

NAME

avg – combined capture and averaging

SYNOPSIS

avg [-n] [-f runfile] [-p parmfile]

DESCRIPTION

avg captures a *run* of data from the A/D converter, much like *cap*(1). The difference is that only one frame is generated in the frame file, consisting of the *average* of all sweeps triggered from each of the *triggered channels*. (If you select a multi-bin average, there will be one frame generated in the frame file for each bin.) The untriggered channels are stored in individual *waveform files*, as for *cap*.

You have the option to perform a disk capture or a queued capture. A disk capture allows a higher transfer rate, but defers the calculation of the average until after the data have been captured, limiting its usefulness. For a queued capture, while the averaged traces are being calculated, they are displayed periodically on the screen, so you can see what you are capturing. The queued capture also allows you to stop the data capture before the run length has expired, by typing a **Q**, or by limiting the number of sweeps.

avg maintains, in your current directory, the file **default.cap**, which keeps track of all the parameters used to control the data capture. If this file does not exist in your current directory, it will be created. Also, if there is no **default.cap** in your current directory, avg will attempt to load the parameter file of the same name, from the directory **/usr/neuro/lib/parmgrps**.

avg allows you to set all required parameters, and then brings you to its main menu, described below. If avg is invoked with either the **-n** option, the **-f** option, or the **-p** option, it will not go into its initial parameter setting mode, but will instead bring you to its main menu right away. The **-n** option will cause all current parameter values to be used for the next capture. The **-f** option allows you to specify an alternate output file name, *runfile*; all other current parameter values are taken as-is. The **-p** option allows you to specify a parameter set, *parmfile*, to be loaded; all parameter values other than the output file name are taken from this file. The *parmfile* name can be a simple parameter set name, to be taken from your current parameter group, or a name of the form *groupname/setname* to load a set from any parameter group.

When avg is invoked without any of the above options, it displays all current parameter values. A line at the top of the display shows the free disk space remaining on the current volume. The right side-bar shows a list of alternate parameter sets which can be loaded, or a list of parameter groups. Parameters and parameter sets are handled in exactly the same way as with *cap*(1).

The "# of Bins" parameter selects the number of bins used in a multi-bin, real-time average. It also determines whether the program will make use of the tagging information on the trigger signal. When this number is **0**, the average is a single bin (single frame) containing all sweeps captured, and the tagging information is ignored. When another number is given, automatic tagging is enabled, and the averages are calculated in the specified number of bins, where each bin receives sweeps with a specific tag value. (I.e. sweeps with tag 0 go in the 1st bin, tag 1 in the 2nd, and so on.) The bins are written out to the frame data file as one frame for each bin. Use this feature only if your hardware is set up for this. See *TAGGING* in *dsepr*(1) for more details.

Once you have finished setting the parameters, and wish to proceed to the data capture, press either **C** or **Q**. The entered parameters are then saved in the file **default.cap**, and you are brought to the main menu, where you can begin the capture. Unlike in *cap*(1), you cannot abort the parameter setting by pressing **ESCAPE**.

After ending the initial parameter setting, avg displays its main menu at the bottom of the screen, as follows:

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Bin-shift Continue Load New-avg Parameters Quit Save Undo View
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An operation is initiated by typing a single letter, the first letter of an item in the menu line. You can also step through the menu using the space bar and the backspace (or erase) key, to highlight the item you want, then press **RETURN** to select that item.

You will usually begin with the *New-avg* selection, described below, to begin a new *run* of averaged data. You can then add to that run using the *Bin-shift* and *Continue* selections. All three of these selections capture into a temporary buffer in your current directory. (The programs alternates between the temporary run files **undo0**, **undo1** and **undo2**.) At any time, you can back up to the previous state by selecting *Undo*, or save the data in its current state by selecting *Save*. The operations selectable from the menu are as follows:

Bin-shift

This selection allows you to restart the capture from scratch on a new bin or set of bins, but keeping the bins already captured in the current run. The capture will be restarted, prompting you again to hit RETURN or SPACE before the capturing actually begins, just like the capture started by the *New-avg* selection. The capture of untriggered channels, if any, is restarted from scratch.

In order to be able to add to an existing run, it is important that the parameters are compatible with those used to capture the run to which you are adding. The capture program will ensure this by making sure that the sampling rate, the window duration and delay, and the channel assignments and divisors are all the same in the old run as in the current parameters. Parameters that you are allowed to change include the file name, the run length, the trigger mode, the number of bins (OK for *Bin-shift*, not for *Continue*), the number of sweeps, the trigger threshold, and the queue buffer length.

Continue

This selection allows you to resume the capture which just ended, adding more sweeps to the current average. You are asked how many additional sweeps you want to capture. If you aborted the last capture before reaching the specified maximum number of sweeps, then the difference will be the default value, allowing you to complete the capture. If you reached the maximum, the default value will be the specified maximum number of sweeps, allowing you to capture another "set" of sweeps. In either case, you can specify any number you want, and as usual you will be able to abort the capture before that number is reached (for a queued capture).

Once you enter the number, or just hit RETURN, the capture will be restarted, prompting you again to hit RETURN or SPACE before the capturing actually begins, just like the capture started by the *New-avg* selection. If you had captured untriggered channels, the old data from these are discarded, and the capture of these channels is restarted from scratch.

As for the *Bin-shift* selection, the capture program will ensure that the parameters are compatible. Also, it will check that there are bins in the run, and that the number of bins is the same, since you want to add into the same bins.

Load

This selection allows you to copy any saved run of averaged data into a temporary buffer, so you can add to it with the *Bin-shift* or *Continue* selections. You are asked for the name of the run to load. The run you select will be copied into a buffer, then *cavg* will show you the data just loaded, by calling the *qm* program, just like the *View* selection below.

