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## News

Our pre-Neuroscience training days this year will take place on Thursday 10<sup>th</sup> and Friday 11<sup>th</sup> of November at the Washington Plaza Hotel, Washington DC. Details of the training day sessions and a booking form can be found in the [training day](#) section of our website.

The latest version of Spike2 is **5.12**, which is available to download from the [CED updates](#) page for registered v5 users.

A full list of new features is available from the updates section of the website.

A demonstration version of the current software is also available [here](#).

Version **4.22** of Spike2 is downloadable for registered v4 users.

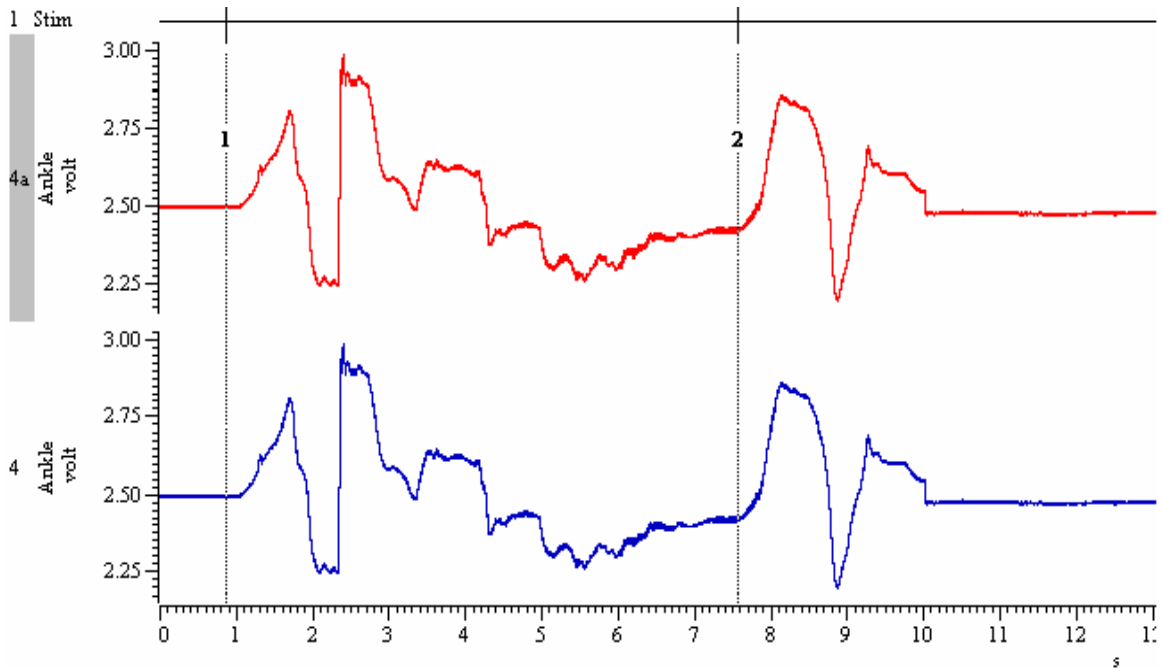
Version **3.03** of Signal is now available for registered v3 users.

A demonstration version of Signal version 3 is available [here](#).

Version **2.15** of Signal is downloadable for registered v2 users.

## Spike2

- Q. I have a series of evoked responses in a single channel that I would like to display on screen at the same time using a common reference point, either as individual channels in the file or overdrawn. Is there a way to do this without using a script?
- A. You can create multiple copies of channels in a file by using the Duplicate Channels... command, either from the analysis menu or by right-clicking on the channels data area. To compare different sections of the same waveform, we can use the Channel Process: Time Shift function on the duplicated channel. 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), select the required processes from the drop-down list and use Add to apply them to a channel.



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. In this example, the stimulation triggers have been recorded in channel 1. The difference between the first nominated trigger and the trigger that marks the waveform section to move can be found by positioning a pair of cursors and using the Cursor Regions function from the Cursor menu. Simply copy and paste the value from the Cursor Regions dialog into the argument field of the Channel Process dialog for the duplicate channel, remembering the use of the negative time to shift data to the left. To position cursors exactly at the stimulus triggers, use the Active Cursors in Data Points mode to find the event markers. You can overdraw channels by clicking and dragging on the channel number, and dropping it on another channel number. A channel number is highlighted with a grey box when clicked.

