Pyro Lines Simulator

A Pyro lines Simulator is used during AIT / AIV phases for pyro line management (up to several hundred), namely thermal knifes simulation, pyro lines simulation, pulse characterization, spurious detection and measurement.

This simulator is usually used following three needs:

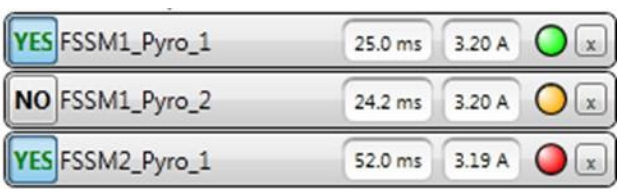
- Simulation of pyro signal. A signal able to initiate a pyro initiator is usually a pulse of a predefined voltage or current (depending of the type of pyro initiator) and a predefined duration (from some milliseconds to several seconds / minutes). The simulator is able to send such kind of predefined signal following user request via MMI / script or following remote control triggering (if any).
- Qualification and validation of pyrotechnic lines. The simulator pyro lines replace the real pyro initiators by being connected at the same interface than these real pyro initiators. On reception of a signal, the simulator qualifies the shape of the signal (voltage or current level – depending on the type of initiator – and duration of the signal). Depending on a predefined pulse shape (per channel), the simulator qualifies the form factor of the signal and reports a time stamped qualification status (good pulse, bad pulse and why).
- Spurious detection. During given on-board validation phase, it is of the outmost importance that NO pulse is sent to the pyro initiators. In this case, the pyro lines simulator can be used to detect unexpected activation of pyro channels. In case of eventual activation, the simulator qualifies the signal (voltage, current, duration) and reports the event.

In any cases, the report is locally logged, displayed on the local MMI and forwarded to remote control interface (if any).

The simulator is based on COTS items 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 inch rack and container.

As options, it can be fitted with:

- Remote control via TCP/IP interface (CCSDS, FEECP, EDEN, PUS Services etc.)
- Mains insulation transformer unit
- Individual front panel test points
- Mini rack
- Reusable container
- 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



Pyro Lines Simulator — TECHNICAL DATA

Function

- Pyrotechnic lines simulation
- Pyrotechnic valid pulse measurement
- Pyrotechnic spurious pulse detection and logging
- Thermal knives simulation
- Thermal knives firing measurement
- User defined script features
- Remote and local control mode
- Self test capability
- Interface cable to spacecraft

Implementation

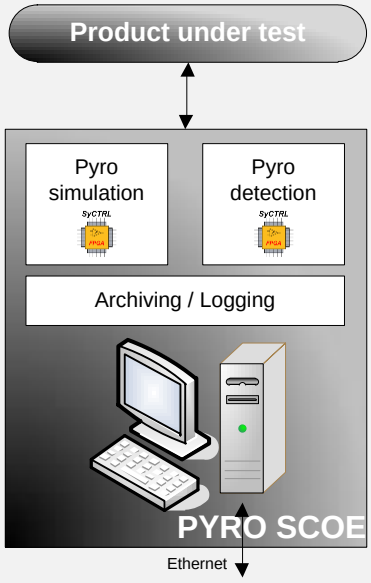
- Pulse detection based on SyCTRL
- Pulse generation based on SyCTRL
- Front panel test points
- Ethernet TCP/IP interface for remote control
- Windows man machine interface for local control
- 19'' rack integrated

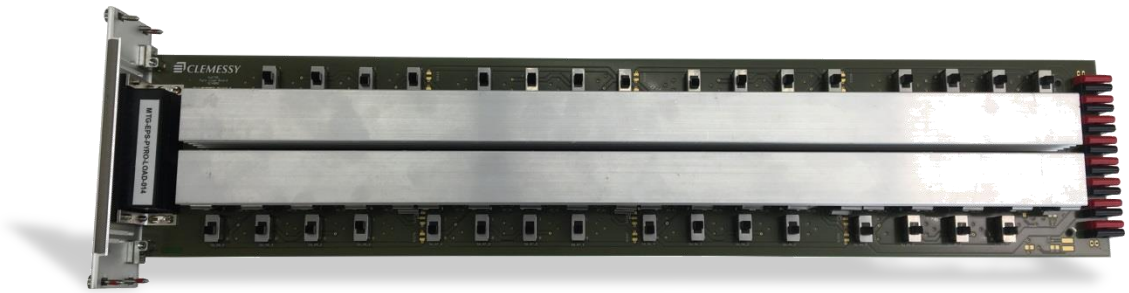
Performance

- Unlimited number of lines
- Spurious pulse detection limits:
  - Pulse duration > 100 µsec
  - Level > 100 mA
- Nominal pulse:
  - Max. level 10 A
  - Duration 1 sec

Used technology

- Clemessy's SyCTRL TM/TC features
- Python script language





SyCTRL FPGA 0 1 0 1 0 1 0 1 0

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