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## News

Version **5.02** of Spike2 is now available and freely downloadable from [www.ced.co.uk/upu.shtml](http://www.ced.co.uk/upu.shtml) for registered v5 users. This revision includes new channel process commands for cubic spline interpolation of channels to any sampling rate and alignment, new script commands that support curve fitting of data and a number of other new features. Full details are documented in the Updates section of the web-site.

Version **4.17** is freely downloadable for registered v4 users  
Version **2.13** of Signal is also freely downloadable for registered v2 users

The [UK training days](#) were held in Cambridge on Monday 16<sup>th</sup> and Tuesday 17<sup>th</sup> of June. These included attendees from as far a field as Miami and Copenhagen, as well as the UK. It is always interesting to gain feedback from our users and hear how CED equipment is being used in a wide range of research applications. We hope that all attendees found the sessions both informative and interesting.

If you have any feedback or questions relating to the training days, then please contact us. There will also be the usual [US training days](#) prior to the Society for Neuroscience annual meeting in November. Tentative dates at the moment are the 6<sup>th</sup> and 7<sup>th</sup> of November.

We will be exhibiting at a number of meetings in the next month, and are always happy to meet with users who may wish to discuss new software features, or have any specific questions. You can see us at the following locations:

- 3<sup>rd</sup> FEPS Congress: 28<sup>th</sup> June – 3<sup>rd</sup> July. Nice.
- Physiological Society Meeting: 8<sup>th</sup> – 10<sup>th</sup> July. Dublin.
- 6<sup>th</sup> IBRO World Congress of Neuroscience: 10<sup>th</sup> – 15<sup>th</sup> July. Prague.
- Polish Neuroscience Society Congress: 16<sup>th</sup> – 19<sup>th</sup> July. Warsaw.

We are working on a replacement for the widely used Sudsa22 (Script for User Definable Spectral Analysis) script. There have been a number of requests for an updated and improved version of this script for the analysis of data in Spike2 using banded power spectra.

With the **sudsa22.s2s** script, the user specifies a region in the data file for analysis; this region is then split into a number of epochs. Every epoch is analysed in turn and the power of frequencies within each band in each epoch for each channel are calculated.

There are several different analyses that can be performed, including dominant frequency, total power of frequency in bands and cross correlation, and in each case the results may be dumped to a text file. A full list of the analysis modes available can be found in the Spike2 scripts section of the web-site.

Interested parties or current users of the **sudsa22.s2s** script who wish to make suggestions and improvements are encouraged to contact us with their ideas.

## SPIKE2

Q. I would like to indicate to my subject when their activity has exceeded a predefined level. We would like to switch on an LED to show that, in our case, a resting level has been exceeded. Oh and this has to be done on two channels simultaneously.

A. In the simplest form this can be achieved entirely with a sequence. This has no feed back from the user though unless the sequence is attached to a script running on-line.

The sequence .pls file

\*\*\*\*\*

```

SET 1.000 1 0 ;Run at 1kHz May need to change depending on data type
VAR V1,Data1 ;Variable for channel value
VAR V2,High1=32768 ;Variable for first channel 'exceed' level.
VAR V3,High2=32768 ;Variable for second channel 'exceed' level

XX: 'X DIGOUT [00000000],XX ; >LEDs off No check

CH1: 'g CHAN Data1,1 ;Return the value of channel 1
      BGT High1,Data1,ON1 ;If greater than 'exceed level' then switch on the LED
      DIGOUT [000000.1],CH2 ;If not greater switch off the first bit (LED)
ON1: DIGOUT [000000.0] ;Switch on first LED

CH2: CHAN Data1,2 ;Return the value of channel 2
      BGT High2,Data1,ON2 ;If greater than 'exceed level' then switch on the LED
      DIGOUT [0000001.],CH1 ;If not greater switch off the second bit (LED)
ON2: DIGOUT [0000000.],CH1 ;Switch on SECOND LED

```

\*\*\*\*\*

The sequence expects channels 1 and 2 to be a waveform type.

