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SCXI™

SCXI Chassis User Manual

NATIONAL INSTRUMENTS™

February 1999 Edition
Part Number 320423E-01

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Contents

About This Manual

Organization of This Manual ix
Conventions Used in This Manual x
National Instruments Documentation xi
Related Documentation xi

Chapter 1
Introduction

About the SCXI Chassis 1-1
What You Need to Get Started 1-1
Unpacking 1-2
Software Programming Choices 1-2
LabVIEW and LabWindows/CVI Application Software 1-2
NI-DAQ Driver Software 1-3
Register-Level Programming 1-4
Optional Equipment 1-5

Chapter 2
Configuration and Installation

Chassis Description 2-1
Chassis Uses 2-9
Cleaning Instructions 2-10
Chassis Configuration 2-10
Chassis Address Selection 2-10
SCXI-1000/1001 2-10
SCXI-1000DC 2-11
SCXI-2000 2-13
Baud Rate Selection on the SCXI-2000 2-13
Voltage Selection and Fuse Replacement for SCXI-1000/1001/2000 2-15
Voltage Selection Procedure 2-16
Power Entry Module Fuse Replacement Procedure 2-17
Backplane Fuse Replacement and Check Procedure for SCXI-1000, SCXI-1001, and SCXI-2000 2-17
Fuse Replacement for the SCXI-1000DC 2-18
Power Entry Fuse and +5 VDC Fuse Replacement Procedure 2-19
Backplane Fuse Replacement and Check Procedure 2-19
Chassis Installation 2-20
SCXI-1000 and SCXI-1001 Chassis Installation 2-20

SCXI-1000DC Chassis Installation 2-21
SCXI-2000 Chassis Installation 2-21
SCXI-2000 Cable Installation 2-22
Parallel Port Cable 2-22
Serial Port Cable 2-22
RS-232 Cable 2-22
RS-485 Cable 2-23
Indicator Lights (SCXI-2000 Only) 2-25
Module Installation 2-27
Filler Panel Installation 2-27
Front Filler Panel Installation 2-28
Rear Panel Installation 2-28
Fan Filter Maintenance 2-28

Appendix A
Specifications

Appendix B
Technical Support Resources

Glossary

Index

Figures

Figure 1-1. The Relationship between the Programming Environment, NI-DAQ, and Your Hardware 1-4

Figure 2-1. SCXI-1000 Front View Diagram 2-2
Figure 2-2. SCXI-1000DC Front View Diagram 2-3
Figure 2-3. SCXI-1001 Front View Diagram 2-4
Figure 2-4. SCXI-2000 Front View 2-5
Figure 2-5. SCXI-1000 Rear View Diagram 2-6
Figure 2-6. SCXI-1001 Rear View Diagram 2-7
Figure 2-7. SCXI-1000DC Rear View Diagram 2-8
Figure 2-8. SCXI-2000 Rear View Diagram 2-9
Figure 2-9. Address Setting Examples 2-11
Figure 2-10. SCXI-1000DC Chassis Address Jumper Settings 2-12
Figure 2-11. Baud Rate and Address Setting Examples 2-14
Figure 2-12. RS-485 Connections for Two SCXI-2000 Chassis 2-24

Figure A-1. Physical Dimensions for the SCXI-1001 ..... A-4
Figure A-2. Physical Dimensions for the SCXI-1000, SCXI-1000DC, and SCXI-2000 ..... A-5

Tables

Table 2-1. SCXI Chassis Front View Items 2-1
Table 2-2. SCXI-1000/1001 Chassis Rear View Items 2-5
Table 2-3. SCXI-1000DC Chassis Rear View Items 2-7
Table 2-4. SCXI-2000 Chassis Rear View Items 2-8
Table 2-5. SCXI-2000 Baud Rate Settings 2-14
Table 2-6. SCXI-1000/1001/2000 Voltage Selection and Fuse Ratings by Region 2-16
Table 2-7. SCXI-1000/1001/2000 Fuse Part Numbers 2-16
Table 2-8. SCXI-1000/1001/2000 Backplane Fuse Part Numbers 2-17
Table 2-9. SCXI-1000DC Rear Panel Fuse Part Numbers 2-18
Table 2-10. RS-232 Signal Connections 2-23
Table 2-11. RS-485 Signal Connections 2-24
Table 2-12. SCXI-2000 Front Panel LED Indicators 2-25
Table 2-13. SCXI-2000 Troubleshooting 2-26

Table A-1. Max Data Transfer Rates (Samples/s) A-7

About This Manual

This manual describes the electrical and mechanical aspects of the SCXI-1000, SCXI-1000DC, SCXI-1001, and SCXI-2000 chassis and contains information concerning their operation and programming. The SCXI chassis supply power to and contain control circuitry for the SCXI series of modules. The SCXI-1000, SCXI-1000DC, and SCXI-2000 can hold up to four modules. The SCXI-1001 can hold up to 12 modules.

Organization of This Manual

The *SCXI Chassis User Manual* is organized as follows:

- Chapter 1, *Introduction*, describes the SCXI chassis; lists what you need to get started; describes the optional software and optional equipment; and explains how to unpack the SCXI chassis kit.
- Chapter 2, *Configuration and Installation*, contains instructions for configuring and installing the SCXI chassis. It describes chassis address selection; baud rate selection (SCXI-2000 only); voltage and fuse selection; installation of the chassis, modules, and accessories; and fan filter maintenance.
- Appendix A, *Specifications*, lists the specifications for the SCXI chassis.
- Appendix B, *Technical Support Resources*, contains information for contacting National Instruments for help using your product or to comment on our products and manuals.
- The *Glossary* contains an alphabetical list and description of terms used in this manual, including abbreviations, acronyms, metric prefixes, mnemonics, and symbols.
- The *Index* contains an alphabetical list of key terms and topics in this manual, including the page where you can find each one.

Conventions Used in This Manual

The following conventions are used in this manual:



This icon to the left of bold italicized text denotes a note, which alerts you to important information.



This icon to the left of bold italicized text denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.



This icon to the left of bold italicized text denotes a warning, which advises you of precautions to take to avoid being electrically shocked.

bold Bold text denotes LEDs.

bold italic Bold italic text denotes a note, caution, or warning.

italic Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text from which you supply the appropriate word or value, as in Windows 3.*x*.

`monospace` Text in this font denotes text or characters that you should literally enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, file names and extensions, and for statements and comments taken from programs.

NI-DAQ Refers to the DAQ software for PC compatibles, unless otherwise noted.

SCXIbus Refers to the backplane in the chassis. A signal on the backplane is referred to as the SCXIbus <signal name> line (or signal). The SCXIbus descriptor may be omitted when the meaning is clear.

SCXI Chassis Refers to the SCXI-1000, SCXI-1000DC, SCXI-1001, and SCXI-2000. When information pertains to only one chassis, that chassis is named explicitly; for example, the SCXI-1001 has 12 module slots.

Slot 0 Refers to the power supply and control circuitry in the SCXI chassis.

Abbreviations, acronyms, metric prefixes, mnemonics, symbols, and terms are listed in the *Glossary*.

National Instruments Documentation

The *SCXI Chassis User Manual* is one piece of the documentation set for your data acquisition and SCXI system. You could have any of several types of documents, depending on the hardware and software in your system. Use the documents you have as follows:

- *Getting Started with SCXI*—This is the first manual you should read. It gives an overview of the SCXI system and contains the most commonly needed information for the modules, chassis, and software.
- Your SCXI hardware user manuals—Read these manuals next for detailed information about signal connections and module configuration. They also explain in greater detail how the module works and contain application hints.
- Your DAQ hardware user manuals—These manuals have detailed information about the DAQ hardware that plugs into or is connected to your computer. Use these manuals for hardware installation and configuration instructions, specification information about your DAQ hardware, and application hints.
- Software documentation—Examples of software documentation you may have are the LabVIEW and LabWindows/CVI documentation sets and the NI-DAQ documentation. After you set up your hardware system, use either the application software (LabVIEW or LabWindows/CVI) or the NI-DAQ documentation to help you write your application. If you have a large, complicated system, it is worthwhile to look through the software documentation before you configure your hardware.
- Accessory installation guides or manuals—If you are using accessory products, read the terminal block and cable assembly installation guides or accessory board user manuals. They explain how to physically connect the relevant pieces of the system. Consult these guides when you are making your connections.
- *SCXI Chassis User Manual*—Read this manual for maintenance information on the chassis and installation instructions.

Related Documentation

If you are designing your own module, the *SCXIbus System Specification* is available from National Instruments upon request. The specification describes the physical, electrical, and timing requirements for the SCXIbus.

1

Introduction

This chapter describes the SCXI chassis; lists what you need to get started; describes the optional software and optional equipment; and explains how to unpack the SCXI chassis kit.

About the SCXI Chassis

The SCXI-1000, SCXI-1000DC, and SCXI-2000 are four-slot SCXI chassis and the SCXI-1001 is a 12-slot SCXI chassis. All the chassis house National Instruments SCXI modules. The SCXI-1000, SCXI-1001, and SCXI-2000 chassis are powered with standard AC power. The SCXI-1000DC is powered by any 9.5 to 16 VDC source, the optional SCXI-1382 battery pack, or the SCXI-1383 power supply.

The SCXI chassis supplies a low-noise environment for signal conditioning, supplying power and control circuitry for the modules. It is a general-purpose chassis and can be used with current and future SCXI modules.

Detailed specifications for the SCXI-1000, SCXI-1000DC, SCXI-1001, and SCXI-2000 are in Appendix A, *Specifications*.

What You Need to Get Started

To set up and use your SCXI chassis, you will need the following items:

- ❑ One of the following SCXI chassis:
  - SCXI-1000
  - SCXI-1000DC
  - SCXI-1001
  - SCXI-2000
- ❑ *SCXI Chassis User Manual*
- ❑ Power cord (120, 220, or 240 VAC)

- ❑ One of the following software packages and documentation:
  LabVIEW for Macintosh
  LabVIEW for Windows
  LabWindows/CVI for Windows
  NI-DAQ for Macintosh
  NI-DAQ for PC compatibles
- ❑ Your computer

Unpacking

Remove the chassis from the package and inspect the chassis for loose components or any other sign of damage. Notify National Instruments if the chassis appears damaged in any way. Do *not* install a module into a damaged SCXI chassis.

Electrostatic discharge can damage several components on the chassis. To avoid such damage in handling the chassis, *never* touch the exposed pins of connectors.

Software Programming Choices

There are several options to choose from when programming your National Instruments plug-in DAQ and SCXI hardware. You can use LabVIEW, LabWindows/CVI, NI-DAQ, or register-level programming.

LabVIEW and LabWindows/CVI Application Software

LabVIEW and LabWindows/CVI are innovative program development software packages for data acquisition and control applications. LabVIEW uses graphical programming, whereas LabWindows/CVI enhances traditional programming languages. Both packages include extensive libraries for data acquisition, instrument control, data analysis, and graphical data presentation.

LabVIEW features interactive graphics, a state-of-the-art user interface, and a powerful graphical programming language. The LabVIEW Data Acquisition VI Library, a series of VIs for using LabVIEW with National Instruments boards, is included with LabVIEW. The LabVIEW Data Acquisition VI Libraries are functionally equivalent to the NI-DAQ software.

LabWindows/CVI features interactive graphics and a state-of-the-art user interface and uses the ANSI standard C programming language. The LabWindows/CVI Data Acquisition Library, a series of functions for using LabWindows/CVI with National Instruments boards, is included with your NI-DAQ software kit. The LabWindows/CVI Data Acquisition Library is functionally equivalent to the NI-DAQ software.

