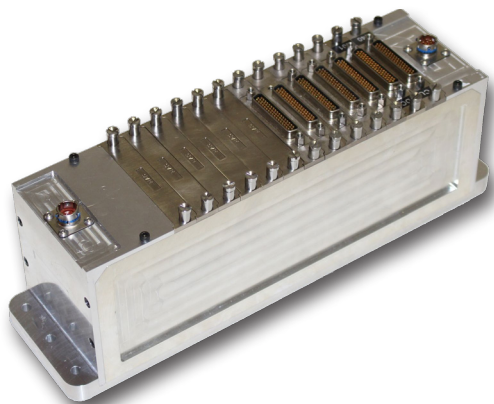


Smart Backplane Chassis

Low cost. High reliability. Smart.

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Key Features

- Backplane designed using Rad-hard components allowing re-use of COTS plug-in modules, minimizing cost
- Detects Single Event Latch-Up (SEL) and corrects for normal operation, ensuring reliability
- Minimizes power consumption through different mission stages

Applications

Mission critical data handling subsystems for

- Launch vehicles
- Re-entry vehicles
- Low earth orbit satellites

Overview

The Smart Backplane chassis (KAM/CSB/12U) is a rugged 12-user slot chassis that has been designed specifically with space-related data acquisition, data processing and recording in mind.

Its smart radiation-hardened backplane design allows the use of 100+ plug-in COTS modules in a radiation-intensive environment without the need for those modules to have any in-built radiation protection. In the event of a Single Event Latch-Ups (SEL) on a module, the backplane detects this phenomenon and resets the operation of the module. This operation ensures that the potential harmful effects of ionizing radiation (module electronic circuit malfunction) are eliminated.

The backplane design provides the ability to individually switch on and off chosen modules in the chassis, thereby helping to minimize the power requirements of the unit at any one time during different phases of a spacecraft mission.

The backplane provides continuous health status information to the on-board mission computer as well as a watchdogging capability (e.g. in case a SEL is detected or if the unit temperature exceeds a pre-defined value).

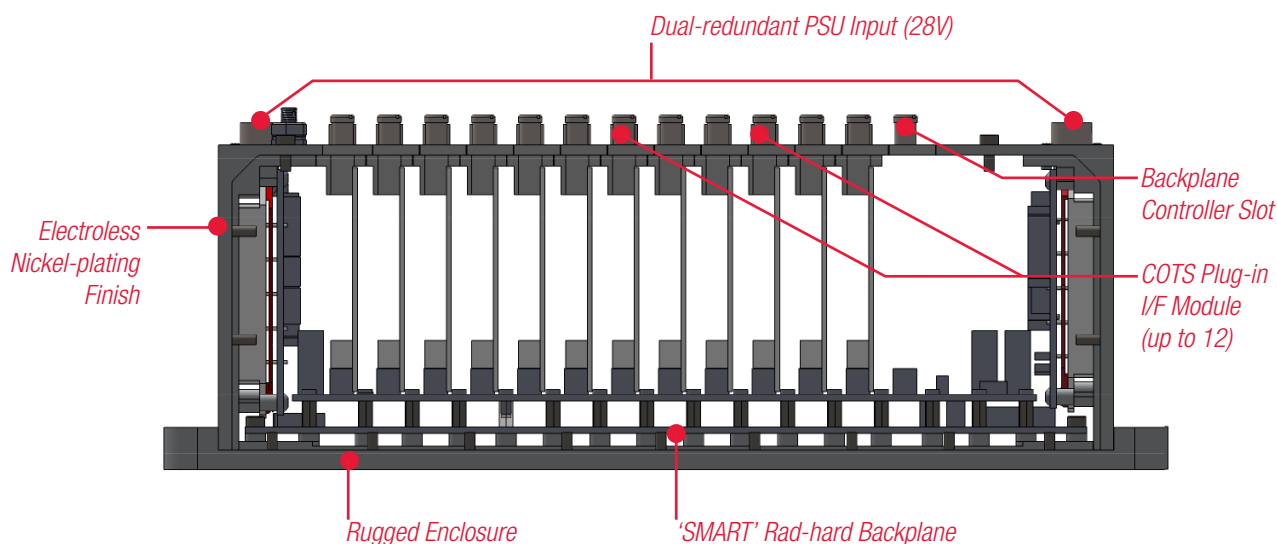


Figure 1: Smart Backplane Chassis features

General Specifications

Interfaces

- Ethernet interface for programming, backplane control and bi-directional interface with on-board Avionics
- 12 user slots to accommodate COTS Acra KAM-500 data acquisition cards (analog, discrete, bus etc.)

Power supply

- Nominal 28V VDC (MIL-STD-704E)
- Provides power supply on backplane to every module:
 - + 5V for digital electronics (4A)
 - + +/- 7V bridge excitation (2A)
 - + +/- 12V analog front end (1A)

Power monitoring

- Enhanced failure isolation mechanism based on individual slot management blocks
- Current surge detection and correction in the event of an SEU or SEL
- Ability to power down each module depending on mission profile

Health Monitoring Capability

- Precision measurement and monitoring of power supply voltages
- Measurement of unit temperature to +/-0.5°C accuracy
- Continuous monitoring of unit configuration (CRC checking)
- Precision monitoring of module current draw to detect SEU and SEL events
- Watchdogging of parameters with message generation in the event of exceedance

Single Event Effects, Single Event Upsets and Single Event Latch-Ups

- A Single Event Upset (SEU) is the corruption of information stored in a single memory cell or flip-flop. It can be caused by the energy in solar radiation. The effect of such an event can be to put an electronic device in to an unknown state and ultimately for it to malfunction.
- A Single Event Latch-Up (SEL) is a latch-up caused by a single event upset. It is the inadvertent creation of a low-impedance path on an integrated circuit, triggering a high current circuit which disrupts proper functioning of the circuit, possibly even leading to its destruction due to overcurrent. A power cycle is required to correct this situation.
- The Smart Backplane design ensures that SEUs and SELs do not impact on the operation of the equipment

Electrical and mechanical

Power

- 6W unloaded, 40W fully loaded

Mass

- 4.3 lb (1.95 kg) with no modules
- 6.4 lb (2.9 kg) when fully populated, based on typical module weight of 2.61 oz (75 g)

Dimensions (H x L x W)

- 4.25 x 11.80 x 3.15" (107.8 x 299.7 x 80.0 mm)

Environmental

- Operating temperature range: -40 to +85°C
- MIL-STD-810F for shock and vibration
- MIL-STD-461E for RE, CE, CS & RS