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# NI-9147 Getting Started

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2024-10-14



# Contents

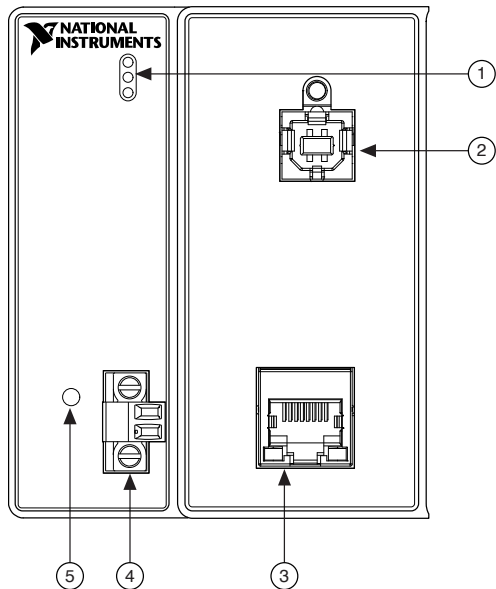
NI-9147 Features .....	4
RJ-45 Gigabit Ethernet Port .....	4
Power Connector .....	5
USB Device Port .....	6
Chassis Grounding Screw .....	7
Internal Real-Time Clock .....	8
Battery .....	8
Buttons .....	10
LEDs .....	11
NI-9147 Block Diagram .....	14
Unpacking the Kit .....	15
Installing Software on the Host Computer .....	16
Mounting the NI-9147 .....	17
Dimensions .....	17
Mounting Requirements .....	18
Ambient Temperature .....	19
Mounting the NI-9147 Directly on a Flat Surface .....	20
Surface Mounting Dimensions .....	21
Mounting the NI-9147 on a Panel .....	21
Panel Mounting Dimensions .....	23
Mounting the NI-9147 on a DIN Rail .....	23
Clipping the Device on a DIN Rail .....	24
Mounting the Controller on a Rack .....	25
Mounting the NI-9147 on a Desktop .....	25
Installing C Series Modules .....	26
Removing C Series Modules .....	27
Connecting the NI-9147 to Ground .....	28
Connecting the NI-9147 to Power .....	29
Powering On the NI-9147 .....	30
Connecting the NI-9147 to the Host Computer or Network .....	31
Connecting the NI-9147 to the Host Computer or Network Using Ethernet .....	31
Finding the NI-9147 on the Network (DHCP) .....	32

Connecting the NI-9147 to the Host Computer Using the USB Device Port .....	32
What to Do When the NI-9147 is Not Communicating with the Network .....	33
Verify the System IP Configuration.....	34
Configuring the Windows Firewall .....	34
Configuring the System in Measurement & Automation Explorer (MAX) .....	35
Setting a System Password .....	35
Installing Software on the NI-9147.....	36
Configuring Startup Options .....	37

# NI-9147 Features

The NI-9147 has the following connectors, LEDs, and buttons.

**Figure 1. NI-9147 Front Panel**



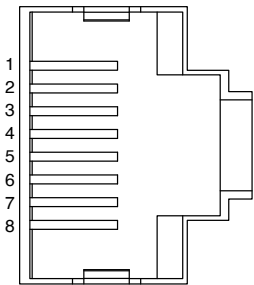
1. LEDs
2. USB Device Port
3. RJ-45 Ethernet Port 1
4. Power Connector
5. RESET Button

## RJ-45 Gigabit Ethernet Port

The NI-9147 has one tri-speed RJ-45 Gigabit Ethernet port. By default, the Ethernet port is enabled and configured to obtain an IP address automatically. The Ethernet port can be configured in MAX.

The following table shows the pinout for the RJ-45 Gigabit Ethernet port.

Table 1. RJ-45 Gigabit Ethernet Port Pinout

Fast Ethernet Signal	Gigabit Ethernet Signal	Pin	Pinout
TX+	TX_A+	1	
TX-	TX_A-	2	
RX+	RX_B+	3	
No Connect	TX_C+	4	
No Connect	TX_C-	5	
RX-	RX_B-	6	
No Connect	RX_D+	7	
No Connect	RX_D-	8	



**Note** The Ethernet port performs automatic crossover configuration so you do not need to use a crossover cable to connect to a host computer.

The following NI Ethernet cables are available for the NI-9147.

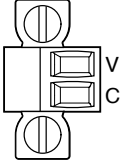
Table 2. RJ-45 Gigabit Ethernet Cables

Cables	Length	Part Number
CAT-5E Ethernet Cable, shielded	2 m	151733-02
	5 m	151733-05
	10 m	151733-10

## Power Connector

The NI-9147 has a power connector to which you can connect a power supply. The following table shows the pinout for the power connector.

**Table 3.** Power Connector Pinout

Pinout	Pin	Description
	V	Power input
	C	Common

The NI-9147 has reverse-voltage protection.

The following NI power supplies and accessories are available for the NI-9147.

**Table 4.** Power Accessories

Accessory	Part Number
NI PS-10 Desktop Power Supply, 24 VDC, 5 A, 100-120/200-240 VAC Input	782698-01
NI PS-14 Industrial Power Supply, 24 to 28 VDC, 3.3 A, 100-240 VAC Input	783167-01
NI PS-15 Industrial Power Supply, 24 to 28 VDC, 5 A, 100/230 VAC Input	781093-01
NI PS-16 Industrial Power Supply, 24 to 28 VDC, 10 A, 115/230 VAC Input	781094-01
NI PS-17 Industrial Power Supply, 24 to 28 VDC, 20 A, 85-276 VAC Input	781095-01

## USB Device Port

The NI-9147 USB device port is intended for device configuration, application deployment, debugging, and maintenance. For example, you can use the USB device port to install software or driver updates during field maintenance instead of interrupting communication on the RJ-45 Ethernet ports.



**Caution** Do not disconnect the power supply wires, I/O-side wires, or connectors from the product unless power has been switched off or the area is known to be nonhazardous.



**Attention** Ne déconnectez les fils d'alimentation, les fils côté E/S et les connecteurs du produit que s'il est hors tension ou qu'il se trouve dans une zone non dangereuse.



