Pulse Picker Spindle Alignment Procedure

The pulse picker spindle comes pre-aligned out of the box. Should you wish to re-align the spindle to the beam path (essentially, computing an adjustment to the current **Mo** calibration), you will need to follow these steps:

1. If the picker is not already aligned in X and Y, perform that alignment first.
2. If the expert panel is not already open, open it using the **CNTRL** button on the simple GUI (Figure 2).
3. Home the spindle using the pulse picker interface (Figure 1). The spindle is now in the positive closed position.
4. Ensure that you have a way of shining light through the picker, and a way of detecting it.
5. Now, start to nudge the picker spindle in the negative direction by entering into the **Move Relative** box, followed by <Enter>:

   ```
   -5
   ```

   In this command, -5 is the number of steps to move from the current position. You can enter any number of steps for this command (1600 steps = 1 rotation, 0.225deg/step).
   The objective in this step is to move the spindle to the point where light *just* starts to shine through. You can move in finer steps, and in the positive direction, to fine-tune this point. Once the spindle is there, record the current position in motor steps, which is on the expert interface as **Motor Steps (C1)** (click the green number to refresh it; it does not automatically refresh). Let this number be A.
6. Now, continue to nudge the pulse picker spindle in the negative direction by issuing in the **Move Relative** box:

   ```
   -5
   ```

   until the spindle interrupts the light. Nudge it in the positive direction by single steps (enter 1 in the box) until you *just* see light again. Record the current motor position **C1**, and call this number B.
7. Compute the average of A and B, and call that number C.
8. Compute a *new* **Magic Motor Offset (Mo)** by taking the existing motor offset **Mo** (from the GUI, click to refresh) and *subtracting* C from it. For example, if the current **Mo** is -250, and C is 5, then the new **Mo** = -250 - 5 = -255.
9. Enter the new **Mo** value into the box directly adjacent to the **Mo** readback, and press <Enter> to send that new value to the motor.
10. Press the **SAVE** button in the upper left of the GUI to save all parameters.
11. Repeat steps 3 through 6 to ensure that the spindle is now centered (A and B should be almost the same). If not yet centered, repeat steps 7 through 10, and re-check.

