
cRIO-9805

Getting Started

2024-02-07



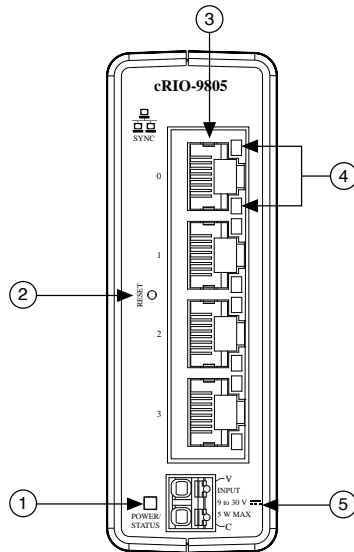
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Getting Started with the cRIO-9805

This document provides information to help you get started with the cRIO-9805, connecting the module to power, connecting to Ethernet, and configuring the device and the network.

Figure 1. cRIO-9805 Front Panel



1. Power/Status LED
2. Reset button
3. Ethernet ports 0 to 3
4. Ethernet LEDs
5. Power connector (9 V to 30 V)

Table 1. Power Connector Pinout

Pinout	Pin	Description
	V	Power input
	C	Common

Table 2. Power/Status LED Indicators

LED Color	LED Pattern	Indication
Blue	Solid	The cRIO-9805 is powered on.
Yellow	Solid	The cRIO-9805 is booting.
	Blinking	The cRIO-9805 is in recovery mode.
Blue and Yellow	Solid	The cRIO-9805 is resetting.
—	Off	The cRIO-9805 is powered off.

Table 3. Ethernet Port Pinout

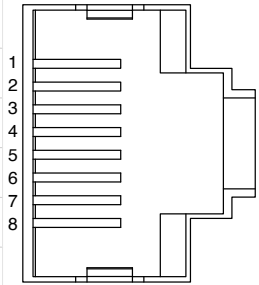

Fast Ethernet Signal	Gigabit Ethernet Signal	Pin	Pinout
TX+	TX_A+	1	
TX-	TX_A-	2	
RX+	RX_B+	3	
No Connect	TX_C+	4	
No Connect	TX_C-	5	
RX-	RX_B-	6	
No Connect	RX_D+	7	
No Connect	RX_D-	8	


Table 4. Ethernet LED Indicators


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

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.

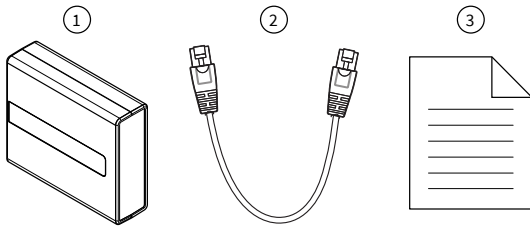
3. Unpack any other items and documentation from the kit.

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

What You Need to Get Started

Kit Contents

Verify that the following items are included in the cRIO-9805 kit.



1. cRIO-9805
2. Ethernet cable
3. Safety, Environmental, and Regulatory Information document

Required Components

- CompactRIO controller or host computer
- Power supply, 9 V to 30 V, 5 W maximum

Recommended Components

- Internet access
- Additional, required-length Ethernet cable(s), user provided

Mounting the cRIO-9805

You can mount the cRIO-9805 with a CompactRIO chassis. Refer to the following sections for instructions and guidelines about the various chassis mounting configurations.

You can also use the cRIO-9805 with a variety of hardware systems and configurations. For more information about using the module with non-CompactRIO systems, contact NI.

Dimensions

Figure 2. cRIO-9805 Front Dimensions

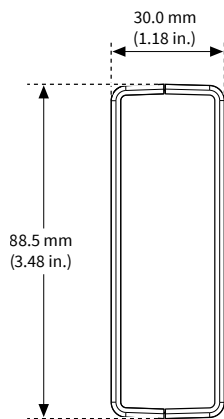


Figure 3. cRIO-9805 Rear Dimensions

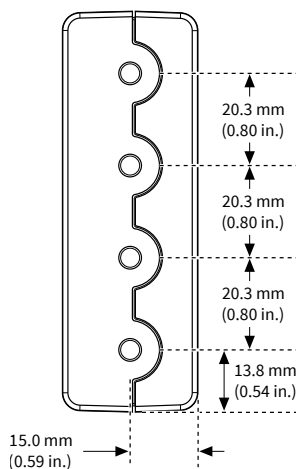
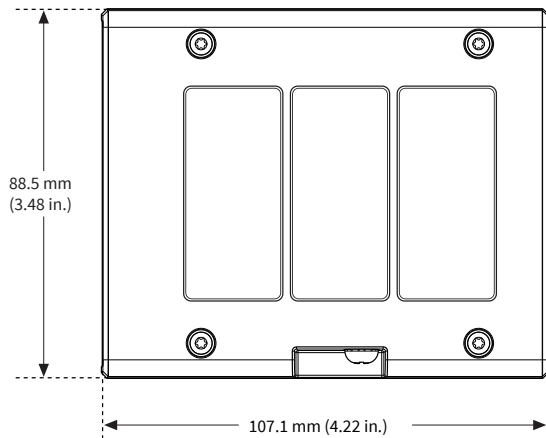
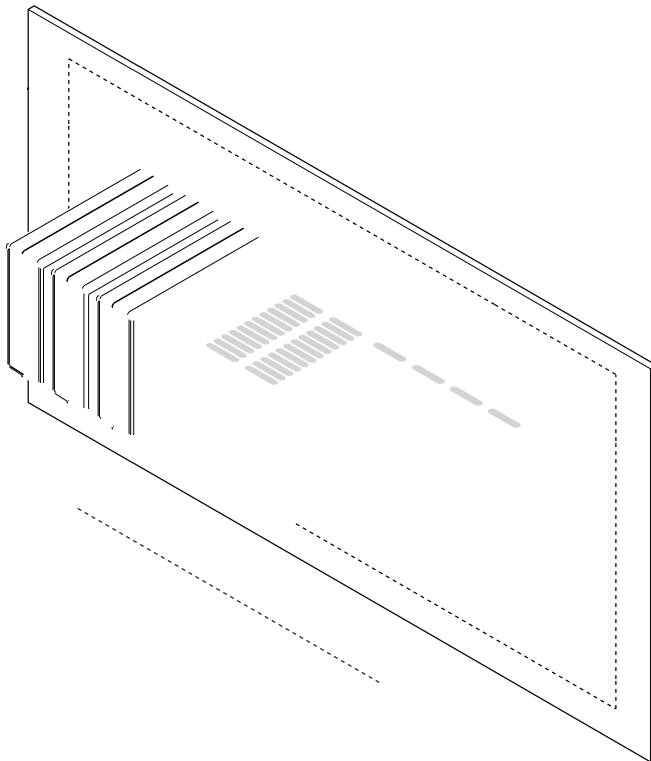


