

Capabilities

Temperature Sensor Inputs:

- 2x Hi-resolution (5mK RMS noise) 4-wire channels.
- 2x Lo-resolution (10mK RMS noise) 4-wire channels.
- Variable bandwidth single-pole digital filtering of all temperature sensor data.

Compatible sensor types:

- Standard Pt100.
- Lakeshore DT670.
- Low-cost 1N4148 diode.

Auxiliary Analogue Inputs:

- 1x 12-bit input, range 0-10V.
- 1x Pressure sensor input (MKS 970 or Pfeiffer PKR251 compatible).

Servo outputs:

- 2x 9W independent P-I servo loops.
- Linear output for low-noise.
- Tunable P,I and maximum slope constants.
- Programmable alarm and "servo-kill" temperature thresholds.
- Automatic shutdown in case of overload or cable faults.
- Telemetry on heater voltage/current/power.
- 10mK stability.

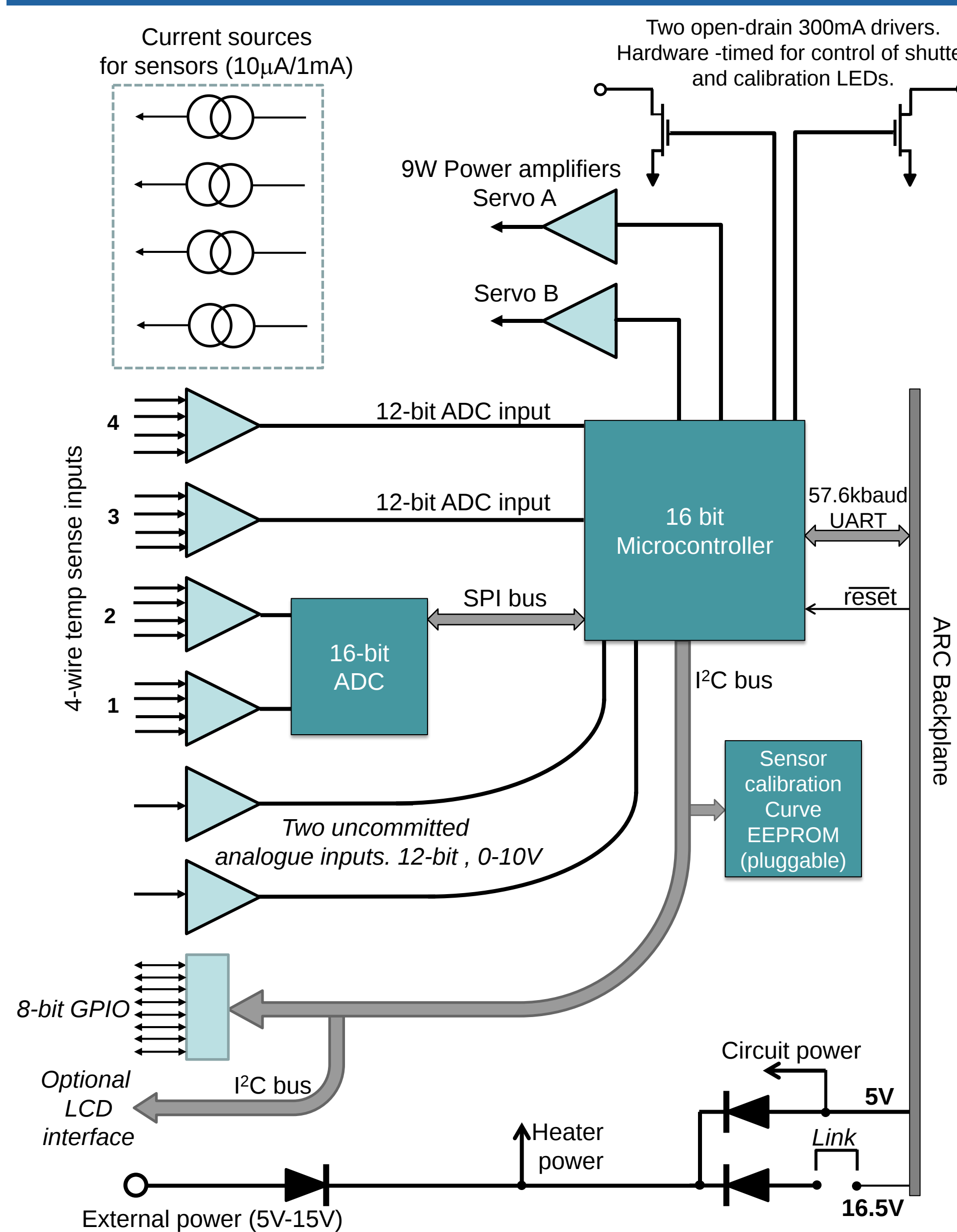
Auxiliary Digital I/O:

