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News

UK Training Days March 19th – 20th 2011

Places on both the Spike2 and Signal courses for this year are booking up fast so if you would like to attend, please visit www.ced.co.uk/training to view the training day program and complete the registration form.

This year we will be holding additional optional sessions on the morning and afternoon of the 19th and morning of the 20th for those who would like to discuss specific questions. If there is a particular topic that is not covered by the course and which you would find useful, please contact sales@ced.co.uk and we will try to make sure we cover it.

Hardware news

CED 1902 mk IV isolated pre-amplifier

The latest version of our versatile modular amplifier utilises digital filters which are generated according to user entered filter values. This allows the use of any high and low pass filter setting from DC to 10kHz, making the 1902 suitable for a wide range of applications including EMG, EEG, Evoked response and many more. Unique to the 1902 is an input clamping option which is useful for avoiding saturation when used for some somatosensory and TMS studies.

CED 3901 Whisker stimulator

The 3901 is a new controller for an array of piezo-electric stimulator elements, as used for whisker-to-barrel investigations. Each 3901 drives 9 stimulator elements, offering precisely controlled temporal patterns with repeatable stimulation. Up to 7 units can be linked giving control of up to 63 elements in total.

64-channel top-box for the Micro1401-3

This top-box is used to sample 64 channels of waveform input with the Micro-3 unit. Two of these top-boxes may be fitted to give a maximum of 128 channels. Input connections are via D type connectors on the rear of the unit.

Future meetings and events

Experimental Biology 2011
Walter E. Washington Convention Center,
Washington, DC, USA
April 9th – 13th 2011

British Neuroscience Association 2011
Harrogate International Conference Centre
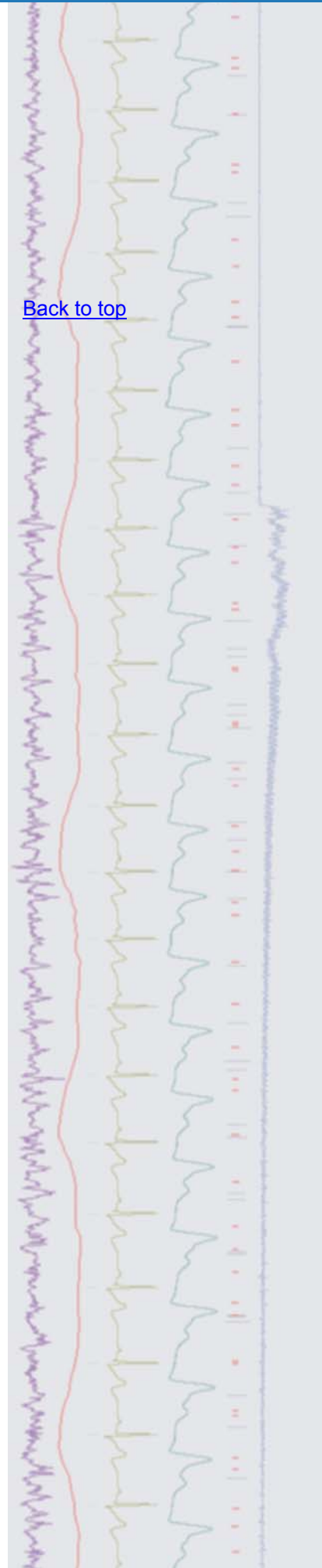Harrogate, UK
April 17th – 20th 2011

Young Life Scientists Symposium: Autonomic Control in Health and Disease
University of Birmingham
Birmingham, UK
May 26th 2011

UCL Neuroscience Symposium 2011
University College London

London, UK
July 1st 2011

Physiology 2011
University of Oxford,
Oxford, UK
July 11th – 14th 2011

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 7.06	02/11	Signal version 5.01	02/11
Spike2 version 6.16	03/11	Signal version 4.08	10/10
Spike2 demo		Signal demo	

Q.   Can I use active cursors to find the half-height repolarisation of action potentials?

A.   Active cursors can be used to find the repolarisation % of action potentials, by finding the point at which a waveform returns a given percentage of the distance to a baseline inside the search range. You specify the baseline (100%) position and search range settings in the Active Mode dialog of cursors.

