Spike2 – 1401 and PATEC script ReadMe

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BEFORE COLLECTING ANY DATA

Turn on the Computer first and then the 1401 device. Wait until the light on the power button turns green and then you can open spike2 on the computer. **This prevents that any electrostatic shock discharge breaking the system when you are connecting the cables.** If the light doesn't turn green it could be a failed of the system. In that case, please contact us!!! Connect the BNC cables according to the equipment you need! **Following, check that the BNC cables or any other cable you are using that are correctly connected!**


Be sure you have created the sampling configuration you need for your study/ purpose. To create a sampling configuration in Spike2 click on Sample → sampling configuration. Once you create it remember to save by clicking on File → Save configuration as…

Check the channels and whether the cables configuration is correct! Specifically, for the PaTec_Script you have to check the "fs_sequencer_adaptable.pls" you are using. Usually it is as follow:

- DAC 0 → it's free.
- DAC 1 → is used for a transistor-transistor logical pulse (TTL) with 3V amplitude. You can use it to trigger and to sync many devices which need at least 2.5V inputs (ex: Myon EMG/IMU system, Vicon).
- DAC 2 → is used to trigger the ultrasound system by sending a TTL square wave duty-cycle @100Hz (you can use to trigger optitrack too).
- DIGBIT 2 and 3: bits 2 and 3 are used to trigger the Isomed rotation (back panel).
- DAC 3 → free

After you open Spike2, you will have a window like the following picture. To open the script, please go to File→ Open/Open File. A pop-up window will open and navigate to the folder where you put the PATEC_script. PS: YOU CAN RENAME THE SCRIPT FILE AS YOU LIKE! THE IMPORTANT PART IS THE LOCATION/PATH TO THE SEQUENCER (see following pages).
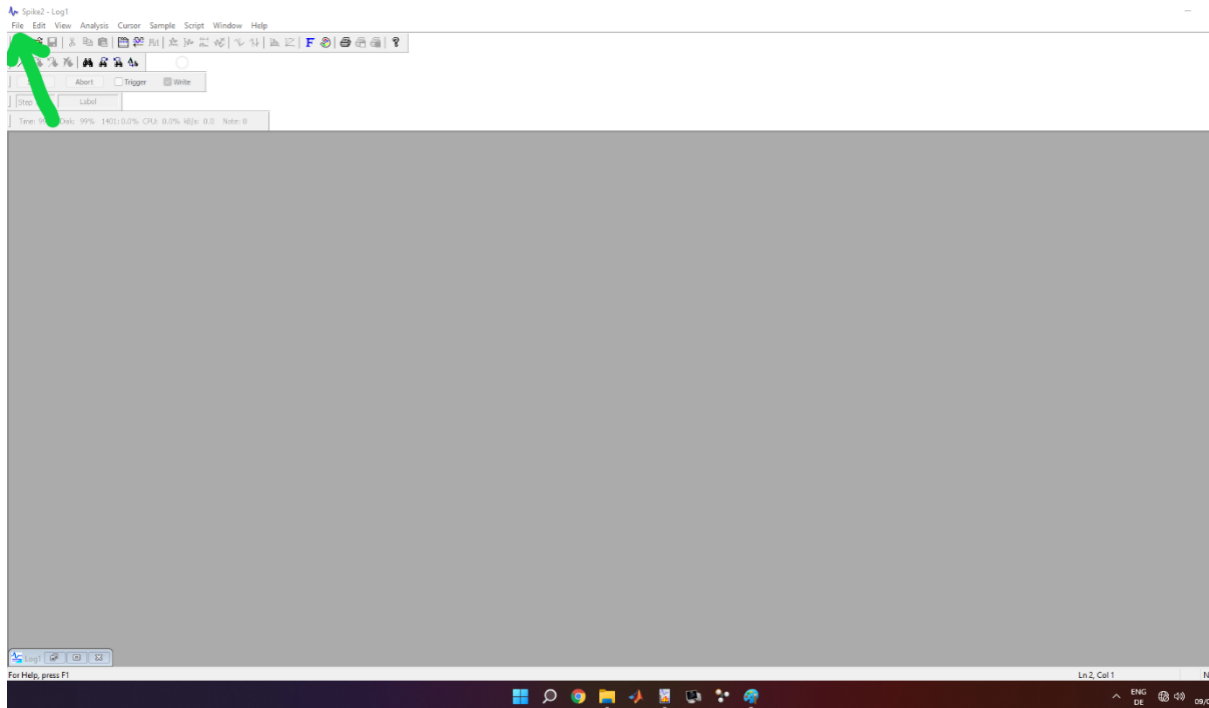
Once selected and opened, a window in spike2 with crazy nerdy code will appear. At this point, check at line 232 the path for the SampleSequencer and correct it based on the location where you put the "fs_sequencer_adaptable.pls" file.

```
228    'START NEW SAMPLING WINDOW AND LOAD CORRESPONDING CONFIGURATIONS*******************
229  ┌ Func New%()
230  │
231  │      FileOpen("",6,1,"Select Sampling config file"); 'open dialog to load sampling config file
232  │      SampleSequencer("D:/Paolo/Spike_Config_FINALE/fs_sequencer_adaptable.pls");    'sets sequencer file to use
233  │      Message("WARNING! DISABLE ISOMED TRIGGER! Depending on the selected program rotation might occur.");
234  │
235  │      mainVH% := FileNew(0, 1);    'creates a new sampling data file / time view
236  │      WindowVisible(3);    'maximises window
237  │      FrontView(mainVH%); 'unnecessary line?
238  │
239  │      SampleStart();
240  │      DisplayButtons();
241  │      return 1;│
242  └ end;
243
244  └
```