- 8-bit Parallel port, bits individually usable as inputs or outputs.
- 2x open-drain MOSFET switches to drive shutter or calibration LED. 300mA max.
- 2x 5V TTL outputs indicating status of the two servos (on/ off/ at temperature).
- 2x 5V TTL temperature alarm outputs.
- 1x 5V TTL Pressure alarm output.

Hardware timers:

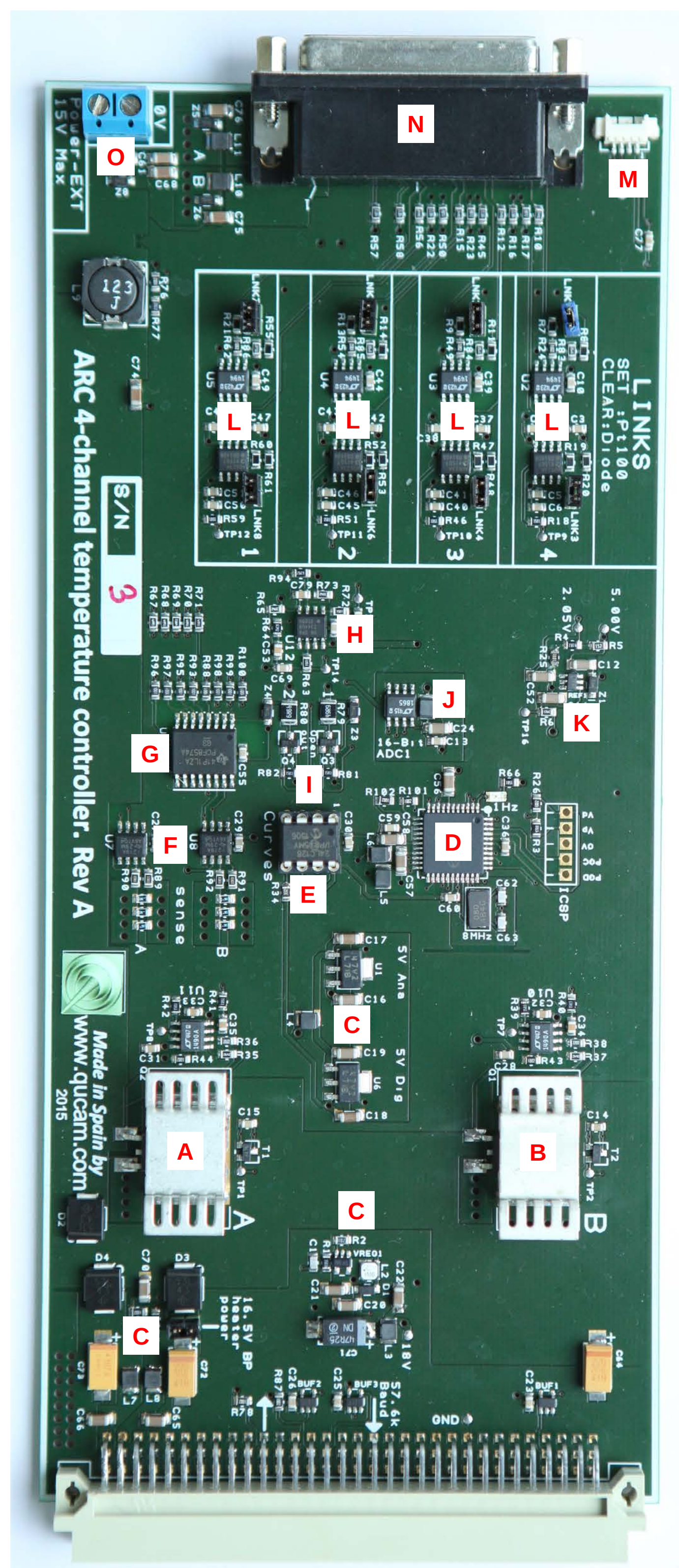
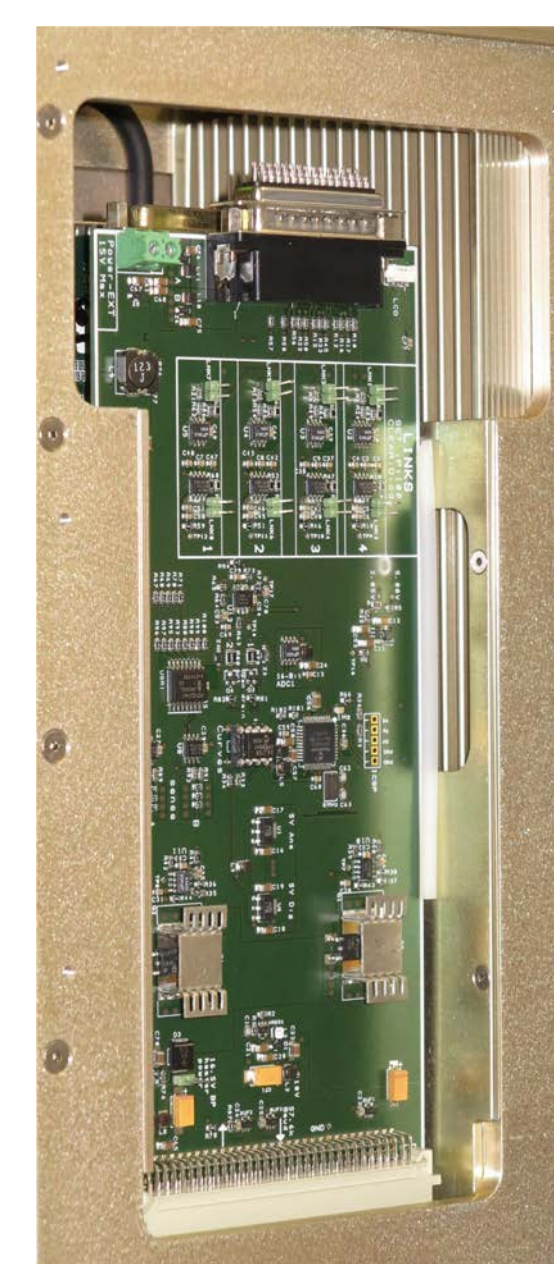
- 2x 16-bit shutter/LED timers.

