planning operation without applying the `reset` command to restore the original parameters for the scout data.

See also: *User Guide: Imaging*

Related:

`drawslice`	Display target slices (M
`plan`	Display menu for planning a target scan (M
`phi`	Euler angle phi from magnet frame (P))
`psi`	Euler angle psi from magnet frame (p)
`pss`	Slice position (P)
`theta`	Euler angle theta from magnet frame (P)

`sslist` Conjugate gradient list (P)

Applicability: Systems with imaging capabilities.

Description: Sets an array of strings that defines the names of gradient parameters used for slice or voxel selection. If the pulse performs no slice selection operation, the user may enter `''` or `'n'` for the value of `sslist` (e.g., `sslist='n','gss','gss'`). The `nD`, `seqcon`, `plist`, `patlist`, `pwrlist`, `fliplist`, and `sslist` parameters configure a particular parameter set for an application sequence defined by the value of the `seqfil` parameter. The `plist`, `patlist`, `pwrlist`, `fliplist`, and `sslist` parameters provide information concerning the rf pulse and conjugate gradients used by the sequence.

See also: *User Guide: Imaging*

Related:

`fliplist`	Standard flip angle list (P)
`nD`	Application dimension (P)
`patlist`	Active pulse template parameter list (P)
`plist`	Active pulse length parameter list (P)
`pwrlist`	Active pulse power level parameter list (P)
`seqcon`	Acquisition loop control (P)
`seqfil`	Application object code name (P)

`ssprep` Calculate slice gradient and slice selection parameters (M)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Syntax: `ssprep`

Description: Calculates the slice gradient parameter, `gss`, and the slice selection parameters, `tpwr1` and `tpwr2`, for use in the EPI experiment. Unlike `imprep`, readout and phase encode related parameters are not modified by `ssprep`.

See also: *User Guide: Imaging*

Related:

`gss`	Slice selection gradient strength (P)
`imprep`	Calculate gradient and rf parameters for imaging (M)
`tpwr1`	Intensity of an excitation pulse (P)
`tpwr2`	Intensity of an inversion pulse (P)

`stack` Fix stacking mode for processing and plotting arrayed spectra (M)

Syntax: `stack(mode)`

Description: When processing and plotting arrayed 1D spectra, VNMR automatically determines if the *stacking mode* is horizontal, vertical or diagonal from the number of traces and the number of lines in the spectrum. If you do not want this automatic function (or it makes an undesirable decision), you can override it by placing the `stack` macro in the experiment startup macro or by calling `stack` before processing (or reprocessing) a spectrum. The macro `autostack` switches back to automatic determination of the stack mode by destroying the parameter `stackmode`.

Arguments: `mode` is one of the stacking modes `'horizontal'`, `'vertical'`, or `'diagonal'`.

See also: *Getting Started*

Related:

`autostack`	Automatic stacking for processing and plotting arrays (M)
`procarray`	Process arrayed 1D spectra (M)
`plarray`	Plot arrayed 1D spectra (M)
`stackmode`	Stacking control for processing (P)

`stackmode` Stacking control for processing arrayed 1D spectra (P)

Description: Controls whether stacking for processing arrayed 1D spectra is automatic or nonautomatic. The *automatic stacking mode* can be overridden by creating and setting `stackmode` in the startup macro or before calling `procplot` or `procarray`. The `autostack` macro switches back to automatic determination of the stack mode by destroying this parameter.

Values: `'horizontal'`, `'vertical'`, or `'diagonal'`.

See also: *Getting Started*

Related:

`autostack`	Automatic stacking for processing and plotting arrays (M)
`procarray`	Process arrayed 1D spectra (M)
`procplot`	Automatically process FIDs (M)
`stack`	Fix stacking mode for processing and plotting arrayed spectra (M)

`status` Display status of sample changer (C,U)

Applicability: Systems with an automatic sample changer.

Syntax: (From VNMR) `status<(directory<,config_file>)>`
(From UNIX) `status directory <config_file>`

Description: Displays a status window with a summary of all experiments and a scrollable list of individual experiments. Individual experiments are selected by clicking anywhere on the experiment of interest. `status` updates as the state of an automation run changes. If an experiment finishes or a new experiment is added, the `status` display is updated.

Arguments: `directory` is the path to the directory where the done queue (`doneQ`) is stored. In the UNIX shell, a directory path is required. In VNMR, a directory path is optional. The default is the automation mode directory.

`config_file` is the name of a user-supplied file that customizes status for local use. Refer to the manual *VNMR User Programming* for details.

Examples: (From VNMR) `status`
(From VNMR) `status('/home/vnmr1/AutoRun_621')`
(From UNIX) `status /home/vnmr1/AutoRun_621 mystatus`

See also: *User Guide: Liquids NMR; VNMR User Programming*

Related:

`autodir`	Automation directory absolute path (P)

autoname	Prefix for automation data file (P)
enter	Enter sample information for automation run (C,U)

stdshm — Interactively create a method string for autoshimming (M)

Syntax: stdshm

Description: Creates a method string to be used in adjusting the spinning controls z1, z2, z3, and z4 when a sample is changed. If non-spin controls also need adjusting, further shimming operations are required.

The method string is constructed in answer to questions about the sample length, the time available for shimming, and the solvent T_1 or, in FID shimming, the T_1 of the sample (background FID shimming is not available on *GEMINI 2000*). In asking about sample height, stdshm assumes that z3 and z4 need adjusting only with short samples; therefore, select "sample height will vary" if z3 and z4 shimming is definitely wanted.

Try lock shimming first to see if it produces a satisfactory result. Lock shimming requires a much shorter shimming time than FID shimming and usually adjusts z1 and z2 just as well. If lock shimming is unsatisfactory, try FID shimming. Again, when z3 and z4 adjustment is required, lock shimming is faster, but FID shimming is more effective. stdshm displays the estimated shimming time, permitting revision when the time is too long.

To shim after running stdshm, enter method='std' (for lock shimming) or method='fidstd' (for FID shimming). Then enter shim or set the wshim parameter to shim before the start of acquisition.

Note that the command newshm is much like stdshm but that newshm provides more flexibility in making method strings

See also: *Getting Started*

Related:

dshim	Display a shim method string (M)
method	Autoshim method (P)
newshm	Interactively create a shim method with options (M)
shim	Submit an Autoshim experiment to acquisition (C)
wshim	Conditions when shimming is performed (P)

steam — Set up volume localized spectroscopy sequence (M)

Applicability: Systems with imaging capabilities.

Syntax: steam

Description: Sets up a sequence for volume localized spectroscopy that uses the stimulated echo technique.

See also: *User Guide: Imaging*

sth — Minimum intensity threshold (P)

Description: Intensity threshold above which transitions are printed and included in the simulated spectrum. Transitions whose intensity falls below this threshold are omitted from the simulation.

Values: 0 to 1.00. A typical value is 0.05.

See also: *User Guide: Liquids NMR*

Related:

spins	Perform spin simulation calculation (C)
spsm	Enter spin system (M)
th	Threshold (P)

string — Create a string variable (C)

Syntax: `string(variable)`

Description: Creates a string variable without a value.

Arguments: `variable` is the string variable to be created.

Examples: `string('strvar1')`

See also: *VNMR User Programming*

strtext — Starting point for LP data extension in np dimension (P)

Description: Specifies inclusively the complex time-domain data point at which LP (linear prediction) data extension (alteration) is to begin in the `np` dimension. Enter `addpar('lp')` to create `strtext` and other `np` dimension LP parameters in the current experiment.

Values: `1` to `np/2`

See also: *Getting Started*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`dglp`	Display group of linear prediction parameters (M)
`lpalg`	LP algorithm in `np` dimension (P)
`np`	Number of data points (P)
`strtlp`	Starting point for LP calculation in `np` dimension (P)

strtext1 — Starting point for LP data extension in ni dimension (P)

Description: Specifies inclusively the complex time-domain data point at which LP (linear prediction) data extension (alteration) is to begin in the `ni` dimension. Enter `addpar('lp',1)` to create `strtext1` and other `ni` dimension LP parameters in the current experiment.

Values: `1` to `ni/2`

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`dglp`	Display group of linear prediction parameters (M)
`lpalg1`	LP algorithm in `ni` dimension (P)
`ni`	Number of increments in 1st indirectly detected dimension (P)
`strtlp1`	Starting point for LP calculation in `ni` dimension (P)

strtext2 — Starting point for LP data extension in ni2 dimension (P)

Description: Specifies inclusively the complex time-domain data point at which LP (linear prediction) data extension (alteration) is to begin in the `ni2` dimension. Enter `addpar('lp',2)` to create `strtext2` and other `ni2` dimension LP parameters in the current experiment.

Values: `1` to `ni2/2`

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`dglp`	Display group of linear prediction parameters (M)
`lpalg2`	LP algorithm in `ni2` dimension (P)
`ni2`	Number of increments in 2nd indirectly detected dimension (P)
`strtlp2`	Starting point for LP calculation in `ni2` dimension (P)

strtlp — Starting point for LP calculation in np dimension (P)

Description: Specifies the first complex, time-domain data point to be used in calculating the complex linear prediction (LP) coefficients in the np dimension. If lpopt='b', the strtlp-th complex time-domain data point and the ensuing (2*lpfilt–1) data points are used in this calculation. If lpopt='f', the strtlp-th complex time-domain data point and the preceding (2*lpfilt-1) data points are used in this calculation. Enter addpar('lp') to create strtlp and other np dimension LP parameters in the current experiment.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
dglp	Display group of linear prediction parameters (M)
lpalg	LP algorithm in np dimension (P)
lpfilt	LP coefficients to calculate in np dimension (P)
lpnupts	LP number of data points in np dimension (P)
lpopt	LP algorithm data extension in np dimension (P)
strtext	Starting point for LP data extension in np dimension (P)

strtlp1 — Starting point for LP calculation in ni dimension (P)

Description: Specifies the first complex, time-domain data point to be used in calculating the complex linear prediction (LP) coefficients in the ni dimension. It functions analogously to strlp. Enter addpar('lp',1) to create strtlp1 and other ni dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
dglp	Display group of linear prediction parameters (M)
lpalg1	LP algorithm in ni dimension (P)
lpfilt1	LP coefficients to calculate in ni dimension (P)
lpnupts1	LP number of data points in ni dimension (P)
lpopt1	LP algorithm data extension in ni dimension (P)
strtext1	Starting point for LP data extension in ni dimension (P)

strtlp2 — Starting point for LP calculation in ni2 dimension (P)

Description: Specifies the first complex, time-domain data point to be used in calculating complex linear prediction (LP) coefficients in the ni2 dimension. strtlp2 functions analogously to strlp. Enter addpar('lp',2) to create strtlp2 and other ni2 dimension LP parameters in the current experiment.

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
dglp	Display group of linear prediction parameters (M)
lpalg2	LP algorithm in ni2 dimension (P)
lpfilt2	LP coefficients to calculate in ni2 dimension (P)
lpnupts2	LP number of data points in ni2 dimension (P)
lpopt2	LP algorithm data extension in ni2 dimension (P)
strtext2	Starting point for LP data extension in ni2 dimension (P)

su — Submit a setup experiment to acquisition (M)

Syntax: su

Description: Sets up the system hardware to match the current parameters but does not initiate data acquisition. Typical uses of su are to change the system frequency

in preparation for probe tuning, to change the sample temperature in advance of beginning an experiment (or after a variable temperature experiment is run), and to turn the decoupler on or off. If `load='y'`, `su` can be used to set shim values. `su` also sets lock parameters (`lockpower`, `lockgain`, `lockphase`) and the field offset parameter (`z0`).

`su` does *not* delete any existing data in the current experiment (only `go`, `ga`, and `au` do that). Everything that `su` does is also done by `go`, `ga`, and `au`.

On UNITY*INOVA* systems, shim DAC values are automatically loaded when the acquisition system boots up; if the acquisition system has been recently rebooted, `su` must be entered before `acqi` or `qtune` can be run.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`acqi`	Interactive acquisition display process (C)
`au`	Submit experiment to acquisition and process data (C)
`change`	Submit a change sample experiment to acquisition (M)
`ga`	Submit experiment to acquisition and FT the result (C)
`go`	Submit experiment to acquisition (C)
`load`	Load status of displayed shims (P)
`lock`	Submit an Autolock experiment to acquisition (C)
`lockgain`	Lock gain (P)
`lockphase`	Lock phase (P)
`lockpower`	Lock power (P)
`qtune`	Tune probe using swept-tune graphical tool (C)
`sample`	Submit change sample, autoshim experiment to acquisition (M)
`shim`	Submit an Autoshim experiment to acquisition (C)
`spin`	Submit a spin setup experiment to acquisition (C)
`z0`	Z0 field position (P)

sub — Subtract current FID from add/subtract experiment (C)

Syntax:
(1) `sub<(multiplier<,'new'>)>`
(2) `sub('new')`
(3) `sub('trace',index)`

Description: Subtracts the last displayed or selected FID from the current contents of the add/subtract experiment (`exp5`). `lsfid` and `phfid` can be used to shift or phase rotate the selected FID before it is subtracted from the data in add/subtract experiment. A multi-FID add/subtract experiment can be created by using the `'new'` keyword. Individual FIDs in a multi-FID add/subtract experiment can subsequently be subtracted by using the `'trace'` keyword followed by the index number of the FID.

Arguments: `multiplier` is a value that the FID is to be multiplied by before being subtracted from the add/subtract experiment (`exp5`). The default is 1.0.

`'new'` is a keyword to create a new FID element in an add/subtract experiment.

`'trace'` is a keyword to use the next argument (`index`) as the number of the FID to subtract from in an add/subtract experiment. The default is to subtract from the first FID in a multi-FID add/subtract experiment.

`index` is the index number of the FID to be used as a target in a multi-FID add/subtract experiment.

Examples:

```
sub
sub(0.75)
sub('new')
sub('trace',2)
```

See also: *User Guide: Liquids NMR*

Related:

add	Add current FID to add/subtract experiment (C)
clradd	Clear add/subtract experiment (C)
lsfid	Number of complex points to left-shift ni interferogram (P)
phfid	Zero-order phasing constant for np FID (P)
select	Select a spectrum without displaying it (C)
spsub	Subtract current spectra from add/subtract experiment (P)

substr — Select a substring from a string (C)

Syntax:
(1) `substr(string,word_number):substring`
(2) `substr(string,index,length):substring`

Description: Returns a substring from a string based on the number of a word in the string (syntax 1) or on the starting character and length of the substring (syntax 2).

Arguments: `string` is the string or a string variable.

`word_number` is the number of the word to be selected. A *word* is defined here as any string of characters separated by spaces or tabs. For example, if `string` is `'There are 10 samples to run'` and `word_number` is 4, the substring `'samples'` is returned (see first example below).

`substring` returns the substring from `string`.

`index` is the character to start from, with the first character considered 1.

`length` is the length of substring in characters or spaces. For example, if `string` is `'abcdefg'`, `index` is 2, and `length` is 3, the substring `'bcd'` is returned (see second example below)

Examples:

```
substr('There are 10 samples to run',4):sa
substr('abcdefg',2,3):sa
```

See also: *VNMR User Programming*

Related:

length	Determine length of a string (C)
string	Create a string variable (C)

suselfrq — Select peak, continue selective excitation experiment (M)

Syntax: `suselfrq`

Description: Sets up selective frequency pulse, power, and shape and continue with the selective excitation experiment. Used by NOESY1D, and TOCSY1D.

Related:

NOESY1D	Change parameters for NOESY1D experiment (M)
setselinv	Set up selective inversion (M)
setselfrqc	Select selective frequency and width (M)
TOCSY1D	Change parameters for TOCSY1D experiment (M)

svdat — Save data (C)

Syntax: `svdat(file<,'f'|'m'|'i'|'b'>)`

Description: Outputs current data from the current experiment to a file. Integer data is scaled when it is written.

Note that `svdat` is also known and used as `svsdfd`; however, that name is in the process of being obsoleted.

Arguments: `file` is the name of the data file. The file is created in the current directory VNMR is in unless a full directory path is given. If a file of the same name

already exists, the user will queried to overwrite the file. If a fully qualified filename is not given, the file will be created in VNMR's current directory.

`'f'|'m'|'i'|'b'` defines how the data is to be written out: `'f'` is 32-bit floating point, `'m'` or `'i'` is 16-bit integer scaled to 12 bits, and `'b'` is 8-bit byte integer. The default is `'f'`.

Floating point data is not scaled when written.

Integer data is scaled when written. A data value `x` is scaled as `ax+b` where:

```
a = (vs*grays1*numgray)/64.0
b = numgray*(0.5-(grays1*grayctr/64.0))
```

where `numgray` (see below) has a default of 4096 for `'m'` and `'i'` formats and a default of 256 for the `'b'` format, `graysl` has a default of 1, and `grayctr` has a default of 32.0.

To scale 16-bit integer data other than 12-bits, the global parameter `numgray` can be created using `create(numgray,real,global)` and set to the value 2^n, where n is the number of bits desired. For example, to scale to 15-bits, set `numgray=32768`.

The display parameters `graysl` and `grayctr` are used by the macros `svib` and `svsis` to save data files for ImageBrowser.

Examples: `svdat(rathead,'b')`

See also: *User Guide: Imaging*

Related:

`browser`	Start ImageBrowser (U)
`create`	Create new parameter in parameter tree (C)
`fdfgluer`	Make FDF file from header and data parts (C)
`grayctr`	Gray level window adjustment (P)
`graysl`	Gray level slope (contrast) adjustment (P)
`svib`	Generate and save images as ImageBrowser FDF files,(M)
`svsis`	Generate and save images as FDF files (M)

svdef — Copy .def files with FID (M)

Applicability: *GLIDE*

Syntax: `svdef (def_file,FID_file)`

Description: Duplicates `.def` file with the FID. Called by `AutoLIST`.

Arguments: `def_file` is either `'acquire'`,`'process'`, or `'plot'`.

`FID_file` is the full name of the FID file.

Related:

`AutoLIST`	Run chained experiments (M)

svf — Save FIDs in current experiment (M)

Syntax: `svf<(file<,'nolog'><,'arch'>)>`

Description: Saves parameters, text, and FID data in the current experiment to a file. No data is removed from the current experiment; `svf` merely saves a copy of the data in a different file. You can enter `rt` to retrieve the complete data set, or enter `rtp` to retrieve parameters only.

Arguments: `file` is the name of the file, with the suffix `.fid` added, to be created to save the data. The default is the system prompts for a file name. You are warned if you attempt to overwrite a file that already exists. In fact, if data has been acquired with the `file` parameter set, the data does not need to be saved. It is already stored in a named file.

'nolog' is a keyword to not save the log file with the data. The default is to save the log file.

'arch' is a keyword to assume that the data goes to a database and appends to the (or creates a) doneQ file with information that can be used by the command status.

Examples:
```
svf
svf('/home/vnmr1/mydatafile')
```

See also: *Getting Started*

Related:

file	File name (P)
rt	Retrieve FID (M)
rtp	Retrieve parameters (M)
status	Display status of all experiments (C)

svfdf — Save FID data in FDF format (M)

Syntax: `svfdf(directory)`

Description: Saves raw data from the FID file of the current experiment as an FDF (Flexible Data Format) file. Data is saved in multiple files, with one trace per file. The files are named fid0001.fdf, fid0002.fdf, etc. The procpar file from the current experiment is also saved in the same directory.

The FDF file format is described in the manual *VNMR User Programming*. Note that the data is complex (FDF type="complex"), and the FDF ordinate = {"intensity", "intensity"}, indicating that each point consists of a pair of intensities. The FDF headers also contain the following special fields:

- nfile gives the sequential number of this file in the series.
- ct is the value of the VNMR ct parameter. The data should be divided by ct to give the average signal intensity for one scan.
- scale gives the power of two scaling factor for the data. The data should be multiplied by 2^{scale} to give the true values.

Arguments: directory_name is the directory in which to store the files. The extension .dat is appended to the given name.

Examples:
```
svfdf(curexp+'/raw')
```

See also: *VNMR User Programming*

Related:

ct	Completed transients (P)
svib	Save image data in FDF format (M)

svib — Generate and save images as ImageBrowser FDF files (M)

Applicability: Systems with imaging capabilities.

Syntax: `svib(directory<,'f'|'m'|'i'|'o'>)`

Description: Generates images from the current experiment and saves them into the specified directory as FDF (Flexible Data Format) files. svib can save a single image, or a number of images in the case of multislice experiments.

The resulting FDF image files are composed of two parts: a text header, followed by the binary image data.

svib uses a the command svdat to dump the transformed data out to the data file. After dumping the headers out, a UNIX shell command fdfgluer is called to glue the headers to the data. svdat dumps the data so that the (0,0) coordinates are the first data point in the file.

Note that modifications to svib should be made in the user's maclib and that the output values of the direction cosines may not be correct.

Arguments: directory is the name of a directory that is made in the current working VNMR directory. The .dat extension is appended to the name. Image files are created in this directory as image0001.fdf, image0002.fdf, and so on. A procpar file is also saved into this directory.

'f', 'm', 'i', and 'o' are keywords that define the type of image data:

- 'f' outputs the data in floating point format. This is the default.
- 'm' or 'i' outputs the data as 12-bit integer values in 16-bit words.
- 'b' outputs the data in 8-bit integer bytes.

Examples: svib('rat.images')

See also: *User Guide: Imaging*

Related:

dmi	Display multiple images (M)
fdfgluer	Make FDF file from header and data parts (U)
svdat	Save data (C)
svimg	Generate and save images as FDF files (M)

svimg — Generate and save images as FDF files (M)

Applicability: Systems with imaging capabilities. This command will be replaced by svib in future versions of VNMR and will be eventually obsolete.

Syntax: svimg(directory<,'f'|'m'>)

Description: Generates images from the current experiment and saves them into the specified directory as Flexible Data Format (FDF) files. svimg can save a single image, or a number of images in the case of multislice experiments.

svimg only saves images with the new imaging parameters that support oblique imaging. Unlike svsis, svimg does not need the name of the sequence. It formats the header according to the following parameters.

seqcon	Sequence loop control flag
nD	Data dimension assumed to be 2
tn, dm	Transmitter nucleus (string)
sfrq, dfrq	Spectrometer frequency (MHz)
lro	FOV size for read out axis (cm)
lpe	FOV size for phase encode axis (cm)
pro	Image center position on the read out axis (cm)
ppe	Image center position on 2D phase encode axis (cm)
thk	Slice thickness (mm)
pss	Slice position (cm)
psi, phi, theta	Euler angles determining direction

svimg uses the command svsdfd to dump the transformed data out to the data file. After dumping the headers out, the UNIX shell command fdfgluer is called to glue the headers to the data. svsdfd dumps the data in such a way that the (0,0) coordinates are the first data point in the file.

Note that modifications to the macro should be made in the user's maclib, and that the output values of the direction cosines may be incorrect.

Arguments: `directory` is the directory name desired. The specified directory is made in the user's data directory and is appended with the suffix `.dat`. Image files are created under this directory as *i*`mage0001.fdf`, `image0002.fdf`, etc. A `procpar` file is also saved into this directory.

`'f'|'m'` defines the type of image data. `'f'` outputs the data in floating point format. `'m'` outputs the data in 12-bit integer values in 16-bit words. The default is `'f'`. ImageBrowser currently only accepts data in floating point values.