**Cursor regions for Example Data.smr** [X]

Cursors	0 - 1	1 - 2
Time (s)		6.713955
1/Time (Hz)		0.14894351

**Channel processing for Example Data.smr** [X]

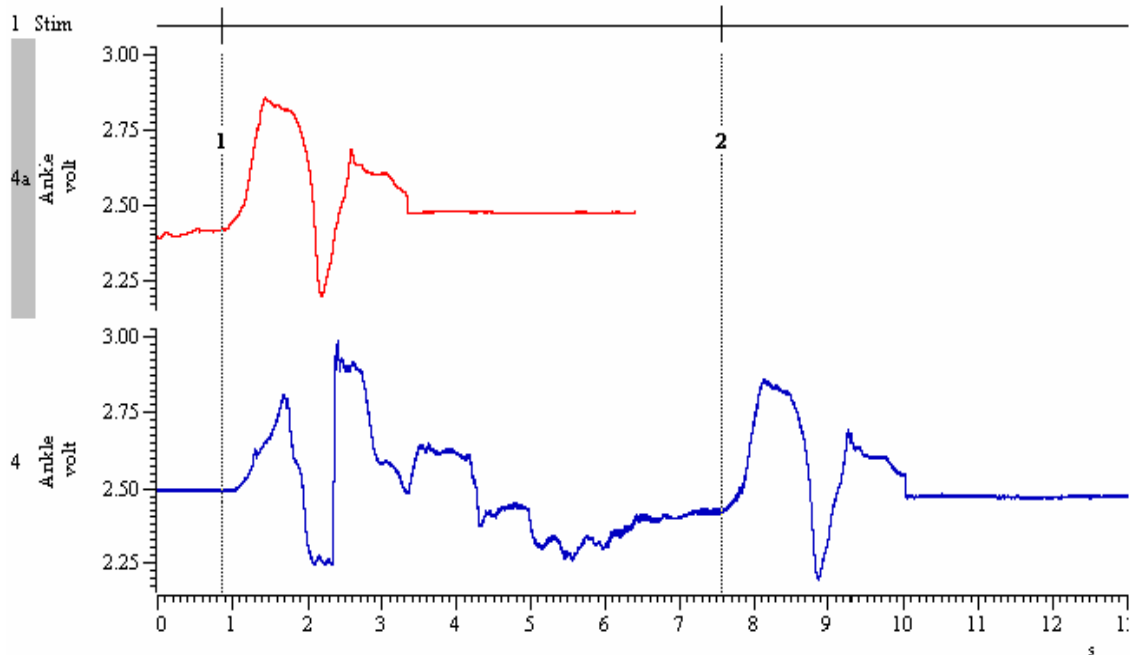
Channel: 4a Ankle (Waveform)      1 processes      [Clear]

Time shift [Time shift]      [Add]

Time shift has 1 arguments:

Time (s) -6.713955

[Delete]      [Apply]      [Help]      [Close]



*Duplicated data time shifted using the value from the cursor regions dialog*

## Signal

- Q. Is there any way to log markers from external devices in a Signal data file?
- A. The forthcoming version of Signal 3.04 will allow the logging of digital markers. To use digital markers, simply select the Digital checkbox in the sampling configuration. The digital marker data is read from bits 0 to 7 of the 1401 digital input port when a low-going TTL pulse is detected on the data available pin (DA, pin 23) of the digital input port. The following table shows the pins used for digital marker inputs on the 1401 digital input connector.

### Digital input: bits 0 to 7

Digital input bit:	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0	Gnd	DA
Digital input pin:	5	18	6	19	7	20	8	21	13	23

### Scripts: Spike2

- Q. I have a number of channels in a data file, and I would like to be able to quickly apply a specific digital filter to all of them, rather than using the digital filters dialog to apply them in turn.
- A. The attached script `apply_Dfilter.s2s` can be used to automatically apply an existing filter from the Digital Filter bank to a number of channels in a data file. You can select the channels to filter by holding down Ctrl and clicking on the channel numbers, to the left of the waveform data. Selected channels have the number highlighted with a grey box, as in the example above.