System schematic



Hardware

4-layer ARC compatible PCB.

Board mounted in
ARC chassis.

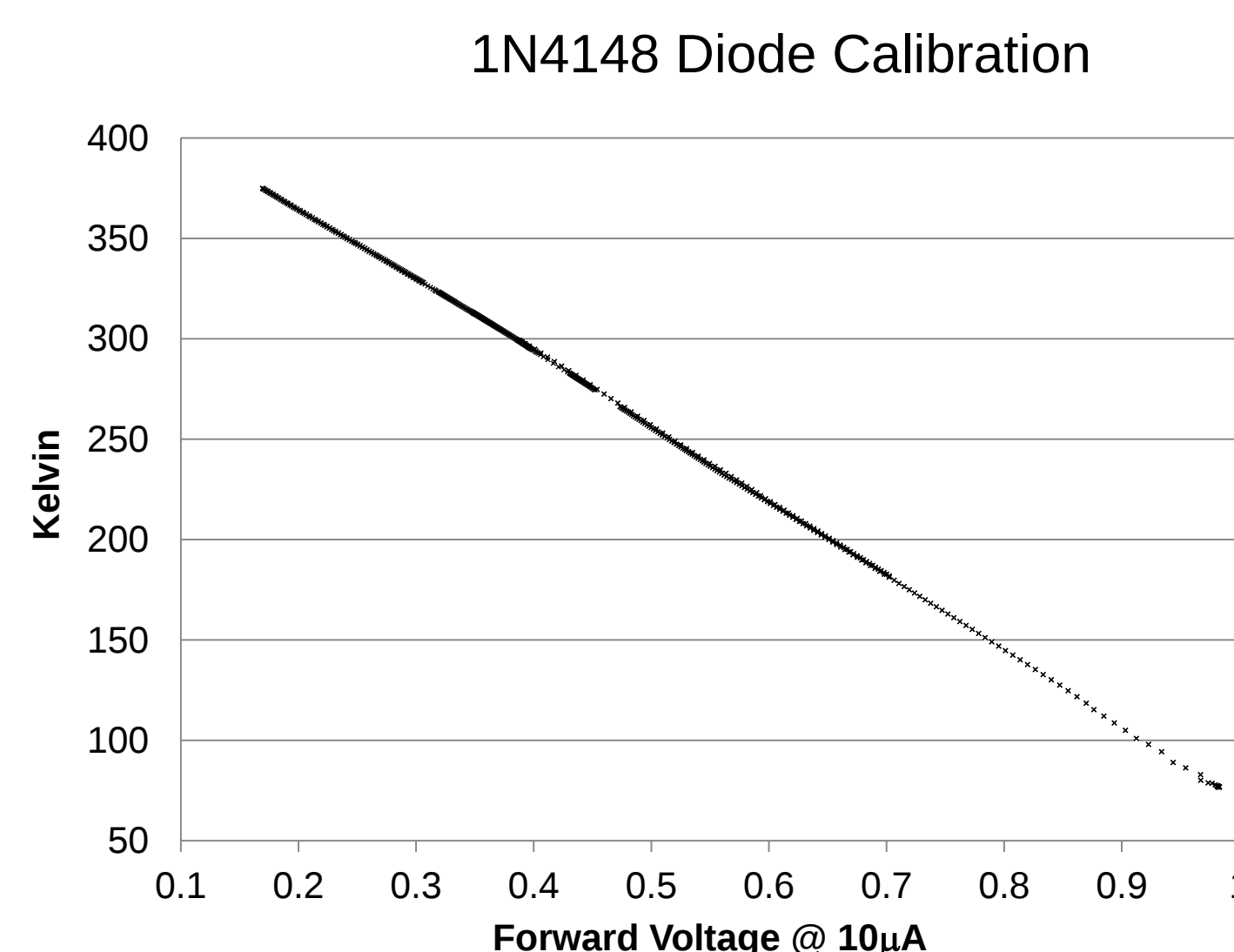
- A: Power Servo A
- B: Power Servo B
- C: Power regulation
- D: 32MHz Microcontroller
- E: External EEPROM with sensor calibration curves.
- F: Current, voltage and power sensing
- G: 8-bit GPIO
- H: 2-channel analogue input
- I: 2x open-drain digital outputs
- J: 16-bit ADC
- K: 10ppm voltage reference
- L: Temperature sensor preamps and current sources
- M: External LCD interface
- N: Sensor/heater/digital-i/o connector
- O: External power input.

