

The LV power system of INTT detector at RHIC

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The sPHENIX experiment is an upgrade project of RHIC's former PHENIX experiment and aims to study quark-gluon plasma.¹⁾ The INTermediate Tracker (INTT) is one of the sub-detectors of sPHENIX. INTT inherits much of the electronics, such as the readout card (ROC) and FPHX chips,²⁾ from the FVTX detector. The power system of INTT includes the high voltage (HV) system, which gives the bias voltage to the silicon sensors, and the low voltage (LV) system, which powers up the FPHX chips and ROC.

The INTT power system is constructed in a power crate (Fig. 1). This power crate is used for ladders test-

ing and for detector operation. On the top of the crate is the MPOD module which can produce 100 V as the high voltage system.

The second top of the crate is the switch distribution board. There are 13 slots for switch distribution board in total. Slots 1–11 from the left-hand side are used to power up the ROCs, and the other two slots are used to give power to the FPHX power supply system.

The third top of the crate is the FPHX power supply system which powers up the FPHX chips. The FPHX power supply system consists of a controlling board and filtering boards. A controlling board is used to give out the command to filtering boards (Fig. 2). There can be up to eight filtering boards in a system. Each filtering board can power up 8 ladders' FPHX chips, which indicates that 64 ladders' FPHX chips can be powered by one power crate.

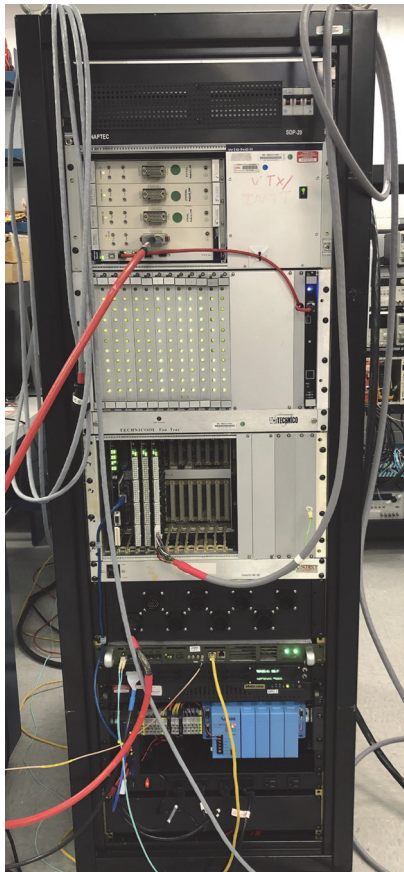


Fig. 1. INTT power crate system.

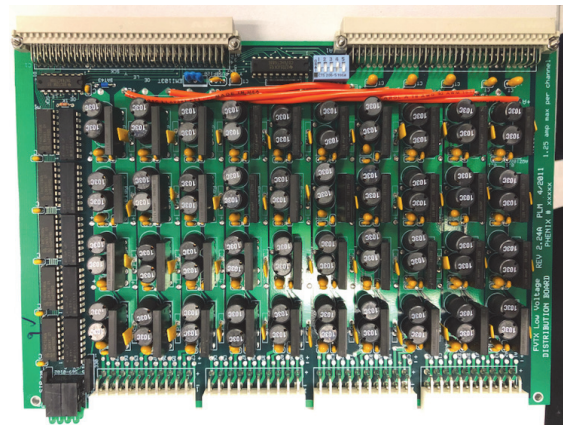


Fig. 2. FPHX power system filtering board.

The Switch distribution board and FPHX power supply system are all connected to the PC by ethernet cables. One can easily enter the rack PC by using the No-Machine, ssh through the gateway, or control it locally using the keyboard and monitor to control the whole system. The Switch distribution board can be controlled by the telnet command line, and the FPHX power supply can be controlled by a perl script respectively. There is a written script for controlling whole INTT power system including HV and LV system, which can turn on and turn off all the power systems by one command.

References

- 1) Conceptual Design Report of sPHENIX (2018).
- 2) "FPHX: A new silicon strip readout chip for the PHENIX experiment at RHIC," 2009 IEEE Nuclear Science Symposium Conference Record.

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