See also: *User Guide: Imaging*

Related:

dfrq	Transmitter frequency of first decoupler (P)
dm	Decoupler mode for first decoupler (P)
fdfgluer	Make FDF file from header and data parts (C)
lpe	Field of view size for phase encode axis in cm (P)
lro	Field of view size for readout axis in cm (P)
nD	Application dimension (P)
phi	Euler angle determining direction (P)
psi	Euler angle determining direction (P)
pss	Slice position (P)
ppe	Position of image center on 2D phase encode axis (P)
pro	Position of image center on readout axis (P)
seqcon	Acquisition loop control (P)
sfrq	Transmitter frequency of observe nucleus (P)
svsis	Generate and saveVarian images as FDF files (M)
theta	Euler angle determining direction (P)
thk	Slice thickness (P)
tn	Nucleus for observe transmitter (P)

svp — Save parameters from current experiment (M)

Syntax: `svp(file)`

Description: Saves parameters from current experiment to a file. The parameter set can be retrieved with the `rtp` and `rt` macros. `svp` reflects any changes made in parameters up to the moment of entering `svp`, including acquisition parameters (unlike macro `svf`).

Arguments: `file` is the name of the file, with the suffix `.par` added, to be created to save the parameters. The default is the system prompts for a file name.You are warned if you attempt to overwrite a parameter set that already exists.

Examples:
```
svp('/vnmr/stdpar/P31')
svp('/usr/george/testdata')
```

See also: *Getting Started*

Related:

rt	Retrieve FID (M)
rtp	Retrieve parameters (M)
svf	Save FIDs in current experiment (M)

svphf — Save current VNMR phasefile (C)

Applicability: Systems with imaging capabilities.

Syntax: `svphf(file)`

Description: Copies current experiment phasefile (`curexp+'/datdir/phasefile'`) to `planes` directory of current experiment (`curexp+'/planes/file'`, where `file` is the file name given in the argument). The current phasefile is the current processed data set after apodization, Fourier transformation, vertical

scaling, and phasing or absolute-value calculation, but before the contrast windowing controlled by the grayctr and graysl parameters. No parameters of any kind are stored with the phasefile. svphf creates the planes directory if it does not already exist.

Arguments: file is the name to be given to the phasefile when copied to the planes directory. Use only a relative path for file, not an absolute path.

Examples:
```
svphf('elsa')
```

See also: *User Guide: Imaging*

Related:

curexp	Current experiment directory (P)
grayctr	Gray level window adjustment (P)
graysl	Gray level slope (contrast) adjustment (P)
imcalc	Calculate 2D phasefiles (M,U)
makephf	Transform and save images as phasefiles (M)
rtphf	Return stored phasefile to the current VNMR phasefile (C)

svs — Save shim coil settings (C)

Syntax:
```
svs(file)<:status>
```

Description: Saves all shim coil settings except Z0 to a file. If svs cannot store the shim file, it displays the directories it tried to use.

Arguments: file is the name of a file for saving the shim coil settings. If the file name is an absolute path, svs uses it with no modifications. Otherwise, svs tries to go into up to three different directories, as follows:

- First, it looks for a shims subdirectory in your VNMR user directory. If that exists, the settings are stored there.
- Next, if the shims subdirectory does not exist, it then looks for the global parameter shimspath. If shimspath is present, it is expected to contain a directory name. If this directory exists and a new file entry can be created in the directory, the file is saved there.
- Finally, if this does not work, the file is saved in the shims subdirectory of the VNMR system directory.

status is a return variable with one of the following values after svs finishes:

- 0 indicates svs failed to store shim file.
- 1 indicates svs stored the shim file, either as an absolute path or in the shims subdirectory of the VNMR user directory.
- 2 indicates svs stored the file using the global parameter shimspath.
- 3 indicates svs stored the file in shims subdirectory of the VNMR system directory.

Examples:
```
svs('acetone')
svs('bb10mm'):r1
```

See also: *Getting Started*

Related:

rts	Retrieve shim coil settings (C)
shimspath	Path to user's shims directory (P)

svs — Spin simulation vertical scale (P)

Description: Vertical scale for simulated spectrum.

Values: 0 to 1e10. A typical value is 200.

See also: *User Guide: Liquids NMR*

Related:

spins	Perform spin simulation calculation (C)
spsm	Enter spin system (M)

svsis — Generate and save images as FDF files (M)

Applicability: Systems with imaging capabilities.

Syntax: `svsis(directory<,'f'|'m'>)`

Description: Generates images from the current experiment and saves them into the specified directory as Flexible Data Format (FDF) files. `svsis` saves one image, or a number of images in the case of multislice experiments.

`svsis` only saves images from the standard SISCO imaging sequences: image, shorte, stecho, multiecho, csi2D, and ssfp. However, `svsis` can be easily modified to produce images from user sequences, provided the sequences use standard SISCO parameters, slice select pulse shapes, and generate data in the same manner as the standard SISCO sequences.

To modify `svisis` for a user sequence, add a line similar to the following in the "Valid Sequences" section:

```
$k=$k+1 $seqfil[$k]='t1image' $seq[$k]='ncsnn'
   $thk[$k]='image'
```

The new sequence name is `t1image`. Its reconstruction properties are given by `$seq`, whose values are similar to the parameter `seqcon`. The string characters for `seqcon` are defined as follows:

First character:	multiecho looping
Second character:	multislice looping
Third character:	2D phase encode loop
Fourth character:	3D phase encode loop
Fifth character:	4D phase encode loop

The values of each character are `'n'` for a null loop, `'s'` for a standard loop, or `'c'` for a compressed loop.

In this case, `'ncsnn'` is a standard 2D image with compressed multislice. The `$thk` value is the slice thickness type, as defined by the type of acquisition, which in this case is the standard image sequence.

`svsis` uses the command `svsdfd` to dump the transformed data out to the data file. After dumping the headers out, the UNIX shell command `fdfgluer` is called to glue the headers to the data. `svsdfd` dumps the data in such a way that the (0,0) coordinates are the first data point in the file.

More detailed modifications can be made to `svsis` but it is left to the user to make these adjustments. Modifications to the macro should be made in the user's `maclib`.

Arguments: `directory` is the directory name desired. The specified directory is made in the user's data directory and is appended with the suffix `.dat`. Image files are created under this directory as `image0001.fdf`, `image0002.fdf`, etc. A `procpar` file is also saved into this directory.

`'f'|'m'` defines the type of image data. `'f'` outputs the data in floating point format. `'m'` outputs the data in 12-bit integer values in 16-bit words. The default is `'f'`. ImageBrowser currently only accepts data in floating point values.

See also: *User Guide: Imaging*

Related:

`seqcon`	Acquisition loop control (P)
`svimg`	Generate and save images as FDF files (M)

svtmp — Move experiment data into experiment subfile (M)

Syntax: `svtmp<(file)>`

Description: Moves the experiment data (parameters, FID, and transformed spectrum) from current experiment into a subdirectory inside `curexp+'/subexp'`. Unlike the macro `cptmp`, the experiment data is no longer accessible in the current experiment; only a copy of the parameters is still present.

Arguments: `file` is the name of the subfile that receives the experiment data. The default name is either the transmitter nucleus (if `seqfil='s2pul'`) or the pulse sequence name.

Examples:

```
svtmp
svtmp('cosy')
```

See also: *Getting Started*

Related:

`cptmp`	Copy experiment data into experiment subfile (M)
`curexp`	Current experiment directory (P)
`rttmp`	Retrieve experiment data from experiment subfile (M)
`seqfil`	Pulse sequence name (P)

sw — Spectral width in directly detected dimension (P)

Description: Sets the total width of the spectrum to be acquired, from one end to the other. All spectra are acquired using quadrature detection. The spectral width determines the sampling rate for data, which occurs at a rate of `2*sw` points per second (actually `sw` pairs of complex points per second). Note that the sampling rate itself is not entered, either directly or as its inverse (known on some systems as the *dwell time*).

The sampling rate is internally constrained to a multiple of a timebase that is set based on the type of acquisition controller board in the system (see the description of the `acquire` statement for a description of these boards):

- 12.5 ns on systems with a Data Acquisition Controller board.
- 25 ns on systems with a Pulse Sequence Controller board or an Acquisition Controller board.
- 0.1 µs on a *GEMINI 2000* system and on systems with an Output board.

If a value of `sw` is entered whose inverse is not an even multiple of the time base listed above, `sw` is automatically adjusted to a slightly different value to give an acceptable sampling rate.

A value of `sw` greater than the value of the `maxsw_loband` parameter forces `dp='y'`.

To enter a value in ppm, append the character `p` (e.g., `sw=200p`).

If a DSP facility is present in the system (i.e., `dsp='i'` or `dsp='r'`) and oversampling in the experiment has not been turned off by setting `oversamp='n'`, then the oversampling factor will be recalculated.

Values: Number, in Hz. The range possible is based on the system:

On UNITY*INOVA*: 100 Hz to 500 kHz.

On *MERCURY-Vx*, *MERCURY*, *GEMINI 2000* broadband, UNITY*plus*, UNITY, and VXR-S: 100 Hz to 100 kHz.

On *GEMINI 2000* $^{1}H/^{13}C$: 100 Hz to 23 kHz.

On ^{UNITY}*INOVA* and UNITY*plus* with solids: up to 5 MHz.

On UNITY and VXR-S with solids: up to 2 MHz.

On UNITY*plus*, UNITY, VXR-S with 200-kHz option: 100 Hz to 200 kHz.

See also: *Getting Started*

Related:

dp	Double precision (P)
dsp	Type of DSP for data acquisition (P)
maxsw_loband	Maximum spectral width of input board (P)
oversamp	Oversampling factor for acquisition (P)
sw1	Spectral width in 1st indirectly detected dimension (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)
sw3	Spectral width in 3rd indirectly detected dimension (P)

sw1 Spectral width in 1st indirectly detected dimension (P)

Description: Analogous to the sw parameter except that sw1 applies to the first indirectly detected dimension of a multidimensional data set. The increment of the variable evolution time d2 is automatically calculated from sw1. The number of increments for this dimension is set by ni. To create sw1 in the current experiment, as well as ni and phase, enter addpar('2d').

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
d2	Incremented delay in 1st indirectly detected dimension (P)
ni	Number of increments in 1st indirectly detected dimension (P)
phase	Phase selection (P)
sw	Spectral width in directly detected dimension (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)
sw3	Spectral width in 3rd indirectly detected dimension (P)

sw2 Spectral width in 2nd indirectly detected dimension (P)

Description: Analogous to the sw parameter except that sw2 applies to the second indirectly detected dimension of a multidimensional data set. The increment of the variable evolution time d3 is automatically calculated from sw2. The number of increments for this dimension is set by ni2. To create sw2 in the current experiment, as well as d3, ni2, and phase2, enter addpar('3d').

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
d3	Incremented delay for 2nd indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
phase2	Phase selection for 3D acquisition (P)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 2nd indirectly detected dimension (P)
sw3	Spectral width in 3rd indirectly detected dimension (P)

sw3 Spectral width in 3rd indirectly detected dimension (P)

Description: Analogous to the sw parameter except that sw3 applies to the third indirectly detected dimension of a multidimensional data set. The increment of the variable evolution time d4 is automatically calculated from sw3. The number of increments for this dimension is set by ni3. To create sw3 in the current experiment, as well as d4, ni3, and phase3, enter addpar('4d').

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
d4	Incremented delay for 3rd indirectly detected dimension (P)
ni3	Number of increments in 3rd indirectly detected dimension (P)
par4d	Create 4D acquisition parameters (C)
phase3	Phase selection for 4D acquisition (P)
sw	Spectral width in directly detected dimension (P)
sw1	Spectral width in 1st indirectly detected dimension (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)

syn — Number of frequency synthesizers (obsolete)

Description: This parameter is no longer part of VNMR.

sysgcoil — System gradient coil (P)

Description: Specially reserved string parameter that specifies which physical gradient set is currently installed, and allows convenient updating of important gradient characteristics when one gradient set is interchanged for another. The value to `sysgcoil` is assigned to the parameter `gcoil` when joining experiments or retrieving parameter sets.

This parameter is set in the CONFIG window (opened by entering `config`) to the name of the gradient set in use. Once set, it is then available to all experiments and to all users.

See also: *VNMR and Solaris Software Installation*; *User Guide: Imaging*

Related:

boresize	Magnet bore size (P)
config	Display current configuration and possibly change it (M)
creategtable	Generate new gradient calibration file (M)
gcoil	Current gradient coil (P)
gmax	Maximum gradient strength (P)
setgcoil	Assign sysgcoil configuration parameter (M)
trise	Gradient rise time (P)

system — System type (P)

Description: A global parameter that sets the basic type of system: spectrometer or data station. The value is set using the System Type label in the CONFIG window (opened from `config`).

Values: `'spectrometer'` is a spectrometer system (Spectrometer choice in CONFIG window).

`'datastation'` is a system used as a data station (Data Station choice in CONFIG window). Acquisition is not allowed in this setting.

See also: *VNMR and Solaris Software Installation*

Related:

config	Display current configuration and possibly change it (M)
Console	System console type (P)

systemdir — VNMR system directory (P)

Description: Contains path to VNMR system directory, typically `/vnmr`. The UNIX environmental variable `vnmrsystem` initializes `systemdir` at bootup.

See also: *Getting Started*

T

t1 — T_1 exponential analysis (M)

Syntax: `t1`

Description: Processes data obtained using an array of values of the parameter `d2` for a T_1 experiment. It runs `expfit`, which does an exponential curve fitting that determines the value of T_1. The output is matched to the equation:

```
M(t)=(M(0)-M0)*exp(-t/T1)+M0
```

where *M0* is the equilibrium Z magnetization and *M(0)* is the magnetization at time zero (e.g., immediately after the 180° pulse for an inversion recovery T_1 experiment). Notice that this equation will fit inversion recovery data (for which *M(0)* is approximately equal to *–M0*) or saturation recovery data (for which *M(0)* is 0).

The required input is the file `fp.out` from `fp` and the values of the arrayed parameter. The T_1 analysis is done for all the peaks listed in `fp.out`. Peaks are selected for analysis by entering `fp(index1,index2,...)` before running the analysis. The output file is the `analyze.list` in the current experiment. The file `analyze.out` is used by `exp1` to display the results. The output of the analysis program shows T_1 and its standard deviation, but does not explicitly show *M(0)*, *M0*, or their standard deviations. The *M(0)* and *M0* values can be found in "raw" form in `analyze.out` in the current experiment, but their standard deviations are not part of the program output.

See also: *User Guide: Liquids NMR*

Related:

`d2`	Incremented delay in 1st indirectly detected dimension (P)
`expfit`	Make least squares fit to polynomial or exponential curve (C)
`fp`	Find peak heights (C)
`t1s`	T_1 exponential analysis with short output table (M)
`t2`	T_2 exponential analysis (M)
`t2s`	T_2 exponential analysis with short output fable (M)

t1image — Fit arrayed imaging data to T_1 exponential data (M)

Applicability: Systems with imaging capabilities.

Syntax: `t1image`

Description: Does preprocessing required for fitting arrayed imaging data to T_1 data using the `imfit` program. The user is prompted for the base phasefile names and the lower limit noise threshold. `t1image` then transforms and saves all of the images, and calls `imfit` to complete the fitting process.

See also: *User Guide: Imaging*

Related:

`imfit`	Fit arrayed imaging data to T_1 or T_2 exponential data (M,U)
`t2image`	Fit arrayed imaging data to T_2 exponential data (M)

t1s — T_1 exponential analysis with short output table (M)

Syntax: `t1s`

Description: Performs the same analysis as `t1` but produces a short output table showing only a summary of the measured relaxation times.

See also: *User Guide: Liquids NMR*

Related: t1 — T_1 exponential analysis (M)

t2 — T_2 exponential analysis (M)

Syntax: t2

Description: Processes data obtained using an array of values for the base time parameter bt for a T_2 experiment. It runs expfit, which does an exponential curve fitting that determines the value of T_2. The output is matched to the equation:

$M(t) = (M(0) - M(inf))*exp(-t/T2) + M(inf)$

where *M(0)* is the magnetization at time zero (i.e., the full magnetization excited by the observe pulse) and *M(inf)* is the xy-magnetization at infinite time (zero unless the peak is sitting on an offset baseline).

The required input is the file fp.out from fp and the values of the arrayed parameter. The T_2 analysis is done for all the peaks listed in fp.out. Peaks are selected for analysis by entering fp(index1,index2,...) before running the analysis. The output file is the file analyze.list in the current experiment. The file analyze.out is used by exp1 to display the results. The output of the analysis program shows T_2 and its standard deviation, but does not explicitly show *M(0)*, *M(inf)*, or their standard deviations. The *M(0)* and *M(inf)* values can be found in "raw" form in analyze.out in the current experiment, but their standard deviations are not part of the program output.

See also: *User Guide: Liquids NMR*

Related:

expfit	Make least squares fit to polynomial or exponential curve (C)
fp	Find peak heights (C)
t1	T_1 exponential analysis (M)
t1s	T_1 exponential analysis with short output table (M)
t2s	T_2 exponential analysis with short output fable (M)

t2image — Fit arrayed imaging data to T_2 exponential data (M)

Applicability: Systems with imaging capabilities.

Syntax: t1image

Description: Does preprocessing required for fitting arrayed imaging data to T_2 data using the imfit program. The user is prompted for the base phasefile names and the lower limit noise threshold. t2image then transforms and saves all of the images, and calls imfit to complete the fitting process.

See also: *User Guide: Imaging*

Related:

imfit	Fit arrayed imaging data to T_1 or T_2 exponential data (M,U)
t1image	Fit arrayed imaging data to T_1 exponential data (M)

t2s — T_2 exponential analysis with short output table (M)

Syntax: t2s

Description: Performs the same analysis as t2 but produces a short output table showing only a summary of the measured relaxation times.

See also: *User Guide: Liquids NMR*

Related: t2 — T_2 exponential analysis (M)

tabc — Convert data in table order to linear order (M)

Syntax: `tabc<(dimension)>`

Description: Converts arbitrarily ordered data obtained under control of an external AP table to linear monotonic order, suitable for processing in VNMR. The data must have been acquired according to a table in the `tablib` directory.

Imaging and other 2D experiments are normally acquired so that the order of the incremented acquisition parameter, such as the phase-encode gradient, is linear and monotonic. For a standard imaging experiment, this linear order means that the phase-encode gradient progresses from a starting negative value monotonically up through zero to a positive value (e.g., –64, –63, –6 2 ,. . ., –1, 0, 1, ... , 62, 63). The `ft2d` program assumes this structure in its operation.

Data from table-driven 2D pulse sequences is used by entering `tabc` *only once* before normal 2D processing and/or parameter storage. In this situation, `tabc` takes no arguments and is executed by entering `tabc` in the VNMR command window. A simple check is done by `tabc` to prevent it from being executed more than once on the same data set.

2D data is expected to be in the standard VNMR format, but if the 2D data is in the compressed format, setting `dimension` to `1` converts the data. `tabc` supports all 2D data types recognized by VNMR: arrayed, compressed multislice, and arrayed compressed multislice,

3D data is expected to be in the compressed/standard format, in which there are `ni` standard 2D planes of data (the third dimension), each consisting of `nf` compressed FIDs (the second dimension). Setting `dimension` to `3` reorders 3D data acquired with an external table.

`tabc` reads the file `fid` in the `acqfil` subdirectory of the current experiment. Before the data is reordered, this file is written to the file `fid.orig` in the same `acqfil` directory. If for any reason `tabc` fails or results in an unpredictable or undesired transformation, the original raw data can be recovered by moving `fid.orig` back to `fid`. To gain more disk space, you can delete `fid.orig` after you are satisfied that conversion is successful.

Use `tabc` on saved data that has been loaded into a VNMR experiment or on data in an experiment that has just been acquired but not yet saved. In the first case, converted data must be resaved for the saved data set to reflect conversion.

`tabc` requires that data must have the same number of “traces” as the table elements. It does not support any of the advanced features of table expansion (e.g., the entire table must be explicitly listed in the table file), and expects to find only one table in a file; whether the table is t1 or t60 is unimportant.

Arguments: `dimension` specifies the type of data to be converted: `1` for 2D compressed data, `2` for 2D standard data, or `3` for 3D compressed/standard data. The default is 2.

Examples:

```
tabc
tabc(1)
tabc(3)
```

See also: *User Guide: Imaging*

Related:		
	`flashc`	Convert compressed 2D data to standard 2D format (C)
	`ft2d`	Fourier transform 2D data (C)
	`ni`	Number of increments in 1st indirectly detected dimension (P)
	`nf`	Number of FIDs (P)

tan — Find tangent value of an angle (C)

Syntax: `tan(angle)<:n>`

Description: Finds the tangent of an angle.

Arguments: `angle` is an angle, in radians.

`n` is the return value giving the tangent of `angle`. The default is to display the tangent value in the status window.

Examples:
```
tan(.5)
tan(val):tan_val
```

See also: *VNMR User Programming*

Related:

arccos	Calculate arc cosine of real number (M)
arcsin	Calculate arc sine of real number (M)
arctan	Calculate arc tangent of real number (M)
atan	Find arc tangent value of a number (C)
cos	Find cosine value of an angle (C)
exp	Find exponential value of a number (C)
ln	Find natural logarithm of a number (C)
sin	Find sine value of an angle (C)

tape — Read tapes from VXR-style system (M,U)

Syntax: (From VNMR) `tape(<-d device,><type,>option <,file1,file2,...>)`
(From UNIX) `tape <-d device> <type> <option> <file1> <file2>...`

Description: Displays the contents of a VXR-style (Gemini, VXR-4000, or XL) 9-track tape for use with VNMR or reads one or several files from the tape into the current directory. Note that the *write* option is not supported (i.e., VNMR only *reads* tapes in a VXR-style format and does not write to a tape).

Arguments: `device` is the tape drive device name. The default value is `/dev/rst8`. For AIX systems, `device` should be `/dev/rmt0.` If the default value is not set properly or another device name is wanted, be sure to type `-d` and a space before the device name you want to input.

`type` is the type of tape to be accessed. `'-q'` or `'-s'` select the 1/4-inch tape unit (“streaming” or cartridge tape); this is the default. `'-9'`, `'-h'`, or `'-n'` select the 1/2- inch tape unit (open reel tape drive).

`option` is one of the following:

- `'help'` is a keyword to display help on the use of the system.
- `'cat'` is a keyword to display a catalog of files on tape.
- `'read'` is a keyword to read one or more files. This option requires that the files be listed as the next argument.
- `'rewind'` is a keyword to rewind tape (1/2-inch tape only).
- `'quit'` is a keyword to release the tape drive (1/2-inch tape only).

`file1, file2, ...` are the names of one or more files to be read. Wildcard characters (`*` and `?`) can be used.

Examples:
```
tape('cat')
tape('-h','read','mydata')
tape -h read mydata
tape -d /dev/rmt/0lb read mydata
```

See also: *Getting Started*

Related: `decomp` Decompose a VXR-style directory (C)
`vxr_unix` Convert VXR-style text files to UNIX format (M,U)

`tape` Control tape options of files program (P)

Description: Defines device that `files` program accesses when it is instructed to read or write to a tape. The parameter `tape` is in the user's global parameter tree.

Values: Name of a device. The default device is `/dev/rst8`. If `tape` does not exist or is set to the null string (two single quotes with no space between), `files` uses its default device value. Notice that different computers define tape drives differently. For VnmrSGI, `tape='/dev/tapens'` is appropriate. For Solaris, `tape='/dev/rmt/0mb'`.

