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Find the *National Instruments SCXI-1503* at our website: *Click HERE*

SCXI 16-Channel RTD Module

NI SCXI-1503 *NEW!*

- 16 channels of voltage or resistive inputs
- Ideally suited for 2-, 3-, and 4-wire RTD and thermistor measurements
- Programmable gain settings per channel
- 5 Hz filter per channel
- 100 μA current excitation
- 333 kS/s maximum sampling rate
- NI-DAQmx driver software simplifies configuration, scaling, and measurements

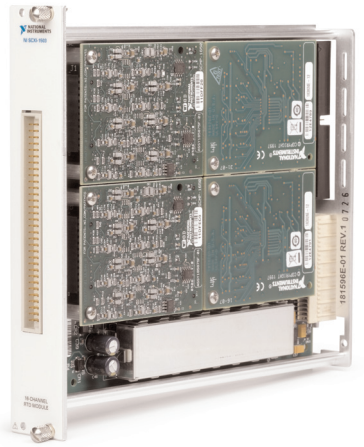
Operating Systems
- Windows XP/2000/NT

Recommended Software
- LabVIEW
- LabWindows™/CVI
- Measurement Studio

Other Compatible Software
- Visual Basic, C, C++

Measurement Services Software (included)
- NI-DAQmx driver software
- Measurement & Automation Explorer configuration utility

Calibration Certificate Included



Overview

The National Instruments SCXI-1503 RTD module provides 16 differential input channels, 16 channels of 100 μA current excitation, and one cold-junction (CJ) sensor channel. The NI SCXI-1503 is ideally suited for measuring resistive transducers, such as RTDs or thermistors. Each channel has an amplifier with a selectable gain of 1 or 100 and a lowpass filter with a 5 Hz cutoff frequency to reject 50/60 Hz noise. The SCXI-1503 can programmatically connect each input to ground, which greatly improves its accuracy by enabling a self-calibration of each input to reduce offset drift errors. You can multiplex several SCXI-1503 modules and other SCXI modules into a single channel on the data acquisition device, greatly increasing the number of analog input signals that you can digitize. The SCXI-1306 is a front mounting terminal block that offers screw-terminal connectivity for the SCXI-1503.

Analog Input

Each of the 16 differential analog input channels feeds to a separate instrumentation amplifier with a programmable gain of 1 or 100. Each channel has a fixed 100 μA current excitation. Then the signal passes through a fixed two-pole, 5 Hz lowpass filter. The CJ sensor input channel reads the sensor temperature from the terminal block. The temperature sensor is for cold-junction compensation of thermocouple measurements. The CJ sensor channel also passes through a 5 Hz lowpass filter to reject unwanted noise on the SCXI-1503. Along with the other 16 input channels, the CJ sensor is multiplexed to the output buffer, where the data acquisition device can read it.

Current Source Operation

SCXI-1503 current sources continuously provide 16 channels of 100 μA current excitation. These current sources are on whenever the SCXI chassis is powered on. SCXI-1503 current sources are designed to be accurate within ±0.05 percent of the specified value with a temperature drift of no more than ±5 ppm/°C. The accuracy and stability of these current sources make them especially well-suited to measuring resistance to a high degree of accuracy.

Calibration

The SCXI-1503 is shipped with a calibration certificate and is calibrated at the factory to the specifications described in *NI SCXI-1503 Specifications*. Calibration constants, stored inside the calibration EEPROM, provide software correction values that your application development software uses to correct the measurements for both offset and gain errors in the module.

Measurement Services Software

NI-DAQmx measurement services software is included with all National Instruments data acquisition and signal conditioning products. This easy-to-use software tightly integrates the full functionality of your NI data acquisition hardware with NI LabVIEW, LabWindows/CVI, and Measurement Studio for Visual Basic software. High-performance features include multidevice synchronization, networked measurements, and DMA data management. Bundled with NI-DAQmx, the Measurement & Automation Explorer (MAX) utility simplifies the configuration of your measurement hardware with device test panels, interactive

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measurements, and scaled I/O channels. NI-DAQmx also provides numerous example programs for LabVIEW and other application development environments to get you started with your application quickly.