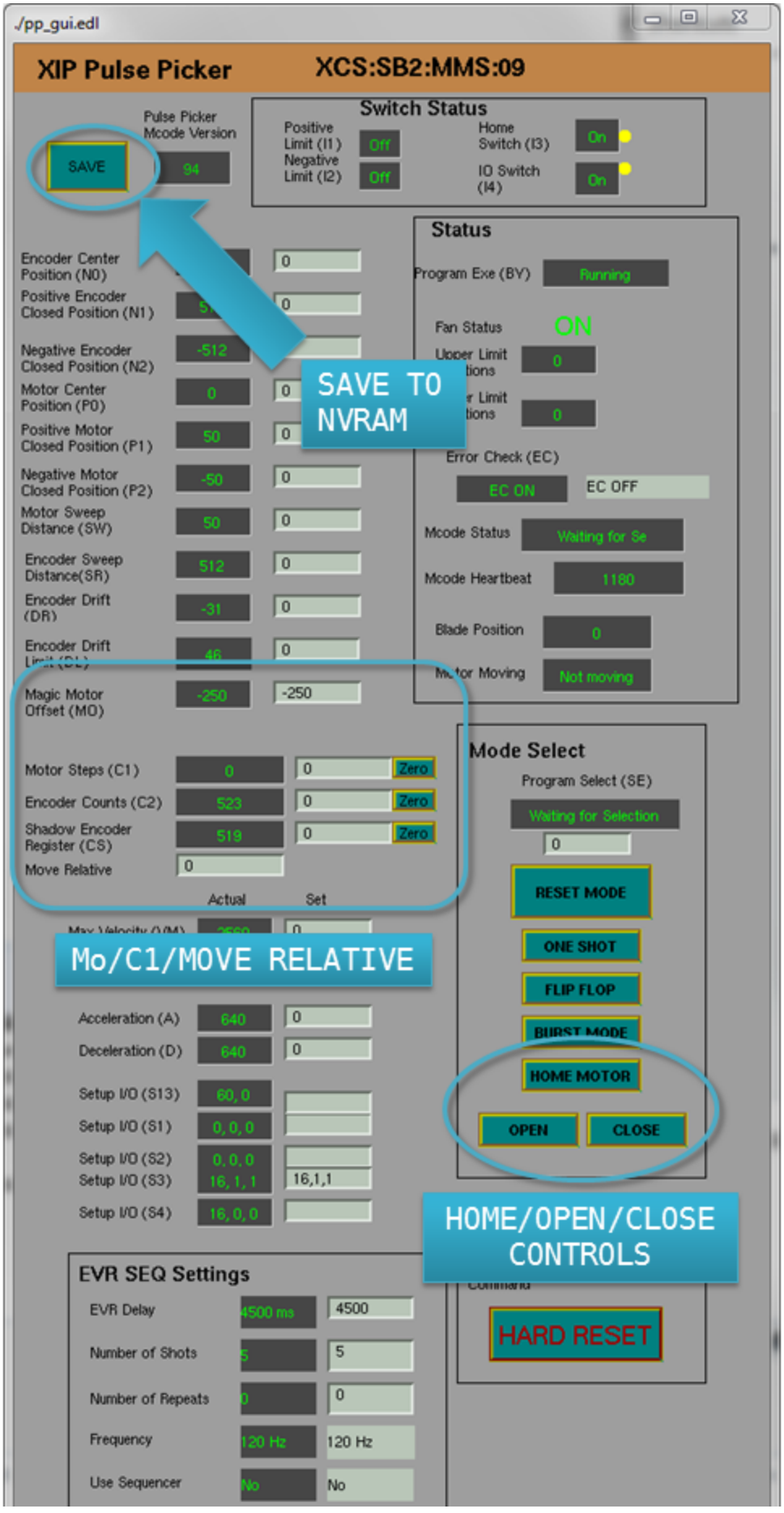
./pp_gui.edl
XIP Pulse Picker
XCS:SB2:MMS:09
Pulse Picker Mcode Version
SAVE
94
Switch Status
Positive Limit (I1)
Off
Negative Limit (I2)
Off
Home Switch (I3)
On
IO Switch (I4)
On
Status
Program Exe (BY)
Running
Fan Status
ON
Error Check (EC)
EC ON
EC OFF
Mcode Status
Waiting for Se
Mcode Heartbeat
1180
Blade Position
0
Not moving
SAVE TO NVRAM
Encoder Center Position (N0)
Positive Encoder Closed Position (N1)
Negative Encoder Closed Position (N2)
-512
Motor Center Position (P0)
0
Positive Motor Closed Position (P1)
50
Negative Motor Closed Position (P2)
-50
Motor Sweep Distance (SW)
50
Encoder Sweep Distance(SR)
512
Encoder Drift (DR)
-31
Encoder Drift
46
Magic Motor Offset (MO)
-250
-250
Motor Steps (C1)
0
Zero
Encoder Counts (C2)
523
Zero
Shadow Encoder Register (CS)
519
Zero
Move Relative
0
Actual
Set
Mo/C1/MOVE RELATIVE
Mode Select
Program Select (SE)
Waiting for Selection
RESET MODE
ONE SHOT
FLIP FLOP
BURST MODE
HOME MOTOR
OPEN
CLOSE
Acceleration (A)
640
Deceleration (D)
640
Setup I/O (S13)
60, 0
Setup I/O (S1)
0, 0, 0
Setup I/O (S2)
0, 0, 0
Setup I/O (S3)
16, 1, 1
16,1,1
Setup I/O (S4)
16, 0, 0
HOME/OPEN/CLOSE CONTROLS
EVR SEQ Settings
EVR Delay
4500 ms
4500
Number of Shots
5
5
Number of Repeats
0
0
Frequency
120 Hz
120 Hz
Use Sequencer
No
No
HARD RESET

Figure 1: Pulse picker expert GUI, showing locations of controls necessary for alignment.

