

# Imaging Sensor Temperature/Vacuum Controller

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The screenshot shows the 'Temperature Controller V2.0' software interface. It features a menu bar with 'Engineering', 'Tune Loops', 'Set Limits', and 'Sensor Response LUTs'. The main display is divided into several sections:

- RTD A:** Shows a reading of 297.5K (Farnell Pt100) with a target of 310K. The 'Enable A' checkbox is checked.
- Diode A:** Shows a reading of 309.7K (Diode 1N4148) with a power of 43.3%. The 'Diode' radio button is selected, and the status is 'SERVOING'.
- RTD B:** Shows a reading of n/c (Pt100 DIN-751) with a target of 315K. The 'Enable B' checkbox is unchecked.
- Diode B:** Shows a reading of 294.4K (Power Diode expt.) with a power of 0.0%. The 'Diode' radio button is selected, and the status is 'STANDBY'.
- Log ON/OFF:** The 'Log ON' radio button is selected. A 'File Select' button is present.
- Unit Temp:** Shows a reading of 296.9K.
- Pressure:** Shows a reading of 1.0e+3mBar (MKS Vacuum Sensor).

A status log at the bottom displays the following text:

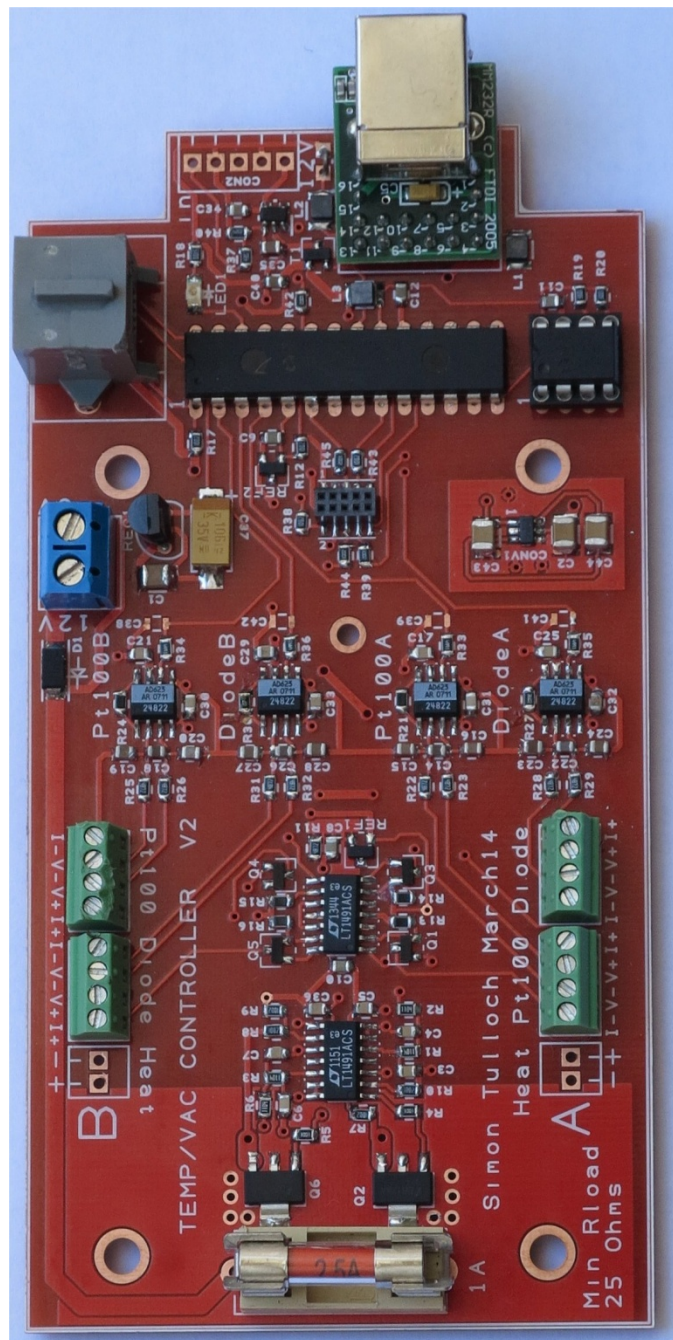
```
Loop B Limit=300K
Loop B ON
Loop B OFF
Loop A limit set to 325K
Loop A ON
Loop A OFF
Loop A ON
Temp controller v2.0 Simon Tulloch Feb 18 2014. smt@qucam.com Serial No:0
```

The interface concludes with a green banner containing the QUCAM logo and the text 'QUCAM Temp/Vac Controller'.

