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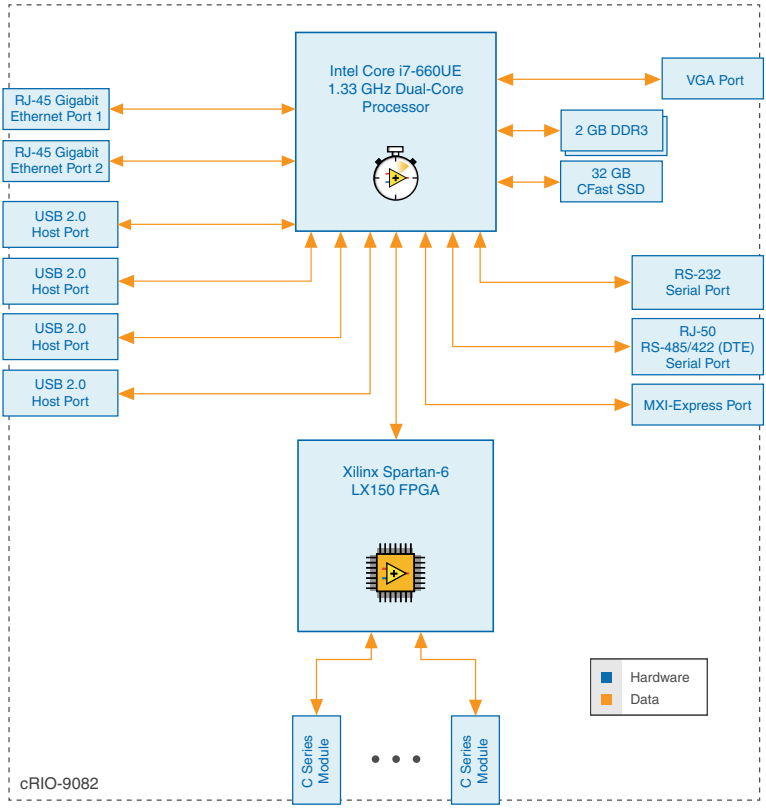
Find the *National Instruments cRIO-9082* at our website: ***Click HERE***

USER MANUAL

NI cRIO-9082

Reconfigurable Embedded Chassis with Integrated Intelligent Real-Time Controller for CompactRIO

This document describes the features of the National Instruments cRIO-9082 and contains information about mounting and operating the device.



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Configuring the cRIO-9082

You can connect the cRIO-9082 to a host computer or network and configure the startup options using the RJ-45 Gigabit Ethernet port 1.

Connecting the cRIO-9082 to the Host Computer or Network Using Ethernet

Complete the following steps to connect the cRIO-9082 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 cRIO-9082 to the host computer or Ethernet hub using a standard Category 5 (CAT-5) or better shielded, twisted-pair Ethernet cable.

   Caution 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 cRIO-9082 attempts to initiate a DHCP network connection the first time you connect using Ethernet. The cRIO-9082 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 cRIO-9082 on the Network (DHCP)

Complete the following steps to find the cRIO-9082 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-9082-1856AAA.

Finding the cRIO-9082 on the Network (Static IP)

Complete the following steps to find the cRIO-9082 on the network if the host computer is using a static IP address. The following instructions are for host computers running Windows 7. For more information about performing the network configuration steps in this section, visit *www.microsoft.com* and search for `change tcp/ip settings`.

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1. Obtain IP settings from the host computer.
   a) Click **Start»Control Panel»Network and Sharing Center**.
   b) Select the primary network connection, which may appear as **Local Area Connection** or something similar.
   c) In the dialog box that appears, click **Properties**.
   d) Select **Internet Protocol Version 4 (TCP/IPv4)**.
   e) Click **Properties**.
   f) Record the **IP address**, **Subnet mask**, and **Default gateway** address. You need these settings to configure the network settings of the cRIO-9082 and to restore the network settings of the host computer.

      Tip You can also access these settings by opening the Start menu, entering `cmd.exe`, and entering `ipconfig` in the command window that launches.

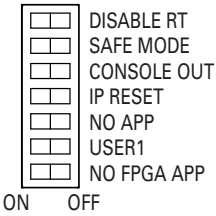
   g) Wait at least one minute.
2. Configure IP Settings on the controller in MAX.
   a) Launch MAX on the host computer.
   b) Expand **Remote Systems** in the configuration tree and locate your system.

      Tip MAX lists the system under the model number followed by the serial number, such as NI-cRIO-9082-1856AAA.

   c) Select the **Network Settings** tab near the bottom of the window.
   d) Select **Static** on the **Configure IPv4 Address** control.
   e) Enter values for **IPv4 Address**, **Subnet Mask**, **Gateway**, and **DNS Server** based on the information you recorded. Be sure to enter a value for **IPv4 Address** that is not used by another device on the network. For example, do not use the IP address usually assigned to the host computer.
   f) Click **Save** and let MAX restart the cRIO-9082. The cRIO-9082 disappears from under **Remote Systems** and does not reappear until you restore the original network settings to the host computer.
   g) Restore the original network settings to the host computer.
   h) Return to MAX and refresh **Remote Systems**.

Configuring DIP Switches

Figure 1. DIP Switches



All of the DIP switches are in the OFF position when the chassis is shipped from National Instruments.

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DISABLE RT Switch

The position of the DISABLE_RT determines the operating system the controller boots into. If the switch is in the OFF position, the system boots into LabVIEW RT. If the switch is the ON position, the system boots into the non-RT OS installed on the system, such as Windows.

SAFE MODE Switch (RT Only)

The position of the SAFE MODE switch determines whether the embedded LabVIEW Real-Time engine launches at startup. If the switch is in the OFF position, the LabVIEW Real-Time engine launches. Keep this switch in the OFF position during normal operation. If the switch is in the ON position at startup, the cRIO-9082 launches only the essential services required for updating its configuration and installing software. The LabVIEW Real-Time engine does not launch.

CONSOLE OUT Switch (RT Only)

The position of the CONSOLE OUT switch determines whether console input and output are redirected to the RS-232 serial port. If the switch is in the ON position, console input and output are redirected to the RS-232 serial port. If the switch is in the OFF position, the RS-232 serial port functions normally.

With a serial-port terminal program, you can use console output to read the POST results, BIOS revision, IP addresses, and software installed on the cRIO-908x. You can also enter the BIOS setup menu and modify BIOS settings. Use a null-modem cable to connect the RS-232 serial port on the chassis to a computer. Push the CONSOLE OUT switch to the ON position. Make sure that the serial-port terminal program is configured with the same settings as the RS-232 serial port. The default configuration settings for the RS-232 serial port in CONSOLE OUT mode are the following:

- 9,600 bits per second
- Eight data bits
- No parity
- One stop bit
- No flow control

You can use the BIOS setup menu to modify the CONSOLE OUT configuration settings for the RS-232 serial port.

Keep the CONSOLE OUT switch in the OFF position during normal operation.

IP RESET Switch (RT Only)

Push the IP RESET switch to the ON position and reboot the controller to reset the IP address and other TCP/IP settings of the controller to the factory defaults. You can also push this switch to the ON position to unlock a controller that was previously locked in MAX.

NO APP Switch (RT Only)

Push the NO APP switch to the ON position to prevent a LabVIEW RT startup application from running at startup. If you want to permanently disable a LabVIEW RT application from running at startup, you must disable it in LabVIEW. To run an application at startup, push the NO APP switch to the OFF position, create an application using the LabVIEW Application

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Builder, and configure the application in LabVIEW to launch at startup. If you already have an application configured to launch at startup and you push the NO APP switch from ON to OFF, the startup application is automatically enabled. For more information about automatically launching VIs at startup and disabling VIs from launching at startup, refer to the *Running a Stand-Alone Real-Time Application (RT Module)* topic of the *LabVIEW Help*.

USER1 Switch (RT Only)

You can define the USER1 switch for your application. To define the purpose of this switch in your embedded application, use the RT Read Switch VI in your LabVIEW RT embedded VI. For more information about the RT Read Switch VI, refer to the *LabVIEW Help*.

NO FPGA Switch

Push the NO FPGA switch to the ON position to prevent a LabVIEW FPGA application from loading at startup. The NO FPGA switch overrides the reset options described in the *System Reset Options* section. After startup you can download to the FPGA from software regardless of switch position.

