

Contents

Script spotlight

How to set-up a timed alert

Spike2

How to calibrate waveform channels

Script for batch import of DSI version 5 files

Signal

Virtual channel expressions

Script for coastline measurements

Did you know...?

Synchronize 1401s for many channels

Recent questions

Change the area for channel display

US Training Days

Our US training days will take place on November 13th and 14th, just prior to the Society for Neuroscience annual meeting, in Washington, DC.

[Sign up](#) and learn how to make the best use of Spike2 and Signal to save time and increase productivity.

Who should attend?

- Users who want to save time and become more efficient with CED systems
- New users or those new to a lab that uses CED systems
- Those considering the purchase of a CED data acquisition and analysis system

Future meetings and events

[11th Annual Scottish Neuroscience Group Meeting](#)

University of Glasgow,
Glasgow,
UK
August 29th 2014

[Oxford Breathing Conference](#)

Grace Hotel,
Sydney,
Australia
October 26th – 31st 2014

[Society for Neuroscience 44th Annual Meeting](#)

Washington, DC
USA
November 15th - 19th 2013
Exhibit dates: November 16th – 19th 2013

Latest versions of Spike2 and Signal

Spike2	Released	Signal	Released
Spike2 version 8.02b	07/14	Signal version 6.01a	03/14
Spike2 version 7.14	07/14	Signal version 5.10	03/14
Spike2 version 6.17	10/12	Signal version 4.11	02/14
Spike2 demo	07/14	Signal demo	03/14

Script spotlight

Many experiments will consist of a number of stages. For example you might record baseline activity for a certain period of time before administering a stimulus or drug and then record the response for another set period of time. Once the time limit has been reached you might apply a different stimulus protocol for a longer or shorter period and again, record the results. You could keep track of the various stages of your experiment using a good old-fashioned stopwatch, but you could also set-up a timer within a script to keep yourself informed.

The `Seconds()` script command can be used for time measurements and to set a timer relative to the system clock. The example script, [Timer.s2s](#) lets you set a time in seconds and then uses an idle routine to play a tone and display a message alert once the time period has expired.

[Back to Contents](#)

Spike2

“I am recording input from a force transducer and need to show the Y-axis scale in Newtons, rather than the default, Volts.”

The default units for Waveform, RealWave and WaveMark channels in Spike2 are Volts, matching the input values from your 1401. When setting up a channel in the sampling configuration, you can use the Scale and Offset fields in the channel information dialog to scale the input voltage to user-defined units for your data file.

For electrophysiological data, a more common requirement is to display the scale in mV. This is easily done by changing the Scale setting to 1000 and Offset to 0.

For more complex scaling requirements, a little more explanation is required. With a ± 5 Volt input range, the Scale setting is the number of user units for every one Volt increase in input. Offset is the value represented by 0 Volts at the input:

$$\text{Input in user units} = \text{Volts at the input} * \text{scale} + \text{offset}$$

For this example, where a waveform represents a force measurement, let us assume that 1 Volt is equivalent to 10 N and 3 Volts is equivalent to 50 N (using a 1401 with a ± 5 Volt input range). In this case you would set:

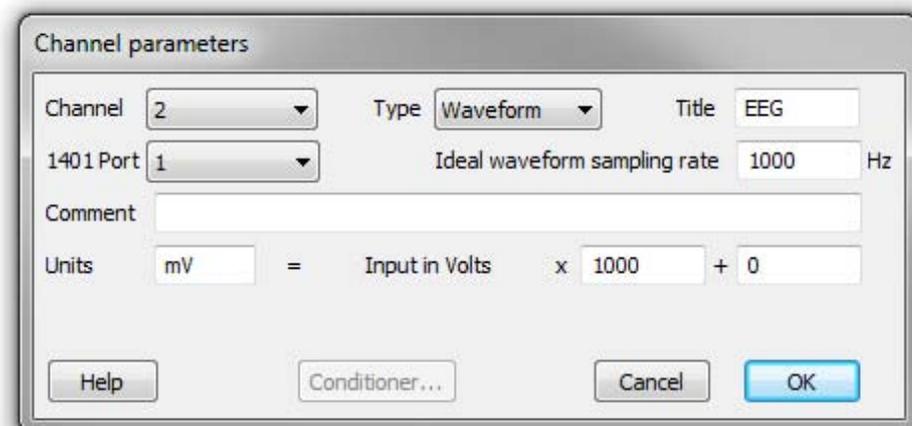
$$\text{Scale} = (50 - 10) / (3 - 1) = 20.0 \text{ N V}^{-1}$$

$$\text{Offset} = 10 - (1 \text{ Volt}) * \text{scale} = -10.0 \text{ N}$$

$$\text{Units} = \text{N}$$

You can also calibrate a channel after sampling with the Analysis menu Calibrate command, as long as you have known input data. See the Spike2 on-line help for more details.

