High Power Command Card

DESCRIPTION

The MDA High Power Command card provides an extensive selection of interfaces to Spacecraft Platform devices: deployment mechanisms actuators, solar arrays & antenna drive mechanism, thermal heaters drive, and propulsion system control, for many applications ranging from Command & Data Handling, scientific instrumentation and payload controllers.

The card provides over 60 external high power command & output control.

The card interfaces through backplane connectors for power from the unit DC/DC Power Converter, and for data to the unit controller (CPU) through a serial CAN bus or a 32-bit standard compact PCI interface. External interfaces are available through front panel connectors using three high density D-sub receptacles (J3, J4 and J5). A 26 HD-Plug connector J6 provides Spacecraft external primary power input to the High power (28V or 50V) drive circuits. All circuits that interface to the front panel connectors are protected against ESD, and can operate into an open circuit without damage.

All primary power drive circuits are optically isolated from the control FPGA secondary ground.

FUNCTIONAL CHARACTERISTICS

Thermal control Heater Switches

- Drives 24 low side heater switches with up to 1 Amp for each heater load from the S/C primary power bus (28V or 50V).
- Independent control for each heater circuit.
- Status flag for each heater switch available as BITE telemetry.

Stepper Motor Drive for driving 3-axis Gimbal motors

- Stepper Motor encoder & drivers for 3 phase (Y windings) or 2 phase unipolar winding
- 28V drive (up to 1A), configurable step rate.

High Level Pulse Commands

- Qty 4 28V drive (up to 0.5 A into inductive loads), for power Latching relays drive
- Qty 6 28V drive, high-side current boost outputs, with fast turn-On/off for driving high pressure gas valves
  - Protected by separate enables command qualifying the activate command
  - Separate Enables of low-side switches with BITE sense to prevent a fault from activating the mechanism
  - On time configurable in FPGA (in msec to seconds)

Pyro" Actuators Drive for deployment mechanisms

- Qty 6 Thermal Knives/Cutters control, 20V drive @ 1 A load for 60 sec
- Qty 4 Quicknut or Frangibolt control: 20V or 28V drive
  - 20V drive @ 4.5A 35msec pulse for driving QuickNuts
  - 28V drive @ up to 4A for 60 sec for driving "Frangibolts"
- Fault Protection by separate enables command qualifying the fire command
  - Separate Enables of low-side switches with BITE sense to prevent a fault from driving an un-selected actuator
  - Active On time configurable in FPGA (in msec, seconds or PWM drive)

Pulse Commands outputs

- Qty 4 Pulse commands outputs, 28V drive
  - Configurable Pulse duration
  - Resistor controlled source current, short circuit protected

CAN Interface: CAN 2.0 Serial Bus at 1 Mb/s

- RS485 compatible voltage levels, with biasing resistors, consistent with the CAN bus standard levels
- Cold Redundant compatible (high impedance when powered off.)
- Dual redundant A/B bus with separate transceivers on each bus.

Control I/O FPGA

The card incorporates a high performance Rad-tolerant Field Programmable Gate Array (FPGA) to implement the CAN node function, PCI target interface, FDIR BITE functions, and for all command timing and output drivers interfaces functions.

