INSTALLATION GUIDE

SCXI-MS100 TEMPERATURE MEASUREMENT SYSTEM

This guide describes how to install and use the SCXI-MS100 temperature measurement system.

Introduction

The SCXI-MS100 is a complete virtual-instrument based temperature and voltage measurement system for Windows 95 and Windows 3.1. The system includes the software and hardware you need to acquire and log up to 32 channels of data without any user programming. You can configure each channel for thermocouple or voltage input, and you can add additional SCXI modules to expand the number of channels to 128.

The SCXI-MS100 is ideal for multichannel temperature applications in many environments, such as process monitoring, industrial automation, and instrumentation. The SCXI-MS100 combines SCXI and multifunction data acquisition (DAQ) products to take highly accurate temperature measurements with thermocouples, which require amplification, cold-junction compensation (CJC), and high-resolution ADCs. In addition, the included VirtualBench software provides an interface which allows you to display and log data.

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What You Need to Get Started

- ❑ SCXI-1000 chassis and documentation, with the following equipment already installed:
  - SCXI-1102 32-channel thermocouple amplifier and documentation
  - SCXI-1349 adapter board
  - Three SCXI-1360 front filler panels
  - Three SCXI-1361 rear filler panels
- ❑ AT-MIO-16XE-50 high-resolution multifunction I/O board and documentation
- ❑ SCXI-1303 32-channel isothermal terminal block and documentation
- ❑ *SCXI-MS100 Temperature Measurement System Installation Guide*
- ❑ SCXI-1349 2 m cable and documentation
- ❑ SCXI Getting Started Pack
- ❑ Power cable
- ❑ The following National Instruments software and documentation:
  - VirtualBench Logger
  - NI-DAQ for PC Compatibles
- ❑ Two cable tie wraps

Installation

Perform the following steps to set up your SCXI-MS100 system.

Installing Your Software

NI-DAQ

1. Insert Disk 1 of your NI-DAQ software.
2. Run `setup.exe` from Disk 1.
3. You will be prompted to **Select the type of application you will be using NI-DAQ with**. Select the **Measure, VirtualBench, ComponentWorks (Minimal Installation)** option and press **Next**.
4. Follow the installer prompts through the rest of the installation.

VirtualBench

1. Insert Disk 1 of the VirtualBench software.
2. Run `setup.exe` from Disk 1.
3. Follow the installer prompts through the rest of the installation.

Installing Your AT-MIO-16XE-50 Board

1. Turn off the power to your computer.
2. Record the serial number of your AT-MIO-16XE-50 board on the appropriate form in the *Customer Communication* appendix of your *AT-MIO E Series User Manual*.
3. Install your board into one of the AT expansion slots in your computer. There are no jumpers or DIP switches to set.
4. Turn on the power and start your computer.

Signal Connection

To connect the signal wires to the SCXI-1303 terminal block, refer to Figures 1 and 2 as necessary while you perform the following steps:

1. Remove the grounding screw of the SCXI-1303 top cover with a Phillips-head screwdriver.
2. Snap out the top cover by placing a flathead screwdriver in the groove at the bottom of the terminal block and pushing down on the screwdriver, as shown in Figure 1.