Figure 4. cRIO-9805 Side Dimensions

Mounting the Expansion Module with Four Slot Controllers

Observe the following guidelines to obtain the maximum ambient operating temperature and to ensure that your system operates correctly across the full operating temperature range.

Figure 5. System Mounting Configuration

①

Horizontal mounting orientation.

②	<p>Mounting substrate options:</p> <ul style="list-style-type: none"> ▪ Mount the system directly to a metallic surface that is at least 1.6 mm (0.062 in.) thick and extends a minimum of 101.6 mm (4 in.) beyond all edges of the device. ▪ Use the NI Panel Mounting Kit to mount the system to a metallic surface that is at least 1.6 mm (0.062 in.) thick and extends a minimum of 101.6 mm (4 in.) beyond all edges of the device.
③	<p>Observe the minimum spacing dimensions in the Mounting Requirements section. Using the NI panel mounting kit ensures minimum spacing dimensions are met.</p>
④	<p>Allow space for cabling clearance according to the Mounting Requirements section.</p>

Mounting Requirements

Figure 6. Minimum Spacing Dimensions

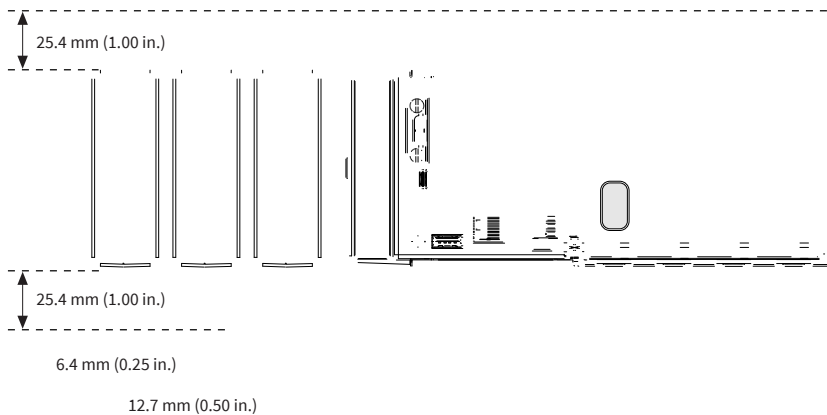
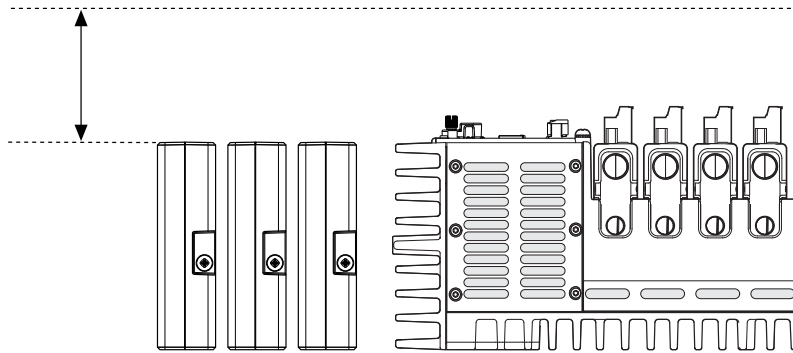
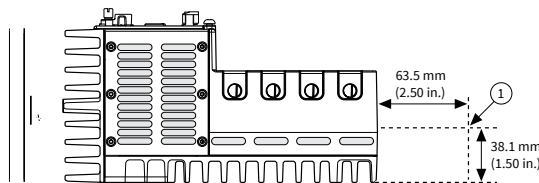


Figure 7. Cabling Clearance



Note The various connector types on Expansion Modules, C Series modules, and the CompactRIO controller may require different cabling clearances. For a complete list of cabling clearances for C Series modules, visit ni.com/info and enter the Info Code crioconn.

Figure 8. Ambient Temperature Location



1. Measure the ambient temperature here.

Mounting the System on a Flat Surface (Four Slot Controllers)

For environments with high shock and vibration, NI recommends mounting the system directly on a flat, rigid surface using the mounting holes in the Expansion Module and the CompactRIO controller.

What to Use

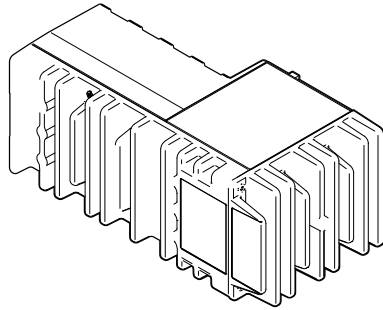
- cRIO-9805
- CompactRIO controller

- M4 x 0.7 thread screw (up to x10), user-provided

What to Do

Complete the following steps to mount the system directly on a flat surface.