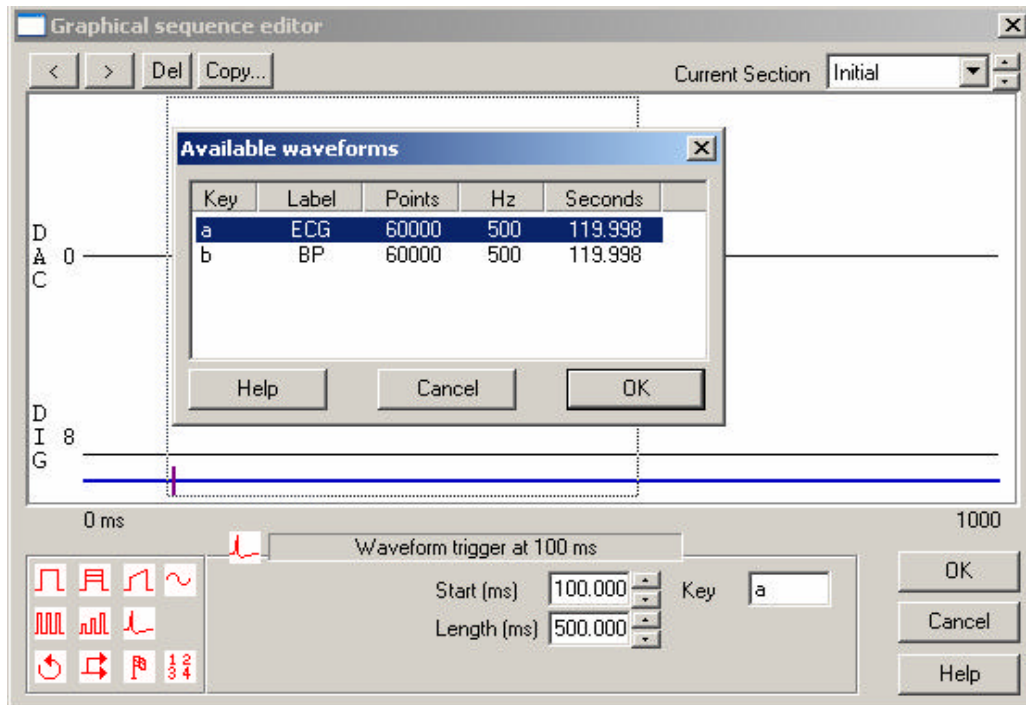
### Scripts: Signal

- Q. How can I get error bar information from a waveform average memory view? The Copy as text function only gives the values of the average even when I select Error bars in the process dialog.
- A. The attached script `ErrorInfo.sgs` can be used to produce text output to the Log view of error bar information from a single channel waveform average or auto average memory view. This

script could easily be expanded to output information from multiple channels. Access to error information in result views will be implemented directly in a future version of Signal.

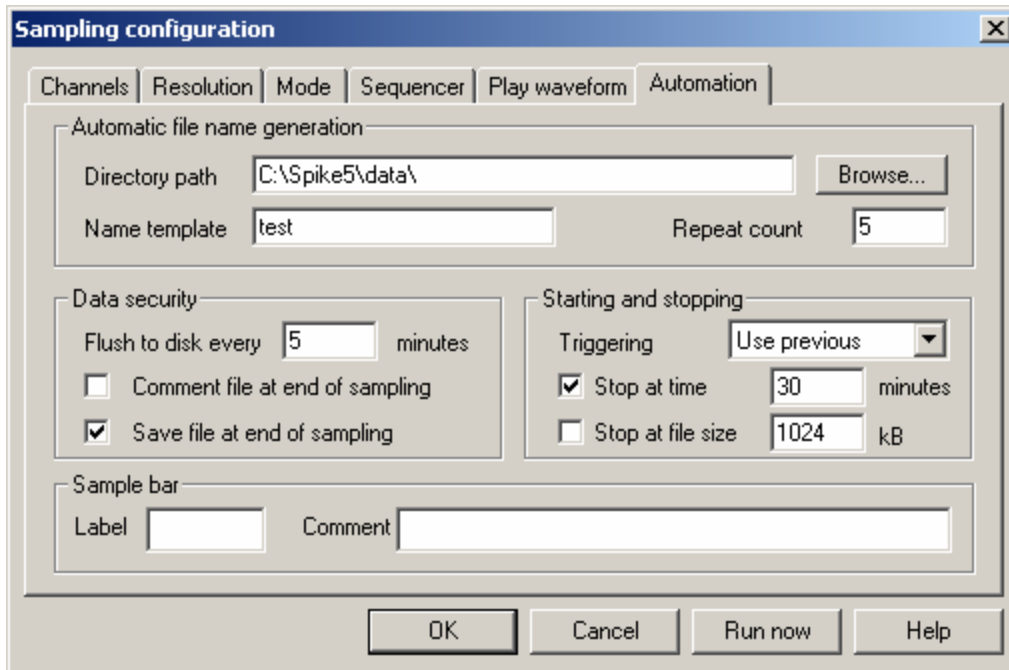
### Did you know...?

