

SSD DOCUMENTATION

SSD Slow Control Hardware

Version Number : 2

28-june-02

2Power supply and Slow Control Crates.....	3
2.1Power Supply.....	3
2.2VME Crate.....	4
2.3Distribution Crate.....	5
2.3.1Control signal distribution.....	5
2.3.2Power distribution (Patch Panel).....	6
2.4Rack Occupancy.....	7
2.5Power Requirements.....	7

1

2 Power supply and Slow Control Crates

All the crates necessary for the SSD slow control and power supply are integrated in one rack.

In this rack will be :

- CAEN SY527 crates for the power supply.
- 1 VME crate for the Slow Control and Detector Control.
- 1 Distribution crate for the spreading of all the power supplies and control signals to the different parts of the SSD.
- Heat exchangers ,filter and breaker panel.

2.1 Power Supply.

Typically, the SSD needs four types of power supply :

- Low Voltage (+/- 2V) for the front end chips (ALICE128C and COSTAR).

High Voltage (~40V) for the Silicon Strip Detectors.

Voltage (5V) for the ADC boards.

Voltage (7V) for the readout and ADC boards.

describes the way these power supplies are connected to the electronics.

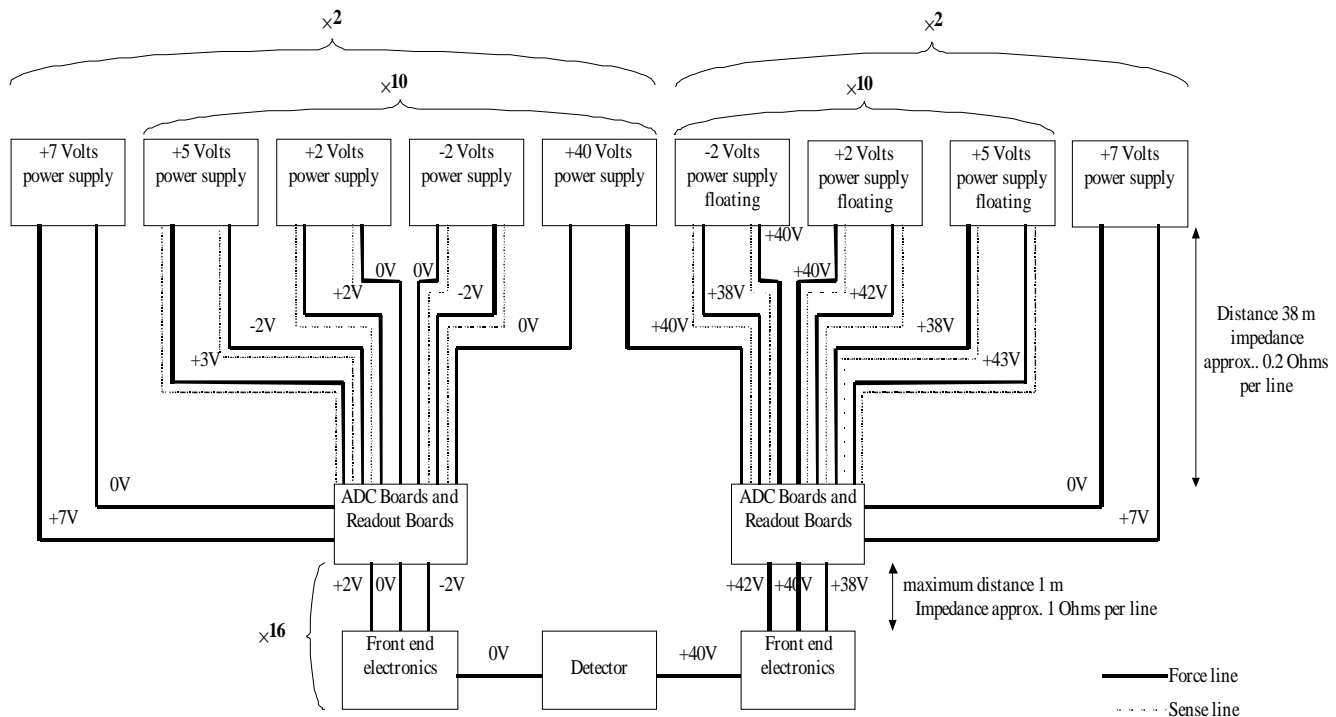


Figure 1 : SSD power supply

These power supplies are generated by the following devices :

Board	Number of boards	Number of channels per Board	Max. Voltage	Max. Current
CAEN A515	2	16	100V	1mA
CAEN A516	5	8	12V	1.5A
CAEN A525	10	8	4V	3A

Two CAEN SY527 crates are necessary to support these boards (One crate can contain up to 10 boards). These crates communicate with the slow control system by mean of a CAENnet bus controlled by a V288 VME board.