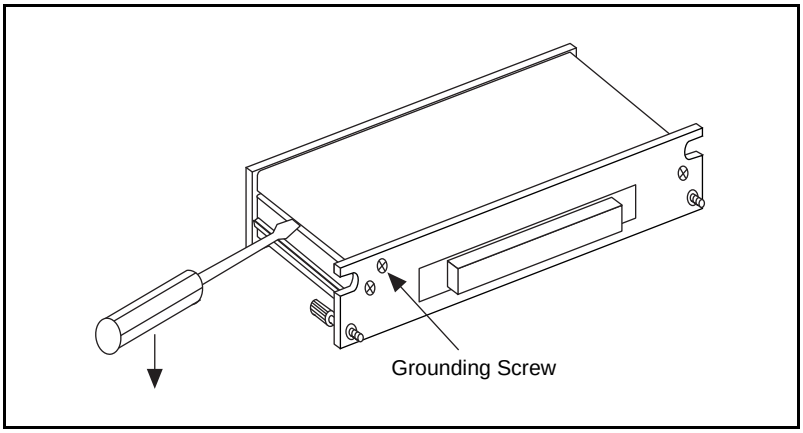


Figure 1. Removing the SCXI-1303 Cover

3. Loosen the strain-relief screws with a Phillips-head screwdriver and slide the thermocouple (included in your kit) through the front panel strain-relief opening. When you add your own thermocouples or wires, if they are not distributed evenly and there are gaps in the strain-relief opening, add insulation or padding as needed for even closure.
4. Connect the wires to the SCXI-1303 screw terminals by inserting the wires into the terminals and tightening the screws with a flathead screwdriver. Refer to Figure 2 to install the thermocouple on channel 0.
5. Tighten the strain-relief screw.
6. Snap the top cover back into place.
7. Reinsert the grounding screw to ensure proper shielding.

Figure 2 shows the SCXI-1303 terminal block parts locator diagram.

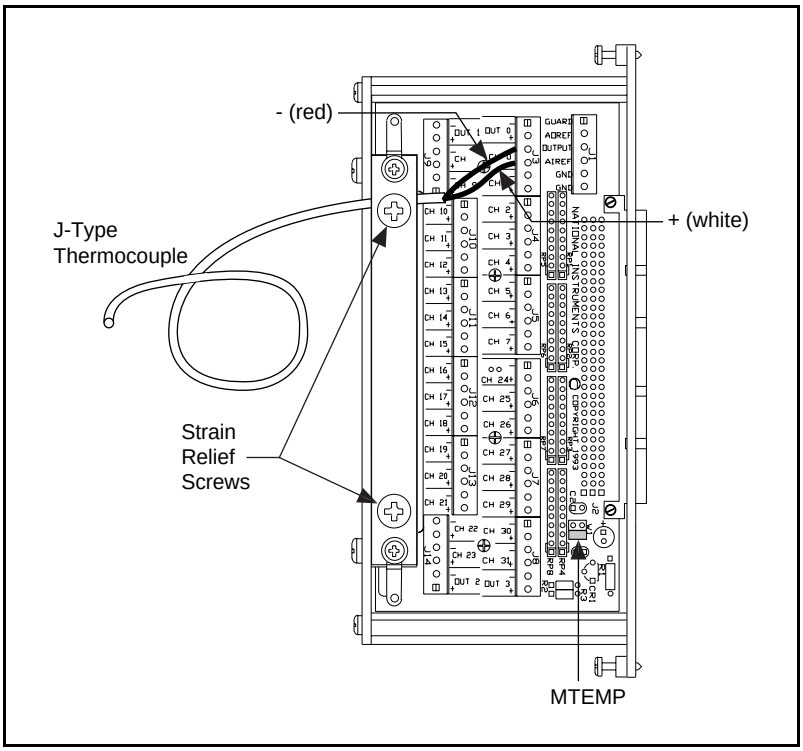


Figure 2. Thermocouple Connected to Channel 0 of the SCXI-1303 Terminal Block

You are ready to connect the SCXI-1303 terminal block to the SCXI-1102 module front connector.

Connecting the SCXI-1303 to Your SCXI-1102 Module

To connect the SCXI-1303 terminal block to your SCXI-1102 module front connector, refer to Figure 3 and perform the following steps:

1. Turn off your SCXI-1000 chassis.
2. Connect the SCXI-1303 terminal block to the SCXI-1102 module front connector.
3. Make sure that the SCXI-1102 module top and bottom thumbscrews do not obstruct the rear panel of the SCXI-1303 terminal block.

4. Tighten the top and bottom thumbscrews on the back of the terminal block to hold it securely in place and to ensure proper shielding.
5. Turn the SCXI-1000 chassis on.

