HOMS XRT Hotfixes for Run 17

Intro

Coming back from the summer shutdown, the XRT HOMS had a couple of issues.

1. Pitch piezos weren't activating properly.
2. Gantry differences appeared on M3H and M1H.
3. Some EPICS PVs were still missing

Fixes and Notes

Piezos weren't working

Deadbands

This is an outstanding HOMS issue. Deadbands govern when the pitch state machine transitions from stepper to piezo. These deadbands are adjustable from EPICS. Their values are reset to zero following a power-cycle of the PLC.

The values have to be restored manually at this point. I wrote a little script and squirreled it away in the iocBoot directory for the xrt-homs IOC.

M1H Stepper Tuning

M1H still wasn't behaving. Really strange because it looked good earlier this summer. I modified the pitch control block to be more specific when logging an error in the coarse move step. Uncovered that SmoothMover was throwing an error, 0x4B07, or move timeout. It seemed the drive deadband was too large, so it was giving up before NC was happy. I can't change that deadband easily (need to connect directly to the drive), so I opted to widen the Target and Position values in the NC to avoid the error for now. Now the absolute move blocks in SmoothMover don't throw errors so the transition to the piezo succeeds.

I am still quite puzzled by why this cropped up now...

We'll have to tighten the drive deadband at some point. They can get to about a urad accuracy.

Gantry differences

After the power-outage, the system came back, but the drives had errors. When the drives have errors they are not allowed to have any power. Until the errors are clear the system may relax mechanically, leading to small gantry differences.

I could automate this recovery a bit and try a few times to clear errors and recouple. Maybe in another life. M1H had acquired a nice 0.3mm of gantry difference with the power off. Fixing this is simple, I use our DECOUPLE PV backdoor, reduce the gantry difference by hand, and recouple. **dusts off hands**

I decided it would be worth 10 minutes to accumulate some archiver links, and put them into the HOMS Engineering and Ops Notes page. This makes it easy for us to assess the history of the system.

Missing EPICS PVs

I noticed that M3H gantry difference wasn't present in the archiver and purple on the screen. No good. Checking the st.cmd the culprit turned out to be a failing modbus port setup. Float ports can only handle 125 words, so the PVs trying to access the M3H gantry values were denied because those values were available at addresses > 125...

The fix is to just open another Float port (float port 2), change the PV address offsets, and go on living your life.