**Hazardous Voltage** The product is designed for nonhazardous, live signals. You must ensure that all signals connected to the product are isolated from hazardous, live circuits and no unsafe voltages are present at the inputs. Voltages that exceed the specifications could result in damage to the product or electric shock.



**Tension dangereuse** Le produit est conçu pour les signaux en direct non dangereux. Vous devez vous assurer que tous les signaux connectés au produit sont isolés des circuits dangereux sous tension et qu'aucune tension dangereuse n'est présente aux entrées. Des tensions supérieures à celles mentionnées dans les spécifications peuvent endommager le produit ou provoquer un choc électrique.

The following table shows the pinout for the USB device port.

Description	Signal	Pin	Pinout	Pin	Signal	Description
USB data+	D+	3		2	D-	USB data-
Ground	GND	4		1	VCC	Cable power (5 V)

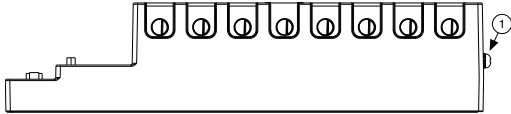
The following NI cable is available for the NI-9147.

**Table 5.** USB Device Port Cable

Cable	Length	Part Number
USB Cable	1 m	157788-01

## Chassis Grounding Screw

The NI-9147 provides a chassis grounding screw.

**Figure 2.** NI-9147 Chassis Grounding Screw

### 1. Chassis grounding screw

For EMC compliance, you must connect the NI-9147 to earth ground through the chassis ground screw. Use wire that is 2.1 mm<sup>2</sup> (14 AWG) solid copper wire with a maximum length of 1.5 m (5 ft). Attach the wire to the earth ground of the electrode system of the facility.



**Notice** If you use shielded cabling to connect to a C Series module with a plastic connector, you must attach the cable shield to the chassis grounding terminal using 2.1 mm<sup>2</sup> (14 AWG) or larger wire. Attach a ring lug to the wire and attach the wire to the chassis grounding terminal. Solder the other end of the wire to the cable shield. Use shorter wire for better EMC performance.

For more information about ground connections, visit [ni.com/r/emcground](https://ni.com/r/emcground).

## Internal Real-Time Clock

The NI-9147 contains an internal real-time clock that maintains system time when the NI-9147 is powered off. The system clock of the NI-9147 is synchronized with the internal real-time clock at startup. You can set the real-time clock using the BIOS setup utility or MAX, or you can set the clock programmatically using LabVIEW.

Refer to the specifications for your controller for the real-time clock accuracy specifications.

## Battery

The NI-9147 contains a lithium cell battery that stores the system clock information when the NI-9147 is powered off. There is only a slight drain on the battery when power is applied to the NI-9147 power connector. The rate at which the battery drains

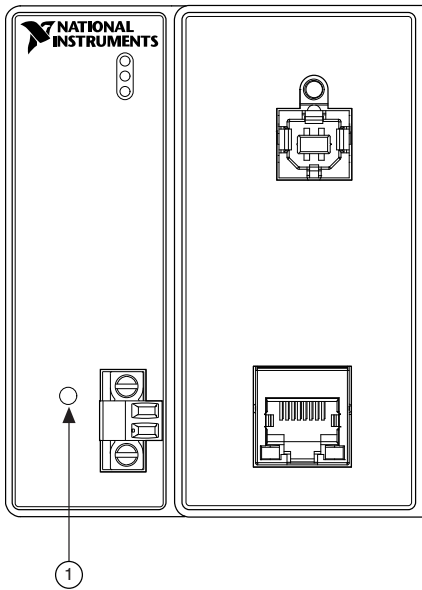


when power is disconnected depends on the ambient storage temperature. For longer battery life, store the NI-9147 at a cooler temperature and apply power to the power connector. Refer to the specifications for your controller for the expected battery lifetime.

The battery is not user-replaceable. If you need to replace the battery, contact NI. Refer to the Safety, Environmental, and Regulatory Information document for your controller for information about battery disposal.

# Buttons

The NI-9147 provides the following buttons.

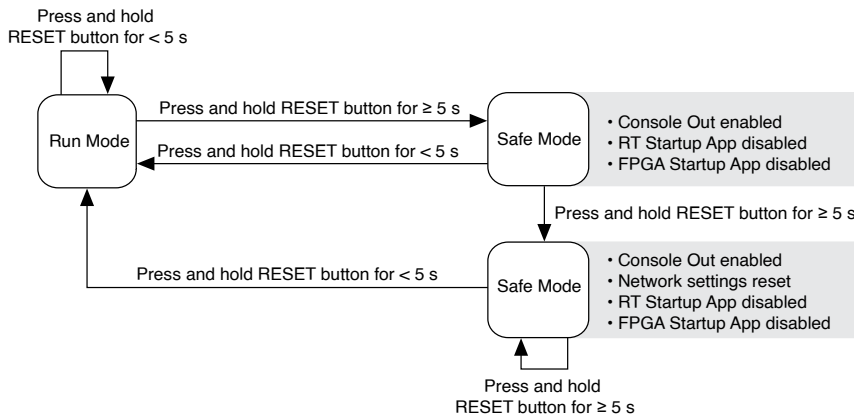


1. RESET Button

## System Reset

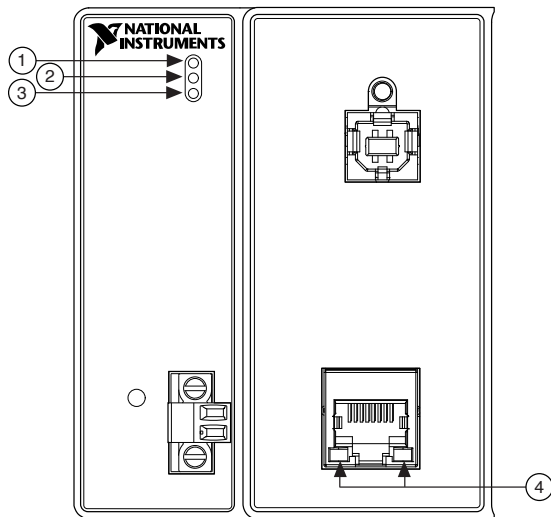
The following figure shows the reset behavior of the NI-9147.