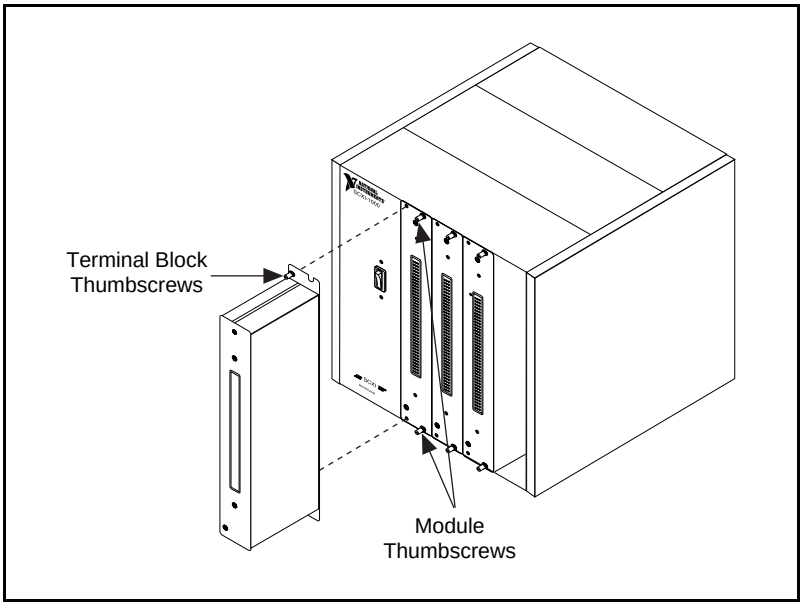


Figure 3. Connecting the SCXI-1303 Terminal Block to the SCXI-1102 Module

☞ **Note:** ***Place the SCXI chassis away from any extreme temperature differential to minimize the temperature gradient inside the terminal block and maintain its isothermal nature for accurate cold-junction compensation.***

Installing the SCXI-1349 Shielded Cable

Refer to Figures 4 and 5 as you perform the following steps to install the SCXI-1349 cable:

1. Turn off the power to your computer and the SCXI-1000 chassis.
2. Connect one end of the SCXI-1349 cable to the 68-pin connector of the SCXI-1349 adapter board (already installed on the rear of the SCXI-1102 module).
3. Connect the other end of the cable to the I/O connector of the AT-MIO-16XE-50 board.

4. Secure the cable to a fixed object with the tie wraps to relieve the strain on the cable. Strain relief is important because the SCXI-1349 shielded cable has a long stiff backshell that can exert leverage on the MIO board connector.