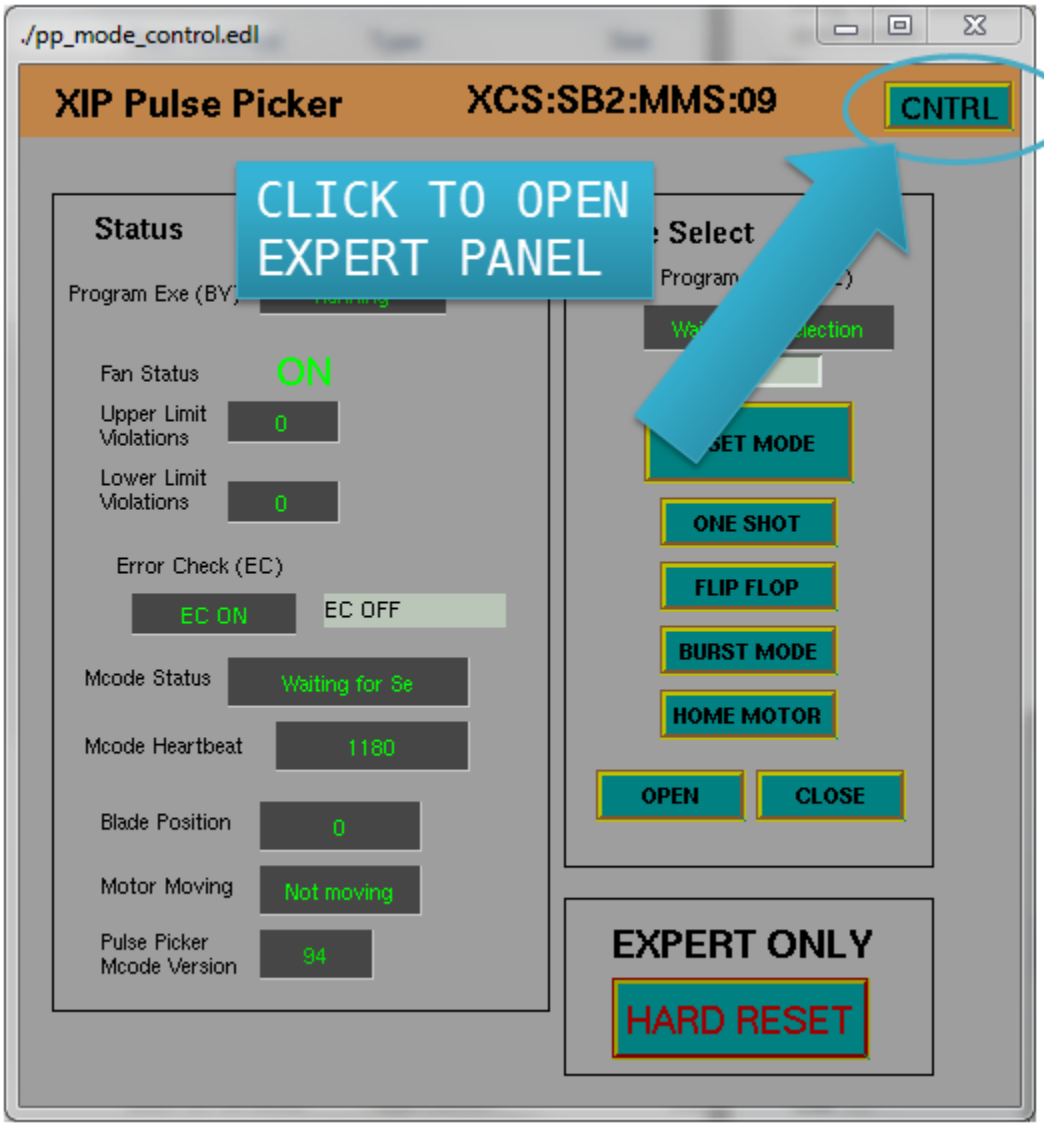

Figure 2: Pulse picker mode select GUI, showing location of CNTRL button to get to expert GUI in Figure 1.