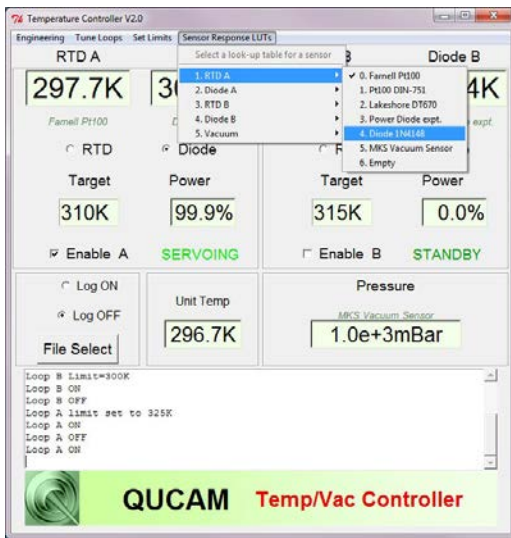
## Key Features

- Measurement range approx 50K to 380K depending on choice of sensor
- Precision constant current excitation (10uA for diodes, 1mA for Pt100) of sensors through a 4 wire connector to eliminate cable effects.
- Measurement resolution 0.1K
- Works with commonly available temperature sensors (Lakeshore DT670, Cryocon S900, standard Pt100) as well as low-cost signal diode sensors (1N4148)
- Two independent control loops with input switchable between a Pt100 and a diode sensor
- Control loops can have Proportional and Integral terms tuned by the user.
- Programmable temperature limits with GUI alarm and TTL output lines.
- Total of 4 simultaneous temperature channels + engineering sensor on PCB
- Servo power outputs have a 4W capacity limited by dissipation in on-board MOSFETs. Linear outputs to avoid EMC compatibility problems.
- EEPROM based sensor curve lookup tables. Preprogrammed with Pt100, 1N4148 and DT670 curves. User can add 3 additional curves for custom sensors.
- RS232->USB2 link with Windows control GUI
- Additional analogue input for interface to MKS vacuum gauges. EEPROM based lookup table translates sensor voltage into mBar units. Can also power MKS gauges.
- Expansion socket offers an I2C bus, two analogue input channels and three TTL i/o pins. Real-time clock option on I2C bus
- GUI has a data logging facility to a user-specified text file.
- Fits on a 130 x 70mm two-layer PCB and runs from a single 12V-16V rail.
- 200mW power consumption.

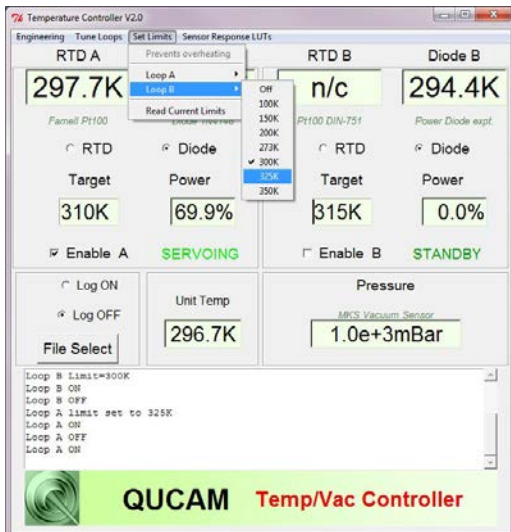
A low-cost alternative to Lakeshore controllers that are over-specified for most CCD imaging applications. Also able to use low-cost signal diodes as temperature transducers. Its small physical profile allows it to be incorporated into commercial CCD controllers.



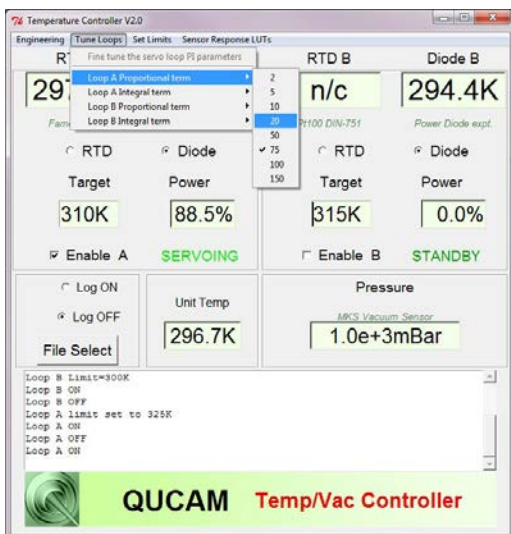
Compact design. The boxed version with integral PSU measures 170 x 80 x 60mm. Other PCB formats available. Larger boards with increased heatsinking will allow higher maximum heater powers. Peltier-driving versions also available. USB2 interface as standard but RS232 also available.