Further, if you are going to use the ultrasound system (in sync mode), remember to check at line 713 if the location of "SaveECO.exe" is correct. It is a program I created to save automatically the US tvd file via CMD with the same name of the spike2 mat files exported. Theoretically, such .exe file should be universal for everyone and always in the same location. The only difference is the path between the PC upstairs and downstairs. If someone touch or delete them, I allow you to kill them ☺

```
683    Func WriteFileName%()
684
685        NameFiles$ := "";
686        ' variables for the Dialog
687        var butCancel% := 0, shitCheck% := 1;  'just a check '
688        var ItemText$:= "";
689        'need this shit otherwise error --> too looooooong argument
690        var expFlags$ := "UseSName=0|UseCName=1|WaveTimes=1|BinFreq=0|BinTimes=0|WaveData=2|MarkAs=1|TMarkAs=2|RMarkAs=2|RMarkData=2|WaveMa
691
692            'Dialog box
693        while(ItemText$ = "" or shitCheck% = 1 ) do
694            DlgCreate("Type the file name (without ext)\nRaw data will be exported",0,0,100,5);
695            DlgString(2, "File Name (max 100 chars)",80,"",-6,1.5);    'String item with max 100char (you can change that)
696            DlgAllow(0x3ff, 0);      'Allow all, no idle, change function
697            butCancel% := DlgShow(throaway%,ItemText$);  '1 if ok is pressed, 0 if cancel is pressed
698
699            if (butCancel% = 0) then 'exit the dowhile loop
700                break;
701            endif
702
703            if (ItemText$ = "") then
704                Message("Type a name! \nYou can't leave it blank!");
705            else
706                'if save goes well it returns zero otherwise it returns other codes < 0
707                ChanProcessClear(-1); 'remove all the operations from the channels to export raw data
708                shitCheck% := FileSaveAs(ItemText$ + ".mat", 100, 0, "", 0,expFlags$); 'Export (string args)
709
710                'if you tick Ultrasound then Run The script.EXE for saving the TVD file automatically with the Path and File Name
711                if uscheck% = 1 and shitCheck% = 0 then
712                    NameFiles$ := FilePath$() + ItemText$;
713                    ProgRun("C:/Users/Biomech/Desktop/SaveECO.exe " + NameFiles$);     'Set the path of where you put the EXE file!
714                endif;
715
716                if shitCheck% = 0  then break; endif; 'if you save/overwrite just break and return'
717                shitCheck% := 1; 'Must put back to 1 because if you don't save and want to change the name the loop restart
718            endif
719        wend
```