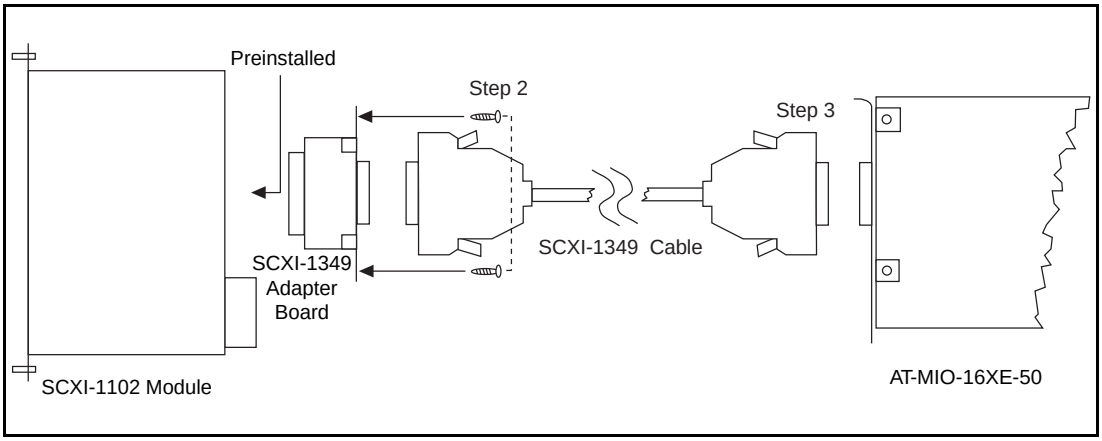


Figure 4. Connecting the SCXI-1349 Cable to Your SCXI-1102 Module and DAQ Board

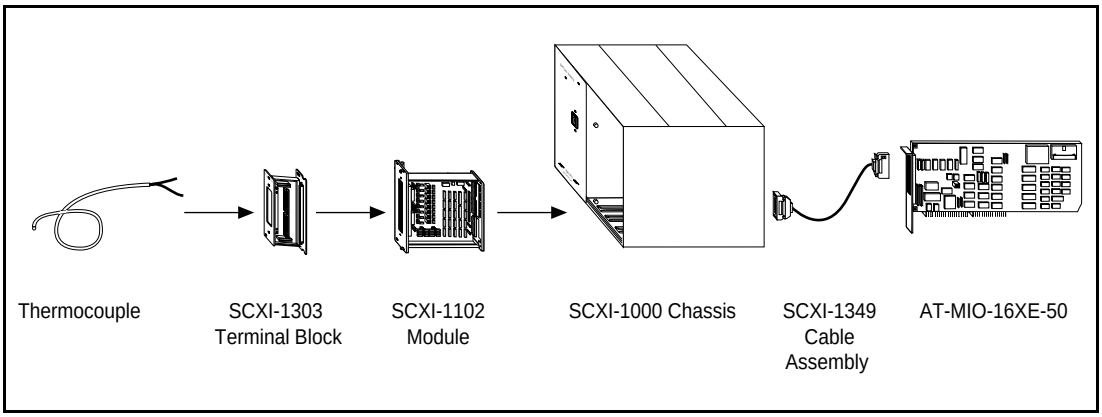


Figure 5. The Complete Installation

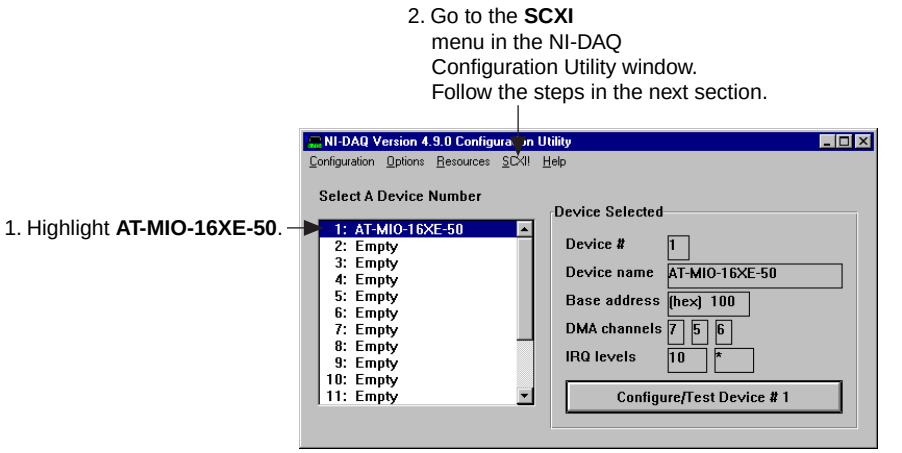
Software Configuration

Configuring Your AT-MIO-16XE-50

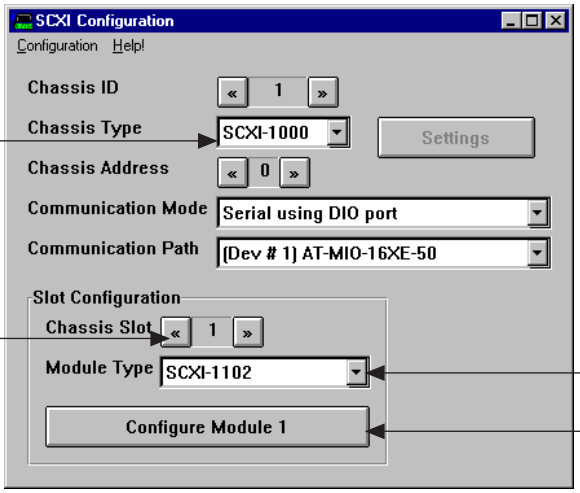
The first time you turn on your computer after installing the AT-MIO-16XE-50, NI-DAQ will recognize and assign resources to the board through the device manager (Windows 95) or `NI-PNP.exe` (Windows 3.1).