For the scaling to work as expected, the Edit menu Preferences option for Voltage range (5 Volt range or 10 Volt range) must be set correctly for your 1401; Spike2 will automatically read back the voltage range for Power1401 mkII and -3 units and the Micro1401-3.



Scripts: Spike2

“I have many long term recordings from a DSI telemetry system that I’d like to analyse with Spike2. I know that I can import these files one-by-one using the Import option from the File menu, but is it possible to automate the import of a whole directory of these files?”

The script, [DSI batchimport.s2s](#) allows you to batch import DSI v5 files to Spike2 .smrx format data files. When you run the script, a dialog opens for you to browse to the folder containing the DSI files. The script requires that you have purchased and installed the DSI A.R.T. Reading Utility software and that the accompanying USB dongle is attached for file import to work correctly. [Contact us](#) for further details.

This script makes use of the new and improved import functions in Spike2 version 8 and will import DSI files up to 30x faster than previous versions. At the time of writing the script will only run with a 32-bit build of Spike2 v8.02 or higher. You can install a 32-bit version of Spike2 v8 alongside your 64-bit version if necessary, using your installation disk.

[Back to Contents](#)

Signal

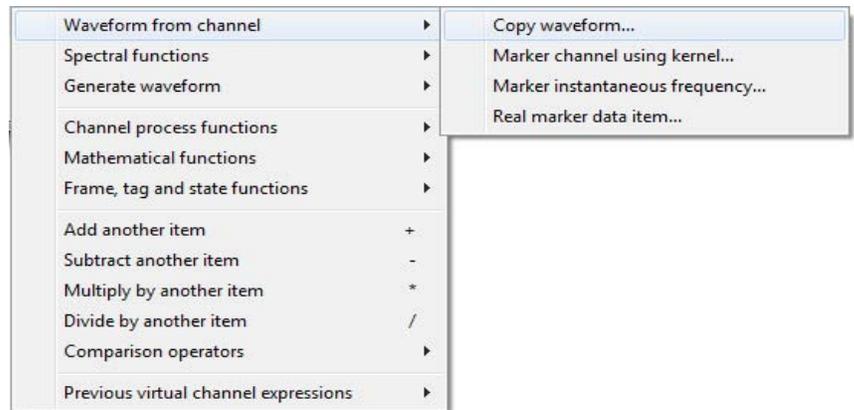
“Can I take channel data and use it in a mathematical expression in Signal, without using the script language?”

Virtual channels can be used to apply mathematical operations, as well as processes, to any channel in a data file. Virtual channels are dynamic so they are not stored on disk and any processes applied do not affect the raw data. [See a video tutorial](#).

Virtual channels are created using the **Analysis** menu > **Virtual channels** > **Create new channel** command, and are shown as channels v1...n in the data file. When a virtual channel is first created, a dialog opens in which you can supply an expression to define the channel contents. Expressions can be entered by hand or ‘built’ by clicking the >> button and selecting menu options.

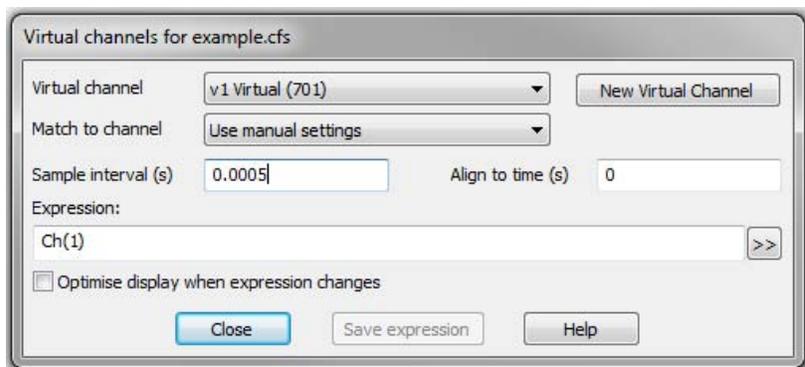
Create waveforms from existing channels

The **Waveform from channel** command will copy an existing waveform channel in the form Ch(n), or create a new waveform based on instantaneous frequency or event kernels from a digital marker channel. Click the >> button in the dialog to access the expression menu.



Upsampling and downsampling

Virtual channels can match the sample rate of existing channels, or you can set the required sample interval and alignment in the virtual channel dialog. The example settings, left, take a copy of channel 1 and apply a sample rate of 2kHz.