**An example using cardiac action potentials**

The first step is to detect the action potential and set a start and baseline position for the repolarisation search method. In this example, Cursor(0) is set to find the peak of the action potential, using an amplitude setting of 1.3 and Cursor(1) is set to a position on the baseline following the action potential, using the `Expression` search mode set to `Cursor(0)+0.2`.
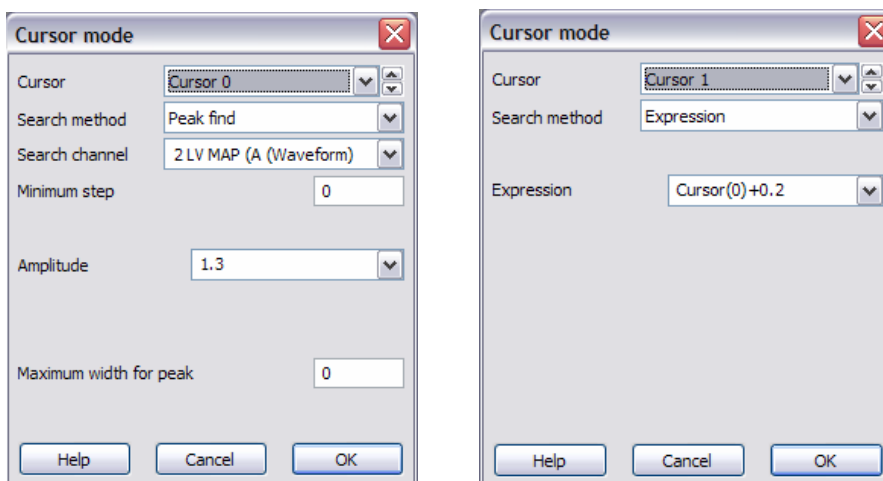
*Active mode settings for Cursor (0) and Cursor (1)*

Cursor(2) can now be set to use the `Repolarisation %` Search method with the Start position set to `Cursor(0)` and the `End` and `100% position` set to Cursor(1). The repolarisation percentage setting is set to find the value of interest, in this case `50%`.
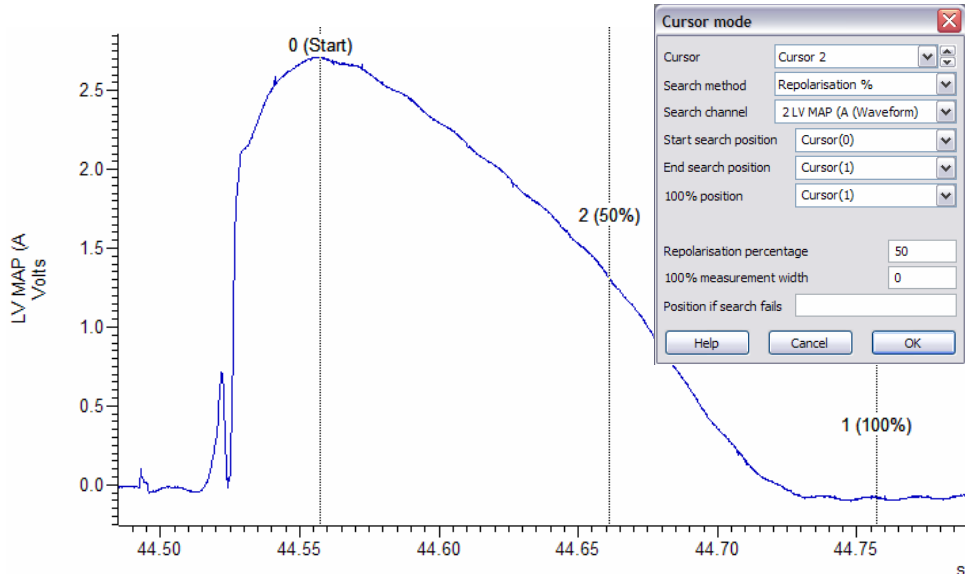
Detection of 50% repolarisation

