Signal Simulator for Developing and Testing Phoebus Alarm System Software Packages for the Interlocks of the EIC DIRC Quartz Bar Laser Testing Lab

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December 19, 2023

An interlock status signal simulator has been written to provide a source of process variables (PVs) that are required to test the Phoebus software packages developed for the interlocks of the laser system, which is to be implemented for the EIC DIRC quartz bar acceptance tests.

To test the Phoebus alarm system [1] software packages for the laser system interlock, a test setup that monitors the laser system's interlock status signals from the laser lab's PCB [2], a real-time signal source, is being developed [3].

Since the final version of the hardware and the LabVIEW software of the test setup is under development, a signal simulator application has been written for the interlock status signals.

The signal simulator is an EPICS database developed with the EPICS Visual Database Configuration Tool program. The EPICS database of the interlock status signal simulator runs on a softIOC on the same Linux computer being used to develop the Phoebus alarm system software packages, providing the advantage that items outside the blue box of Fig. 1 are not needed for testing the software.

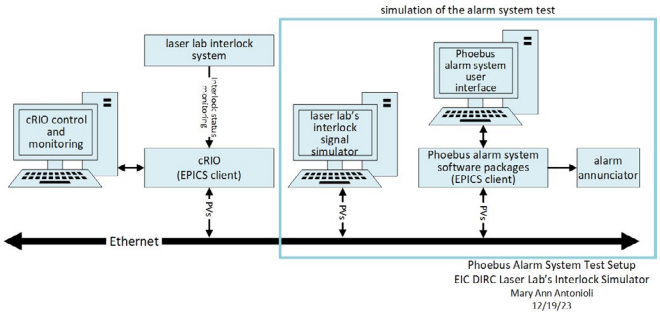

FIG. 1. Schematic of the test setup for the Phoebus software packages with laser lab's interlock simulator.

The interlock status signal simulator database in the softIOC contains EPICS records that generate the user-controllable simulated PVs and the alarm limits for the PVs.

Alarms are generated when the simulated PV values exceed the alarm limits. The Phoebus alarm system is tested by checking whether the software reacts correctly to alarm conditions.

A user interface monitors and controls the interlock signal simulator softIOC. Figure 2 shows the simulated PV value, EPICS alarm limits, and the alarm status of the two simulated PV signals *eic_dirc_intlk_immediate_stat* and *eic_dirc_intlk_latch_stat*. The softIOC simulator can be set to generate a fixed or a random signal value for each of the simulated PVs. The data scan rate, simulated signal range, and minimum value are adjustable via the softIOC controls.

FIG. 2. User interface for EIC DIRC test.

In conclusion, the developed laser system's interlock status signal simulator for the software packages of the Phoebus alarm system is a diagnostic software tool for debugging and testing during the initial alarm system startup and during normal operations.

[1] P. Bonneau, et al. *Development and Implementation of the Phoebus Alarm System Software Packages for the Laser Interlock System*, DSG Note 2023-49, 2023.
[2] T. Lemon, et al., *Design and Features of the EIC-DIRC Laser Lab's Laser Interlock System*, DSG Note 2023-01, 2023.
[3] P. Bonneau, et al. *Development of the CS-Studio Phoebus Alarm System for the EIC-DIRC Laser Interlocks*, DSG Note 2023-43, 2023.