New-avg

This selection allows you to start up a new capture, using the current parameter settings. The program will capture a new run of averaged data into a temporary buffer, which you can save later. *Cavg* invokes *qcavg* or *dcavg* to perform the capture and averaging. (See *dsepr(1)* for more details about the data capture, and about the files produced.) In either case, you will be prompted to hit RETURN or SPACE before the capturing actually begins. The capture program will copy the calibration information into the run header of the frame file it will create.

Once the capture has completed, *cavg* will show you the data just captured, by calling the *qm* program, just like the *View* selection below.

Parameters

This selection allows you to change your current parameter values. It brings you to the parameter editing screen it presented initially, allowing you to set individual parameters or load parameter sets. See *cap(1)* for more details about how to do this. Press **Q** to leave the parameter setting screen, and return to the

main menu.

It is also possible to load in a parameter set, without leaving the main menu. If you hit a key that corresponds to one of the twelve parameter sets in your current group, while at the main menu, the parameter set is loaded. Note that the parameter values are not redisplayed on the screen when this is done. On an X Window terminal, the keys **F1** through **F12** are used to load in the twelve parameter sets. On ASCII terminals, use **1** through **9**, **0** and **-** to load the first eleven sets. The **=** key will not select the twelfth set from the main menu, as it already serves another function; it will work correctly from the parameter setting screen.

Quit

This selection causes the program to terminate.

Save

This selection allows you to save the current run of averaged data. If the current run has already been saved, you will be warned of this; just hit a key to erase the message and go on. You are asked for the run file name. The default value is the current value of the "File" parameter, but you can change the parameter at this point by entering a new name. If you decide not to save, (for instance, if the run is already saved), hit ESCAPE at the file name prompt, to return to the main menu. Once you enter the file name, or just hit RETURN, the run will be saved under the given name. If a run of that name already existed, you will be asked if it's OK to overwrite it. You are then asked to provide a *run description* for the run just saved. When prompted, enter a single line of text describing the run. *Cavg* will then attempt to "increment" the run file name parameter so that the next time you save a run, it will be set to the next run number.

Undo

This selection allows you to back out of an unwanted change to your data. For example, if you added to your current run with the *Bin-shift* or *Continue* selection, and don't like the result, selecting *Undo* will put things back to the previous state. It will also show you the data again, by calling the *qm* program, just like the *View* selection below.

View

This selection allows you to view the current data again. The *qm(1)* program is simply called again, letting you see the same run. Once you quit the *qm* program, you are returned to the menu shown above. If you modified the data at all, while in *qm*, (for example, using its *Run/Calc* selection), then an *Undo* operation will restore the data to the state it was when the *View* was started.

!command

Whenever the menu line has just been printed, instead of typing a letter to select a menu item, you can type an exclamation point, followed by any UNIX command, then hit RETURN. A UNIX shell is invoked to interpret and execute this command. You can recall and edit the last command entered, by hitting the "up arrow" key, or Control-K, after typing the exclamation point.

\$ or %

Whenever the menu line has just been printed, you can also type either a dollar sign (\$), to invoke an interactive Bourne shell, or a percent sign (%), to invoke an interactive C shell. In either case, the shell will continue accepting commands until you type a **Control-D**, to exit from the shell, and return to this program.

? or /

Whenever the menu line has just been printed, you can also type either a question mark (?), or slash (/), to get a short description of all choices available in the current menu.

NOTES

Cavg should be run from a graphics terminal, in order to view the captured traces. It can be run from other types of terminals, to capture data, but no graphs will be generated on screen.

Unlike with the previous version of *cavg*, runs must now be saved explicitly. If you do not save a run that you want to keep, it will be lost when the temporary buffer in which it was captured is re-used.

Although there are three buffers, you can really only undo the last change made, not the last two. This is because a buffer is used (temporarily) whenever *cavg* calls *qm*.

On an X Window terminal, *cavg* clears the **KEYMAP** environment variable while it is running, to disable any keyboard mapping you may have enabled, such as the ISO Latin 1 character set. It does this so that the function keys, which are mapped internally to upper-half 8-bit characters, have their usual assignments. The side effect is that if you selected an alternate keyboard mapping, it will not work while in *cavg*, or in any program called from *cavg*.

X WINDOW SUPPORT

When *cavg* is run from an *xterm* (or *kterm*) window on an X Window terminal, a new window will be shown. Like the other X Window programs in this package, *cavg* will recognise the usual X command line options, such as **-display**, **-geometry**, **-font**, etc. The environment variables for setting these options will also work. (This is provided that the **DISPLAY** environment variable is set, and **TERM** is set to *xterm* or *kterm*.) See *analysis*(1) for details on X options and environment variables.

FILES

default.cap	default capture parameters
/usr/neuro/lib/parmgrps/*.ini	configuration files
/usr/neuro/lib/parmgrps/editprms.grp	group list
/usr/neuro/lib/parmgrps/*/editprms.grp	parameter set lists
/usr/neuro/lib/parmgrps/*/*.cap	parameter sets
default.cal	calibration information
/usr/neuro/lib/default.cal	system calibration file
undo?.???	temporary capture buffer files
*.raw	produced by disk capture
*.frm	the frame file
*.w[0-9][0-9]	untriggered waveforms
*.txt	run description text line
*.p??	parameter files

SEE ALSO

dsepr(1), cap(1), calibrate(1), lsrn(1), analysis(1), qm(1)

BUGS

Due to bugs in the kernel (pre-3.0 release), *dcavg* (the disk capture) may cause the system to hang.