**Technical Note**

# V-Link® and SG-Link®


## Interfacing an Resistance Temperature Detector (RTD)

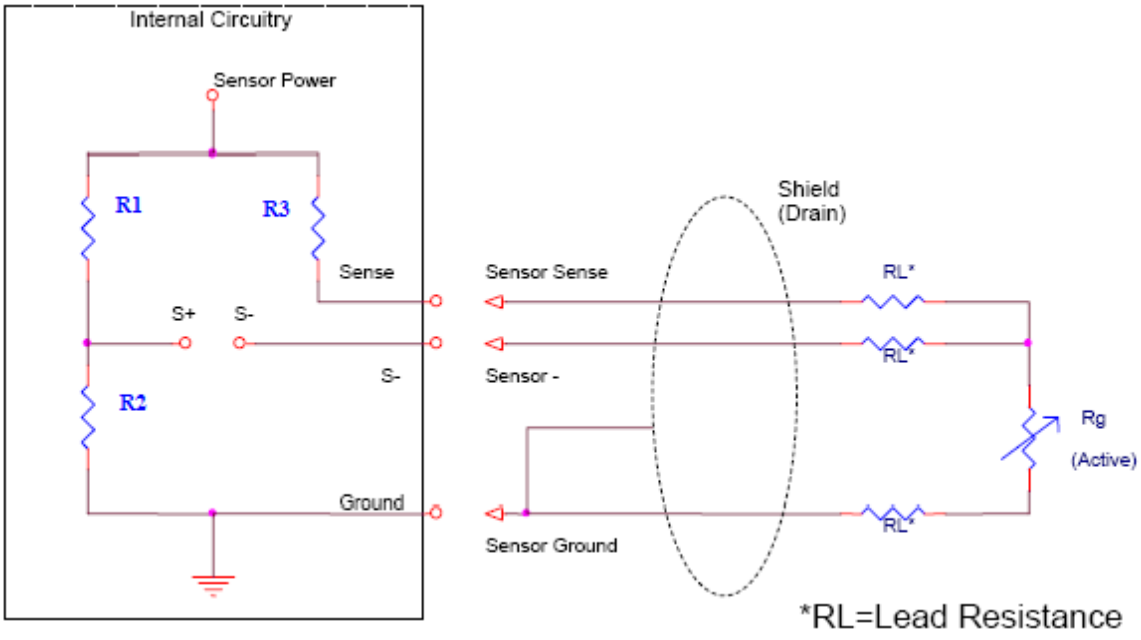
## Overview

Resistance Temperature Detectors, or RTDs, allow for precise temperature measurements with fast response. They work on the basic principle that the resistance of a metal increases with temperature. MicroStrain's V-Link® and SG-Link® are designed to accept an array of bridge sensors. With minor hardware modifications or external circuitry, they can be set up to receive the quarter bridge RTD.

## Detail

A quarter bridge means that the sensor is inserted as one of the four arms of a Wheatstone bridge. By default the V-Link® and SG-Link® are set up to receive full bridge sensors, but resistors may be added internally or externally to allow a channel to receive a quarter bridge sensor. MicroStrain will pre-solder these resistors upon request. **Note:** MicroStrain is not responsible for damage that might incur due to customer soldering.

The circuit diagram below displays the completed circuit. R1, R2, and R3 are the internal resistors which must be added, Rg is the RTD, and RL represents the resistance of the lead wires. Shielded wiring can be purchased from Alphawire (PN 1122, www. Alphawire.com).



The physical locations of the internal bridge completion resistors R1, R2, and R3 will depend on the sensor channel you wish to alter. The plot below displays which resistor positions in the V-Link® and SG-Link® correspond to each part of the bridge.

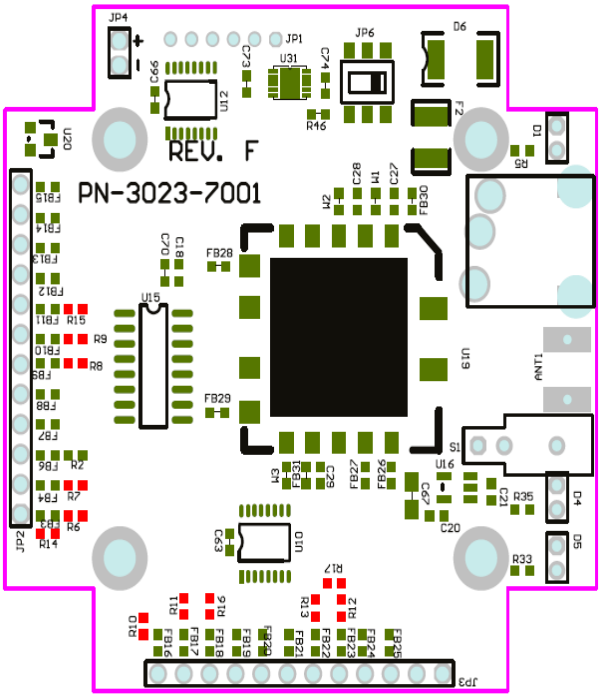
| Above Diagram | Channel 1 | Channel 2 | Channel 3 | Channel 4 |
|---|---|---|---|---|
| R1 | R6 | R8 | R10 | R12 |
| R2 | R14 | R15 | R16 | R17 |
| R3 | R7 | R9 | R11 | R13 |
| Rg | RTD | RTD | RTD | RTD |

