# Upgrading OS on Hall D Solenoid PXIe Controller

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**Upgrading a Hall D Solenoid PXIe Controller to NI Linux Real-Time**

The Hall D solenoid uses a PXI setup as the basis for the fast data acquisition of various sensors/signals from the magnet: voltage taps, current, knock sensors for quench detection. The setup consists of a PXIe chassis (PXIe-1078), controller (varies: PXIe-8135 [production] or PXIe-8840 Quad-Core [spare]) and eight ADC modules (PXIe-4300). Due to the default operating system (OS) on the PXIe-8135 running Phar Lap going end of life  it will eventually be required to migrate to a different OS, in this case NI Linux Real-Time.

Initial evaluations were done in 2020 however it was found not all of the toolkits/modules uses by the project: NI Real-Time (for the EPICS Server), EtherNet/IP (to communicate with the PLC), DAQmx (to aquire data from the ADCs) and NI-Sync (for IEEE-1588 PTP support to keep PLC and PXI timestamps in sync) were available. With the recent release of LabVIEW 2022 Q3 another evaluation was performed. After all the needed software was installed, done with individual offline installers, the first issue encountered was that the volume license server only supported up to version 2021 so while LabVIEW itself would open the needed modules weren't being loaded. After a license upgrade on the server all needed software and add-ons were licensed and available.

The install process for getting the base NI software installed is slightly different with NI Linux Real-Time, requiring the use of a USB hard drive to install the base OS whereas previous versions could be completely done through NI-MAX. Once the base OS is installed the rest of the software installation process is similar to the previous versions in NI-MAX. This was done with the spare PXIe controller as it is the only one that supports Linux Real-Time as an alternative OS.

- **All needed additional software LabVIEW add-on modules and toolkits are available in 2022 Q3**
- **Main project has been updated with no errors**
- **Final evaluation will be done once current experimental run is completed**

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With the base OS and needed software installed on the controller and the base LabVIEW and needed add-ons installed on the local computer the existing project was mass compiled to 2022 and opened. In the beginning of the evaluation process when there were either license or missing software the main VI program when opened would show up as having errors and a broken run icon. Once all issues were addressed the run icon is now properly shown and no errors are present.

The final round of evaluations will be done once the current experimental run is complete as there is not a full set of spares of ADC cards and the code will attempt to communicate with all modules and as such can only be completed with the hardware in the end station. However, the current results seem promising as all needed software, mainly the extra LabVIEW toolkits and modules needed by the project, is now available in 2022 Q3.