Power Front End / PCDU Simulator

The PCDU simulator is used during AIT /AIV phases for representative powering of flight equipment. It simulates the powering that is provided through regulated or unregulated power buses.

As a baseline, it provides multi independent output power lines with standard over voltage and over current protection based on COTS items.

The PCDU Simulator is based on COTS items (power supplies, PC, …) enhanced by Clemessy's SyCTRL products. It is designed as a self standing equipment with its own local GUI. It is fitted with self test and safety loop, embedded in standard 19'' rack and container.

As options, it can be fitted with:

- Second level over voltage / over current protection (per line, per group of lines etc.)
- Latch Current Limiter
- Specific sensor simulation (thermistor, cell sample, switch etc.)
- Remote control via TCP/IP interface (CCSDS, FEECP, EDEN, PUS Services etc.)
- Mains insulation transformer unit
- Reusable container
- Umbilical link tester
- Full redundancy
- Mini rack
- Interface harness:
    - Ambient harness for ISO8 clean rooms
    - Thermal vacuum harness for TVAC chambers
    - Bulk head to vacuum chambers
    - Bio-burden harness for ISO7 clean rooms
    - Savers

Function

- Controlled and secured power supply to spacecraft platform and / or instruments
- Power distribution unit
- Over-voltage, over-current, under-voltage, reverse-over-current protection
- User defined script features
- Remote and local control mode
- Self test capability
- Safety loop signal management (Inhibit input & Fault output signals)
- Interface cable to spacecraft

Implementation

- Power provided by DC source or solar array power supply
- Independent protection features based on SyCTRL
- Ethernet TCP/IP interface for remote control
- Windows / Linux man machine interface for local control
- 19'' rack integrated.

Performance

- Typical output voltage   up to 200V (more on request)
- Typical output current   up to 70A (more on request)
- Protection reaction time   down to 30 μsec

Used technology

- Keysight or Regatron power supplies
- Clemessy's SyCTRL second level protection and TM/TC features
- LXI interface with power supplies
- Python script language

Product under test — Protections LCL — SyCTRL FPGA — Power Supply — Monitoring — SyCTRL FPGA — PFE SCOE — Ethernet

SyCTRL — FPGA — 0 1 0 1 0 1 0 1 0