**Figure 3. Reset Button Behavior**



# LEDs

The NI-9147 provides the following LEDs.



1. POWER LED
2. STATUS LED
3. USER FPGA1 LED
4. RJ-45 Ethernet LEDs

## POWER LED Indicators

The following table lists the POWER LED indicators.

**Table 6.** POWER LED Indicators

LED Pattern	Indication
Solid	The NI-9147 is powered on.
Off	The NI-9147 is powered off.

## STATUS LED Indicators

The following table describes the STATUS LED indicators.

Table 7. STATUS LED Indicators

LED Pattern	Indication
Blinks twice and pauses	<p>The NI-9147 is in safe mode. Software is not installed, which is the factory default state, or software has been improperly installed on the NI-9147.</p> <p>An error can occur when an attempt to upgrade the software is interrupted. Reinstall software on the NI-9147. Refer to the <b>Measurement &amp; Automation Explorer (MAX) Help</b> for information about installing software on the NI-9147.</p>
Blinks three times and pauses	<p>The NI-9147 is in user-directed safe mode, or the NI-9147 is in install mode to indicate that software is currently being installed.</p> <p>This pattern may also indicate that the user has forced the NI-9147 to boot into safe mode by pressing the reset button for longer than five seconds or by enabling safe mode in MAX. Refer to the <b>Measurement &amp; Automation Explorer (MAX) Help</b> for information about safe mode.</p>
Blinks four times and pauses	<p>The NI-9147 is in safe mode. The software has crashed twice without rebooting or cycling power between crashes.</p>
Continuously blinks	<p>The NI-9147 has not booted into NI Linux Real-Time. The NI-9147 either booted into an unsupported operating system, was interrupted during the boot process, or detected an unrecoverable software error.</p>
On momentarily	<p>The NI-9147 is booting. No action required.</p>
Off	<p>The NI-9147 is in run mode. Software is installed and the operating system is running.</p>

## User LED

You can define the USER FPGA1 LED to meet the needs of your application. The following table lists the USER FPGA1 LED indicators.

**Table 8.** User LEDs

LED	LED Color	Description
USER FPGA1	Green/Yellow	Use the LabVIEW FPGA Module and NI-RIO Device Drivers software to define the USER FPGA1 LED. Use the USER FPGA1 LED to help debug your application or retrieve application status. Refer to the <b>LabVIEW Help</b> for information about programming this LED.

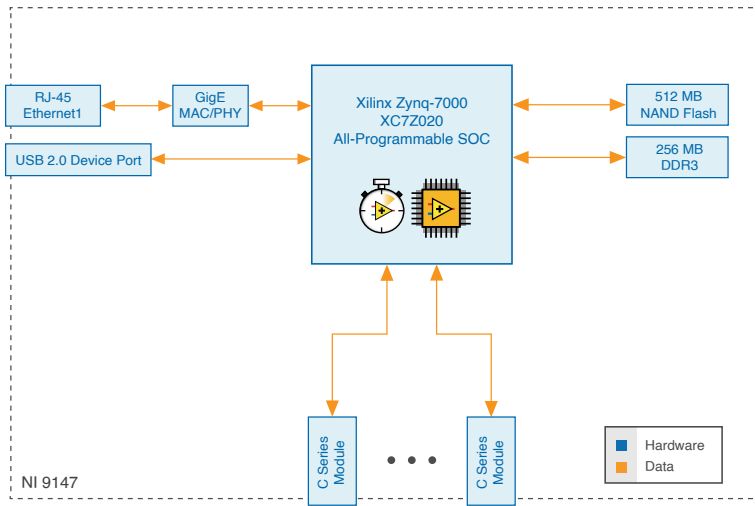
## Ethernet LED Indicators

The following table lists the Ethernet LED indicators.

**Table 9.** Ethernet LED Indicators

LED	LED Color	LED Pattern	Indication
ACT/LINK	—	Off	LAN link not established
	Green	Solid	LAN link established
		Flashing	Activity on LAN
10/100/1000	Yellow	Solid	1,000 Mb/s data rate selected
	Green	Solid	100 Mb/s data rate selected
	—	Off	10 Mb/s data rate selected

# NI-9147 Block Diagram



# Unpacking the Kit



**Notice** To prevent electrostatic discharge (ESD) from damaging the device, ground yourself using a grounding strap or by holding a grounded object, such as your computer chassis.

1. Touch the antistatic package to a metal part of the computer chassis.
2. Remove the device from the package and inspect the device for loose components or any other sign of damage.



**Notice** Never touch the exposed pins of connectors.



**Note** Do not install a device if it appears damaged in any way.

3. Unpack any other items and documentation from the kit.

Store the device in the antistatic package when the device is not in use.

## Verifying the Kit Contents

Verify that the following items are included in the NI-9147 kit.

- NI-9147
- USB A-to-B cable
- Documentation

# Installing Software on the Host Computer

Before using the NI-9147, you must install the following application software and device drivers on the host computer in this order:

1. LabVIEW 2014 SP1 or later
2. LabVIEW FPGA Module 2014 SP1 or later
3. NI CompactRIO 14.5 or later



**Note** LabVIEW FPGA Module is not required when using Scan Interface mode. To program the user-accessible FPGA on the NI-9147, LabVIEW FPGA Module is required.

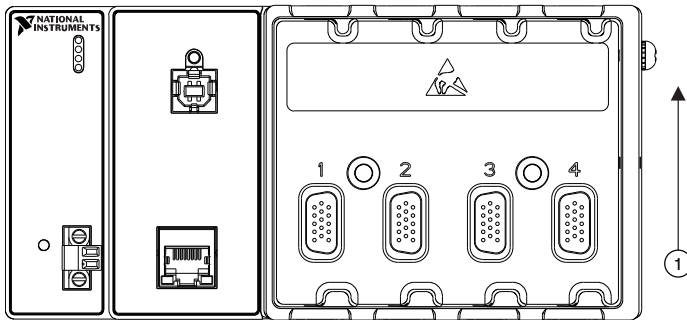
For minimum software support information, visit [ni.com/r/swsupport](http://ni.com/r/swsupport).



