

Contents

- [News](#) – Updates & Meetings
- [Scripts Spotlight](#) – Handling views
- [Spike2](#) – Channel processes – using Time shift
- [Spike2 Script](#) – Display measurements from last n seconds of data
- [Signal](#) – Introduction to multiple states
- [Signal Script](#) – Audio tones for different frame states
- [Did you know...?](#) – Dialog expressions
- [Recent Questions](#) – Sonogram frequency display

News

Did you know...?

[Back to top](#)

Use **ALT** and click and drag in a data file to take quick interactive measurements. Just one of the tips you can learn at our US Training Days: [follow this link to register](#).

Future meetings and events

CED US Training Days 2013

Wyndham San Diego Bayside Hotel
San Diego, CA
USA
November 7th - 8th 2013

Society for Neuroscience 43rd Annual Meeting

San Diego, CA
USA
November 9th - 13th 2013
Exhibit dates: November 10th – 13th 2013

Latest versions of Spike2 and Signal

Updates for Spike2 and Signal are available from the [CED Downloads](#) page, or by clicking on the links in the table below. Demonstration versions of the latest software are also available.

Spike2 downloads	Released	Signal downloads	Released
Spike2 version 7.12b	07/13	Signal version 5.09	05/13
Spike2 version 6.17	10/12	Signal version 4.10	10/12
Spike2 demo	03/13	Signal demo	06/12



Scripts Spotlight

[Back to top](#)

One of the most common errors you will come across when testing out your scripts is “View is wrong type” This usually occurs when the currently selected view is not the one you want, and you then mistakenly attempt to place a vertical cursor in the Log view or try to access channel data from a Text window, for example. After the first few times, you will start to realise how important it is to ensure that your script is looking at the correct view before it attempts to do something!

Each open window (or view) in Spike2 and Signal is assigned a view number, which can be used as an identifier or ‘handle’. You can find out the view handle number for any open view from the `Window` menu, but good programming practice dictates that you should assign variables to hold the view handle numbers from any files that are opened from within your script, as you can then access those views using the variable name instead.

The `FrontView(vh%)` command, where `vh%` is the view handle value, is used to bring a view to the front and give it the focus of the program, as if you had clicked on the window with the mouse. For an on-line script you would normally use this to bring the data file to the front and keep the focus on it, so the user can always see the incoming data.

You can also apply functions to a view, or access channel data in a view, without changing the focus on the front view. Using the `View(vh%)`, `View(vh%).x()` or `View(vh%{, c%}).[]` variants will access the selected view, but the focus of the program will remain on any previously set `FrontView()`.

The `View(vh%)` function sets the current view, but does not bring it to the front or change the focus. You would normally use this to access views ‘behind the scenes’. For example, processing result views while the script is running, before displaying them for the user once the script is finished.

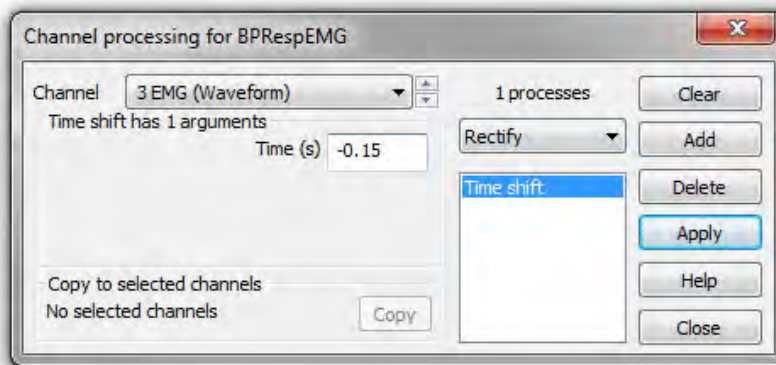
The `View(vh%).x()` construction overrides the current view for the evaluation of the function following the dot. For example `View(vh%).Draw()` would draw the view indicated by `vh%`, but would not bring it to the front.

The `View(vh%{, c%}).[]` construction accesses view data for channel `c` in Signal data files and Spike2 result views. The `[]` refers to the whole array of data unless you use an expression to define a range of data elements. For example, assuming channel 1 in our view is a waveform channel, `ArrSum(View(vh%,1).[]);` would return the sum of all the data points.