The following script section will place horizontal cursors on to the appropriate data channels when it runs. Once the correct number of horizontal channels are in place it will then update the sequence with 16-bit numbers representing the level at which the cursors have been placed.

The script .s2s file

\*\*\*\*\*

'\$SetLevel|Script to set horizontal cursor levels to interact with sequence file

```

var lev[2]; 'Array holding channel 'level'
var n%; 'Counter variable

```

```

for n% := 1 to 2 do 'for the two channels do....
  if HCursorExists(n%) then 'Does cursor exists
    if HCursorChan(n%) = n% then 'If it does on the correct channel
      lev[n%-1] := HCursor(n%); 'Make the level array update

```

```

else
    HCursor(n%,YLow(n%) + (YHigh(n%)-YLow(n%))/1.2,n%); 'If cursor in
wrong place put 'it at 4/5 max amplitude
    Message("Cursor %d was on incorrect channel\nPosition cursor and rerun
script",n%);
    Halt;
endif;
else
    HCursorNew(n%,YLow(n%) + (YHigh(n%)-YLow(n%))/1.2); 'If no cursor make one at
4/5 max 'amplitude
    Message("No cursor %d was present\nPosition cursor and rerun script",n%);
    Halt;
endif;
next;

lev[0] := lev[0] * (32768/5); 'Calculate new 16-bit number of cursor position
lev[1] := lev[1] * (32768/5);

SampleSeqVar(2,lev[0]); 'Pass new values to sequencer
SampleSeqVar(3,lev[1]);

```

\*\*\*\*\*  
This is a v4 or v5 function.

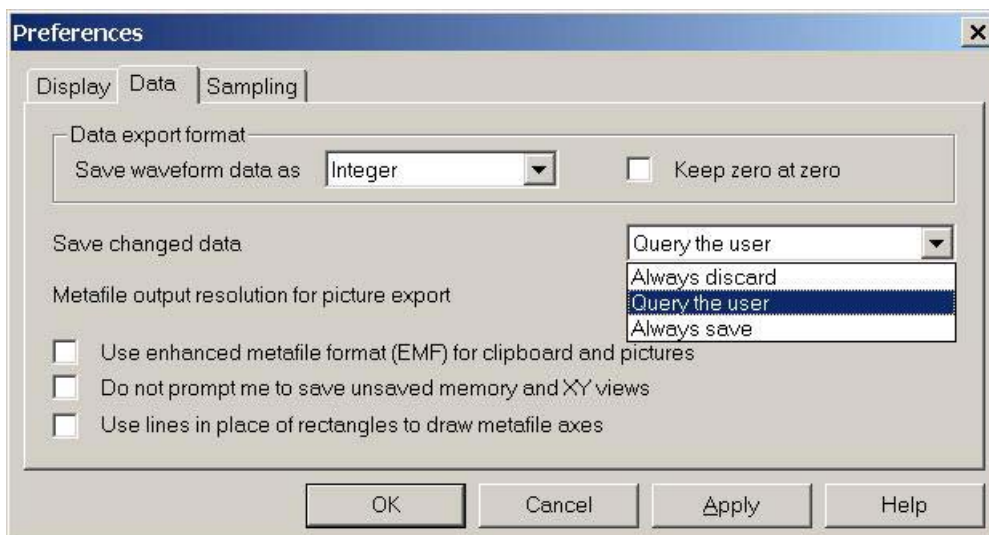
## SIGNAL

**Q** If I make changes to my data using the *Modify channel* options under the *Analysis* menu is the data permanently changed or can I revert to my original data?

**A** There are a number of ways in which you can modify the data in a file view. Under the *Analysis* menu there are many options including smoothing, digital filtering, DC subtraction, rescaling and offsetting. Data can also be modified in many ways using scripts. Before making any changes to your data it is important to specify whether these are written back to disk, which permanently alters the original data file, or discarded when you move on to another data frame or close down the file.

