Heater Power Distribution Module

For distribution of bus power to spacecraft heaters a Heater Power Distribution (HPD) Module is available. The module provides sixteen output switches in two groups of eight switches. Each group is protected by upstream Latching Current Limiters (LCL).

Each switch function can be commanded on / off via a dual command & monitoring bus, distributed by a backplane interface. The actual group load current and switch status is provided as telemetry for each group of switches.

In case of overload or short circuit, the output current is instantly limited to protect the upstream main power bus. When exceeding a predefined delay the LCL will automatically switch off.

The voltage drop for each switch function is compatible with requirements for a regulated 28 or 50 volt bus.

Each heater switch group is fully self-contained with proven no failure propagation in-between, thus eliminating the need for "A and B sides" in the distribution function. The module forms an autonomy function deriving its internal supply voltage directly from the power bus.

The HPD module is 2nd generation of an older 2 x 6 switch module with the following references:

- 8 modules onboard XMM-Newton, flying since December 1999.

- 12 modules onboard Integral, flying since October 2002.

References:

- Six modules onboard each of the four Galileo IOV spacecrafts. The first two spacecrafts were launched in October 2011.
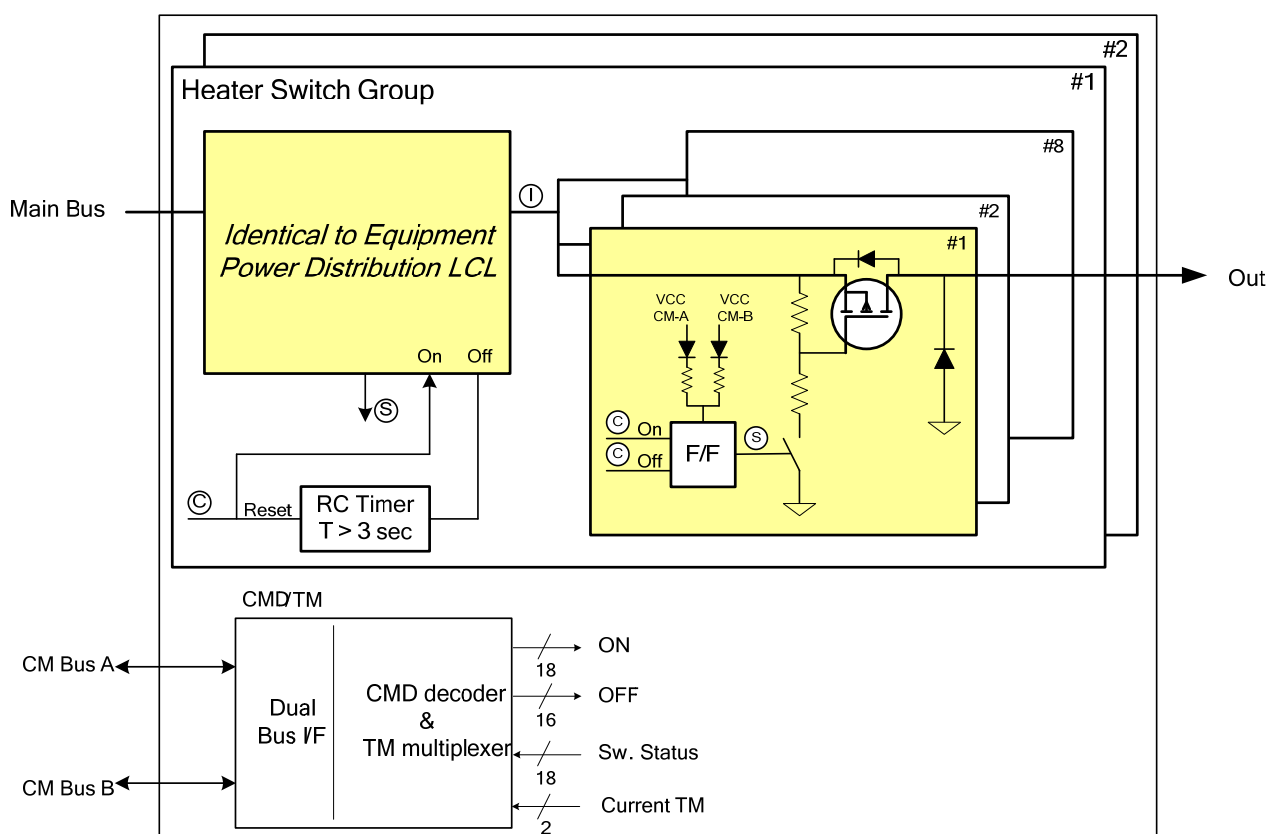