Using LabVIEW or LabWindows/CVI software will greatly reduce the development time for your data acquisition and control application.

NI-DAQ Driver Software

The NI-DAQ driver software is included at no charge with all National Instruments DAQ hardware and the SCXI-2000 chassis. NI-DAQ has an extensive library of functions that you can call from your application programming environment. These functions include routines for analog input (A/D conversion), buffered data acquisition (high-speed A/D conversion), analog output (D/A conversion), waveform generation, digital I/O, counter/timer operations, SCXI, RTSI, self-calibration, messaging, and acquiring data to extended memory.

NI-DAQ also internally addresses many of the complex issues between the computer and the plug-in board, such as programming interrupts and DMA controllers. NI-DAQ maintains a consistent software interface among its different versions so that you can change platforms with minimal modifications to your code. Whether you are using conventional programming languages, LabVIEW, or LabWindows/CVI, your application uses the NI-DAQ driver software, as illustrated in Figure 1-1.

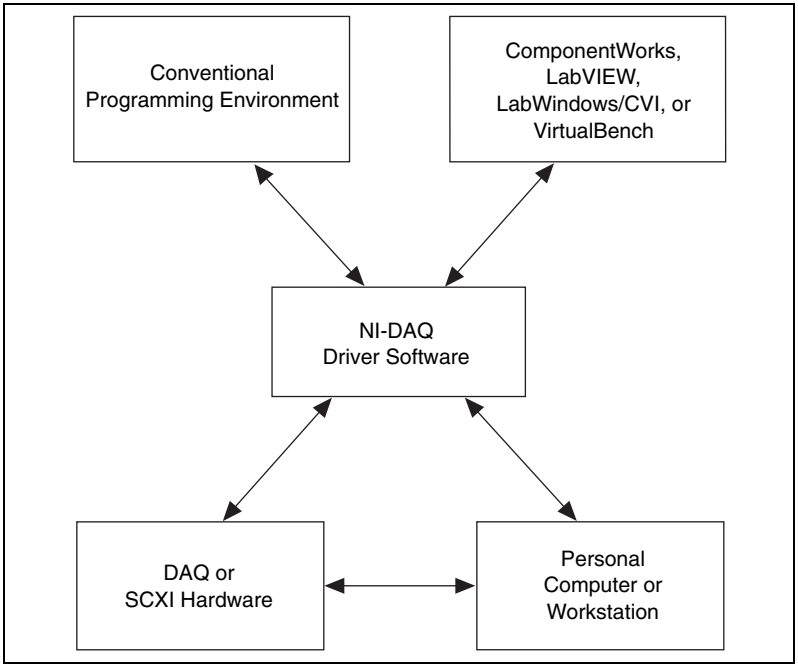


Figure 1-1. The Relationship between the Programming Environment, NI-DAQ, and Your Hardware

Register-Level Programming

The final option for programming any National Instruments DAQ hardware is to write register-level software. Writing register-level programming software can be very time-consuming and inefficient and is not recommended.

Even if you are an experienced register-level programmer, consider using NI-DAQ, LabVIEW, or LabWindows/CVI to program your National Instruments DAQ hardware. Using the NI-DAQ, LabVIEW, or LabWindows/CVI software is easier than and as flexible as register-level programming and can save weeks of development time.

Optional Equipment

National Instruments provides a full line of modules that amplify, filter, isolate, and multiplex a wide variety of signal types, such as thermocouples, resistance temperature detectors (RTDs), strain gauges, high-voltage inputs, current inputs, analog outputs, and digital I/O signals. Cables and terminal blocks with screw terminals, BNC connectors, or thermocouple plugs are available to connect your modules.

See the latest National Instruments catalog and the web site at `http://www.natinst.com` for a complete listing of sensors and I/O types supported in SCXI.

2

Configuration and Installation

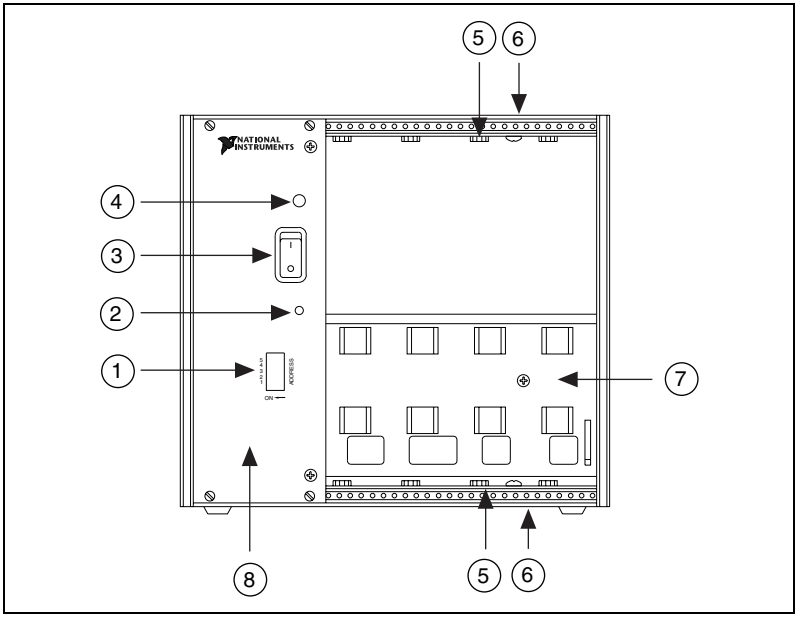
This chapter contains instructions for configuring and installing the SCXI chassis. It describes chassis address selection; baud rate selection (SCXI-2000 only); voltage and fuse selection; installation of the chassis, modules, and accessories; and fan filter maintenance.

Chassis Description

Figures 2-1 through 2-4 point out the front view items of the SCXI-1000, SCXI-1000DC, SCXI-1001, and SCXI-2000 respectively. Table 2-1 describes the front view items.

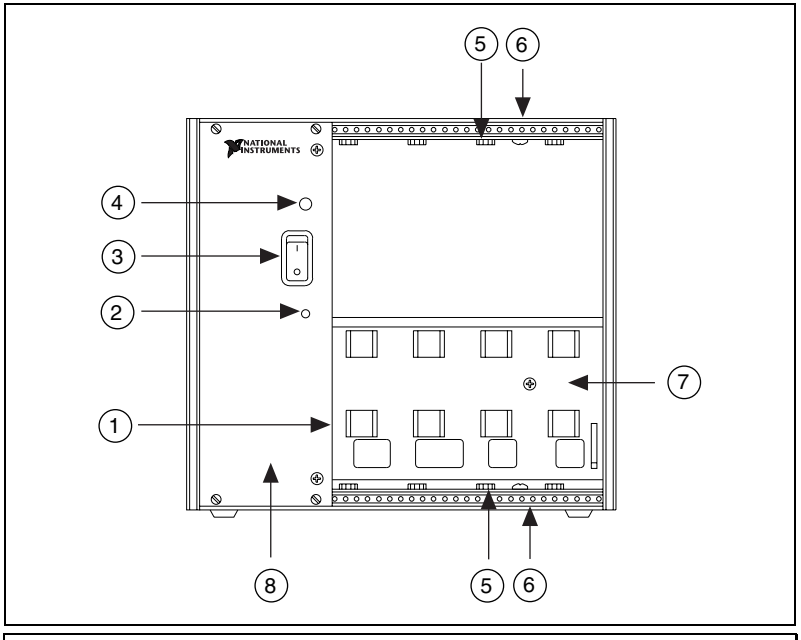
Table 2-1. SCXI Chassis Front View Items

Item	Definition
Power switch	Turns the chassis on and off
Indicator light	When lit, indicates that the chassis is powered on
Reset button	Reinitializes Slot 0 and all modules to their power-on state when pressed
Slot 0/power supply	Contains the power supply and control circuitry for the chassis
Address selection jumpers (hidden)	Determine the chassis address, located behind the front panel (SCXI-1000DC only)
Module guides	Guide modules to mate with the SCXIbus connector
Backplane	Brings power, control lines, and analog bus connections to modules
Front threaded strips	Secure modules in the chassis and attaches front panels
DIP switches	Determine the chassis address (SCXI-1000, SCXI-1001, and SCXI-2000) and baud rate (SCXI-2000 only)
9-pin DSUB	RS-232 connector (SCXI-2000 only)
Status LEDs	Indicate chassis activity (SCXI-2000 only)



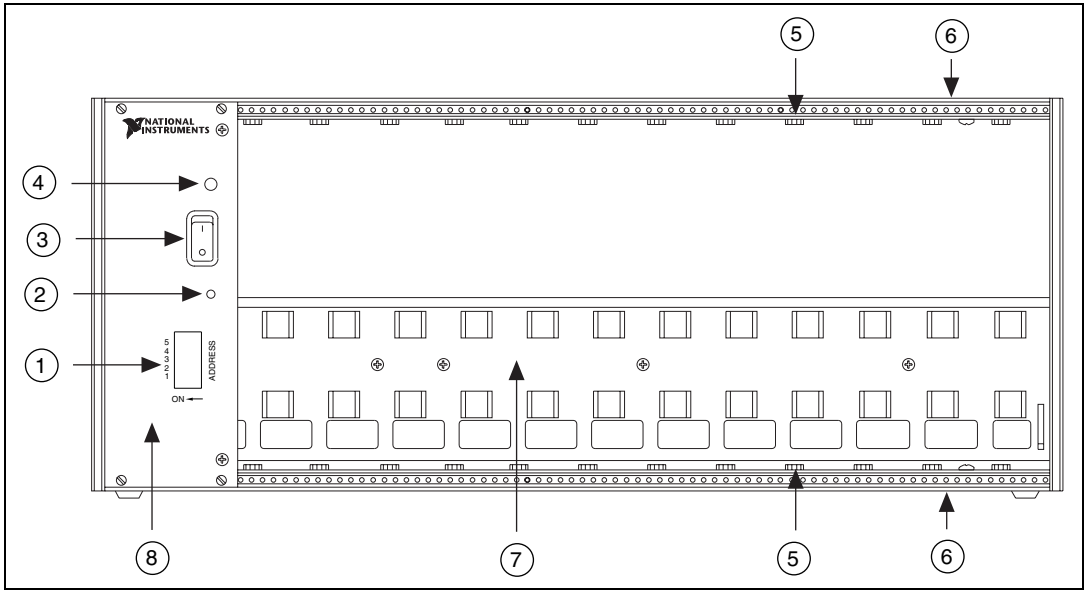
1	DIP Switches	4	Indicator Light	7	Backplane
2	Reset Button	5	Module Guides	8	Slot 0/Power Supply
3	Power Switch	6	Threaded Strips		