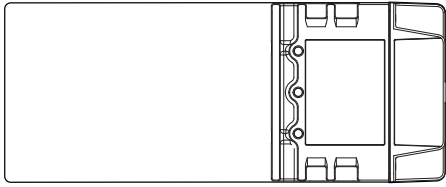
Figure 9. Mounting the System on a Flat Surface



1. Prepare the surface for mounting the system using the **Surface Mounting Dimensions**.
2. Align the module(s) and the controller on the surface.
3. Fasten the module(s) and the controller to the surface using M4 screws appropriate for the surface.
 - Screws must not exceed 8 mm of insertion into the module(s) and the controller.
 - Tighten the screws to a maximum torque of 1.3 N · m(11.5 lb · in.).

Surface Mounting Dimensions (Four Slot Controllers)

Figure 10. cRIO-9805 Surface Mounting Dimensions



Mounting the System on a Panel (Four Slot Controllers)

What to Use

To mount one module:

- cRIO-9805
- CompactRIO controller
- Screwdriver, Phillips #2
- NI panel mounting kit, 786795-01
 - Panel mounting plate
 - M4 x 10 mm screw (x6)

(Optional) To mount each additional module:

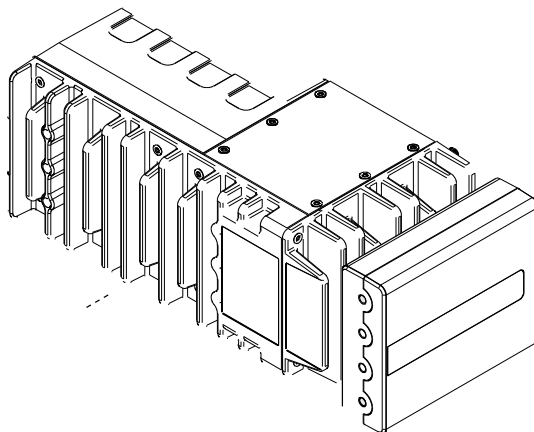
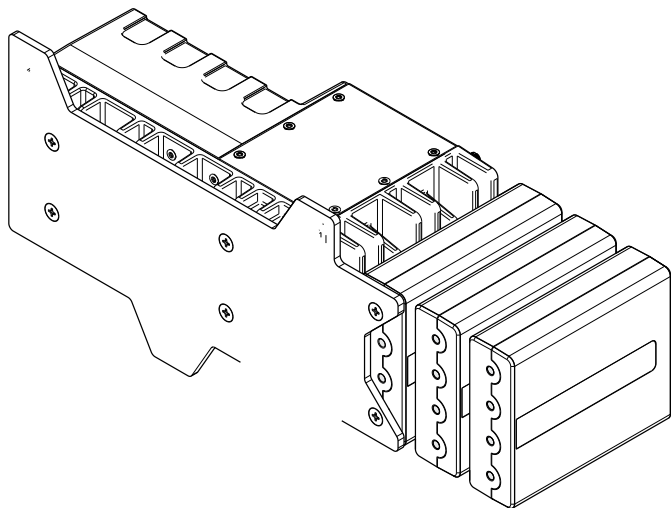
- NI panel mounting nesting bracket kit, 787135-01
 - Nesting bracket
 - M4 x 10 mm screw (x4)

To mount the panel to a surface:

- Screwdriver
- Screws (x3), M5 (#10) maximum, user-provided, appropriate for surface

What to Do

Complete the following steps to mount the system on a panel.

Figure 11. Mounting One Module**Figure 12. Mounting Multiple Modules (Optional)**

1. Fasten the panel mounting plate to the controller and the first expansion module.



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.



Note Tighten all screws to a maximum torque of $1.3 \text{ N} \cdot \text{m}$ ($11.5 \text{ lb} \cdot \text{in.}$).

2. (Optional) Mount one or two additional modules to the system using nesting brackets.
 - a. Fasten the nesting bracket to the adjacent, mounted module.
 - b. Align and fasten the next module to the nesting bracket.
3. Fasten the panel mounting plate to the surface using screws that are appropriate for the surface.

Panel Mounting Dimensions (Four Slot Controller)

Figure 13. Panel Mounting Dimensions, One Module

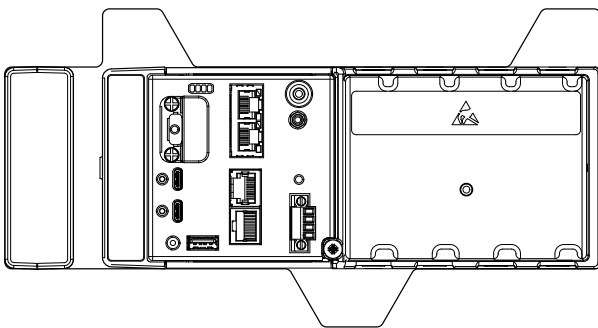
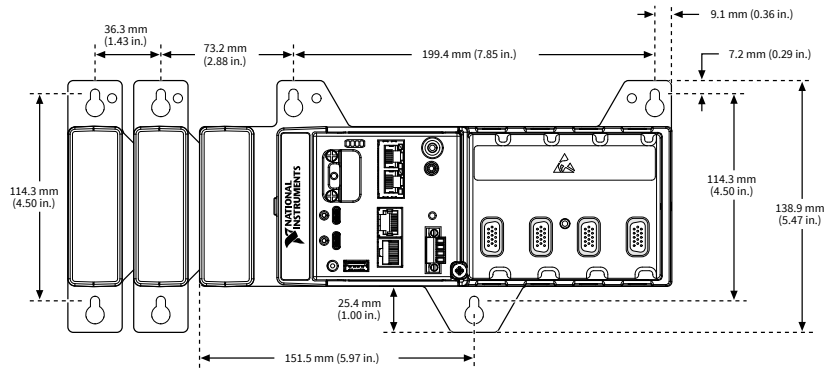