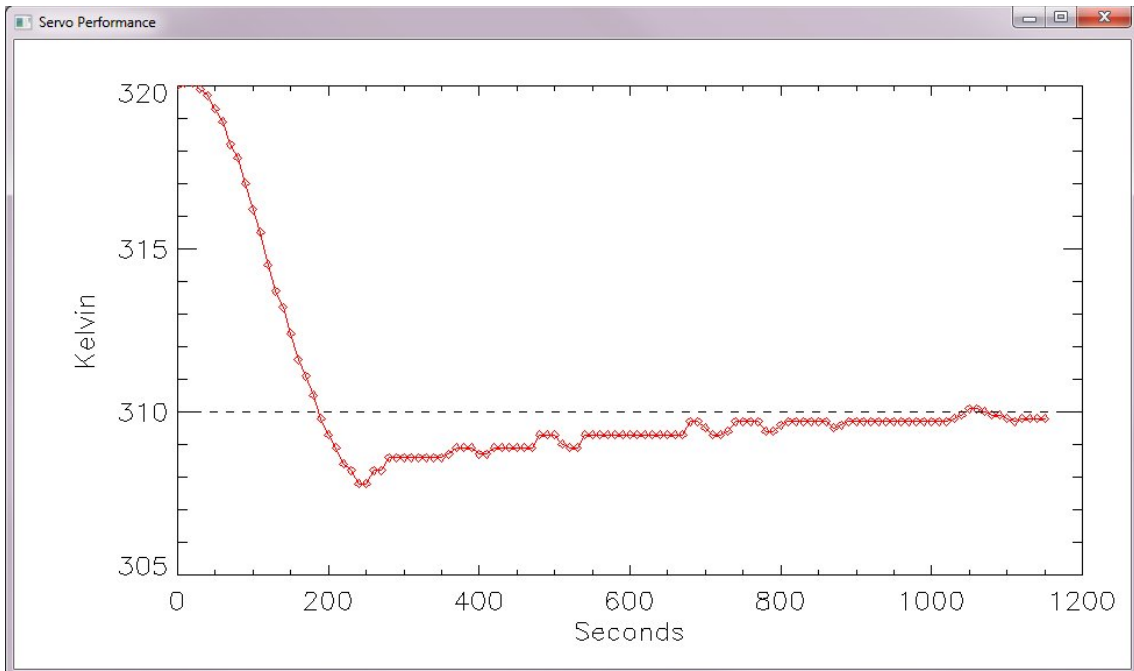
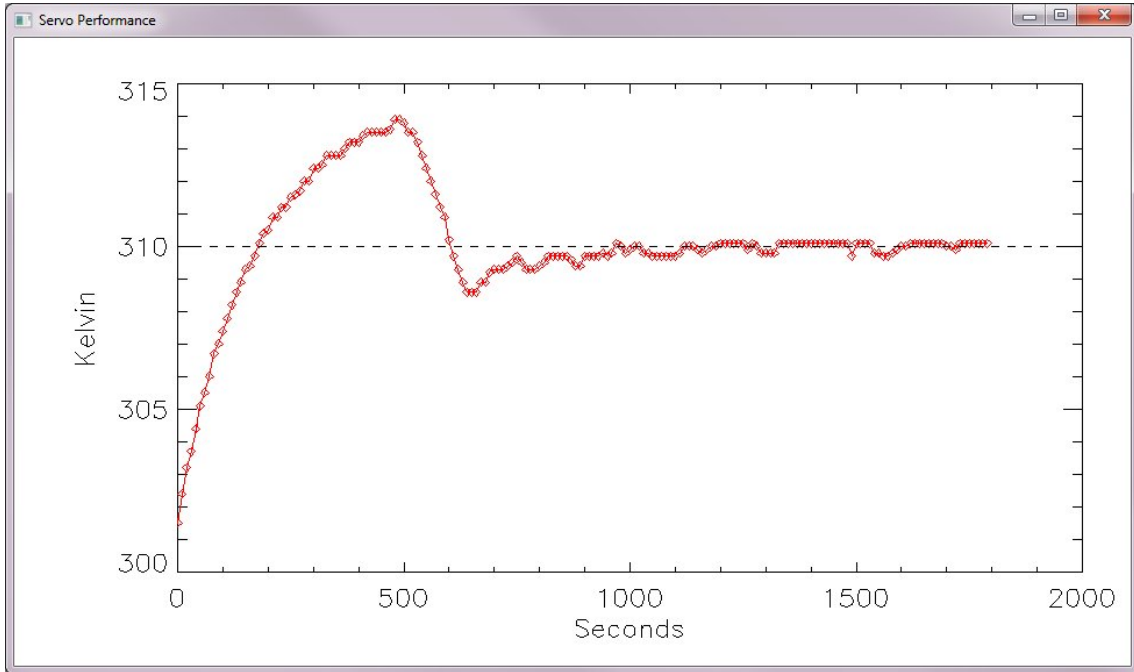
Look-up table sensor response curves are user-selectable. New curves can be downloaded or supplied on a pluggable EEPROM