Figure 2-1. SCXI-1000 Front View Diagram



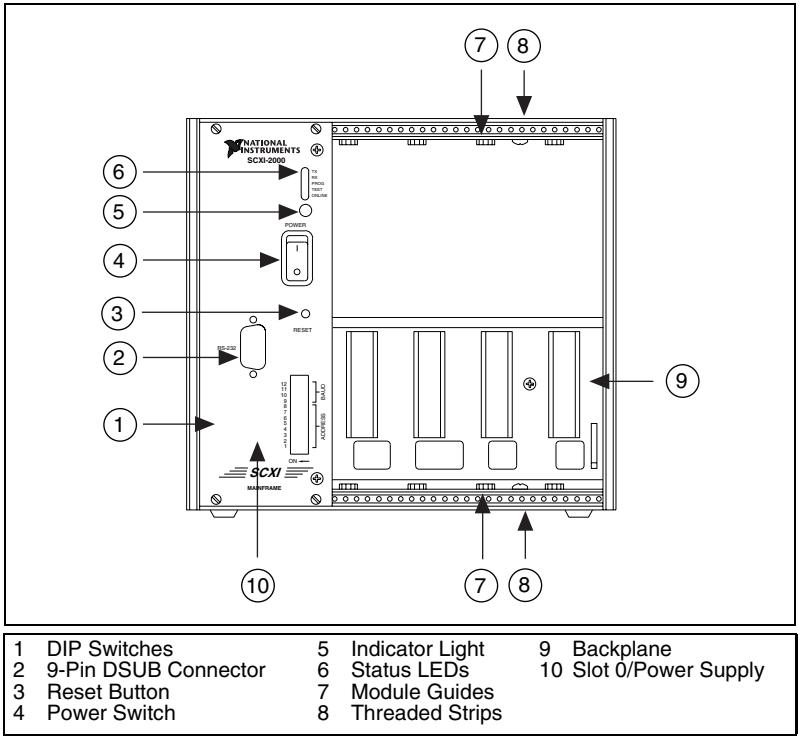
1	Jumpers (behind front panel)	4	Indicator Light	7	Backplane
2	Reset Button	5	Module Guides	8	Slot 0/Power Supply
3	Power Switch	6	Threaded Strips		

Figure 2-2. SCXI-1000DC Front View Diagram



1	DIP Switches	3	Power Switch	5	Module Guides	7	Backplane
2	Reset Button	4	Indicator Light	6	Threaded Strips	8	Slot 0/Power Supply

Figure 2-3. SCXI-1001 Front View Diagram



1	DIP Switches	5	Indicator Light	9	Backplane
2	9-Pin DSUB Connector	6	Status LEDs	10	Slot 0/Power Supply
3	Reset Button	7	Module Guides		
4	Power Switch	8	Threaded Strips		

Figure 2-4. SCXI-2000 Front View

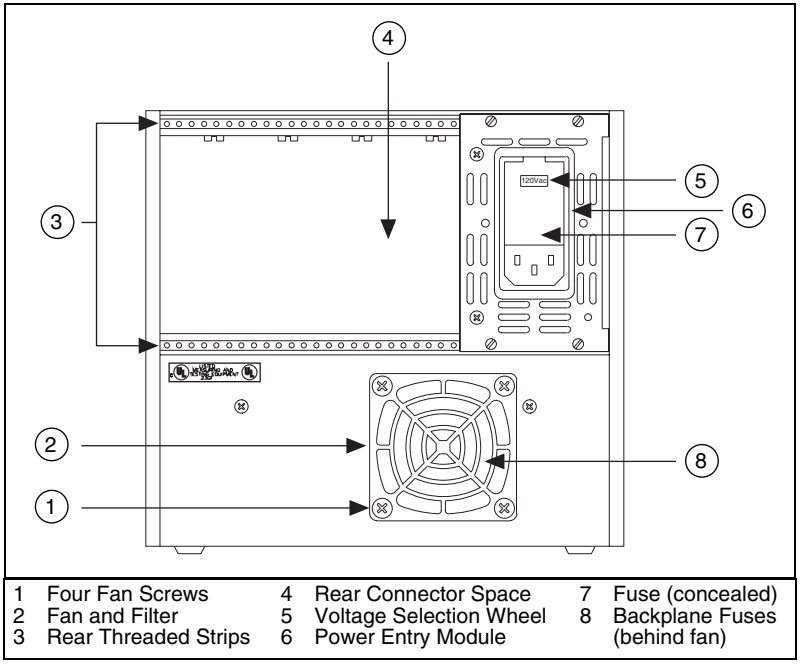
Tables 2-2 through 2-4 describe the rear view items shown in Figures 2-5 through 2-8 on the following pages.

Table 2-2. SCXI-1000/1001 Chassis Rear View Items

Item	Description
Power entry module	IEC receptacle for power input, voltage selection board, and fuse
Fuse	Protects both you and the chassis in case of a fault in the SCXI chassis
Voltage selection wheel	Configures the chassis for the AC line voltage
Fan(s) and filter(s)	Cool the chassis; prevents dirt from contaminating the circuitry in the chassis
Fan screws	Secure the fan(s) to the chassis

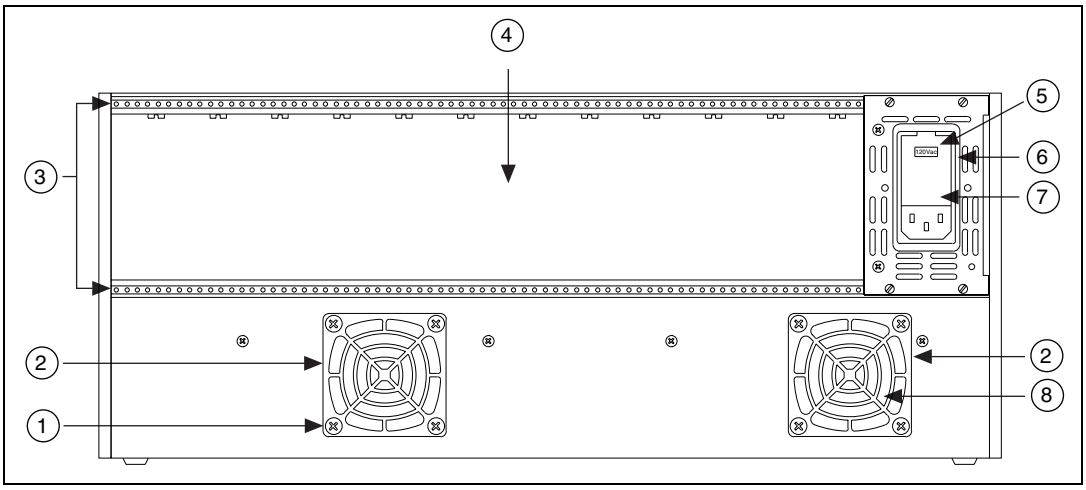
Table 2-2. SCXI-1000/1001 Chassis Rear View Items (Continued)

Item	Description
Backplane fuses	Protect the power supply from shorts on modules
Rear connector space	For module space, connector mounting brackets, or adapter boards
Rear threaded strips	Secure cable connections, mounting brackets, or filler panels to the chassis



1	Four Fan Screws	4	Rear Connector Space	7	Fuse (concealed)
2	Fan and Filter	5	Voltage Selection Wheel	8	Backplane Fuses (behind fan)
3	Rear Threaded Strips	6	Power Entry Module		

Figure 2-5. SCXI-1000 Rear View Diagram

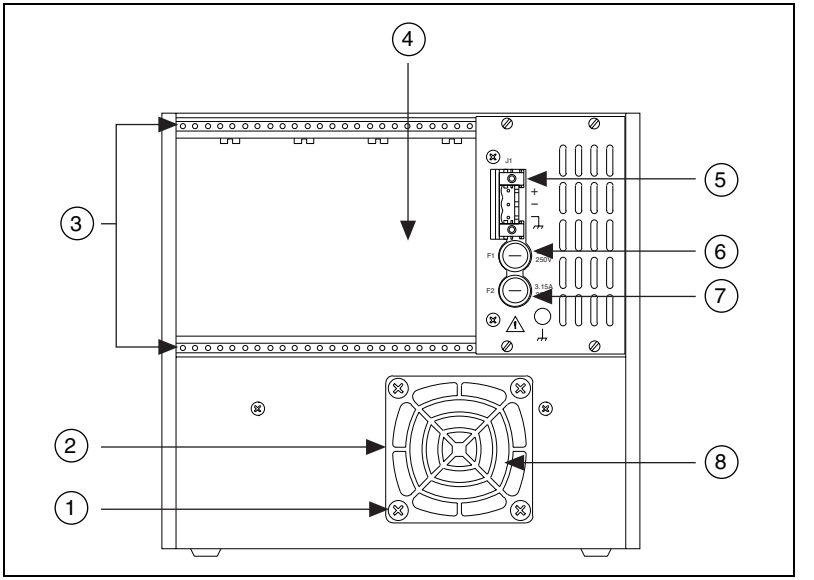


1 Eight Fan Screws	4 Rear Connector Space	7 Fuse (concealed)
2 Fans and Filters	5 Voltage Selection Wheel	8 Backplane Fuses (behind fan)
3 Rear Threaded Strips	6 Power Entry Module	

Figure 2-6. SCXI-1001 Rear View Diagram

Table 2-3. SCXI-1000DC Chassis Rear View Items

Item	Description
Power entry connector J1	Receptacle for power input. Manufacturer part number (Phoenix Contact P/N 17 59 02 0). Use a 9.5 to 16 VDC power source
Fuse F1	Power input fuse (6.3 A), protects both you and the chassis in case of a fault in the SCXI chassis
Fuse F2	+5 VDC internal power supply fuse (3.15 A), protects the power supply from shorts on modules
Fan and filter	Cools the chassis; prevent dirt from contaminating the circuitry in the chassis
Fan screws	Secure the fan to the chassis
Backplane fuses	Protect the power supply from shorts on modules
Rear connector space	For module space, connector mounting brackets, or adapter boards
Rear threaded strips	Secure cable connections, mounting brackets, or filler panels to the chassis



1	Four Fan Screws	5	Power Entry Connector
2	Fan and Filter	6	Power Input Fuse
3	Rear Threaded Strips	7	+5 VDC Internal Power Supply Fuse
4	Rear Connector Space	8	Backplane Fuses (behind fan)

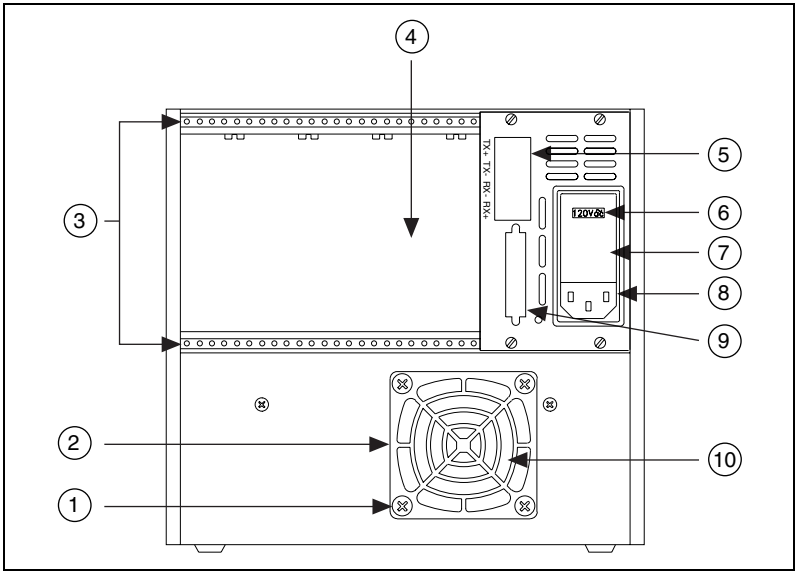
Figure 2-7. SCXI-1000DC Rear View Diagram

Table 2-4. SCXI-2000 Chassis Rear View Items

Item	Description
Power entry module	An IEC receptacle for power input, a voltage selection wheel, and a fuse holder
Fuse	Protects both you and the chassis in case of a fault in the SCXI chassis
Voltage selection wheel	Configures the chassis for the AC line voltage
Fan and filter	Cools the chassis; prevents dirt from contaminating the circuitry in the chassis
Fan screws	Secure the fans to the chassis
Backplane fuses	Protect the power supply from shorts on modules
Rear connector space	Module space, connector mounting brackets, or adapter boards
Rear threaded strips	Secure cable connections, mounting brackets, or filler panels to the chassis

Table 2-4. SCXI-2000 Chassis Rear View Items (Continued)

Item	Description
Screw terminal connector	Connects screw terminal block to make RS-485 connections
Parallel port connector	For cabling to SCXI-1200 module



1	Eight Fan Screws	6	Voltage Selection Wheel
2	Fans and Filters	7	Fuse (concealed)
3	Rear Threaded Strips	8	Power Entry Module
4	Rear Connector Space	9	Parallel Port Connector
5	Screw Terminal Connector	10	Backplane Fuses (behind fan)

Figure 2-8. SCXI-2000 Rear View Diagram

Chassis Uses

Before you configure your chassis, decide how you are going to use it. You can use SCXI chassis in the following ways:

- You can install several modules and cable one of them to a DAQ board that controls and/or acquires data from all of the modules.
- You can install several modules and one DAQ module that operates similarly to a DAQ board, except that it communicates with the host computer via a parallel port instead of the computer's plug-in bus.