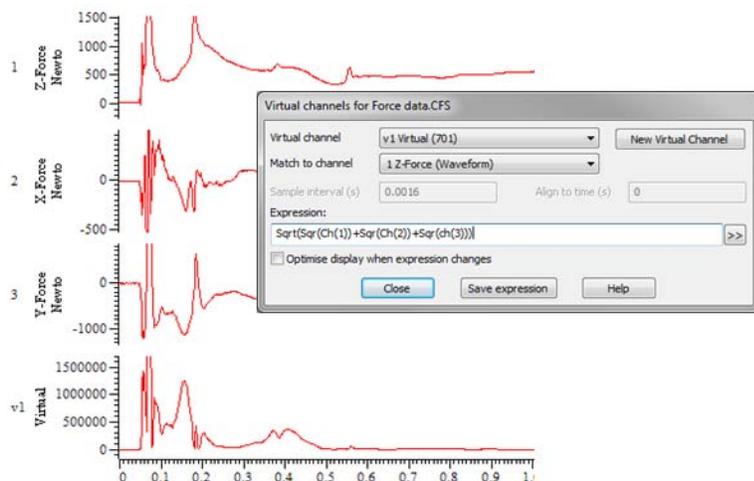
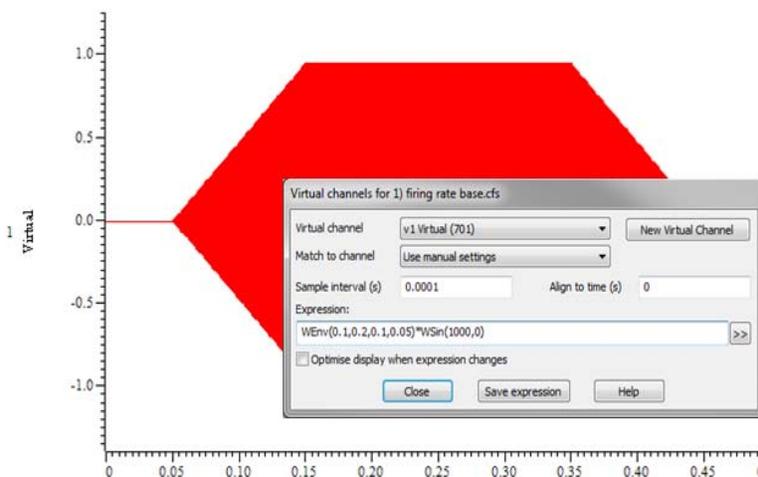
Channel arithmetic

For example, sums and differences of channels. The simple expression $Ch(1)-Ch(2)$, displays the difference between channels 1 and 2. Mathematical functions can also be used and combined in expression statements.

In the example, right,

$Sqrt(Sqr(Ch(1))+Sqr(Ch(2))+Sqr(Ch(3)))$

displays the square root of the sum of squares of the three channels.



Generate waveforms

This option allows you to create a channel based on various wave shapes, or based on linear time or a polynomial of time. These functions can be used to generate arbitrary waveforms for output as a stimulus.

The expression

$WEnv(0.1, 0.2, 0.1, 0.05)*WSin(1000, 0)$

generates a 1kHz tone 'pip' using a combination of an envelope and sine wave.

Full details of the virtual channel expression commands are available in the on-line help.

[Back to Contents](#)

Scripts: Signal

"I want to generate a coastline measurement from selected ranges of my EEG data"

The script [coastline.sgs](#) allows the user to select a channel and then mark a time range with cursors for coastline measurement analysis. The coastline measurement for the selected area is then displayed in a new memory channel in the data file. This script requires Signal v6.

Did you know...?

Multiple 1401 units can be synchronised together to give many channels of recording at high sample rates. For example, two Power1401 mk II units with an ADC-16 top-box each (giving 32 channels per 1401) could be synchronised to give 64 channels capable of sampling at 30kHz per channel.

Recent Questions

“I record a large number of channels and want to be able to expand some of them at various stages of my experiment so that they take up more of the display area and are easier to monitor.”

You can adjust the vertical area occupied by individual channels in a file. Hold down `Shift` and click anywhere in the channel and the mouse cursor will snap to the closest channel edge. You can then drag the edge up and down to change the spacing between adjacent channels. Hold down `Ctrl+Shift` and then drag to change all channels with a Y-axis or use `Ctrl` only to scale all channels in the file.

[Back to Contents](#)

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.

Contact us:

In the UK

Science Park, Milton Road
Cambridge CB4 0FE, UK
Telephone: (01223) 420186
Fax: (01223) 420488

Email: info@ced.co.uk

International Tel: [44] 1223 420186

International Fax: [44] 1223 420488

USA and Canada Toll Free: 1 800 345 7794

Web site: www.ced.co.uk

Germany Science Products GmbH: [49] 619 290 1936

Japan (East) Physio-Tech Ltd.: [81] 33 864 2781

Japan (West) Bio Research: [81] 52 932 6421

France DIPSI Industrie: [33] 1 49 65 67 20

China Shanghai Qichi Inst. Co. Ltd. [86] 21 5415 8764