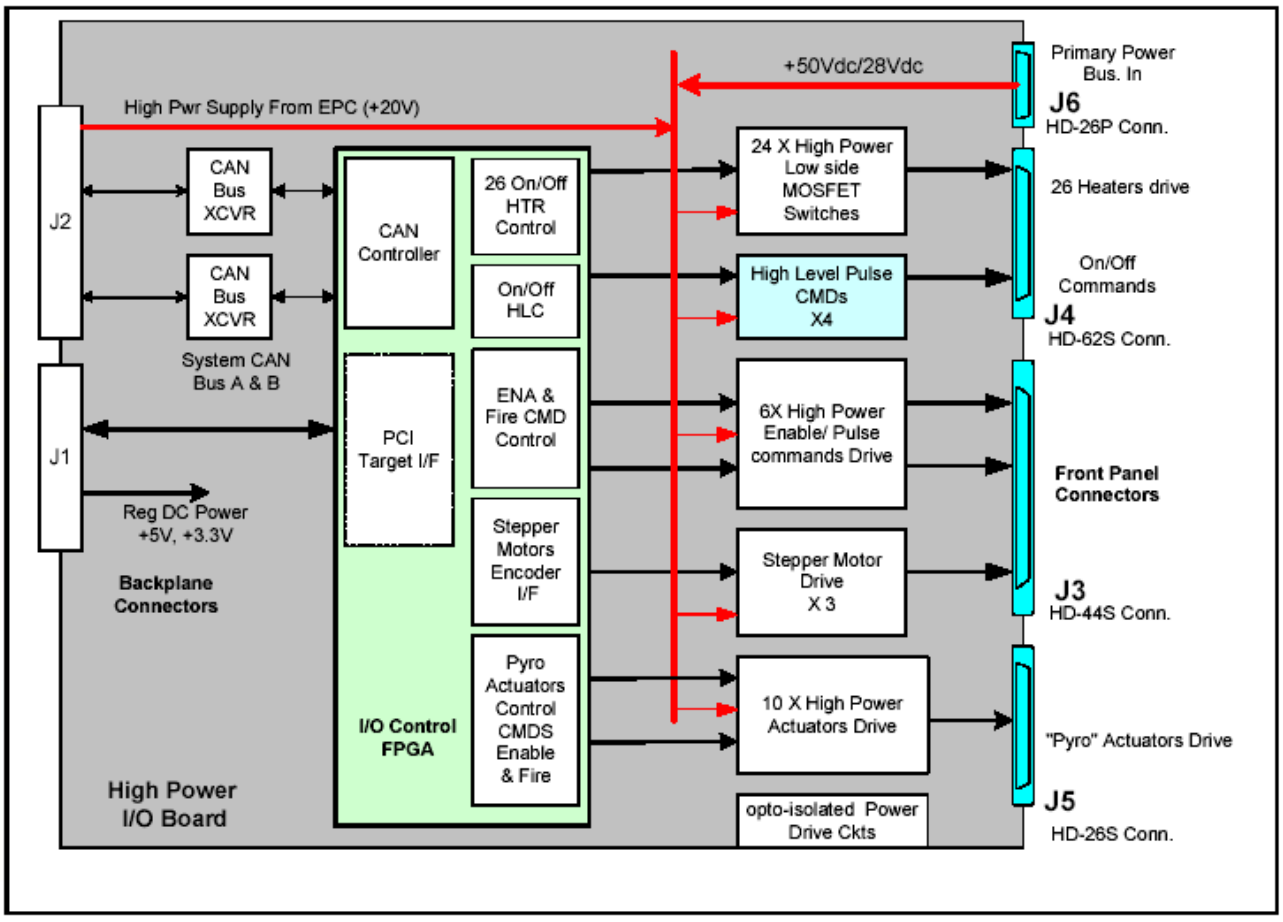
Physical Performance

Operating temperature	-30°C to +65°C at board thermal interface
Power consumption	Less than 6 W typical (full operation)
Radiation Hardness	60 Krads No Latch-up, Tolerant to SEU
Dimension	160 mm x 233.35 mm (Compact PCI 6U standard form factor)
Random Vibration	20 Grms (Qualification level)
Mass	900 grams
Operating Voltages	+5V DC, +3.3V DC

Other Features

Technology	Space Qualified Radiation tolerant EEE parts, MIL-PRF-38535 QML Q/V Double-sided SMT assembly Conduction cooled card, stiffener ribs and wedgelocks retainers
Software Support	Extensive selection of software development tools, including EM and Engineering Breadboards. Includes Board Support Package (BSP) and driver set

High Power Commands Card Functional Diagram



MDA
21025 Trans Canada Highway, Ste-Anne-de-Bellevue, Quebec H9X 3R2
Tel: 514-457-2150 | Fax: 514-457-2724 | www.mdacorporation.com/spacemissions