Restoring the Hard Drive to Factory Default Condition (Windows Only)

You can restore the hard drive of the cRIO-9082 to factory default condition either from a recovery partition on the hard drive or from the NI Embedded Controller OEM Re-Installation DVD shipped with thecRIO-9082.

In order to use the hard-drive recovery partition, you must press and hold <F4> during the POST to launch the recovery utility. In order to use the recovery DVD, you must connect an external DVD-ROM drive to one of the USB ports of the cRIO-9082. For more information about restoring the hard drive to factory default condition, go to *ni.com/info* and enter the Info Code `hdrecovery908x`.

Note Restoring the hard drive to factory default condition erases the contents of the hard drive. Back up any files you want to keep before restoring the hard drive.

Installing an Operating System

The cRIO-9082 is shipped with an operating system installed. You can use an external CD/DVD-ROM drive, connected to one of the USB ports, to install a different operating system such as Windows Embedded Standard 7 Runtime (WES7). For more information about installing an operating system on the cRIO-9082, go to *ni.com/info* and enter the Info Code `hdrecovery908x`.

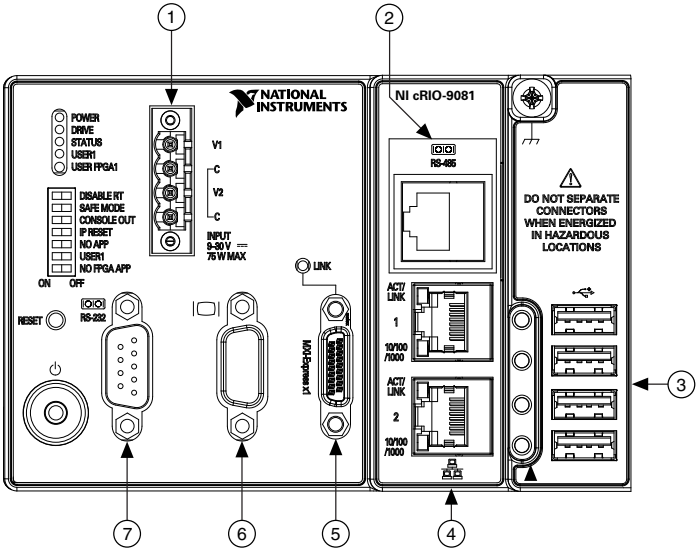
cRIO-9082 Features

The cRIO-9082 provides the following features.

Ports and Connectors

The cRIO-9082 provides the following ports and connectors.

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1. Power Connector
2. RJ-50 RS-485 Serial Port
3. USB Ports 1-4
4. RJ-45 Ethernet Ports 1 and 2
5. MXI Express Connector
6. VGA Video Connector
7. RS-232 Serial Port

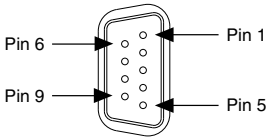
RS-232 Serial Port

The cRIO-9082 has an RS-232 serial port to which you can connect devices such as displays or input devices. Use the Serial VIs to read from and write to the serial port. Refer to the *LabVIEW Help* for information about the Serial VIs.

The following table shows the pinout for the RS-232 serial port.

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Table 1. RS-232 Serial Port Pinout

Pinout	Pin	Signal
	1	DCD
	2	RXD
	3	TXD
	4	DTR
	5	GND
	6	DSR
	7	RTS
	8	CTS
	9	RI/WAKE

You can use the Ring Indicator (RI) on pin 9 to wake the controller from a low-power state. You can drive RI with a logic level high to wake the cRIO-9082. Refer to the specifications on *ni.com/manuals* for the RI wake voltage.

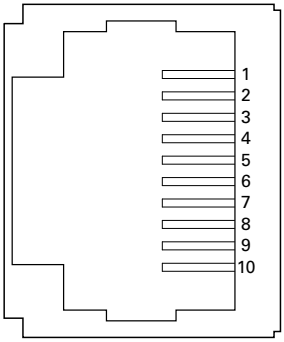
RS-485/422 Serial Port

The cRIO-9082 has an RS-485/422 serial port that is implemented with an RJ-50, 10-position modular jack. The RJ-50 connector is isolated from the cRIO-9082. For more information about the electrical isolation of the RS-485/422 port, refer to the specifications on *ni.com/manuals*.

The following table shows the pinout for the RS-485 serial port.

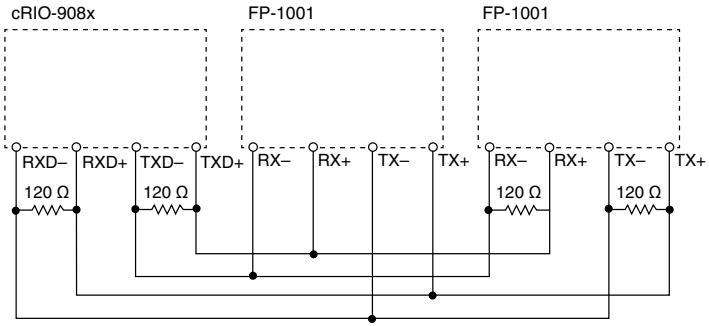
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Table 2. RS-485/422 Serial Port Pinout

Pinout	Pin	Signal
	1	No Connect
	2	TXD-
	3	TXD+
	4	No Connect
	5	No Connect
	6	RXD-
	7	RXD+
	8	No Connect
	9	No Connect
	10	Isolated GND

The following figure shows how to wire several NI FP-1001 banks in an RS-485/422 network controlled by the cRIO-9082. Only two FP-1001 banks are shown, but the cRIO-9082 can control up to 24 nodes. Install 120 Ω termination resistors at each end of the network.

Figure 2. Wiring for an RS-485/422 Network Controlled by the cRIO-9082



COM 2 is designed to operate in four-wire (RS-422) mode. You can also use COM 2 in two-wire mode.

The following accessories are available for the RS-485/422 serial port.

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Table 3. RS-485/422 (DTE) Serial Port Accessory

Accessory	Length	Part Number
RS-485, S8 Serial Cable, 10-Position Modular Plug to 9-Pin DSUB (Isolated)	1 m	182845-01
	2 m	182845-02
	3 m	182845-03
DIN Rail-Mountable Screw Terminal Adapter	—	778674-01

MXI Express Port

You can use the MXI Express port on the cRIO-9082 to connect to a MXI Express chassis. Complete the following steps to connect one or more cRIO-9082 to a MXI Express device.

1. Make sure the MXI Express device is configured and powered off.
2. Make sure the cRIO-9082 is powered off.
3. Connect the cRIO-9082 to the MXI Express device using a x1 cable.
4. Power on the MXI Express device.
5. Power on the cRIO-9082.

   The MXI Express LINK LED on the front panel of the cRIO-9082 lights green when communication is established. The LINK LED lights yellow when communication is broken or no cable is connected.

   Note The cRIO-9082 may not detect MXI Express devices connected while the cRIO-9082 is powered on.

   The following table shows the MXI Express cables available from NI.

Table 4. NI MXI Express Cables

Length	Part Number
1 m	779500-01
3 m	779500-03
7 m	779500-07

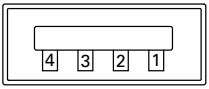
USB Ports

The USB ports on the cRIO-9082 support common USB mass-storage devices such as USB Flash drives, USB-to-IDE adapters formatted with FAT16 and FAT32 file systems. LabVIEW usually maps USB devices to the `U:`, `V:`, `W:`, or `X:` drive, starting with the `U:` drive if it is available.

The following table shows the pinout for the USB host ports.

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Table 5. USB Host Port Pinout

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

Caution Do not hot-swap USB devices while the cRIO-9082 is in a hazardous location or connected to high voltages. If the cRIO-9082 is not in a hazardous location, you can connect and disconnect USB devices without affecting operation.

Video Port (VGA)

The cRIO-9082 VGA port outputs graphics using VESA standard VGA analog signaling. The following table lists the VGA signals.