The 7 Volts for the Readout Boards is generated by a JWS300-12 (LAMBDA)

2.2 VME Crate.

The VME Crate is the interface between the user interface (a SUN workstation running EPICS) and the detector. 3 boards are used in this crate :

- A processor board (MVME 167 01-B) which manages the EPICS real-time database (the OS is VxWorks).
- A memory board (PME 16EP) 4 Mo.
- An interface board (V288) for the Caen power supply.
- An interface board (CVME 1149.1) for the control signals.

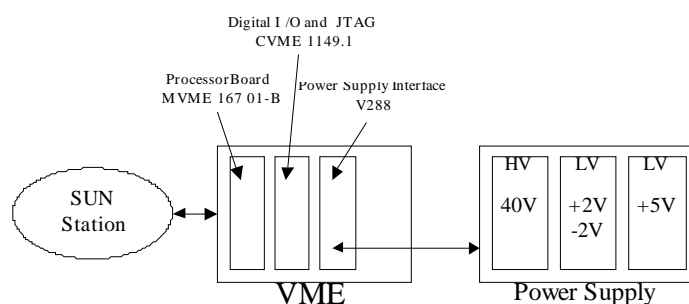


Figure 2 : VME crate

2.3 Distribution Crate.

The distribution crate has two purposes :

- Distributes the control signals coming from the JTAG & Digital I/O board to the 4 Readout and Control boards (Fig. 3).
- Distributes the power lines coming from the CAEN crates to the 20 ladders (Fig. 4).

2.3.1 Control signal distribution.

The control signals are generated by the JTAG & Digital I/O board (Corelis CMVE 1149.1). This board can handle up to 6 JTAG port , 32 digital inputs and 32 digital outputs. In our case 4 JTAG ports are used for the 4 parts of the detector and 1 JTAG port is used for the programming of FPGAs. 6 digital outputs are the address of the ladder in which the JTAG is sent. The 2 most significant bits address one of the 4 half-clamshell, and the 4 least significant bits address one of the 10 ladders in this half-clamshell.

Actually, from the 6 JTAG port of the VME board only the TMS signals are fully independent. The TDI, TCK and TRSTB signals are common for all the JTAG ports, and there are 2 TDO signals. From these 2 TDO signals, one is used for the FPGA programming, the other is shared by the remaining 4 JTAG ports.

Furthermore, due to distance between the control room and the detector, all the control signals need to be converted to differential signals.

Thus, for the multiplexing of the TDO signal and the conversion from TTL to differential pairs, a control signal distribution board is needed. The fig. 3 shows a schematic of this board.

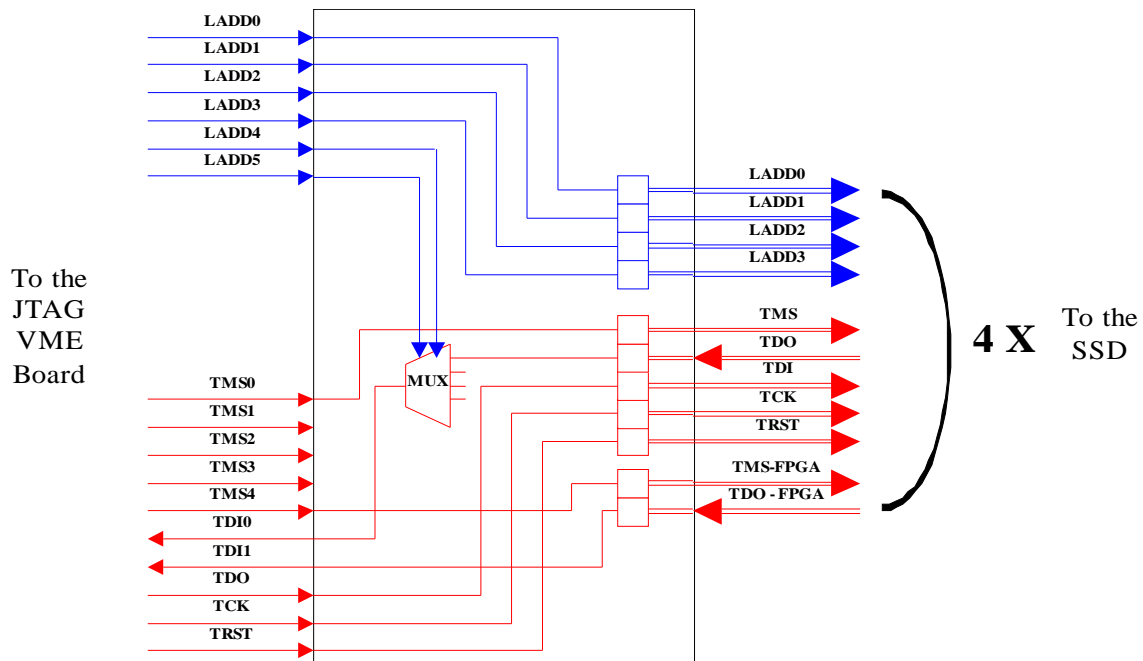


Figure 3 : Control distribution board

2.3.2 Power distribution (Patch Panel)

The purpose of the power distribution boards is to distribute the voltages coming from the CAEN power supply boards in order to have 40 sets of cables, each set corresponding to one half-ladder (see fig. 4).