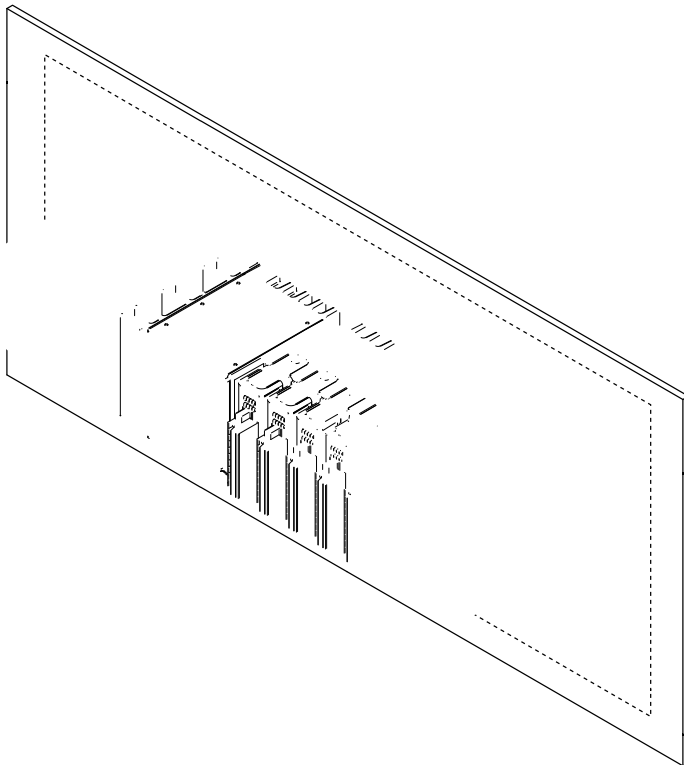
Figure 14. Panel Mounting Dimensions, Multiple Modules



Mounting the Expansion Module with Eight Slot Controllers

Observe the following guidelines to obtain the maximum ambient operating temperature and to ensure that your system operates correctly across the full operating temperature range.

Figure 15. System Mounting Configuration



①

Horizontal mounting orientation.

②	<p>Mounting substrate options:</p> <ul style="list-style-type: none"> ▪ Mount the system directly to a metallic surface that is at least 1.6 mm (0.062 in.) thick and extends a minimum of 101.6 mm (4 in.) beyond all edges of the device. ▪ Use the NI Panel Mounting Kit to mount the system to a metallic surface that is at least 1.6 mm (0.062 in.) thick and extends a minimum of 101.6 mm (4 in.) beyond all edges of the device.
③	<p>Observe the minimum spacing dimensions in the Mounting Requirements section. Using the NI panel mounting kit ensures minimum spacing dimensions are met.</p>
④	<p>Allow space for cabling clearance according to the Mounting Requirements section.</p>

Mounting Requirements

Figure 16. Minimum Spacing Dimensions

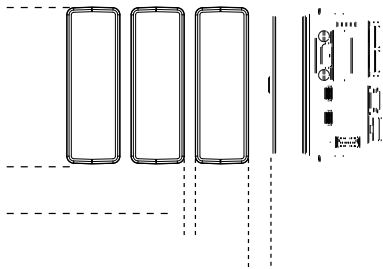
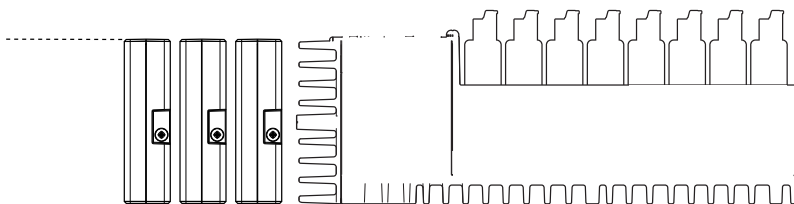


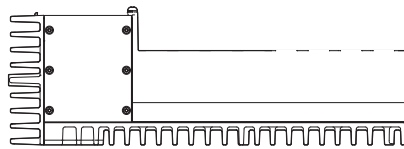
Figure 17. Cabling Clearance





Note The various connector types on Expansion Modules, C Series modules, and the CompactRIO controller may require different cabling clearances. For a complete list of cabling clearances for C Series modules, visit ni.com/info and enter the Info Code criocnn.

Figure 18. Ambient Temperature Location



1. Measure the ambient temperature here.

Mounting the System on a Flat Surface (Eight Slot Controllers)

For environments with high shock and vibration, NI recommends mounting the system directly on a flat, rigid surface using the mounting holes in the Expansion Module and the CompactRIO controller.

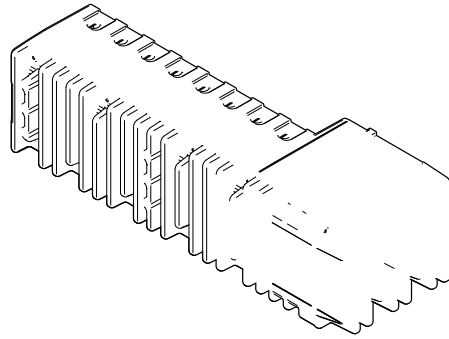
What to Use

- cRIO-9805
- CompactRIO controller
- M4 x 0.7 thread screw (up to x12), user-provided

What to Do

Complete the following steps to mount the system directly on a flat surface.