See also: *Getting Started*

Related: `files` Interactively handle files (C)

`tbox` Draw a tilted box (C)

Applicability: Systems with imaging capabilities.

Syntax: (1) `tbox(<'keywords'>angle,xcenter,ycenter,hlen,vlen)`
(2) `tbox(<'keywords'>angle,xcenter,ycenter,hlen,vlen,vspace,nboxes)`

Description: Draws a tilted box centered at `xcenter,ycenter` (as indicated by a small diamond) (syntax 1) or produces an aligned array of `nboxes` tilted boxes centered at `xcenter,ycenter` (syntax 2) and separated by `vspace`.

Arguments: `'keywords'` identifies the output device (`'graphics'|'plotter'`), drawing mode (`'xor'|'normal'`), and drawing capability (`'newovly'|'ovly'|'ovlyC'`).

- `'graphics'|'plotter'` is a keyword selecting the output device. The default is `'plotter'`. The output selected is passed to subsequent `pen`, `move`, or `draw` commands and remains active until a different mode is specified.
- `'xor','normal'` is a keyword for the drawing mode when using the `'graphics'` output device. The default is `'normal'`. In the `'xor'` mode, if a line is drawn such that one or more points of the line are in common with a previous `'xor'` line, the common points are erased. In the `normal` mode, the common points remain. The mode selected is passed to subsequent `pen`, `move`, and `draw` commands and remains active until a different mode is specified.
- `'newovly'`, `'ovly'` and `'ovlyC'` are keywords that specify an interactive drawing capability that is slightly slower than the `'xor'` mode but more consistent in color. `'newovly'` clears any previous draws, boxes, and writes made with the `'ovly'` modes and draws the figure. `'ovly'` draws without clearing so that multi-segment figures can be created. `'ovlyC'` clears without drawing.

`angle` is the tilt angle, in radians, of a box.

`xcenter,ycenter` are coordinates on the screen, in mm, specifying the point at which a box is centered.

`hlen` is the horizontal coordinate on the screen, in mm.

`vlen` is the vertical coordinate, on the screen, in mm.

`vspace` controls the separation or overlap of boxes.

`nboxes` is the number of boxes.

Examples: `tbox('plotter',20,100,40,150)`

See also: *Getting Started*

Related:

`box`	Draw a box on a plotter or graphics display (C)

tcapply — Apply table conversion reformatting to data (C)

Applicability: Systems with imaging capabilities.

Syntax: `tcapply<(file)>`

Description: Rearranges the spectra in a 2D data set that resides in the current data file. You must apply `ft1d` to the data before you can use `tcapply`. Using values from an AP table, `tcapply` arranges the spectra corresponding to the value in the AP table from low value to high value. The values might have already been read in by the `tcopen` command.

Arguments: `file` specifies the name of the file containing the AP table to be read. The file must be in `$vnmruser/tablib`.

Examples: `tcapply('petable')`

See also: *User Guide: Imaging*

Related:

`tabc`	Close table conversion file (C)
`ft1d`	Fourier transform along f_2 dimension (C)
`ft2d`	Fourier transform along f_2 dimension (C)
`tcclose`	Close table conversion file (C)
`tcopen`	Open table convert file (C)

tcclose — Close table conversion file (C)

Applicability: Systems with imaging capabilities.

Syntax: `tcclose`

Description: Removes a table conversion file and frees the memory used to store the sorted table indices read in with the `tcopen` command.

See also: *User Guide: Imaging*

Related:

`tcapply`	Apply table conversion reformatting to data (C)
`tcopen`	Open table convert file (C)

tcl — Send Tcl script to Tcl version of dg window (C)

Syntax: `tcl(script)`

Description: Sends a Tcl (Tool Command Language) script to the Tcl version of the `dg` window. If this window is not active, this command does nothing.

Arguments: `script` is any legal Tcl script.

See also: *VNMR User Programming*

Related:

`dg`	Display group of acquisition/processing parameters (C)

tcopen — Open table conversion file (C)

Applicability: Systems with imaging capabilities.

Syntax: `tcopen<(file)>`

Description: Explicitly reads, sorts, and stores in memory, a table conversion file. `tcopen` uses the file when `tcapply` is called.

Arguments: `file` specifies the file to be read; it must be in `$vnmruser/tablib`.

Examples: `tcopen('petable')`

See also: *User Guide: Imaging*

Related:

`tcapply`	Apply table conversion reformatting to data (C)
`tcclose`	Close table convert file (C)

te — Echo time (P)

Applicability: Systems with imaging capabilities.

Description: Echo time for imaging and some localized spectroscopy experiments.

In gradient and spin echo imaging sequences, `te` is usually defined as the time measured from the middle of the initial rf excitation pulse to the center of the resulting echo.

In multiecho sequences, `te` may also define the time duration between successive echoes, normally a constant interval. Multiecho sequences with variable echo times are also possible, in which case the `te` period between successive echoes may take on a range of values represented by a `te` array.

Some more unusual pulse sequences, such as stimulated echo, RARE and Fast Spin Echo, may use `te` in ways somewhat different from the normal standards.

See also: *User Guide: Imaging*

Related:

`ne`	Number of echoes to be acquired (P)

techron — Set up parameters for gradient amplifier tests (M)

Applicability: Systems with imaging capabilities.

Syntax: `techron`

Description: Recalls parameters sets for gradient amplifier tests during microimaging installation.

See also: *Microimaging Module Installation*

temp — Open the Temperature Control window (C)

Applicability: Systems with a variable temperature (VT) controller.

Syntax: `temp`

Description: Opens the Temperature Control window, which has the following capabilities:

- Turn temperature control off.
- Set temperature control on at a specified temperature in degrees C.
- Enable temperature control from within an experiment using the `temp` parameter and the `su`, `go`, `ga`, or `au` macros. This mode is the default.
- Alternatively, turn off experiment control of the temperature and allow only the Temperature Control window (and `sethw`) to set the temperature. This mode has the advantage that, often times, `temp` is different between experiments. Joining a different experiment and entering `go` can unexpectedly change the temperature. This mode prevents this problem.
- Resetting the temperature controller when the temperature cable is reconnected to a probe.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`acqi`	Interactive acquisition display process (C)
`au`	Submit experiment to acquisition and process data (M)
`ga`	Submit experiment to acquisition and FT the result (M)
`go`	Submit experiment to acquisition (M)
`sethw`	Set values for hardware in acquisition system (C)
`su`	Submit a setup experiment to acquisition (M)
`temp`	Sample temperature (P)
`tin`	Temperature interlock (P)

`temp` Sample temperature (P)

Applicability: Systems with a variable temperature (VT) module.

Description: Sets the temperature of sample.

Values: `'n'` or `-150` to `+200`, in steps of 0.1°C. `'n'` instructs the acquisition system not to change the VT controller and to ignore temperature regulation throughout the course of the experiment.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`temp`	Open the Temperature Control window (C)
`tempcal`	Temperature calculation (C)
`tin`	Temperature interlock (P)
`vtc`	Variable temperature cutoff point (P)

`tempcal` Temperature calculation (C)

Applicability: Systems with a variable temperature (VT) module.

Syntax: `tempcal(solvent)<:temperature>`

Description: For exact determination of sample temperature when using the VT unit, a temperature calibration curve must be made for each probe used. All data, such as gas flow, must be noted. Use samples of ethylene glycol for high-temperature calibration, and use samples of methanol for low-temperature calibration. To make the calculation:

- Bring the sample to the desired temperature and allow sufficient time for equilibration, then obtain a spectrum.
- Next, align two cursors on the two resonances in the spectrum, then enter `tempcal('e')` for ethylene glycol, or enter `tempcal('m')` for methanol. The temperature is calculated based on the difference frequency between the cursors.

Arguments: `solvent` is the sample solvent: `'glycol'`, `'e'`, or `'g'` for ethylene glycol, or `'methanol'` or `'m'` for methanol.

`temperature` returns the calculated value of the sample temperature. The default is the system displays the value.

Examples:

```
tempcal('glycol')
tempcal('m'):temp
```

See also: *User Guide: Liquids NMR*

`tep` Post-acquisition delay in EPI experiments (P)

Applicability: Systems with echo planar imaging (EPI) capabilities.

Description: Delay used in the EPI sequence to adjust the beginning of data acquisition. This correction is necessary to allow for the finite (propagation) delay of gradient pulses. This allows the user to center the EPI echoes in the acquisition window.

Values: Number, in µs. Typically 0 to 50 µs, depending on the gradient hardware.

See also: *User Guide: Imaging*

Related:

episet	Set up parameters for EPI experiment (M)

testct — Check ct for resuming signal-to-noise testing (M)

Syntax: testct

Description: Used by the testsn macro to decide when to resume testing of signal-to-noise. See the description of testsn for details.

See also: *User Guide: Liquids NMR*

Related:

ct	Completed transients (P)
testsn	Test signal-to-noise of a spectrum (M)

testsn — Test signal-to-noise of a spectrum (M)

Syntax: testsn

Description: Part of the automatic periodic signal-to-noise testing that occurs during various automated acquisitions, most notably c13. Transforms the data using fn=16000, and then baseline corrects, setting the left-most 10% of the spectrum and the right-most 2% as baseline. After the baseline correction, testsn uses getsn to calculate the signal-to-noise.

- If signal-to-noise exceeds the desired goal in parameter sn (found in the standard carbon parameter set /vnmr/stdpar/c13), testsn aborts the experiment using the command halt, which initiates processing according to the wexp parameter.
- If signal-to-noise is not reached, testsn estimates the signal-to-noise ratio at the end of the experiment. If signal-to-noise target will not be reached by then, it cancels subsequent signal-to-noise testing, but allows the experiment to proceed.
- If the signal-to-noise target will be reached before the end of the experiment, it saves the estimated number of transients required to reach the goal in the parameter r7 (using a conservative estimate), and then sets the processing at future blocks to be only testct, which simply tests if ct is greater than r7, and, if so, resumes testing of signal-to-noise with testsn.

See also: *User Guide: Liquids NMR*

Related:

c13	Automated carbon acquisition (M)
fn	Fourier number in directly detected dimension (P)
getsn	Get signal-to-noise estimate of a spectrum (M)
halt	Abort acquisition with no error (C)
r1–r7	Real parameter storage for macros (P)
sn	Signal-to-noise ratio (P)
testct	Check ct for resuming signal-to-noise testing (M)
wexp	Specify action when experiment completes (C)

text — Display text or set new text for current experiment (C)

Syntax: text<(text_string)><:string_variable>

Description: Associated with each experiment is a text file, consisting of a block of text, that can be used to describe the sample and experiment. `text` allows displaying the text file and changing the text file for the current experiment. A UNIX text editor, such as `vi`, or the macro `textvi` can also be used to edit the text file of the current experiment.

Arguments: `text_string` is a string of text that replaces the existing text file. The default is to display the text file in the current experiment. The characters `\\` or `\n` can be used in the string to denote a new line, and the characters `\t` can be used to denote a tab (see example below).

`string_variable` returns the text in `text_string` as a string variable. Thus, for example, the `text:n1` and `text(n1+'cosy experiment')` commands, where `n1` is a string, can be used in a macro to add a "cosy experiment" to the text. An equivalent operation using the `atext` command would be `atext('cosy experiment')`.

Examples:
```
text('Sample 101\tCDCl3\\13 February')
```

See also: *Getting Started*

Related:

`atext`	Append string to the current experiment text (M)
`ctext`	Clear the text of the current experiment (C)
`curexp`	Current experiment directory (P)
`dtext`	Display a text file in the graphics window (C)
`puttxt`	Put text file into another file (C)
`textvi`	Edit text file of current experiment (M)
`vnmrprint`	Print text files (U)

`textis` Return the current text display status (C)

Syntax:
(1) `textis(command):$yes_no`
(2) `textis:$display_command`

Description: Determines if a command given by the user currently controls the text window (syntax 1) or returns the name of the command currently controlling the text window (syntax 2).

Arguments: `command` is the name of a command that potentially may be controlling the text window.

`$yes_no` returns `1` if `command` controls the text window, or `0` if it does not.

`$display_command` returns the name of the command currently controlling the text window.

Examples:
```
textis:$display
if ($display = 'dg') then . . . endif
```

See also: *VNMR User Programming*

Related:

`graphis`	Return the current graphics display status (C)

`textvi` Edit text file of current experiment (M)

Syntax:
```
textvi
```

Description: Edits the text file of the current experiment using the UNIX text editor `vi`. `textvi` is equivalent to the command `vi(curexp+'/text')`.

See also: *Getting Started*

Related:

`edit`	Edit a file with user-selectable editor (M)
`text`	Display text or set new text for current experiment (C)
`vi`	Edit text file with `vi` editor (M)

th — Threshold (P)

Description: Sets threshold for printout of peak frequencies so that peaks greater than `th` on the plot appear on any peak listings. `th` is always bipolar (i.e., negative peaks greater in magnitude than `th` also appear in peak listings).

Values: 0 to 1e9, in mm.

See also: *User Guide: Liquids NMR*

Related:

`thadj`	Adjust threshold for peak printout (M)

th2d — Threshold for integrating peaks in 2D spectra (P)

Description: Used by `ll2d` when determining the bounds of a peak and calculating its volume. To create the 2D peak picking parameters `th2d` and `xdiag` in the current experiment, enter `addpar('ll2d')`.

Values: From `0.0` to `1.0`. If `th2d=1.0`, `ll2d` integrates all points in the peak that are above the current threshold for the spectrum (i.e., the portion of the peak that can be seen in a contour plot of the spectrum). A smaller value causes `ll2d` to integrate a larger area when determining the volume of a peak. If `th2d=0.5`, for example, `ll2d` integrates all points in a peak that are above 0.5 times the current threshold.

See also: *User Guide: Liquids NMR*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`ll2d`	Automatic and interactive 2D peak picking (C)
`xdiag`	Threshold for excluding diagonal peaks when peak picking (P)

thadj — Adjust threshold for peak printout (M)

Syntax: `thadj<(max_peaks<,noise_mult<,llarg1<,llarg2>>>)>`

Description: Adjusts the threshold `th` so that no more than a specified maximum number of peaks are found in a subsequent line listing (see `nll`) and so that `th` is at least a specified noise multiplier times the root-mean-square noise level.

Arguments: `max_peaks` is the maximum number of peaks in the displayed spectral range. The default is `wc/4` (i.e., the threshold is adjusted such that `ppf` will produce a “reasonable” number of lines with any width of plot).

`noise_mult` is a noise multiplier used to calculate the minimum value for `th` from the size of the root-mean-square noise.

`llarg1` is the `noise_mult` argument (the default is 3) to the `nll` command used inside this macro

`llarg2` is the keyword argument (`'pos'`, `'neg'`, `'all'`; the default is `'all'`.) to the `nll` command used inside this macro.

Examples:

```
thadj
thadj(50)
thadj(200,4)
thadj(200,4,2)
thadj(200,4,2,'pos')
```

See also: *Getting Started*

Related:

`nll`	Find line frequencies and intensities (C)
`ppf`	Plot teak frequencies over spectrum (M)
`th`	Threshold (P)
`vsadj`	Automatic vertical scale adjustment (M)
`vsadj2`	Automatic vertical scale adjustment by powers of two (M)

vsadjc	Automatic vertical scale adjustment for ^{13}C spectra (M)
vsadjh	Automatic vertical scale adjustment for ^{1}H spectra (M)
wc	Width of chart (P)

theta — Euler angle theta from magnet frame (P)

Applicability: Systems with imaging capabilities.

Description: Euler angle theta from magnet frame.

Values: –90 to +90, in degrees.

See also: *User Guide: Imaging*

Related:

phi	Euler angle phi from magnet frame (P)
psi	Euler angle psi from magnet frame (P)

thk — Slice thickness (P)

Applicability: Systems with imaging capabilities.

Description: Returns the slice thickness, in mm.

See also: *User Guide: Imaging*

ti — Inversion recovery time (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the recovery time following an inversion prepulse in inversion recovery experiments. The value of `ti` generally has a strong impact on image contrast, which depends on the T_1 relaxation time of the sample in different regions of the image.

See also: *User Guide: Imaging*

Related:

ir	Inversion recovery mode (P)
pi	Width of an inversion pulse (P)
pipat	Shape of an inversion pulse (P)
tpwri	Intensity of inversion pulse (P)

ticks — Number of trigger pulses (P)

Applicability: Systems with imaging capabilities.

Description: Sets the number of trigger pulses the system waits before acquisition begins. This parameter is found in some Varian pulse sequences that feature gating. `ticks` controls an external gating signal received through an external TTL input. If `ticks=0`, the system ignores trigger pulses and runs in the nontriggered mode. The pre- and post-trigger delays `rcvry` and `hold` remain active in the nontriggered mode.

Values: Integers from 0 to 100.

See also: *User Guide: Imaging*

Related:

hold	Post-trigger delay (P)
rcvry	Pre-trigger delay (P)

time — Display experiment time or recalculate number of transients (M)

Syntax: `time<(<hours,>minutes)>`

Description: Estimates the acquisition time or recalculates the number of transients so that the total acquisition time is approximately the requested time. The parameters

looked at when calculating the time per transient are d1, d2, d3, at, ni, sw1, ni2, and sw2.

Arguments: hours and minutes are numbers making up a time to be used by the system to recalculate the parameter nt so that the total acquisition time is approximately the time requested; the default (no arguments) is for the system to estimate the acquisition time for a 1D, 2D, or 3D experiment using the parameters in the current experiment.

Examples:
```
time
time(2,45)
```

Alternate: Show Time button in the Acquire menu.

See also: *Getting Started*

Related:

at	Acquisition time (P)
d1	First delay (P)
d2	Incremented delay in 1st indirectly detected dimension (P)
d3	Incremented delay in 2nd indirectly detected dimension (P)
exptime	Display experiment time (C)
ni	Number of increments in 1st indirectly detected dimension (P)
ni2	Number of increments in 2nd indirectly detected dimension (P)
nt	Number of transients (P)
sw1	Spectral width in 1st indirectly detected dimension (P)
sw2	Spectral width in 2nd indirectly detected dimension (P)

tin — Temperature interlock (P)

Description: Controls error handling based on temperature regulation. If temperature regulation is lost, tin can be used to select whether an error is generated and acquisition is halted or whether a warning is generated and acquisition continues. In both cases, the lost regulation will cause werr processing to occur, thus providing a user-selectable mechanism to respond to VT failure.

Values: 'n' turns off the temperature interlock feature

'w' indicates the variable temperature regulation light is monitored during the course of the experiment and, if it starts to flash (regulation lost), a warning is generated; however, acquisition is not stopped.

'y' indicates the variable temperature regulation light is monitored during the course of the experiment and, if it starts to flash (regulation lost), the current data acquisition is stopped. The acquisition will not resume automatically if regulation is regained.

See also: *User Guide: Liquids NMR*

Related:

in	Lock and spin interlock (P)
werr	When error (P)

title — Plot a title on a plotter (M)

Applicability: Systems with imaging capabilities.

Syntax: title(string)

Description: Plots a string provided by the user on the plotter.

Arguments: string is a string of characters.

Examples: title('15 June Image')

See also: *User Guide: Imaging*

tlt — First-order baseline correction (P)

Description: When spectral display is active, the command dc turns on a linear drift correction (baseline correction). The result of this operation includes calculating a first-order baseline correction parameter tlt. The calculation is made by averaging of a small number of points at either end of the display and drawing a straight line baseline between them.

See also: *Getting Started*

Related:

cdc	Cancel drift correction (C)
dc	Calculate spectral drift correction (C)
lvl	Zero-order baseline correction (P)

tmove — Left-shift FID to time-domain cursor (M)

Syntax: tmove

Description: Provides an alternative method of left shifting time-domain data. To use this method, position the right time cursor at the place that should be the start of the FID, then enter tmove. This adjusts lsfid to left-shift the FID.

See also: *Getting Started*

Related:

lsfid	Number of complex points to left-shift *np* FID (P)

tmsref — Reference 1D proton or carbon spectrum to TMS (M)

Syntax: tmsref:tms_found

Description: Tries to locate a TMS line. If found, tmsref re-references the spectrum to the TMS line and returns a 1 to the calling macro; if not found, tmsref returns 0 and the referencing is left as it was. In the case of other signals (e.g., from silicon grease) immediately to the left of the TMS line (even if they are higher than the reference line), tmsref tries avoiding those by taking the rightmost line in that area, as long as it is at least 10% of the main Si-CH_3 signal. Large signals within 0.6 ppm for ^{1}H (or 6 ppm for ^{13}C) to the right of TMS may lead to misreferencing.

Arguments: tms_found returns 1 if a TMS line was located or returns 0 if not.

See also: *Getting Started*

Related:

c13	Automated carbon acquisition (M)
h1	Automated proton acquisition (M)

tn — Nucleus for observe transmitter (P)

Description: Changing the value of tn causes a macro (_tn) to be executed that extracts values for sfrq and tof from lookup tables. The tables, stored in the directory /vnmr/nuctables, are coded by atomic weights.

Values: In the lookup tables, typically given by 'H1', 'C13', 'P31', etc. The value tn='lk' sets the deuterium frequency, and also holds the lock current and switches the relay in the automated deuterium gradient shimming module, if present, so that deuterium signal may be observed without disturbing lock. The frequency is the same as tn='H2'. The relay is available only on UNITY*INOVA*, *MERCURY-Vx*, *MERCURY*, and UNITY*plus* systems.

Alternate: Nucleus Selection Menu

See also: *Getting Started*

Related:

dn	Nucleus for first decoupler (P)
dn2	Nucleus for second decoupler (P)

dn3	Nucleus for third decoupler (P)
sfrq	Transmitter frequency of observe nucleus (P)
tof	Frequency offset for observe transmitter (P)

tncosyps **Set up parameters for TNCOSYPS pulse sequence (M)**

Applicability: Sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: tncosyps

Description: Sets up a homonuclear correlation experiment (phase-sensitive version) with water suppression.

See also: *User Guide: Liquids NMR*

tndqcosy **Set up parameters for TNDQCOSY pulse sequence (M)**

Applicability: Systems with a linear amplifier on the observe channel and a T/R switch. Sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: tndqcosy

Description: Sets up a 2D J-correlation experiment with water suppression.

See also: *User Guide: Liquids NMR*

tnmqcosy **Set up parameters for TNMQCOSY pulse sequence (M)**

Applicability: Systems with hardware digital phaseshifter for transmitting with direct-synthesis rf; otherwise, software small-angle phaseshifter for transmitting with the old-style rf is used. Sequence not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: tnmqcosy

Description: Sets up a multiple-quantum filtered COSY experiment with water suppression.

See also: *User Guide: Liquids NMR*

tnnoesy **Set up parameters for TNNOESY pulse sequence (M)**

Applicability: Systems with a linear amplifier on the observe channel and a T/R switch. Sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: tnnoesy

Description: Sets up a 2D cross-relaxation experiment with water suppression.

See also: *User Guide: Liquids NMR*

tnroesy **Set up parameters for TNROESY pulse sequence (M)**

Applicability: Sequence is not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: tnroesy

Description: Sets up a rotating-frame NOE experiment with water suppression.

See also: *User Guide: Liquids NMR*

tntocsy **Set up parameters for TNTOCSY pulse sequence (M)**

Applicability: Systems with T/R switch, computer-controlled attenuators, and linear amplifiers on observe channel. Sequence not supplied with *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000*.