- With an SCXI-2000 chassis, you can control the chassis and modules from the serial port of your computer. If you also want to acquire analog signals, you can install a DAQ module and cable its parallel port to the back of the SCXI chassis.
- You can install modules that are each dedicated to conditioning signals for only a single DAQ board (for example, in parallel mode), or that operate independently and only use the SCXI chassis as a power source and/or container. You can use the chassis this way in addition to or instead of one of the first three methods.

Cleaning Instructions

Caution ***Do not operate this equipment in an unprescribed way. Misuse of this equipment could result in a hazard.***

To clean the chassis, brush off light dust with a soft, non-metallic brush. Remove other contaminants with deionized water and a stiff non-metallic brush. Make sure the chassis is completely dry and free from contaminants before returning it to service.

Chassis Configuration

Chassis configuration involves selecting a chassis or high-level data link control (HDLC) address, line voltage, and fuse value on any chassis, and a baud rate on the SCXI-2000.

Chassis Address Selection

SCXI-1000/1001

Unless you are using multiple chassis and need to configure one or more SCXI chassis for a different address, you can skip this section and the SCXI chassis will have the factory-default address of 0.

If you are using the SCXI chassis with the SCXI-2400 RS-232/RS-485 communication module, you must set the HDLC address using the DIP switches on the SCXI-2400. Leave the chassis address at the factory-default of 0 and skip this section.

You can configure the SCXI chassis for one of 32 different addresses so that you can connect multiple SCXI chassis to the same control source. The five switches on the front panel of Slot 0 determine the chassis address.

Switches one through five represent the values 1, 2, 4, 8, and 16 when set to the ON position. When set to the OFF position, their value is zero. The chassis address is the sum of the switch values. Figure 2-9 shows examples of both the factory-default setting of the chassis address 0 and the switch setting for chassis address 19.

Note ***Older SCXI-1001 and SCXI-1000 chassis do not have switches; they use jumpers like those on the SCXI-1000DC. Very old SCXI-1000 chassis do not have switches or jumpers and respond to any address. To determine if your chassis has no jumpers, look at the label on the back of your chassis. If the part number has no letter or it has a B, C, or D, it has no jumpers. You cannot use chassis without jumpers or switches in a multichassis system.***

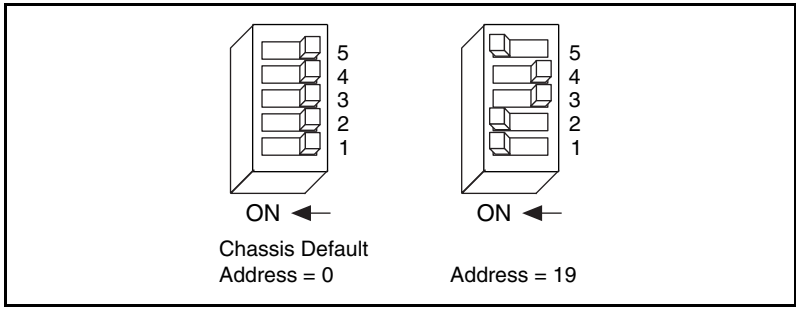


Figure 2-9. Address Setting Examples

SCXI-1000DC

Unless you are using multiple chassis and need to configure one or more SCXI chassis for a different address, you can skip this section and the SCXI chassis will have the factory-default address of 0.

If you are using the SCXI chassis with the SCXI-2400 RS-232/RS-485 communication module, you must set the HDLC address using the DIP switches on the SCXI-2400. Leave the chassis address at the factory-default of 0 and skip this section.

You can configure the SCXI chassis for one of 32 different addresses so that you can connect multiple SCXI chassis to the same control source. Three jumpers that determine the chassis address are located behind the front panel of Slot 0 just below the Reset button. The chassis address is the sum of the values of each jumper. Figure 2-10 shows examples of both the factory-default setting of address 0 and the jumper settings for address 19 for the SCXI chassis.

Note ***Older SCXI-1000DC chassis do not have any jumpers and these chassis respond to any address. To determine if your chassis has no jumpers, look at the label on the back of your chassis. If the SCXI-1000DC part number has no letter or it has a B or C, it has no jumpers. You cannot use jumperless chassis in a multichassis system.***

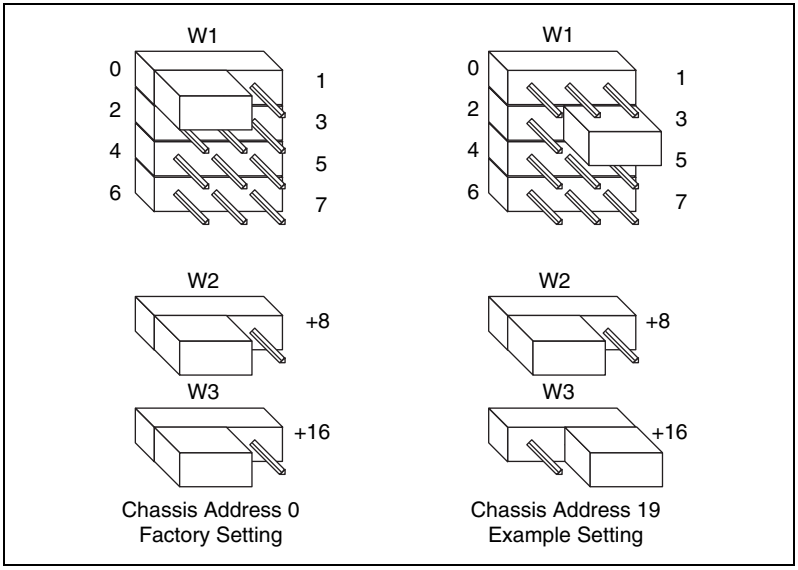


Figure 2-10. SCXI-1000DC Chassis Address Jumper Settings

Use the following procedure to change the chassis address of the SCXI-1000DC chassis:

Caution ***To prevent electrical energy hazard, make sure that the power switch is off and the power cord has been removed from the power entry module.***

1. Using a Phillips-head screwdriver, remove the two panhead screws from the front panel of Slot 0.
2. Using a flathead screwdriver, remove the four cheesehead screws from the front panel of Slot 0.
3. Remove the front panel of Slot 0.
4. Set all three jumpers for the chassis address you want.
5. Replace the front panel of Slot 0.
6. Replace the four cheesehead screws. Do *not* overtighten.
7. Replace the two panhead screws. Do *not* overtighten.

SCXI-2000

Unless you are using multiple chassis and need to configure one or more chassis with a different address, you can skip this section. Your chassis will have an HDLC address of 1 if you control the chassis by its serial port. The SCXI-2000 will have a chassis address of 1 if you configure it as an SCXI-1000 chassis.

The SCXI-2000 has two addresses. The HDLC address is used for addressing the serial port of the chassis. The chassis address is used for addressing the internal functionality of the SCXI chassis.

If you are controlling your chassis via its RS-485 serial port (you cannot use RS-232 to control more than one chassis from a single serial port), you must specify the HDLC address of the chassis on the serial port. You must configure all the chassis on the same network for different HDLC addresses. Set the HDLC address on the chassis with switches 1 through 8 on the front panel of the SCXI-2000 to select an HDLC address from 1 to 254; addresses 0 and 255 are reserved. The chassis address is automatically set to 0 when you configure your chassis for serial port operation.

If you are not controlling your chassis via its serial port, and you are using a DAQ device to control multiple chassis, you must specify the address of the chassis as if it were an SCXI-1000. Set the address on the chassis with switches 1 through 5 on the front panel of the SCXI-2000 to select an address between 0 and 31; switches 6 through 8 are not used. You must also set the baud rate switches for the SCXI-1000 setting as shown in Table 2-5. The chassis does not have an HDLC address when it is configured as an SCXI-1000. If you accidentally set the baud rate switches for a real baud rate, but try to use the SCXI-2000 as an SCXI-1000, the chassis address will be zero, regardless of the address switch settings.

If you are controlling your chassis via the RS-232 port, make sure you note the HDLC address because it must match that in your software configuration.

Baud Rate Selection on the SCXI-2000

If you are controlling your chassis via its serial port, RS-232 or RS-485 connector, you must specify the baud rate (the signal rate over the serial port, expressed in bits per second) of the serial port. If you have multiple chassis cabled to the same RS-485 network, you must configure all the chassis on the same network for the same baud rate. Set the baud rate with switches 9 through 12 on the front panel of the SCXI-2000. Use Table 2-5 to determine the appropriate settings for your baud rate.

If you are not controlling your chassis via its serial port, set the four baud rate switches to the SCXI-1000 setting shown in Table 2-5. The chassis will operate like an SCXI-1000 chassis and the serial ports and parallel port will not function. Figure 2-11 shows some examples of baud rates and settings.

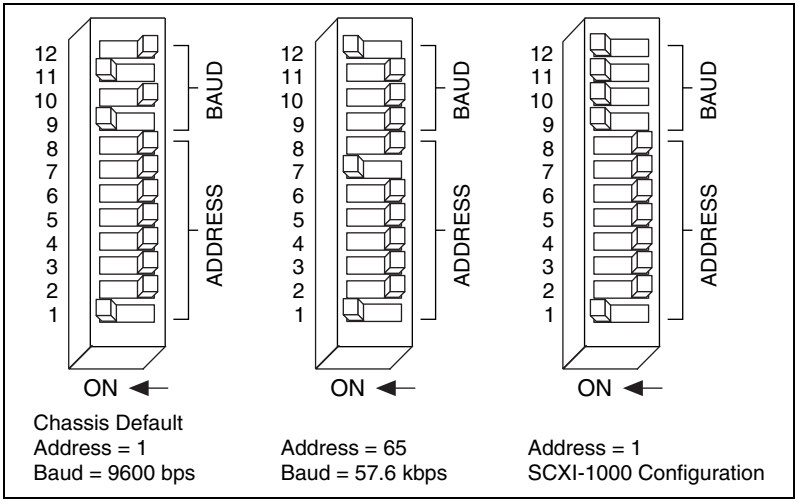


Figure 2-11. Baud Rate and Address Setting Examples

Table 2-5. SCXI-2000 Baud Rate Settings

Baud Rate	Switch 12	Switch 11	Switch 10	Switch 9
300 bps	Off	Off	Off	Off
600 bps	Off	Off	Off	On
1200 bps	Off	Off	On	Off
2400 bps	Off	Off	On	On
4800 bps	Off	On	Off	Off
9600 bps	Off	On	Off	On
19.2 kbps	Off	On	On	Off
38.4 kbps	Off	On	On	On
57.6 kbps	On	Off	Off	Off

Table 2-5. SCXI-2000 Baud Rate Settings (Continued)

Baud Rate	Switch 12	Switch 11	Switch 10	Switch 9
Reserved	On	Off	Off	On
Reserved	On	Off	On	Off
Reserved	On	Off	On	On
Reserved	On	On	Off	Off
Reserved	On	On	Off	On
Reserved	On	On	On	Off
Functions as SCXI-1000	On	On	On	On

Voltage Selection and Fuse Replacement for SCXI-1000/1001/2000

If you have ordered your chassis with the appropriate part number (the -0*x* extension of the kit part number corresponds to your geographical region), the voltage selection wheel and fuse will be correct for operation in your geographical region. Check the voltage on the voltage selection wheel to ensure that you have the correct voltage selection wheel setting and fuse.