From Windows, run the NI-DAQ Configuration Utility. It will prompt you to select a device number for your board. Select **Device Number 1** and press **OK**.

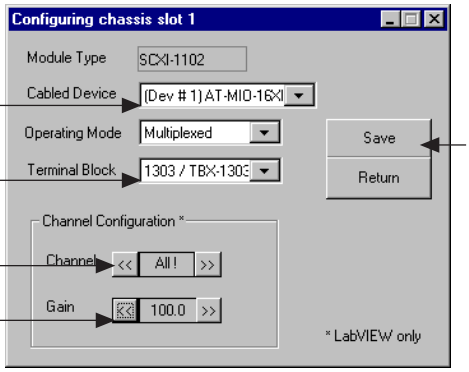
Follow the numbered steps in the following diagram.



Configuring Your SCXI Equipment



1. Set the **Chassis Type** input to **SCXI-1000**.
2. Set the **Chassis Slot** input to **1**. (If installing an expansion module, set to the appropriate number.)
3. Set the **Module Type** input to **SCXI-1102**.
4. Press the **Configure Module 1** button.



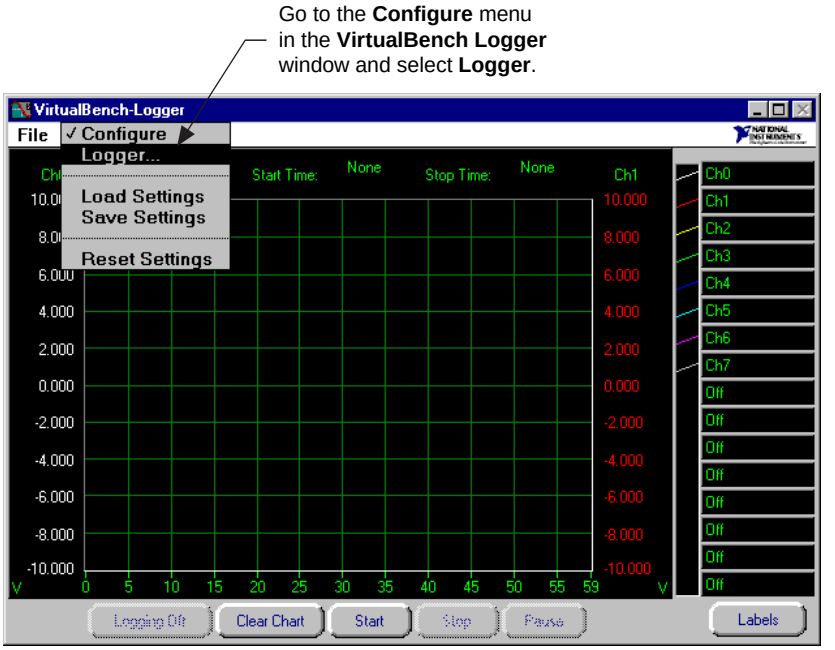
1. Set the **Cabled Device** input to **AT-MIO-16XE-50**. (If installing an expansion module, set to **None**.)
2. Set the **Terminal Block** input to **1303/TBX-1303**.
3. Cycle through the **Channel Configuration** until it displays **All!**.
4. Set the gain to **100.0**.
5. Confirm that your SCXI-1000 chassis is on and that you have completed the previous hardware installation steps. Then press the **Save** button. Press **OK** on the **Configuration Verified** window, then press **Return**.