Pin	Signal Name	Signal Description
1	RED	Red analog video signal
2	GREEN	Green analog video signal
3	BLUE	Blue analog video signal
4	NC	No Connect
5	GND	Ground reference
6	RED RETURN	Ground reference
7	GREEN RETURN	Ground reference
8	BLUE RETURN	Ground reference
9	POWER	5 V power for DDC
10	GND	Ground return for power
11	NC	No Connect
12	DDC_D	Data signal of serial communication
13	HSYNC	Horizontal synchronization signal
14	VSYNC	Vertical synchronization signal
15	DDC_C	Clock signal of serial communication

Note Do not hot-swap VGA devices while the cRIO-9082 is in a hazardous location or connected to high voltages.

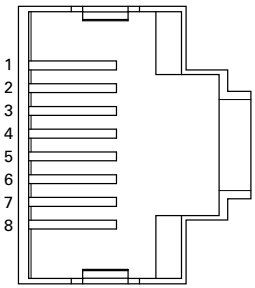
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RJ-45 Gigabit Ethernet Ports

The cRIO-9082 has two tri-speed RJ-45 Gigabit Ethernet ports. By default, both Ethernet ports are enabled and configured to obtain an IP address automatically. The Ethernet ports can be configured in MAX.

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

Table 6. 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 Both Ethernet ports perform 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 cRIO-9082.

Table 7. 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

Table 8. Ethernet 10/100/1000 LAN Connector LED Indications

LED	LED Color	LED State	Condition
ACT/LINK	Green	Off	LAN link not established
ACT/LINK	Green	On (continuously lit)	LAN link established
ACT/LINK	Green	On (pulsing)	Activity on LAN
10/100/1000	Unlit	Off	10 Mbit/s data rate selected

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Table 8. Ethernet 10/100/1000 LAN Connector LED Indications (Continued)

LED	LED Color	LED State	Condition
10/100/1000	Green	On	100 Mbit/s data rate selected
10/100/1000	Yellow	On	1,000 Mbit/s data rate selected

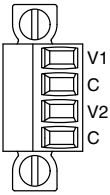
CPU eXpansion Module (CXM) Connector

In the future, the CXM connector will enable you to connect additional industry-standard I/O to the cRIO-9082.

Power Connector

The cRIO-9082 has a power connector to which you can connect a primary and secondary power supply. The following table shows the pinout for the power connector.

Table 9. Power Connector Pinout

Pinout	Pin	Description
	V1	Primary power input
	C	Common
	V2	Secondary power input
	C	Common

Caution The C terminals are internally connected to each other, but are not connected to chassis ground. This isolation is intended to prevent ground loops and does not meet UL ratings for safety isolation. You can connect the C terminals to chassis ground externally. Refer to the specifications on *ni.com/manuals* for information about the power supply input range and maximum voltage from terminal to chassis ground.

If you apply power to both the V1 and V2 inputs, the cRIO-9082 operates from the V1 input. If the input voltage to V1 is insufficient, the cRIO-9082 operates from the V2 input.

The cRIO-9082 has reverse-voltage protection.

The following NI power supplies and accessories are available for the cRIO-9082.

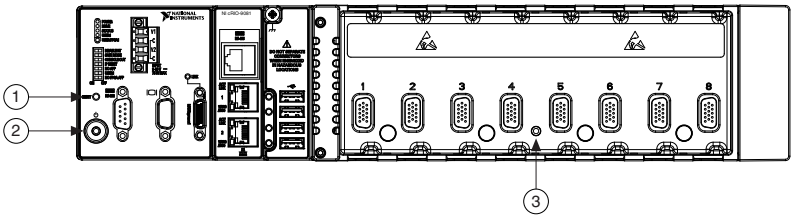
Table 10. Power Accessories

Accessory	Part Number
NI PS-15 Power Supply, 24 VDC, 5 A, 100-120/200-240 VAC Input	781093-01
NI PS-10 Desktop Power Supply, 24 VDC, 5 A, 100-120/200-240 VAC Input	782698-01

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Buttons

The cRIO-9082 provides the following buttons.



1. Reset Button
2. Power Button
3. CMOS Reset Button

Power Button

Pressing the POWER button powers the cRIO-9082 on and off. If the cRIO-9082 becomes unresponsive, you can power it off by holding the POWER button down for 4 seconds.

Reset Button

Pressing the RESET button resets the processor in the same manner as cycling power.

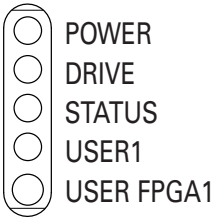
Note The FPGA continues to run unless you select the **Autoload on Any Device Reset** boot option.

CMOS Reset Button

The cRIO-9082 has a CMOS reset button that you can use to reset the CMOS and the BIOS.

LEDs

The cRIO-9082 provides the following LEDs.



POWER LED Indicators

The following table lists the POWER LED indicators.

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Table 11. POWER LED Indicators

LED Color	LED Pattern	Indication
Green	Solid	The cRIO-9082 is powered from the V1 input.
Yellow	Solid	The cRIO-9082 is powered from the V2 input.
—	Off	The cRIO-9082 is powered off.

Drive LED

The DRIVE LED is lit yellow when an internal drive is being accessed.

STATUS LED Indicators

The STATUS LED is off during normal operation. The cRIO-9082 indicates specific software error conditions by flashing the STATUS LED yellow a certain number of times every few seconds, as shown in the following table.

Table 12. STATUS LED Software Indicators

Number of Yellow Flashes Every Few Seconds	Indication
1	The chassis is unconfigured. Use MAX to configure the chassis. Refer to the *Measurement & Automation Explorer Help* for information about configuring the chassis.
2	The chassis has detected an error in its software. This usually occurs when an attempt to upgrade the software is interrupted. Reinstall software on the chassis. Refer to the *Measurement & Automation Explorer Help* for information about installing software on the chassis.
3	The chassis is in safe mode because the SAFE MODE DIP switch is in the ON position or there is no software installed on the chassis.
4	The software has crashed twice without rebooting or cycling power between crashes. This usually occurs when the chassis runs out of memory. Review your RT VI and check the memory usage. Modify the VI as necessary to solve the memory usage issue.

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Table 12. STATUS LED Software Indicators (Continued)

Number of Yellow Flashes Every Few Seconds	Indication
Continuously Flashing	The chassis has detected an unrecoverable error. Contact National Instruments.
Continuously Flashing or Solid	The device may be configured for DHCP but unable to get an IP address because of a problem with the DHCP server. Check the network connection and try again. If the problem persists, contact National Instruments.

The cRIO-9082 indicates specific hardware error conditions by flashing the STATUS LED red a certain number of times every few seconds, as shown in the following table.

Table 13. STATUS LED Hardware Indicators

Pattern of Red Flashes	Indication
Continuously Flashing	An internal power supply has failed. Check front-panel I/O, CXM, and C Series module connections for shorts. Remove any shorts and power cycle the controller. If the problem persists, contact National Instruments.
Solid	The cRIO-9082 internal temperature has exceeded a critical threshold. Ensure that the ambient operating temperature does not exceed the range specified in the *Environmental* section. If the problem persists, contact National Instruments.

User LEDs

You can define the USER1 and USER FPGA1 LEDs to meet the needs of your application. The following table lists the USER1 and USER FPGA1 LED indicators.

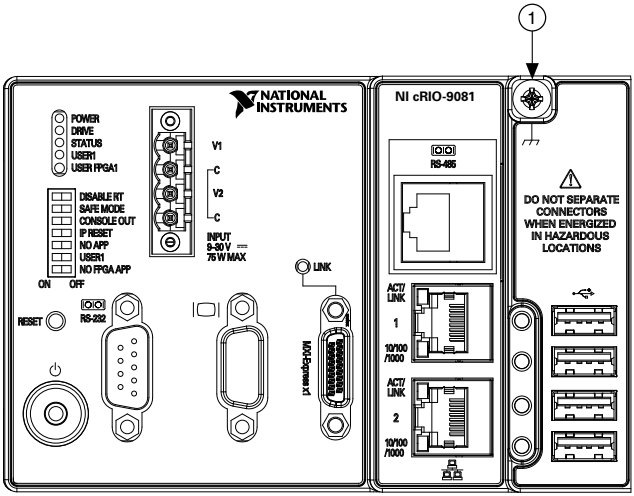
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Table 14. User LEDs

LED	LED Color	Description
USER1	Green/Yellow	Use LabVIEW Real-Time to define the USER1 LED with the RT LEDs VI. For more information about the RT LEDs VI, refer to the *LabVIEW Help*.
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 *LabVIEW Help* for information about programming this LED.