The SCXI chassis can operate with line voltages of 100, 120, 220, and 240 VAC. The voltage selection wheel in the power entry module determines the voltage for which the chassis is configured. You can identify the operating voltage by looking at the number on the power entry module when the door that covers the selection wheel is closed. The fuse is a 5 by 20 mm SLO-BLO type, which has a current rating relative to the operating voltage. Table 2-6 shows the proper voltage selection and fuse ratings for different parts of the world.



Caution ***For continued protection against fire, replace fuses only with fuses of the same type and rating.***

Table 2-6. SCXI-1000/1001/2000 Voltage Selection and Fuse Ratings by Region

Region	Line Voltage	Fuse Rating		
		SCXI-1000	SCXI-1001	SCXI-2000
North America	120 VAC	1/2 A	1.6 A	1/2 A
Japan	100 VAC	3/4 A	1.6 A	3/4 A
Europe	240 VAC	1/4 A	8/10 A	1/4 A
Switzerland	220 VAC	1/4 A	8/10A	1/4 A

Table 2-7 shows the manufacturer part numbers National Instruments uses for these fuses.

Table 2-7. SCXI-1000/1001/2000 Fuse Part Numbers

Fuse Rating	Manufacturer	Part Number	National Instruments Part Number
1/4 A	Littlefuse	218.250	766093-01
1/2 A	Littlefuse	239.500	766038-01
3/4 A	Littlefuse	239.750	766092-01
8/10 A	Wickman	19195-046	766106-01
1.6 A	Littlefuse	239 01.6	766105-01

Voltage Selection Procedure

Use the following procedure to select a voltage:

1. Turn off the power.
2. Remove the power cord from the power entry module.
3. Using a flat blade screwdriver, pry the door to the selection wheel open from the top.
4. Remove the selection wheel.
5. Rotate the wheel for the appropriate voltage and reinsert it into the power entry module.
6. Close the door.
7. Check that the voltage showing on the selection wheel is correct.
8. Reinsert the power cord.

Power Entry Module Fuse Replacement Procedure

Warning ***Disconnect all power before removing cover.***

Use the following procedure to replace the power entry module fuse:

1. Turn off the power.
2. Remove the power cord from the power entry module.
3. Using a flat blade screwdriver, pry the door to the selection wheel open from the top.
4. Pull out the fuse drawer.
5. Remove the fuse.
6. Install the new fuse in the drawer.
7. Reinsert the fuse drawer in the right side slot with the arrow pointing to the right.
8. Close the door.
9. Reinsert the power cord.

Backplane Fuse Replacement and Check Procedure for SCXI-1000, SCXI-1001, and SCXI-2000

In addition to the power entry module fuse, the analog supply lines on the backplane are fused at 1.5 A on the SCXI-1000 and SCXI-2000 chassis and at 4 A on the SCXI-1001 chassis. The manufacturer part numbers National Instruments uses for these fuses are given in Table 2-8.

Table 2-8. SCXI-1000/1001/2000 Backplane Fuse Part Numbers

Fuse Rating	Manufacturer	Part Number	National Instruments Part Number
1.5 A	Littlefuse	251 01.5	766027-01
4 A	Littlefuse	251 004	766056-01

If you are going to make your own modules, fuse your module at 250 mA to avoid blowing the backplane fuses. Fusing your module also better protects your module because a failure can result in a large amount of current drawn, but not enough to blow the backplane fuses.

On the SCXI-1000 and SCXI-2000, the backplane fuses are located behind the fan. On the SCXI-1001, the backplane fuses are located behind the rightmost fan, closest to the power entry module, as viewed from the rear of the chassis.

Use the following procedure to check or replace fuses:

1. Remove the appropriate fan and filter from the rear of the chassis, following the instructions in the *Fan Filter Maintenance* section. Make sure to switch the power off and remove the power cord.
2. The fuse marked with a copper + on the backplane is for the positive analog supply, and the fuse marked with a copper - is for the negative analog supply. To check whether a fuse is blown, connect an ohmmeter across the leads. If the reading is not 0 Ω, replace the fuse.
3. Using a pair of needle-nose pliers, carefully extract the fuse.
4. Take a new fuse and bend its leads so the component is 0.5 in. long, the dimension between the fuse sockets, and clip the leads to a length of 0.25 in.
5. Using the needle-nose pliers, insert the fuse into the socket holes.
6. Repeat, if necessary, for the other fuse.
7. Check the fan filter and, if it is dirty, clean it as described in the *Fan Filter Maintenance* section.
8. Reinstall the fan and filter.

Fuse Replacement for the SCXI-1000DC

There are two fuses located on the rear panel of the SCXI-1000DC. The input power fuse (F1) is a 6.3 A, 5 x 20 mm time lag fuse. The internal +5 VDC supply is fused by a 3.15 A, 5 x 20 mm time lag fuse (F2). Table 2-9 shows the manufacturer part numbers National Instruments uses for these fuses.

Table 2-9. SCXI-1000DC Rear Panel Fuse Part Numbers

Fuse	Fuse Rating	Manufacturer	Part Number	National Instruments Part Number
F1	6.3 A	Schurter	034.3125	766073-01
F2	3.15 A	Schurter	034.3122	766067-01

Power Entry Fuse and +5 VDC Fuse Replacement Procedure

Caution ***For continued protection against fire, replace fuses only with fuses of the same type and rating.***

Use the following procedure to replace the rear panel fuses:

1. Turn off the power.
2. Remove the power cord from the power entry connector J1.
3. Turn the fuse holder counter-clockwise with a screw driver and pull the fuse holder out to expose the fuse in the housing.
4. Remove the fuse.
5. Install the new fuse.
6. Push the fuse holder back into the housing and screw it clockwise until it tightens completely.
7. Reinsert the power cord.

Backplane Fuse Replacement and Check Procedure

In addition to the power entry and the +5 V supply fuses, the analog supply lines on the backplane are fused at 1.5 A on the SCXI-1000DC chassis. This backplane fuse is manufactured by Littlefuse (part number 251 001.5). The manufacturer part number National Instruments uses for this fuse is 766027-01.

If you are going to make your own modules, fuse your module at 250 mA to avoid blowing the analog backplane and +5 V supply fuses. Fusing your module better protects your module because a failure can result in a large amount of current drawn, but not enough to blow the backplane and +5 V fuses.

On the SCXI-1000DC, the backplane fuses are located behind the fan. Use the following procedure to check or replace fuses:

1. Remove the appropriate fan and filter from the rear of the chassis, following the instructions in the *Fan Filter Maintenance* section. Make sure to switch the power off and remove the power cord.
2. The fuse marked with a copper + on the backplane is for the positive analog supply, and the fuse marked with a copper - is for the negative analog supply. To check whether a fuse is blown, connect an ohmmeter across the leads. If the reading is not 0 Ω, replace the fuse.
3. Using a pair of needle-nose pliers, carefully extract the fuse.

4. Take a new fuse and bend its leads so the component is 0.5 in. long, the dimension between the fuse sockets, and clip the leads to a length of 0.25 in.
5. Using the needle-nose pliers, insert the fuse into the socket holes.
6. Repeat, if necessary, for the other fuse.
7. Check the fan filter and, if it is dirty, clean it as described in the *Fan Filter Maintenance* section.
8. Reinstall the fan and filter.

Chassis Installation

Caution ***Equipment described in this manual must be used in an Installation Category II environment per IEC 644. This category requires local level supply mains-connected installation.***

SCXI-1000 and SCXI-1001 Chassis Installation

Use the following procedure to install the SCXI-1000 and SCXI-1001 chassis:

1. If necessary, change the chassis address of the box by following the instructions in the *Chassis Address Selection* section. Unless you are using multiple chassis, skip this step and leave the address at its factory-default setting of 0.
2. Place the SCXI chassis on a sturdy, level surface. Leave at least 10 cm (4 in.) of space behind the chassis for adequate air circulation.
3. Turn off the power switch.
4. Check that the voltage selection wheel in the power entry module is set for the line voltage of your outlet. Refer to the *Voltage Selection Procedure* section if necessary.
5. Insert the female end of your power cord into the power entry module.
6. Insert the male end of your power cord into the wall outlet.
7. Install the modules into the chassis.
8. Install the necessary cabling for your modules. Consult your SCXI module user manual for cabling installation instructions.
9. Install any front and rear filler panels.
10. Turn on the chassis power switch.
11. Turn on the computer connected to your modules.

SCXI-1000DC Chassis Installation

Use the following procedure to install the SCXI-1000DC chassis:

1. If necessary, change the chassis address of the box by following the instructions in the *Chassis Address Selection* section. Unless you are using multiple chassis, skip this step and leave the address at its factory-default setting of 0.
2. Place the SCXI chassis on a sturdy, level surface. Leave at least 10 cm (4 in.) of space behind the chassis for adequate air circulation.
3. Turn off the power switch.
4. Check that the voltage of the power source is between 9.5 and 16 VDC.
5. If your power connector plug has screw terminals, wire the power source to the screw terminals. Observe correct polarity. Refer to Figure 2-7 for the rear view of the SCXI-1000DC. Tighten the screws on the terminals fully.

Caution ***Connecting the power source with opposite polarity may cause permanent damage to the SCXI chassis. National Instruments is not liable for any damage or injuries resulting from improper power connections.***

6. Insert the power plug into the header J1.
7. Install the modules into the chassis.
8. Install the necessary cabling for your modules. Consult your SCXI module user manual for cabling installation instructions.
9. Install any front and rear filler panels.
10. Turn on the chassis power switch.
11. Turn on the computer connected to your modules.

SCXI-2000 Chassis Installation

Use the following procedure to install the SCXI-2000 chassis:

1. If necessary, change the chassis address or HDLC address and baud rate of the box by following the instructions in the *Chassis Address Selection* and *Baud Rate Selection on the SCXI-2000* sections. Unless you are using multiple chassis, leave the address at its factory-default setting of 1.
2. Place the SCXI chassis on a sturdy, level surface. Leave at least 10 cm (4 in.) behind the chassis for adequate air circulation.
3. Turn off the power switch.