Up to 10 cursors are available (0-9) in Spike2 so additional cursors could be used to find other repolarisation % times of the action potential.
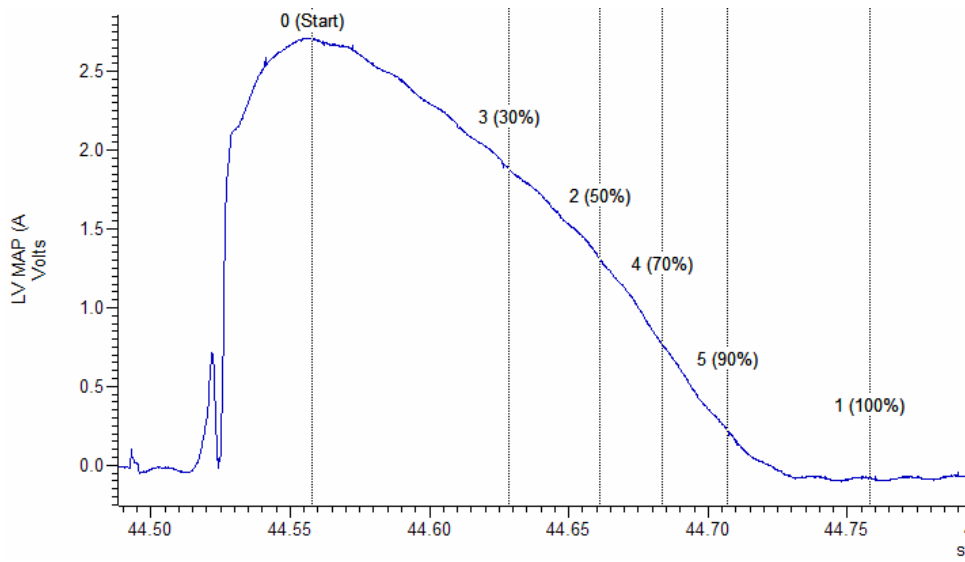

Using multiple active cursors

Scripts: Spike2

Q. I would like to be able to generate duplicate channels containing TextMarks of the same code, much like the built-in function for separating WaveMark templates into individual channels.

A. The script, `DuplicateMarkers.s2s`, contains a general purpose function that fills an array with marker codes present in a selected channel. The script then creates duplicate channels for each individual marker code and displays them in the data file.

Q. Is there any way to apply mathematical expressions to channel data?

A. Virtual channels can be used to apply mathematical operations and 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.

Virtual channels are created using the `Analysis menu > Virtual channels > Create new channel` command, and are shown as channels
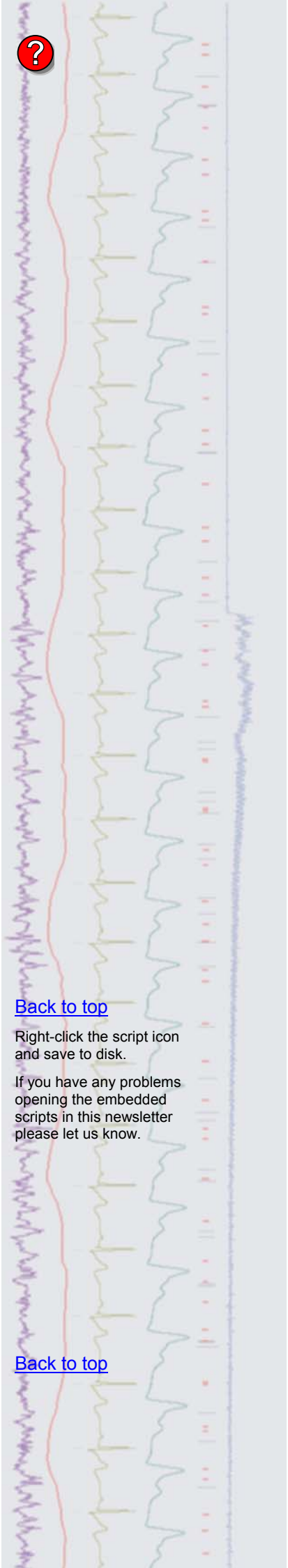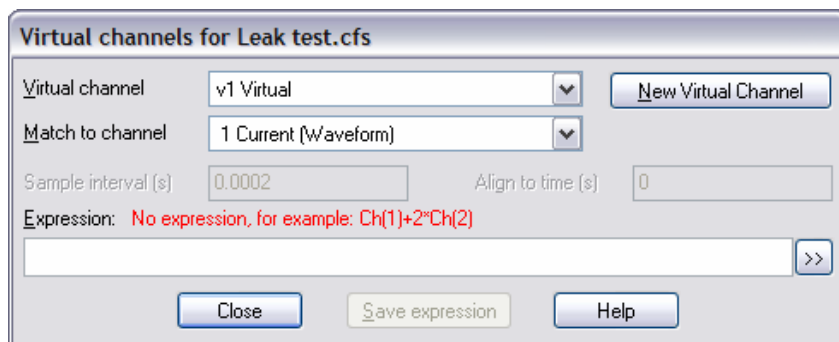
Right-click the script icon and save to disk.

