

TUTORIAL N° 4

BECKER & HICKL TUTORIAL



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This guide will take you through the steps of setting up your PIEZOCONCEPT device with photon counting module from Becker & Hickl. The interfacing with Picoquant device is pretty much the same.

A. Hardware setting

At the back of the controller, you have 4 TTL outputs, numbered from 1 to 4. The Becker and Hickl device requires at least 2 (eventually 3) TTL connection: One TTL for the pixel clock, One TTL for the line clock and eventually One TTL for the image clock.

In term of hardware, we can state the following simple rule (but you may define different rules of course) :

- The TTL 1 output of the PIEZOCONCEPT controller will be in charge of the Pixel Clock
- The TTL 2 output of the PIEZOCONCEPT controller will be in charge of the Line Clock
- The TTL 3 output of the PIEZOCONCEPT controller will be in charge of the Image Clock.

As a consequence, the TTL output of the PIEZOCONCEPT controller should be connected accordingly to the Becker and Hickl controller by using 3 BNC cables (not provided).

B. Programming

For sending the TTL, you have the choice between different softwares : Termite, Labview, Micromanager...

a. Programming with Termite

Termite is a very simple Hyperterminal program to use (See Tutorial N°1 for more information).

Let's imagine that you would like to realize a 100X100 pixels scan with X between 0 and 30 μ m and Y between 0 and 30 μ m.

The command to be sent are the following ones (in blue) :

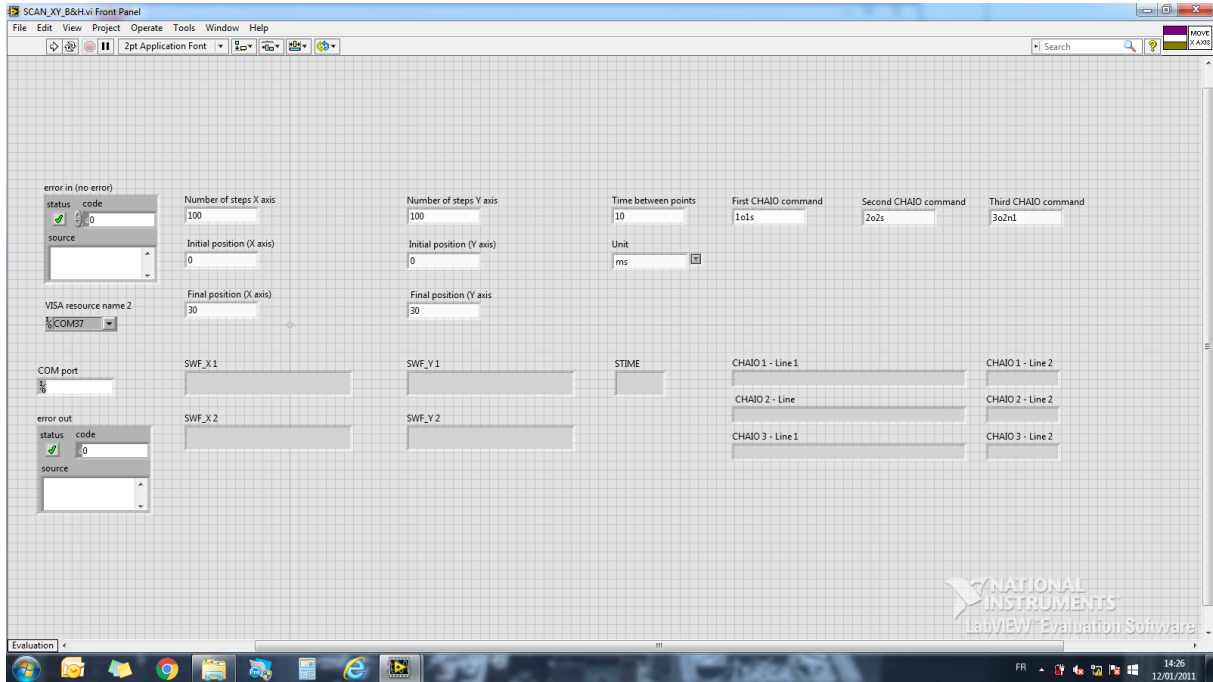
```
SWF_X 100 0u 30u (that means : I set a waveform with 100 points in X between 0 and 30 $\mu$ m)
NumPoints: 100, Start: 0.0, End: 19660.0
Ok
```