4. Check that the voltage selection wheel in the power entry module is set for the line voltage of your outlet. Refer to the *Voltage Selection Procedure* section if necessary.
5. Insert the female end of your power cord into the power entry module.
6. Insert the male end of your power cord into the wall outlet.
7. Install the modules into the chassis.
8. Install the necessary cabling for your modules. See the *SCXI-2000 Cable Installation* section for cabling instructions for your chassis. Consult your SCXI module user manual for cabling installation instructions for your modules.
9. Install any front and rear filler panels.
10. Turn on the chassis power switch.
11. Turn on the computer connected to your modules.

SCXI-2000 Cable Installation

Parallel Port Cable

If you are using an SCXI DAQ module, connect the 25-pin end of your parallel port cable to the parallel port connector on the module. Then connect the 36-pin end of your parallel port cable to the parallel port connector on the back of the SCXI-2000.

Serial Port Cable

You can use the RS-232 port on your computer to control one chassis up to 100 ft (2,500 pF) from your computer. If your chassis is farther away or you are using multiple chassis, you must use RS-485.

RS-232 Cable

You can use only an RS-232 or an RS-485 cable; you cannot use both at the same time.

The RS-232 connector is the same as the 9-pin DSUB connector found on most computers. Some computers use a 25-pin connector and some NEC computers use a 14-pin connector.

Note ***You must use a null modem cable to connect your computer directly to your SCXI-2400.***

If you must make your own cable, use Table 2-10 for the RS-232 connector pinout and for what each pin should connect to on your computer.

Table 2-10. RS-232 Signal Connections

SCXI-2400 Connections		Serial Port Pin Connections			
Pin Number	Signal Name	Signal Name	Pin Number		
			9-Pin	25-Pin	14-Pin
1	No connect	—	—	—	—
2	RXD	TXD	3	2	9
3	TXD	RXD	2	3	1
4	DTR	DSR	6	6	2
5	GND	GND	5	7	13, 14
6	No connect	—	—	—	—
7	RTS	CTS	8	5	4
8	No connect	—	—	—	—
9	No connect	—	—	—	—

The DTR and RTS lines are always driven active by the chassis. Some computer serial ports may be disabled if their DSR and CTS lines are not active, so you should connect these signals. The chassis ignores the control lines from the computer's serial port so it is not necessary to connect them, although connecting them will not adversely affect the system.

RS-485 Cable

You can use only an RS-232 or an RS-485 cable; you cannot use both at the same time.

The RS-485 connector uses a screw terminal plug to accept wires from your RS-485 cable. Use twisted-pair cable to increase noise tolerance. Make the network connections as given in Table 2-11.

Table 2-11. RS-485 Signal Connections

Computer RS-485 Port Signal	SCXI-2000 Signal
TX+	RX+
TX–	RX–
RX+	TX+
RX–	TX–

In addition, you need to terminate the differential pairs by adding termination resistors at the ends of the cable. You should terminate the cables with a resistor that is the same value as the characteristic impedance of the cable. For most twisted pair cables, 120 Ω is sufficient. On the pair of wires that is cabled to the TX+ and TX– of the computer, install a resistor between RX+ and RX– on the last chassis in the chain.

On the pair of wires that is cabled to the RX+ and RX– of the computer, install a resistor between TX+ and TX– on the last chassis in the chain and install a resistor between RX+ and RX– on the computer serial port. Figure 2-12 shows a diagram of a two-chassis network.

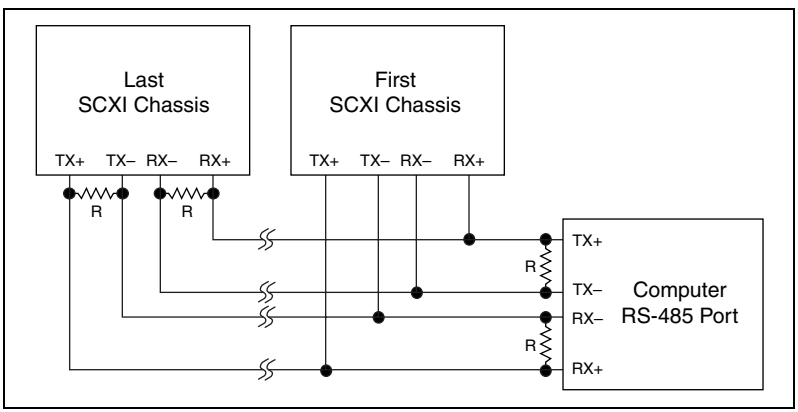


Figure 2-12. RS-485 Connections for Two SCXI-2000 Chassis

Indicator Lights (SCXI-2000 Only)

The SCXI-2000 has five indicator lights in addition to the main power light. These lights indicate the state of the chassis in operation. Table 2-12 lists the SCXI-2000 indicator lights and their functions.

Table 2-12. SCXI-2000 Front Panel LED Indicators

LED	Name	Function
TX	Transmit	Flashes when the chassis is speaking to the host computer
RX	Receive	Flashes when the host computer is speaking
ONLINE	Online	Flashes slowly while waiting for synchronization with the host computer, then lights and stops flashing when the chassis is ready for normal operation
PROG	Program	Lights when the chassis firmware requires reprogramming
TEST	Test	Lights when the chassis powers up or is reset. Turns off after all self-testing and self-initialization is complete

Listed below are the possible indications given by these LEDs:

- When you first turn on your chassis, both the power LED and the **TEST** LED should light.
- If the chassis needs to be reprogrammed, the **TEST** LED will turn off and the **PROG** LED will light and remain lit until the firmware on the chassis is reinstalled. Consult your software manual for the procedure for firmware upgrades.
- If the power-on test determines that something is wrong with the chassis, the **ONLINE**, **PROG**, and **TEST** LEDs will all flash on and off together.
- While the SCXI-2000 is waiting for synchronization with the NI-DAQ driver on the host computer, the **ONLINE** LED flashes slowly. The LED lights and stops flashing when the SCXI-2000 and the host computer are synchronized.
- If your switch settings are invalid, only the **PROG** and **TEST** LEDs will flash on and off together.
- If the chassis is ready for normal operation and set for SCXI-1000 mode, the **PROG**, **TEST**, and **ONLINE** LEDs will flash in sequence.
- When the chassis is ready for normal operation and set for serial port control, only the **ONLINE** LED will flash.

- When the chassis receives an initialization instruction from the serial port, the **ONLINE** LED will remain lit.

Table 2-13 lists potential problems with your SCXI-2000 noted by your LEDs and possible solutions:

Table 2-13. SCXI-2000 Troubleshooting

Problem	Solution
Power LED does not light	Make sure the chassis is plugged in. Make sure the power switch is on. Make sure the chassis voltage selection is correct. Check the fuse in the power entry module. Return the chassis for servicing.
Power LED lights but **TEST** does not	Check the chassis backplane fuses. Return the chassis for servicing.
PROG lights	Upgrade the firmware on your chassis.
TEST and **PROG** flash simultaneously	Check the switch settings.
ONLINE keeps flashing even after you have started your DAQ application	Check that the **RX** LED flashes when you use your host serial port. If not, then check the cable and your serial port configuration on the computer. If the **RX** LED flashes but **TX** does not, make sure that the address switches and baud rate switches match the configuration for the SCXI-2400 in Measurement & Automation Explorer. Check the cable for bad connections. If you are using a long cable, use a slower baud rate on the system. If you are using RS-485, make sure the serial port is configured to communicate using 4-wire mode.

Table 2-13. SCXI-2000 Troubleshooting (Continued)

Problem	Solution
TEST, **PROG**, and **ONLINE** flash simultaneously	Return the chassis for servicing.
TEST, **PROG**, and **ONLINE** flash in sequence but nothing works	If you are using SCXI-1000 mode, check the address switches, baud rate switches, and configuration for the chassis in Measurement & Automation Explorer. Check your cables.

Module Installation

Use the following general procedure to install modules:

1. Turn off the SCXI chassis.
2. Remove the front filler panel of an empty SCXI slot.
3. Insert the module into the module guide rails and slide the module to the back of the chassis. Do *not* force the module into place.
4. Screw the front mounting panel of the module to the top and bottom threaded strips of the SCXI chassis using the thumbscrews on the front panel of the module.
5. Install any cabling necessary for the module.
6. Check the installation.

Refer to your SCXI module user manual for specific instructions pertaining to the module, especially regarding the module cabling.

Filler Panel Installation

The front and rear filler panel accessories protect the inside of the chassis and installed modules by preventing unwanted material from entering the chassis and damaging modules or forming conductive paths that may degrade performance. Install all modules first, then start installing filler panels from the edge of a front panel.

Front Filler Panel Installation

Use the following procedure to install front filler panels:

1. Place the panel with the captive screws to the right of the chassis front. Line up the screws with the threaded strip holes.
2. Using a flathead screwdriver, screw the captive screws into the threaded strip holes.

Rear Panel Installation

Use the following procedure to install rear panels:

1. Place the panel at the rear of the chassis between the two threaded strips. Align the panel so that the serial number faces into the chassis and the screw holes are on the right.
2. Using a flathead screwdriver, screw the two screws through the rear panel into the threaded strip holes.

Fan Filter Maintenance

The fan(s) on the rear of the chassis cool the SCXI chassis and its modules. To keep the fan effective, the fan filter(s) must be clean. Dust and dirt accumulation reduces airflow, which make the inside of the chassis hotter and so shortens the life of the chassis and modules. Use the following procedure to clean the fan filter(s):

1. Turn the power off.
2. Remove the power cord from the power entry module.
3. Place the chassis face down on a flat surface so that the fan is on top. If the chassis is so heavily cabled that you cannot practically place it in this position, leave the chassis as it is but be careful to support the fan during removal and reinstallation to prevent breaking the fan wires.
4. Remove the fan filter. Remove the four screws that secure the fan and filter to the rear of the chassis. When removing the last screw, be careful to hold the fan to prevent breaking the fan wires.
5. Clean the fan filter by moving the filter around under a gentle stream of cold tap water until all the dust has been removed. Dry the filter.
6. Replace the fan filter by aligning the fan and filter with the fan holes, making sure that the label side of the fan is face down. Reinstall the four screws and make sure the assembly is secure.

A

Specifications

This appendix lists the specifications of the SCXI chassis. These are typical at 25 °C unless otherwise stated.

Electrical Characteristics

Supplies	SCXI-1000/ 1000DC/2000	SCXI-1001
V+ Tolerance limits include peaks Ripple (peak-to-peak) Max load	 +18.5 to +25 V 1.5 V 680 mA	 –18.5 to –25 V 1.5 V 2.04 A
V– Tolerance limits include peaks Ripple (peak-to-peak) Max load	 –18.5 to –25 V 1.5 V 680 mA	 –18.5 to –25 V 1.5 V 2.04 A
+5 V Tolerance limits include peaks Ripple (peak-to-peak) Max load	 +4.75 to +5.25 V 50 mV 250 mA	 +4.75 to +5.25 V 50 mV 600 mA

Maximum loads are the supply current for the entire chassis. Scaling the maximum power gives the allotted current per slot, as follows:

Supplies	SCXI-1000/ 1000DC/2000	SCXI-1001
V+	170 mA	170 mA
V–	170 mA	170 mA
+5 V	50 mA	170 mA

Source Power Requirements

Line Voltage, 47–63 Hz	Max AC Current		
	SCXI-1000	SCXI-1001	SCXI-2000
120 VAC, ± 10%	0.6 A	1.25 A	0.6 A
100 VAC, ± 10%	0.5 A	1.25 A	0.5 A
240 VAC, ± 10%	0.25 A	0.75 A	0.25 A
220 VAC, ± 10%	0.25 A	0.75 A	0.25 A

SCXI-1000DC

Input voltage .....12 VDC nominal
(9.5 to 16.0 VDC)

Max DC operating current
at 9.5 VDC .....5.5 A

Physical

Weight

SCXI-1000 .....3.9 kg (8 lb 10 oz.)

