Redundant SmallSat Propulsion Controller 20032000

SPACE

VACCO's Propulsion System Controller Module is optimized for SmallSats and CubeSats. It is fully redundant with separate primary and redundant controllers that work independently and are completely isolated from each other. Each controller includes advanced drivers for Thruster Valves, Latch Valves and Heaters.

The controller is compatible with both blowdown systems and pressure regulated systems. The electronic hardware design is capable of facilitating control of series / parallel redundant electronic pressure regulators. This includes the control of digital pulse-width-modulated control valves. Flight-proven software and valves are readily available to support this option.

This radiation tolerant module heavily leverages components with flight heritage and TID and SEE testing to provide a robust controller package. The aluminum housing can easily be customized to provide additional radiation shielding. The design is flight proven from LEO (NanoACE) to Mars (MarCO) and beyond. The latest redundant controller design is built to withstand the radiation environment of GEO for 5 years.

Optimized for SmallSats and CubeSats in LEO, GEO and beyond

Each Of The Two Redundant Controllers Includes:

- 10 valve drivers with automatic stepdown voltage
- 10 Heater Drivers
- 4 Thermistors & 10 Thermocouples
- Closed loop temperature control
- 3 pressure sensor inputs
- Auxiliary analog inputs
- RS-422, full duplex data interface
- Heath Monitoring transmitted at 10 Hz
- 10Hz command rate
- Firing command response within 5ms
- Firing time resolution to 1ms
- Passed radiation testing at 22 kRAD and 200 MeV protons (tested without shielding)
- Built-in radiation sensors: 0-2kRAD and 0-13kRAD LEO and two MarCO units flown by Mars. Radiation test heritage includes 22kRAD TID and high energy 200 MeV proton SEE tests
- Latch valve position sensing
- Sofisticated Software

Options:

- Flight and simulator boards available
- Hot-cold and hot-warm redundancy
- Emulators for ground testing
- Custom operating voltages
- Additional Output Drivers
- Additional Analog inputs
- Flight equivalent units for radiation testing
- Custom designs for extra valves, heaters, thermistor, PTs, etc.
- Additional Shielding for greater radiation tolerance
- 2 closed loop pressure controllers
- 9 to 13V or 24-33V input

Operating Parameters:

Standby power..... <1W	Data interface..... RS-422, full duplex
Operating temperature range..... - 20°C to +60°C	Maximum fire duration..... 30 minutes
Storage temperature range.....- 30°C to +70°C	Fire time resolution..... 1ms
Operating voltage option 1..... 9 to 13V	Maximum output current .....6 Amps
Operating voltage option 2..... 24 to 32V	

Performance characteristics are based on customer requirements. As such, they are not representative of component capabilities or limitations.

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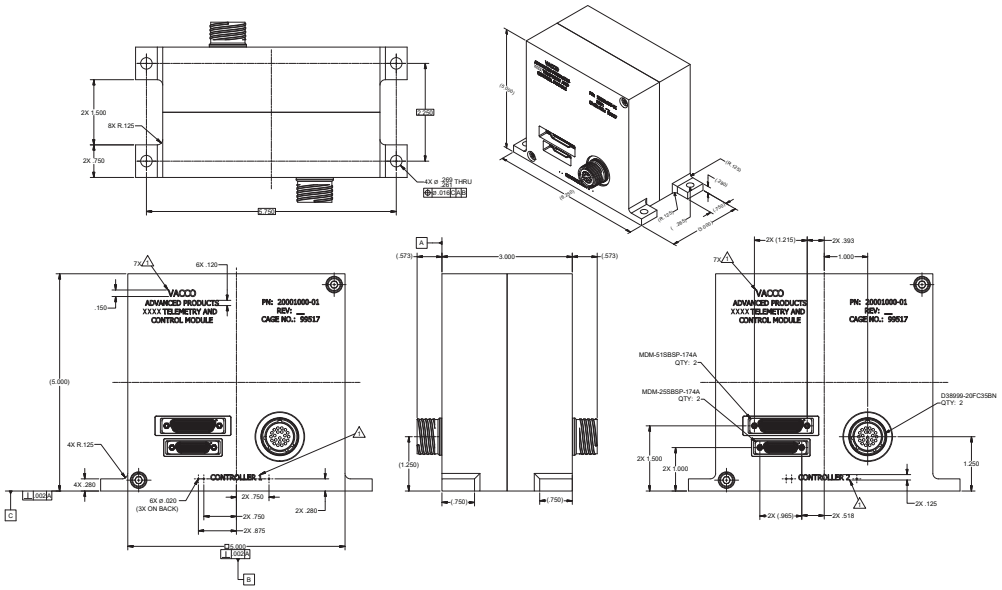
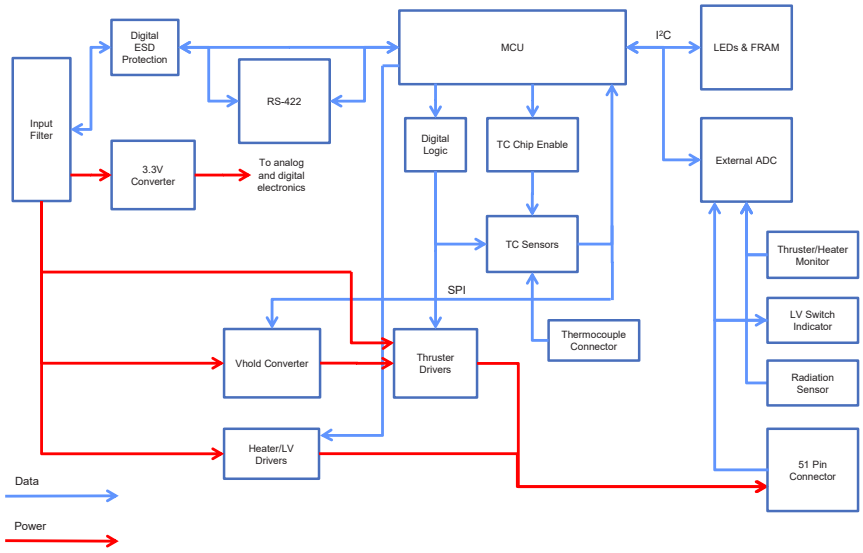
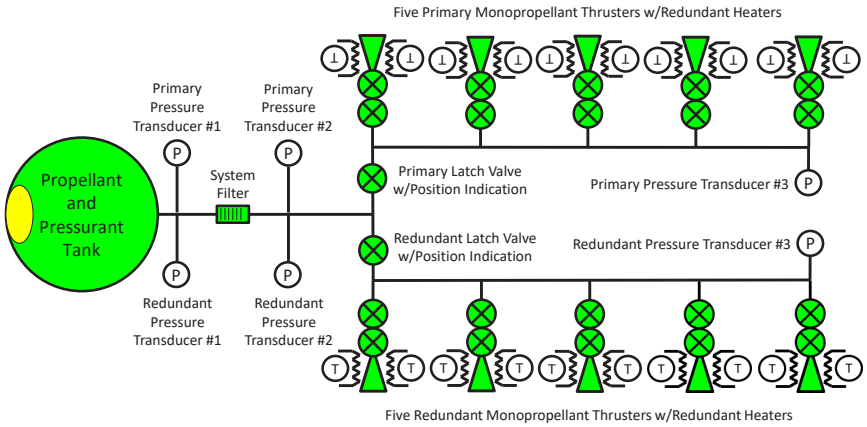
Envelope Drawing:



Example Controller Block Diagram:



Example System Schematic:



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