Once everything is ready, please press in the top right corner the second icon from left (or press F5 on the keyboard). It will run the script.
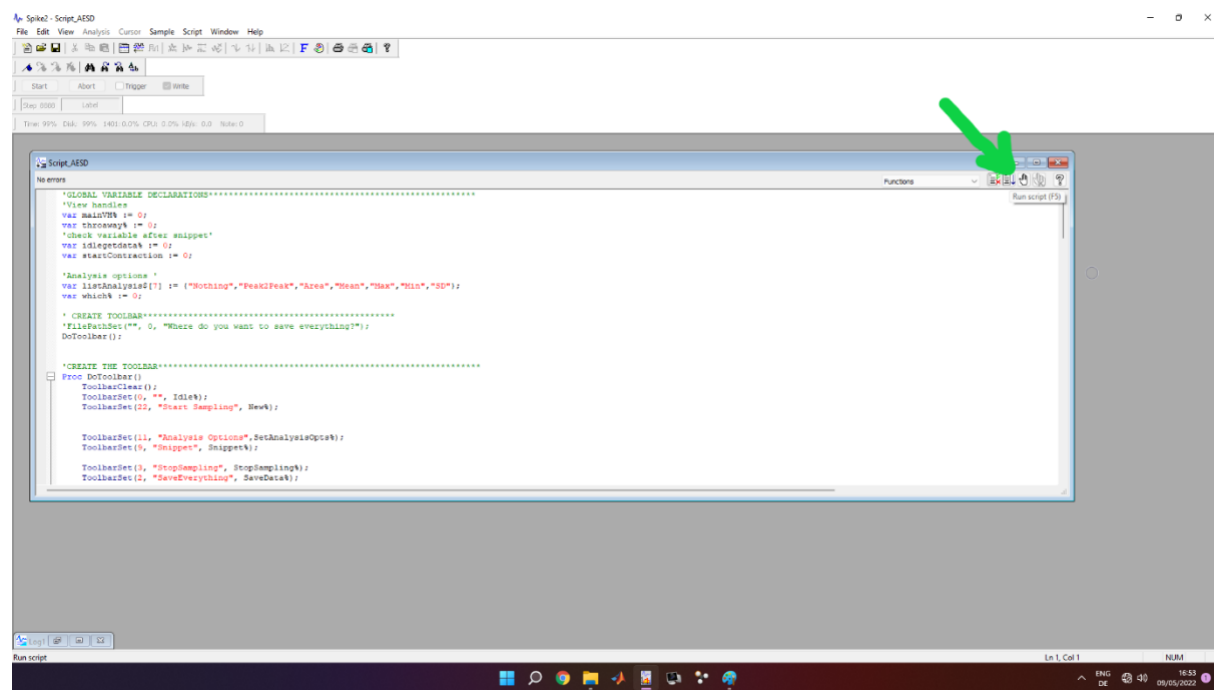
ONCE YOU OPEN IT
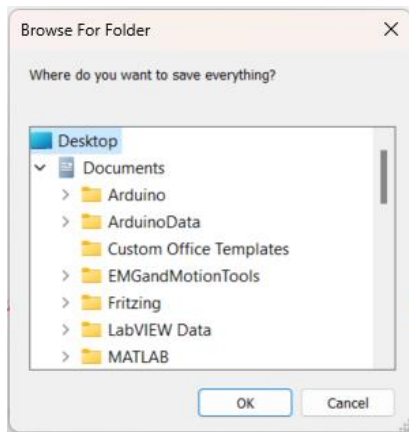
After you run the script a pop-up window will appear. It asks you where you want to save the files. I recommend that you create a folder for each session or for each participant. (In this specific case I select the desktop for example).

After you select the folder, a new toolbar will appear in the upper part of Spike2 widonw. Two buttons are active:

- "Start sampling"→ to start sampling/collecting your data
- "Quit" → if you want to exit the script.

Once you click on "Start sampling", a pop-up window appears, and it asks you for a "Sampling Configuration" file. So, select the config file you created. In case you press cancel it will automatically load the last configuration used. If an error occurs, it means there was already a time view open (maybe old collected data). Please close any open window in spike2 and then run again the script.
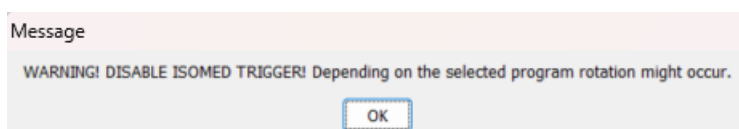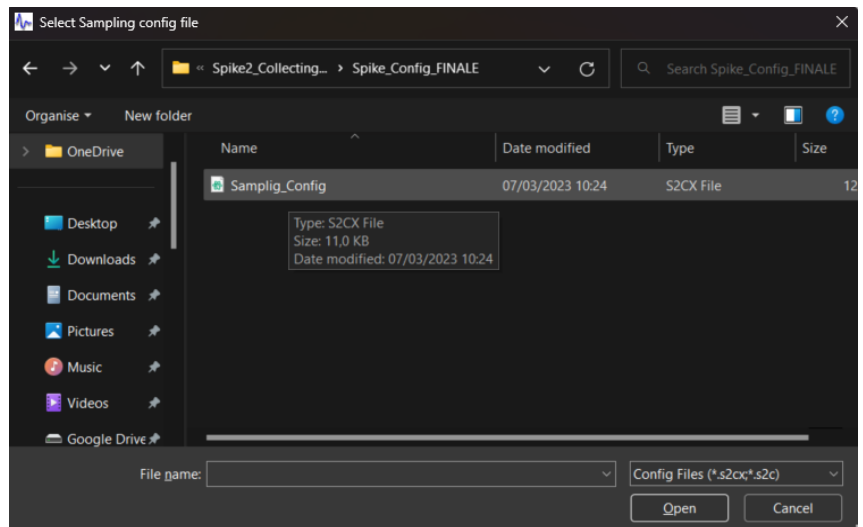
Once you select (or not) the config file, a message will appear to inform you to disable the trigger to the Isomed. It's a reminder!

BUT BE 100% SURE THE ISOMED IS SET UP CORRECTLY AND THE PARTICIPANT IS IN SAFE CONDITIONS!

If the 1401 (or the CED device for collecting data) is off or not connected/recognized by windows, the script will return an error. If the device is correctly set up and on, a window view with all the channels for your configuration will appear!

Active Tor. Ch. | Draw Trace | Start Sampling | Main view | Rep XY/Seq Config | XY-Ramp | MVC Opts | Analysis Options | Equipment Options | Snippet | Stop Snippet | DAC1 TAP | Un/Freeze US | Start US | Move IsoMed | StopSampling | SaveEverything | Quit

Active Tor. Ch.