Syntax: `tntocsy`

Description: Sets up a total-correlation spectroscopy experiment (HOHAHA) with water suppression.

See also: *User Guide: Liquids NMR*

tnuc — Retrieve nucleus table parameters for transmitter (obsolete)

Description: A command no longer in VNMR. Use `setfrq` as the effective replacement.

Related:
- `setfrq` — Set frequencies of rf channels in system (C)

TOCSY — Change parameters for TOCSY experiment (M)

Syntax: `TOCSY<('GLIDE')>`

Description: Converts the current parameter set to a TOCSY experiment.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding proton spectrum for the experiment.

Related:
- `tocsy` — Set up parameters for TOCSY experiment (M)

tocsy — Set up parameters for TOCSY pulse sequence (M)

Applicability: Any system with linear amplifiers on the observe channel. Sequence is not supplied with the *GEMINI 2000*.

Syntax: `tocsy`

Description: Sets up a total-correlation (TOCSY) experiment, also known as the Homonuclear Hartmann-Hahn (HOHAHA) experiment.

Alternate: TOCSY button on the 2D Pulse Sequence Setup Secondary Menu.

See also: *User Guide: Liquids NMR*

Related:
- `ft1dac` — Combined arrayed 2D FID matrices (M)
- `ft2dac` — Combined arrayed 2D FID matrices (M)
- `wft1dac` — Combined arrayed 2D FID matrices (M)
- `wft2dac` — Combined arrayed 2D FID matrices (M)

TOCSY1D — Change parameters for TOCSY1D experiment (M)

Syntax: `TOCSY<('GLIDE')>`

Description: Converts the current parameter set to a TOCSY1D (also known as DPFGSE-noe) experiment. A 1D proton spectrum is displayed with `ds_selfrq` menu to do peak selection.

Arguments: `'GLIDE'` is a keyword used only in a *GLIDE* run to ensure that the starting parameter set is the corresponding carbon spectrum for the experiment.

Related:
- `NOESY1D` — Change parameters for NOESY1D experiment (M)

tof — Frequency offset for observe transmitter (P)

Description: Controls the exact positioning of the transmitter. As the value assigned to `tof` increases, the transmitter moves to a higher frequency (toward the left side of the spectrum). The minimum step size of `tof` is determined by the type of rf hardware in the spectrometer. The limit is specified using the Step Size label in the CONFIG window (opened from `config`, implicitly set for *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems). Systems with broadband style rf

(rftype='b') generally have 100-Hz resolution; all other systems have 0.1 Hz resolution.

Values: Approximate, depends on frequency. On *GEMINI 2000* $^{1}H/^{13}C$ systems: –50000 to 50000, in Hz (^{1}H has 0.0795... Hz step size, ^{13}C has 19.... Hz step size); on other systems: –100000 to 100000, in Hz.

See also: *Getting Started*

Related:		
	config	Determine current configuration and possibly change it (M)
	dof	Frequency offset for first decoupler (P)
	dof2	Frequency offset for second decoupler (P)
	dof3	Frequency offset for third decoupler (P)
	rftype	Type of rf generation (P)

tpe — Duration of the phase encoding gradient pulse (P)

Applicability: Systems with imaging capabilities.

Description: Sets the length of the phase encoding gradient period in imaging and CSI experiments. The spectral width in the indirect dimension (sw1) is determined from tpe as sw1=1/tpe. tpe may be recomputed within the pulse sequence to provide optimum performance, such as minimum echo time, or scaled to match the required timing for slice refocusing and readout dephasing.

See also: *User Guide: Imaging*

Related:		
	gpe	Phase encoding gradient increment in DAC units (P)
	nv	Number of 2D phase encode steps to be acquired (P)
	sw1	Spectral width in 1st indirectly detected dimension (P)
	tpe2,tpe3	Duration of second and third phase encoding gradient periods (P)

tpe2,tpe3 — Duration of second and third phase encoding gradient periods (P)

Applicability: Systems with imaging capabilities.

Description: Sets the lengths of the phase encoding gradient periods that control second spatial and third spatial dimensions in nD imaging and CSI experiments.

For example, 3D volume imaging sequence have two independent phase encode axes, controlled by tpe and tpe2. It is common to have a single phase encoding time block, in which two independent phase encode gradients share the same time period. In this case, tpe and tpe2 would be equal.

See also: *User Guide: Imaging*

Related:		
	sw2	Spectral width in 2nd indirectly detected dimension (P)
	tpe	Duration of the phase encoding gradient pulse (P)

tpwr — Observe transmitter power level with linear amplifiers (P)

Applicability: Systems with a linear amplifier on the observe channel.

Description: Controls transmitter power. The value of the attenuator upper safety limit is set using the Upper Limit label in the CONFIG window (opened from config). Depending on hardware adjustments, the system may saturate at a given value of tpwr (i.e., values above a certain value may give equal output).

Values: On *MERCURY* systems, the range is 0 to 63, in dB, 1-dB steps.

On *GEMINI 2000* systems: 0 to 63.5 (63.5 is maximum power), in units of dB, 0.5-dB steps.

On systems other than *GEMINI 2000* with 63-dB attenuator installed: 0 to 63 (63 is maximum power), in units of dB. About 55 to 60 is normal. Lower values (e.g., 49) might be used for water suppression experiments like 1-3-3-1.

On systems other than *GEMINI 2000* with 79-dB attenuator installed: –16 to 63 (63 is maximum power), in units of dB.

CAUTION: **Continuous power greater than 2 watts in a switchable probe will damage the probe. Always carefully calibrate power to avoid exceeding 2 watts. The maximum value for tpwr on a 200-MHz, 300-MHz, or 400-MHz system with a linear amplifier on the decoupler channel has been set to 49, corresponding to about 2 watts of power. Before using tpwr=49 for continuous decoupling, ensure safe operation by measuring the output power. This should be done during system installation and checked periodically by the user.**

See also: *Getting Started*

Related:

`cattn`	Coarse attenuator (P)
`config`	Determine current configuration and possibly change it (M)
`dpwr`	Power level for first decoupler with linear amplifiers (P)
`dpwr2`	Power level for second decoupler (P)
`dpwr3`	Power level for third decoupler (P)
`dpwrf`	First decoupler fine power (P)
`fattn`	Fine attenuator (P)
`tpwrf`	Observe transmitter fine power (P)

`tpwr1` Intensity of an excitation pulse (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the peak power, in dB, of transmitter pulses corresponding to `p1`.

See also: *User Guide: Imaging*

Related:

`p1`	First pulse width (P)
`tpwr`	Observe transmitter power level with linear amplifiers (P)

`tpwr2` Intensity of an excitation pulse (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the peak power, in dB, of transmitter pulses corresponding to `p2`.

See also: *User Guide: Imaging*

Related:

`p2`	Second pulse width (P)
`tpwr`	Observe transmitter power level with linear amplifiers (P)

`tpwrcal` Calibrate power levels of 90° and 180° pulse (M)

Applicability: Systems with imaging capabilities.

Syntax: `tpwrcal(start_tpwr,end_tpwr)`

Description: Sets up paired arrays of form `tpwr1`, `tpwr2` The parameter `array` is set as `array='(tpwr1,tpwr2)'`. This macro is especially useful for calibrating the 90° and 180° power levels for a slice.

Arguments: `start_tpwr` is the starting value for the `tpwr` part of the arrayed pairs. The starting value for `tpwr1` is 6 less than `start_tpwr`.

`end_tpwr` is the ending value for the `tpwr` part of the arrayed pairs. The ending value for `tpwr1` is 6 less than `end_tpwr`.

Examples: `tpwrcal(30,45)`

See also: *User Guide: Imaging*

Related:

array	Parameter order and precedence (P)
tpwr	Observe transmitter power level with linear amplifiers (P)
tpwr1	Intensity of excitation pulse (P)

tpwrf — Observe transmitter fine power (P)

Applicability: Systems with a fine attenuator on the observe transmitter channel.

Description: Controls the transmitter fine attenuator. Systems with this attenuator are designated using the Fine Attenuator label in the CONFIG window (opened from config). The fine attenuator is linear and spans 60 dB (UNITY*INOVA* or UNITY*plus* system) or 6 dB (other systems). If tpwrf is not present, enter create('tpwrf','integer') setlimit('tpwrf',4095,0,1) to create it.

On *MERCURYplus* and *MERCURY-Vx* systems, controls the transmitter by simulating a fine attenuator. The fine power control is linear and spans 0 to tpwr.

Values: 0 to 4095, where 4095 is maximum power. If tpwrf does not exist in the parameter table, a value of 4095 is assumed.

On *MERCURYplus* and *MERCURY-Vx* systems, 0 to 255 (where 255 is maximum power). If tpwrf or tpwrm do not exist in the parameter table, a value of 255 is assumed. If both exist, tpwrm is used.

See also: *Getting Started*; *User Guide: Solids*; *MERCURYplus and MERCURY-Vx CP/MAS Installation, Testing, and Operation*

Related:

config	Determine current configuration and possibly change it (M)
dpwr	Power level for first decoupler with linear amplifiers (P)
dpwrf	First decoupler fine power (P)
fattn	Fine attenuator (P)
tpwr	Observe transmitter power level with linear amplifier (P)
tpwrm	Observe transmitter linear modulator power (P)

tpwri — Intensity of inversion pulse (P)

Applicability: Systems with imaging capabilities.

Description: Specifies the peak power of transmitter pulses corresponding to pi.

Values: Number, in dB.

See also: *User Guide: Imaging*

Related:

ir	Inversion recovery mode (P)
pi	Width of an inversion pulse in microseconds (P)
tpwr	Observe transmitter power level with linear amplifiers (P)
tpwr1	Intensity of an excitation pulse (P)

tpwrm — Observe transmitter linear modulator power (P)

Applicability: UNITY*INOVA*, UNITY*plus*, and *MERCURY* systems.

Description: Controls the power level on the observe transmitter linear modulator. On *MERCURYplus* and *MERCURY-Vx* systems, tpwrm controls the transmitter by simulating a fine attenuator. The fine power control is linear and spans 0 to tpwr.

Values: 0 to 4095, where 4095 is maximum power. If tpwrm does not exist in the parameter table, a value of 4095 is assumed.

On *MERCURYplus* and *MERCURY-Vx* systems, 0 to 255 (where 255 is maximum power). If `tpwrm` does not exist in the parameter table, a value of 255 is assumed.

See also: *Getting Started*; *User Guide: Solids*; *MERCURYplus and MERCURY-Vx CP/MAS Installation, Testing, and Operation*

Related:

`config`	Determine current configuration and possibly change it (M)
`dpwrf`	First decoupler fine power (P)
`fattn`	Fine attenuator (P)

`tr` Repetition time in imaging and localized spectroscopy experiments (P)

Applicability: Systems with imaging capabilities.

Description: Sets the repetition time of an experiment. The definition of repetition time can vary somewhat from pulse sequence to pulse sequence. In general, for imaging experiments, `tr` is the time required to complete one transient of one phase encode step, including relaxation delay, excitation, data acquisition, and any post-acquire events, such as rf spoiling, phase encode rewinding, and gradient turn-off.

For multislice and/or multiecho imaging sequences, `tr` includes the complete multslice/multiecho train (for standard arrayed slice acquisitions, where the second character in `seqcon` is *s*, the complete train is not included, and `tr` is the repetition time for each slice position).

Some 1D experiments, such as STEAM and ISIS are also written using `tr`, with the similar definition that `tr` is the repetition time per transient.

`tr` describes the total duration of all events in a pulse sequence, and will never be directly found as an argument to "delay." Instead, `tr` will generally be used in precalculations to determine the time required to pad the sum of programmed events up to the desired repetition time. This padding delay will often be found in the pulse sequence as "predelay."

See also: *User Guide: Imaging*

Related:

`seqcon`	Acquisition loop control (P)

`trace` Mode for *n*-dimensional data display (P)

Applicability: All systems; however, *MERCURY-Vx*, *MERCURY*, and *GEMINI 2000* systems can only process 3D data and cannot acquire such data.

Description: Sets the multidimensional data display mode.

Values: `'f1'` displays the f_1 axis horizontally and allows f_1 traces to be displayed.

`'f2'` displays the f_2 axis horizontally and allows f2 traces to be displayed.

`'f3'` displays the f3 axis horizontally and allows f_3 traces to be displayed if the data set is 3D.

See also: *User Guide: Liquids NMR*

`transfer` Move parameters to target experiment (M)

Applicability: Systems with imaging capabilities.

Syntax: `transfer(data_type,<scout_exp,>target_exp)`

Description: Transfers selectively parameter data from a scout data set to the target experiment in preparation for the next or future scanning operation. The following series of actions are carried out: (1) `transfer` joins the scout

experiment and saves the current parameters in the userdir+'/parlib' directory, under the file name TRANSFER.par. Any previous parameter sets with this file name are removed. (2) transfer then joins the target experiment and displays the transfer menu. The user may then use the menu to selectively copy groups of parameters from TRANSFER.par to the target experiment. The groups that may be transferred include:

Nucleus	tn, resto
Voxel	pos1-pos3, vox1-vox3, psi1, theta1, mopos, scpos
Slice	pss, psi, phi, theta, mopos, scpos
FOV	lro, lpe
Coil	rfcoil, gcoil
Sample	mopos, scpos

If any of the parameters pos1, pos2, pos3, psi1, theta1, psi, phi, or theta are arrayed in the scout experiment, in addition to copying the voxel or slice list, transfer sets the array parameter in the target experiment. Other parameters copied by transfer cannot legally be arrayed, except pss.

Parameters tn, gcoil, and pss are special cases that trigger _macros execution. transfer executes the _tn, _gcoil, and _pss (setloop) programs once if these parameters are copied to the target. This execution ensures that all the normal side effects of setting these parameters are properly executed.

Arguments: data_type is a keyword defining the type of data for transfer as 's' or 'voxel', which can be abbreviated to 's' or 'v', respectively.

scout_exp is the number of the scout experiment. The default is the current experiment is the source of the scout parameter data.

target_exp is the number of the target experiment.

Examples:
```
transfer('s',5)
transfer('v',5,6)
```

See also: *User Guide: Imaging*

Related:

gcoil	Read data from gradient calibration tables (P)
lpe	Field of view size for phase encode axis (P)
lro	Field of view size for readout axis (P)
phi	Euler angle from magnet frame (P)
psi	Euler angle from magnet frame (P)
pss	Slice position (P)
resto	NMR resonance offset frequency (P)
rfcoil	RF pulse calibration identity (P)
theta	Euler angle from magnet frame (P)
tn	Nucleus for observe transmitter (P)
userdir	VNMR user directory (P)

traymax — Sample changer tray slots (P)

Applicability: Systems with an automatic sample changer.

Description: Specifies the type of sample changer. It also can be used to disable the sample changer. The value is set using the Sample Changer label in the CONFIG window (opened from config).

Values: 0 is setting for no sample changer present or, if a sample changer is attached, to disable the changer (None choice in the CONFIG window).

9, 50, 100, 96, 48 are `traymax` values that indicate the number of sample slots for the corresponding sample changer (9 is for Carousel, 50 is for SMS/ASM 50 Sample, 100 is for SMS/ASM 100 Sample, 96 is for VAST, and 48 is for NMS).

See also: *VNMR and Solaris Software Installation; Getting Started*

Related: `config` Display current configuration and possibly change it (M)

`trfunc` Translate screen coordinates (M)

Applicability: Systems with imaging capabilities.

Syntax: `trfunc($x,$y):$xincm,$yincm`

Description: Translates screen coordinates to hertz or centimeters depending upon the `axis` parameter.

Arguments: `$x` is a coordinate . . .

`$y` is a coordinate . . .

`$xincm` is a coordinate . . .

`$yincm` is a coordinate . . .

See also: *User Guide: Imaging*

Related: `axis` Axis label for displays and plots (P)
`trfuncd` Translate screen distance (M)

`trfuncd` Translate screen distance (M)

Applicability: Systems with imaging capabilities.

Syntax: `trfuncd($screenlength):$imagelength`

Description: Translates a screen distance into centimeters in a real image. It is only useful in `axis='cc'` (aspect ratio constrained) images.

Arguments: `$screenlength` is the length of the display screen.

`$imagelength` is the length of the image.

See also: *User Guide: Imaging*

Related: `axis` Axis label for displays and plots (P)
`trfunc` Translate screen coordinates (M)

`trise` Gradient rise time (P)

Applicability: Systems with imaging capabilities.

Description: Stores the time required for an x, y, or z magnetic field gradient to change from zero to maximum gradient (`gmax`). Because the gradient system is adjusted by Varian at installation time so that all three gradients have the same rise time, only one parameter is used to describe the rise time for all three gradients.

This parameter accurately describes the time required for gradient changes only in systems that use slew-rate-limited gradient amplifiers, such as the Oxford GPS 2239 gradient amplifier supplied with most imaging systems. Do not confuse this gradient rise time with the amount of time required by a pulse sequence to transmit the DAC value that initiates a gradient value change (see the `gradient` and `vgradient` statements in the manual *VNMR User Programming* for a discussion of that timing).

`trise` is used in some sequences to control various aspects of gradient timing, including the automatic setup of gradient refocusing. This parameter does not need to be declared and initialized in pulse sequence source code files, because

it is a standard PSG parameter and is therefore already declared and initialized by the Varian-supplied PSG library. See the source file `sems.c` for an example.

`trise` is defined in the system gradient table files found in the directory `$vnmrsystem/gradtables`, and is automatically set from one of those files when a value is entered for the parameter `gcoil`.

Values: 0.005 seconds (nominal).

See also: *User Guide: Imaging*

Related:

`boresize`	Magnet bore size (P)
`gcoil`	Read data from gradient calibration tables (P)
`gmax`	Maximum gradient strength (P)

`troesy` Set up parameters for TROESY pulse sequence (M)

Applicability: Not on *MERCURY-Vx*, *MERCURY,* and *GEMINI 2000* systems.

Syntax: `troesy`

Description: Sets up parameters for the transverse cross-relaxation experiment in a rotating frame.

See also: *User Guide: Liquids NMR*

`trunc` Truncate real numbers (O)

Syntax: `trunc`

Description: In MAGICAL programming, an operator that truncates real numbers.

Examples:

```
$3 = trunc(3.6)
```

See also: *User Programming*

Related:

`acos`	Find arc cosine of number (C)
`arccos`	Calculate arc cosine of real number (M)
`arcsin`	Calculate arc sine of real number (M)
`arctan`	Calculate arc tangent of real number (M)
`asin`	Find arc sine of number (C)
`atan`	Find arc tangent of a number (C)
`cos`	Find cosine value of an angle (C)
`exp`	Find exponential value (C)
`ln`	Find natural logarithm of a number (C)
`tan`	Find tangent value of an angle (C)
`sqrt`	Return square root of a real number (O)
`typeof`	Return identifier for argument type (O)

`tshift` Adjust tau2 to current cursor position (M)

Applicability: Systems with a solids module.

Syntax: `tshift`

Description: Adjusts `tau2` to make the current time cursor position the start of acquisition. As the time-domain cursor can move between points, this macro allows the accurate adjustment of `tau2` so as to start another acquisition exactly at the top of an echo.

See also: *User Guide: Solid-State NMR*

`tspoil` Gradient spoiling time (P)

Applicability: Systems with imaging capabilities.

Description: Delay parameter for use in controlling a spoiling gradient. Many imaging sequences use `tspoil` to set the additional time that the slice-select gradient is on, symmetrically bracketing the 180° refocusing pulse, to spoil any magnetization excited by the 180 itself.

See also: *User Guide: Imaging*

Related:

`gcrush`	Crusher gradient level (P)
`gspoil`	Spoiler gradient level (P)
`tcrush`	Crusher gradient control (P)

`tugain` Amount of receiver gain used by qtune (P)

Applicability: UNITY*INOVA*, UNITY*plus*, UNITY, and VXR-S systems.

Description: Sets the amount of receiver gain used by the interactive probe tuning program `qtune`. On some systems, the default receiver gain of 50 causes the signal to saturate, which `qtune` displays as a mostly flat line. To adjust the receiver gain to avoid saturation, set `tugain` to an appropriate value for the system before `qtune` is started.

Values: 0 to 60, in steps of 2 dB (60 represents the highest possible receiver gain and 0 the lowest). On UNITY*INOVA* and UNITY*plus* (500-MHz and higher), low-band gain is limited 18 to 60.

See also: *Getting Started*

Related:

`qtune`	Tune probe using swept-tune graphical tool (C)

`tune` Assign a frequency to a channel for probe tuning (C)

Applicability: UNITY*INOVA* and UNITY*plus* systems.

Syntax:
(1) `tune(freq1,<freq2,freq3,freq4>)`
(2) `tune(chan1,freq1,<chan2,freq2,...>)`

Description: Assigns a frequency to a channel when tuning the probe. The frequency assignment remains in effect (as a tune frequency) until the next `su` or `go` command is executed. Although only the first synthesizer is connected to the tuning system, the console is programmed to set this synthesizer to the desired frequency based on the channel shown on the CHAN readout on the TUNE INTERFACE unit.

The `tune` program has two formats. If syntax 1 is used, frequencies are assigned to channels based on the order of the arguments. The first argument is interpreted and assigned to the first (observe) channel, the second argument is assigned to the second (decoupler) channel. A third or fourth argument would be interpreted and assigned in a similar manner.

If syntax 2 is used, the arguments are entered in pairs, with the first argument specifying the rf channel and the next argument specifying the frequency.

`tune` selects the format based on the first argument. If the first argument is a name for an rf channel, syntax 2 is assumed; otherwise, syntax 1 is used.

Arguments: `freq1`, `freq2`, `freq3`, and `freq4` specify the frequency of the rf channel as a value in MHz (e.g., `200` or `300`) or indirectly using the nucleus for tuning the probe (e.g., `'H1'` or `'C13'`). If a nucleus is entered, it must be found in the nucleus table. The frequency of any channel without an argument is unaffected. For example, `tune('H1','C13','N15')` sets the first channel to tune at the ^{1}H, the second channel at ^{13}C, and the third channel at ^{15}N. If a fourth channel is present, it is not affected. Entering `tune('H1','C13',200)`

assigns the same frequencies for the first and second channels but the third channel tunes to 200 MHz, regardless of the proton frequency.

`chan1`, `chan2`, `chan3`, and `chan4` specify the channel directly:

- `'todev'` or `'ch1'` specify channel 1 (observe transmitter).
- `'dodev'` or `'ch2'` specify channel 2 (first decoupler).
- `'do2dev'` or `'ch3'` specify channel 3 (second decoupler).
- `'do3dev'` or `'ch4'` specify channel 4 (third decoupler).

Only one of these keywords is used per channel (do not enter the channel using just its number). If a channel does not have a keyword entered as an argument, that channel is not affected (e.g., `tune('ch4','P31')` selects the frequency corresponding to ^{31}P on the fourth channel, but leaves the first three channels unaffected).

