CED eNews

The eNewsletter from Cambridge Electronic Design

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CED 2502 skin conductance unit

We are pleased to announce that we have resolved the component supply problems with the CED 2502 skin conductance unit, and it will soon be available to order. This unit uses the constant-voltage principle and has manually switched conductance ranges of 10, 25 and 100 micromhos suitable for galvanic skin response (GSR) research studies. The new design includes a front panel power switch and BNC output along with both male (1.5mm) and female (2mm) touchproof electrode connectors. Suitable electrodes for GSR studies will be supplied with the unit.

Future meetings and events

Annual Neuroscience
University of Leicester,
Leicester, UK
May 3rd 2012

2012 UCL Neuroscience
University College
London, UK
June 29th 2012

Physiology 2012
Edinburgh International Conference Centre,
Edinburgh, UK
July 2nd – 5th 2012

8th FENS Forum of Neuroscience 2012
International Convention Center (CCIB),
Barcelona, Spain
July 14th – 18th 2012

ISEK 2012
Brisbane Convention and Exhibition Centre,
Brisbane, Australia
July 19th – 21st 2012

International Motoneuron Meeting 2012
Crowne Plaza Hotel Coogee,
Sydney, Australia
July 23rd – 26th 2012

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 7.09a	02/12	Signal version 5.05a	02/12
Spike2 version 6.16	03/11	Signal version 4.09	08/11
Spike2 demo	10/11	Signal demo	10/11

Scripts Spotlight

Hum Remove revisited

The 'classic' Hum Remove script (see eNews #61) uses the method of reference noise subtraction to remove mains interference from physiological recordings. The method requires an event channel with time stamps that reliably mark the onset of each hum cycle. However, we realised that many users did not have the means to record such a channel. So, the advice was to record an additional waveform channel from a length of bare wire that would pick up mains interference. A number of features were included in the script in order to derive an acceptable hum cycle marker from such a waveform, check the frequency, remove spurious markers, insert missing ones and so on… Despite this compromise, the resulting clean-up of your data can be well worthwhile. However, there is no longer any need to compromise. As announced in the last eNews, CED now produces a low-cost mains pulse box that allows you to generate an accurate hum cycle marker as an Event channel. We have also developed a streamlined script for Spike2 version 7, `HumRemExpress.s2s` to use when you have recorded an accurate hum marker. There is a user guide in the comments at the top of the script file.

There are also some recent improvements to the original hum remove script. If your copy has a release date before 2012, then you should download the latest version from the CED website.

Show me how!

Click on the link above to play a video tutorial showing how to set threshold levels for spike sorting in Spike2

Q. Is there any way to set the trigger levels in the WaveMark dialogs based on user entered values or positions of horizontal cursors in the data file?

A. When setting up a new WaveMark channel, the two default horizontal cursors in the spike shape 'oscilloscope' window are used to set the positive and negative trigger levels for spike detection. It is also possible to add a further two cursors, using the `Ctrl+H` shortcut or button highlighted below, that can be used to define amplitude limits for the spikes being captured, where any spike crossing these outer thresholds is rejected.
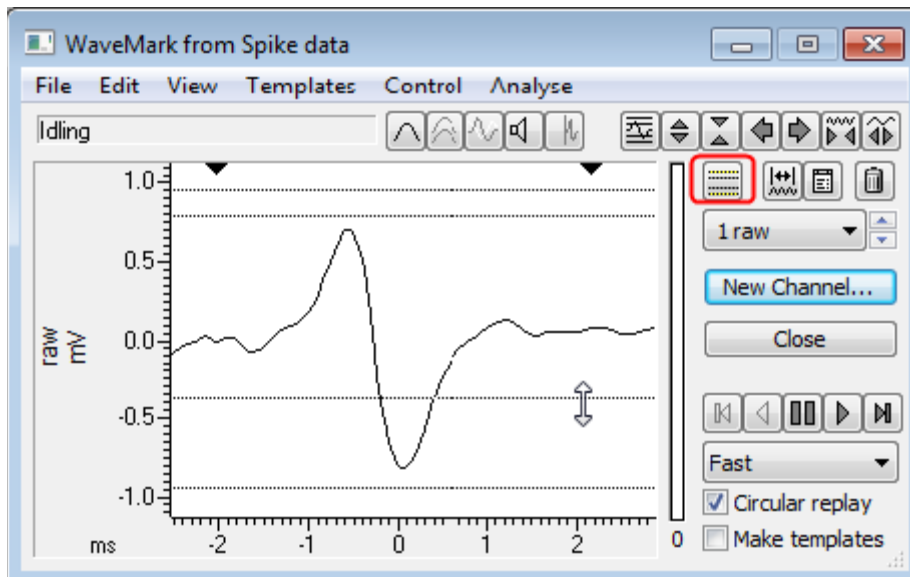
WaveMark dialog with 4 or 2 cursor option button highlighted

The cursor positions are displayed in the status bar at the top of the dialog when the cursors are dragged. You can also set specific values for cursor positions by right-clicking on them in the oscilloscope window and selecting the `Set cursor position...` option from the context menu. From this menu you can also copy cursor positions to the clipboard, move the cursor out of range of the incoming spikes so that they will not trigger and fetch cursors that are out of range.