LCD display

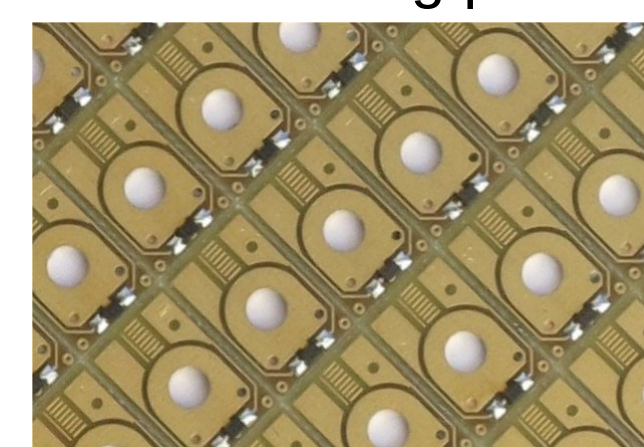


16 page display

Low-cost temperature sensor



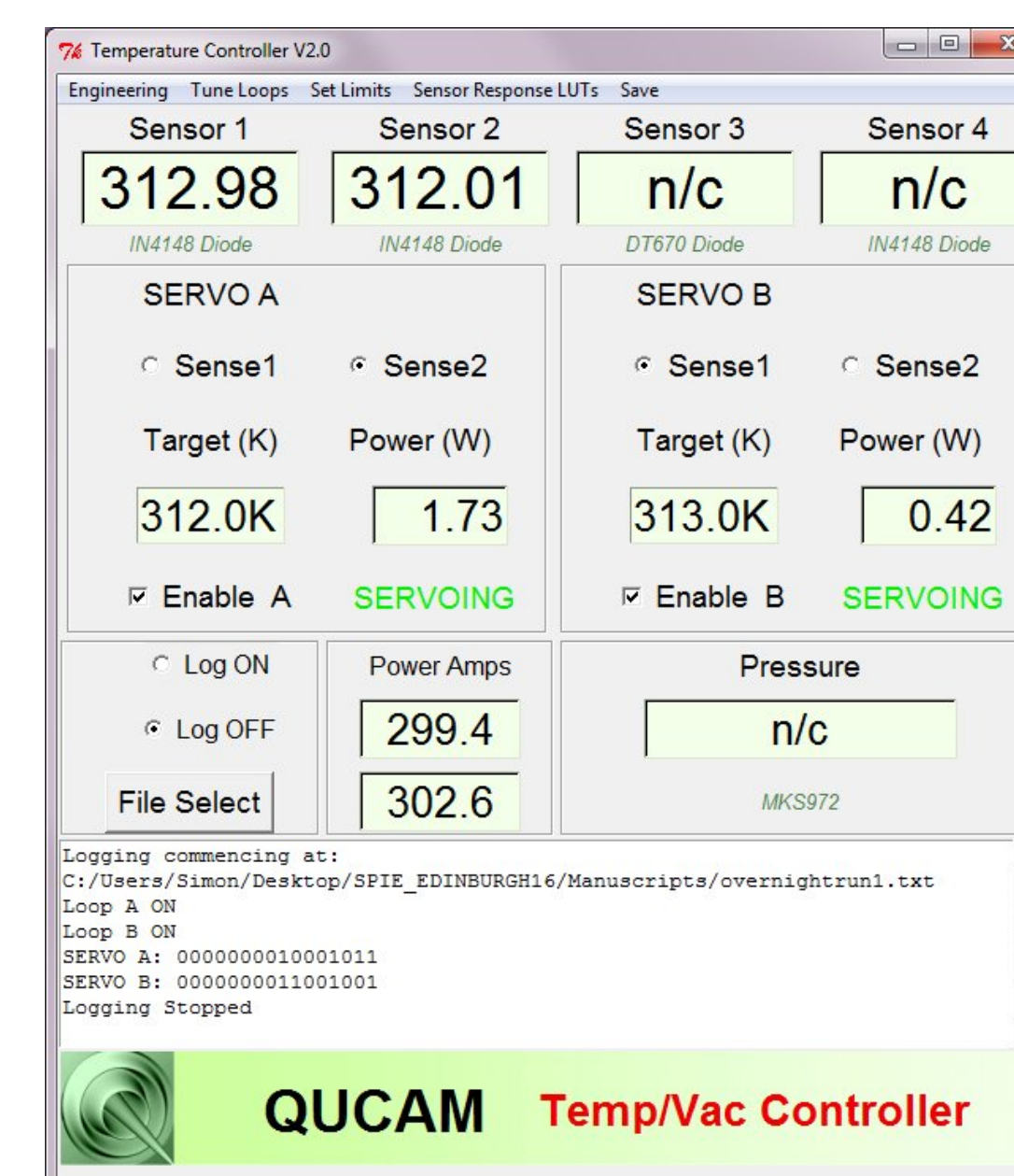
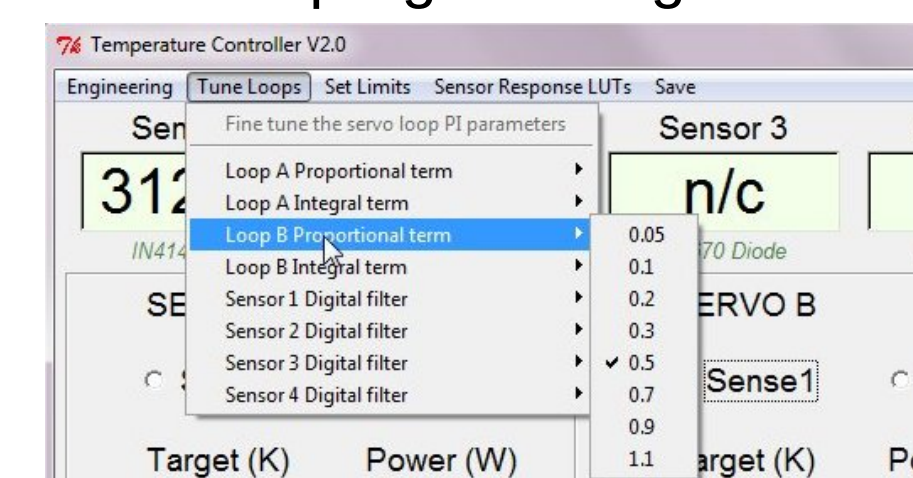
Manufacturing panel