Examples:
```
tune('H1','C13','N15')
tune('H1','C13',200)
tune('ch4','P31')
```

See also: *Getting Started*

Related:

`btune`	Tune broadband channel on *MERCURY* series, *GEMINI 2000* (M)
`ctune`	Tune carbon channel on ^{1}H/^{13}C *GEMINI 2000* (M)
`dfrq`	Transmitter frequency of first decoupler (P)
`dfrq2`	Transmitter frequency of second decoupler (P)
`dfrq3`	Transmitter frequency of third decoupler (P)
`dtune`	Tune lock channel on *GEMINI 2000* (M)
`go`	Submit experiment to acquisition (C)
`htune`	Tune proton channel on *GEMINI 2000* (M)
`qtune`	Tune probe using swept-tune graphical tool (C)
`sfrq`	Transmitter frequency of observe nucleus (P)
`spcfrq`	Display frequencies of rf channels (M)
`su`	Submit a setup experiment to acquisition (C)
`tuneoff`	Turn off probe tuning mode, *MERCURY* series, *GEMINI 2000* (M)

`tuneoff` Turn off probe tuning mode on MERCURY series, GEMINI 2000 (M)

Applicability: *MERCURY* series and *GEMINI 2000* systems.

Syntax: `tuneoff`

Description: Takes a *MERCURY* series, *GEMINI 2000* broadband, or *GEMINI 2000* ^{1}H/^{13}C system out of tuning mode by turning off the transmitter directing rf to the probe. After entering `tuneoff`, be sure to change the cables on the probe and magnet leg back to the normal BNC connectors (as they were before they were moved for tuning purposes).

See also: *Getting Started*; *Autoswitchable NMR Probes Installation*

Related:

`btune`	Tune broadband channel on *MERCURY* series, *GEMINI 2000* (M)
`ctune`	Tune carbon channel on ^{1}H/^{13}C *GEMINI 2000* (M)
`dtune`	Tune lock channel on *GEMINI 2000* (M)
`htune`	Tune proton channel on *GEMINI 2000* (M)
`sethw`	Set values for hardware in acquisition system (C)
`su`	Submit a setup experiment to acquisition (M)

`typeof` Return identifier for argument type (O)

Syntax: `typeof`

Description: In MAGICAL programming, an operator that returns an identifier (0 or 1) for the type (real or string) of an argument.

Examples:
```
if typeof('$1') then $arg=1 else $arg=$1 endif
```

See also: *User Programming*

Related:

on	Make a parameter active or test its state (C)
size	Return number of elements in an arrayed parameter (O)

U

undospins — Restore spin system as before last iterative run (M)

Syntax: `undospins`

Description: Returns the values of the line assignments and the chemical shifts and coupling constants existing before the last iterative adjustment with `spins('iterate')`, and then runs `spins`. The parameters are returned from the file `spini.inpar` and the transitions from the file `spini.savela` in the current experiment.

See also: *User Guide: Liquids NMR*

Related:

`spins`	Perform spin simulation calculation (C)

undosy — Restore original 1D NMR data from subexperiment (M)

Syntax: `undosy`

Description: Restores the 1D DOSY data stored by the `dosy` macro (if data exists) by recalling the data stored in the file `subexp/dosy2Ddisplay` in the current experiment. `undosy` and `redosy` enable easy switching between the 1D DOSY data (spectra as a function of `gzlvl1`) and the 2D DOSY display (signal as a function of frequency and diffusion coefficient).

See also: *User Guide: Liquids NMR*

Related:

`dosy`	Process DOSY experiments (M)
`redosy`	Restore 2D DOSY display from subexperiment (M)

unit — Define conversion units (C)

Syntax:
```
unit<(suffix,label,m<,tree><,'mult'|'div'>   \
   ,b<,tree><,'add'|'sub'>)>
```

Description: Defines a linear relationship that can be used to enter parameters with units. The unit is applied as a suffix to the numerical value (e.g., `10k`, `100p`). The definition of the linear relations follows the traditional `y=mx+b` equation, where `x` is the input value and `y` is the converted result.

Entering the `unit` command with no arguments displays all currently defined units. To remove a unit, define the unit with a 0 for the slope.

A convenient place to put `unit` commands for all users is in the `bootup` macro. Put private `unit` commands in a user's `login` macro.

Arguments: `suffix` is a string identifying the name for the unit. The length of the string is limited to 12 characters.

`label` is a string for the name to be displayed when the `axis` parameter is set to the value of the suffix (if the suffix is only a single character). The length of the string is limited to 12 characters.

`m` is the slope of the linear relationship, defined either as a numerical value or as the name of a parameter. If a parameter name is used, it may be optionally followed with the parameter tree to use (argument `tree`) and by another optional keyword that specifies whether the parameter value should be a multiplier (keyword `'mult'`) or divisor (keyword `'div'`).

`tree` is the parameter tree to use (i.e.,`'current'`, `'processed'`, `'global'`, or `'systemglobal'`). The default tree is `'current'`.

`'mult'` is a keyword that specifies that a parameter value used for the slope should be a multiplier. This is the default for the slope.

`'div'` is a keyword that specifies that a parameter value used for the slope should be a divisor.

`b` is the intercept of the linear relationship, defined either as a numerical value or as the name of a parameter. If a parameter name is used, it may be optionally followed with the parameter tree to use (argument `tree`) and by another optional keyword that specifies whether the parameter value should be added (keyword `'add'`) or subtracted (keyword `'sub'`).

`'add'` is a keyword that specifies that a parameter value used for the intercept should be a added. This is the default for the intercept.

`'sub'` is a keyword that specifies that a parameter value used for the intercept should be a subtract.

Examples: `unit`
Displays all currently defined units

`unit('k','kHz',1000)`
`r1=10k` will set `r1` to `10000`

`unit('p','ppm','reffrq','processed')`
`r1=10p` will set `r1` to `10*reffrq`, where `reffrq` from processed tree

`unit('p','',0)`
`r1=10p` will set `r1` to `10` and give an error "`unknown unit p`"

`unit('F','degF',5/9,-32*5/9)`
`r1=212F` will set `r1` to `100` (degrees C)

`unit('C','degC',9/5,32)`
`r1=100C` will set `r1` to `212` (degrees F)

See also: *Getting Started, VNMR User Programming*

Related:

`axis`	Axis label for displays and plots (P)
`bootup`	Macro executed automatically when VNMR is activated (M)

`unix_vxr` Convert UNIX text files to VXR-style format (M,U)

Syntax: (From VNMR) `unix_vxr(UNIX_file,VXR_file)`
(From UNIX) `unix_vxr UNIX_file VXR_file`

Description: Converts a UNIX text file to the VXR-style format used with Gemini, VXR-4000, and XL systems. The conversion must be done before moving the file to the VXR system.

Arguments: `UNIX_file` is the name of the input file, which must be a text file.

`VXR_file` is the name of the output file after conversion. The names of the input and output files must be different.

Examples: (From VNMR) `unix_vxr('oldtextfile','newtextfile')`
(From UNIX) `unix_vxr oldtextfile newtextfile`

See also: *Getting Started*

Related:

`convert`	Convert data set from a VXR-style system (C,U)
`decomp`	Decompose a VXR-style directory (C)
`vxr_unix`	Convert VXR-style text files to UNIX format (M,U)

unlock — Remove inactive lock and join experiment (C)

Syntax: `unlock(exp_number,'force')`

Description: In attempting to join another experiment, the `jexp` command may abort claiming the experiment is locked. This feature prevents two users from processing the same experimental data at the same time, which could corrupt the data (a "user" can also be a background operation invoked by the same user, such as in `wexp` processing). This lock can be left behind if the program or the computer crashes.

The `unlock` command removes the lock if it is inactive and joins the unlocked experiment. The command will fail if the lock is still active (i.e., the process that made the lock is still executing) or if the lock was placed on the experiment by a remote host. The latter situation can only occur when one or more nodes are sharing the same file system (and experimental data).

Arguments: `exp_number` is the number of the experiment from 1 to 9 to be unlocked.

`force` unlocks an experiment under all circumstances and joins the unlocked experiment.

Examples:
```
unlock(3)
```

See also: *Getting Started*

Related:

`jexp`	Join existing experiment (C)

updatepars — Update all parameter sets saved in a directory (M)

Syntax: `updatepars(directory)`

Description: Corrects saved parameter sets. Starting with VNMR version 4.2, all parameters, upper limit, lower limit, and step sizes have been tightened. Further additions were made in VNMR 4.3. `updatepars` searches a directory for parameter and FID files and corrects the `procpar` files found. This macro overwrites parameters in the current experiment. The corrections applied to the parameter sets are defined by the `parfix` macro. Because `updatepars` uses the current experiment to process the parameter sets, the experiment chosen for running `updatepars` should not contain a valuable data set.

Arguments: `directory` is the name of the directory to be searched.

Examples:
```
updatepars('myparlib')
updatepars('mydata')
```

See also: *Getting Started*

Related:

`parfix`	Update parameter sets (M)
`parversion`	Version of parameter set (P)

updateprobe — Update probe file (M)

Syntax: `updateprobe(<probe|'tmplt'><,'system'>)`

Description: Updates the current existing probe file or probe template.

Arguments: `probe` is the probe parameter to update. The default is the current probe parameter value.

`'tmplt'` is a keyword to update the local probe template. The default is the current probe file.

`'system'` is a keyword to update the system template or probe file, providing you have write permission to the file. The default is to update the local template or probe file.

Examples:
```
updateprobe
updateprobe('autosw')
updateprobe('autosw','system')
updateprobe('tmplt')
```

See also: *Getting Started*

Related:

addparams	Add parameter to current probe file (M)
getparam	Receive parameter from probe file (M)
setparams	Write parameter to current probe file (M)

updaterev — Update after installing new VNMR version (M)

Syntax: `updaterev`

Description: Updates experiment parameters and the global file following installation of a new VNMR software version. `updaterev` is called by the `makeuser` command during the installation process.

See also: *VNMR and Solaris Software Installation*

updtgcoil — Update gradient coil (M)

Applicability: Systems with three-axis gradients.

Syntax: `updtgcoil`

Description: Creates the `gcoil` parameter, if it does not exist, and sets it to the current value of the system gradient coil `sysgcoil`. `updtgcoil` only executes if gradients are configured in the system.

The `updtgcoil` macro is called when a new experiment is joined or new parameters are read into an experiment; however, it is only called at these times if the `gcoil` parameter exists. If `sysgcoil` is set to a gradient table name and if the values of `sysgcoil` and `gcoil` are different, a message is displayed in the Status window to let the user know that the gradient coil parameters have been updated.

`updtgcoil` can be called directly if the user wants to update the parameter set with the `gcoil` and gradient table parameters.

See also: *Getting Started; VNMR User Programming; User Guide: Imaging*

Related:

creategtable	Generate system gradient table (M)
gcoil	Read data from gradient calibration tables (P)
sysgcoil	System gradient coil (P)

updtparam — Update specified acquisition parameters (C)

Syntax: `updtparam`

Description: Enables interactive updating of specified acquisition parameters.

See also: *SpinCAD*

Related:

psgupdateoff	Prevent update of acquisition parameters (C)
psgupdateon	Enable update of acquisition parameters (C)

usemark — Use “mark” output as deconvolution starting point (M)

Syntax: `usemark`

Description: In some cases it is not possible to produce a line list that is a suitable starting point for a deconvolution (e.g., lines may overlap so severely that a line list does not find them). In this case, or in any case, the results of a “mark” operation

during a previous spectral display (ds) may be used to provide a starting point. If the "mark" has been made with a single cursor, the information in the file mark1d.out contains only a frequency and intensity, and the starting linewidth is taken from the parameter slw.

If the "mark" is made with two cursors, placed symmetrically about the center of each line at the half-height point, mark1d.out contains two frequencies and an intensity. In this case, the starting frequency is taken as the average of the two cursor positions; the starting linewidth is taken as their difference (thus allowing different starting linewidths for each line).

See also: *User Guide: Liquids NMR*

Related:

ds	Display a spectrum (C)
slw	Spin simulation linewidth (P)

userdir — VNMR user directory (P)

Description: Stores the full UNIX path of the directory that contains a user's private VNMR files. These include a user's private maclib, menulib, shims, psglib, experiments, etc. This parameter is initialized at bootup by the UNIX environmental variable vnmruser.

Values: Typical value is /home/vnmr2/vnmrsys

See also: *Getting Started*

Related:

curexp	Current experiment directory (P)
systemdir	VNMR system directory (P)

usergo — Experiment setup macro called by go, ga, and au (M)

Syntax: usergo

Description: Called by macros go, ga, or au before starting an experiment. The user typically creates usergo as a means to set up general experiment conditions.

See also: *Getting Started*

Related:

au	Submit experiment to acquisition and process data (M)
ga	Submit experiment to ac acquisition and FT the result (M)
go	Submit experiment to acquisition (M)
go_	Pulse sequence setup macro called by go, ga, and au (M)

userfixpar — Macro called by fixpar (M)

Syntax: userfixpar

Description: Called by the macro fixpar to provide an easy mechanism to customize parameter sets.

See also: *Getting Started*

Related:

fixpar	Correct parameter characteristics in experiment (M)

V

vast1d **Set up initial parameters for VAST experiments (M)**

Applicability: Systems with VAST accessory.

Syntax: `vast1d`

Description: Sets up initial VAST parameters from the `/vnmr/stdpar` directory or from the user's `stdpar` directory if the appropriate file exists there. Any changes made to the files in these directories are reflected in the setup. The file `/vnmr/stdpar/vast1d.par` contains the "default" parameters for VAST spectra and should be modified as needed to produce spectra under desirable conditions. `vast1d` is typically run by using the corresponding button in the menu system. After running `vast1d`, the solvent parameter can be set by choosing it from the list of solvents listed in `/vnmr/solvents`.

See also: *User Guide: Liquids NMR*

vastget **Selects and displays VAST spectra (M)**

Applicability: Systems with VAST accessory.

Syntax: `vastget(<well>,<well>, ...)>`

Description: Selects and displays the spectra from any arbitrary well or wells using the well label(s) as arguments. the spectra are displayed in a `dss` stacked plot.

Arguments: `well` is the well label from which you want to select and display spectra. The wells are labeled [A->H][1-8].

Examples: `vastget('B6','B7','C11','G3')`

See also: *User Guide: Liquids NMR*

vastglue **Assemble related 1D datasets into a 2D (or pseudo-2D) dataset (M)**

Applicability: Systems with the VAST accessory.

Syntax: `vastglue(<rack,<zone>)`

`vastglue(<glue order>,<plate>)`

Description: Used to artificially reconstruct a 2D dataset from a series of 1D data sets having similar filenames. It is crucial to ensure that the format of the file names of each of the 1D data sets is identical. `vastglue` reads in each 1D file, in succession, and adds it to the previous data, but in a 2D format. It assumes that file names are of the format obtained when using the default setting of `autoname` (`autoname=''`). If `autoname` has been redefined, use a macro like `vastglue2`. Save the resulting reconstructed 2D dataset in the normal manner using `svf`.

Arguments: `rack` is the rack number; the default is 1. If you enter a `rack` number, you must also enter a `zone` number.

`zone` is the zone number; the default is 1. If you want to specify a `zone` number, you must enter a `rack` number.

`glue order` is the specific glue order to be defined based on the order defined in a `plate_glue` file. If `glue order` is specified, you can provide a

`plate` number as the second argument and used with the `glue order` argument.

See also: *User Guide: Liquids NMR*

Related:
- `autoname` Prefix for automation data file (P)
- `vastglue2` Assemble related 1D datasets into a 2D (or pseudo-2D) dataset (M)

`vastglue2` Assemble related 1D datasets into a 2D (or pseudo-2D) dataset (M)

Applicability: Systems with the VAST accessory

Syntax: `vastglue2<(number)>`

Description: Used to artificially reconstruct a 2D data set from a series of 1D datasets having similar filenames. It is crucial to ensure that the format of the file names of each of the 1D datasets is identical. `vastglue2` reads in each 1D file, in succession, and adds it to the previous data, but in a 2D format. It assumes that file names are of the format obtained using a nondefault setting of `autoname` (`autoname='filename_R%RACK:%_Z%ZONE:%_S%SAMPLE#:%_'`). This definition must be hard coded into the macro by the user. If `autoname` has not been redefined, use a macro like `vastglue`. Save the resulting reconstructed 2D data set in the normal manner using `svf`.

Arguments: `number` is used to specify that only spectra from 1 through `number` are to be glued. The default is to glue all the spectra stored in the current directory that have the proper file name format (from 1 through `arraydim`).

See also: *User Guide: Liquids NMR*

Related:
- `autoname` Prerix for automation data file (P)
- `vastglue` Assemble related 1D datasets into a 2D (or pseudo-2D) dataset (M)

`vastgo` Turn off LC stopped flow automation and start VAST automation (M)

Applicability: Systems with the LC-NMR and VAST accessory

Syntax: `vastgo`

Description: Turns off LC stopped flow use of automation and starts VAST automation run.

`vbg` Run VNMR processing in background (U)

Syntax: (From UNIX) `vbg exp_number command_string <prefix>`

Description: Enables user to perform VNMR tasks in the background. `vbg` (for “VNMR background processing”) must be run from within a UNIX shell, and *no* foreground or other background processes can be active in the designated experiment (e.g., if you are working in `exp2` in VNMR (in the foreground), you cannot execute background processing in `exp2` as well).

Foreground processing causes a lock file to be placed in the appropriate experiment. The file has a format such as `f.1268`, where `1268` indicates the process number in the process table (accessed in UNIX by entering the command `ps -e`). Background processing causes a lock file to be in the appropriate experiment as well. This file has a format such as `b.4356`, where `4356` indicates the process number. By displaying the files within an experiment, the user can readily determine whether any foreground or background processes are active in that experiment.

Arguments: `exp_number` is the number of the experiment, from 1 to 9, in the user’s directory in which the background processing is to take place.

`command_string` is the command string to be executed by VNMR in the background. Double quotes enclosing the string are mandatory (e.g., `"fn=4096 fn1=2048 wft2da"`).

`prefix` is a prefix to be added to the name of the log file, making the name `prefix_bgf.log`. The default name is `exp_number_bgf.log`, where `exp_number` is the experiment number. The log file is placed in the experiment in which the background processing takes place.

Examples: (From UNIX) `vbg 1 "wft2da bc('f1')"`
(From UNIX) `vbg 3 "vsadj pl pscale pap page" plotlog`

See also: *VNMR User Programming*

vf — Vertical scale of FID (P)

Description: In normalized intensity (`nm`) mode, `vf` is the height of the largest FID. In absolute intensity (`ai`) mode, `vf` is a multiplier that is adjusted to produce a desired vertical scale, using the appearance on the display screen as a guide (full scale on the screen gives full scale on the plotter).

`vf` can be entered in the usual way or interactively controlled by clicking the middle mouse button in the graphics window during a FID display (click above the FID to increase `vf` or below the FID to decrease it).

Values: 1e–6 to 1e9, in mm (in `nm` mode) or as a multiplier (in `ai` mode).

See also: *Getting Started*

Related:

`ai`	Select absolute intensity mode (C)
`df`	Display a single FID (C)
`nm`	Select normalized intensity mode (C)
`sf`	Start of FID (P)
`wf`	Width of FID (P)

vi — Edit text file with vi text editor (M)

Syntax: `vi(file)`

Description: Invokes the UNIX text editor `vi` for editing the file name given. On the Sun workstation, a popup screen contains the editing window. On the GraphOn terminal, the main screen becomes the editing window. `vi` is a powerful text editor, but its user interface is limited: the mouse is not used, menus are not available, and status information is virtually nonexistent.

`vi` operates in three modes: the *command mode* (for moving the cursor and editing text), the *insert mode* (for inserting text into the file), and the *last line mode* (for special operations). Each mode is described below.

Command mode

`vi` starts up in the command mode. In this mode, user commands consist mostly of a single character, sometimes in combination with another character, or a number, or both. A number preceding a command typically defines how many times a command should be executed (e.g., `3dd` means delete three lines). The commands available include the following:

`G`	go to the start of the last line in the file
`3G`	go to the start of line 3
`0`	(zero) go to the start of the current line
`$`	go to the end of the current line
Return or `+`	go to start of next line

-	(hyphen) go to start of previous line
Ctrl-d	scroll down (forward) half a screen
Ctrl-f	scroll forward by a full screen
Ctrl-u	scroll up (back) half a screen
Ctrl-b	scroll back by a full screen
/expression	find next expression and jump to its first character
?expression	find previous expression, jump to its first character
n	find next expression (from the last search)
N	find previous expression (from the last search)
dd	delete one line and put it into the buffer
3dd	delete three lines and put them into the buffer
dw	delete word
x	erase one character forward (under cursor)
X	erase one character backwards (before cursor)
3x	erase three characters forward
rcharacter	erase character and replace with character
ZZ	write if necessary and quit *vi*
.	(period) repeat the last command
u	undo the last command
J	join the next line to the current line
yy or Y	yank one line and put into a buffer (called yank buffer)
p	put contents of yank buffer after the cursor
P	put contents of yank buffer before the cursor
"aY	yank line into buffer a (buffers b to z also available)
"ap	put contents of buffer a below current line
"aP	put contents of buffer a above current line

Because there is no command line, these commands do not show up on the screen but are *executed immediately* (without pressing the Return key).

Insert mode

In the insert mode, characters typed on the keyboard (except for the Esc key) show up in the text. The insert mode is entered by typing one of the following commands from the command mode:

a text Esc	append text after the current cursor position
A text Esc	append text to the end of current line
i text Esc	insert text before current cursor position
cw word Esc	change word from current cursor position to end
2cw words Esc	change two words from current cursor position to end
o text Esc	open line below current line and append text
O text Esc	open line above current line and append text

The only way to exit the insert mode is by pressing the Esc key, which leads back to the command mode. Unfortunately, there is no indication on the screen whether vi is in the command mode or in the insert mode. Inexperienced users often press the Esc key to make sure they are still in the command mode. The Esc key can also be used to avoid execution of commands that have been typed partially (e.g., the number has been typed, but not the last character).

You can insert special (normally nondisplayable) characters into the text if they are preceded by a Ctrl-v (e.g., entering Ctrl-v Ctrl-q is displayed in the text as ^Q).

Changing selected occurrences

The following actions find one or more occurrences of a particular word and change it to another word:

- First, type `/word` and press Return, where / is a forward slash and `word` is word you want to change.
- Next, press `n` as necessary until you reach the occurrence of the `word` you want to change.
- Finally, type `cw newword` and press Esc, where `newword` is replacement word.
- To repeat for another occurrence of `word`, press `n` as necessary to scan forward, and then type `.` (a period) to repeat `cw newword` (or whatever was the last change)

Changing selected occurrences of an expression (one or more words) is similar. To change two words, for example, take the same actions as above but use the command `2cw` (or `c2w`) instead.

Last line mode

The last line mode is initiated with a colon; thereafter, commands such as the following can be used (press Return to execute these commands):

`:r filename`	read file named `filename` (insert in currently open file)
`:w`	write (save) file
`:w filename`	write under a new file named `filename`
`:e filename`	edit a different file named `filename`
`:q`	quit `vi` (only possible if file has been written back)
`:wq`	write back file (save changes) and quit `vi`
`:q!`	quit `vi` without saving changes

Exiting from `vi` is accomplished by using the `ZZ` command in the command mode, or with the `:q`, `:wq`, or `:q!` commands in the last line mode.

This description lists only a selection of the most important commands. For more information on `vi`, refer to UNIX books and manuals.

Examples:
```
vi(userdir+'/psglib/apt.c')
vi(curexp+'/text')
```

See also: *VNMR User Programming*

Related:

`edit`	Edit a file with user-selectable editor (M)
`paramvi`	Edit a parameter and its attributes with `vi` text editor (M)
`macrovi`	Edit a user macro with the `vi` text editor (C)
`menuvi`	Edit a menu with the `vi` text editor (M)
`textvi`	Edit text file of current experiment (M

vn — Start VNMR directly (U)

Syntax: (From UNIX) `vn <-display Xserver> <-fn font> &`

Description: Starts the VNMR application directly without checking the operating system and attempting to run the window manager.