A pop-up window will appear, informing you that four rotations will be triggered. After pressing "Okay," a second window will appear, prompting you to select two channels from two lists. The first channel should be the angle channel (X) from the dynamometer, and the second channel should be the torque channel (Y) from the dynamometer. Finally, you can select the polyfit order to fit the data; you can choose either 1st or 3rd order. If you are satisfied and press "Okay," a vertical cursor (0) will be set, and the four rotations will occur. Data from cursor (0) to cursor (1) of the two selected channels will be used for the polyfit. The coefficients of the fitting will then be used as an expression to create a virtual channel called "Active torque," where the value is calculated as: Torque channel – passive torque (calculated from the fitting of the angle). Therefore, you will finally have a live virtual channel displaying only active torque data, independent of the angle.

Select the chane for active torque

Select the Angle Channel (X) — All Channels

Select the Torque Channel (Y) — All Channels

Select polyfit order — 1

Be sure that in the next 17seconds (between Cursor(0) and Cursor(1)) the participant stays relaxed while the rotations occur
If the torque is negative,just add a -(minus)
in the expression of the virtual chan that will appear

Cancel | OK

Draw trace

A window will pop up asking you to insert the following parameters before drawing:

Playwave View parameters

Time Points Resolution / Frequency (Hz) — 200
Playwave duration (s) — 15
Channel Offset — 0
Channel Full Scale — 5
Units — Volts

Cancel | OK

- **the points per second/frequency** → so it is like the "resolution" of such points you'll draw (200Hz should be more than enough).
- **PlayWave duration** → Time length (X axis) (maximal value equals to XY width!)
- **Channel offset** → not necessary
- **Channel full scale** → not necessary
- **Units** → not necessary

The last three parameters are just arbitrary to set the Y in the correct scale for you to draw, but you can change it afterwards in the view as you prefer. Following a result view will appear where you can draw the trace you want. To draw press **shift + left click mouse** and drag/move the mouse as you prefer in window.
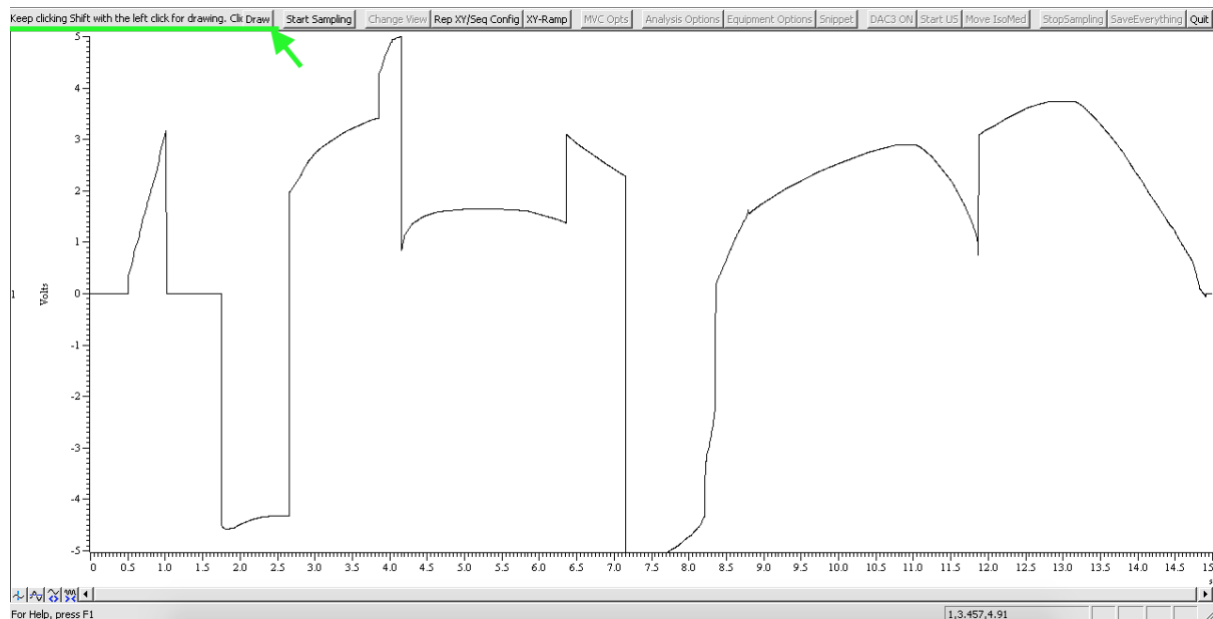
Once you are done click the button **"DRAW"** in the toolbar to save it and the select the trace "*Hand Draw*" in the *XY-ramp → select what to do.*

Change View

Change view opens a pop-up window that let you to change between the main view with all the channels and the XY view. You can also re-size them as you prefer.

Rep XY /Seq Config

Here you can configure how many times you want to perform a cycle and the time point to trigger the Isomed first rotation and the second one. So, for example a stretch-shortening cycle and/or Stimulation settings. The values you insert are in second and "real" so you can also put 4.15 (s). Such values must be smaller than the XY width (see XY-ramp).