Spike2

- Q. We are recording blood pressure and respiration directly using Spike2 and a 1401 and recording EMG using a separate telemetry system, the output of which is also being fed to the 1401. The problem I have is that there is a time lag, constant at 150ms, between the EMG data and the other signals in the data file due to the transfer of the telemetry data to the 1401. Is there any way to remove this time lag?
- A. To align the telemetry data channel with the data recorded directly with the 1401, we can use the `Time Shift` process, available from the `Channel Processes` dialog. Channel Processes are applied in real-time to waveforms and can be used on and off-line. They do not modify the raw information on disk, but will display the channel data as modified by the selected processes. From the `Channel Process` dialog (available from the `Analysis` menu or by right-clicking on the channel), select `Time Shift` from the drop-down `Process` list and `Add` it to the channel.



Applying Time Shift from the Channel process dialog

The `Time Shift` channel process uses one argument, the amount to shift the waveform by in seconds. A positive value moves the wave forwards in time (to the right in the data file); a negative time moves the waveform to the left on the X-axis.

Scripts: Spike2

- Q. I am recording and would like to have a text display of the mean value based on the last five seconds of data during sampling
- A. The script `Monitor.s2s`, will monitor a selected waveform channel on-line using an `Idle` routine and print measurements, based on the last `n` seconds, to a text file. The script creates a toolbar from which you can `Set Up` the text display, the channel to monitor, the type of measurement to take and the time range of data to measure.

You should have a data file sampling or open ready to sample before running the script.

[Back to top](#)



[Back to top](#)



Signal



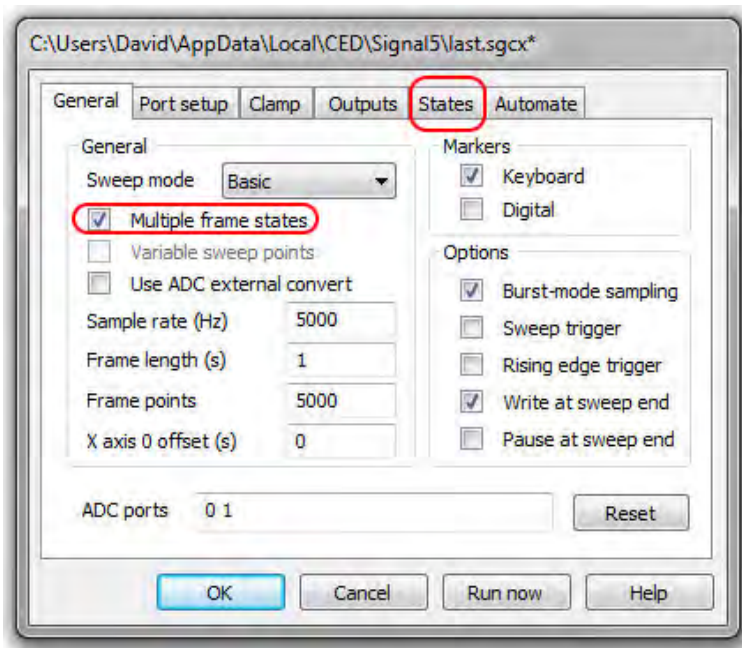
Show me How!

Click here to watch a video on setting up multiple states in Signal

[Back to top](#)

- Q. I need to set up an experiment that uses a number of different stimulation protocols using Signal.
- A. One of the most powerful features in Signal is the use of Multiple frame states to setup a number of different sets of output pulses for use during an experiment and switch between these outputs during sampling. TMS, evoked response and patch and voltage clamp studies are example of applications where multiple states sampling is widely used.