# Mounting the NI-9147

To obtain the maximum allowable ambient temperature of 70 °C, you must mount the NI-9147 horizontally on a flat, metallic, vertical surface such as a panel or wall. You can mount the NI-9147 directly to the surface or use the NI Panel Mounting Kit. The following figure shows the NI-9147 mounted horizontally.

**Figure 4.** NI-9147 Horizontal Mounting



1. Up

You can also mount the NI-9147 in other orientations, on a nonmetallic surface, on a 35-mm DIN rail, on a desktop, or in a rack. Mounting the NI-9147 in these or other configurations can reduce the maximum allowable ambient temperature and can affect the typical accuracy of modules in the NI-9147. For more information about typical accuracy specifications for C Series modules and temperature deratings caused by different mounting configurations, visit [ni.com/r/criotypical](http://ni.com/r/criotypical).



**Caution** Make sure that no C Series modules are in the NI-9147 before mounting it.

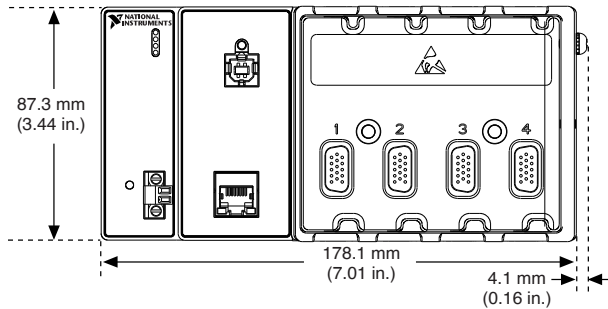


**Tip** Before using any of these mounting methods, record the serial number from the back of the NI-9147 so that you can identify the NI-9147 in MAX. You will be unable to read the serial number after you mount the NI-9147.

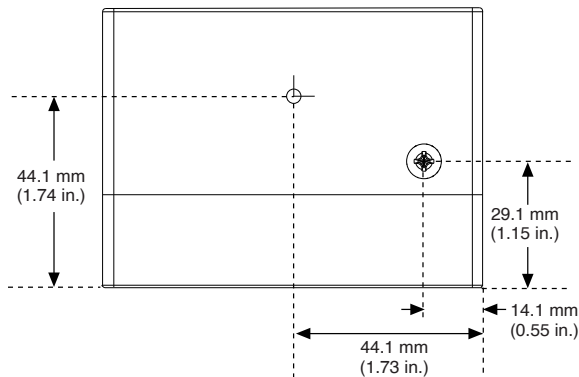
## Dimensions

The following figures show the front and side dimensions of the NI-9147. For detailed dimensional drawings and 3D models, visit [ni.com/dimensions](http://ni.com/dimensions) and search for the model number.

**Figure 5. NI-9147 Front Dimensions**



**Figure 6. NI-9147 Side Dimensions**

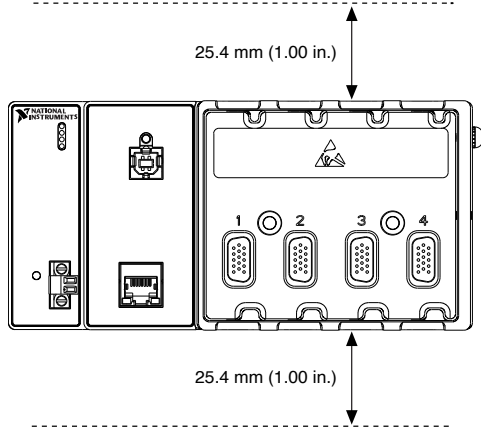


## Mounting Requirements

Your installation must meet the following requirements for cooling and cabling clearance.

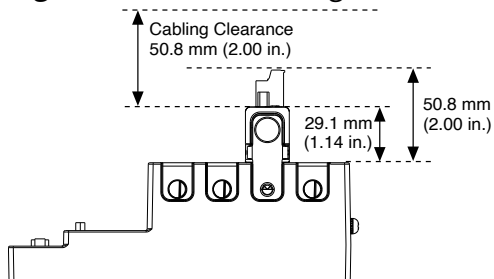
Allow 25.4 mm (1.00 in.) on the top and the bottom of the NI-9147 for air circulation, as shown in the following figure.

Figure 7. NI-9147 Cooling Dimensions



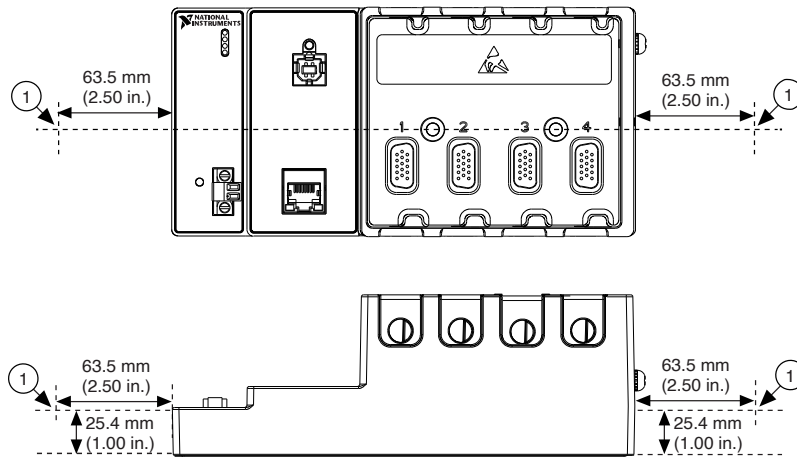
Allow the appropriate space in front of C Series modules for cabling clearance, as shown in the following figure. The different connector types on C Series modules require different cabling clearances. For a complete list of cabling clearances for C Series modules, visit [ni.com/r/crioconn](http://ni.com/r/crioconn).