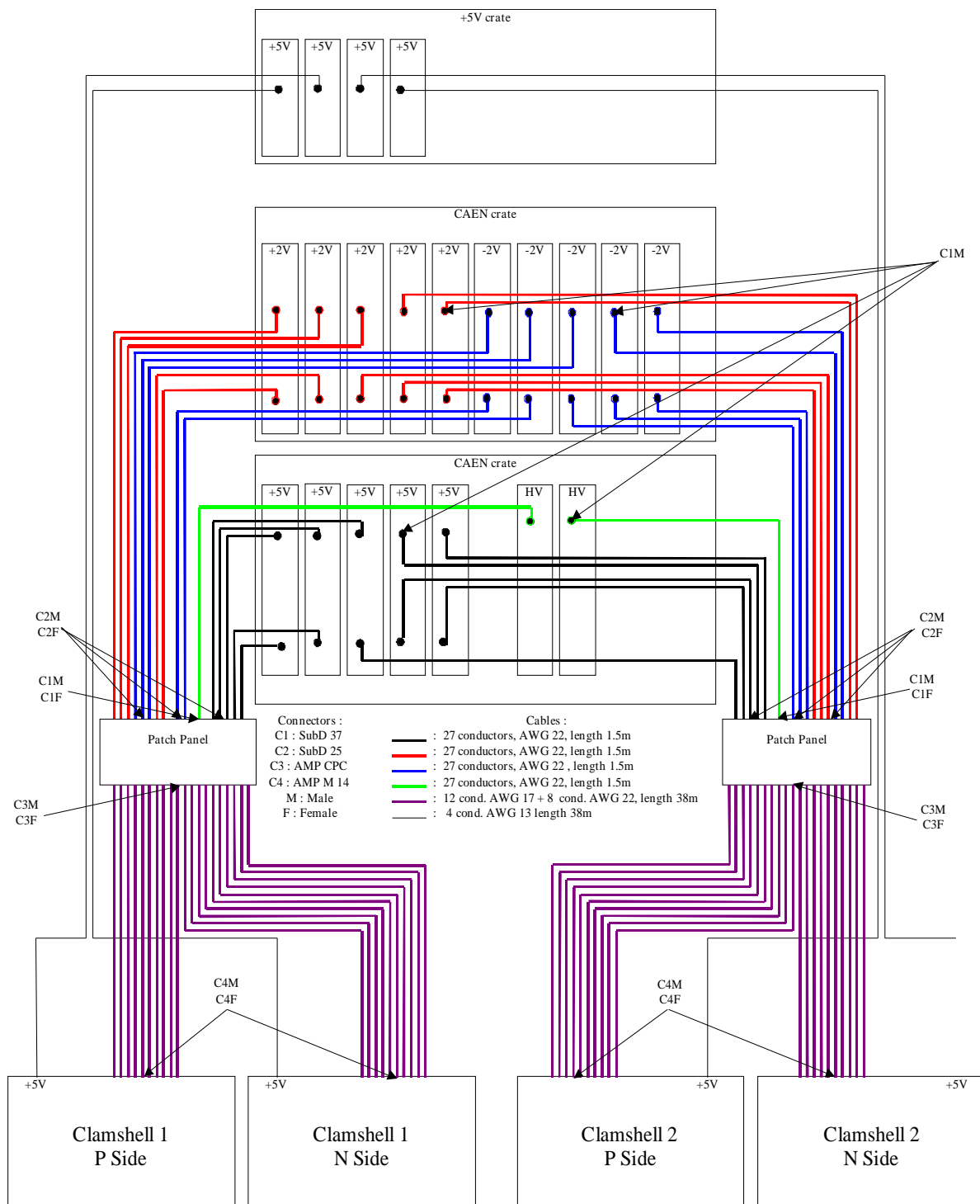


Figure 4 : Power supply distribution

2.4 Rack Occupancy.

Breaker Panel	
VME crate	8U
Heat exchanger	1U
CAEN crate	8U
Heat exchanger	1U
CAEN crate	8U
Heat exchanger	1U
Distribution crate	8U
Heat exchanger	1U
Filter	2U

Rack dimension
43U x 19" x 32"

2.5 Power Requirements.

CAEN SY527 CRATE

Input Voltage : 220 Vac @ 50Hz or 110 Vac @ 60Hz.

Power : 200 V A (mainframe) + 1600 V A (boards).

Estimated Heat : 300 W per crate.

VME CRATE

Input Voltage : 220 Vac @ 50Hz or 110 Vac @ 60Hz.

Power : 100 V A

Estimated Heat : 100 W

DISTRIBUTION CRATE

Input Voltage : 220 Vac @ 50Hz or 110 Vac @ 60Hz.

Power : 300 V A

Estimated Heat : 200 W