

Development of graphical user interface application for sPHENIX-INTT LV system

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We create a Graphical User Interface (GUI) that allows you to operate the Low Voltage (LV). A control panel based on the Graphic User Interface (GUI) application is under development to operate the LV power for a Read Out Card (ROC), *i.e.*, an electronics to read out from the INtermediate Tracker (INTT) detector. The INTT is one of the three tracking detectors in the sPHENIX experiment, which is scheduled to go live in the spring of 2023. The ROC is a multi-functional circuit board and consists of as many as 3000 surface mount components. Thus ROC requires a couple of different voltages to distribute relevant voltage(s) to each component. There are 13 LV distribution modules assigned to power 8 ROCs. Each module occupies a single VME slot and supplies a preset voltage up to 10 output channels. Thus a single ROC power is provided by the multiple distribution modules with various voltage settings. The LV distribution module can be operated from a remote server (KEPServer¹⁾) and its output voltage and current can be readout from the KEPServer. The GUI has been developed using the commercial application called “Ignition Designer”^{2,3)} which runs on an Ignition Gateway PC. The KEPServer and the Ignition Gateway are linked to the OPC interoperability standard.

Shown in Fig. 1 is the main control panel of the LV control GUI. It is still under development. The panel is designed to be operated in the interactively. Clickable buttons are implemented to turn on/off all powers (11 channels) for ROC-1 at once.

Only first ROC(ROC1) has already been implemented in the image, but the plan is to introduce new buttons for ROC2, ROC3 ... ROC8. The black buttons on the left with numbers from 1 to 11 represents the slot number of the LV distribution module. The table on the right of the panel displays the history of abnormalities. It shows the channel and the time. In

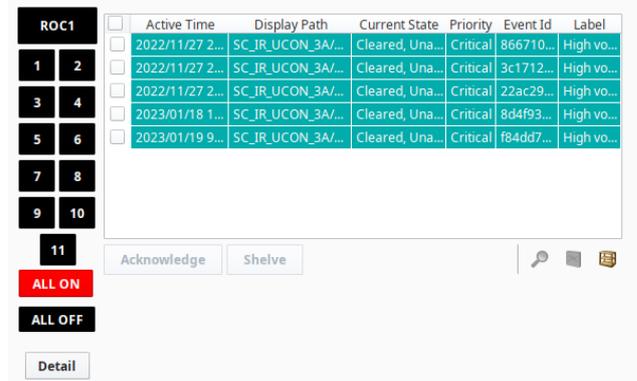


Fig. 1. The main control panel of the INTT LV distribution modules.

order to avoid the main control panel being too busy with too many buttons and voltage/current displays, a “Detail” button is implemented on the bottom left corner of the panel. A new pop-up panel, as shown in Fig. 2, appears on the screen by clicking the Detail button.

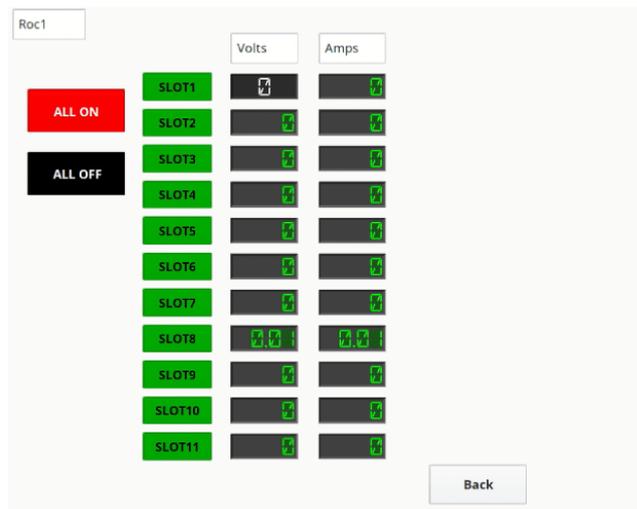


Fig. 2. A new pop-up panel appears by clicking “Detail” button on the main control panel.

This panel displays the latest current and voltage values of each channel of a given ROC. Further development is planned to change the color of buttons to express the power on/off status of each channel following

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the same color coordinate manner of the main control panel. The green rectangles with SLOT number are also implemented to function as interactive buttons, allowing each channel to turn on/off independently. This GUI is still under development, so we would like to create buttons that can control other ROCs and ROC detail screens in the future.

References

- 1) <https://www.kepware.com/en-us/>.
- 2) <https://docs.inductiveautomation.com/display/DOC80/Welcome>.
- 3) <https://docs.inductiveautomation.com/display/DOC80/Standard+Architecture>.