Figure 8. NI-9147 Cabling Clearance



## Ambient Temperature

Measure the ambient temperature at each side of the NI-9147, 63.5 mm (2.50 in.) from the side and 25.4 mm (1.00 in.) forward from the rear of the NI-9147, as shown in the following figure.

**Figure 9. NI-9147 Ambient Temperature Location**

1. Location for measuring the ambient temperature

## Mounting the NI-9147 Directly on a Flat Surface

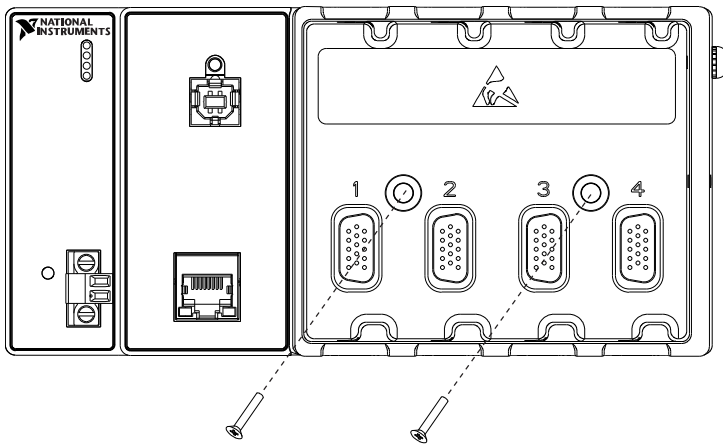
For environments with high shock and vibration, NI recommends mounting the NI-9147 directly on a flat, rigid surface using the mounting holes in the NI-9147.

### What to Use

- NI-9147
- Screwdriver, Phillips #2
- M4 or number 8 screw (x2), user-provided, longer than 23.00 mm (0.91 in.) to pass all the way through the NI-9147

### What to Do

Complete the following steps to mount the NI-9147 directly on a flat surface.

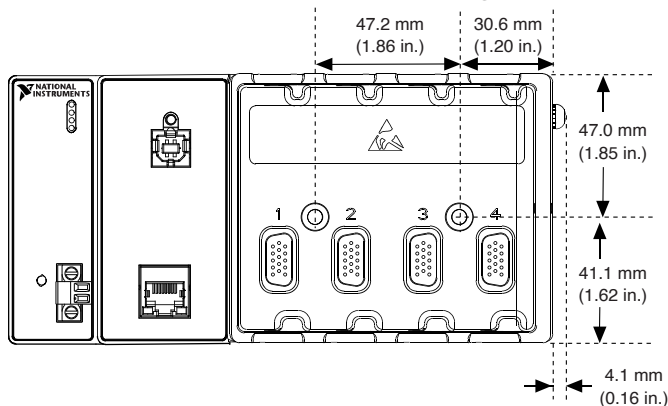


1. Prepare the surface for mounting the NI-9147 using the **Surface Mounting Dimensions**.
2. Align the NI-9147 on the surface.
3. Fasten the NI-9147 to the surface using the M4 or number 8 screws appropriate for the surface. Tighten the screws to a maximum torque of  $1.3 \text{ N} \cdot \text{m}$  ( $11.5 \text{ lb} \cdot \text{in.}$ ).

## Surface Mounting Dimensions

The following figure shows the surface mounting dimensions for the NI-9147.

Figure 10. NI-9147 Surface Mounting Dimensions



## Mounting the NI-9147 on a Panel

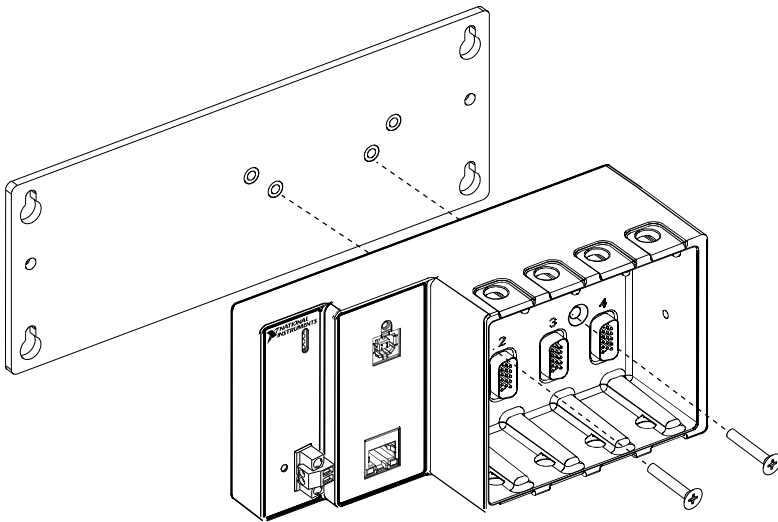
You can use the NI panel mounting kit to mount the NI-9147 on a panel.

## What to Use

- NI-9147
- Screwdriver, Phillips #2
- NI panel mounting kit, 779097-01
  - Panel mounting plate
  - M5 or number 10 screw (x4)

## What to Do

Complete the following steps to mount the NI-9147 on a panel.



1. Align the NI-9147 and the panel mounting plate.
2. Fasten the panel mounting plate to the NI-9147 using the screwdriver and M5 or number 10 screws. NI provides these screws with the panel mounting kit. Tighten the screws to a maximum torque of 1.3 N · m(11.5 lb · in.).



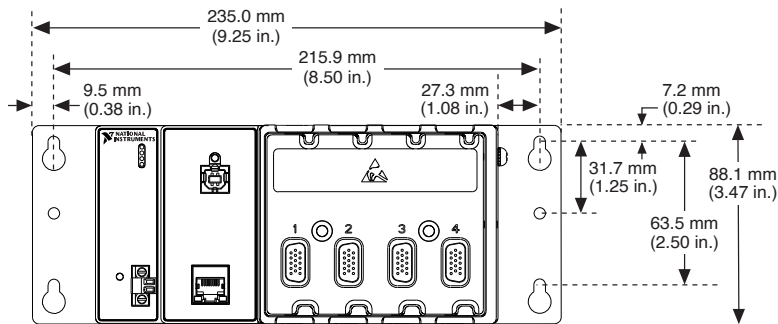
**Note** You must use the screws provided with the NI panel mounting kit because they are the correct depth and thread for the panel mounting plate.