Chassis Grounding Screw

The cRIO-9082 provides a chassis grounding screw.



1. Chassis Grounding Screw

For EMC compliance, you must connect the cRIO-9082 to earth ground through the chassis ground screw. Use wire that is 1.31 mm^2 (16 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.

Caution 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 1.31 mm^2 (16 AWG) or larger wire. Attach a ring lug to the wire and attach the wire

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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* and enter the Info Code `emcground`.

Internal Real-Time Clock

The cRIO-9082 contains an internal real-time clock that maintains system time when the cRIO-9082 is powered off. The system clock of the cRIO-9082 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 on *ni.com/manuals* for the real-time clock accuracy specifications.

CMOS Battery

The cRIO-9082 contains a CMOS battery. The CMOS battery is a lithium cell battery that stores the system clock information when the cRIO-9082 is powered off. There is only a slight drain on the CMOS battery when power is applied to the cRIO-9082 power connector. The rate at which the CMOS battery drains when power is disconnected depends on the ambient storage temperature. For longer battery life, store the cRIO-9082 at a cooler temperature and apply power to the power connector. Refer to the specifications on *ni.com/manuals* for the expected battery lifetime.

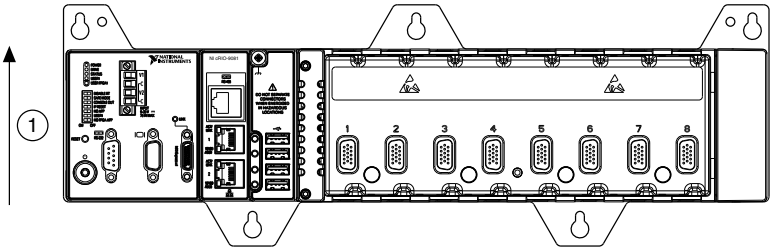
The `CMOS BATTERY IS DEAD` warning appears onscreen during the power-on self test if the battery is dead. The cRIO-9082 still starts, but the system clock is reset to the date and time of the BIOS release. The battery is not user-replaceable. If you need to replace the CMOS battery, contact NI. Refer to the specifications on *ni.com/manuals* for information about battery disposal.

Mounting the Device

To obtain the maximum allowable ambient temperature of 55 °C, you must mount the cRIO-9082 horizontally on a flat, metallic, vertical surface such as a panel or wall. You can mount the cRIO-9082 directly to the surface or use the NI Panel Mounting Kit. The following figure shows the cRIO-9082 mounted horizontally.

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Figure 3. cRIO-9082 Horizontal Mounting



1. Up

You can also mount the cRIO-9082 in other orientations, on a nonmetallic surface, on a 35-mm DIN rail, on a desktop, or in a rack. Mounting the cRIO-9082 in these or other configurations can reduce the maximum allowable ambient temperature and can affect the typical accuracy of modules in the cRIO-9082. For more information about typical accuracy specifications for C Series modules and temperature deratings caused by different mounting configurations, visit *ni.com/info* and enter the Info Code `criotypical`.

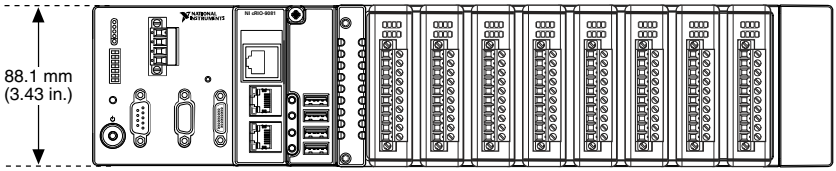
Caution Make sure that no C Series modules are in the cRIO-9082 before mounting it.

Tip Before using any of these mounting methods, record the serial number from the back of the chassis. Knowing the serial number makes it easier to find the CompactRIO system in MAX. You will be unable to read the serial number after you mount the cRIO-9082.

Dimensions

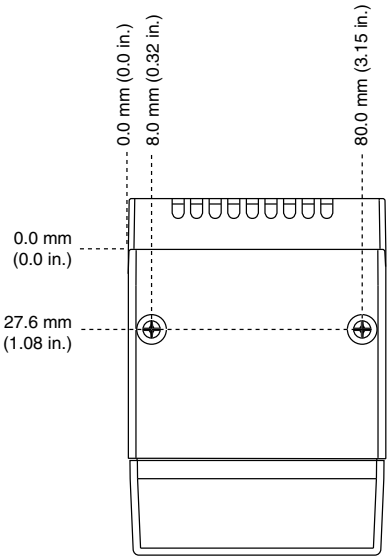
The following figures show the front and side dimensions of the cRIO-9082. For detailed dimensional drawings and 3D models, visit *ni.com/dimensions* and search for the module number.

Figure 4. cRIO-9082 Front Dimensions



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Figure 5. cRIO-9082 Side Dimensions

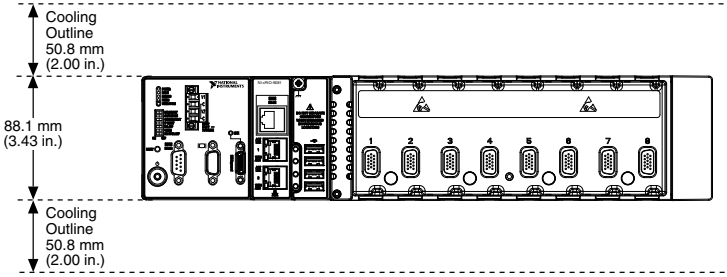


Mounting Requirements

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

Allow 50.8 mm (2.00 in.) on the top and the bottom of the cRIO-9082 for air circulation, as shown in the following figure.

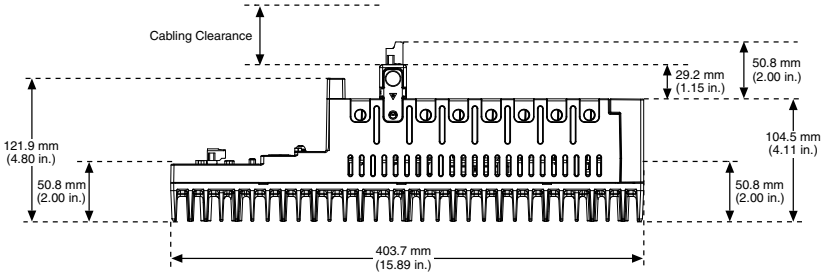
Figure 6. cRIO-9082 Cooling Dimensions



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/info* and enter the Info Code `crioconn`.

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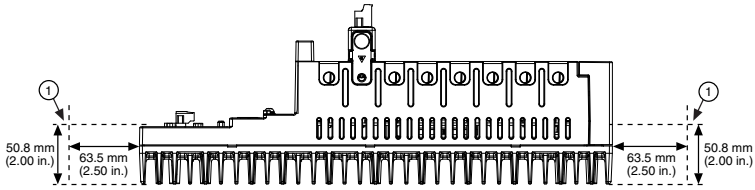
Figure 7. cRIO-9082 Cabling Clearance



Ambient Temperature

Measure the ambient temperature at each side of the cRIO-9082, 63.5 mm (2.50 in.) from the side and 50.8 mm (2.00 in.) forward from the rear of the cRIO-9082, as shown in the following figure.

Figure 8. cRIO-9082 Ambient Temperature Location



1. Location for measuring the ambient temperature

Mounting the Device Directly on a Flat Surface

For environments with high shock and vibration, NI recommends mounting the cRIO-9082 directly on a flat, rigid surface using the mounting holes in the cRIO-9082.