The `Link Time view cursors` option links horizontal cursors in the spike shape dialog to corresponding horizontal cursors in the data file where horizontal cursor 1 is the lower trigger level, horizontal cursor 2 is the upper trigger level and horizontal cursors 3 and 4 are the lower and upper amplitude limits, if these have been made visible. This allows the threshold levels to be adjusted in the data file itself as well as in the spike shape dialog. If you intend to use the horizontal cursors in the data file to set trigger levels, it is important to note that the source channel must have the same DC offset as the spikes displayed in the WaveMark dialog. This will always be the same for WaveMark source channels (for example when sampling data) but may not be the case with waveform or RealWave data. See the Spike2 help for full details.

Scripts: Spike2

Q.   Are there any functions to perform coherence analysis available in Spike2?

A.   The coherence of two waveforms is the measure of their phase and amplitude similarity as a function of frequency and ranges from 0 for totally incoherent waveforms to 1.0 for fully coherent. The script, `Coher.s2s`, which is available to download under the Spectrum heading of the Spike2 scripts downloads section of our website, generates the coherence between two selected waveform channels and displays the results for frequencies up to half the sampling rate.

The two waveform channels selected for analysis must be sampled at the same rate. If you want to analyse two channels sampled at different rates, you can use the `Match channel` process, available from the `Channel process` option in the `Analysis` menu, to apply the same sample rate from one channel to another.

A full description of the principles and operation of the script can be found in a Word document which is included in the zip file.
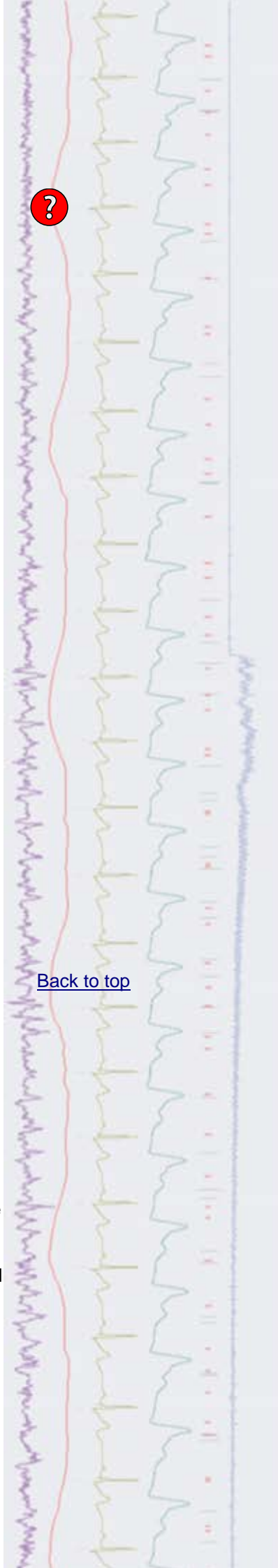
Q.   I would like to be able to output a smoothed and rectified version of incoming data via the DAC outputs during sampling.

A.   The attached output sequence file, `RectSmoothOutput.pls`, is an example of reading incoming data on channel 1 and applying rectification and 3 point smoothing before playing the data back out of DAC 0. You can change the data channel to use, output DAC and smooth settings (3 or 5 point) by opening the sequencer file and editing the appropriately commented lines. For optimal timing you should set the sequencer step period to 0.01ms in the `Outputs` tab of the sampling configuration. This sequence is only supported for Signal version 4 and above and should be used with a Micro1401 mk II, Micro1401-3 or a Power1401 interface.

      This output sequence file can also be edited to work in Spike2 (version 7 only). Simple remove the `;` character preceding the SET command in the sequence to make a Spike2 version 7 compatible sequence file.

Scripts: Signal

Q.   Is it possible to automatically detect and measure silent periods following an MEP in my EMG recordings? Ideally I would like to be able to specify a baseline period and then use the mean of this plus a number of standard deviations of the mean to set the threshold level for the silent period detection.

A.   The script, `SPdetect.sgs`, is a simple example that will detect silent periods that fall below mean baseline plus *n* number of Standard Deviations. The user selects the channel to analyse and the settings to use from a dialog when the script is run before then specifying a baseline period and the start of the MEP response with vertical cursors. The script then processes each frame by detecting silent periods based on the settings and asking the user to accept or reject the findings. The time range of the silent period is then printed to the Log window.

Did you know...?

Script writers can select variables in the global and local variable windows and then use the `Watch window` option (highlighted below) to only display those selected values when debugging.
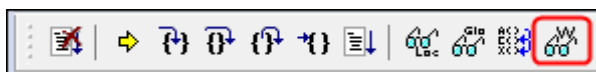
Debug bar

Recent Questions

Q.   I have been given a DVD of data files by a colleague, along with an example data file that they have previously set up to show only the required channels and display settings for analysis. Is there any way to copy these settings from the example file and apply them to all of the others on the DVD? It is taking me a long time to reproduce the settings for each file by hand!

A.   Display settings for data files are stored in a separate resource file, which is saved alongside the data file with the same name and the extension .s2r. To apply the resource settings from one file to multiple data files you can use the `Global file resource` option from the File menu in Spike2. This can be applied to all data files or to data files per folder. This is particularly useful when you are reviewing data stored on a read-only device such as a CDROM or DVD.

User group
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.