If you have any problems opening the embedded scripts in this newsletter please let us know.

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.

Virtual channels for Leak test.cfs

Virtual channel	v1 Virtual	▾	New Virtual Channel
Match to channel	1 Current (Waveform)	▾	
Sample interval (s)	0.0002	Align to time (s)	0

Expression: No expression, for example: Ch(1)+2*Ch(2)

[   ] ⟩⟩

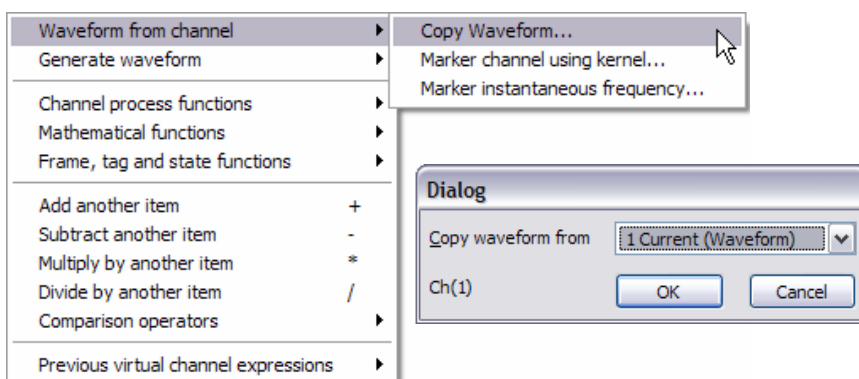[Close]   [Save expression]   [Help]

Dialog to create a new Virtual channel

Some of the more common uses for virtual channels are outlined below.
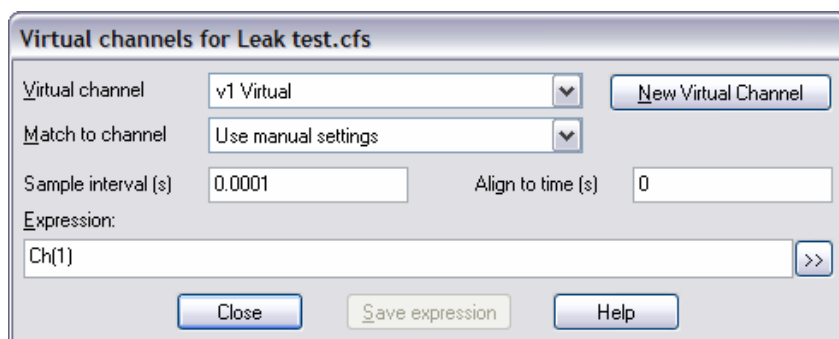
Create waveforms from existing channels

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

Waveform from channel ▸	Copy Waveform…
Generate waveform ▸	Marker channel using kernel…
	Marker instantaneous frequency…
Channel process functions ▸	
Mathematical functions ▸	
Frame, tag and state functions ▸	
Add another item +	**Dialog**
Subtract another item -	
Multiply by another item *	Copy waveform from [1 Current (Waveform)] ▾
Divide by another item /	Ch(1) [OK] [Cancel]
Comparison operators ▸	
Previous virtual channel expressions ▸	

Expression to copy waveform from channel 1

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 below take a copy of channel 1 and apply a sample rate of 10kHz.