The *stimulations settings* work without rotations or with only ISOMED 1, when this is tick in the "equipment options" (Two rotations are in "baustelle" ☺). It works with stimulation without any rotations, or stimulations before, during or rather after one rotation.

Remember, *the stimulation lasts a tick and then there is a delta t as long as the stimulation time (-1 tick).*

All these values are sent to the sequencer to match your request and create the condition you desire and to sync everything.

The "*stimulation settings to stimulate at a specific value*" is currently in development. It works so far however is not perfectly implement with XY width and snippet because a double loop dual condition in assembly is quite hard to make. In a nutshell, everytime you change the value and/or the channel to use, the sequencer is opened as a text file in the background, a function looks for specific "CHAN" position and change the value with the one corresponding to the selected channels. While the value

to check is converted back to 16bit integer (+32767 to -32768) with a threshold of +-7bits, and pass as a variable to the sequencer. The pulse lasts 1ms!

Settings for ramps with up to eight points

Select feedback channel	1 Torque (Waveform)
Select X-feedback channel (None = time)	None
Select Snippet time	15
Select allowed offset	0.1
Select what to do	Ramp 1

Simple Ramp

X-Value 1	0
Y-Value 1 ----- ----- ----- ----- ----- -----	0
X-Value 2	3
Y-Value 2 ----- ----- ----- ----- ----- -----	0
X-Value 3	5
Y-Value 3 ----- ----- ----- ----- ----- -----	1
X-Value 4	8
Y-Value 4 ----- ----- ----- ----- ----- -----	1
X-Value 5	10
Y-Value 5 ----- ----- ----- ----- ----- -----	0.7
X-Value 6	12
Y-Value 6 ----- ----- ----- ----- ----- -----	0.5
X-Value 7	15
Y-Value 7 ----- ----- ----- ----- ----- -----	0
X-Value 8	17
Y-Value 8 ----- ----- ----- ----- ----- -----	0

Optional

Offset for RMS	0
Factor	1
X value Vert line 1	0
X value Vert line 2	0

☐ GAME-MODE --> (tick in case of multiple XY-cycles)

[Cancel]   [OK]

For example, 0.1 = ±10%

XY-Ramp

In the XY-ramp you can create a "plot" of the ideal ramp your participant must follow. Starting from the top we have:

• **Select feedback channel →** you can select which channel Spike2 is gonna plot in the XY view. It can be torque, angle, EMG, whatever…depends on the sampling configuration you create. You can also plot a virtual channel! This is the Y feedback channel

• **Select X-feedback channel (None = time) →** you can select a channel also for the X value. So, if you want to do a centre of pressure feedback, you can have X and Y forces. However, if you want to simply plot a channel over time, leave it to "None".

• **Select Snippet time →** how long you want the view and the data be plotted? IMPORTANT! Your repetitive contractions (*set in the RepXY / Seq Config*) are based on this value as well as when you save the file after you click "Snippet". So, if put Snippet-time = 8s the output mat file (and the time you see the channel plotted in the xy-view, unless you have also a X channel selected) will end after 8s!

• **Select allowed offset →** how much is your tolerance error? So how large is the "space" between the two black lines drawn.

• **Select what to do →** select a ramp or a trace as follow

  o **Ramp 1 and Ramp 2:** they work in the same way. You adjust the Timepoints and the Values in the "Simple Ramp Box" below.

  o **Import Array**: a pop-up window appears and asks you to select a txt file. In the txt file you can put the time value (first column) and the y value (second column) of a custom trace. So, in case you want to plot some non-linear or "special" traces. The txt file can be created easily in any program languages or even on notepad. Check "EXAMPLE_create_txt_ramp.m" for matlab (or .py for python).

  o **MVC:** in the "MVC opts button" you can set the max and min value manually or if you tick "Check Min and Max", after you click snippet and the participant performs a contraction, it automatically calculates the min and the max of the selected feedback channel. Then it plots automatically horizontal lines according to the offset you set in the min and the max.

  o **Hand draw:** plot the hand draw trace drawn in the playwave view. For more details see **DRAW TRACE**.

• **Simple Ramp:** here you insert manually the values for the Timepoints and the relative values. It's up to 8 points!

- **Offset for RMS:** delay of biofeedbackchannel, usually used when moving average filters are applied (e.g., RMS). It's a real number and the value in second.
- **Factor**: a simple percentage factor multiplies to the Y values, so 1 = 100%, if you want to keep the values of the ramp but simply scale to 90%, set factor to 0.9.
- **X value Vert line (1 and 2):** here you can draw two vertical dashed lines at two specific time points in the XY view. It's particularly useful for giving a visual-live-feedback to the subject on when start contracting or relaxing or maybe when something is triggered (you can also create a fake condition for the subject when the stimulation is sent for example even though is not true).
- **Game-mode**: if you tick this, when you click snippet the X range is dynamic and moves. It's really good to help the participant to follow the trace/ramp at his best. It's mandatory to tick in case of multiple repetition of the XY ramp!