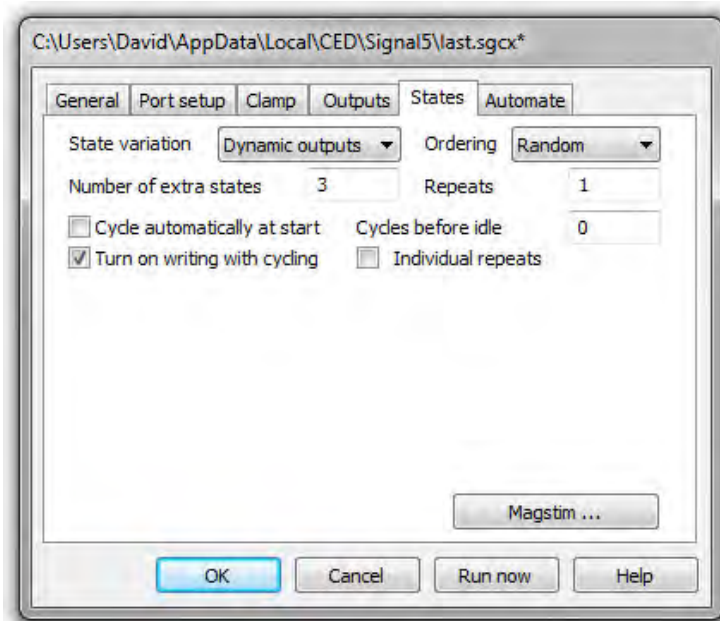
As an example, you could set up one state that generates a single stimulation pulse on a DAC output, another state that has two stimulation pulses separated by 20 milliseconds and a third state containing a pulse train consisting of 10 pulses at 50Hz. Signal can then switch between these outputs randomly or in a preset order during sampling. Every sampled frame stores the state number that was used for that particular sweep, allowing analysis of responses to a particular set or combination of stimulus outputs. This is called `Dynamic Outputs` mode and is the most useful and general-purpose way of using multiple states during sampling.



Signal sampling configuration

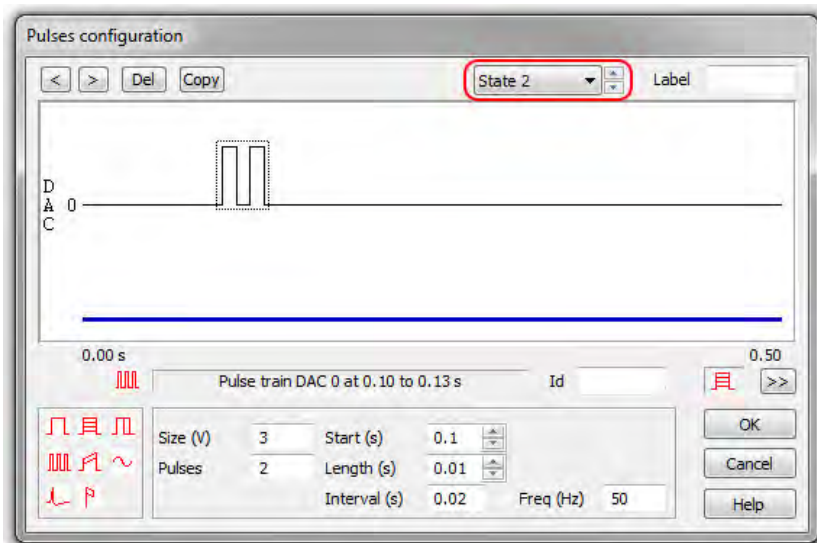
Multiple states are enabled by selecting the `Multiple frame states` checkbox in the `General` tab of the sampling configuration. Once enabled, a `States` tab is added to the configuration from where the mode, number of extra states (state 0 is always available as the default sampling state) and ordering during the experiment can be defined. Signal can switch between states in numeric or random order during an experiment, or run multiple user-defined protocols for state sequencing.





States configuration tab

The outputs generated by the different states are set-up in the pulses configuration dialog, available in the `Outputs` tab of the sampling configuration. States can be selected from the drop-down list in the pulses configuration dialog and pulses are added to the frame of outputs by clicking and dragging pulses from the palette to the output 'tracks' in the graphical display.



Pulses configuration dialog

When sampling with multiple states Signal provides a `States control` toolbar to display the current state and allow manual or automated control of the state sequencing during the experiment.