Virtual channels for Leak test.cfs

Virtual channel	v1 Virtual	▾	New Virtual Channel
Match to channel	Use manual settings	▾	
Sample interval (s)	0.0001	Align to time (s)	0

Expression:

[Ch(1)   ] ⟩⟩

[Close]   [Save expression]   [Help]

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.
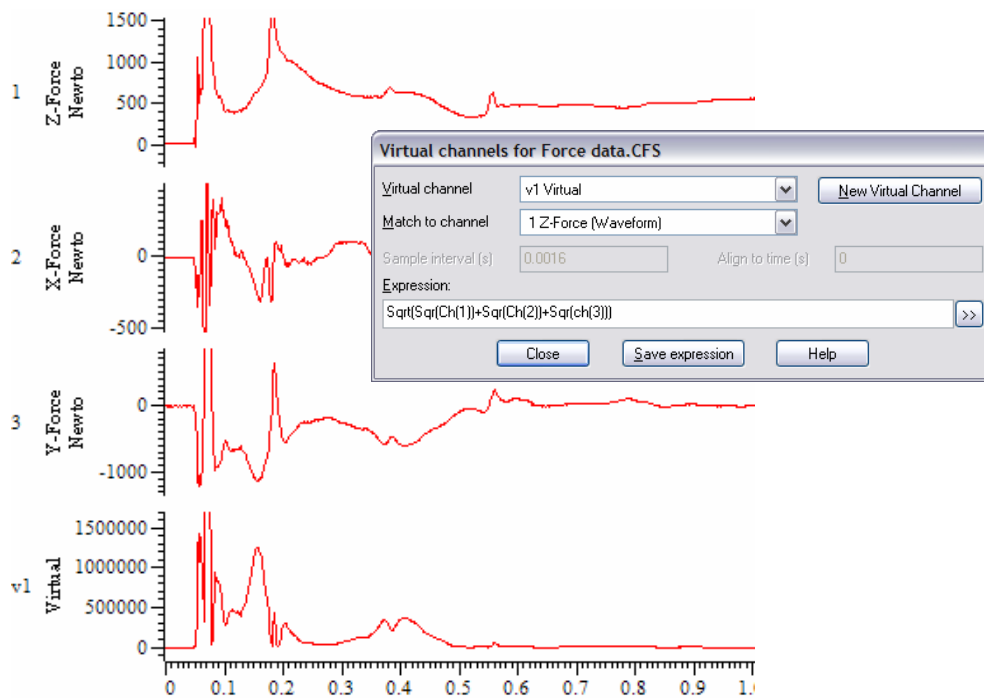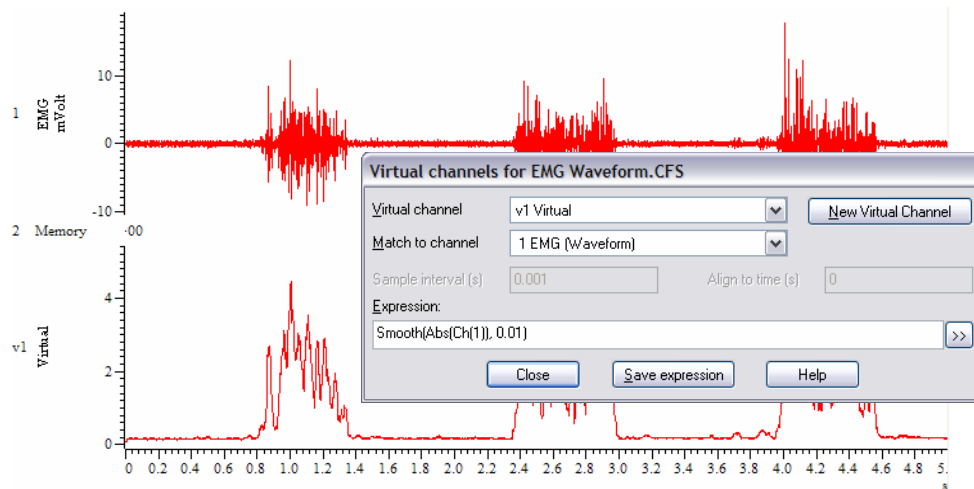
In the above example, `Sqrt(Sqr(Ch(1))+Sqr(Ch(2))+Sqr(Ch(3)))` displays the square root of the sum of squares of the three channels.

Channel processing

These functions can be used to modify channel data without changing the raw data in the view.

Multiple processes can be applied to channel data; the expression `Smooth(Abs(Ch(1)),0.01)` applies both rectification and smoothing with a time constant of 0.01s to channel 1.