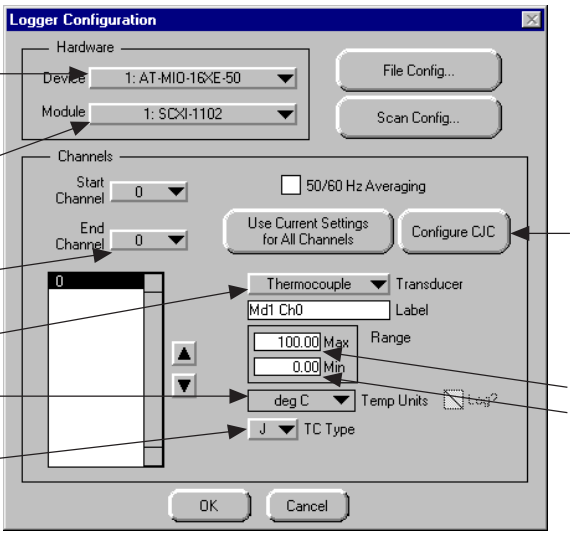
Close the SCXI Configuration window.

Close the NI-DAQ Configuration Utility window.

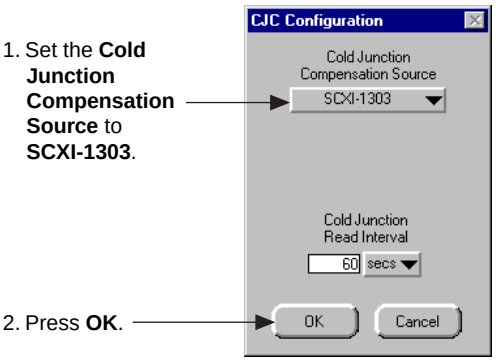
Configuring the VirtualBench Logger

Run the VirtualBench Logger software.





1. Set the **Device** input to **AT-MIO-16XE-50**.
2. Set the **Module** input to **SCXI-1102**.
3. Set the **End Channel** input to **0**.
4. Set the **Transducer** input to **Thermocouple**.
5. Set the **Temp Units** input to **deg C**.
6. Set the **TC Type** to **J**.
7. Set the **Min** input to **0**.
8. Set the **Max** input to **100**.
9. Press on the **Configure CJC** button.



Press the **Use Current Settings for All Channels** button. Press **OK**.

Collecting Temperature Data

You are now ready to collect temperature data. Press the **Start** button; the **VirtualBench Logger** window will display temperature data from the thermocouple.

For more information on configuring VirtualBench Logger and implementing its data-logging capabilities, refer to the VirtualBench online help.

Expanding for More Channels

Up To 32 Channels

The base SCXI-MS100 system can accommodate up to 32 channels. To measure and log up to 32 thermocouple or voltage inputs, perform the following steps:

1. Remove the SCXI-1303 terminal block. Refer to the *Signal Connection* and *Connecting the SCXI-1303 to Your SCXI-1102 Module* sections to connect the additional signals and reinstall the SCXI-1303. Make sure you connect the signals to consecutive input channels.
2. Run the VirtualBench software and go to the Logger Configuration window. Modify the **Start Channel** and **End Channel** to reflect the number of thermocouple or signal inputs that you have connected.

More Than 32 Channels

You can expand the SCXI-MS100 system beyond 32 channels by adding up to three SCXI-MS100 32-channel expansion kits. Each kit includes one SCXI-1102 module and one SCXI-1303 terminal block.

To integrate an SCXI-MS100 32-channel expansion kit into your system, perform the following:

1. Turn off the SCXI-1000 chassis.
2. Remove one of the front metal filler panels.
3. Install the SCXI-1102 module into the available slot.
4. Connect the additional signals and install the SCXI-1303 by referring to the *Signal Connection* and *Connecting the SCXI-1303 to Your SCXI-1102 Module* sections. Make sure you connect the signals to consecutive input channels.
5. Turn on the SCXI-1000 chassis.
6. Run the NI-DAQ Configuration Utility.
7. Refer to the *Configuring Your SCXI Equipment* section to configure your expansion module.
8. Run the VirtualBench Logger.
9. Go to the Logger Configuration screen and set up the channels on the new SCXI-1102.

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