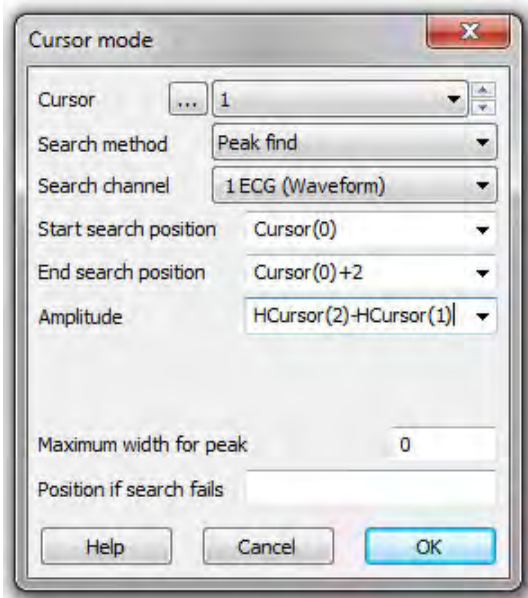


Scripts: Signal

- Q. Is it possible for Signal to play out a tone for every sampled frame? This would be even more useful if you could have separate tones to signify different frame states during sampling.
- A. The script, [SampleBeep.sgs](#), is an example of monitoring a data file and responding to different frame states. It plays a short tone for each frame that is sampled, with the tone pitch changing depending on the frame state. The script creates a toolbar from which you can open a new data file ready to sample and start and stop sampling of data.

Did you know...?

Many dialogs in Spike2 and Signal will accept expressions in place of numbers. These expressions can be either numeric (composed of numbers and arithmetic operators) or view based (allowing references to cursor positions and positions along the axes).



Cursor mode dialog

An example of this would be the `Cursor Mode` dialog for setting active cursors to automatically search for data features. In the dialog above, Cursor 1 is set to search for a peak on channel 1 within 2 seconds of Cursor 0, using the amplitude for peak detection set by the difference between the levels of horizontal cursors 1 and 2. This allows the user to set the amplitude interactively by moving the levels of the horizontal cursors.

Recent Questions

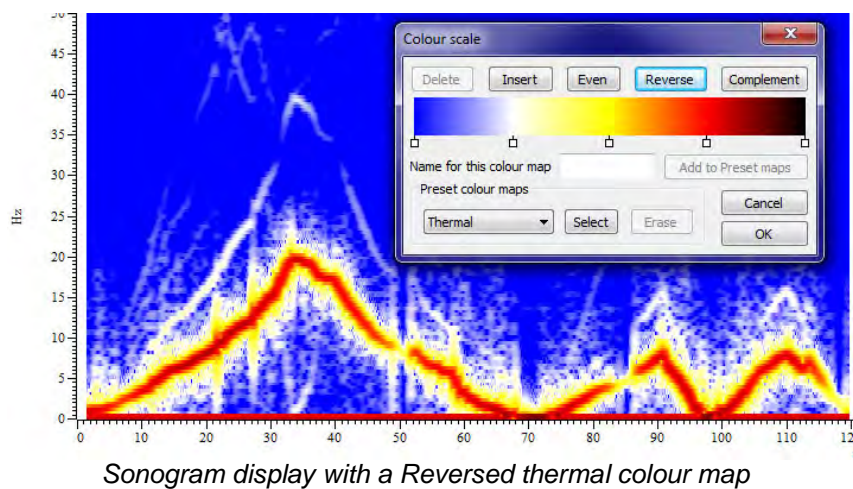
- Q. Can Spike2 generate a “time frequency spectrum” of waveform data, with frequency on the y-axis and time on the x-axis?
- A. The channel draw modes in Spike2 enable you to display data types in a variety of ways. One of the options for displaying waveform data is as a sonogram. This shows how the frequency content of a waveform changes with time. The y-axis displays values in Hz from zero up to one half of the sample rate for the channel.

[Back to top](#)

[Back to top](#)

[Back to top](#)

By default the frequency intensity is indicated by a monochrome grey scale; the darker the image, the higher the frequency intensity of the signal. You can also select pre-set or user-defined colour scales for the sonogram display in the Display tab of the Edit Preferences dialog.



CED User forums

Try the [CED Forums](#) bulletin board for software and hardware support

If you have any comments about the newsletter format and content, or wish to unsubscribe from the mailing list for this newsletter, please notify sales@ced.co.uk.

