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News

Introducing the Power1401-3



We are pleased to announce the release of the Power1401-3, our latest high performance data acquisition interface. It uses advanced processor technology and expandable memory of up to 2GB to give you the power and flexibility required for the most demanding applications. The significant speed increases in the Power1401-3 make it ideal for dynamic clamp using multiple models; the table below shows the simultaneous input and output rates with Hodgkin-Huxley models.

H-H Models	x1	x2	x4	x8
Power1401-3	400 kHz	300 kHz	200 kHz	110 kHz
Power1401 mk II	130 kHz	100 kHz	60 kHz	30 kHz

US Training Days: Thursday 11th and Friday 12th October

Our US training days will take place at the [DoubleTree by Hilton, 300 Canal Street, New Orleans](#) just prior to the Society for Neuroscience meeting. These days are designed for both existing and prospective users and are made up of multiple threads to cover all aspects of sampling and analysis with Spike2 and Signal.

Attendance is limited so please [register](#) early to reserve your place on the appropriate course.

Local Training Sessions

In addition to our annual UK and US training days, we are also happy to offer on-site local training sessions for Spike2 and Signal. These smaller training sessions can be tailored towards particular requirements for research groups or departments. If you are interested in organizing a local training seminar for your group or department, please contact us.

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Future meetings and events

Cardiac & Respiratory Physiology Themed Meeting

Hulme Hall, University of Manchester
Manchester, UK
September 4th - 6th 2012

CED US Training Days 2012

Doubletree by Hilton,
New Orleans, LA, USA
October 11th - 12th 2012

Society for Neuroscience 2012

Ernest N Morial Convention Center,
New Orleans, LA, USA
October 13th - 17th 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 7.10b	07/12	Signal version 5.07	06/12
Spike2 version 6.16	03/11	Signal version 4.09	08/11
Spike2 demo	07/12	Signal demo	06/12

Scripts Spotlight



I often find that when analysing data there is a need for additional processing of the waveform signal to enhance the features of interest. Both Spike2 and Signal can apply filters to data offline but it can be tedious to apply the same filter again and again to channels in a file or even to channels in a batch of files. Automation of these kinds of repetitive tasks is one of the strengths of the script language, so for this example we will look at creating and applying an FIR filter with the `FiltCreate()` and `FiltApply()` script commands.

The `FiltCreate()` command specifies the type of filter to use, the filter specification and an index in the filter bank to store the filter.

```
FiltCreate(index%, type%, trW{, edge1{, edge2{, ...}}});
```

Spike2 and Signal contain a bank of twelve filter definitions that can be viewed and applied from the Analysis menu FIR filters dialog. These contain default filter types that can be modified to suit your needs and then saved back to the filter bank, to be used repeatedly. The `FiltCreate()` function can either save the filter definition to an index in the filter bank using the `index%` argument with a value of 1-12 or create a temporary filter with an argument of -1 that does not overwrite any of the existing filter set.

The `FiltApply()` function uses the `n%` argument to use an index from the filter bank (1-12) or a temporary filter as described above (-1).

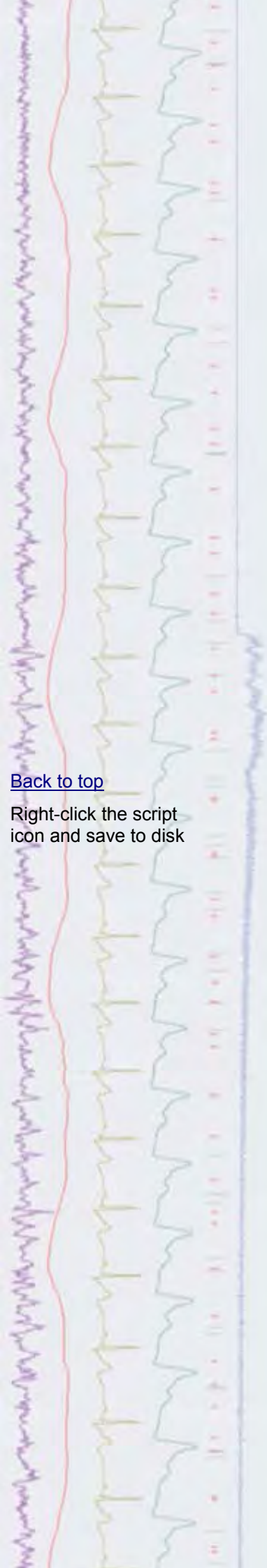
```
FiltApply(n%|coef[], dest%, srce%, sTime, eTime {,flags%});
```

The other arguments set the destination channel used to display the filtered data, the source waveform to filter and start and end times.