Terminal Block	Part Number	Type
SCXI-1306	779698-01	Screw terminals/front mounting

Table 1. Terminal Block Option for SCXI-1503

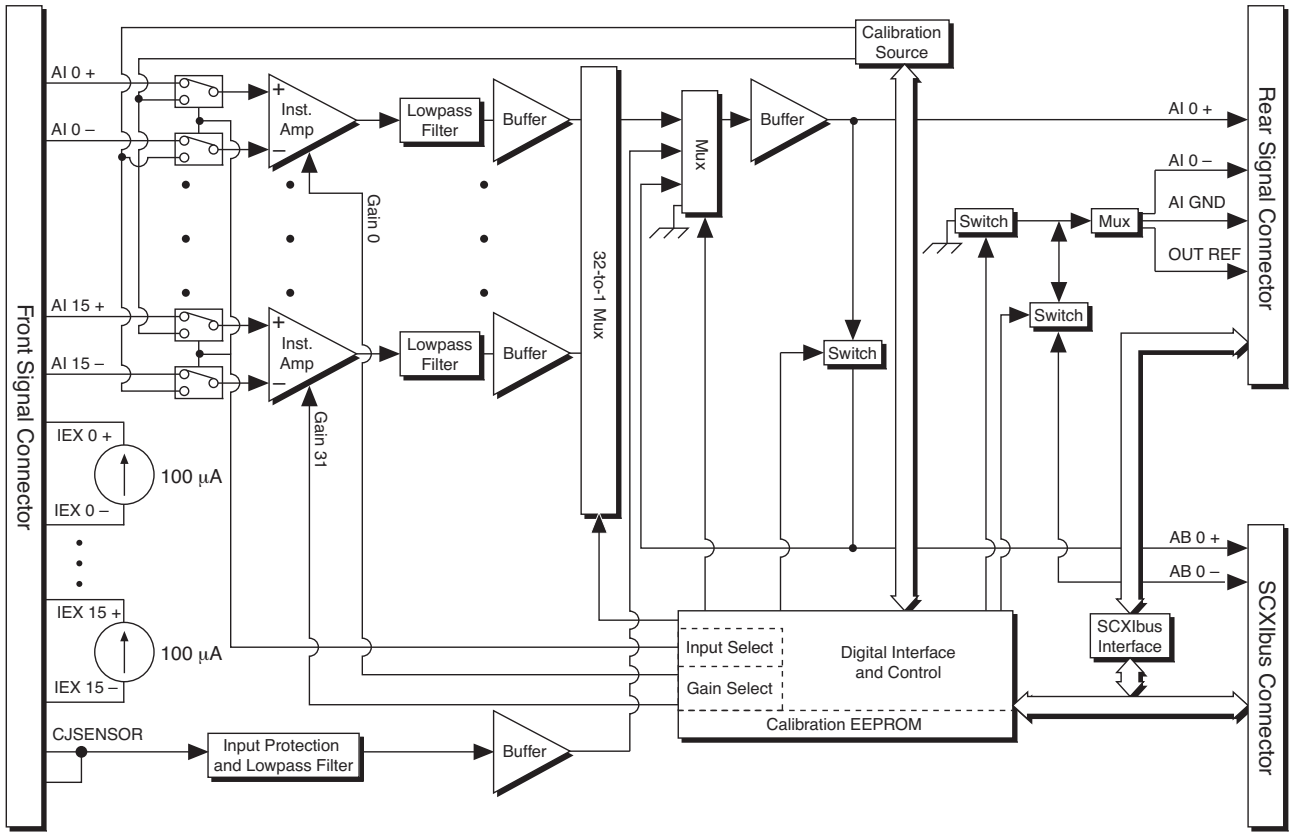


Figure 1. SCXI-1503 Block Diagram

Ordering Information

NI SCXI-1503 779638-01

NI SCXI-1306 (terminal block) 779698-01

For information on extended warranty and value-added services, visit **ni.com/services**.

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/scxi**.

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Specifications

>> For complete specifications, see the *NI SCXI-1503 Specifications* manual at **ni.com/manuals**.

Specifications are typical at 25 °C unless otherwise noted. Specifications do not include transducer error.

Input Characteristics

Number of channels ..... 16 differential
Input coupling ..... DC
Input signal ranges ..... ±100 mV (gain = 100) or ±10 V (gain = 1)
Input overvoltage protection
  Powered on ..... ±42 VDC
  Powered off ..... ±25 V
  Inputs protected ..... AI<0..15>
  CJ sensor input protection ..... ±15 VDC powered on or off

Transfer Characteristics

Nonlinearity ..... 0.005% FSR
Input offset error (RTI)
  Gain = 1
    Calibrated[1] ..... ±650 µV max
      ±250 µV typ
    With autozero enabled[2] ..... ±300 µV max
      ±150 µV typ
  Gain = 100
    Calibrated[1] ..... ±25 µV max
      ±10 µV typ
    With autozero enabled[2] ..... ±10 µV max
      ±5 µV typ
Gain error (relative to calibration reference)
Gain = 1 or 100
Calibrated[1] ..... 0.074% of reading max
  0.02% of reading typ

[1]Assumes 1,000 point average, 25 °C ±10 °C over one year.