MVC Opts
See XY-ramp → Select Ramp → MVC

Analysis Options
You can basically select which type of analysis you want to perform between the cursors after Snippet and the X range * number of contractions is concluded.

Equipment Options
The "equipment options" is the most important part because based on this, the instructions sent to the sequencer changes! In order from the top:

- **Save snippet** → export **all raw data from NON virtual channels** in a mat file (v7.3) since when you click snippet to X range * Repetition of XY width + 1 second. It must be ticked otherwise no instruction is found. If you don't wanna save it, just press cancel afterwards;)
- **Ultrasound** → trigger the ultrasound with a square wave duty cycle @ 100Hz as long as to X range * Repetition of XY width. However, when "Stimulation" is tick, the ultrasound is triggered by my C# prompt app which use/open a terminal. So, you need that exe file (EchoWaveCMD.exe) to automatically trigger the US via Spike2. The US sync option must not be de-activated as Echowave is automatically triggered by the software. The saving is not affected! Important: Check the delay, as a cmd prompt up, there is a slightly bigger delay than a sec (about 1.8ish). Just check you do not create conditions where the Echowave starts recording too late relative to your conditions. For example: you start stimulating after 0.5s and Echowave starts recording after 1.2s…you lost 0.7s of information that is not baseline. You can adjust the delay by increase "Yield(1)" at line 700.

BE sure that at line 203 and 703, the path to EchoWaveCMD.exe is correct, otherwise it won't control Echowave and the telemed US system.

```
180 ┌ Func Idle%()
181 │      View(mainVH%);      'select main view so that maxtime can be read in the following if-condition
182 ├      if MaxTime() < startramp + allXY% and mainVH% > 0 then      'startramp is the maximum time at ramp initialis
183 │          relativetime := MaxTime() - startramp;
184 │          lastdata := ChanValue(fdbkdata%, MaxTime()-fdbkoffset);
185 │          resetT := relativetime -(n%-1)*xywidth;
186 │          View(xyVH%);
187 ├          if xyVH% > 0 then
188 │            if (game_mode% = 1) then XRange(resetT -1, resetT +2); endif'Moving win in XY for following trace or
189 │            XYAddData(fdbckCH%, resetT, lastdata);
190 │          endif;  'draw the x value as relative time to be able to have static ramps
191 ├          if ((relativetime/xywidth) >= n%) then 'if repetitive, re-Send the sequencer instruct'
192 │            'SetUp_VarSeq%(); 'Send values to Sequencer for the new cycle TO CHECK IF KEEPS THE VALUES!
193 │            SampleKey(samplekey$);      'use sequencer based on sample key defined in SetEquipment%()
194 │            View(xyVH%); XYDelete(fdbckCH%); 'Solution to remove data form xy view'
195 │            n% := n% + 1; 'Potentially delete old point in the XY if becomes too slow'
196 │          endif
197 │            return 1;
198 │      endif;
199 │
200 ├      if idlesave% = 1 and MaxTime() > (startramp + allXY%) then 'i need idle save other wise it will always ent
201 │        FrontView(mainVH%); 'set mainVH just to be sure to be in the time view'
202 ├        if samplekey$ = "M" or samplekey$ = "N" then
203 │            ProgRun("C:/Users/Messung/Desktop/EchoWaveCMD.exe Freeze");      'Set the path of where you put the E>
204 │        endif
205 │        CursorNew(MaxTime(),2);      ' cursor2 at max time
206 │        Cursor(2, MaxTime()); CursorVisible(3);
207 │
208 │        Yield(1);
209 │        ExportChanList(1);      'initialise the channel list
210 │        ExportChanList(Cursor(0), Cursor(0)+ (allXY%+2), -1); 'save from the time snippet was clicked to the ler
211 │        WriteFileName%(); 'Func to save and also send the potential cmd to US exe app to save with same name
212 │        idlesave% := 0;
213 │        quickAnalysis%(which%); 'call the function to analyse between cursor 2 and 3 based on selection selectec
214 │      endif
215 │
216 ├      if idlecramp% = 1 and MaxTime() > startramp + xywidth then
217 │          ChanData(fdbkdata%, r3y[][sc%], Cursor(0)+1, Cursor(0)+xywidth);
218 │          idlecramp% := 0;
```

```
678        'FUNCTION TO TRIGGER EQUIPMENT, START BIOFEEDBACK AND SAVE SHORT SNIPPETS**********
679 ┌ Func Snippet%()
680 │
681 ├      if (samplekey$ = "n") then
682 │          Message("No equipment option selected");
683 │
684 │      else
685 │          allXY% := xywidth * repXYcycle%; 'calculate overall XY duration'
686 │          'prepare a cursor from which on the snippet can be saved
687 │          View(mainVH%);
688 │          n% := 1; 'reset number of contractions/XY performed'
689 │
690 │          Cursor(0, MaxTime());
691 │          CursorVisible(0,1);
692 │          CursorActive(0,14, 31, 0, "", "", 1);   'Data points --> keyboard. Make cursor 0 active to search keybo
693 │          'easy to navigate everytime you snippet'
694 │
695 │          'Pass values to vars to the sequencer'
696 │          SetUp_VarSeq%(); 'Firt snippet Send Vars to sequencer'
697 │
698 │          'you can't rely on the timing of the cursor positions for post-analysis, therefore save an extra secono
699 │          'such that you can always refer to your event timestamp or TTL channels as common signal
700 │          Yield(1);
701 │
702 ├          if samplekey$ = "M" or samplekey$ = "N" then'whatever instruction requires the sequecer to stimulate sp
703 │            ProgRun("C:/Users/Messung/Desktop/EchoWaveCMD.exe Run");      'Set the path of where you put the EXE fi
704 │          endif
705 │
706 │          CursorNew(MaxTime(),1);      'set the cursor1 already in the main view
707 │          Cursor(1,MaxTime());
708 │          GetXYData%();   'sets startramp variable to current time so that biofeedback can be given
709 │          SampleKey(samplekey$);   'use sequencer based on sample key defined in SetEquipment%()
710 │          if savetrue% = 1 then idlesave% := 1; endif;   'idle function checks for state of idlesave% variable
711 │          if storecramp% = 1 then idlecramp% :=1; endif;      'idle function checks for state of idlecramp% variab
712 │      endif
713 │      return 1;
714 │
715 │ end;
716 │
```

