

# DIGITAL HEATER

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## Abstract

The presentation is dedicated to the project “Digital Heater” aimed at developing a very compact electronic module to be used close to the heater and able to drive the heater in a temperature controlled way. Thanks to this electronic module, the heater can be seen externally as a digital devices, and in particular as a “Digital Heater”. The module allows the implementation of a “distributed” thermal control system and it is aimed at reducing the mass and volume of harness that characterize traditional centralized thermal control systems.

The digital heater module is an actuator dedicated to the closed loop control of heaters located inside a spacecraft. The actuator receives the desired temperature set-point from spacecraft OBDH and provides electrical power to the heating devices to lock the desired temperature.

The digital heater Module has been designed to be installed in a network of digital actuators thus allowing to achieve a distributed temperature control.

In order to reduce the spacecraft data bus overload, the operation in a cluster configuration have been considered for the definition of the digital heater architecture.

The network consists of two master nodes (nominal & redundant) and a certain number of slave nodes. Each master node performs following tasks:

- Bus bridging and protocol conversion
- Monitor of the status of all slave nodes
- Decode and distribute commands issued by OBDH
- Transmission to the OBDH of a significant subset of data produced by network nodes

The use of two masters is required to enhance the system reliability in case of a fault within the master node.