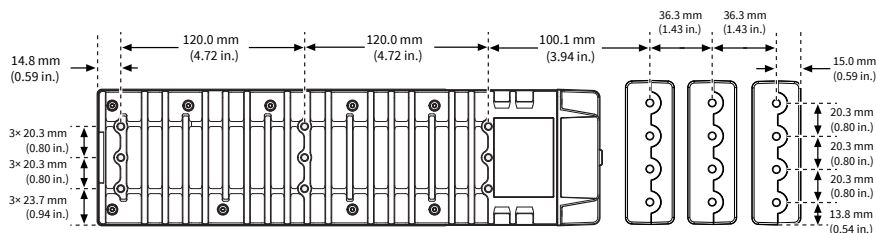
Figure 19. Mounting the System on a Flat Surface



1. Prepare the surface for mounting the system using the **Surface Mounting Dimensions**.
2. Align the module(s) and the controller on the surface.
3. Fasten the module(s) and the controller to the surface using M4 screws appropriate for the surface.
 - Screws must not exceed 8 mm of insertion into the module(s) and the controller.
 - Tighten the screws to a maximum torque of 1.3 N · m (11.5 lb · in.).

Surface Mounting Dimensions (Eight Slot Controllers)

Figure 20. cRIO-9805 Surface Mounting Dimensions



Mounting the System on a Panel (Eight Slot Controllers)

What to Use

To mount one module:

- cRIO-9805
- CompactRIO controller
- Screwdriver, Phillips #2
- NI panel mounting kit, 786796-01
 - Panel mounting plate
 - M4 x 10 mm screw (x8)

(Optional) To mount each additional module:

- NI panel mounting nesting bracket kit, 787135-01
 - Nesting bracket
 - M4 x 10 mm screw (x4)

To mount the panel to a surface:

- Screwdriver
- Screws (x5), M5 (#10) maximum, user-provided, appropriate for surface

What to Do

Complete the following steps to mount the system on a panel.

Figure 21. Mounting One Module

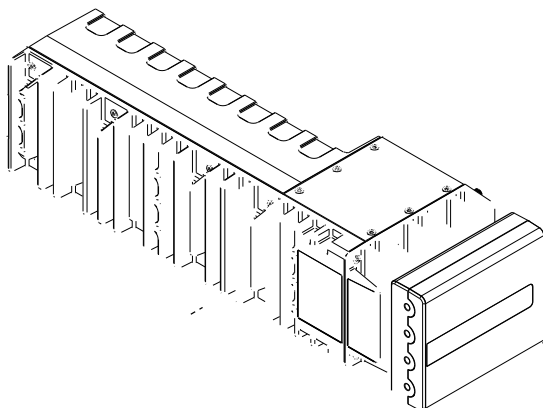
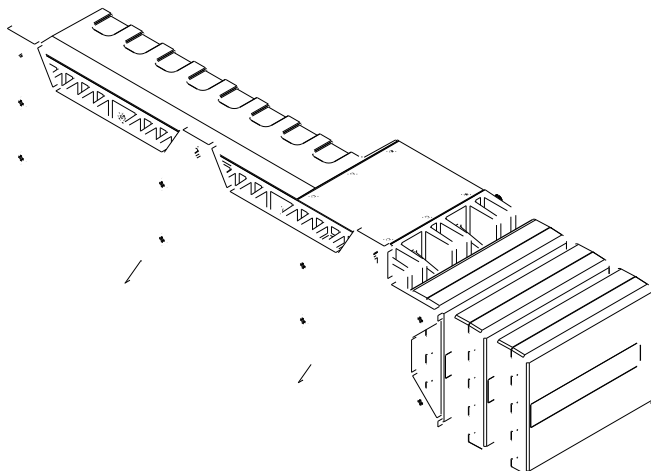


Figure 22. Mounting Multiple Modules (Optional)



1. Fasten the panel mounting plate to the controller and the first expansion module.



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.



Note Tighten all screws to a maximum torque of $1.3 \text{ N} \cdot \text{m}$ ($11.5 \text{ lb} \cdot \text{in.}$).

2. (Optional) Mount one or two additional modules to the system using nesting brackets.
 - a. Fasten the nesting bracket to the adjacent, mounted module.
 - b. Align and fasten the next module to the nesting bracket.
3. Fasten the panel mounting plate to the surface using screws that are appropriate for the surface.

Panel Mounting Dimensions (Eight Slot Controller)

Figure 23. Panel Mounting Dimensions, One Module

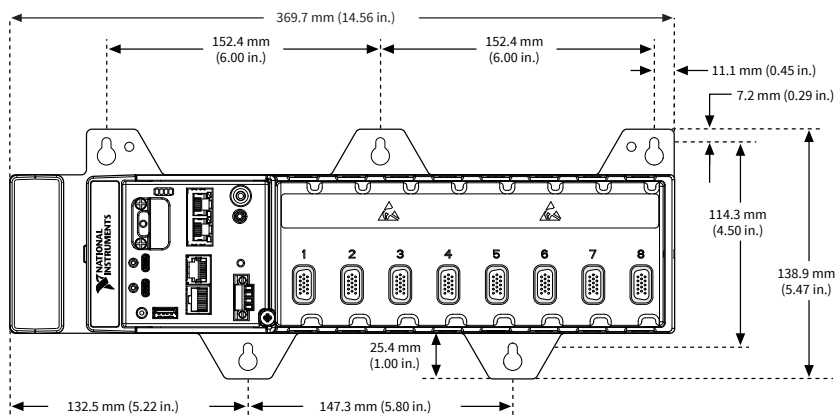
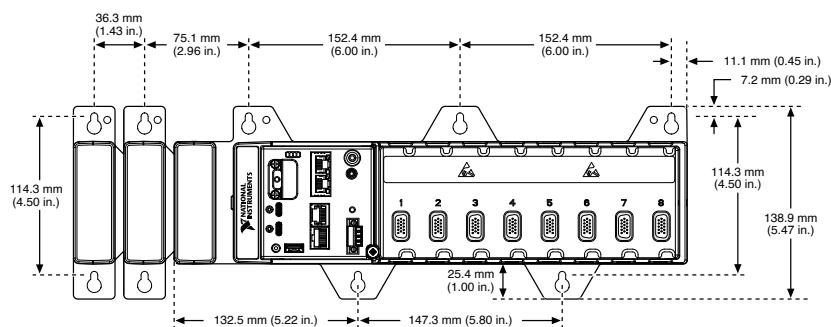