Arguments: `-display Xserver` specifies X server display (e.g., `hostname:0.0`). The default is the environment set by the `DISPLAY` variable.

`-fn font` specifies the size of the font displayed (e.g., `9x15`, `8x13`, or `7x13`). The default is the font set in the `.Xdefaults` file. Note that the size of the font affects the size of the VNMR window.

Examples:
```
vn &
vn -display hostname:0.0 &
vn -font 8x13 &
```

See also: *Getting Started*

Related: `vnmr` Start VNMR (U)

vnmr — Start VNMR in current windowing system (U)

Syntax: (From UNIX) `vnmr`

Description: Starts the VNMR application using the current windowing system. If the Open Window system is running on the Sun, VnmrX starts. If Motif is running on an IBM workstation, VnmrI starts. `vnmr` can also be used to start VNMR from terminals. In this case, the `vnmr` command is equivalent to the `vn` command.

See also: *Getting Started*

Related: `vn` Start VNMR in window environment (U)

vnmr2sc — VNMR to SpinCAD pulse sequence translator (M)

Syntax: `vnmr2sc<('sequence_name'<,rfchannels<,gradchannels>>)>`

Description: Converts the pulse sequence pointed to by the `seqfil` parameter in the current VNMR parameter set from a C program into a SpinCAD pulse sequence. The conversion result is stored in the local `spincad/psglib` under the same name as the C pulse sequence (i.e., the name stored in the `seqfil` parameter), but without the `.c` extension.

`vnmr2sc` uses `dps` output to generate the SpinCAD code, i.e., the pulse sequence must be compiled and must be displayable with `dps`. Pulse sequences that do not compile with the `dps` option cannot be translated. For the same reason, `vnmr2sc` cannot translate features that do not show up in `dps`. This means that `go`-time decisions (such as flag-based C `if` constructs) will *not* show up in the translated SpinCAD sequence. In such cases, you have two options:

- Translate the sequence several times, once for each of the relevant flag settings. That is, generate several (simpler) SpinCAD pulse sequences from a single C sequence.
- Translate the sequence once (preferably with all options turned on), then manually insert the necessary `if` statements and other missing elements using SpinCAD.

Arguments: `sequence_name` is an optional argument that permits the name of the resulting SpinCAD pulse sequence to be specified. By default, `vnmr2sc` creates a SpinCAD sequence with the name specified in the `seqfil` parameter (i.e., the SpinCAD sequence has the same name as the C pulse sequence). `sequence_name` is particularly useful if a C sequence is to be translated into multiple SpinCAD sequences; see the examples.

`rfchannels` is an optional numeric argument specifying the number of rf channels. Use it when you want the SpinCAD sequence to address more rf channels. By default, `vnmr2sc` determines the number of rf channels from the source sequence. You can only *increase* the number of rf channels. If you specify 0 rf channels, the number of rf channels is left unchanged.

`gradchannels` is a second optional numeric argument specifying the number of gradient channels or axes. Use it when you want to convert a nongradient sequence to a gradient sequence or when you want the SpinCAD sequence to address more gradient axes than the source sequence. By default, `vnmr2sc` determines the number of gradient axes from the source sequence. You can only *increase*, not decrease, the number of gradient axes.

Examples:
```
vnmr2sc
setup('H1','CDCl3') hmqc null=0.2 vnmr2sc
null=0 mbond='y' vnmr2sc('hmbc')
vnmr2sc('gcosy',2,3)
nt=256 vnmr2sc
vnmr2sc(4,1)
vnmr2sc(0,1)
```

See also: *SpinCAD Manual*

Related:
- `dps` — Display pulse sequence (C)
- `spincad` — Run SpinCAD program (C)

`vnmr_accounting` Open VNMR Accounting window (U)

Syntax: (From UNIX) `vnmr_accounting`

Description: Opens a window for creating and maintaining cost accounting data for groups of users on a spectrometer system. The program accommodates multiple rate schedules for spectrometer usage. A calendar tool can be used to define holidays for holiday rates. There is no limit on the number of rates that can be defined. Multiple printers can be selected.

Any user can view the accounting information (enter `cd /vnmr/bin` followed by `./vnmr_accounting`), but to update information, the user must have `root` privileges.

See also: *System Administration*

`vnmrexit` Exit from the VNMR system (C)

Syntax: `vnmrexit`

Description: Exits from the VNMR system in a graceful manner by writing parameters and data to the disk, removing lock files, and restoring the terminal (if on a GraphOn). To provide flexibility when exiting VNMR, the macro `exit` calls `vnmrexit` to exit from VNMR.

CAUTION: When you exit from the VNMR user interface on your X display system, whether you are using an X terminal or a Sun computer, and whether you are using OpenWindows, CDE, or Motif, you must first exit from any copy of VNMR running on your system. Failure to do this can cause current parameter values and even current data to be lost.

See also: *Getting Started*

Related:
- `exit` — Call the `vnmrexit` command (M)

`vnmrplot` Plot files (U)

Syntax: (From UNIX) `vnmrplot <file>`

Description: A UNIX command that plots files from inside VNMR commands. To plot a file, you should use the `page` command, which uses `vnmrplot` internally.

Arguments: `file` is the name of the file to be plotted.

See also: *Getting Started*

Related: `vnmrprint` Print text files (U)

vnmrprint Print text files (U)

Syntax: (From UNIX) `vnmrprint printfile <printcap> <printer_type <clear|file>>`

Description: A UNIX command installed as part of the VNMR system to print text files. The `printon` and `printoff` commands use `vnmrprint` to print files. `vnmrprint` can also be used to delete a print file or save a print file to a different name.

Arguments: `printfile` is the name of the text file to be printed.

`printcap` is a UNIX printcap entry (e.g. `LaserJet_300`) for the printer to print the text file. The default is the printer selected by the `-p` option of the UNIX `lp` command.

`printer_type` is the type of printer from the list of VNMR printers (e.g., `LaserJet_300`). `printer_type` is required as an argument when it is desired to clear the printer file or save the printer file to another name.

`clear` is a keyword to delete the current print file. Deleting this file also requires that the `printfile`, `printcap`, and `printer_type` arguments be entered so that `clear` is the fourth argument.

`file` is the name of the file to use in saving the `printfile`. If a file with the name specified already exists, it is overwritten. Saving the file also requires that the `printfile`, `printcap`, and `printer_type` arguments be entered so that `file` is the fourth argument.

Examples:
```
vnmrprint /vnmr/psglib/tocsy.c LaserJet_300
vnmrprint myfile LaserJet_300 LaserJet_300 clear
vnmrprint myfile ps PS_AR yourfile
```

See also: *Getting Started*

Related:
- `printoff` Stop sending text to printer and start print operation (C
- `printon` Direct text output to printer (C)
- `vnmrplot` Plot files (U)

vo Vertical offset (P)

Description: For 1D data sets, sets the vertical offset of the each spectrum in a *stacked display* with respect to the previous spectrum. The parameter `ho` sets the horizontal offset. For a “left-to-right” presentation, `ho` is typically negative; for a “bottom-to-top” presentation, `vo` is positive.

For 2D data sets, the parameter `wc2` sets the distance between the first and last trace and the *vo* parameter is inactive.

Values: Number, in mm.

See also: *Getting Started; User Guide: Liquids NMR*

Related:
- `ho` Horizontal offset (P)
- `wc2` Width of chart in second direction (P)

vox1,vox2,vox3 Voxel dimensions (P)

Applicability: Systems with imaging capabilities.

Description: Defines the dimensions of a desired voxel for localized spectroscopy experiments.

Values: Number, in mm.

See also: *User Guide: Imaging*

Related:

`transfer`	Move parameters to target experiment (M)

voxplan — Set voxel parameters for voxel defined by 2D box cursor (M)

Applicability: Systems with imaging capabilities.

Syntax: `voxplan`

Description: Calculates and sets the voxel parameters for the voxel defined by the position of the 2D box cursor. The parameter for the voxel can be calculated and set using the Calculate Target button of the voxel planning menu. This uses the `voxplan` macro. See the `plan` macro for details.

See also: *User Guide: Imaging*

Related:

`drawslixw`	Display target slices (M)
`drawvox`	Display target voxels (M)
`plan`	Display menu for planning a target scan (M)
`ssplan`	Set slice parameters for target slice (M)

vp — Vertical position of spectrum (P)

Description: Contains vertical position of spectrum with respect to the bottom of the display or plotter.

Values: –200 to +200, in mm.

See also: *Getting Started*

Related:

`vpf`	Current vertical position of FID (P)
`vpfi`	Current vertical position of imaginary FID (P)

vpf — Current vertical position of FID (P)

Description: Contains the current vertical position of an FID. To create this parameter and the other FID display parameters `axisf`, `crf`, `deltaf`, `dotflag`, and `vpfi` (if the parameter set is older and lacks these parameters), enter `addpar('fid')`.

Values: Number, in mm. If `vpf=0`, the FID is positioned in the middle of the screen.

See also: *Getting Started*

Related:

`addpar`	Add selected parameters to the current experiment (M)
`axisf`	Axis label for FID displays and plots (P)
`crf`	Current time-domain cursor position (P)
`deltaf`	Difference of two time-domain cursors (P)
`dotflag`	Display FID as connected dots (P)
`vp`	Vertical position of spectrum (P)
`vpfi`	Current vertical position of imaginary FID (P)

vpfi — Current vertical position of imaginary FID (P)

Description: Contains the current vertical position of the imaginary part of an FID. To create this parameter and the other FID display parameters `axisf`, `crf`, `deltaf`, `dotflag`, and `vpf` (if the parameter set is older and lacks these parameters), enter `addpar('fid')`.

Values: Number, in mm. In vpfi=0, the imaginary part is positioned in the middle of the screen.

See also: *Getting Started*

Related:

addpar	Add selected parameters to the current experiment (M)
axisf	Axis label for FID displays and plots (P)
crf	Current time-domain cursor position (P)
deltaf	Difference of two time-domain cursors (P
dotflag	Display FID as connected dots (P)
vp	Vertical position of spectrum (P)
vpf	Current vertical position of FID (P)

vs — Vertical scale (P)

Description: In normalized (nm) mode, vs is the height of the largest peak in the spectrum. In absolute intensity (ai) mode, vs is a multiplier that is adjusted to produce a desired vertical scale, using the appearance on the display screen as a guide (full scale on the screen gives full scale on the plotter). vs can be entered in the usual way or interactively controlled by clicking the middle mouse button on a display.

Values: 1e–6 to 1e9, in mm (in nm mode) or as a multiplier (in ai mode).

See also: *Getting Started; User Guide: Liquids NMR*

Related:

ai	Select absolute intensity mode (C)
isadj	Adjust integral scale (M)
nm	Select normalized intensity mode (C)
thadj	Adjust threshold for peak printout (M)
vsadj	Automatic vertical scale adjustment (M)
vsadj2	Automatic vertical scale adjustment by powers of two (M)
vsadjc	Automatic vertical scale adjustment for ^{13}C spectra (M)
vsadjh	Automatic vertical scale adjustment for ^{1}H spectra (M)

vs2d — Vertical scale for 2D displays (P)

Description: Sets a multiplier for 2D spectra and images that is adjusted to produce a desired vertical scale for display or plotting. vs2d takes the place of vs for 2D data display and can be adjusted by explicitly setting it to a value or by clicking the middle mouse button when pointing to a point on a 2D display. If vs2d does not exist, it can be created by running par2d.

Related:

par2d	Create 2D acquisition, processing, and display parameters (M)
vs	Select vertical scale (C)
vsproj	Adjust vertical scale for projections and traces (M)

vsadj — Automatic vertical scale adjustment (M)

Syntax:
```
vsadj<(height)>
```

Description: Automatically sets the vertical scale vs in the absolute intensity (ai) mode so that the largest peak is at the requested height.

Arguments: height is the desired height, in mm, of the largest signal in the displayed portion of the spectrum. The default is 0.9*(wc2max-vp-sc2).

Examples:
```
vsadj
vsadj(100)
```

Alternate: Adj VS button in the 1D Data Manipulation menu.

See also: *Getting Started*

Related:

ai	Select absolute intensity mode (C)
isadj	Adjust integral scale (M)
thadj	Adjust threshold for peak printout (M)
vs	Vertical scale (P)
vsadj2	Automatic vertical scale adjustment by powers of two (M)
vsadjc	Automatic vertical scale adjustment for ^{13}C spectra (M)
vsadjh	Automatic vertical scale adjustment for ^{1}H spectra (M)
wc2max	Maximum width of chart in second direction (P)

vsadj2 — Automatic vertical scale adjustment by powers of 2 (M)

Syntax: `vsadj2<(height)>:scaling_factor`

Description: Adjusts the vertical scale by powers of two as required for expansion plots (see aexppl for more information).

Arguments: `height` is desired height of largest (or largest relevant) signal in displayed portion of the spectrum. The default is `0.9*(wc2max-vp-sc2)`.

`scaling_factor` returns to the calling macro the ratio of the new compared to the old value of vs.

Examples:
```
vsadj2
vsadj2(50):r1
```

Alternate: Adj VS button in the 1D Data Manipulation menu.

See also: *Getting Started*

Related:

aexppl	Automatic expansions plot (M)
isadj	Adjust integral scale (M)
sc2	Start of chart in second direction (P)
thadj	Adjust threshold for peak printout (M)
vp	Vertical position of spectrum (P)
vs	Vertical Scale (P)
vsadj	Automatic vertical scale adjustment (M)
vsadjc	Automatic vertical scale adjustment for ^{13}C spectra (M)
vsadjh	Automatic vertical scale adjustment for H1 spectra (M)
wc2max	Maximum width of chart in second direction (P)

vsadjc — Automatic vertical scale adjustment for ^{13}C spectra (M)

Syntax: `vsadjc<(height)>`

Description: Functionally the same as the macro vsadj, except excludes solvent and TMS signals from the carbon spectra for the adjustment of vs.

Arguments: `height` is desired height of largest (or largest relevant) signal in displayed portion of the spectrum. The default is `0.9*(wc2max-vp-sc2)`.

Examples:
```
vsadjc
vsadjc(wc2max-sc2-wc2-5)
```

Alternate: Adj VS button in the 1D Data Manipulation menu.

See also: *Getting Started*

Related:

isadj	Adjust integral scale (M)
thadj	Adjust threshold for peak printout (M)
vs	Vertical Scale (P)
vsadj	Automatic vertical scale adjustment (M)
vsadj2	Automatic vertical scale adjustment by powers of two (M)
vsadjh	Automatic vertical scale adjustment for H1 spectra (M)

vsadjh — Automatic vertical scale adjustment for ^{1}H spectra (M)

Syntax: `vsadjh<(height<,do_not_ignore_solvent>)>`

Description: Works as the same as the macro `vsadj`, except disregards solvent and TMS signals from proton spectra and, if from the remaining spectrum the highest line is more than three times as high as the second highest line, the spectrum is scaled to this second highest signal (otherwise the highest signal is taken as relevant).

Arguments: `height` is desired height of largest (or largest relevant) signal in displayed portion of the spectrum. If `height` is 0 or a negative value, it defaults to `0.9*(wc2max-vp-sc2)`, which is also the default with no arguments.

`do_not_ignore_solvent` is any second argument. If present, it signals `vsadjh` to not ignore the solvent line and regard the solvent line as normal signal (i.e, only exclude the TMS line). This argument was added for the situation where frequently there are high “real” signals at the position of the solvent line. Such signals could otherwise be regarded as solvent line and would then be ignored. This could then lead to overscaling in the result.

Examples:
```
vsadjh
vsadjh(0.7*wc2max)
```

Alternate: Adj VS button in the 1D Data Manipulation menu.

See also: *Getting Started*

Related:

`isadj`	Adjust integral scale (M)
`sc2`	Start of chart in second direction (P)
`thadj`	Adjust threshold for peak printout (M)
`vs`	Vertical scale (P)
`vsadj`	Automatic vertical scale adjustment (M)
`vsadj2`	Automatic vertical scale adjustment by powers of two (M)
`vsadjc`	Automatic vertical scale adjustment for ^{13}C spectra (M)

vsproj — Vertical scale for projections and traces (P)

Description: Sets a multiplier that is adjusted to produce a desired vertical scale for projections or traces of 2D data sets. `vsproj` can be explicitly adjusted by setting it to a value or by clicking the middle mouse button when pointing at the projection or trace. When interactively adjusting the scale with the mouse, the higher the pointer is in the trace display, the larger the vertical scale. If the parameter does not exist, it can be created by running the `par2d` macro.

Related:

`par2d`	Create 2D acquisition, processing, and display parameters (M)
`vs`	Select vertical scale(C)
`vs2d`	Adjust vertical scale for 2D displays (M)

vtc — Variable temperature cutoff point (P)

Applicability: Systems with a variable temperature (VT) module.

Description: Sets a VT cutoff point. Above this temperature, VT air flows straight into the probe, past the heater, then past the sample. Below this temperature, air goes first through the heat exchange bucket, for cooling by the heat exchange fluid, and then into the probe and past the heater.

Values: 0 to 50, in degrees celsius. `vtc` is typically set 5°C higher than the supply gas used for VT regulation.

See also: *Getting Started; User Guide: Liquids NMR*

Related:
- `temp` Sample temperature (P)
- `tin` Temperature interlock (P)

`vttype` Variable temperature controller present (P)

Description: In the CONFIG window, this parameter specifies whether a variable temperature (VT) controller is present or not on the system. The value is set using the VT Controller label in the CONFIG window (opened from `config`).

When entered from command line in VNMR, control of the variable temperature (VT) controller from the current experiment is either engaged (*vttype=2)* or disengaged *(vttype=0)*. The current state of the variable temperature (VT) controller is not changed when *vttype* is set in the command window.

The variable temperature (VT) controller setting in CONFIG is not affected by entering *vttype* on the command line.

Values: `2` is setting for VT controller (Present choice in CONFIG window).

0 is setting for no VT controller (Not Present choice in CONFIG window).

Examples: If *temp='some temperature'* while *vttype=2* and *vttype* is then changed to *vttype=0* on the command line, the variable temperature (VT) controller will continue regulate the sample at the value set by *temp*. While *vttype=0* changes to *temp* will have no effect.

See also: *VNMR and Solaris Software Installation*; *User Guide: Liquids NMR*

Related:
- `config` Display current configuration and possibly change values (M)
- `masvt` Type of variable temperature system (P)

`vtwait` Variable temperature wait time (P)

Applicability: Systems with a variable temperature (VT) module.

Description: Sets a time for establishing temperature regulation. If temperature interlock `tin` is set and regulation is not established after the time set by `vtwait`, VNMR displays the message "`VT FAILURE`" and aborts the experiment.

Values: Number, in seconds, A typical value is 180 seconds.

See also: *User Guide: Liquids NMR*

Related:
- `pad` Preacquisition delay (P)
- `tin` Temperature interlock (P)

`vxr_unix` Convert VXR-style text files to UNIX format (M,U)

Syntax: (From VNMR) `vxr_unix(VXR_file<,UNIX_file>)`
(From UNIX) `vxr_unix VXR_file UNIX_file`

Description: Converts a VXR-style text file (from a Gemini, VXR, or XL system) to the UNIX format.

Arguments: `VXR_file` is the name of the input file, which must be a text file.

`UNIX_file` is the name of the output file after conversion. The names of the input and output files must be different.

Examples: (From VNMR) `vxr_unix('oldtextfile','newtextfile')`
(From UNIX) `vxr_unix oldtextfile newtextfile`

See also: *Getting Started*

Related:
- `convert` Convert data set from a VXR-style system (C,U)
- `decomp` Decompose a VXR-style directory (C)
- `unix_vxr` Convert UNIX text files to VXR-style format (M,U)

`vxrprint` Script for interface between VNMR and UNIX printing (obsolete)

Description: The `vxrprint` macro is no longer in VNMR. It was replaced by `vnmrprint`.

Related:
- `vnmrprint` Print text files (U)

W

w — Who is using system (C)

Syntax: `w`

Description: Displays information about users currently on the system. It functions like the UNIX command of the same name.

See also: *VNMR User Programming*

walkup — Walkup automation (M)

Syntax: `walkup`

Description: Enables using sample changers for continuous “walk-up” operation. To use this macro, enter `walkup`, provide an automation directory name, fill in the Sample Entry Form window (`enter` program) that appears, and submit the experiment. The macro creates a new automation directory each day with the name `auto_dd.mm.yy`, where `dd` is the day of the month, `mm` is the month, and `yy` is the year (e.g., `auto_070497`). The automation directory is saved in a directory specified by the global parameter `globalauto`. `walkup` creates the directory `globalauto` and the parameter `globalauto`, and then sets the `globalauto` parameter.

See also: *User Guide: Liquids NMR*

Related:

`enter`	Enter sample information for automation run (M,U)
`globalauto`	Automation directory name (P)

waltz — WALTZ decoupling present (P)

Description: Sets whether system is equipped for WALTZ decoupling. The value is changed by normal parameter entry rather than using the CONFIG window.

Values: `'n'` sets WALTZ decoupling not present.

`'y'` sets WALTZ decoupling present.

See also: *VNMR and Solaris Software Installation*

wbs — Specify action when bs transients accumulate (C)

Syntax: `wbs(string)`

Description: Specifies what action to take when `bs` transients accumulate. The *command* `wbs` sets the corresponding *parameter* `wbs`. Using the command, rather than setting the parameter value explicitly, notifies the acquisition process that the associated parameter value has changed. Thus, the desired operation can be effected even if the experiment has already started.

Arguments: `string` is a string argument containing the command or macro to be executed when this event happens. The string must be enclosed in single quotes. If single quotes are required *within* the text string, place a backslash character before each of the interior single quotes (\'). Maximum length of the string is 256 characters. To turn off `wbs` processing, enter `wbs('')`, where the argument is two single quotes with no space between.

Examples:
```
wbs('dg wft')
wbs('mf(3)')
wbs('')
```

See also: *Getting Started*

Related:

bs	Block size (P)
makefid	Make a FID element using numeric text input (C)
phfid	Zero-order phasing constant for np FID (P)
wbs	When block size (P)
werr	Specify action when error occurs (C)
wexp	Specify action when experiment completes (C)
wnt	Specify action when nt transients accumulate (C)

wbs — When block size (P)

Description: Invokes an action to occur automatically after each bs block of transients is completed. For example, wbs='wft' results in an automatic weighting and Fourier transformation after each bs transients. To specify no wbs processing, set wbs to the null string. If the acquisition has already started, the wbs *command* must be used to change this parameter.

Values: Command, macro, or null string (wbs='', where the value is given by two single quotes with no space between them).

See also: *Getting Started; User Guide: Liquids NMR*

Related:

bs	Block size (P)
wbs	Specify action when bs transients accumulate (C)

wc — Width of chart (P)

Description: Specifies the width of the chart (plotting or printing area).

Values: 5 to wcmax, in mm.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

wc2	Width of chart in second direction (P)
wcmax	Maximum width of chart (P)

wc2 — Width of chart in second direction (P)

Description: Specifies width of chart (plotting or printing area) along the second axis (or *y* axis) of a 2D contour plot or 2D "stacked display." For plots made in the cutoff mode, wc2 specifies the width of the plotted area along the *y*-axis.