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.
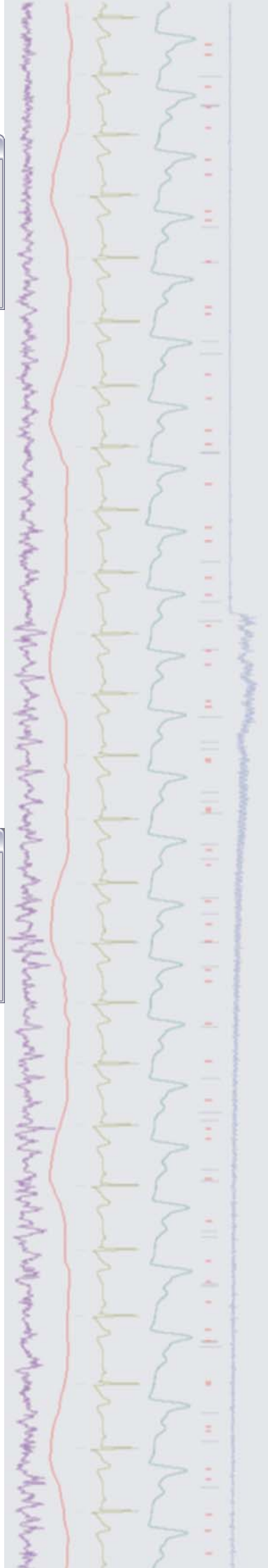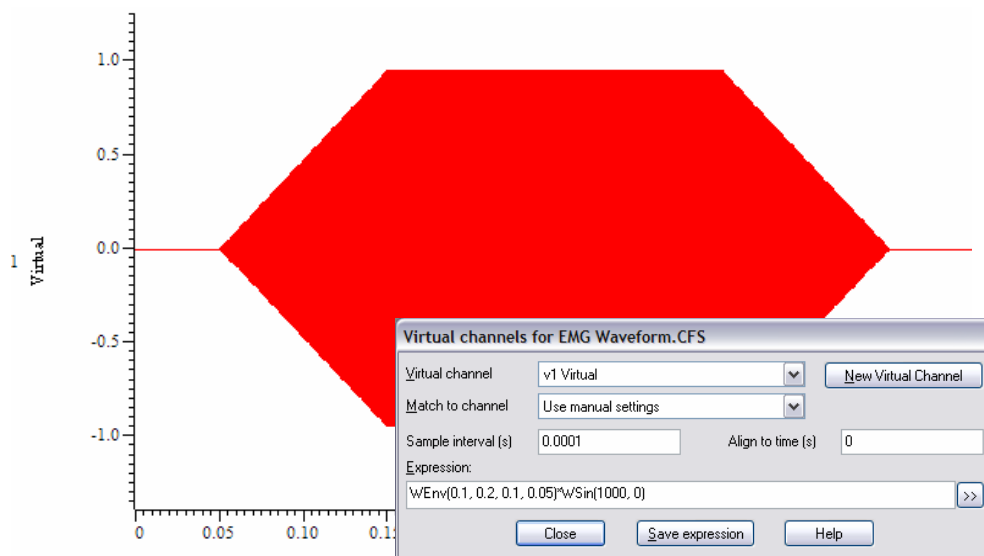
The expression `WEnv(0.1, 0.2, 0.1, 0.05)*WSin(1000, 0)` generates a 1kHz tone 'pip' using a combination of an envelope and sine wave.

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

Scripts: Signal

Q. Is it possible to subtract channel data between files? I am recording voltage clamp experiments and would like to subtract current traces from different files.

A. The script, `SubCurrentData.sgs`, can be used to subtract current traces from voltage clamp recordings to see the effect of a common stimulus protocol. The user selects the source file and the file containing the data to subtract when the script is run. The current channel is selected from a dialog once the files have been opened.

Right-click the script icon and save to disk.

If you have any problems opening the embedded scripts in this newsletter please let us know.

Did you know…?

You can export Spike2 and Signal data files, result, XY and memory views as MATLAB data files. The MATLAB support is an optional feature which is selected during installation.

Recent questions

Q. I need to generate an image of spikes, templated with different WaveMark codes, for inclusion in a black and white publication. Is there any way to apply grey scale colours to WaveMarks?

A. The colour palette in Spike2 can be used to set different colours for individual WaveMark codes. The first seven colours in the palette range from black to white so you could apply these to the different WaveMark codes that you want to include, giving a grey scale effect on your images for the publication.

User group

You can now find our eNewsletters archived on the CED website.

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 un-subscribe from the mailing list for this newsletter, please notify sales@ced.co.uk.

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