Figure 24. Panel Mounting Dimensions, Multiple Modules



Mounting an Expansion Module on a DIN Rail

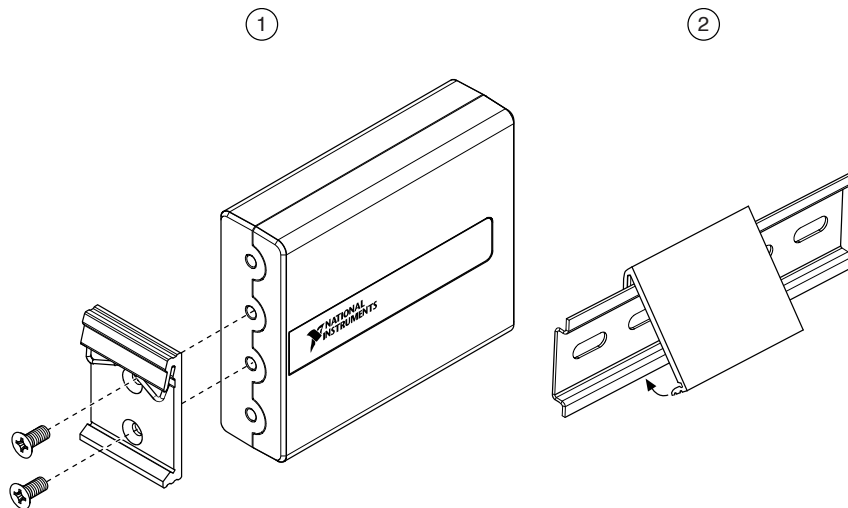
What to Use

- cRIO-9805
- DIN rail mounting kit, 786797-01
 - Standard DIN rail clip
 - M4 screw (x2)

What to do

Complete the following steps to mount the cRIO-9805 on a DIN Rail.

Figure 25. Mounting the Module on a DIN Rail



1. Attach the DIN rail clip to the back of the module. Tighten the screws to a maximum torque of $1.3 \text{ N} \cdot \text{m}$ ($11.5 \text{ lb} \cdot \text{in.}$).



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.

2. Snap the DIN rail clip onto the DIN rail.
 - Observe the spacing dimensions in the **Mounting Requirements** section.

Grounding the cRIO-9805

You must connect the cRIO-9805 grounding terminal to the grounding electrode system of the facility.



Note For more information about ground connections, visit ni.com/r/emcground.

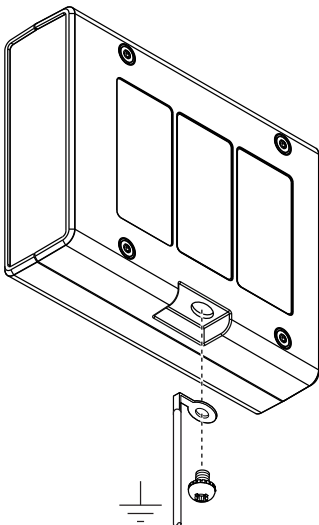
What to Use

- Right angle ring lug
- Wire, 1.3 mm² (16 AWG) or larger
- Screwdriver, Phillips #2

What to Do

Complete the following steps to ground the cRIO-9805.

Figure 26. Installing the Ground Wire



1. Attach the ring lug to the wire.



Note NI recommends using a right angle ring lug to ensure sufficient cabling clearance for the ground wire. If your system uses a single module, a standard ring lug may be sufficient for cabling clearance.

2. Remove the grounding screw from the grounding terminal on the bottom of the module.
3. Fasten the ring lug to the grounding terminal.
4. Tighten the grounding screw to $0.5 \text{ N} \cdot \text{m}$ ($4.4 \text{ lb} \cdot \text{in.}$) of torque.
5. Attach the other end of the wire to the chassis safety ground using a method that is appropriate for your application.

Connecting the cRIO-9805 to an External Power Supply

The cRIO-9805 requires a 9 V to 30 V power supply.

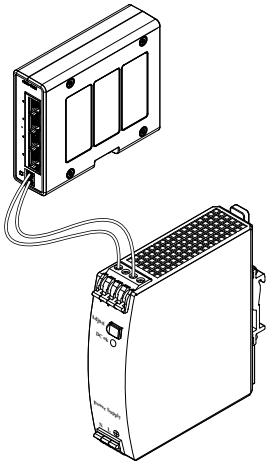
What to Use

- Power supply, 9 V to 30 V, 5 W maximum
- Wire, 1.3 mm² to 0.2 mm² (16 AWG to 24 AWG)
- Ferrules (recommended)
- Screwdriver, 2.54 mm (0.10 in.) flathead

What to Do

Complete the following steps to connect the cRIO-9805 to an external power supply.

Figure 27. Connecting the cRIO-9805 to an External Power Supply



1. Power off the power supply.
2. Connect a ferrule to the end of the power wires.
3. Push the ferruled wires directly into the power connector terminals on the cRIO-9805.
4. Power on the power supply.
5. Verify the Power/Status LED is on.

Connecting the cRIO-9805 to the Controller Power Connector

The cRIO-9805 requires a 9 V to 30 V power supply. You can power both the module and a CompactRIO or CompactDAQ controller from the same power supply.