- **Isomed 1 Rot** → trigger only one rotation at the time point set in the Rep XY/ Seq Config

- **Isomed 2 Rot** → trigger second isomed rotation at the time point set in the Rep XY/Seq Config. If *you need super fast rotations cycle (<0.01s), please untick Ultrasound and trigger the US manually or you can set to use the console App like at line 707 "ProgRun("C:/Users/Messung/Desktop/EchoWaveCMD.exe Run");" to start the recording and " ProgRun("C:/Users/Messung/Desktop/EchoWaveCMD.exe Stop)"; to stop the running. Keep it in mind, it takes about ~1.2s ish between sending the command and the actual execution of it in echowave. You can also hard code it in case or use DAC1 for triggering the US.*

- **Short Tap** → Not used right now (it was used for the tendon tapper).

- **DAC 1 TTL (to triggering any external system)** → basically a 3V TTL from DAC1. It is always on as I used it in all configuration independently whether people will you use it or not. It didn't make sense to create tons of sequencer instructions when in the end is a simple TTL taking a simple tick

INFO: DAC1 raises up to 3V 10us before the Ultrasound system is triggered (so it's sync unsless you need to control nuclear reactions). And DAC1 falls down to 0V 10us <u>after</u> the ultrasound system stop being triggered. So, unless you are recording at 100kHz you won't see such difference. For more info check the sequencer file.

IMPORTANT! If you tick a combination that does not exist as command for the sequencer it returns the following message: *<u>"No sequencer instruction found".</u>* So, no instruction will be sent to the sequencer, and nothing will be triggered/sync, but you can still click snippet. If you want for example to trigger specific conditions that the Script returns "No sequencer instruction found", that's because I created just some instructions that triggers more devices together, so you should also tick the other devices, even if you are not going to use them. Nothing bad happens, it's just sending a signal to nothing :)! If you need a specific combination that does not exist, you have to create it in the sequencer!

<u>To give an idea how to integrate a new sequencer instruction into the script</u>: you select the equipment options and based on the selections, a <u>letter</u> (corresponding to the sequencer one) is assign to a variable (SampleKey). Following, once you click snippet the variables for the sequencer (SetSequencerVar function) are adjusted according to the values set in the script in live (REP XY/seq config) and the sequencer sample key is sent!

Snippet
Snippet is the final step, it will set a cursor 0 at the moment you click, and after 1s it sends the corresponding sample key based on the equipment options you selected and it will start display the visual feedback into the X-Y ramp. One second after the end of the xy ramp (and by N cycles, so as many reps as you do of the XY ramp), a second and third cursor (1 and 2) are displayed, and the saving GUI appears.

Stop Snippet
If you want to stop the snippet at any time, perhaps because you are performing long, repeated contractions that are causing fatigue and you wish to stop at a specific, unknown point, you can click "Stop Snippet." This action will immediately halt the snippet execution, set all DAC outputs to 0, and set the Digital output to 0 (except for the bits that control the isomed rotation).

TAP DAC 1
Quick tap sends a 1ms pulse square wave via DAC 1, it's useful for long lasting tasks that you don't know how long a snippet will be, so you can export afterwards based on the pulse(s) you send for identifying the start and stop.