Sensor with leads
attached

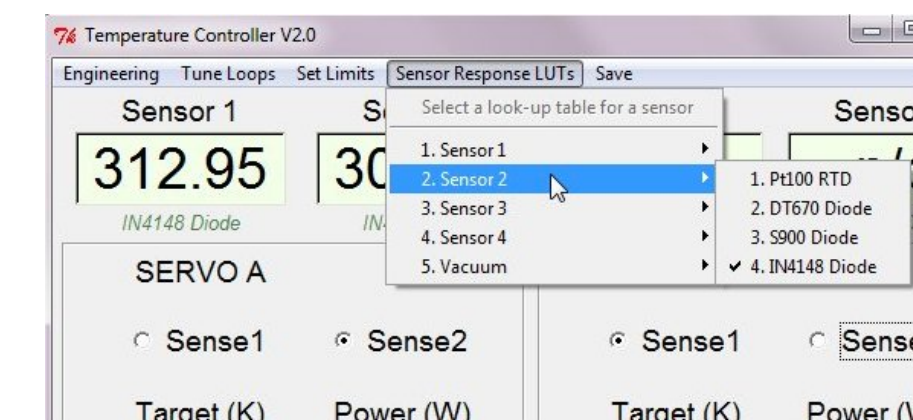
User Interface

The board can be controlled using the ARC SDK and the OWL GUI. It can also be used independently with a USB interface and Python GUI. Servo loops can be freely configured and the telemetry read back.