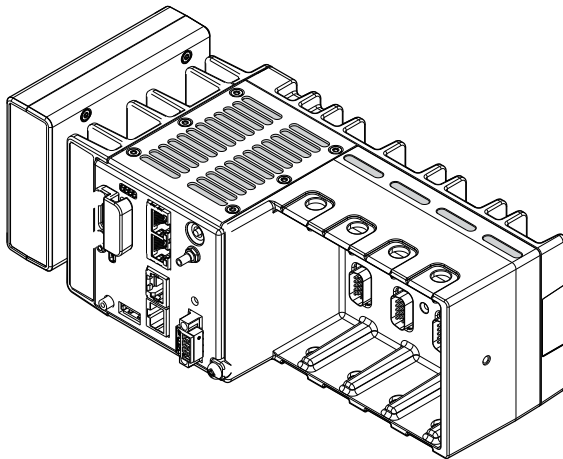
What to Use

- Power supply, 9 V to 30 V, 5 W maximum (sufficient power for the cRIO-9805 and the controller)
- Wire, 1.3 mm² to 0.2 mm² (16 AWG to 24 AWG)
- Ferrules (recommended)
- Screwdriver, 2.54 mm (0.10 in.) flathead

What to Do

Complete the following steps to connect the cRIO-9805 to a controller power connector.

Figure 28. Connecting the cRIO-9805 to a Controller Power Connector



1. Power off the power supply connected to the CompactRIO controller.
2. Remove the power connector from the CompactRIO controller.
3. Use a two-wire ferrule to insert the power supply wires and module power wires into the CompactRIO controller power connector terminals.

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 CompactRIO controller.
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. Connect a ferrule to the other end of the power wires.
8. Push the ferruled wires directly into the power connector terminals on the cRIO-9805.
9. Power on the power supply.
10. Verify the cRIO-9805 Power/Status LED is on.

Disconnecting Power from the cRIO-9805

1. Power off the power supply connected to the cRIO-9805.
2. Use a small flathead screwdriver or similar tool to press the white release button on the power connector.
3. Remove the ferruled wire from the power connector.
4. Repeat steps 2 and 3 to remove the second ferruled wire from the power connector.

Connecting the cRIO-9805 to a Network

What to Use

- cRIO-9805
- Ethernet cable, included in shipping kit

What to Do

Complete the following steps to connect the cRIO-9805 to a network.

Figure 29. Connecting the cRIO-9805 to a Controller

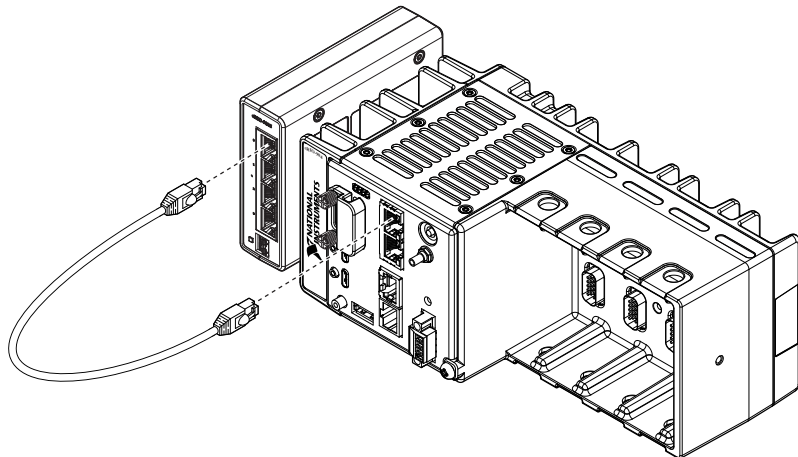
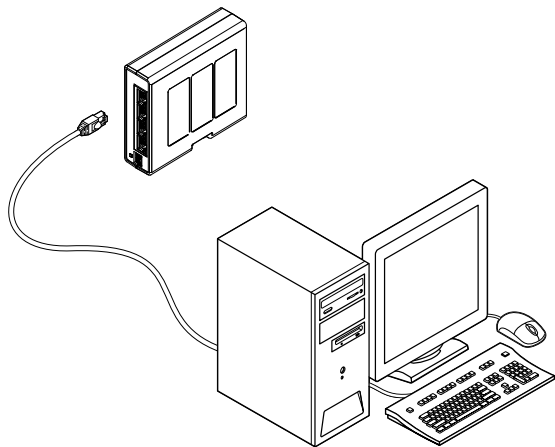


Figure 30. Connecting the cRIO-9805 to a Host Computer



1. Connect the Ethernet cable to any port on the cRIO-9805.
2. Connect the other end of the cable to the Ethernet port on the CompactRIO controller or the network card on your computer.
3. Verify that the Act/Link LED on the cRIO-9805 is on.

Configuring Your System

The cRIO-9805 functions as an Ethernet switch for an out-of-the-box NI TSN system. The following sections describe the most common topologies created with a cRIO-9805.



Note You can use other network devices as nodes in your Ethernet system, but the system may not provide the advantages of an NI TSN system.

Host	Can be a Windows computer or a real-time controller with the NI Linux Real-Time operating system, such as the IC-317x, cRIO-9035/9039 Sync, cRIO-904x, cRIO-905x, or cDAQ-913x for LabVIEW Real-Time.
Node	Can be the cDAQ-9185, cDAQ-9189, or any FieldDAQ device.
cRIO-9805	Ethernet switch.

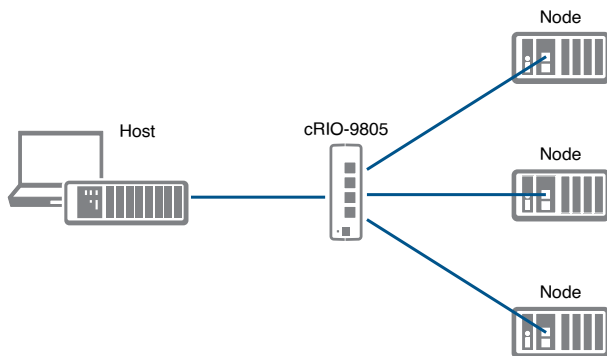


Note Network configuration and programming require careful consideration. Visit ni.com/r/cdaqenet for information about exploiting link redundancy and automatically improving reliability.

