S.D.S. TH7: Seven Channel Thermocouple Pi Hat

Scientific Data Systems

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TH7 description

The TH7 is a raspbery pi hat (see figure 1) that provides seven thermocouple inputs. This mean seven different temperatures can be read simultaneously. Its possible uses are logging/monitoring and control of temperature sensitive processes. With with on board PCB temperature measurement it provides full Cold Junction Compensation (CJC). Uncalibrated the TH7 gives a typical accuracy of $\pm\ 2°C$. It also provides two user programmable LEDS and displays the supply voltage to the pi.

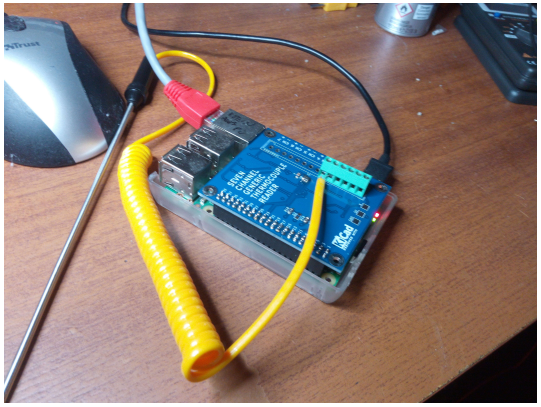

Figure 1: TH7 with a ‘k’ type probe fitted.

The TH7 is a generic thermocouple reader, and therefore should work with any thermocouple. Software defines its micro-volt to temperature and cold junction compensation characteristics. Software support has been written for the 'k' type only currently.

Characteristics

The TH7 offers:

- Full cold junction compensation;
- Loss of/disconnection of thermocouple detection;
- Seven inputs;
- Uses the rasberry pi standard python SPI interface;
- Python coding examples https://github.com/robin48gx/TH7;
- Two user Programmable LEDs;
- On chip PCB temperature measurement;
- Can be used as a general micro-volt reader with a $\approx -6000\mu V \rightarrow 40000\mu V$ range.

Instructions

Connection to terminal block

Connect the thermocouples using the hital tech connectors and ensure the wires make contact with the connector metal clamps (see figure 2).

Conection to the device being measured

Always apply insulation to the thermocouples (i.e. do not ground them). Epoxy resin is often useful for gluing thermcouples to devices under long term temperature test.

Figure 2: image shows wiring for European standard 'k' type thermocouples Wiring (green is plus and the green and white is minus; other countries may use different colour schemes). If the thermoucouple is inserted with incorrect polarity it will read incorrectly and temperature from it will be seen to go down when heat is applied to it.

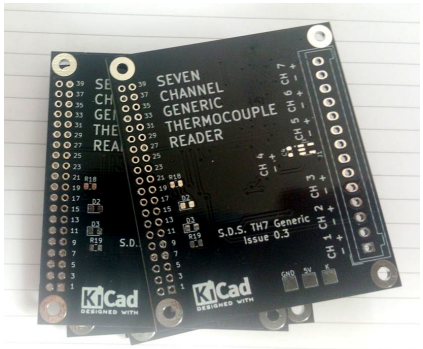

Figure 3: TH7 thermocouple interface PCB/pi Hat

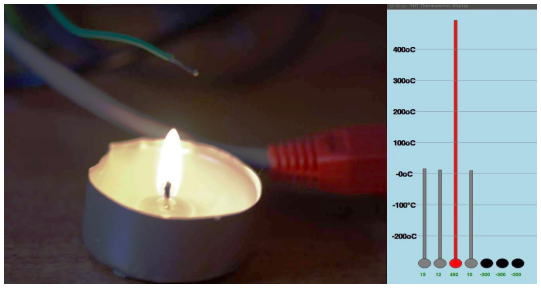

Figure 4: Thermocouple over a tea light flame at circa $500°C$.

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