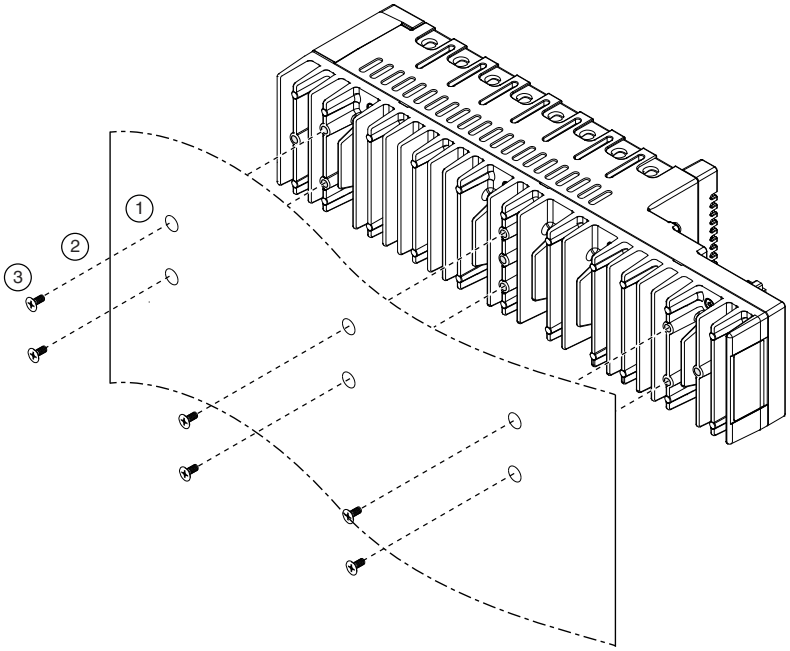
What to Use

- cRIO-9082
- M4 screw (x6), user provided, which must not exceed 8 mm of insertion into the cRIO-9082

What to Do

Complete the following steps to mount the cRIO-9082 directly on a flat surface.

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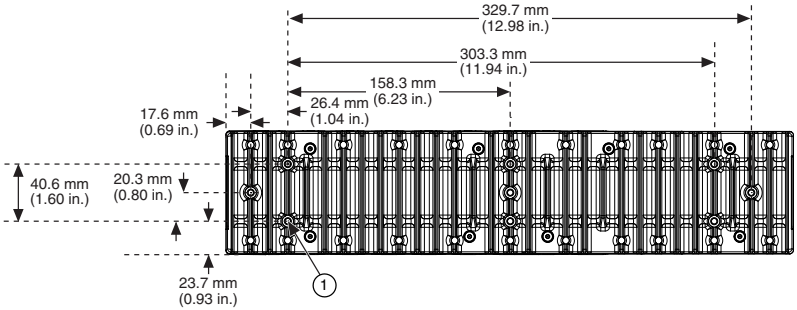


1. Prepare the surface for mounting the cRIO-9082 using the *Surface Mounting Dimensions*.
2. Align the cRIO-9082 on the surface.
3. Fasten the cRIO-9082 to the surface using the M4 screws appropriate for the surface. Screws must not exceed 8 mm of insertion into the cRIO-9082. Tighten the screws to a maximum torque of 1.3 N · m (11.5 lb · in.).

Surface Mounting Dimensions

The following figure shows the surface mounting dimensions for the cRIO-9082.

Figure 9. cRIO-9082 Surface Mounting Dimensions



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Mounting the Device on a Panel

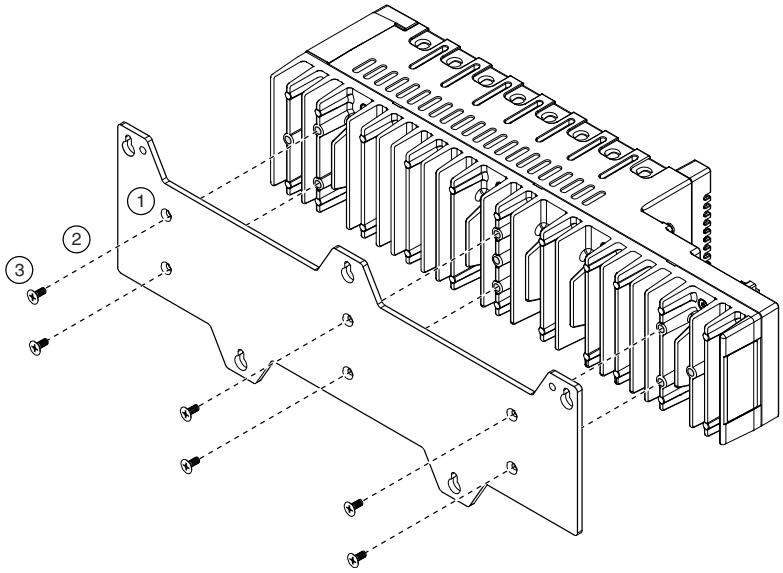
You can use the NI panel mounting kit to mount the cRIO-9082 on a panel.

What to Use

- cRIO-9082
- Screwdriver, Phillips #2
- NI panel mounting kit, 781919-01
  - Panel mounting plate
  - M4x10 screw (x6)

What to Do

Complete the following steps to mount the cRIO-9082 on a panel.



1. Align the cRIO-9082 and the panel mounting plate.
2. Fasten the panel mounting plate to the cRIO-9082 using the screwdriver and M4x10 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.

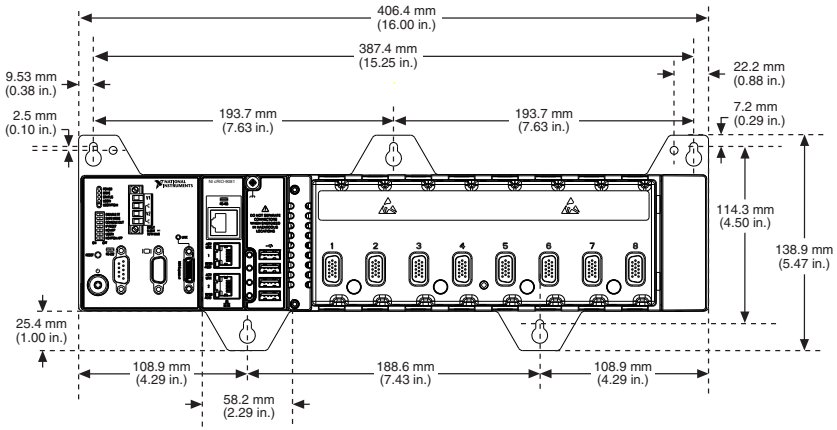
3. Fasten the panel mounting plate to the surface using the screwdriver and screws that are appropriate for the surface. The maximum screw size is M5 or number 10.

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Panel Mounting Dimensions

The following figure shows the panel mounting dimensions for the cRIO-9082.

Figure 10. cRIO-9082 Panel Mounting Dimensions



Mounting the Device on a DIN Rail

You can use the NI DIN rail mounting kit to mount the cRIO-9082 on a standard 35-mm DIN rail.

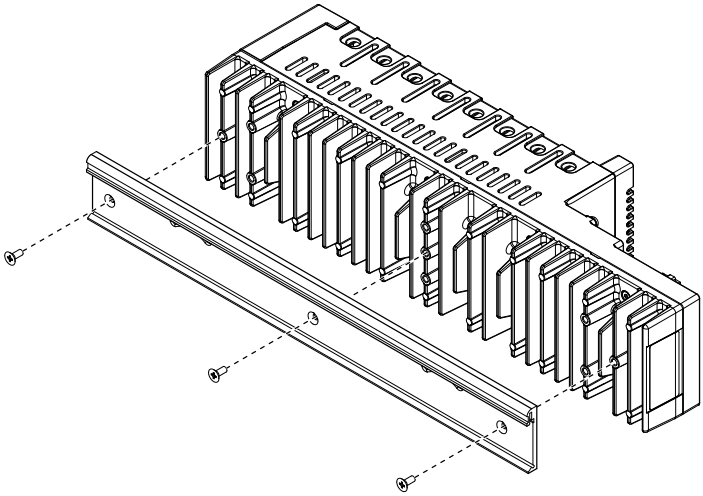
What to Use

- cRIO-9082
- Screwdriver, Phillips #2
- NI DIN rail mounting kit, 781987-01
  - DIN rail clip
  - M4x10 screw (x3)

What to Do

Complete the following steps to mount the cRIO-9082 on a DIN rail.

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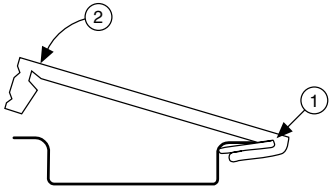


1. Align the cRIO-9082 and the DIN rail clip.
2. Fasten the DIN rail kit to the cRIO-9082 using the screwdriver and M4x10 screws. NI provides these screws with the DIN rail mounting kit. Tighten the screws to a maximum torque of 1.3 N · m (11.5 lb · in.).