When you drop an arbitrary waveform in the Spike2 graphical sequence editor, you are prompted to choose the waveform to use if multiple waveforms are defined in the on-line play list. You can also double-click the arbitrary waveform icon on the control track to change the associated waveform for output.

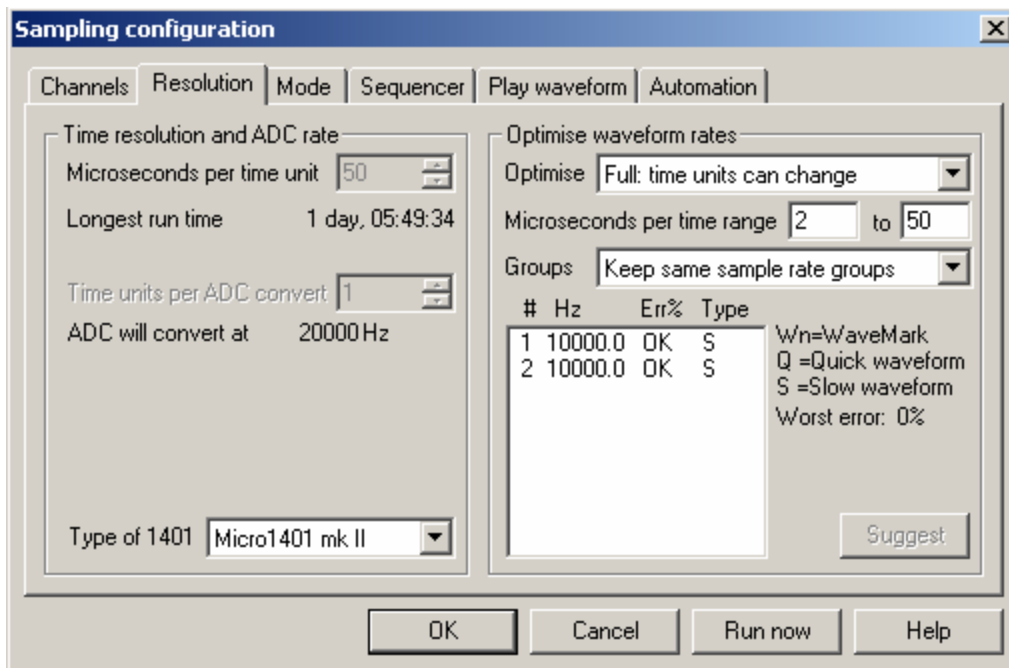


### Recent questions

- Q. I record long experiments on multiple channels using Spike2, and often need to record multiple data files for a single experiment as my running time is too long for a single data file. The problem is that sometimes I am concentrating on other aspects of the experiment when the file size is reached, and so I can miss data between files. Is there any way to get Spike2 to automatically open a new file and start sampling once a file has reached the limit?
- A. You can set Spike2 to sample a sequence of data files automatically from the Automation tab in the sampling configuration. To do this you first need to set a name template for the data files. Spike2 then uses this name template and adds a number to the end, incrementing the number for each data file in the sequence so for example, a template of test would generate files called test000, test001, test002 etc. up to test999. If a file name is already in use, Spike2 increments the number until it forms a name that is not in use in the specified directory path. The next step is to set the data file to stop and save after a certain amount of time has elapsed in the file, or once the file size has reached a specified limit using the Stop at time and/or the Stop at file size fields.



You can find out the longest possible run time for a single data file by viewing the Resolution tab in the Sampling configuration. You can quickly optimise the resolution settings to give you the longest possible run-time for a single file and the closest possible sampling rates for your channels by setting the Optimise field to Full: time units can change and setting the Type of 1401 field as appropriate for your hardware as in the example below;



Once you have selected the stop method for the data, check the Save file at end of sampling box to the left of the dialog. This then enables the Repeat count field, where you can set the number of files to sample in sequence. Each file is saved and closed when the Stop conditions are met, and

any result and XY views created from it are closed. Sampling then continues by opening and starting the next file until;

- The set number of files have been sampled
- There is not enough disk space available
- The name template cannot be incremented or there are no unused file names
- There is an error during sampling
- The user clicks Stop or Abort in the sampling control panel

### **User Group**

If you have any comments about the newsletter format and content, or wish to un-subscribe from the mailing list for this newsletter, please notify [sales@ced.co.uk](mailto:sales@ced.co.uk).