



Multi Purpose Drive Electronics

The **Multi Purpose Drive Electronics (MPDE)** is designed to drive most different mechanisms on-board of satellites.

Overview

The Multi Purpose Drive Electronics (MPDE) is a generic two-axes stepper motor controller capable of operating various types of mechatronic systems such as antenna pointing mechanisms, solar arrays or thruster pointing mechanisms. It has been optimized for low micro-vibrations and is compatible to different types of actuators. The MPDE comprises two electrically identical units, operated in cold redundancy.

Each unit contains an isolated DC/DC converter as well as a control module. The MPDE is controlled via a MIL1553 TC/TM interface, which optionally may be replaced by another command interface to adapt it to different satellite platforms. The main feature of the MPDE is its high flexibility, its large degree of autonomy as well as its high drive performance allowing a wide range of drive applications.

Features

- 2+2 (redundant) mechanism interfaces
- Minimized generation of micro-vibrations
- Half-/Full-/up to 64 micro-steps
- Autonomous start-up
- Flexible configuration via MRAM
- Different drive operations:
 - Target (drive to position)
 - Cruise (rotate at constant speed)
 - Track (follow user defined trajectory)
- Control of speed and acceleration
- Drive range limitation, end switch processing
- 8 user-defined actuator settings (kinematic limits, current amplitude, current waveform)
- Automatic step counter calibration
- Steploss detection based on position feedback

Protections

- Output power limitation for motor driver
- Over-current protection of motor driver
- Optional solid-state relays on each motor output to isolate motors with large inter-winding coupling

Product availability: Please contact our Sales team.

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Interfaces

- Baseline: MIL-STD-1553B, UART (RS-422)
- Optional: Can-bus, SpaceWire
- Primary power bus options: 50V, 30V, 100V
- On/off: High power command interface
- Discrete TM: Power status, unit temperature
- Thermistor acquisition interfaces
- Potentiometer: user-defined calibration tables, deadband detection, coarse/fine option for high-precision pointing
- Switch: end-stop, reference position

Performance

- Start-up time: <500 ms
- MIL-1553 TM rate: up to 16 Hz
- Motor Drive voltage: up to 60 V
- Drive current: up to 1 A, 8-bit
- Motor speed: 0 - 750 full-steps per second
- Thermistor acquisition: 1.3°C in a range of -50° to +140°C; 0.5°C in reduced range
- Potentiometer acquisition: 0.07% full-scale, 12-bit
- Speed jitter: <0.02%
- Standby power consumption: < 8 W
- Motor driver efficiency: >75%
- Failure rate: < 820 FIT per redundant unit
- Magnetic moment: < 0.015 Am²

Physical / Environment

- Size: 300x250x123 mm
- Weight: < 5 kg
- Operating temperature: -30°C to +60°C
- Non-operating temperature: -40°C to +70°C
- Minimum switch-on temperature: -30°C
- Radiation: typ. 50 kRad (Si), higher values with additional shielding