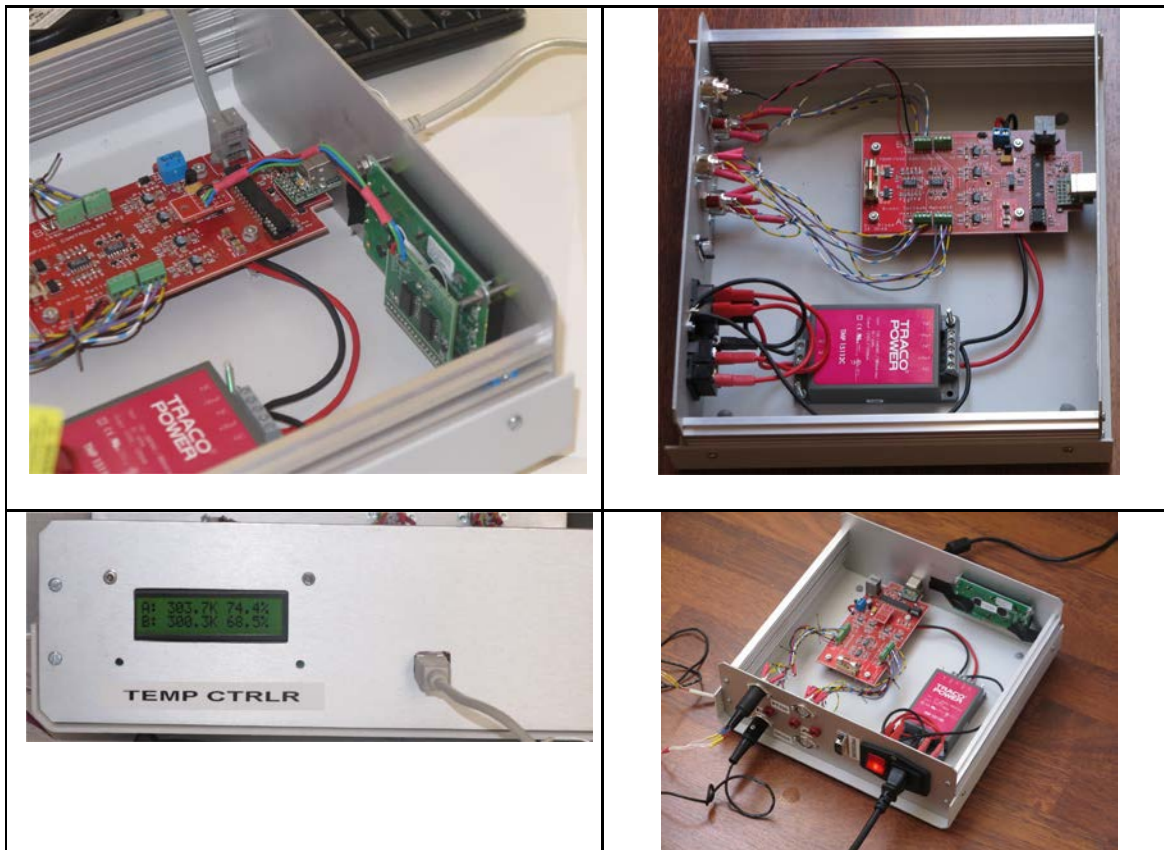
User-programmable temperature limits



PI control loop parameters can be tuned to optimise performance.



Servo performance with a small thermal mass equipped with a heater and a 1N4148 sensor.



Further details available from:

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[www.qucam.com](http://www.qucam.com)

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