[2]Assumes 1,000 point average, ±1 °C of autozero temperature.

RTD Measurement Accuracy

Measured Temperature °C	100 W Max °C	100 W Typ °C	1000 W Max °C	1000 W Typ °C
-100 to 0	0.60	0.23	1.09	0.46
0 to 25	0.62	0.23	1.11	0.47
25 to 100	0.69	0.25	1.20	0.49
100 to 500	1.11	0.37	1.68	0.65
500 to 1200	2.06	0.65	2.81	1.04

Notes: The accuracies in this table reflect using the module in 4-wire mode. They do not include errors from the RTD such as lead-wire errors when using 2- or 3-wire connections. The accuracies assume autozero is enabled and the environmental conditions are 25 °C ±10 °C over a one-year period.

These accuracies were computed using a standard RTD with a TCR of 3851.

Amplifier Characteristics

Input coupling ..... DC
Input impedance
  Normal powered on ..... >1 GΩ
Input bias current ..... ±2.8 nA
CMRR characteristics (DC to 60 Hz)
  Gain 1 ..... -75 dB min
    -90 dB typ
  Gain 100 ..... -106 dB min
    -110 dB typ
Output range ..... ±10 V
Output impedance ..... 91 Ω

Dynamic Characteristics

Minimum scan interval (per channel, any gain)
  ±0.012% accuracy ..... 3 µs
  ±0.0061% accuracy ..... 10 µs
  ±0.0015% accuracy ..... 20 µs
Noise characteristics (RTI)
  Gain = 1
    10 Hz to 1 MHz ..... 100 μV_{rms}
  Gain = 100
    10 Hz to 1 MHz ..... 1 μV_{rms}
    0.1 to 10 Hz ..... 0.5 μV_{pp}

Filter

Cutoff frequency (-3 dB) ..... 5 Hz
NMR (60 Hz) ..... -40 dB min
Step response characteristics (gain 1 or 100)
  To 0.0015% ..... 0.6 s

Stability

Recommended warm-up time ..... 20 min
Offset temperature coefficient
  Gain = 1 ..... ±35 µV/°C max
    ±10 µV/°C typ
  Gain = 100 ..... ±1.5 µV/°C max
    ±0.5 µV/°C typ
Gain temperature coefficient
  (gain 1 or 100) ..... ±15 ppm/°C max
    ±5 ppm/°C typ

Excitation

Channels ..... 16 single-ended outputs
Current output ..... 100 µA
Accuracy ..... ±0.05%
Temperature drift ..... ±5 ppm/°C
Output voltage compliance ..... 10 V
Maximum resistive load ..... 100 kΩ
Overvoltage protection ..... ±40 VDC
Measurement Category ..... CAT I

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Power Requirements from SCXI Backplane

V+	18.5 to 25 VDC, 170 mA
V-	-18.5 to -25 VDC, -170 mA
+5 V	+4.75 to 5.25 VDC, 50 mA

Environmental

Operating temperature	0 to 50 °C
Storage temperature	-20 to 70 °C
Humidity	10 to 90% RH, noncondensing
Maximum altitude	2,000 m
Pollution degree (indoor use only)	2

Physical

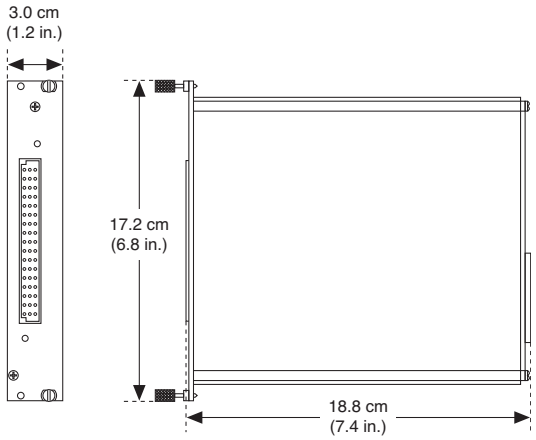


Figure 2. SCXI-1503 Dimensions

Weight	745 g (26.3 oz)

Maximum Working Voltage

Maximum working voltage refers to the signal voltage plus the common-mode voltage.

Signal + common mode	Each input should remain within ±10 V of AI GND

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN-61010-1
- UL 61010-1, CSA 61010-1

Note: For UL and other safety certifications, refer to the product label or visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note: For EMC compliance, operate this device according to product documentation.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Note: Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit **ni.com/environment/weee.htm**.

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We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit **ni.com/ssp**.

Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with **ni.com/pxiadvisor**.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit **ni.com/calibration**.

Repair and Extended Warranty

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit **ni.com/services**.

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