

Payload Computing and Processing Unit (PCPU)



Payload Computing and Processing Unit.

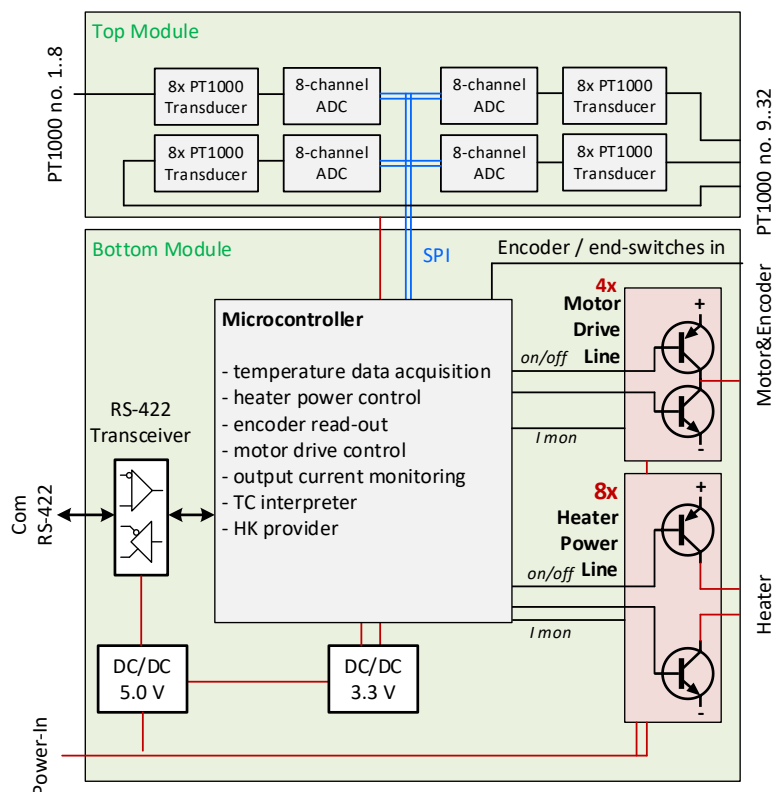
The PCPU is a compact, low-power control unit for NewSpace payloads, managing up to 8 heater channels and stepper motors with 200 steps and 1.8° accuracy. It delivers high-resolution temperature readings (± 0.1 K) and interfaces with a higher-level payload controller via serial UART RS-422 interface. It supports memory-mapped software control for system management where default values are written in FLASH memory while operating values are accessible in SRAM.

Equipped with a secondary power supply and EMI filtering, its modular design and integrated calibration data ensure precision and reliability in demanding environments. Additionally, it provides housekeeping measurements of current monitoring for 8 output lines with ± 0.1 A accuracy.

Key features are:

- Temperature control of 8 channels
 - 8 PT1000 temperature readout transducers
 - 8 PWM-controlled heater lines
 - Automatic and manual operation of heaters
- Additional 24 high-accuracy temperature readout (± 0.1 K)
- Temperature measurement range: $-20 - +60^{\circ}\text{C}$
- Output current housekeeping measurements
- Stepper motor driver incl. read-out of Encoder
- RS-422 interface

All features can be modified by customization.



Combined with application boards (e.g. a data acquisition board), the SPPM becomes a stand-alone payload computer.

Technical Specifications

Microprocessor:

Core processor	ARM Cortex-M4
Maximum Frequency	Up to 170 MHz

Power supply and consumption:

Input Voltage	28V
Power consumption	Idle: 0.7W Heating: $< 2W + P_{\text{Heater}}$
Heater power output	Up to 50W

Memory control:

Register size	32-bit
Temperature control	PID parameter, Temperature setpoint, Channel control, Heater duty cycle (manual mode), PWM threshold
Motor control	Steps, direction
Housekeeping	Temperature data, Heater output current, Motor output current, board temperature
Calibration data	Thermistor calibration data

Connectors:

Power	D-Sub-9, pin
Communication	RS-422, D-Sub-9, socket
Heaters	D-Sub-25, socket
Motor control	D-Sub-15, socket
Thermistors	D-Sub-25, pin HD-Sub-62, socket

Size, Weight:

Length	110 mm
Width	104 mm
Height	45 mm
Mass	460 grams

Environmental:

Total Ionizing Dose (TiD)	10 kRAD
Random Vibration (grms)	Lateral: 13 grms Axial: 16.5 grms