Creating a Basic Topology

The cRIO-9805 is configured to work in this topology out of the box. Most systems should follow this topology. The host communicates directly with each node through the external switch.

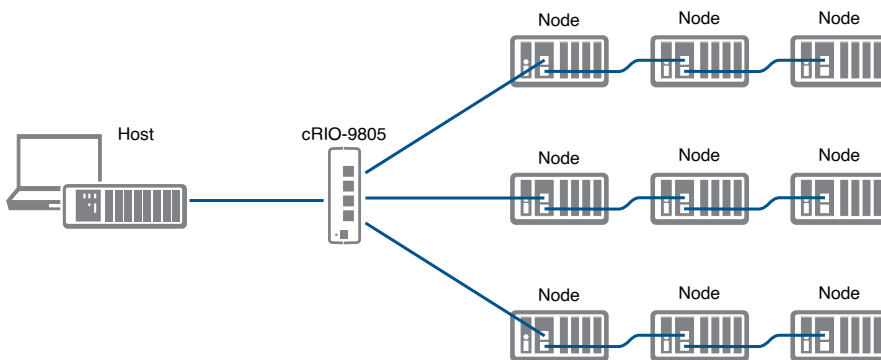
Figure 31. Basic Topology



Expanding Your System

You can daisy-chain your system starting from each node connected to the switch. The host communicates directly with all the nodes in one chain through one bus line. A standard Ethernet device or switch can be added to the end of the chain if desired and used as normal. Be aware that these devices will compete for network bandwidth with the controller. Reliable system design requires awareness of the bandwidth consumed by each device during operations. This topology offers no redundant links.

Figure 32. Expanded Topology



Advantages:

- Simple and inexpensive installation, expansion, and troubleshooting.
- Ideal for low number of nodes. NI recommends a maximum of 15 nodes per chain.
- No additional switch needed.
- Can cover long distances.

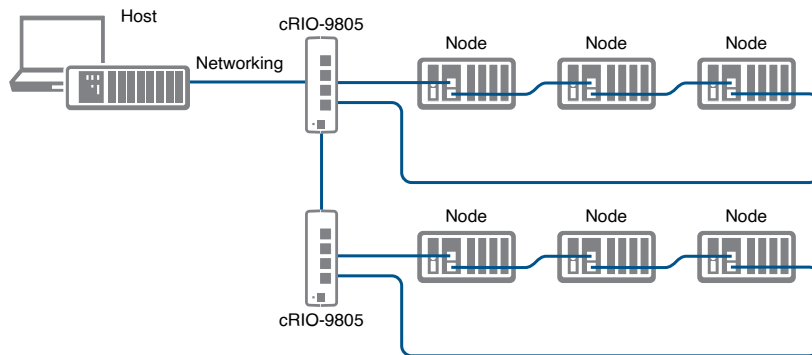
Disadvantages:

- Any unpowered nodes and/or node failure disrupts network communication.
- Addition or removal of any node disrupts network communication.
- Failure of any Ethernet cable and/or improper cable termination disrupts network communication.
- Network performance and synchronization affected when node count exceeds 15 per chain.

Adding Redundancy

To add redundancy, you can connect an additional Ethernet cable to the last node of a daisy chain and reconnect that cable back to the switch. In this topology, the host communicates with all nodes through the most effective path. You must configure the network properly before creating redundant links in the network.

Figure 33. Adding Redundancy



Advantages:

- Failure of any single Ethernet cable does not disrupt network communication.
- Additional nodes or heavier network traffic affects network performance less than the line topology.
- Simple installation.
- Ideal for a local networking solution.

Disadvantages:

- Network traffic patterns can make troubleshooting difficult.
- Only allows one chain per switch. Requires more switches to configure larger systems.

More Options



Note For more information about designing Ethernet measurement systems, visit ni.com/r/cdaqenet.



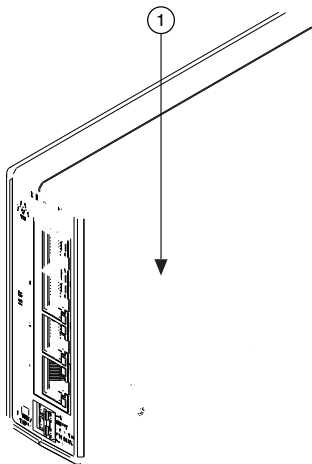
Note For more advanced network management needs, visit ni.com/r/netconfig.

Locating the Security Label

The security label on the cRIO-9805 contains the following information necessary for setting up and configuring your system:

- Model name
- Serial number
- Username
- Password
- MAC address

Figure 34. Security Label Location



1. Security label

Resetting the Module

When you press the reset button for less than five seconds, the module reboots with the current configuration.

What to Use

- Reset tool

What to Do

1. Press the Reset button.
2. Hold it for one second.
3. Confirm the Status LED behavior:
 - a. The LED lights both blue and yellow to indicate the module is resetting.
 - b. The LED lights solid yellow to indicate the module is booting.
 - c. The LED lights solid blue to indicate the module is powered on and running.

Resetting the Module to Factory Default Configuration

If you press the reset button for five seconds or longer, the module reboots into factory default mode, which returns the module user configuration to the factory-set defaults

Table 5. cRIO-9805 Default Settings

Attribute	Value
Hostname	cRIO9805- <serial number>
IP	DHCP or Link Local
Default login	User name: admin Password: printed on security label

What to Use

- Reset tool

What to Do

Follow these steps to reset the firmware on the cRIO-9805 to default settings.

1. Press the Reset button.
2. Hold it for five seconds.
3. Confirm the Status LED behavior:
 - a. The LED lights both blue and yellow to indicate the module is resetting.
 - b. The LED lights solid yellow to indicate the module is booting.
 - c. The LED lights solid blue to indicate the module is powered on and running.