The attached script code example contains a function called `FiltCreateLP%`. This

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Right-click the script icon and save to disk



utilises the `FiltCreate()` and `FiltApply()` functions to generate a low-pass FIR filter with a user-defined cutoff. This is then applied to a selected waveform channel time range in a data file and the filtered result is displayed in a new memory channel.

Spike2

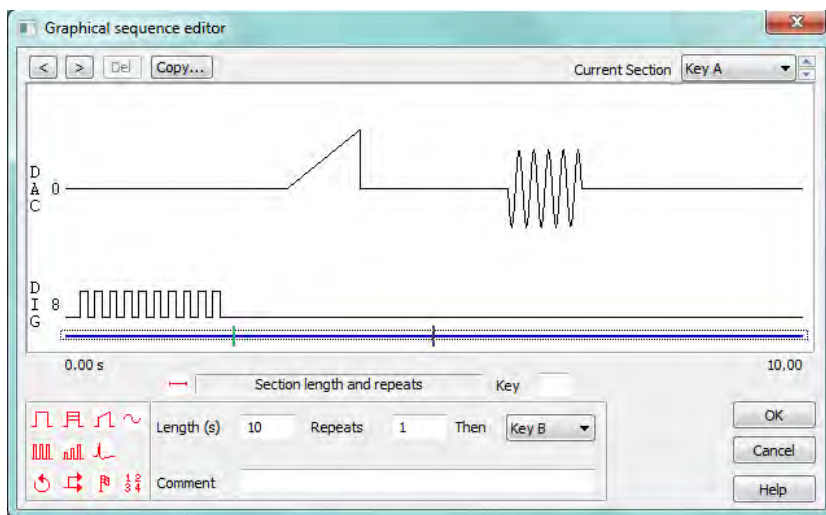


Show me How!

Click here to view a video tutorial on how to use the graphical editor

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- Q. I'm a new Spike2 user who needs to setup a simple output sequence, and my supervisor has suggested using the graphical editor to do this. As I'm not at all familiar with this I was hoping for a quick guide on how to use it.
- A. The main display in the graphical sequence editor window contains a graphical representation of the enabled DAC and digital outputs. The thicker blue line at the bottom of the display is the Control track. The control track can be clicked on and edited to set the section length, number of repeats and how the sequence should progress to the next section.



Graphical editor

Above this display are controls for stepping between and deleting individual pulse items and a drop-down list showing the `Current Section`, the first of which is named `Initial`. This section runs straight away when sampling starts and is generally used to set initial baseline levels for the outputs. The remaining 26 sections are named from `Key A` to `Key Z` and can each contain different time bases and output protocols that can be accessed independently during sampling or linked together to give fully automated control.

Below and to the left of the main display is a pulse palette which contains seven output pulse types that can be clicked and dragged onto the output tracks in the main display. Digital output tracks can only accept the square pulse and square pulse train output types; variable height pulses, ramps, sinewaves and arbitrary waveforms require a DAC output. The arbitrary waveform option can only be added to the control track and sets aside an area in the 1401 memory for waveform output. Waveforms can be added from a data file using the `Sample menu Output waveform` option or from a



script. Arbitrary waveform settings, such as the DAC to use and number of cycles to output can be edited in the `Play` waveform tab of the sampling configuration. Once a pulse output has been added to an output track, the pulse parameters are shown and can be edited in the area below the main display.

The bottom row of the pulse palette area contains icons for the conditional statements wait and branch, a digital marker and the variable arithmetic option. These four icons can only be added to the control track in the main display and can be used to add delays, wait for times, conditions or variables to be met, add markers to the digital marker channel and perform basic variable arithmetic during a sequence.

Full details of the graphical editor functions can be found in the Spike2 on-line help.

