



RESISTANCE DATA LOGGER (RDL) REV D6 SPECIFICATIONS

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OVERALL SYSTEM PROPERTIES

- Jericho model number: RDL-RevD6
- Temperature measurements: Thermistor only
- Number of channels with temperature measurements: 16
- Number of channels with resistive measurements: 16
- Number of channels with I2C protocol ability: 2
- Number of control signal channels: 1
- Outdoor use: Yes (Weatherproof only)
- USB connection: Male Type B
- USB cable length: 0.9 m
- Timestamp: Yes
- Output format: ASCII (serial communication only)
- Storage: Varies with computer/smartphone. Typical: 1,000,000 temperatures = 28 MB text file.
- Maximum measurement interval: 96 400 000 ms (24 hr)
- Default baud rate: 57 600 bits per sec
- Calibration type: end-to-end 3-point characterization
 - ice bath (0°C / 32°F)
 - warm bath (typically 37°C/99°F)
 - steam point (typically 100°C/212°F)
 - For more information about the calibration process, refer to the Jericho calibration procedures.



PERFORMANCE

A) *Temperature measurements*¹

1) *Measurement range*

- Minimum value: -83°C
- Maximum value: 334°C

2) *Measurement resolution*

- Maximum resolution in the 0-100°C range: 0.09°C
- Minimum resolution in the 0-100°C range: 0.57°C
- Resolution at 0°C: 0.12°C
- Resolution at 100°C: 0.57°C

3) *Overall system uncertainty with uncalibrated thermistors TH-1 or TH-2*²

- Overall measurement accuracy in the 0-100°C range: $< (\pm 0.7^\circ\text{C})$
- Overall measurement accuracy at 0°C : $\pm 0.3^\circ\text{C}$
- Overall measurement accuracy at 100°C : $\pm 0.7^\circ\text{C}$

4) *Overall system uncertainty with calibrated thermistors TH-1 or TH-2*

- [To be determined]

Note: For more details about temperature measurements performance, see graphs of Annex 1 and 2.

¹ Specifications only valid for 10 kohm 1% accurate NTC thermistor

² Uncertainty specifications do not take into account electromagnetic noise nor the self-heating effect.

B) *Resistance measurements*

1) *Measurement range*

- Resistance min = 9.8 Ω
- Resistance max = 10 22 0000 Ω

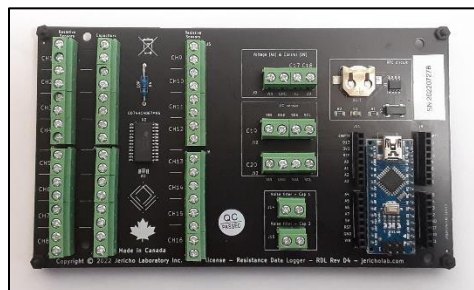
2) *Measurement resolution*

- Resolution at 0°C: 12 Ω
- Resolution at 100°C: 182 Ω
- Minimum resolution: 9.8 Ω
- Maximum resolution: 5 115 200 Ω

3) *Overall system uncertainty*

- Minimum uncertainty: [To be determined]
- Maximum uncertainty: [To be determined]

For more details about the resistance measurements performance, see graphs of Annex 1 and 2.



RDL CONTROLLER

- Outside dimensions (controller): 162 x 94 x 19 mm
- Weight (assembled controller only): ~150g
- Microcontroller: ATmega328P-U-KR (with old bootloader)
- Multiplexer: CD74HC4067 16-channel CMOS
- Real-Time-Clock: DS1307ZN+T&R (No temperature compensation)
- Voltage input: 5V DC (USB)
- Operating temperature (controller): -40°C to 85°C (-40°F to 185°F)
- Maximum operating relative humidity for the controller: 95%
- Analog-to-digital converter (ADC) accuracy: 10-bit
- Tension divider circuit resistor value: 10 k Ω +/- 0.1%
- Microcontroller total memory available (Flash): 30.7 kB
- SRAM memory available: 2 kB
- EEPROM memory available: 1 kB
- Typical maximum acquisition rate for various conditions:

RTC Active ?	MUX_Delay (ms)	Probe Quantity	Display	Baudrate	Real Speed (Hz)	Real Interval (mS)
No	0	1	T_only	115200	666	1.5
No	0	1	T_only	57600	374	2.7
Yes	0	1	T_only	57600	125	8
Yes	0	16	T_only	57600	9	110
Yes	0	16	All Displays	57600	6	157