Values: Width, in mm.

See also: *User Guide: Liquids NMR*

Related:

cutoff	Data truncation limit (P)
ho	Horizontal offset (P)
sc2	Start of chart in second direction (P)
wcmax	Maximum width of chart (P)
wc2max	Maximum width of chart in second direction (P)

wcmax — Maximum width of chart (P)

Description: Specifies the maximum width of a chart (plotting or printing area). Set when plotter or printer is installed.

Values: Width, in mm.

See also: *Getting Started*

Related:
- `wc` — Width of chart (P)
- `wc2` — Width of chart in second direction (P)

wc2max — Maximum width of chart in second direction (P)

Description: Specifies the maximum width of a chart (plotting or printing area) in the second direction (*y*-axis). Set when the plotter or printer is installed.

Values: Width, in mm.

See also: *Getting Started*

Related:
- `wc2` — Width of chart in second direction (P)
- `wcmax` — Maximum width of chart (P)

werr — Specify action when error occurs (C)

Syntax: `werr(string)`

Description: Specifies what action to take if an error occurs during acquisition. The *command* `werr` sets the corresponding *parameter* `werr`. Using the command, rather than setting the parameter value explicitly, notifies the acquisition process that the associated parameter value has changed. Thus, the desired operation can be effected even if the experiment has already started.

Arguments: `string` is a string argument containing the command or macro to be executed when this event happens. The string must be enclosed in single quotes. If single quotes are required *within* the text string, place a backslash character before each of the interior single quotes (`\'`). Maximum length of the string is 256 characters. To turn off `werr` processing, enter `werr('')`, where the argument is two single quotes with no space between them.

Examples:
```
werr('react')
werr('')
```

See also: *Getting Started*

Related:
- `wbs` — Specify action when `bs` transients accumulate (C)
- `werr` — When error (P)
- `wexp` — Specify action when experiment completes (C)
- `wnt` — Specify action when `nt` transients accumulate (C)

werr — When error (P)

Description: Specifies a macro (e.g., `werr='react'`) that will take appropriate action when an error occurs during acquisition. To specify no `werr` processing, set `werr` to the null string. If the acquisition has already been started, the `werr` *command* must be used to change the `werr` *parameter*. Arrayed parameter `acqstatus` provides the error code to `werr` in `acqstatus[1]` and `acqstatus[2]`. For a list of error codes, refer to the description of `acqstatus` or view the file `acq_errors` in directory `/vnmr/manual`.

Values: Macro or null string (`werr=''`, where the value is given by two single quotes with no space between them).

See also: *Getting Started; User Guide: Liquids NMR*

Related:
- `acqstatus` — Acquisition status (P)
- `react` — Recover from error conditions during `werr` processing (M)
- `werr` — Specify action when error occurs (C)

wet1d **Set up parameters for a WET1D pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wet1d`

Description: Sets up for a WET1D LC-NMR experiment.

See also: *User Guide: Liquids NMR*

wetdqcosy **Set up parameters for a WETDQCOSY pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetdqcosy`

Description: Sets up for a WETDQCOSY LC-NMR experiment.

See also: *User Guide: Liquids NMR*

wetgcosy **Set up parameters for a WETGCOSY pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetgcosy`

Description: Sets up for a WETGCOSY LC-NMR experiment.

See also: *User Guide: Liquids NMR*

wetghmqcps **Set up parameters for a WETGHMQCPS pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetghmqcps`

Description: Sets up for a WETHMQCPS LC-NMR experiment.

See also: *User Guide: Liquids NMR*

wetghsqc **Set up parameters for a WETGHSQC pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetghsqc('nucleus')`

Description: Sets up for a WETGHSQC LC-NMR experiment.

See also: *User Guide: Liquids NMR*

wetgmqcosy **Set up parameters for a WETGHSQC pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetgmqcosy`

Description: Sets up for a WETGMQCOSY LC-NMR experiment.

See also: *User Guide: Liquids NMR*

wetnoesy **Set up parameters for a WETNOESY pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetnoesy`

Description: Sets up for a WETNOESY LC-NMR experiment.

See also: *User Guide: Liquids NMR.*

wetpwxcal **Set up parameters for a WETPWXCAL pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetnoesy`

Description: Sets up for a WETPWXCAL LC-NMR pulse width calibration.

See also: *User Guide: Liquids NMR*

wettntocsy **Set up parameters for a WETTNTOCSY pulse sequence (M)**

Applicability: Systems with LC-NMR accessory.

Syntax: `wetnoesy`

Description: Sets up for a WETTNTOCSY LC-NMR experiment.

See also: *User Guide: Liquids NMR*

wetshape **Shape for pwwet pulses (P)**

Applicability: Systems with LC-NMR accessory.

Description: Sets the name of the shape used for `pwwet` pulses (e.g., `wetshape='wet'`).

See also: *User Guide: Liquids NMR*

wexp **Specify action when experiment completes (C)**

Syntax: `wexp(string)`

Description: Specifies what action to take when the experiment completes. The `wexp` *command* sets the corresponding *parameter* `wexp`. Using the command, rather than setting the parameter value explicitly, notifies the acquisition process that the associated parameter value has changed. Thus, the desired operation can be effected even if the experiment has already started.

Arguments: `string` is a string argument containing the command or macro to be executed when the experiment completes. The string must be enclosed in single quotes. If single quotes are required *within* the text string, place a backslash character before each of the interior single quotes (`\'`). Maximum length of the string is 256 characters. To turn off `wexp` processing, enter `wexp('')`, where argument is two single quotes with no space between them.

Examples:
```
wexp('wft(\'all\') calcT1')
wexp('')
```

See also: *Getting Started*

Related:

`wbs`	Specify action when `bs` transients accumulate (C)
`werr`	Specify action when error occurs (C)
`wexp`	When experiment completes (P)
`wnt`	Specify action when `nt` transients accumulate (C)

wexp **When experiment completes (P)**

Description: Invokes a single action to occur automatically after the experiment is finished, which can occur after a single FID or after a number of FIDs in a multi-FID experiment. To specify no `wexp` processing, set `wexp` to the null string. If the acquisition has already started, the `wexp` *command* must be used to change the `wexp` *parameter*. For `wexp` to execute after an experiment finishes, the execure the experiment with the `au` command.

wexp processing occurs after wnt processing in a single FID experiment, and both can be used. wexp also occurs after wnt during the last FID of a multi-FID experiment. Thus, wnt='wft(\'all\')' wexp='calcT1' and wexp='wft(\'all\') calcT1' transforms each FID in a T_1 experiment as it is performed, and when each of the FIDs has been collected, performs the calculation of the T_1 using a hypothetical macro command calcT1. Notice the use of the backslash to include a single quotation mark inside the string.

Values: Command, macro, or null string (wexp='', where the value is given by two single quotes with no space between them). If the command or macro uses a file name as an argument, specifying an absolute path is best. Be sure the path is valid and you have the appropriate write permission.

See also: *Getting Started; User Guide: Liquids NMR*

Related:		
	wexp	Specify action when experiment completes (C)
	wnt	When number of transients (P)
	au	Submit experiment to acquisition and process data (C)

wf — Width of FID (P)

Description: Width of the FID display. This parameter can be entered in the usual way or interactively controlled by selecting the sf wf button during a FID display.

Values: 0 to the value of at, in seconds.

See also: *Getting Started*

Related:		
	at	Acquisition time (P)
	dcon	Display noninteractive color intensities map (C)
	dconi	Interactive 2D data display (C)
	df	Display a single FID (C)
	sf	Start of FID (P)
	vf	Vertical scale of FID (P)
	wf1	Width of interferogram in 1st indirectly detected dimension (P)
	wf2	Width of interferogram in 2nd indirectly detected dimension (P)

wf1 — Width of interferogram in 1st indirectly detected dimension (P)

Description: Sets the width of the interferogram display in the first indirectly detected dimension.

Values: 0 to (2 × ni)/sw1, in seconds.

See also: *User Guide: Liquids NMR*

Related:		
	ni	Number of increments in 1st indirectly detected dimension (P)
	sf1	Start of interferogram in 1st indirectly detected dimension (P)
	sw1	Spectral width in 1st indirectly detected dimension (P)
	wf	Width of FID (P)

wf2 — Width of interferogram in 2nd indirectly detected dimension (P)

Description: Sets the width of the interferogram display in the second indirectly detected dimension.

Values: 0 to (2 × ni2)/sw2, in seconds.

See also: *User Guide: Liquids NMR*

Related:		
	ni2	Number of increments in 2nd indirectly detected dimension (P)
	sf2	Start of interferogram in 2nd indirectly detected dimension (P)

sw2	Spectral width in 2nd indirectly detected dimension (P)
wf	Width of FID (P)

wfgtest — Waveform generator test (M)

Applicability: Systems with a waveform generator.

Description: Retrieves a parameter set and pulse sequence, and compiles the sequence, in order to set up an experiment to test the waveform generators.

See also: *Waveform Generator Kit Installation*

wft — Weight and Fourier transform 1D data (C)

Syntax:
(1) `wft<(<options,><'nf'><,start><,finish><,step>)>`
(2) `wft('inverse',exp_number,expansion_factor)`

Description: Performs a Fourier transform on one or more 1D FIDs with weighting applied to the FID. The command executes a left-shift, zero-order phase rotation, and a frequency shift according to the parameters lsfid, phfid, and lsfrq, respectively, on the time-domain data prior to the weighting and Fourier transformation. The type of Fourier transformation to be performed is determined by proc. wft uses the same arguments as the command ft, and except for weighting, it functions the same as the ft command.

Alternate: Weight,Transform button on 1D Data Processing menu.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

ft	Fourier transform 1D data (C)
lsfid	Number of points to left-shift np FID (P)
lsfrq	Frequency shift of the fn spectrum in Hz (P)
phfid	Zero-order phasing constant for np FID (P)
proc	Type of processing on np FID (P)

wft1d — Weight and Fourier transform f_2 for 2D data (C)

Syntax:
(1) `wft1d(element_number)`
(2) `wft1d<(<options,><coefficients>)>`

Description: Performs the first Fourier transformation along the dimension defined by sw, with weighting and matrix transposition. This allows the display of t_1 interferograms with the dcon and dconi commands.

Except for weighting, wft1d functions the same as the ft1d command. See the description of ft1d for further information.

Arguments: Same as the arguments to ft1d. See the ft1d command for details.

See also: *User Guide: Liquids NMR*

Related:

dcon	Display noninteractive color intensity map (C)
dconi	Interactive 2D data display (C)
ft1d	Fourier transform along f_2 dimension (C)
sw	Spectral width in directly detected dimension (P)

wft1da — Weight and Fourier transform phase-sensitive data (M)

Syntax: `wft1da<(options)>`

Description: Processes 2D FID data as well as 2D planes at particular t_1 or t_2 times from a 3D data set for a pure absorptive display.

wft1da differs from ft1da only in that weighting of the time-domain data is performed prior to the Fourier transform. See the description of ft1da for further information.

Arguments: Same as arguments to ft2da. See the ft2da command for details.

See also: *User Guide: Liquids NMR*

Related:		
	ft1da	Fourier transform phase-sensitive data (M)
	ft2da	Fourier transform phase-sensitive data (M)
	wft2da	Weight and Fourier transform phase-sensitive data (M)

wft1dac — Combine arrayed 2D FID matrices (M)

Syntax: `wft1dac<(<mult1>,<mult2>, ,...<multn>)>`

Description: Allows the ready combination of 2D FID matrices within the framework of the 2D Fourier transform program. Weighting is performed. This command requires that the data be acquired either without f_1 quadrature or with f_1 quadrature using the TPPI method. wft1dac is used with TOCSY (with multiple mixing times).

Arguments: mult1,mult2,...,multn are multiplicative coefficients. The *n*th argument is a real number and specifies the multiplicative coefficient for the *n*th 2D FID matrix.

See also: *User Guide: Liquids NMR*

Related:		
	ft1dac	Combine arrayed 2D FID matrices (M)
	tocsy	Set up parameters for TOCSY pulse sequence (M)
	wft2dac	Combine arrayed 2D FID matrices (M)

wft2d — Weight and Fourier transform 2D data (C)

Syntax: `wft2d<(<options,>coefficients)>`

Description: Performs a complete 2D transformation with weighting after 2D data has been acquired. If the first Fourier transformation has already been done using ft1d, wft1d, ft1da, or wft1da, then the wft2d command performs only the second transform.

For arrayed 2D experiments, a single array element can be transformed and weighted using the array element number as an argument. Interferograms can be constructed explicitly using the following coefficient table:
wft2d(rr1,ir1,rr2,ir2,...ri1,ii1,ri2,ii2,...).
wft2d('ptype',...) transforms P-type spectra, and
wft2d('ntype',...) transforms N-type spectra. The default is N-type.

wft2d also *completes* a 2D transform that has been started with wft1d (or related commands such as wft1da). The first transform will not be done again if it has already been performed. For phase-sensitive 2D experiments, the coefficients must be applied as part of the first transform (e.g., with wft1da) since the interferograms are formed at that stage. These coefficients need not be repeated when invoking the subsequent transform: a simple wft2d or ft2d can suffice.

See the ft2d command description for further information.

Arguments: Same as the arguments to ft2d. See the ft2d command for details.

Examples:
```
wft2d(1,0,0,0)
wft2d(2)
wft2d(1,0,1,0,0,1,0,1)
wft2d(.67,0,.33,0,0,.67,0,.33)
```

See also: *User Guide: Liquids NMR*

Related:

dconi	Interactive 2D data display (C)
ft1d	Fourier transform along f_2 dimension (C)
ft1da	Fourier transform "halfway" for pure absorption 2D data (M)
ft2d	Fourier transform 2D data (C)
wft1d	Weight and Fourier transform f_2 for 2D data (C)
wft1da	Weight and FT "halfway" for pure absorption 2D data (M)
wft2da	Weight and transform for pure absorption 2D data (M)

wft2da — Weight and Fourier transform phase-sensitive data (M)

Syntax: `wft2da<(options)>`

Description: Processes 2D FID data, as well as 2D planes at particular t_1 or t_2 times, from a 3D data set for a pure absorptive display.

`wft2da` differs from `ft2da` only in that weighting of the time-domain data is performed prior to the Fourier transform. See the description of `ft2da` for further information.

Arguments: Same as used with `ft2da`. See the `ft2da` command for details.

See also: *User Guide: Liquids NMR*

Related:

ft1da	Fourier transform phase-sensitive data (M)
ft2da	Fourier transform phase-sensitive data (M)
wft1da	Weight and Fourier transform phase-sensitive data (M)

wft2dac — Combine arrayed 2D FID matrices (M)

Syntax: `wft2dac<(<mult1><,mult2>,...<,multn>)>`

Description: Allows the ready combination of 2D FID matrices within the framework of the 2D Fourier transform program. Weighting is performed. This command requires that the data be acquired either without f_1 quadrature or with f_1 quadrature using the TPPI method. `wft2dac` is used with TOCSY (with multiple mixing times).

Arguments: `mult1,mult2,...,multn` are multiplicative coefficients. The `n`th argument is a real number and specifies the multiplicative coefficient for the *n*th 2D FID matrix.

See also: *User Guide: Liquids NMR*

Related:

ft1dac	Combine arrayed 2D FID matrices (M)
ft2dac	Combine arrayed 2D FID matrices (M)
tocsy	Set up parameters for TOCSY pulse sequence (M)
wft1dac	Combine arrayed 2D FID matrices (M)

wftt3 — Process f_3 dimension during 3D acquisition (M)

Syntax: `wftt3`

Description: Allows f_3 processing of 3D data to be performed concurrently with data acquisition. To invoke this function, set `wnt='wftt3'` and use `au` to start the acquisition of the 3D data. When `wftt3` detects that all the FIDs comprising a `(t1,t2)` block have been acquired, it starts up the `ft3d` program in background to process that block of FIDs in f_3.

The 3D processing information file, created by entering `set3dproc` within VNMR, does not need to contain valid f_1 and f_2 processing information but only valid f_3 processing information. Once the f_3 processing is complete, a new 3D

information file can be created for the f_1-f_2 processing stages that contains valid f_1 and f_2 processing information.

The non-standard VNMR string parameter `path3d` can be used to specify the directory into which the f_3 processed 3D data is to be stored. Normally, `path3d` is absent in the parameter set. If this is the case or if `path3d=''`, the f_3-processed 3D data is stored in the directory `curexp/datadir`. `path3d` can be created by entering `create('path3d','string')` `setgroup('path3d','display')`.

See also: *User Guide: Liquids NMR*

Related:

`au`	Submit experiment to acquisition and process data (C)
`create`	Create new parameter in a parameter tree (C)
`ft3d`	Perform a 3D Fourier transform (M,U)
`getplane`	Extract planes from a 3D spectral data set (M)
`path3d`	Path to currently displayed 2D planes from a 3D data set (P)
`select`	Select a spectrum or 2D plane without displaying it (C)
`set3dproc`	Set 3D processing (C)
`setgroup`	Set group of a parameter in a tree (C)
`wnt`	When number of transients (P)

`which` Display which VNMR command or macro is used (M)

Syntax: `which(name)`

Description: Searches VNMR libraries and then displays on line 3 which VNMR command or macro with the given name will be executed. For macros, `which` displays the type of macro (user, local, application, or Varian) and the path to the library.

Arguments: `name` is the name of a command or macro.

Examples: `which('wft')`

See also: *VNMR User Programming*

Related:

`exists`	Determin if a parameter, file, or macro exists (C)
`hidecommand`	Execute macro instead of command with same name (M)

`wnt` Specify action when nt transients accumulate (C)

Syntax: `wnt(string)`

Description: Specifies what action to take when `nt` transients accumulate. The `wnt` *command* sets the corresponding *parameter* `wnt`. Using the command, rather than setting the parameter value explicitly, notifies the acquisition process that the associated parameter value has changed. Thus, the desired operation can be effected even if the experiment has already started.

Arguments: `string` is a string argument containing the command or macro to be executed when this event happens. The string must be enclosed in single quotes. If single quotes are required within the text string, place a backslash character before each of the interior single quotes (`\'`). Maximum length of the string is 256 characters. To turn off `wnt` processing, enter `wnt('')`, where the argument is two single quotes with no space between them.

Examples:
```
wnt('wft(\'all\')')
wnt('')
```

See also: *Getting Started*

Related:

`nt`	Number of transients (P)
`wbs`	Specify action when `bs` transients accumulate (C)
`werr`	Specify action when error occurs (C)

wexp	When experiment completes (P)
wnt	When number of transients (P)

wnt — When number of transients (P)

Description: Invokes a single action to occur automatically after the FID is finished (ct=nt) or after each FID in a multi-FID experiment involving an arrayed parameter. The most common processing to occur after an FID is an automatic weighting and Fourier transformation (i.e., wnt='wft'); however, this is normally not needed because the command ga is the exact equivalent of wnt='wft(\'acq\')' au (i.e., ga sets the wnt action automatically). To specify no wnt processing, set wnt to the null string. If the acquisition has already been started, the wnt *command* must be used to change this parameter.

Values: Command, macro, or null string (wnt='', where the value is given by two single quotes with no space between them).

See also: *Getting Started; User Guide: Liquids NMR*

Related:

nt	Number of transients (P)
wnt	Specify action when nt transients accumulate (C)

wp — Width of plot in directly detected dimension (P)

Description: Sets the width of the displayed or plotted region of the spectrum.

Values: Always stored in Hz, but can be entered in ppm by using the p suffix (e.g., wp=6p sets the width of plot to 6 ppm).

See also: *Getting Started; User Guide: Liquids NMR*

Related:

wp1	Width of plot in 1st indirectly detected dimension (P)
wp2	Width of plot in 2nd indirectly detected dimension (P)

wp1 — Width of plot in 1st indirectly detected dimension (P)

Description: Analogous to the wp parameter except that wp1 applies to the first indirectly detected dimension of a multidimensional data set.

See also: *User Guide: Liquids NMR*

Related:

wp	Width of plot in directly detected dimension (P)
wp2	Width of plot in 2nd indirectly detected dimension (P)

wp2 — Width of plot in 2nd indirectly detected dimension (P)

Description: Analogous to the wp parameter except that wp2 applies to the second indirectly detected dimension of a multidimensional data set.

See also: *User Guide: Liquids NMR*

Related:

wp	Width of plot in directly detected dimension (P)
wp1	Width of plot in 1st indirectly detected dimension (P)

write — Write formatted text to a device (C)

Syntax:

```
(1) write('keywords'><,color|pen>
    <,'reverse'>,x,y<,template>) <:height>
(2) write('alpha'|'printer'|'line3'|'error',template)
(3) write('reset'|'file'|'fileline',file<,template>)
```

Description: Writes text to a graphics screen or plotter in a given format (syntax 1), writes formatted text to another device (syntax 2), clears a file (syntax 3), or writes to

a file (syntax 3). The input to the command comes from arguments in `template`, which can be parameters such as `n1` or `pw`.

Arguments: `'keywords'` identify the output device (`'graphics'|plotter'`) and the drawing mode (`'xor'|'normal'|'newovly'|'ovly'|'ovlyC'`).

- `'graphics'|'plotter'` is a keyword selecting the output device. The default is `'plotter'`. The output selected is passed to subsequent `pen`, `move`, or `draw` commands and remains active until a different mode is specified.
- `''xor','normal'` is a keyword for the drawing mode when using the `'graphics'` output device. The default is `'normal'`. In the `'xor'` mode, if a line is drawn such that one or more points of the line are in common with a previous `'xor'` line, the common points are erased. In the `normal` mode, the common points remain. The mode selected is passed to subsequent `pen`, `move`, and `draw` commands and remains active until a different mode is specified.
- `'newovly'`, `'ovly'`, and `'ovlyC'` are keywords that specify an interactive drawing capability that is slightly slower than the `'xor'` mode but more consistent in color. `'newovly'` clears any previous draws, boxes, and writes made with the `'ovly'` modes and draws the figure. `'ovly'` draws without clearing so that multi-segment figures can be created. `'ovlyC'` clears without drawing.

`color` is the color of the text on a color display: `'red'`, `'yellow'`, `'green'`, `'cyan'`, `'blue'`, `'magenta'`, and `'white'`. The default is `'yellow'`.

`pen` is the plotter pen: `'pen1'`, `'pen2'`, etc.

`'reverse'` is a keyword specifying a sideways orientation of the output.

`x` and `y` are coordinates on the screen or plotter, in mm.

`template` is a string of formatting characters along with arguments to those characters. The format is the same as used with the UNIX `printf` command (for details, see any basic UNIX manual or enter `man printf` in UNIX). For example, `'pw = %12.5f'` is a template to format the parameter `pw` as fixed point with a field width of 12 spaces and 5 decimal places. The following format characters are implemented:

character	%c
integer	%d
hexadecimal	%h
exponential:	%e
fixed point	%f
exponential/fixed point	%g
octal	%o
string	%s
write a % character	use `write(...'%s','%')`

`height` returns the height of the characters on the screen or plotter. This is useful for positioning multiple-line displays. See the source code of the macro `dtext` in the `maclib` directory for an example of usage.

`'alpha'` is a keyword to write text to the alphanumeric screen.

`'printer'` is a keyword to print text on the printer

`'line3'` is a keyword to write text as a message on line 3.

`'error'` is a keyword to write text as an error on line 3 and sound a beep.

`'reset'` is a keyword to clear the file specified.