The default setting for what happens to the data can be found in the *Preferences* dialog under the *Edit* menu. The options are:

- Always discard – Any changes are discarded and the original data is retained
- Query the user – You can specify whether to keep or discard changes
- Always save – All changes are accepted and the original data is lost



Once a data file is open the update mode can be set from the *File* menu. This applies only to the current data file while it is open. If the file is closed down and then reopened the update mode will revert to the default.

When using the *Multiple frames* option from the Analysis menu, or a script which alters the data on multiple frames of a **file view** it is important that the data update mode for the file is set to either *Query the user*, or preferably, *Always save*. This will ensure that the changes are saved to disk, otherwise the action will have no effect. If the mode is set to *Query the user* a dialog appears each time the system moves to the next frame asking whether to accept or discard the changes. This dialog also includes a checkbox which allows you to set the update mode to either save or discard changes and then continue automatically through the remaining frames in the file.

For **memory views** the data update mode does not apply as all of the data is held in memory.



**It is highly recommended that you make a back up of your data before making and saving any channel modifications.**

### **Scripts.** Spike2

An improved version of W\_Bursts.s2s.

Spike2 is shipped with W\_Bursts an old script that generates a new channel of open closed times indicating the time and duration of bursting events. From the newly created channel we can obtain further analysis such as the mean burst duration and cycle time.

The revised script available from our web site as [Improved burst analysis](#) greatly improves on the old by taking advantage of newer functions within Spike2. This script can:

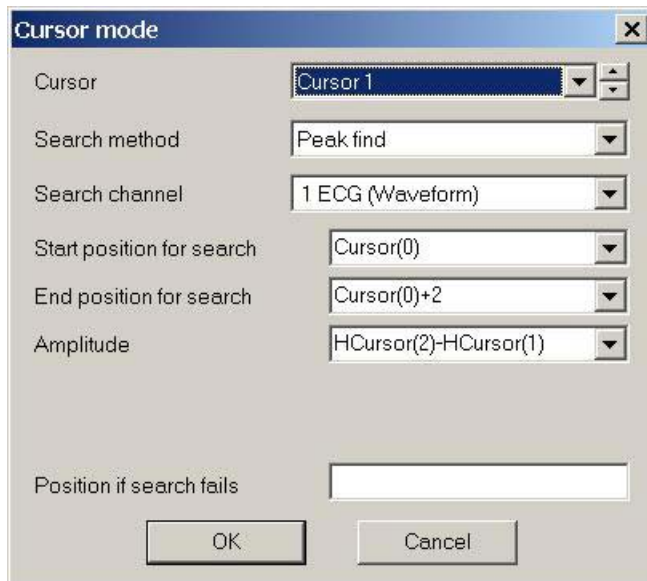
- Create level channels in a data file that mark groups of Events, Markers or Wavemarks.
- Plot burst duration, inter-burst interval, burst period or events /burst vs time.
- Create additional channels showing burst rate, burst onset times, and events within bursts and events not in bursts.
- Generate a table of burst statistics that can be easily copied to a spreadsheet for further analysis.

### **Did you know...?**

Many dialogs in Spike2 will accept expressions in place of simple numbers. These expressions can be either numeric (composed of numbers and arithmetic operators) or view based (allowing references to cursor positions and positions along the axes).

An example of this would be the *Cursor Mode* dialog for setting active cursors to automatically search for data features. In the diagram below, cursor 1 is set to search for a peak on channel 1 within 2 seconds of cursor 0 and using an amplitude for peak detection set by the difference between the levels of horizontal cursors 1 and 2. This allows the user to set the amplitude interactively by simply moving the levels of the horizontal cursors.

Further details are available from the *Dialog expressions* section of the Spike2 help.



### Recent questions

- Q. Can I export a Spike2 channel as binary for importing to another software package
- A. Yes. There is a script in the c:\SpikeN\trainday\memchan folder called BinDump.s2s. This allows you to output in Integer, 32-bit or 64-bit IEEE reals.

### User group

It will take a short time to set up an archive message board on our web site. As soon as this is done I will use this newsletter to announce that it is available. This seems to be the most sensible route to go rather than direct emailing both for security and for minimising spam.