3. Fasten the panel mounting plate to the surface using the screwdriver and screws that are appropriate for the surface. The maximum screw size is M5 or number 10.

## Panel Mounting Dimensions

The following figure shows the panel mounting dimensions for the NI-9147.

**Figure 11.** NI-9147 Panel Mounting Dimensions



## Mounting the NI-9147 on a DIN Rail

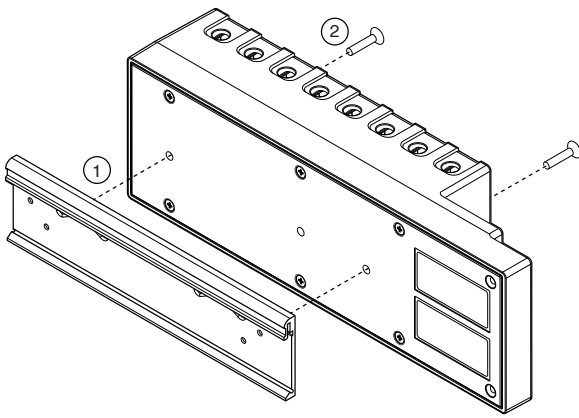
You can use the NI DIN rail mounting kit to mount the NI-9147 on a standard 35-mm DIN rail.

### What to Use

- NI-9147
- Screwdriver, Phillips #2
- NI DIN rail mounting kit, 779019-01
  - DIN rail clip
  - M4 × 25 flathead screw (x2)

### What to Do

Complete the following steps to mount the NI-9147 on a DIN rail.



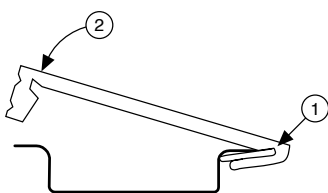
1. Align the NI-9147 and the DIN rail clip.
2. Fasten the DIN rail kit to the NI-9147 using the screwdriver and M4 × 25 flathead screws. NI provides these screws with the DIN rail mounting kit. Tighten the screws to a maximum torque of 1.3 N · m (11.5 lb · in.).



**Note** You must use the screws provided with the NI DIN rail mounting kit because they are the correct depth and thread for the DIN rail clip.

## Clipping the Device on a DIN Rail

Complete the following steps to clip the NI-9147 on a DIN rail.



1. Insert one edge of the DIN rail into the deeper opening of the DIN rail clip.
2. Press down firmly to compress the spring until the clip locks in place on the DIN rail.



**Notice** Ensure that no C Series modules are in the NI-9147 before removing it from the DIN rail.



## Mounting the Controller on a Rack

You can use the following rack mount kits to mount the NI-9147 and other DIN rail-mountable equipment on a standard 482.6 mm (19 in.) rack.

- NI Sliding Rack-Mounting Kit, 779102-01
- NI Rack-Mounting Kit, 781989-01



**Note** You must use the NI DIN rail mounting kit, 779019-01, in addition to a rack-mounting kit.

## Mounting the NI-9147 on a Desktop

You can use the NI desktop mounting kit to mount the NI-9147 on a desktop.

### What to Use

- NI-9147
- Screwdriver, Phillips #2
- NI desktop mounting kit, 779473-01
  - Desktop mounting brackets (x2)

### What to Do

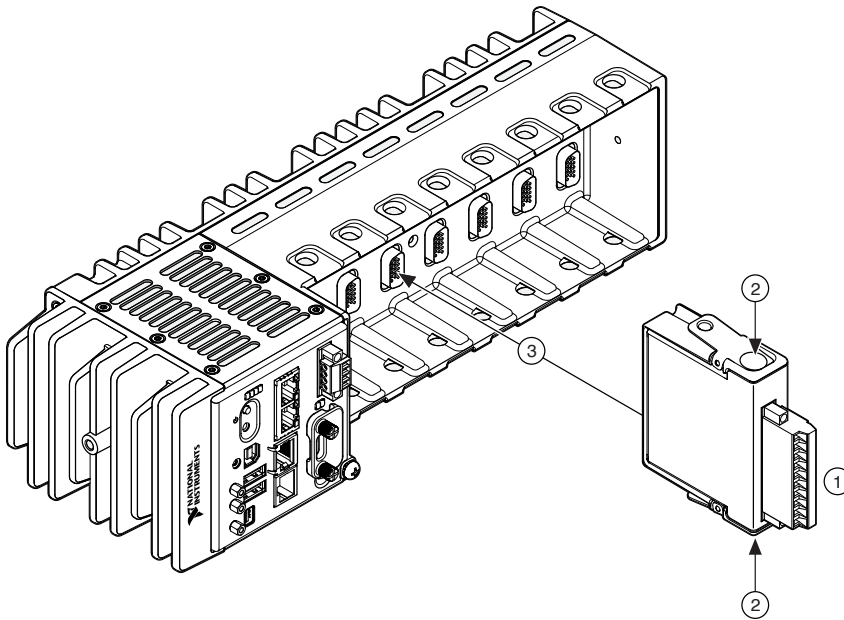
Complete the following steps to mount the NI-9147 on a desktop.

1. Align the brackets with the mounting holes on the ends of the NI-9147.
2. Use the screwdriver to tighten the captive screws on the end of the brackets.

# Installing C Series Modules

Complete the following steps to install a C Series module.

Figure 12. Installing C Series Modules



1. Verify that power is not connected to the I/O connector(s) on the C Series module. If the system is in a nonhazardous location, the NI-9147 can be powered on when you install modules.
2. Press the latches on the C Series module.
3. Align the C Series module with a slot and seat it in the slot until the latches lock in place.

# Removing C Series Modules

Verify that power is not connected to the I/O connector(s) on the C Series module before you remove a module from the NI-9147. If the system is in a nonhazardous location, the NI-9147 can be powered on when you remove modules.

# Connecting the NI-9147 to Ground

You must connect the NI-9147 grounding terminal to the grounding electrode system of the facility.