`'file'` is a keyword to append data to the file specified. Existing data in the file is not overwritten. By writing repeated `'file'` calls, a formatted data file can be created (see the fifth example below). Each `write` command automatically appends a carriage return (linefeed) to the end of the string defined by the `template` argument. To append data without the automatic linefeed, use the `'fileline'` keyword instead of `'file'`.

`'fileline'` is a keyword to append data to the file specified, the same as using the `'file'` keyword, but without automatically appending a carriage return (linefeed) to the end of the data. Any linefeeds desired must be explicitly defined (using `\n`) by the `template` argument (see the sixth example below).

`file` is the name of the file used with the `'reset'`, `'file'`, and `'fileline'` keywords.

Examples:

```
write('graphics',100,100):$ys
write('plotter',20,180, 'pw = %12.5f',pw)
write('line3', 'Too many arguments')
write('reset','temp1')
write('file','temp1','%10f %10.1f',n1,pw)
write('fileline','temp1','\nEnd of data\n\n')
```

See also: *VNMR User Programming*

Related:

`dtext`	Display a text file in the graphics window (M)

`writefid` Write numeric text file using a FID element (C)

Syntax: `writefid(file<,element_number>)`

Description: Writes a text file using data from the selected FID element. The program writes two values per line—the first is the value from the X (or real) channel and the second is the value from the Y (or imaginary) channel. `writefid` writes the raw FID data (i.e., FID data processing based on the parameters `phfid`, `lsfid`, and `lsfrq` does not occur).

Arguments: `file` is the name of a text file to store the data.

`element_number` is an integer larger than 0 for the number of a FID element. The default is 1.

See also: *Getting Started, VNMR User Programming*

Related:

`lsfid`	Number of complex points to left-shift `np` FID (P)
`lsfrq`	Frequency shift of `fn` spectrum in Hz (P)
`makefid`	Make a FID element using numeric text input (C)
`phfid`	Zero-order phasing constant for `np` FID (P)

`wsram` Send hardware configuration to acquisition console (C)

Applicability: UNITY*INOVA* and UNITY*plus* systems.

Syntax: `wsram<:$success>`

Description: Sends new hardware configuration information to the acquisition console when `config` is used (e.g., to set `lockfreq`). `wsram` (write to static RAM) is not normally entered directly by the user.

Arguments: `success` returns 1 if `wsram` is successful, or 0 otherwise.

See also: *VNMR and Solaris Software Installation*.

Related:
- `config` — Display current configuration and possibly change it (M)
- `lockfreq` — Lock frequency (P)

wshim — Conditions when shimming is performed (P)

Description: Specifies when automatic shimming is to be used, according to the method specified by the parameter `method`.

Values: `'n'` sets that no automatic shimming is performed. Even with `wshim` set to this value, the shimming procedure specified by the parameter `method` can be activated by using the `shim` command.

`'e'` or `'exp'` sets that automatic shimming is done before data acquisition.

`'s'` or `'samp'` sets that automatic shimming is done only at the beginning of the first experiment, following the change of a sample using the automatic sample changer.

`'g'` sets that automatic shimming using gradient shimming is done only at the beginning of the first experiment, following the change of a sample using the automatic sample changer. The parameter `method` is ignored. This option is only available in automation and is not used with the `go`, `ga`, or `au` commands.

`'f'` or `'fid'` set automatic shimming is done prior to the data collection of each new array member in a multi-FID experiment (this option not implemented on *MERCURY-VX*, *MERCURY*, and *GEMINI 2000* systems).

`'fn'`, where *n* is an integer, sets shimming is done prior to data collection of every *n*th FID (e.g., `wshim='f16'` shims prior to acquiring FIDs 1, 17, 33, etc.). This method is only relevant to arrayed or 2D experiments (this option not implemented on *MERCURY-VX*, *MERCURY*, and *GEMINI 2000* systems).

See also: *Getting Started*

Related:
- `gf` — Prepare parameters for FID/spectrum display in `acqi` (M)
- `method` — Autoshim method (P)

wtfile — User-defined weighting in directly detected dimension (P)

Description: Set to name of the file containing the user-written weighting function along the directly detected dimension. This dimension is referred to as the f_2 dimension in 2D data sets, the f_3 dimension in 3D data sets, etc. The shellscript `wtgen` is used to compile the user-written weighting module into an executable program. The source file is stored in the directory `vnmruser+'/wtlib'` with a `.c` file extension. The executable file is in the same directory and has the same name as the source file but has no file extension.

Values: `file` is the name of the executable weighting function or the name of the weighting function text file.

`''` (two single quotes with no space in between) indicates `wtfile` is inactive and VNMR should not look for a user-written weighting function.

See also: *Getting Started; VNMR User Programming*

Related:
- `wtfile1` — User-defined weighting in 1st indirectly detected dimension (P)
- `wtfile2` — User-defined weighting in 2nd indirectly detected dimension (P)
- `wtgen` — Compile user-written weighting functions (C,U)

wtfile1 — User-defined weighting in 1st indirectly detected dimension (P)

Description: Set to the name of the file containing the user-written weighting function for the first indirectly detected dimension. This dimension is often referred to as the f_1 dimension of a multidimensional data set. Otherwise, `wtfile1` is analogous to `wtfile`.

See also: *User Guide: Liquids NMR; VNMR User Programming*

Related:

`wtfile`	User-defined weighting in directly detected dimension (P)
`wtfile2`	User-defined weighting in 2nd indirectly detected dimension (P)

wtfile2 — User-defined weighting in 2nd indirectly detected dimension (P)

Description: Set to the name of the file containing the user-written weighting function along the second indirectly detected dimension. This dimension is often referred to as the f_2 dimension of a multidimensional data set. `wtfile2` can be set with `wti` on the 2D interferogram data. Otherwise, `wtfile2` is analogous to `wtfile`.

See also: *User Guide: Liquids NMR; VNMR User Programming*

Related:

`wtfile`	User-defined weighting in directly detected dimension (P)
`wtfile1`	User-defined weighting in 1st indirectly detected dimension (P)
`wti`	Interactive weighting (C)

wtgen — Compile user-written weighting functions (M,U)

Syntax: (From VNMR) `wtgen(file<.c>)`
(From UNIX) `wtgen file<.c>`

Description: Allows compilation of a user-written weighting function that subsequently can be executed from within VNMR. `wtgen` performs the following functions:

- Checks for the existence of the `/vnmr/bin` directory and aborts if the directory is not found.
- Checks for files `usrwt.o` and `weight.h` in the `/vnmr/bin` directory and aborts if either of these two files cannot be found there.
- Checks for the existence of the user's directory and creates this directory if it does not already exist.
- Establishes in the `wtlib` directory soft links to `usrwt.o` and `weight.h` in the `/vnmr/bin` directory.
- Compiles the user-written weighting function, which is stored in the `wtlib` directory, link loads it with `usrwt.o`, and places the executable program in the same directory; any compilation and/or link loading errors are placed in the file `errmsg` in `wtlib`.
- Removes the soft links to `usrwt.o` and `weight.h` in the `/vnmr/bin` directory.

The name of the executable program is the same as that for the source file without a file extension (e.g., `testwt.c` is the source file for the executable file `testwt`).

Examples: (From VNMR) `wtgen('testwt')`
(From UNIX) `wtgen testwt.c`

See also: *VNMR User Programming*

Related:

`wtfile`	User-defined weighting for t_2 (P)
`wtfile1`	User-defined weighting for t_1 (P)
`wtfile2`	User-defined weighting in `ni2` dimension (P)

wti — Interactive weighting (C)

Syntax: `wti<(element_number)>`

Description: Allows weighting parameters to be set interactively for both t_2 FIDs and t_1 interferograms. *wti* responds appropriately to `phfid` and `lsfid` for t_2 FIDs and to `phfid1` and `lsfid1` for t_1 interferograms. The following parameters can be interactively weighted:

- `awc`, `awc1`, and `awc2` set the additive weighting constant; added in to the weighting function after the `lb` and `sb` (or `sbs`) contributions but before the `gf` (or `gfs`) contributions.
- `gf`, `gf1`, and `gf2` set the Gaussian apodization constant, in seconds.
- `gfs`, `gfs1`, and `gfs2` set the Gaussian function shift, in seconds; shifts the origin of the Gaussian function; active only if `gf` (or `gf1`) is active.
- `lb`, `lb1`, and `lb2` set the line broadening factor, in Hz; a positive value gives sensitivity enhancement; a negative value gives resolution enhancement.
- `sb`, `sb1`, and `sb2` set the sinebell time period, in seconds; a negative value give a sine squared bell.
- `sbs`, `sbs1`, and `sbs2` set the sinebell shift, in seconds; shifts the origin of the sine bell; active only if `sb` (or `sb1`) is active.

These parameters can be typed in or changed with the left mouse button in the proper field. The right mouse button turns off the spectrum for a faster response to changes in the weighting function.

Arguments: `element_number` specifies which FID element or interferogram trace is to be used in adjusting the weighting parameters. The default is the currently active element or trace.

Examples:
```
wti
wti(3)
```

Alternate: Adj Weighting button in the 1D Data Processing Menu, or
Adj Weighting button in the 2D Data Processing Menu, or
Adj Weighting button in the 2D Interferogram Processing Menu.

See also: *Getting Started; User Guide: Liquids NMR*

Related:

`lsfid`	Number of complex points to left-shift `np` FID (P)
`lsfid1`	Number of complex points to left-shift `ni` interferogram (P)
`phfid`	Zero-order phasing constant for `np` FID (P)
`phfid1`	Zero-order phasing constant for `ni` interferogram (P)
`wtia`	Interactive weighting for 2D absorptive data (C)

wtia — Interactive weighting for 2D absorptive data (M)

Syntax: `wtia<(element_number)>`

Description: Allows weighting parameters to be set interactively for both t_2 FIDs and t_1 interferograms in 2D absorptive data. Refer to the description of the `wti` command for further information.

Arguments: `element_number` specifies which FID element or interferogram trace is to be used in adjusting the weighting parameters. The default is the currently active trace.

See also: *User Guide: Liquids NMR*

Related:

`lsfid`	Number of complex points to left-shift `np` FID (P)
`lsfid1`	Number of complex points to left-shift `ni` interferogram (P)

phfid	Zero-order phasing constant for np FID (P)
wti	Interactive weighting (C)

wysiwyg — Set plot display or full display (P)

Description: Sets whether the window display is the same as the plot ("what you see is what you get," or WYSIWYG) or is expanded to fill the window. This allows the user to scale the image to the full window, making it easier to view. This parameter is in the user's global parameter file.

Values: 'y' makes the window picture size depend on the current plotter setting. Scaling the window does not change the ratio of the picture. This value is the default display condition.

'n' makes the window display expand, giving a full display.

See also: *Getting Started*

X

x0 **X-zero position of HP pen plotter or Postscript device (P)**

Applicability: Systems with a Hewlett-Packard pen plotter or a Postscript output device.

Description: Adjusts the *x*-zero position on the chart. Use hpa to adjust x0 (and y0) to place the numbers in a pleasing position when filled in on the blank lines. x0 is part of vnmrsys/global and hence common to all experiments.

Values: Number, in mm.

See also: *Getting Started*

Related:
- hpa — Plot parameters on special preprinted chart paper (C)
- y0 — Y-zero position of HP plotter or Postscript device (P)

x1 **X1 shim gradient (P)**

Description: Holds current setting of the X1 radial shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

x2y2 **X2Y2 shim gradient (P)**

Description: Holds current setting of the X2Y2 radial shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

x3 **X3 shim gradient (P)**

Description: Holds current setting of the X3 radial shim gradient.

Values: If shimset is 1, 2, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

x4 **X4 shim gradient (P)**

Description: Holds current setting of the X4 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

xdiag **Threshold for excluding diagonal peaks when peak picking (P)**

Description: Used by the ll2d program to exclude diagonal peaks when peak picking.

To create the 2D peak picking parameters xdiag and th2d in the current experiment, enter addpar('ll2d').

Values: Peaks within xdiag Hz of the diagonal will not be picked by ll2d. Setting xdiag to 0.0 will cause ll2d to pick all peaks, including diagonal peaks.

See also: *User Guide: Liquids NMR*

Related:

addpar	Add selected parameters to the current experiment (M)
ll2d	Automatic and interactive 2D peak picking (C)
th2d	Threshold for integrating peaks in 2D spectra (P)

xgate — Load time counter (M)

Applicability: Systems with a solids module.

Syntax: xgate(counts)

Description: Loads the (12-bit) time counter on the pulse programmer with the specified number of counts and switches the counter to the external time base (the external trigger). On each trigger, the counter counts one unit down, and the next pulse sequence event starts when the count reaches zero. Often that time count will be just 1 (1.0, as the argument must be a floating point number). If the final pulse is to be performed after a longer delay, two options are available:

- Perform a normal delay, followed by the xgate(1.0) call.
- Calculate how many rotor cycles that delay would be (calculation is typically done based on a VNMR parameter srate) and then perform xgate with that calculated number of rotor triggers. Be aware that the only number of rotor cycles that can be counted this way is 4096, because the pulse programmer uses a 12-bit counter). At typical rotor speeds of 5 to 10 kHz, the “counted” delay is limited to 0.8 to 0.4 seconds.

Arguments: counts is the number of counts to load into the time counter. The value must be a floating point number.

Examples: xgate(5.0)

See also: *User Guide: Solid-State NMR; VNMR Pulse Sequences*

Related:

srate	Spinning rate for magic angle spinning (P)

xpol — Cross-polarization (P)

Applicability: Systems with a solids module.

Description: Selects cross-polarization or direct polarization in solid-state NMR experiments such as XPOLAR and XPOLAR1.

Values: 'n' sets the experiment for direct polarization.
'y' sets the experiment for cross-polarization.

See also: *User Guide: Solid-State NMR*

Related:

xpolar	Set up parameters for XPOLAR pulse sequence (M)
xpolar1	Set up parameters for XPOLAR1 pulse sequence (M)

xpolar — Set up parameters for XPOLAR pulse sequence (M)

Applicability: UNITY systems with a solids module.

Syntax: xpolar

Description: Sets up a solid-state NMR cross-polarization experiment.

Alternate: XPOLAR button in the 1D Pulse Sequence Setup Secondary menu.

See also: *User Guide: Solid-State NMR*

Related:
- `hsrotor` Display rotor speed for solids operation (P)
- `rotorsync` Rotor synchronization (P)
- `srate` Spinning speed (P)
- `xpolar1` Set up parameters for XPOLAR1 pulse sequence (M)

xpolar1 — Set up parameters for XPOLAR1 pulse sequence (M)

Applicability: UNITY*INOVA* and UNITY*plus* systems with a solids module.

Syntax: `xpolar1`

Description: Sets up the solid-state NMR cross-polarization experiment XPOLAR using the parameters preferred for the UNITY*INOVA* and UNITY*plus*. Otherwise, `xpolar1` contains the same functionality as `xpolar`.

See also: *User Guide: Solid-State NMR*

Related:
- `hsrotor` Display rotor speed for solids operation (P)
- `rotorsync` Rotor synchronization (P)
- `xpolar` Set up parameters for XPOLAR pulse sequence (M)

xy — XY shim gradient (P)

Description: Holds current setting of the XY radial shim gradient.

Values: If `shimset` is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If `shimset` is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- `shimset` Type of shim set (P)

xz — XZ shim gradient (P)

Description: Holds current setting of the XZ radial shim gradient.

Values: If `shimset` is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If `shimset` is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- `shimset` Type of shim set (P)

xz2 — XZ2 shim gradient (P)

Description: Holds current setting of XZ2 radial shim gradient.

Values: If `shimset` is 2, 8: –2048 to +2047, steps of 1, 0 is no current.
If `shimset` is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- `shimset` Type of shim set (P)

Y

y0 **Y-zero position of HP pen plotter or Postscript device (P)**

Applicability: Systems with a Hewlett-Packard pen plotter or a Postscript output device.

Description: Adjusts the *y*-zero position on the chart. Use hpa to adjust y0 (and x0) to place numbers in a pleasing position when filled in on the blank lines. y0 is part of vnmrsys/global; therefore, it is common to all experiments.

Values: Number, in mm.

See also: *Getting Started*

Related:
- hpa — Plot parameters on special preprinted chart paper (C)
- x0 — X-zero position of HP plotter or Postscript device (P)

y1 **Y1 shim gradient (P)**

Description: Holds current setting of the Y1 radial shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

y3 **Y3 shim gradient (P)**

Description: Holds current setting of the Y3 radial shim gradient.

Values: If shimset is 1, 2, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

y4 **Y4 shim gradient (P)**

Description: Holds current setting of the Y4 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

yz **YZ shim gradient (P)**

Description: Holds current setting of the YZ radial shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:
- shimset — Type of shim set (P)

yz2 **YZ2 shim gradient (P)**

Description: Holds current setting of the YZ2 radial shim gradient.

Values: If `shimset` is 2, 8: –2048 to +2047, steps of 1, 0 is no current.
If `shimset` is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: `shimset` Type of shim set (P)

Z

z — Add integral reset point at cursor position (C)

Syntax: z<(reset1,reset2,...)>

Description: Resets the integral to zero at the point marked by the displayed cursor. The command cz removes all such integral resets and it should generally be used before starting to enter a series of integral zeros (resets). The resets are stored as frequencies and do not change if fn is changed.

Arguments: reset1, reset2,... are reset points entered, in either Hz or ppm. The default is the cursor position). Reset points can be entered in any order.

Examples:
```
z
z(7.5*sfrq,5*sfrq,2.5*sfrq,0.1*sfrq)
```

See also: *Getting Started*

Related:

cz	Clear integral reset points (C)
dlni	Display list of normalized integrals (C)
ds	Display a spectrum (C)
fn	Fourier number in directly detected dimension (P)
nli	Find integral values (C)
nlni	Find normalized integral values (C)

z0 — Z0 field position (P)

Description: Holds current setting of the Z0 setting. The value of z0 can be set by su. Starting with VNMR 6.1, and only on UNITY*INOVA* systems, lockfreq can be used to find the lock signal or resonance. To use the lock frequency, deactivate z0 by typing the statement z0='n'. To activate z0, enter z0='y'.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:

lockfreq	Lock frequency (P)
su	Submit a setup experiment to acquisition (M)

z1 — Z1 shim gradient (P)

Description: Holds current setting of the Z1 axial shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related:

shimset	Type of shim set (P)

z1c — Z1C shim gradient (P)

Description: Holds current setting of the Z1C axial shim gradient.

Values: If shimset is 1, 2, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 5 or 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: shimset Type of shim set (P)

z2 Z2 shim gradient (P)

Description: Holds current setting of the Z2 axial shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: shimset Type of shim set (P)

z2c Z2C shim gradient (P)

Description: Holds current setting of the Z2C axial shim gradient.

Values: If shimset is 1, 2, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 5 or 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: shimset Type of shim set (P)

z2x2y2 Z2X2Y2 shim gradient (P)

Description: Holds current setting of the Z2X2Y2 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z2x3 Z2X3 shim gradient (P)

Description: Holds current setting of the Z2X3 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z2xy Z2XY shim gradient (P)

Description: Holds current setting of the Z2XY radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z2y3 Z2Y3 shim gradient (P)

Description: Holds current setting of the Z2Y3 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z3 Z3 shim gradient (P)

Description: Holds current setting of the Z3 axial shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: shimset Type of shim set (P)

z3c **Z3C shim gradient (P)**

Description: Holds current setting of the Z3C radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z3x **Z3X shim gradient (P)**

Description: Holds current setting of the Z3X radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z3x2y2 **Z3X2Y2 shim gradient (P)**

Description: Holds current setting of the Z3X2Y2 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z3x3 **Z3X3 shim gradient (P)**

Description: Holds current setting of the Z2X3 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z3xy **Z3XY shim gradient (P)**

Description: Holds current setting of the Z3XY radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z3y **Z3Y shim gradient (P)**

Description: Holds current setting of the Z3Y radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z3y3 **Z3Y3 shim gradient (P)**

Description: Holds current setting of the Z3Y3 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z4 **Z4 shim gradient (P)**

Description: Holds current setting of the Z4 shim gradient.

Values: If shimset is 1, 2, 8, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: shimset Type of shim set (P)

z4c Z4C shim gradient (P)

Description: Holds current setting of the Z4C shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z4x Z4X shim gradient (P)

Description: Holds current setting of the Z4X shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z4x2y2 Z4X2Y2 shim gradient (P)

Description: Holds current setting of the Z4X2Y2 radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z4xy Z4XY shim gradient (P)

Description: Holds current setting of the Z4XY radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z4y Z4Y shim gradient (P)

Description: Holds current setting of the Z4Y shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z5 Z5 shim gradient (P)

Description: Holds current setting of the Z5 axial shim gradient.

Values: If shimset is 2, 10: –2048 to +2047, steps of 1, 0 is no current.
If shimset is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: shimset Type of shim set (P)

z5flag Z5 shimming present (obsolete)

Description: A configuration parameter no longer in VNMR.

Related: shimset Type of shim set (P)

z5x Z5X shim gradient (P)

Description: Holds current setting of the Z5X radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z5y — Z5Y shim gradient (P)

Description: Holds current setting of the Z5Y radial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z6 — Z6 shim gradient (P)

Description: Holds current setting of the Z6 axial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z7 — Z7 shim gradient (P)

Description: Holds current setting of the Z7 axial shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

z8 — Z8 shim gradient (P)

Description: Holds current setting of the Z8 shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

zap — Set up for gradient refocused high-speed imaging sequences (M)

Applicability: Systems with imaging capabilities.

Syntax: `zap`

Description: Sets up a pulse sequence consisting of a slice-selective excitation pulse to generate transverse magnetization.

See also: *User Guide: Imaging*

Related: `gss` Slice selection gradient strength in DAC units (P)

zeroneg — Set all negative intensities of 2D spectra to zero (C)

Syntax: `zeroneg`

Description: Sets to zero all negative intensities of 2D-J spectra.

See also: *User Guide: Liquids NMR*

Related: `foldj` Fold J-resolved 2D spectrum about f_1=0 axis (C)
`rotate` Rotate 2D data (C)

zoom — Adjust display to given width (M)

Syntax: `zoom(width)`

Description: Adjusts the display limits. It is useful in the display of powder patterns after `split` has been used. `zoom` both zooms in and out from the current display.

Arguments: `width` is the total display width, in Hz. Display limits are set to ±`width/2`.

See also: *Getting Started*

Related: `split` Split the difference between two cursors (M)

zx2y2 ZX2Y2 shim gradient (P)

Description: Holds current setting of the ZX2Y2 shim gradient.

Values: If `shimset` is 2, 8: –2048 to +2047, steps of 1, 0 is no current.
If `shimset` is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: `shimset` Type of shim set (P)

zx3 ZX3 shim gradient (P)

Description: Holds current setting of the ZX3 shim gradient.

Values: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

zxy ZXY shim gradient (P)

Description: Holds current setting of the ZXY shim gradient.

Values: If `shimset` is 2, 8: –2048 to +2047, steps of 1, 0 is no current.
If `shimset` is 3 to 7, 9: –32768 to +32767, steps of 1, 0 is no current.

See also: *Getting Started*

Related: `shimset` Type of shim set (P)

zy3 ZY3 shim gradient (P)

Description: Holds current setting of the ZY3 shim gradient.

Values: –32768 to +32767, steps of 1, 0 as no current.

See also: *Getting Started*

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