TH-1 PROBE

- NTC thermistor 10 k Ω , with black epoxy coating
- Probe dimensions: approximately 3.5 x 14 mm
- Probe operating temperature range: -40°C to 125°C (-40°F to 257°F)
- Probe thermal time constant: [To be determined]
- Probe pH tolerance: [To be determined]
- Wire length: 1m
- Wire temperature range: -30°C to 110°C (-22°F to 230°F)
- Wire properties: 26 AWG, 300V, 105°C. Copper multiple conductors.
- Typical power consumption per probe (continuous measurement, 3.3V circuit): 0.1 W
- Typical power consumption per probe (slow speed (1 S/s), 3.3V circuit): 0.01 W
- Origin: Made in China



TH-2 PROBE

- NTC thermistor 10k Ω , stainless steel
- Probe dimensions: $\sim 0.026 \times 0.005$ m diameter
- Probe operating temperature range: -40°C to 125°C (-40°F to 257°F)
- Probe thermal time constant: [To be determined]
- Probe pH tolerance: [To be determined]
- Wire length: 1m
- Wire temperature range: -30°C to 110°C (-22°F to 230°F)
- Wire properties: 26 AWG, 300V, 105 $^{\circ}\text{C}$. Copper multiple conductors.
- Typical power consumption per probe (continuous measurement, 3.3V circuit): 0.1 W
- Typical power consumption per probe (slow speed (1 S/s), 3.3V circuit): 0.01 W
- Origin: Made in China