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 cRIO-9082 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.

Caution Ensure that no C Series modules are in the cRIO-9082 before removing it from the DIN rail.

Mounting the Device on a Desktop

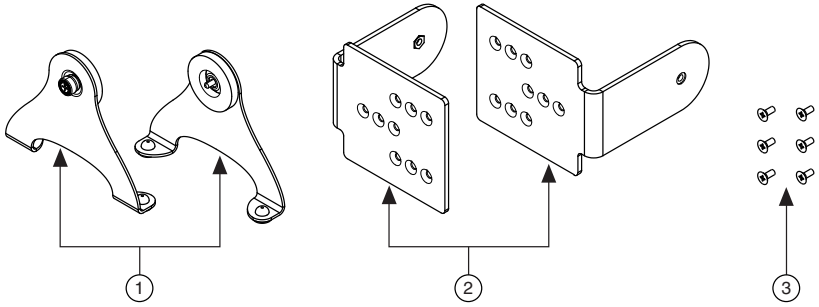
You can use the NI desktop mounting kit to mount the cRIO-9082 on a desktop.

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What to Use

- cRIO-9082
- Screwdriver, Phillips #1
- Screwdriver, Phillips #2
- NI desktop mounting kit, 781988-01

Figure 11. Components of the NI Desktop Mount Kit



1. Desktop mounting brackets (x2)
2. Adapter brackets (x2)
3. M4x10 screws (x6)

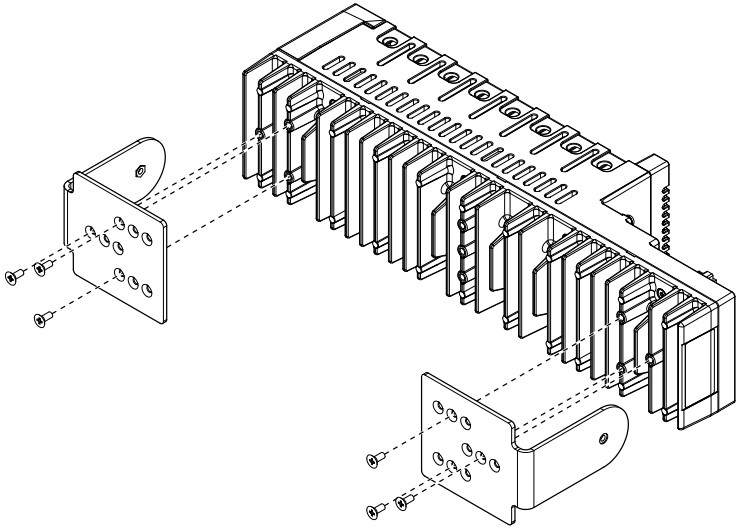
What to Do

Complete the following steps to mount the cRIO-9082 on a desktop.

1. Use a #1 Phillips screwdriver and the six M4×10 screws to attach the adapter brackets to the chassis.

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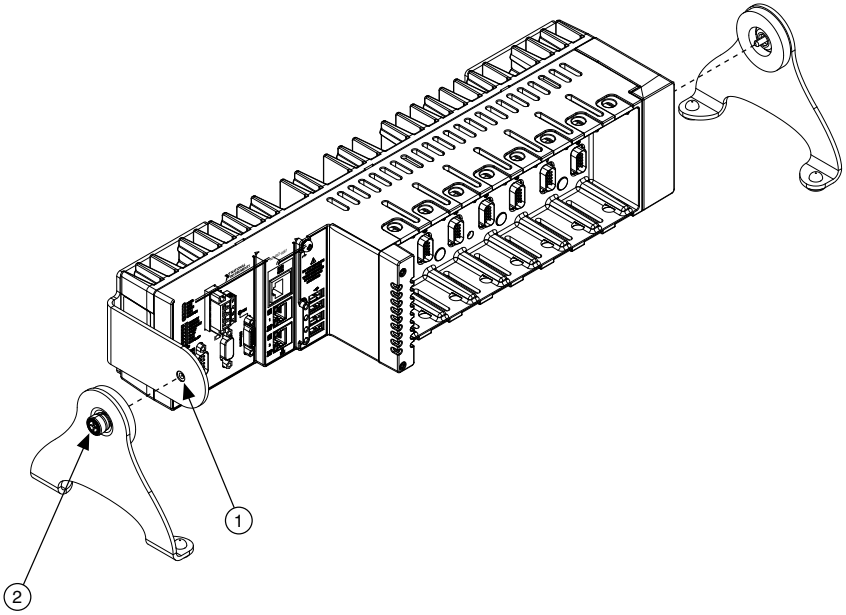
Figure 12. Attaching the Adapter Brackets to the cRIO-9082



2. Align one of the end brackets with the mounting hole at one of the ends of the chassis.

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Figure 13. Connecting the End Brackets to the Chassis



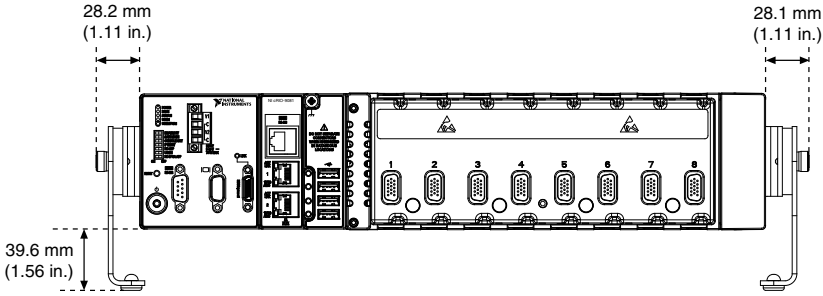
1. Mounting Holes
2. Captive Screw

3. Use a #2 Phillips screwdriver to tighten the captive screw on the end bracket.
4. Repeat steps 2 and 3 to attach the other end bracket to the other end of the chassis.

Desktop Mounting Dimensions

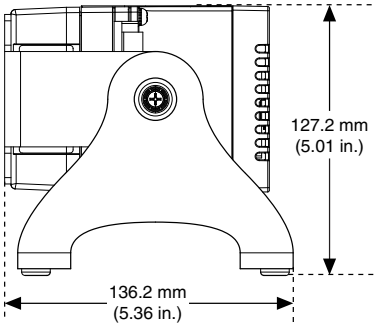
The following figures show the desktop mounting dimensions for the cRIO-9082.

Figure 14. cRIO-9082 Desktop Mounting Front Dimensions



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Figure 15. cRIO-9082 Desktop Mounting Side Dimensions



BIOS Configuration

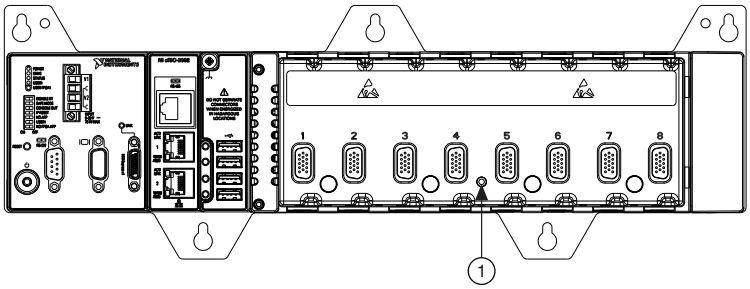
Resetting the System CMOS and BIOS Settings

The cRIO-9082 BIOS configuration information is stored in a nonvolatile memory location that does not require a battery to preserve the settings. Additionally, the BIOS optimizes boot time by saving specific system information to memory backed up by a battery (CMOS).

Complete the following steps to reset the CMOS and reset the BIOS settings to factory default values.

1. Disconnect power from the cRIO-9082.
2. Press the CMOS reset button and hold it for 1 second.

Figure 16. CMOS Reset Button



1. CMOS Reset Button

3. Reconnect power to the cRIO-9082.

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The `BIOS Reset Detected` warning message appears onscreen.

Note If the CMOS battery is dead, the CMOS reset button will not work.

Resetting the System with a Dead CMOS Battery

If the CMOS battery is dead, the CMOS Reset button does not work.