SCXI-1000DC .....3.3 kg (7 lb 5 oz.)

SCXI-1001 .....6.8 kg (14 lb 14 oz.)

SCXI-2000 .....3.8 kg (8 lb 8 oz.)

Refer to the following figures for the physical dimensions of the 4-slot chassis (SCXI-1000, SCXI-1000DC, and SCXI-2000) and the 12-slot chassis (SCXI-1001).

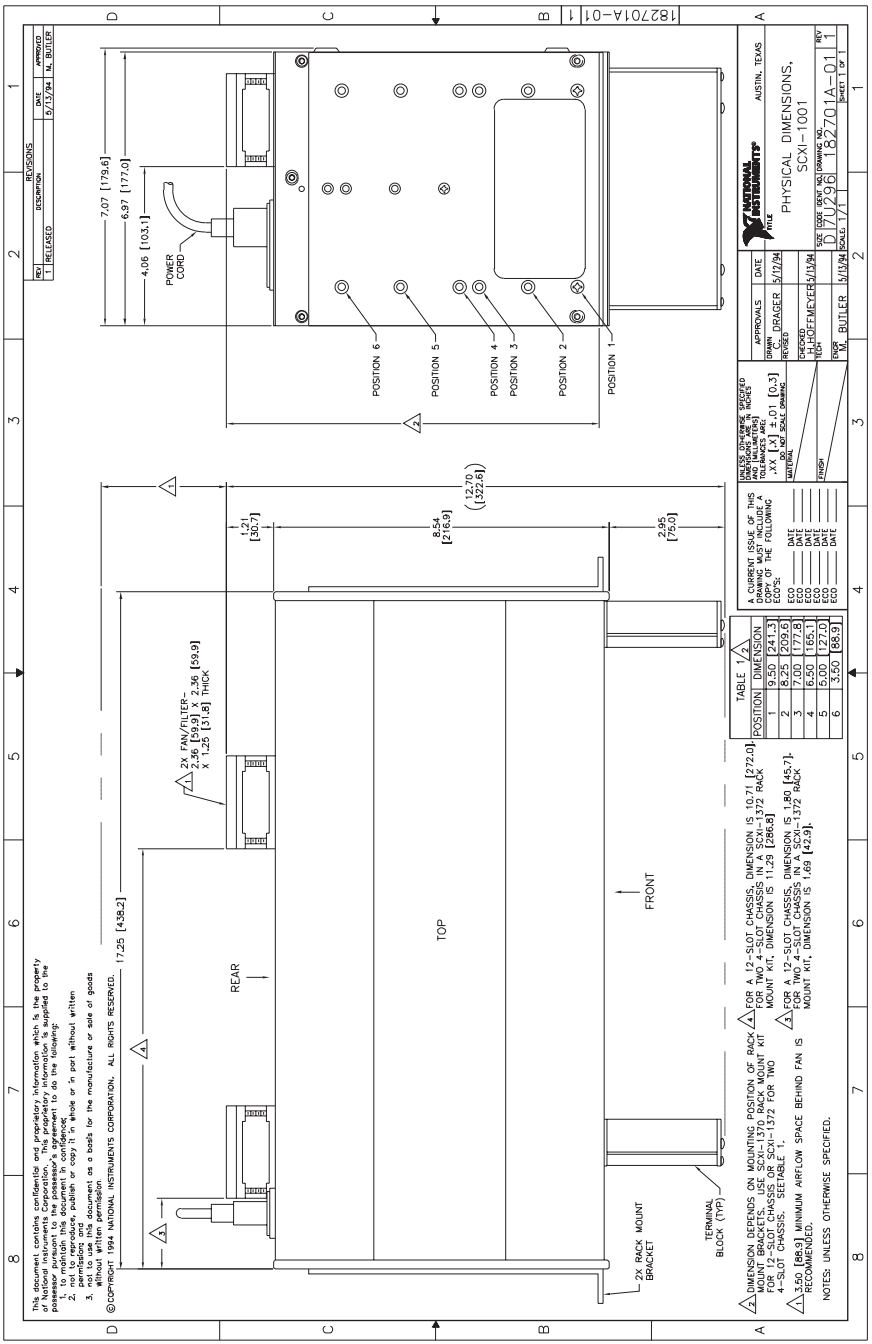


Figure A-1. Physical Dimensions for the SCXI-1001

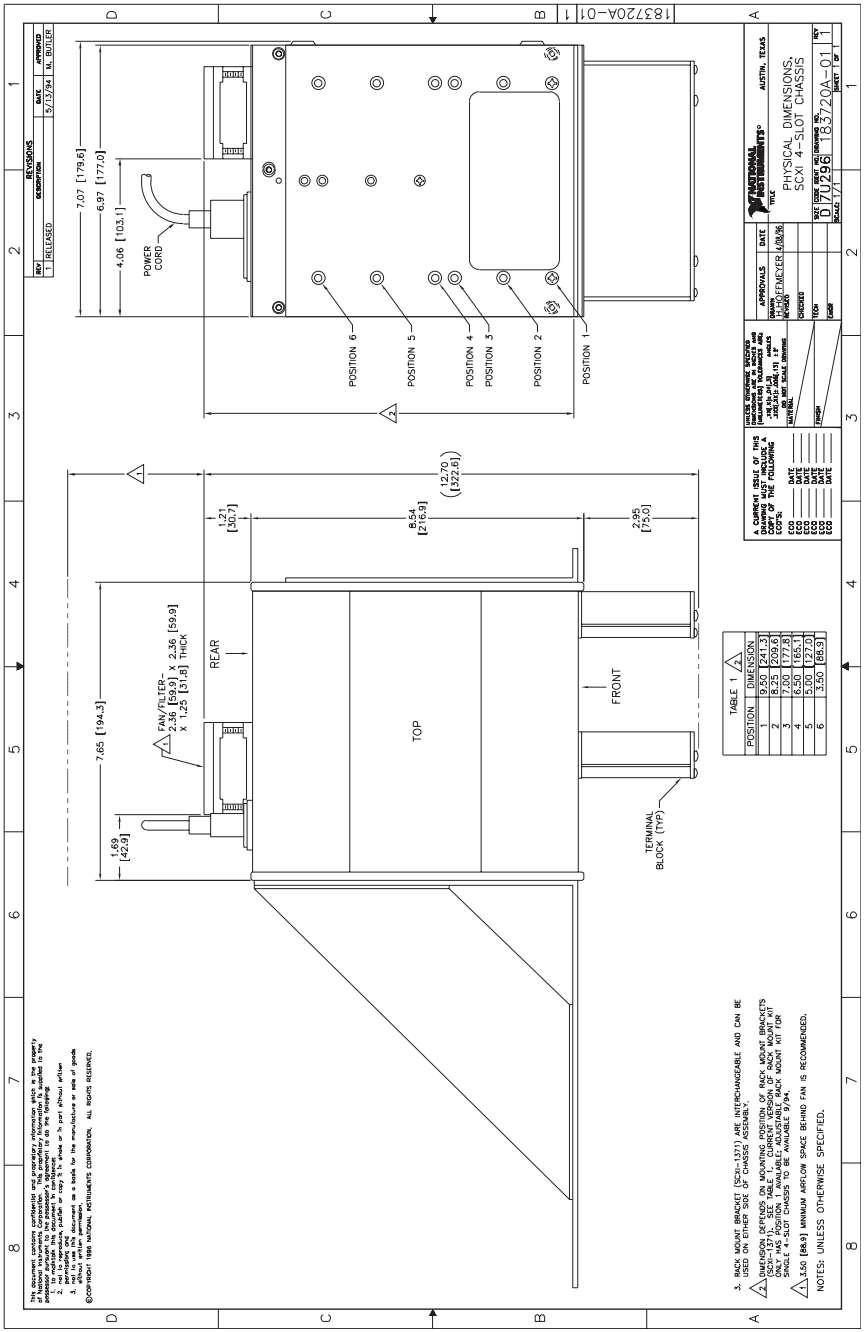


Figure A-2. Physical Dimensions for the SCXI-1000, SCXI-1000DC, and SCXI-2000

Environment

Operating temperature .....0 to 50 °C

Storage temperature .....–20 to 70 °C

Relative humidity .....5% to 90% noncondensing

Safety

Designed in accordance with IEC 1010-1, UL 3111-1, and CAN/CSA C22.2 No. 1010.1 for electrical measuring and test equipment. Approved at altitudes up to 2000 meters.

Installation Category II

Pollution Degree 2

Connectors

SCXI-2000

RS-232 connector .....9-pin male DSUB, AT pinout

Max cable length .....2,500 pF capacitance (100 ft. typ)

RS-485 connector .....4-pin screw terminal, labeled on panel

Max cable length .....4,000 ft.

Digital I/O

Isolation

RS-485 port .....42 V

Common-mode transient suppression

RS-485 port .....750 V

Transfer Characteristics

SCXI-2000 serial port

Baud rates supported .....300, 600, 1200, 2400, 4800, or 9600 bps; 19.2, 38.4, or 57.6 kbps

Byte format.....One start bit, one stop bit, no parity, eight data bits

Table A-1. Max Data Transfer Rates (Samples/s)

Baud Rate	Operating System	
	Windows 95	**Windows 3.1**
57.6 kbps	1,500	1,500
38.4 kbps	1,000	1,000
19.2 kbps	500	500
9600 bps	250	250
4800 bps	125	125
2400 bps	60	60
1200 bps	30	30
600 bps	15	15
300 bps	7	7

Maximum data transfer rates are for a single chassis operating continuously with an SCXI-1200. For short duration acquisitions of 20,000 samples or less, the chassis can buffer data at 12,000 samples per second. Acquisitions that fit in the input FIFO of the SCXI-1200 can be run at the maximum specified rates of the SCXI-1200.

B

Technical Support Resources

National Instruments offers technical support through electronic, fax, and telephone systems. The electronic services include our Web site, an FTP site, and a fax-on-demand system. If you have a hardware or software problem, please first try the electronic support systems. If the information available on these systems does not answer your questions, contact one of our technical support centers, which are staffed by applications engineers, for support by telephone and fax. To comment on the documentation supplied with our products, send e-mail to `techpubs@natinst.com`.

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FTP Site

To access our FTP site, log in to our Internet host, `ftp.natinst.com`, as `anonymous` and use your e-mail address, such as `yourname@anywhere.com`, as your password. The support files and documents are located in the `\support` directories.

Fax-on-Demand Support

Fax-on-Demand is a 24-hour information retrieval system containing a library of documents in English on a wide range of technical information. You can access Fax-on-Demand from a touch-tone telephone at 512 418 1111.

E-Mail Support

You can submit technical support questions to the applications engineering team through e-mail at `support@natinst.com`. Remember to include your name, address, and phone number so we can contact you with solutions and suggestions.

Telephone and Fax Support

National Instruments has branch offices all over the world. Use the following list to find the technical support number for your country. If there is no National Instruments office in your country, contact the source from which you purchased your software to obtain support.