ANNEX 1: RDL SYSTEM PERFORMANCE WITH UNCALIBRATED THERMISTORS FOR THE 0 TO 100°C RANGE, BASED ON OCTAVE SCRIPT

Fig.1. Resistance measurement resolution as a function of resistance

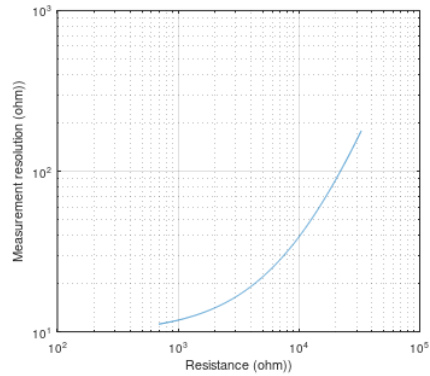


Fig.2. Temperature measurement resolution as a function of temperature

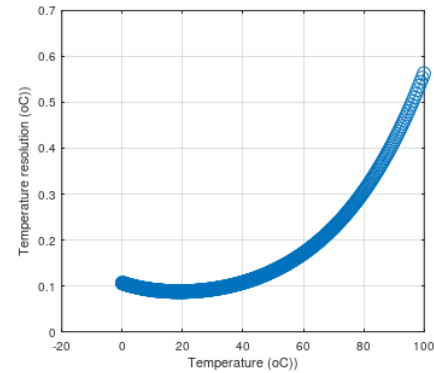


Fig.3. Steinhart-Hart Equation: Temperature as a function of resistance

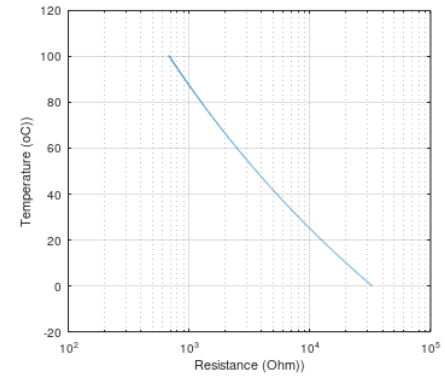


Fig.4. Steinhart-Hart reverse equation: Resistance as a function of temperature

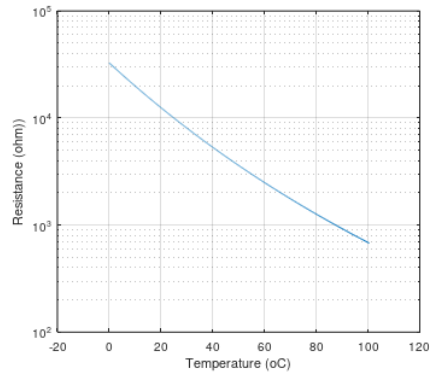


Fig.5. Thermistor-only temperature uncertainty

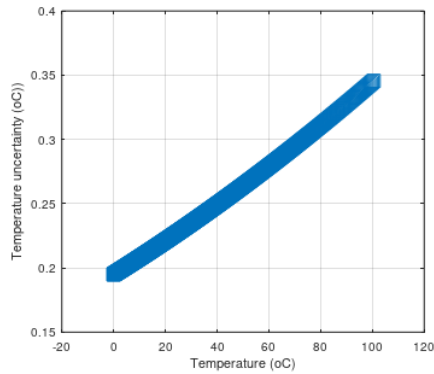
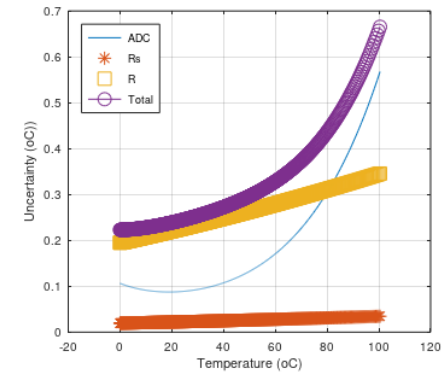


Fig.6. Measurement uncertainty components as a function of temperature





ANNEX 2: RDL SYSTEM PERFORMANCE WITH UNCALIBRATED THERMISTORS FOR THE FULL RANGE, BASED ON OCTAVE SCRIPT

Fig.1. Resistance measurement resolution as a function of resistance

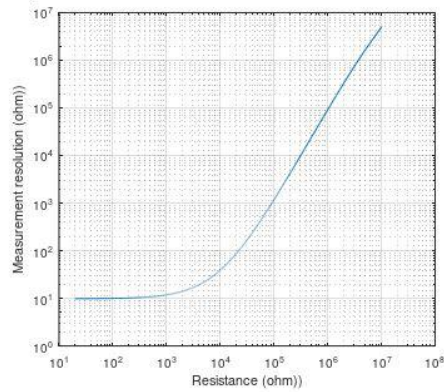


Fig.2. Temperature measurement resolution as a function of temperature

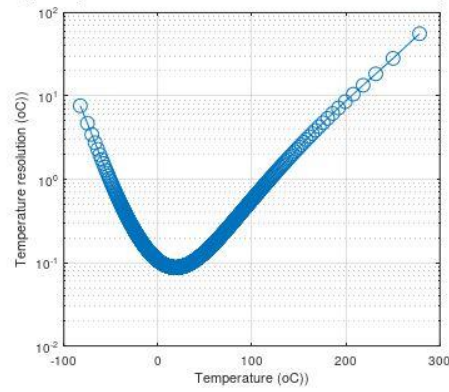


Fig.3. Steinhart-Hart Equation: Temperature as a function of resistance

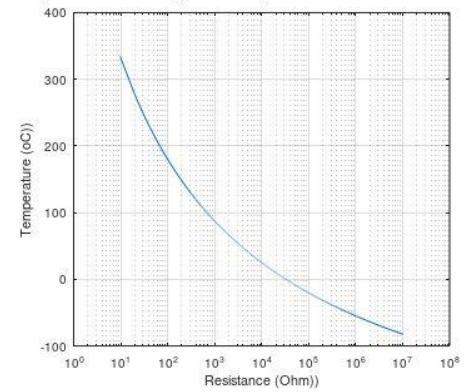


Fig.4. Steinhart-Hart reverse equation: Resistance as a function of temperature

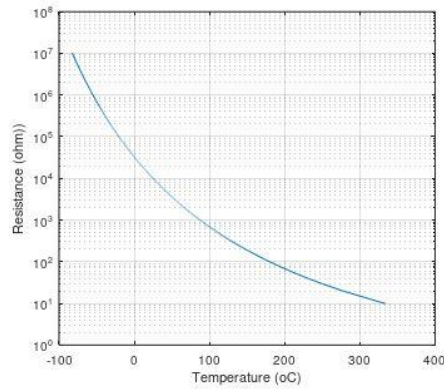


Fig.5. Thermistor-only temperature uncertainty

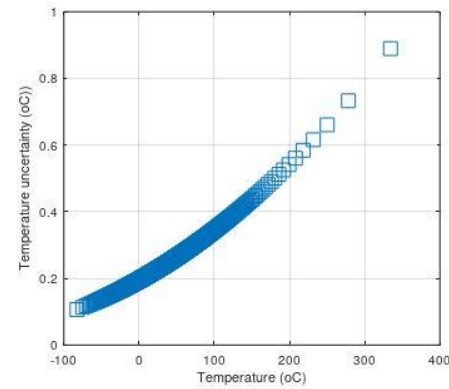


Fig.6. Measurement uncertainty components as a function of temperature