## What to Use

- Ring lug
- Wire, 2.1 mm<sup>2</sup> (14 AWG) or larger
- Screwdriver, Phillips #2

## What to Do

Complete the following steps to ground the NI-9147.

1. Attach the ring lug to the wire.
2. Remove the grounding screw from the grounding terminal on the NI-9147.
3. Attach the ring lug to the grounding terminal.
4. Tighten the grounding screw to 0.5 N · m (4.4 lb · in.) of torque.
5. Attach the other end of the wire to the grounding electrode system of your facility using a method that is appropriate for your application.



**Notice** If you use shielded cabling to connect to a C Series module with a plastic connector, you must attach the cable shield to the chassis grounding terminal using 2.1 mm<sup>2</sup> (14 AWG) or larger wire. Attach a ring lug to the wire and attach the wire to the chassis grounding terminal. Solder the other end of the wire to the cable shield. Use shorter wire for better EMC performance.

For more information about ground connections, visit [ni.com/info](https://ni.com/info) and enter the Info Code `emcground`.

# Connecting the NI-9147 to Power

The NI-9147 requires a 9 V to 30 V external power supply. The NI-9147 filters and regulates the supplied power and provides power for the C Series modules. The NI-9147 has one layer of reverse-voltage protection.

The following table lists the POWER LED indicators.

**Table 11.** POWER LED Indicators

LED Color	LED Pattern	Indication
Green	Solid	The NI-9147 is powered on and the connected power supply is adequate.
—	Off	The NI-9147 is powered off.

## What to Use

- Screwdriver, 2.54 mm (0.10 in.) flathead
- Power supply, 9 V to 30 V, 11 W minimum

NI recommends the power supply listed in the following table for the NI-9147.

**Table 11.** NI Power Supplies

Power Supply	Part Number
NI PS-15 Industrial Power Supply (24 V DC, 5 A, 100 V AC to 120 V AC/200 V AC to 240 V AC input)	781093-01

## What to Do

Complete the following steps to connect a power supply to the NI-9147.

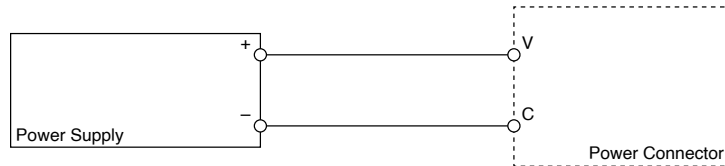
1. Ensure that your power supply is powered off.
2. Remove the power connector from the NI-9147.



**Caution** Do not tighten or loosen the terminal screws on the power connector while the NI-9147 is powered on.

3. Connect the power supply to the power connector, as shown in the following figure.

**Figure 13.** NI-9147 Power Connections



**Note** The C terminals are internally connected to each other.

4. Tighten the terminal screws on the power connector to 0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.) of torque.
5. Install the power connector on the front panel of the NI-9147.
6. Tighten the power connector screw flanges to 0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.) of torque.
7. Power on the power supply.

## Powering On the NI-9147

When you power on the NI-9147 for the first time, the device boots into safe mode. The POWER LED illuminates, the STATUS LED illuminates briefly, and then the STATUS LED blinks twice every few seconds.

# Connecting the NI-9147 to the Host Computer or Network

You can connect the NI-9147 to the host computer and/or network in the following ways:

- USB device port
- RJ-45 Ethernet port



**Tip** NI recommends using the USB device port for configuration, debug, and maintenance.

## Connecting the NI-9147 to the Host Computer or Network Using Ethernet

Complete the following steps to connect the NI-9147 to a host computer or Ethernet network using the RJ-45 Gigabit Ethernet port 1. NI recommends using the RJ-45 Gigabit Ethernet port 1 for communication with deployed systems.



**Note** You can configure the RJ-45 Gigabit Ethernet port 2 in Measurement & Automation Explorer (MAX) under the **Network Settings** tab.

1. Power on the host computer or Ethernet hub.
2. Connect the RJ-45 Gigabit Ethernet port 1 on the NI-9147 to the host computer or Ethernet hub using a standard Category 5 (CAT-5) or better shielded, twisted-pair Ethernet cable.



**Notice** To prevent data loss and to maintain the integrity of your Ethernet installation, do not use a cable longer than 100 m (328 ft).

The NI-9147 attempts to initiate a DHCP network connection the first time you

connect using Ethernet. The NI-9147 connects to the network with a link-local IP address with the form 169.254.x.x if it is unable to initiate a DHCP connection.

## Finding the NI-9147 on the Network (DHCP)

Complete the following steps to find the NI-9147 on a network using DHCP.

1. Disable secondary network interfaces on the host computer, such as a wireless access card on a laptop.
2. Ensure that any anti-virus and firewall software running on the host computer allows connections to the host computer.



**Note** MAX uses UDP 44525. Refer to the documentation of your firewall software for information about configuring the firewall to allow communication through the UDP 44525.

3. Launch MAX on the host computer.
4. Expand **Remote Systems** in the configuration tree and locate your system.



**Tip** MAX lists the system under the model number followed by the serial number, such as NI-cRIO-9147-1856AAA.

## Connecting the NI-9147 to the Host Computer Using the USB Device Port

Complete the following steps to connect the NI-9147 to the host computer using the USB device port.

1. Power on the host computer.
2. Connect the NI-9147 to the host computer using the USB A-to-B cable.



**Notice** NI requires the use of a locking USB cable (157788-01) to meet the shock and vibration specifications, as listed in the specifications for your controller.



The device driver software automatically detects the NI-9147. If the device driver software does not detect the NI-9147, verify that you installed the appropriate NI software in the correct order on the host computer.

## What to Do When the NI-9147 is Not Communicating with the Network

- Ensure that the USB connections between the NI-9147 and the host computer and the Ethernet connections between the host computer and the router are secure.
- Configure the IP and other network settings by completing the following steps.
  1. Use a USB A-to-B cable to connect the NI-9147 USB device port to a host computer. The USB driver creates a virtual network interface card and assigns an IP address to the NI-9147 in the format of 172.22.11.x.
  2. In MAX, expand your system under Remote Systems.
  3. Select the **Network Settings** tab to configure the IP and other network settings.
  4. (Optional) Use the RJ-45 Ethernet port 1 to reconnect the NI-9147 to the host computer. The NI-9147 attempts to initiate a DHCP network connection at powerup.