V-Link®

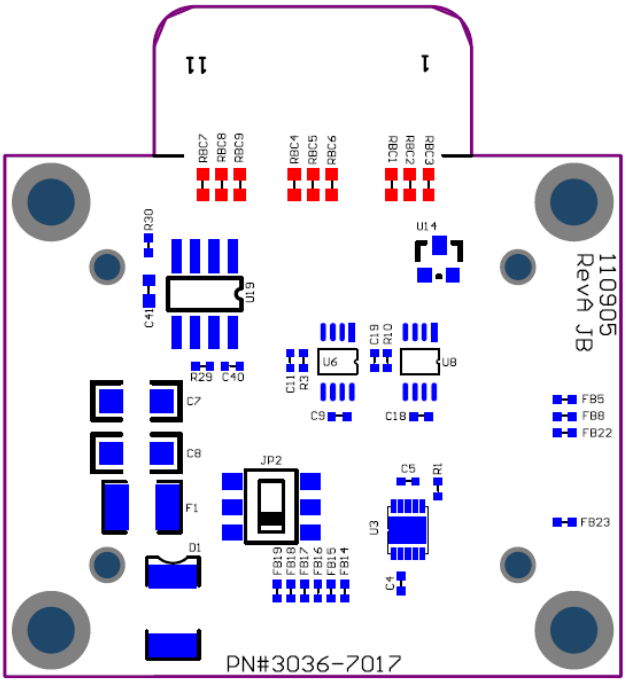
| Above Diagram | Channel 1 | Channel 2 | Channel 3 |
|---|---|---|---|
| R1 | RBC2 | RBC5 | RBC8 |
| R2 | RBC3 | RBC6 | RBC9 |
| R3 | RBC1 | RBC4 | RBC7 |
| Rg | RTD | RTD | RTD |

SG-Link®

The pads for these resistors are found by removing the four screws on the V-Link® or SG-Link® enclosure cover and exposing the circuit boards inside. The circuit overlay shown below displays these locations in red.




V-Link®

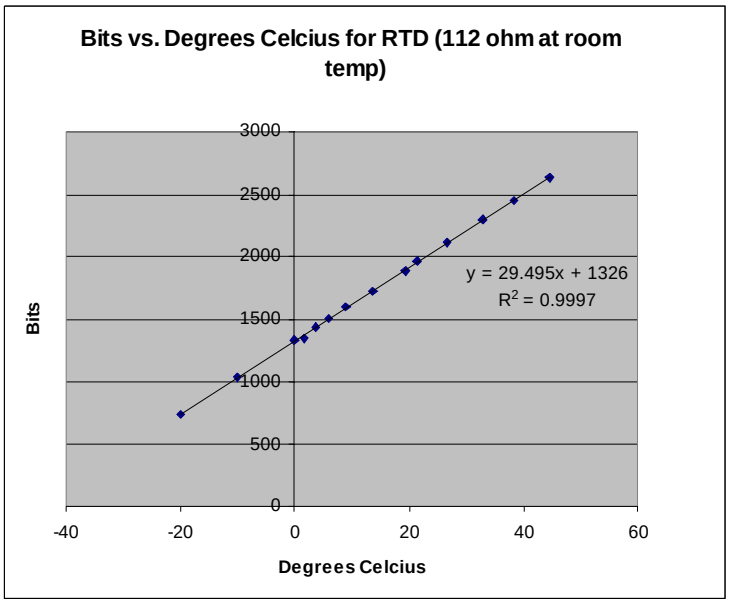



SG-Link®

For a 100-ohm RTD, best results are found by using a relatively high resistance for R1 and R3, such as 10k ohm. With lower values of R1 and R3, sensitivity is increased, but range is limited by V-Link® or SG-Link®.

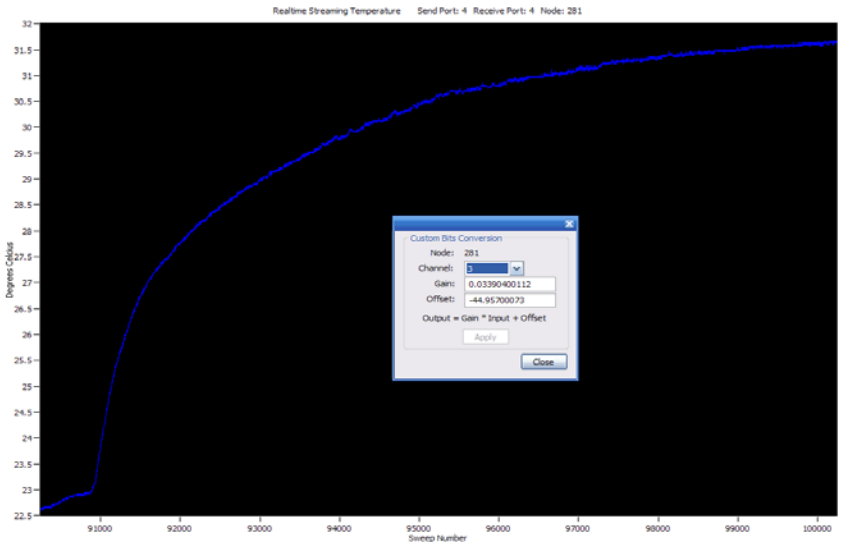
R2 should be chosen to match the resistance of the RTD at a baseline temperature, such as freezing or room temperature.

Example data was collected with R1 = R3 = 10k ohms and R2 = Rg (at room temp) = 112 ohms in the V-Link®. This data is shown below.




Though RTD's are non-linear, the measured sensor response is effectively linear for this range of data.

The linear equation fit to this data can be applied in Agile-Link software to view data in temperature units instead of bits. To do this, right click the node, then select “Plugins” and “Custom Formula.” The Custom Conversion window will appear. Enter the desired gain and offset and your data can now be viewed in degrees. The graph shown is example data collected in degrees Celsius.

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