Un/Freeze US (NOT ACTIVE AT THE MOMENT BUT IN THE CODE)
If you want to control Echowave II interface via Spike2 but without using a specific duty cycle square wave. This sends a command via the C# prompt cmd app to freeze/unfreeze Echowave. <u>Be sure you check and adjust the path to the exe at line 978</u>.

```
976      'BUTTON TO SEND FREEZE/UNFREEZE via CMD to EHCOWAVE***********************************************
977   ☐ Func TapUS%()
978          ProgRun("C:/Users/Messung/Desktop/EchoWaveCMD.exe Tap");
979          return 1;
980   end
981    '
```

Start US

If you have put the TELEMED ultrasound system in sync mode (ultrasound frame line), you cannot control it fully by EchoWave II. So, in the beginning that maybe you just need to check the US probe orientation and position, you want to be able to see how the image looks like. By clicking start US you are just sending a square wave duty cycle (100Hz, 80/20 duty cycle 3V amplitude), so it will start showing images. By clicking again, you will stop it. <u>Important</u>: if you start it and then you click "move isomed", the sequencer in background will stop sending any signal to the US. Remember to reset the frames count in EchoWave II before starting the data collection!

Move Isomed

Just switch bit 2 and 3 (rear panel) to trigger the Isomed rotation. If you click this button while some instructions in the sequencer are still running, it will quit immediately those instructions and then switch the bits. It's a simple TTL for closing/opening a circuit with two relays (check schematics in the repo).

Stop sampling

Spike2 will stop sampling but the script is still on going. Further, a sample key ("Q") will be sent to the sequencer to set to zero (or low) all outputs.

Save everything

When you are happy and you have finished collecting all the data and after clicking "Stop sampling", "Save Everything" will be active. By clicking a pop-up window will appear and you can save the entire recording into a single Spike2 file. So, in case you missed something, you can always open the file in a second moment and double check it or re-export what you need. **I strongly recommend that you save the entire recording following the session.**

Quit

Exit the script. It will be active only after you click "stop sampling". To stop the script execution click on the button "Quit". The bar on the top of Spike2 should disappear (see following figure). Now you can close Spike2, then turn off the 1401, the computer (and any devices you were using).
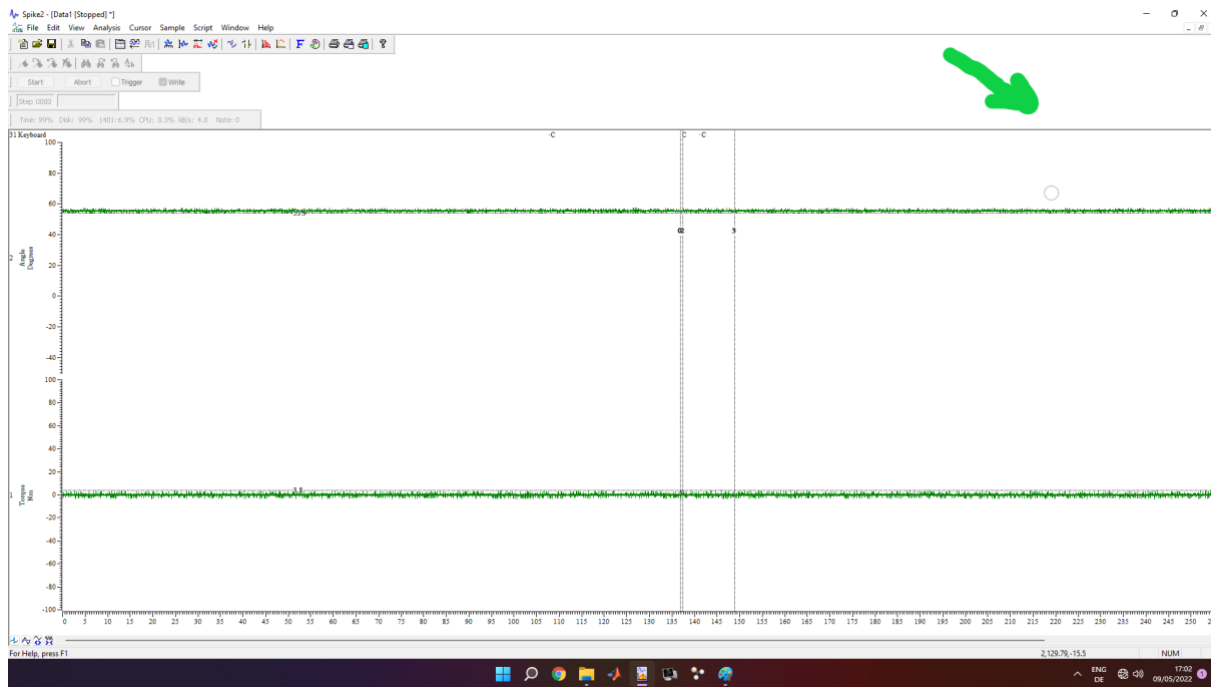
FOR ANY REASONS, DO NOT EVER EVER PRESS "ESC" ON THE KEYBOARD!!!! IT STOPS THE SCRIPT FROM RUNNING BUT NOT THE LIVE RECORDING OF SPIKE. IN THAT CASE, YOU NEED TO DO AN "ABORT" RECORDING IN SPIKE.

Written by Paolo Tecchio   *7th May 2025*