

# SyCTRL Solution

- Integrated solution for electrical protection and I/O
- Simple, robust and versatile
- Electrical protection
  - Single power line protection
  - Secured power distribution
- Input / Output
  - Analog measurement,
  - Thermistor measurement and simulation,
  - Digital Input and Output
  - High Power Command
  - Communication (RS485,...)
- Downtime optimization policy



## Overview

SyCTRL is a modular I/O and protection solution that has been targeted for Special Check Out Equipment (SCOE) and in particular for spacecraft Electrical Ground Support Equipment (EGSE) used during Assembly Integration Test and Validation phases (AIT/AIV) of spacecrafts or spacecraft Instruments as well as during Launch Preparation and Launch Operations.

The solution is based on electronic boards designed to be fitted in standard 19 inch chassis.

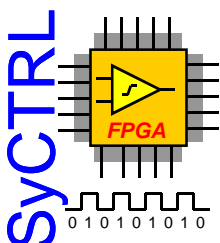
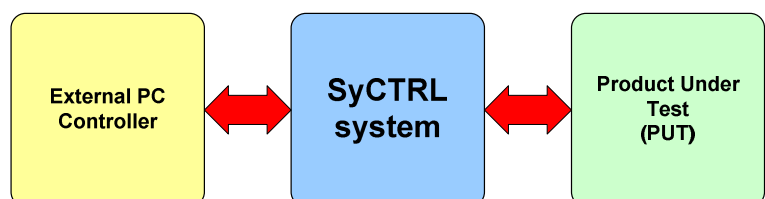
The wide board's catalog allows with the same solution to meet most of the requirements of the test benches:

- Secured power distribution through electrical protection board (Protection) or Latching Current Limiter boards (LCL),
- Analog and digital signal monitoring and generation (AnalIn, DigitalIO, ...),
- Relay interface (RelayOut),
- High Power Command – Pulse emission (HPC)
- Serial / parallel communication protocol interface (RS485).

## Implementation

The Chassis is a 4U / 19 inch rack mountable chassis embedding the mechanical, electrical and thermal interfaces aimed to accommodate the other items. A Chassis is fitted with a backplane board that separates the front and rear side of the chassis. The front side accommodates up to 6 Decision boards which are the heart of the SyCTRL solution, when the rear side holds up to 18 daughter boards such as protection or I/O boards.

The Decision board is a computer board based on a PXA 270 / 312Mhz micro controller embedding Windows CE 5.0 and provides a 10/100Mb Ethernet interface and a TFT 240x320 touch screen. The board is equipped with an ALTERA Cyclone® III FPGA, which enables the configuration of customer specific I/O functions especially for safety critical applications. The Decision board is the master board that manages the communication with an external PC controller and is interfaced with 1 to 3 slave boards through serial links and digital I/O lines located on the backplane board of the Chassis .



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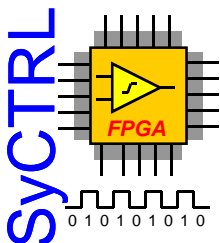
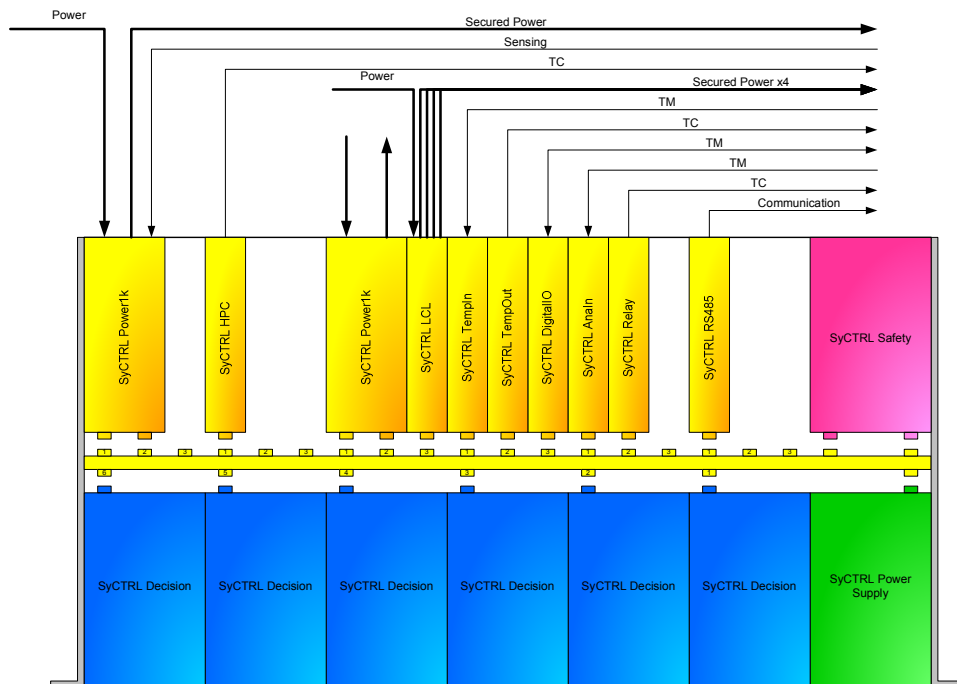
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## Catalogue

Board type	Part number	Description
Decision	sc100	Master board of the SyCTRL solution.
Safety	sc030	Safety loop management board.
Protection	sc210, sc211, sc212, sc213, sc216	Protection module board. Supply secured power (OVP, OCP,...) to the unit under test.
LCL	sc214, sc215	Latching current limiter board. Distributes secured power (OVP, OCP,...) to up to four outputs.
Analn	sc220	8-Channel Isolated Analog Input board.
TempIn	sc240	8-Channel Temperature Input board.
TempOut	sc250	Multi Channels Temperature Output board.
DigitalIO	sc260	12-Channel Digital Input / 12-Channel Digital Output board.
RelayOut	sc270	16-Channel Relays Output board.
HPC	sc281, sc282	High Power Command board.
RS485	sc290	24-Channel RS422-485 board.

**Note** All the boards are available in tropicalized and non tropicalized version.

## Example of chassis implementation



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## Safety Loop management

The Safety Loop enables to daisy chain the various Decision board (intra chassis or inter chassis), in order to shut them down in case of error detection (internal error, protection triggering, ...). Each Decision board is able to be subscribed or not to the Safety Loop.

## Downtime optimization

All the boards are designed to reduce the test benches maintenance downtime to a minimum. For instance, all the boards, which embed measurement channel requiring calibration, store their calibration parameters on non volatile memory located on the board itself. The maintenance activities are hence reduced to the board replacement, no additional calibration activities are required.

## Control and monitoring

The SyCTRL solution can be driven either by a local Man Machine Interface based on front panel touch screen or via a remote controller through a UDP based 10/100 Base-T Ethernet link.

## Safety / EMC consideration

The SyCTRL solution is designed in compliance with European EMC and safety standards. The systematic EMC protection attributes guarantee robust EMC protection for emission as well as for immunity.

Safety directive / standards compliance:

- Low Voltage Directive 2006/95/EC
- EN 61010-1 Part 1 : General requirements

EMC directive / standards compliance:

- EMC Directive 2004/108/EC
- EN 61326 Part 1: General requirements
- EN 61000-6-2 Part 6-2: Generic standards - Immunity for industrial environments
- EN 61000-6-4 Part 6-4: Generic standards - Emission standard for industrial environments