Scripts: Spike2

- Q. I would like a way of setting an alert facility in Spike2 to indicate to my subject to begin a reaching task at a set time into the recording
- A. The attached script, `TaskAlert.s2s`, allows the user to set a given time into sampling for a message alert. The script opens a new file based on the current sampling configuration and creates a toolbar to start and stop sampling. Once the 'alert' time has been reached, the script changes the background colour, sounds a tone and also uses the `Speak()` function to let the subject know that the task should begin. You could easily modify the script to generate other messages if required.

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Right-click the script icon and save to disk

Signal

- Q. Is there a section in the manual that concentrates on how to setup Signal for use with a Magstim unit for TMS studies? I am a new CED user and need to setup the system to control the Magstim using the multiple states system in Signal.
- A. [TMS and Magstim control using Signal](#) is the first in a series of Application Guides that will be made available for download from our website and contains comprehensive instructions for setting up Signal and a 1401 to control a Magstim device for TMS recordings. These application guides are laid out in the style of a lab notebook and are suitable for viewing using Adobe Reader or for printing as a hard copy. If you have any feedback regarding the style or content of these Application Guides please contact sales@ced.co.uk.

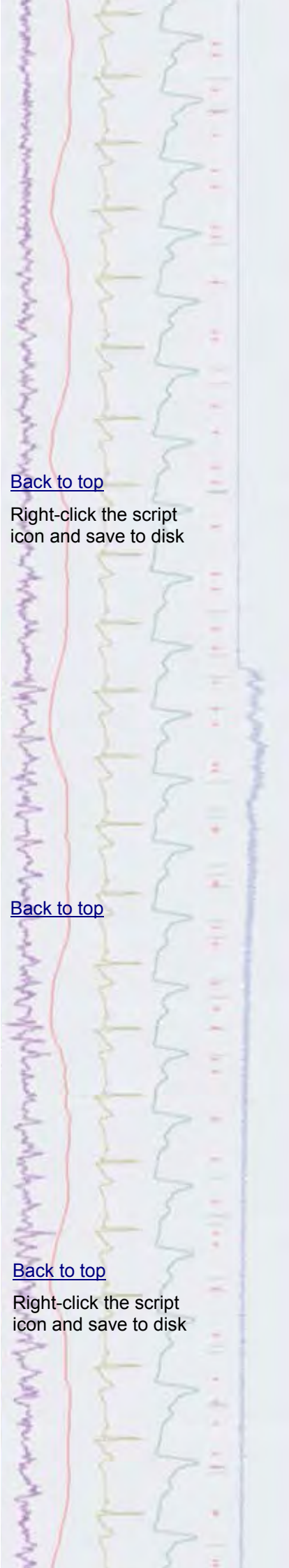
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Scripts: Signal

- Q. Is there any way to control older Magstim 200 series models that don't have a serial line connection using Signal?
- A. The script, `Ctrl1200series.sgs`, can be used to control older Magstim 200 models that have been fitted with a parallel port modification to enable external control of the intensity settings. The script uses multiple states to control the 1401 digital outputs. It creates a suitable sampling configuration

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Right-click the script icon and save to disk



and allows the user to specify the Magstim output intensities and interval between outputs for each state used. The connection between the Magstim parallel port interface and the 1401 digital outputs can be achieved with a modified cable, available from CED.

Did you know...?

The Power1401-3 can be fitted with programmable gain of x1, 2, 5 and 10 for the ADC inputs on the base unit and top-boxes.

Recent Questions

- Q. I would like to record pulses from an external device to my Spike2 data file, but these pulses are only 100ns wide and are not always registered by the digital inputs.
- A. The digital inputs on the Micro1401 and Power1401 can be used to log external pulses of 1us or wider as events in a Spike2 data file. For pulses narrower than 1us, you would need to utilise a separate device or circuit between the pulse generator and the 1401 that has the effect of 'stretching' the pulse, allowing it to be recognised by the 1401 digital inputs. Contact us for details.

The digital input bits 8 and 9 are routed to the Event Input front panel BNC's by default, with the remaining bits 10-15 available on the rear digital input port. You can set Spike2 to read all of the digital inputs from the rear port in the Edit menu Preferences dialog. Click on the Sample tab and select the Event ports 0 and 1 on rear digital input connector option.

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.

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