**Note** If the NI-9147 cannot obtain an IP address, it connects to the network with a link-local IP address with the form 169.254.x.x. The host computer communicates with the NI-9147 over a standard Ethernet connection.

- Ensure that you have the correct version of NI CompactRIO Device Drivers installed on the host computer. Visit [ni.com/info](http://ni.com/info) and enter the Info Code `swsupport` for the minimum supported versions of LabVIEW and NI CompactRIO Device Drivers.



**Tip** If you have recently upgraded LabVIEW, you must reinstall NI CompactRIO Device Drivers.

- Ensure that the NI USBLAN adapter is recognized in the Device Manager. On Windows 7, select **Start » Control Panel » Device Manager » Network adapters » National Instruments » USBLAN adapter**. If the USBLAN adapter is not recognized, you must reinstall NI CompactRIO Device Drivers.

- Temporarily disable any network firewalls or other security software.

## Verify the System IP Configuration

1. Put the NI-9147 in safe mode by holding the RESET button down for 5 seconds. The STATUS LED starts blinking three times every few seconds.
2. Set a new DHCP connection by holding the RESET button down for 5 seconds. The STATUS LED repeats the same behavior from [Step 1](#).  
If the NI-9147 fails to set a new DHCP address, it assigns itself a link-local IP address. If the DHCP connection is successful and appropriate for your application, skip to [Step 5](#).
3. In MAX, expand your system under Remote Systems.
4. Select the **Network Settings** tab to configure the IP and other network settings.
5. Reboot the NI-9147 by pressing the RESET button.

## Configuring the Windows Firewall

- Add an exception for MAX to your network firewall or other security software by completing the following steps:
  1. On Windows 7, select **Start » Control Panel » System and Security » Windows Firewall » Allow a program through Windows Firewall**.
  2. Click **Allow another program**.
  3. Select **Measurement & Automation**.
  4. Click **Add**.
  5. Click **OK**.
- Ensure that UDP port 44525 is open to communication on the host computer. If you are using an intelligent switch on the network, ensure that it is not disabling UDP port 44525.

# Configuring the System in Measurement & Automation Explorer (MAX)

Complete the following steps to find the system in MAX.

1. Launch MAX on the host computer.
2. Expand **Remote Systems** in the configuration tree and locate your system.
3. Select your target.



**Tip** MAX lists the system under the model number followed by the serial number, such as NI-cRIO-9147-1856AAA.

## Setting a System Password

Complete the following steps to set a system password.



**Note** The default username for the NI-9147 is `admin`. There is no default password for the NI-9147, so you must leave the password field blank when logging in until you set a system password.

1. Right-click your system and select **Web Configuration**.  
The NI Web-Based Configuration and Monitoring utility opens in your default browser and is where you set the password. If you have not installed Microsoft Silverlight, NI Web-based Configuration & Monitoring prompts you to do so.
2. Enter a unique name for your system in the **Hostname** field.
3. Click the **Security Configuration** icon.
4. Click **Login**.
5. In the **Login** dialog box, enter the username `admin` and leave the password field blank.
6. Click **OK**.
7. Click **Change Password**.

8. Enter and re-enter a new password.
9. Click **OK**.
10. Click **Save**.
11. Click **OK** to confirm you are changing the password.



**Notice** NI cannot recover lost system passwords. If you forget the password, you must contact NI and reformat the controller.

## Installing Software on the NI-9147

Complete the following steps to install software on the NI-9147.

1. In MAX, expand your system under Remote Systems.
2. (**cRIO-9032/9037**) Update the firmware for your controller.
  - a. Select the **Systems Settings** tab.
  - b. Click **Update Firmware**.
  - c. Select the latest firmware version.
  - d. Click **Open**.
3. Right-click **Software**.
4. Select **Add/Remove Software** to launch the LabVIEW Real-Time Software Wizard.



**Tip** You must log in if you set a system password.

5. Select the recommended software set for your LabVIEW and NI CompactRIO Device Drivers versions.
6. Click **Next**.
7. Select **NI Scan Engine** from the software add-ons.

Select any additional software to install. If you plan on using the NI-9147 with the LabVIEW FPGA Module, you can click **Next**. Click **NI Scan Engine** if you plan on using the NI-9147 without the LabVIEW FPGA Module.



**Tip** You can use this wizard at anytime to install additional software.

8. Click **Next**.
9. Verify that the summary of software to install is correct.

10. Click **Next** to start the installation.
11. Click **Finish** when the installation is complete.

## Configuring Startup Options

You can configure the startup options using the USB device port or the RJ-45 Gigabit Ethernet port 1 or port 2.


Complete the following steps to configure the NI-9147 startup options in MAX.


1. In MAX, expand your system under Remote Systems.
2. Select the **Startup Settings** tab to configure the startup settings.

### NI-9147 Startup Options

You can configure the following NI-9147 startup options.

**Table 12.** NI-9147 Startup Options

Startup Option	Description
Force Safe Mode	Rebooting the NI-9147 with this setting on starts the NI-9147 without launching LabVIEW Real-Time or any startup applications. In safe mode, the NI-9147 launches only the services necessary for updating configuration and installing software.
Disable FPGA Startup App	Rebooting the NI-9147 with this setting on prevents autoloading of any FPGA application.   <b>Note</b> When you reset the cRIO-906x controller either programmatically or by using the RESET button, you also reset the FPGA. All FPGA I/O lines are tri-stated after a reset, and will enter predefined states once loaded.
Enable Secure Shell (SSH) Logins	Rebooting the NI-9147 with this setting on starts sshd on the NI-9147. Starting sshd enables logins

Startup Option	Description
	<p>over SSH, an encrypted communication protocol.</p> <div data-bbox="824 317 1468 443"> <b>Note</b> Visit <a href="https://ni.com/r/openssh">ni.com/r/openssh</a> for more information about SSH.</div>