Thermocouple and RTD Measurement -
NAI's thermal measurement smart function modules provide a thermocouple (TC) and/or resistance temperature detector (RTD)The TR1 provides eight channels which can be individually programmed as a Thermocouple (TC) or a Resistance Temperature Detector (RTD) measurement interface. NAI offers 3 thermal measurement smart function modules. Each are individually configurable for up to 8 isolated measurement channels. TC smart function modules can interface with virtually all thermocouple-type NIST temperature ranges. RTD smart function modules can interface to two, three and four-wire platinum RTD sensor configurations.

Function	Module	Description
RTD	RT1	8 Channels, RTD Measurement
Thermocouple	TC1	8 Channels Thermocouple, Independent 24-bit Sigma-Delta type
RTD or Thermocouple	TR1	8 Channels Independent 24-bit Sigma-Delta type (one for each channel)

Key Features
RT1
- 8 measurement channels
- Higher accuracy and repeatability as compared with thermocouples in applications below 600° C
- Two, three or four-wire mode
- Channels are calibrated at the factory

Built-In-Test (BIT) / Diagnostic Capability
Automatic background BIT testing is provided. Each channel is checked for correct A/D operation using an onboard 100 Ω nominal resistor. The open input detection test applies a 0.5 µA current to the A/D converter inputs. The FPGA then tests for a full-scale reading, indicating an open circuit. Any failure triggers an interrupt, if enabled, with the results available in the status registers. The testing is totally transparent to the user and has no effect on the operation of this module. It can be enabled or disabled. It is enabled by default

TC1
- 8 measurement channels
- Interfaces with virtually all NIST temperature ranges
- Self-powered
- Large temperature range; up to 2300° C
- Accuracy up to ±0.2° C

Automatic Background Built-In-Test (BIT) / Diagnostic Capability
Automatic background BIT testing is provided. Each channel is checked at periodic intervals for correct A/D operation using an internal measurement of an on-board resistor reference. The open input detection test applies a low-level current pulse to the A/D converter inputs and tests for a full-scale 3.3V limit, indicating an open sensor circuit. Any failure triggers an interrupt if enabled, with the results available in the status registers. The testing is transparent to the user and has no effect on the operation of this module. Enabled by default at power on, it may optionally be disabled

TR1
Thermocouple Features
- Interfaces with all standard NIST thermocouple types
- Self-powered
- Large temperature range; up to 2300° C
- Accuracy up to ±0.2° C (thermocouple type dependent)
- Measurement capability for low voltages, microvolt ranges

RTD Features

- Higher accuracy and repeatability as compared with thermocouples in applications below 600° C
- Two, three or four-wire mode
- Channels are calibrated at the factory for Pt100, Pt500, and Pt1000 RTDs

Automatic Background Built-In-Test (BIT) / Diagnostic Capability – Same as TC1

New Embedded Soft Panel

North Atlantic Industries offers the newest cross platform (Windows and Linux) GUI for our Gen 5 products that allows a user to quickly interact with our broad range of modular, I/O cards and rugged embedded computing products. Embedded Soft Panel 2 (ESP 2) is coherent and easy to use with a clean, fleshed out UI with features such as drag and drop dock able windows, a dark and light theme, and multi-language support. Multiple ways to open a board are offered, including saving board opening settings for future use. Interacting with and collecting information on hardware is simple to do with the register editor for reading and writing specific addresses, and the API logger which logs all API library calls including their return status and parameters. ESP 2 has many new features and provides an organized and effortless interface for NAI's next generation products. Available for CentOS 7.4 and 8.2 and Windows 10 x64

Thermocouple Measurement Example - Module TC1 Demo Mode Screen Shots

Ch	BIT	Open	Alarm Lo	Alert Lo	Alert Hi	Alarm Hi
1	D L	D L	D L	D L	D L	D L
2	D L	D L	D L	D L	D L	D L
3	D L	D L	D L	D L	D L	D L
4	D L	D L	D L	D L	D L	D L
5	D L	D L	D L	D L	D L	D L
6	D L	D L	D L	D L	D L	D L
7	D L	D L	D L	D L	D L	D L
8	D L	D L	D L	D L	D L	D L
All	Clear	Clear	Clear	Clear	Clear	Clear

Status

Module Settings | **Temperature Panel** | **Interrupts**

Celsius ▾	Current Core	Current Board	Max Core	Min Core	Max Board	Min Board
Motherboard						
Module						

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Rev. A