SWF_Y 100 0u 30u (that means : I set a waveform with 100 points in Y between 0 and 30µm)
NumPoints: 100, Start: 0.0, End: 19660.0
Ok
STIME 10m (that means : I would like the time between points to be 10ms)
Ok
CHAIO 1o1s (that means : I set up TTL pulse from port 1 for axis 1 at start of motion)
TTL1 output
set up TTL pulse from port 1 for axis 1 at start of motion
Ok
CHAIO 2o2s (that means : I set up TTL pulse from port 2 for axis 2 at start of motion)
set up TTL pulse from port 2 for axis 2 at start of motion
Ok
CHAIO 3o2n1 I set up TTL pulse from port 3 for axis 2 on step number 1 (which is start of the image)
set up TTL pulse from port 3 for axis 2 on step number 1
Ok
RUNWF (that means : I run the waveform)
Ok
100.00
100.00
0.00
Scan completed

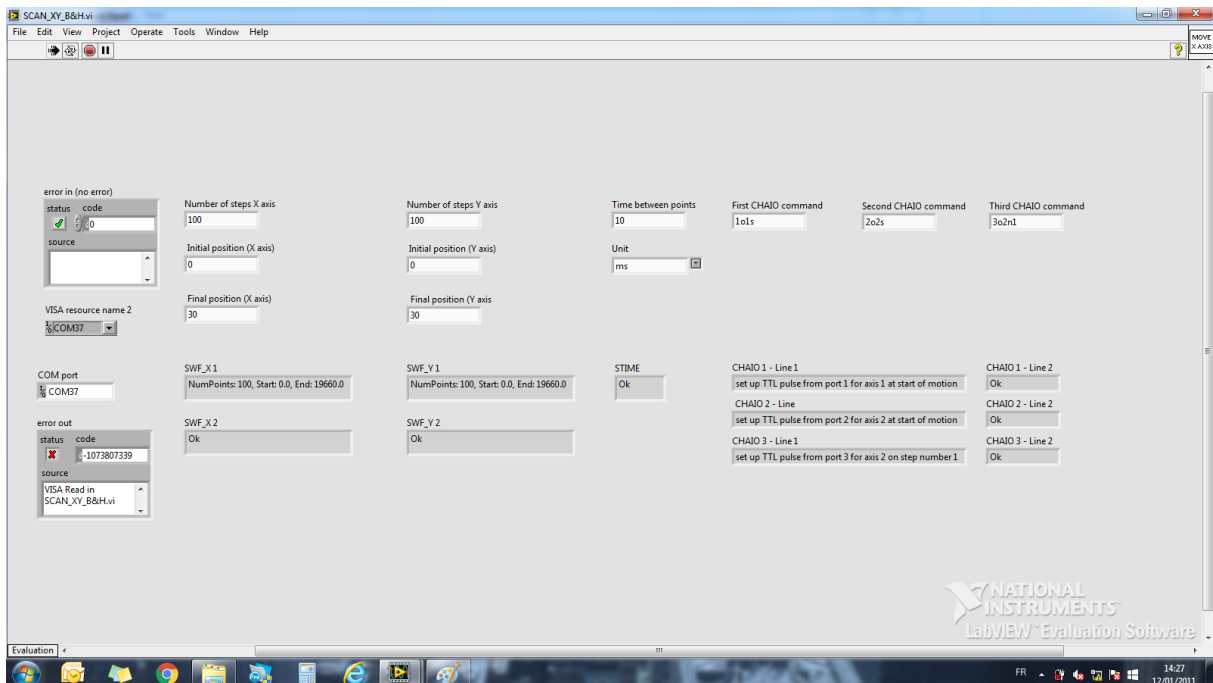
The XY scan will be done only once.

b. Programming with Labview

- 1°) The first thing to do is to run the initialization.vi. You can run it automatically (if you don't know the COM port to be used) or eventually manually (but you need the COM port used by the controller)
- 2°) Then run the VI called Scan XY B&H : the window below will appear
- 3°) Select the good COM port (the one you got with initialization.vi)
- 4°) Enter the appropriate scanning parameter (see the screenshot) and CHAIO command



If you press the RUN button, all the commands will be sent, the buffer will be read. The scan will start and the TTL will be sent when they need to be. Please note that in that case, the XY scan will be done only once.



If you press the “RUN CONTINUOUSLY” button, the XY scan will be done again and again until you press the “STOP” button.

It is easy to do a XYZ scanning by using the same principle

Synchronizing the movement of PIEZOCONCEPT piezostage with the TCSPC device from Picoquant : the hardware from Picoquant needs TTL at the start of each line (sent for example on TTL1), at the end of each lines (sent for example on TTL2), , and at the beginning of each image (sent for example on TTL3) .

The CHAIO command to be sent are consequently the following ones :

- First CHAIO command : CHAIO 1o2s (set up TTL pulse from port 1 for axis 2 at start of motion)
- Second CHAIO command: CHAIO 2o2e (set up TTL pulse from port 2 for axis 2 at end of motion)
- Third CHAIO command: CHAIO 3o2n1 (set up TTL pulse from port 3 for axis 2 at start of position N°1 : Indeed, the beginning of the first line is also the beginning of the image !)