

## Development of LabVIEW EPICS Server for Testing Hall C CSS-BOY Magnets Screens

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The Detector Support Group (DSG) is developing Control System Studio-Best OPI Yet (CSS-BOY) screens based on the Hall C Human Machine Interface (HMI) screens, which are used to control and monitor the magnets of the High Momentum Spectrometer (HMS) and Super High Momentum Spectrometer (SHMS). This note details the motivation for and implementation of this server.

DSG is developing CSS-BOY screens for the controls and monitoring systems of the HMS and SHMS magnets. These screens standardize the EPICS framework for the controls and monitoring systems of all the experimental halls, providing a clear and consistent EPICS-framework-based user interface similar to that used in Halls B and D [1]. This allows DSG to use their EPICS expertise to better support the halls. To facilitate testing the logic/rules of these screens, DSG has developed an EPICS Server using LabVIEW.

Once a CSS-BOY screen has been created, the associated EPICS process variables (PVs) are used to test the logic and functionality of the screen. LabVIEW is used to create an EPICS Server for the CSS-BOY screen, which is the EPICS Client. A virtual folder is created to hold server libraries that contain the PLC/HMI tags, one library for each CSS-BOY screen, Fig. 1. These PLC/HMI tags are called variables once they are entered into the LabVIEW server library.

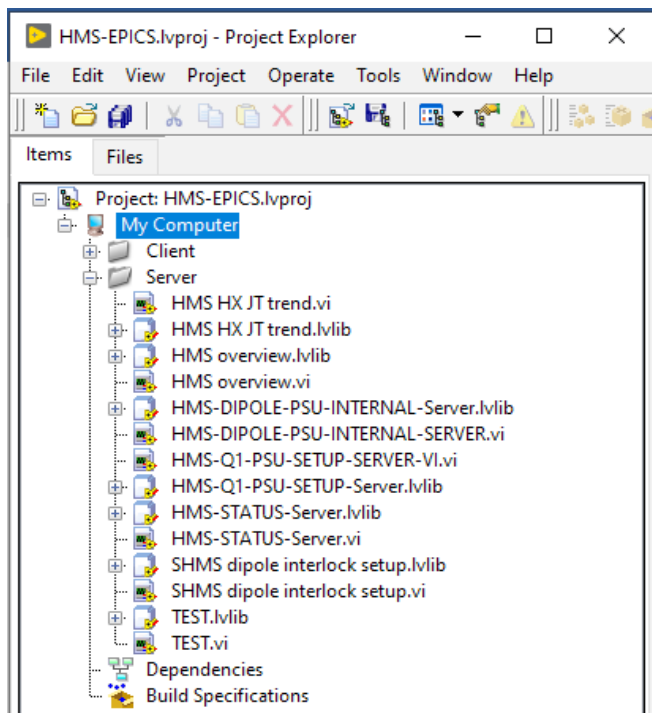


FIG. 1. Contents of the Server Virtual Folder in LabVIEW. The folder contains the server libraries and EPICS server VIs.

A LabVIEW EPICS I/O Server is created, the variables are added to the server, and once added, these variables become LabVIEW EPICS process variables (PVs).

In the same folder as the library, a LabVIEW EPICS Server VI is created using these LabVIEW EPICS PVs. When running, the VI sends values to the EPICS Client, or reads back values that are input to the EPICS Client. The VI, Fig. 2, allows the user to run the CSS-BOY screen with the local LabVIEW PVs, which in turn allows the logic/rules of the screen to be tested to ensure that the screen works correctly.

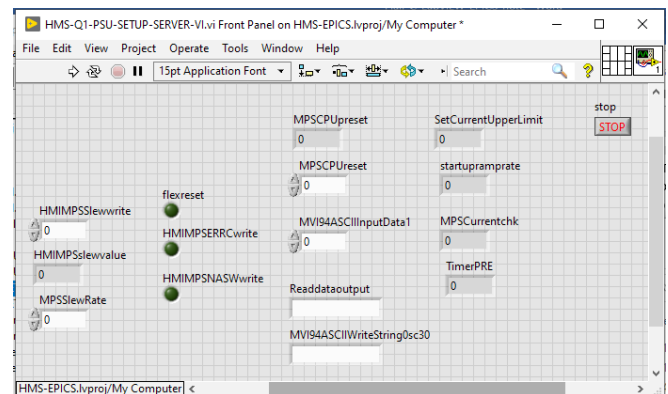


FIG. 2. Front panel for the EPICS Server VI for the Q1 PSU Setup CSS-BOY screen.

The EPICS Server uses local EPICS PVs to ensure that testing efforts do not interfere with ongoing work in the experimental hall. These PVs are broadcast only across the local DSG network to which the machine running the LabVIEW EPICS Server VI is connected. The majority of the PVs needed to test the CSS-BOY magnet screens are only proposed PVs—they do not exist on the Hall C subnet and would need to be created when the screen is to be deployed and activated. There are a few PVs used by the Hall C that are based on the PLC/HMI tags used in the current HMI screens; care has been taken to ensure that this testing process does not interact with the Hall C subnet.

In conclusion, DSG is developing CSS-BOY screens for the HMS and SHMS magnets. DSG has developed a method of testing these screens using a local EPICS Server created using LabVIEW, which allows DSG to test the functionality of the screens without accessing the Hall C subnet.

[1] A. Brown, et al. *Hall C Magnets' Screen Conversion*, DSG Note 2019-40, 2019.