Country	Telephone	Fax
Australia	03 9879 5166	03 9879 6277
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Belgium	02 757 00 20	02 757 03 11
Brazil	011 284 5011	011 288 8528
Canada (Ontario)	905 785 0085	905 785 0086
Canada (Québec)	514 694 8521	514 694 4399
Denmark	45 76 26 00	45 76 26 02
Finland	09 725 725 11	09 725 725 55
France	0 1 48 14 24 24	0 1 48 14 24 14
Germany	089 741 31 30	089 714 60 35
Hong Kong	2645 3186	2686 8505
India	91805275406	91805275410
Israel	03 6120092	03 6120095
Italy	02 413091	02 4139215
Japan	03 5472 2970	03 5472 2977
Korea	02 596 7456	02 596 7455
Mexico (D.F.)	5 280 7625	5 520 3282
Mexico (Monterrey)	8 357 7695	8 365 8543
Netherlands	0348 433466	0348 430673
Norway	32 84 84 00	32 84 86 00
Singapore	2265886	2265887
Spain (Madrid)	91 640 0085	91 640 0533
Spain (Barcelona)	93 582 0251	93 582 4370
Sweden	08 587 895 00	08 730 43 70
Switzerland	056 200 51 51	056 200 51 55
Taiwan	02 2377 1200	02 2737 4644
United Kingdom	01635 523545	01635 523154
United States	512 795 8248	512 794 5678

Glossary

Prefix	Meaning	Value
p-	pico	10^{-12}
m	milli-	10^{-3}
k-	kilo-	10^{3}

Numbers/Symbols

°	degrees
–	negative of, or minus
Ω	ohms
±	plus or minus
+	positive of, or plus
%	percent
+5 V	+5 volt signal

A

A	amperes
AC	alternating current
A/D	analog to digital

C

C	Celsius
CTS	clear to send signal

D

D/A	digital to analog
DAQ	data acquisition
DSR	data set ready
DSUB	D-subminiature connector
DTR	data terminal ready

F

F	farads
FIFO	first-in-first-out memory unit that stores the Slot 0 scan list
ft	feet

G

g	grams
GND	ground

H

HDLC	high-level data link control
Hz	hertz

I

IEC	International Electrotechnical Commission
in.	inches
I/O	input/output

L

LED	light-emitting diode

M

m	meters

O

ONLINE	online LED
oz.	ounces

P

PROG	program LED

R

RAM	random-access memory
RTS	request to send
RTSI	Real-Time System Integration
RX	receive LED
RXD	receive data signal

S

s	seconds
SCXI	Signal Conditioning eXtensions for Instrumentation

T

TEST	test LED

TTL	transistor-transistor logic
TX	transmit LED
TXD	transmit data signal

V

V	volts
VAC	volts alternating current
VDC	volts direct current

W

W	watts

Index

Numbers

+5 VDC fuse replacement,
SCXI-1000DC, 2-21

A

address selection
jumper settings (figure)
SCXI-1000 and SCXI-1001, 2-12
figure, 2-13
SCXI-1000DC, 2-13
figure, 2-14
SCXI-2000, 2-15
jumperless chassis (note), 2-13
SCXI-1000/1000DC/1001, 2-12

B

backplane fuse replacement and check procedure
SCXI-1000/1001 and SCXI-2000, 2-19
SCXI-1000DC, 2-21
baud rate selection on SCXI-2000, 2-16
baud rate and address setting examples (figure), 2-16
settings (table), 2-17
bulletin board support, B-1

C

cables
optional equipment, 1-5
SCXI-2000
parallel port cable, 2-25
serial port cable, 2-25
RS-232 cable, 2-25
RS-485 cable, 2-26
chassis address selection. *See* address selection.
chassis uses, 2-11
cleaning instructions, 2-11
configuration, 2-12. *See also* installation.
address selection
SCXI-1000 and SCXI-1001, 2-12
figure, 2-13
SCXI-1000DC, 2-13
figure, 2-14
SCXI-2000, 2-15
baud rate selection, 2-16
figure, 2-16
chassis descriptions
front view diagrams, 2-1
front view items (table), 2-1
rear view diagrams, 2-6
rear view items (tables), 2-6, 2-9
chassis usage considerations, 2-11
fuse part numbers (table)
SCXI-1000, SCXI-1001, and SCXI-2000, 2-18
fuse replacement and check procedure, backplane
SCXI-1000, SCXI-1001 and SCXI-2000, 2-19
SCXI-1000DC, 2-21
fuse replacement for power entry module
+5 VDC fuse replacement, SCXI-1000DC, 2-21
SCXI-1000, SCXI-1001, and SCXI-2000, 2-19
fuse replacement for SCXI-1000DC, 2-21
voltage selection
SCXI-1000, SCXI-1001, and SCXI-2000, 2-17

voltage selection and fuse ratings by region (table)
SCXI-1000, SCXI-1001, and SCXI-2000, 2-18
connector specifications, A-6

D

digital I/O specifications, A-6
documentation
conventions used in manual, *x*
National Instruments documentation, *xi*
organization of manual, *ix*
related documentation, *xi*

E

e-mail support, B-2
electrical characteristics (table), A-1 to A-2
electronic technical support, B-1 to B-2
environment specifications, A-6
equipment, optional, 1-5

F

fan filter maintenance, 2-31
fax and telephone support, B-2
faxback support, B-2
filler panel installation, 2-30
front filler panel, 2-30
rear filler panel, 2-30
FTP support, B-1
fuse replacement. *See also* voltage selection.
backplane fuse replacement and check procedure
SCXI-1000, SCXI-1001 and SCXI-2000, 2-19
SCXI-1000DC, 2-21
fuse part numbers (table)
SCXI-1000, SCXI-1001, and SCXI-2000, 2-18
fuse ratings by region (table)
SCXI-1000, SCXI-1001, and SCXI-2000, 2-18
fuse replacement for power entry module
+5 VDC fuse replacement, SCXI-1000DC, 2-22
SCXI-1000, SCXI-1001, and SCXI-2000, 2-19
SCXI-1000DC, 2-22
SCXI-1000DC, 2-21

I

indicator lights on SCXI-2000, 2-28
installation. *See also* configuration.
chassis descriptions
front view diagrams, 2-1
front view items (table), 2-1
rear view diagrams, 2-6
rear view items (tables), 2-6
fan filter maintenance, 2-31
filler panel installation, 2-30
module installation, 2-30
SCXI-1000 and SCXI-1001, 2-23
SCXI-1000DC, 2-24
SCXI-2000, 2-24
indicator lights, 2-28
parallel port cable, 2-25
serial port cable, 2-25
RS-232 cable, 2-25
RS-232 signal connections (table), 2-26
RS-485 cable, 2-26
RS-485 connections for two chassis (figure), 2-27
RS-485 signal connections (table), 2-27
troubleshooting (table), 2-29
unpacking the chassis, 1-6

L

LabVIEW and LabWindows/CVI application software, 1-2
LEDs on SCXI-2000, 2-28

M

manual. *See* documentation.
maintenance of fan filter, 2-31

N

NI-DAQ driver software, 1-3

O

ONLINE LED, SCXI-2000, 2-28

P

PROG LED, SCXI-2000, 2-28

R

RX LED, SCXI-2000, 2-29

S

safety specifications, A-6
SCXI-1000
- address selection, 2-12
  - jumper settings (figure), 2-13
- front view diagrams, 2-2
- fuse replacement
  - backplane fuse replacement and check procedure, 2-19
  - backplane fuse part numbers, 2-20
  - fuse part numbers (table), 2-18
  - fuse ratings by region (table), 2-18
  - power entry module, 2-19
- installation, 2-23
- rear view diagrams, 2-6
- rear view items (table), 2-6
- source power requirements, A-2
- voltage selection, 2-17
  - procedure, 2-19
  - voltage selection and fuse ratings by region (table), 2-18

SCXI-1000DC
- address selection, 2-13
  - jumper settings (figure), 2-14
- front view diagrams, 2-3
- fuse replacement, 2-21
  - +5 VDC fuse replacement, 2-21
  - backplane fuse replacement and check procedure, 2-22
  - backplane fuse part numbers, 2-22
  - power entry fuse and +5 VDC, 2-21
  - rear panel fuse part numbers (table), 2-21
- installation, 2-24
- rear view diagrams, 2-8
- rear view items (table), 2-7
- source power requirements, A-2

SCXI-1001
- address selection, 2-12
  - jumper settings (figure), 2-13
- front view diagrams, 2-4
- fuse replacement
  - backplane fuse replacement and check procedure, 2-19
  - backplane fuse part numbers (table), 2-20
  - fuse part numbers (table), 2-18
  - fuse ratings by region (table), 2-18
  - power entry module, 2-19
  - installation, 2-23
- physical dimensions (figure), A-5
- rear view diagrams, 2-7
- rear view items (table), 2-6
- source power requirements, A-2

voltage selection, 2-17
procedure, 2-19
voltage selection and fuse ratings by region (table), 2-18
SCXI-2000
address selection, 2-15
backplane fuse replacement and check procedure, 2-19
baud rate selection, 2-16
baud rate and address setting examples (figure), 2-16
settings (table), 2-17
front view diagrams, 2-5
fuse replacement
backplane fuse replacement and check procedure, 2-19
backplane fuse part numbers (table), 2-20
fuse part numbers (table), 2-18
fuse ratings by region (table), 2-18
power entry module, 2-19
indicator lights, 2-28
installation, 2-24
parallel port cable, 2-25
serial port cable, 2-25
RS-232 cable, 2-25
RS-232 signal connections (table), 2-26
RS-485 cable, 2-26
RS-485 connections for two chassis (figure), 2-27
RS-485 signal connections (table), 2-27
rear view diagram, 2-10
rear view items (table), 2-9
source power requirements, A-2
troubleshooting (table), 2-29
voltage selection, 2-17
procedure, 2-19
voltage selection and fuse ratings by region (table), 2-18
SCXI chassis
hardware and software requirements, 1-1 to 1-2
optional equipment, 1-5
overview, 1-1
software programming choices, 1-2 to 1-4
LabVIEW and LabWindows/CVI application software, 1-2
NI-DAQ driver software, 1-3
SCXI chassis descriptions
front view diagrams
SCXI-1000, 2-2
SCXI-1000DC, 2-3
SCXI-1001, 2-4
SCXI-2000, 2-5
front view items (table), 2-1
rear view diagrams
SCXI-1000, 2-6
SCXI-1000DC, 2-8
SCXI-1001, 2-7
SCXI-2000, 2-10
rear view items (table)
SCXI-1000/1001, 2-6
SCXI-1000DC, 2-7
SCXI-2000, 2-9
serial port cables, 2-25
RS-232, 2-25
RS-485, 2-26
software programming choices
LabVIEW and LabWindows/CVI application software, 1-2
NI-DAQ driver software, 1-3
register-level programming, 1-4
source power requirements
SCXI-1000/1001/2000, A-2
SCXI-1000DC, A-2
specifications
connectors, A-6
digital I/O, A-6
electrical characteristics (table), A-1 to A-2

environment, A-6
physical dimensions
SCXI 4-slot chassis (figure), A-4
SCXI-1001 (figure), A-5
safety, A-6
source power requirements
SCXI-1000/1001/2000, A-2
SCXI-1000DC, A-2
transfer characteristics, A-6
weight, A-3

T

technical support, B-1 to B-2
TEST LED, SCXI-2000, 2-28
transfer characteristics, A-6
TX LED, SCXI-2000, 2-28

V

voltage selection. *See also* fuse replacement.
SCXI-1000, SCXI-1001, and SCXI-2000, 2-17
procedure, 2-17
voltage selection and fuse ratings by region (table), 2-18

W

weight specifications, A-3

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