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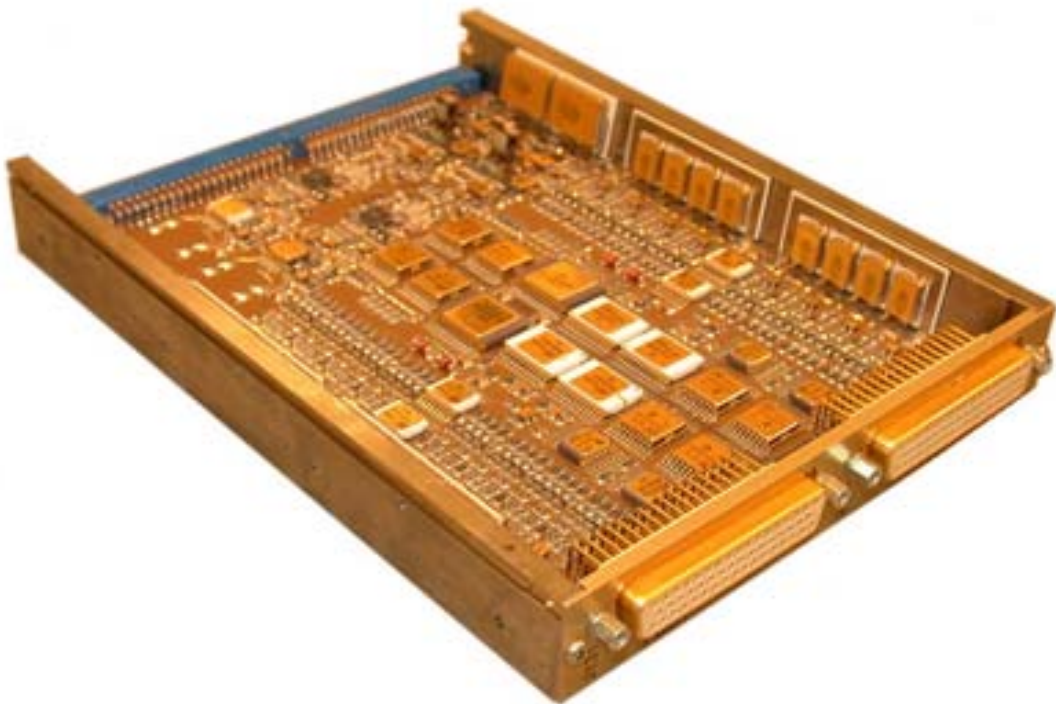
Space Engineering and Knowledge

Specifications:

Dimensions (L x W x H)	193 x 150 x 24 [mm]
Mass	477 gram
Bus voltage range	28 – 50 volt
Number of heater switches	16
Number of heater switch groups	2
LCL load current class	5.0 Ampere
LCL trip off & current limitation level	+5 % to +15 %
Switch trip off delay	5 ms
Switch current regulation response	< 500 ns
Switch voltage drop	< 3%
Module output power capability	up to 400 Watt
Idle consumption, all switches off / on	< 0.13 / 0.26 Watt
Load current TM inaccuracy	< 5 %

Heater Power Distribution Module Functional Schematic