Main GUI

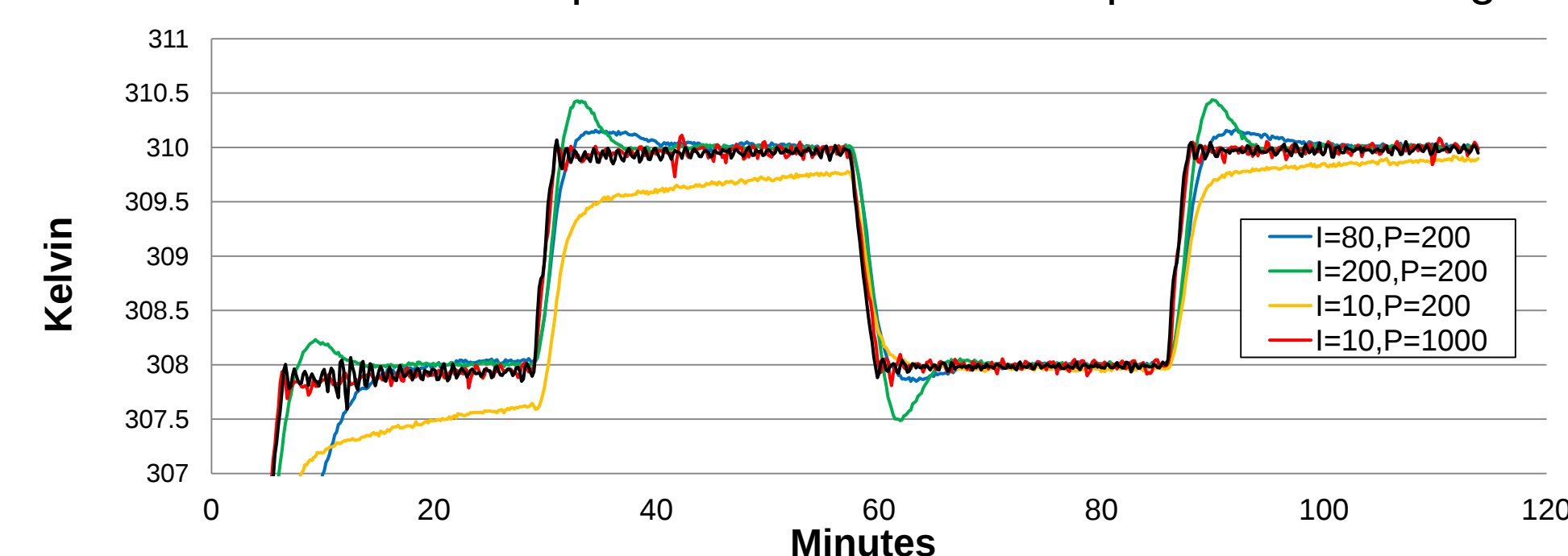
P and I term
programming

Sensor LUT selection

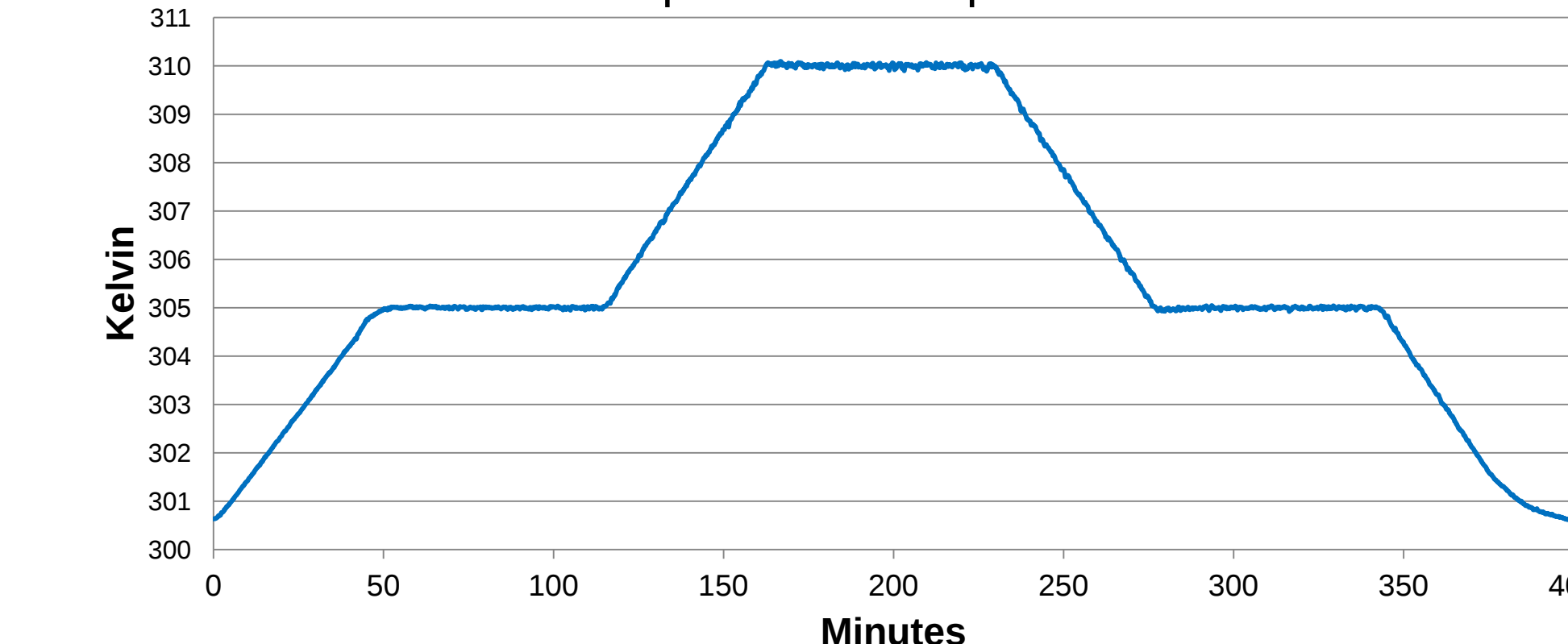


Performance

Transient response for various servo parameter settings



Slope control response



Long-term stability