Complete the following steps to reset the CMOS and reset the BIOS settings to factory default values.

1. Disconnect power from the cRIO-9082.
2. Configure the front-panel DIP switches as shown in the following table.

Table 15. DIP Switch Settings to Reset CMOS and BIOS Settings

Switch	Position
DISABLE RT	On
SAFE MODE	On
CONSOLE OUT	Off
IP RESET	Off
NO APP	On
USER1	On
NO FPGA APP	Either Position

3. Reconnect power to the cRIO-9082. The BIOS Reset Detected warning message appears onscreen.
4. Reset the DIP switches to their normal positions.

Power-On Self Test Warning Messages

The cRIO-9082 POST displays warning messages for specific issues onscreen. You can use MAX to enable Console Out to send these warning messages through the RS-232 serial port.

Note When a warning message is displayed, 10 additional seconds are added to the POST to give the user time to read the warning.

The POST can display the following warning messages:

- First Boot Detected—This warning is displayed at the first boot of the system after updating the BIOS firmware. This warning indicates that the BIOS settings have the default values.
- BIOS Reset Detected—This warning is displayed when the CMOS Reset button has been pushed. This warning indicates that the BIOS settings have the default values.
- CMOS Battery Is Dead—This warning is displayed when the CMOS battery is dead and must be replaced. The BIOS settings are preserved even when the CMOS battery is dead, but that the system will boot very slowly because the BIOS cannot optimize boot time by saving specific system information to CMOS.

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- Front Panel Switches Set to Reserved State—This warning is displayed when the CMOS battery is dead and the DIP switches are configured to reset the CMOS and BIOS settings. This warning indicates that the BIOS settings have the default values.
- Warning: Recovering from CPU Overtemp—This warning indicates that the thermal protection features of the cRIO-9082 shut down the system because of a high CPU temperature.
- Warning: Recovering from Ambient Overtemp—This warning indicates that the thermal protection features of the cRIO-9082 shut down the system because of a high ambient temperature.

BIOS Setup Utility

Use the BIOS setup utility to change configuration settings and to enable special functions. The cRIO-9082 ships with configuration settings that work for most applications, but you can use the BIOS setup utility to change configuration settings to meet the needs of your application.

Changing BIOS settings can cause incorrect behavior, including failure to boot. In general, do not change a setting unless you are sure what the setting does. Reset the BIOS settings to restoring the default configuration settings.

Launching the BIOS Setup Utility

Complete the following steps to launch the BIOS setup utility.

1. Connect a VGA monitor to the VGA video connector of the cRIO-9082.
2. Connect a USB keyboard to one of the USB ports on the cRIO-9082.
3. Power on or reboot the cRIO-9082.
4. Hold down either the <F10> key or the <Del> key until `Please select boot device:` appears onscreen.
5. Use the Down Arrow key to select **Enter Setup** and press <Enter>. The setup utility loads after a short delay.

The Main setup menu is displayed when you first enter the BIOS setup utility.

BIOS Setup Utility Keyboard Navigation

Use the following keys to navigate through the BIOS setup utility:

Table 16. Navigation Keys

Key(s)	Function(s)
Left Arrow, Right Arrow	Move between the different setup menus. If you are in a submenu, these keys have no effect, and you must press <Esc> to leave the submenu first.
Up Arrow, Down Arrow	Move between the options within a setup menu.

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Table 16. Navigation Keys (Continued)

Key(s)	Function(s)
<Enter>	Enter a submenu or display all available settings for a highlighted configuration option.
<Esc>	Return to the parent menu of a submenu. At the top-level menus, this key serves as a shortcut to the Exit menu.
<+>, <->	Cycle between all available settings for a selected configuration option.
<Tab>	Select time and date fields.
<F9>	Load the optimal default values for all BIOS configuration settings. The optimal default values are the same as the shipping configuration default values.
<F10>	Save settings and exits the BIOS setup utility.

Main Setup Menu

The Main setup menu reports the following configuration information:

- BIOS Version and Build Date—These values indicate the version of the controller BIOS and the date on which the BIOS was built.
- Processor Type, Base Processor Frequency, and Active Processor Core—These values indicate the type of processor used in the controller, the speed of the processor, and the number of active processor cores.
- Total Memory—This value indicates the size of system RAM detected by the BIOS.

The Main setup menu also includes the following settings:

- System Date—This setting controls the date, which is stored in a battery-backed real-time clock. Most operating systems also include a way to change this setting. Use <+> and <-> in conjunction with <Enter> and <Tab> to change these values.
- System Time—This setting controls the time of day, which is stored in a battery-backed real-time clock. Most operating systems also include a way to change this setting. Use <+> and <-> in conjunction with <Enter> and <Tab> to change these values.

Advanced Setup Menu

The Advanced setup menu contains BIOS settings that do not require modification for normal operation of the cRIO-9082. If you have specific problems, such as unbootable disks or resource conflicts, you may need to examine the settings in this menu.

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Caution Changing settings in the Advanced setup menu may result in an unstable or unbootable controller. If this happens, restore BIOS settings to the factory defaults.

The Advanced setup menu includes the following submenus:

- SATA Configuration—Use this setting to access the SATA Configuration submenu.
- CPU Configuration—Use this setting to access the CPU Configuration submenu.
- Video Configuration—Use this setting to access the Video Configuration submenu.
- Power/Wake Configuration—Use this setting to access the Power/Wake Configuration submenu.
- USB Configuration—Use this setting to access the USB Configuration submenu.
- Intel AMT Configuration—Use this setting to access the AMT Configuration submenu.
- Serial Port Configuration—Use this setting to access the Serial Port Configuration submenu.
- Serial Port Console Redirection—Use this setting to access the Serial Port Console Redirection submenu.

SATA Configuration Submenu

The SATA configuration submenu contains the hard disk drive (HDD) interfaces settings. The factory default settings provide the most compatible and optimal configuration.

- SATA Mode Selection—This setting determines whether AHCI mode is enabled or disabled for the SATA port. Some operating systems, such as Windows 2000, do not support AHCI mode. You can use this setting to disable AHCI mode and enable IDE mode so that non-compatible OSes function correctly. The default value is **AHCI**.
- Onboard Storage—This item displays the onboard drive detected in the system.

CPU Configuration Submenu

Use this submenu to apply alternate settings to the CPU. Normally, you do not need to modify these settings, as the factory default settings provide the most compatible and optimal configuration possible.

- Hyper-Threading—This setting enables or disables Intel Hyper-Threading technology. The default value is **Disabled** if the boot OS is LabVIEW Real-Time and **Enabled** for other boot OSes. Enabling Hyper-Threading increases performance for some applications by adding virtual CPU cores. Hyper-Threading can cause control algorithms to behave less deterministically.
- Enabled CPU Cores—This setting selects the number of active CPU cores for the processor. Valid values are 2 and 1. The default value is **2**.
- Turbo Boost—This setting enables or disables Intel Turbo Boost technology. The default value is **Disabled** if the boot OS is LabVIEW Real-Time and **Enabled** for other boot OSes. Enabling Turbo Boost allows CPU cores to run at higher than their base frequency for short durations, while other cores are idle. Enabling Turbo Boost can cause control algorithms to behave less deterministically. To achieve maximum possible Turbo Boost frequencies, also enable the C-States setting.
- C-States—This setting enables or disables CPU power management. The default value is **Disabled** when booting LabVIEW Real-Time, **Enabled** when booting other OSes.

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Enabling C-States allows the processor to put idle CPU cores to sleep, allowing active cores to run at higher than base frequencies when Turbo Boost is enabled (if applicable). Enabling C-States can cause control algorithms to behave less deterministically.

- Hardware Prefetcher—This setting enables or disables CPU cache hardware prefetching. The default value is **Enabled**.
- Adjacent Cache Line Prefetch—This setting enables or disables prefetching of adjacent cache lines from memory to the CPU cache. The default value is **Enabled**.

Video Configuration Submenu

Use this submenu to apply alternate settings to the video configuration. Normally, you do not need to modify these settings, as the factory default settings provide the most compatible and optimal configuration possible.

- Primary Display—This setting specifies which video adapter the BIOS uses as the primary adapter if more than one adapter is present. To use an external video adapter as the primary graphics adapter, choose **Add-in Board Video**. The default value is **Onboard Video**.

