

CAEN SY1527: a new LHC dedicated HV Power Supply System

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Abstract

LHC experiments represent an enormous technological challenge both for Experimenters and Industrial partners. CAEN has strongly invested its resources, in the last two years, in the development of a Power Supply system totally dedicated to LHC applications. The underlying idea is to provide the Slow Control groups with an extremely flexible system, featuring an enhanced local intelligence to minimize the Slow Control feedback loops.

The new system embeds a completely new approach to the power generation and distribution problem and has been designed with safety, reliability and ease of maintenance criteria. Telnet and WWW access facilities will allow remote debugging and technical support of the system.

Summary

LHC experiments represent an enormous technological challenge both for Experimenters and Industrial partners. Several problems must be faced, including radiation hardness environment and strong magnetic fields. CAEN, thanks to the know-how accumulated in several years of activity, has strongly invested its resources, in the last two years, in the development of a High Voltage Power Supply system totally dedicated to LHC applications. The underlying idea is to provide the Slow Control groups with an extremely flexible system, featuring an enhanced local intelligence to minimize the Slow Control feedback loops.

The new system embeds a completely new approach to the power generation and distribution problem: ordinary High Voltage boards will be used both as direct supplies to the various detectors and as primary channels for remote distributed systems (peripherals). Moreover the control of remote generators and distributors will be performed by "branch controllers" housed in the system mainframe.

The mainframe will be available in three different versions, namely:

- a laboratory version with 6 slots;
- a fully equipped experiment version with 16 slots;
- a low cost experiment version with 16 slots.

The remote control and monitoring of all operational parameters of the High Voltage system is possible via the CAEN traditional built-in links (RS232, H.S. CAENET), via CERN approved Fieldbuses and via Ethernet (TCP/IP). Multimaster data handling and control is foreseen. The User interface encompasses all the usual friendliness of previous CAEN systems. The use of one microprocessor per slot allows fast and accurate setting/monitoring of channel parameters (14 bit resolution on Voltages and Currents). Moreover, each "branch controller" allows to control and monitor up to 1024 parameters of the peripherals.

The system employs modularity criteria: the internal power supply allows different configurations up to 2250 Watts per mainframe. Live insertion of the boards is also available, thus reducing the down time of the global system.

The huge LHC experiments will introduce several problems with the maintenance of the detector electronics: the new system has been designed in order to gain an easy access to the computing core and peripherals. Telnet and WWW access facilities will allow remote debugging and technical support of the system.