Power/Wake Configuration Submenu

The Power/Wake configuration submenu contains the power and wake settings for the chipset and cRIO-9082. The factory default settings provide the most compatible and optimal configuration.

- Restore After Power Loss—This setting specifies the power state that the cRIO-9082 should return to after DC power is lost. Valid values are **Stay Off** and **Turn On**. The default value is **Turn On**. When set to **Stay Off**, the cRIO-9082 returns to the soft off power state after AC power is restored. When set to **Turn On**, the cRIO-9082 powers on when DC power is restored.
- Power Button Off Behavior—This setting specifies how the system responds to the power button. Valid options are **Normal** and **Disabled**. The default value is **Normal**. If the value is **Normal**, the system responds to the power button as defined by the OS. If the value is **Disabled**, pressing the power button has no effect when the system is on. When the system is in the soft off state, pushing the power button always powers on the system.
- Ring Indicator Wake—This setting enables or disables the ability to wake a powered-off system using the Ring Indicator pin of the RS-232 serial port. The default value is **Disabled**.

USB Configuration Submenu

The USB configuration submenu contains the USB host ports settings. The factory default settings provide the most compatible and optimal configuration.

- USB Devices—This item lists the total number of devices detected in the system, categorized by device type.
- Legacy USB Support—This setting specifies whether legacy USB support is enabled. Legacy USB support refers to the ability to use a USB keyboard and mouse during system boot or in a legacy operating system such as DOS.

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- Overcurrent Reporting—This setting allows the BIOS to notify the operating system about any USB ports that source too much current. The default value is **Disabled**. Hardware overcurrent protection is always active and cannot be disabled.
- Transfer Timeout—This setting specifies the timeout value for Control, Bulk, and Interrupt USB transfers. The default value is **20** seconds.
- Device Reset Timeout—This setting specifies the number of seconds the POST waits for a USB mass storage device to start. The default value is **20** seconds.
- Device Power-Up Delay—This setting specifies the maximum time a device takes before enumerating. Valid options are **Auto** and **Manual**. The default value is **Auto**. When set to **Auto**, a root port is granted 100 ms, and the delay value of a hub port is assigned from the hub descriptor.
- Device Power-Up Delay in Seconds—This setting specifies the number of seconds the POST waits for a USB device or hub to power on. This setting is only visible when the Device Power-Up Delay is set to **Manual**. The default value is **5** seconds.
- Emulation Type—This setting specifies how the BIOS presents the USB mass storage device to the system for each detected USB mass storage device. This option presents a USB mass storage device as a floppy, Zip, hard disk, or CD-ROM drive. The default value is **Auto**, which allows the BIOS to treat small USB flash disk drives as floppy drives and larger USB flash disk drives as hard disk drives.

Intel AMT Configuration Submenu

Use this submenu to enable or disable the Intel Active Management Technology feature.

Note Intel Active Management Technology is disabled by default. For information on how to enable, configure, and disable AMT, go to *ni.com/info* and enter the Info Code `intelamt`.

- Management Engine Setup Prompt—This setting enables the Intel Management Engine Setup prompt during the POST. If this setting is enabled, pressing CTRL-P during the POST starts the ME Setup utility. The default value is **Disabled**.
- Unconfigure Management Engine—This setting enables the prompt during the POST to unconfigure the Management Engine on the next boot. The default value is **Disabled**.
- USB-Based Configuration—This setting enables searching USB drives for AMT configuration files. If such files are found, the user is prompted during the POST to perform configuration using the information stored on the USB drive. The default value is **Disabled**.

Serial Port Configuration Submenu

Use this submenu to view the serial port configuration and enable or disable the onboard serial ports. Normally, you do not need to modify these settings, as the factory default settings provide the most compatible and optimal configuration possible.

- COM 1 (RS-232)—This setting enables or disables the onboard RS-232 serial port. The default value is **Enabled**.
- Device Settings—This item displays the current base address and interrupt request level (IRQ) information for the onboard RS-232 serial port.

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- COM 2 (RS-485)—This setting enables or disables the onboard RS-485 serial port. The default value is **Enabled**.
- Device Settings—This item displays the current base address and interrupt request level (IRQ) information for the onboard RS-485 serial port.

Serial Port Console Redirection Submenu

Use this submenu to access configuration information related to console redirection.

- COM1 Console Redirection—This item displays the current state of COM1 (RS-232) console redirection based on the state of the CONSOLE OUT switch.
- Console Redirection Settings—Use this setting to access the **Console Redirection Settings** submenu. This setting is enabled only if COM1 Console Redirection is enabled.

Console Redirection Settings Submenu

Use this submenu to apply alternate configurations to the serial port related to console redirection. Normally, you do not need to modify these settings, as the factory default settings provide the most compatible and optimal configuration possible.

- Terminal Type—This setting selects the terminal emulation type. Valid values are **ANSI**, **VT100**, **VT100+**, and **VT-UTF8**. The default value is **ANSI**.
- Bits Per Second—This setting selects the serial port transmission speed (baud rate). Valid values are **9600**, **19200**, **57600**, and **115200**. The default value is **9600**.
- Data Bits—This setting selects the number of data bits per byte. Valid values are **7** and **8**. The default value is **8**.
- Parity—This setting selects the parity bit type which can help detect some types of transmission errors. Valid values are **None**, **Even**, **Odd**, **Mark** (Always Send 1), and **Space** (Always Send 0). The default value is **None**.
- Stop Bits—This setting selects the number of stop bits. Valid values are **1** and **2**. The default value is **1**.
- Flow Control—This setting enables flow control to help prevent data loss from buffer overflows. Valid values are **None** and **Hardware RTS/CTS**. The default value is **None**.
- Recorder Mode—This setting selects whether or not terminal display formatting characters are transmitted with the screen text. When **Recorder Mode** is **Enabled**, only the text characters are transmitted. The default value is **Disabled**.
- 100x31 Resolution—This setting enables extended terminal resolution. The default value is **Disabled**.
- Legacy OS Redirection—This setting selects the resolution (rows and columns) used for Legacy OS Redirection. Valid values are **80x24** and **80x25**. The default value is **80x24**.

LabVIEW RT Options Setup Menu

Use this menu to configure boot options for LabVIEW RT if it is installed on the controller. If you are not using LabVIEW RT, you should leave these settings at default.

Note The following settings temporarily override the behavior of the switches.

- Change Boot Config on Next Boot—This setting temporarily overrides the combined state of the LABVIEW RT and SAFE MODE switches. This setting selects whether the

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controller should boot LabVIEW RT, LabVIEW RT Safe Mode, or an installed OS such as Windows 7. The default is **No**.

- Reset IP Address on Next Boot— This setting temporarily overrides the state of the IP RESET switch. The default is **No**.
- Disable Startup VI on Next Boot— This setting temporarily overrides the state of the NO APP switch. The default is **No**.
- LabVIEW RT Configuration Overrides—Use this setting to access the **LabVIEW RT Configuration Overrides** submenu.

LabVIEW RT Configuration Overrides Submenu

Use this submenu to override specific settings optimized for using LabVIEW RT. Normally, you do not need to modify these settings, as the factory default settings provide the most compatible and optimal configuration possible.

Note When booting LabVIEW RT, certain options are automatically set to minimize system jitter and optimize LabVIEW RT performance. These settings can be manually overridden using the menu options described below but may result in an increase in overall system jitter, so care should be taken when enabling this setting on a Real Time system.

- CPU Hyper Threading (NI cRIO-9082 Only)—This setting allows overriding the optimal configuration for Intel Hyper-Threading technology when booting LabVIEW RT. The default value is **Use RT Default**.
- CPU Turbo Boost (NI cRIO-9082 Only)—This setting allows overriding the optimal configuration for Intel Turbo Boost technology when booting LabVIEW RT. The default value is **Use RT Default**.
- CPU C-States—This setting allows overriding the optimal configuration for CPU power management when booting LabVIEW RT. The default value is **Use RT Default**.

Boot Setup Menu

The Boot Setup menu contains setting related to the boot process and the boot device priority.

- Boot Settings Configuration Submenu—This item accesses the Boot Settings Configuration submenu.
- SCSI Drive Boot—This setting specifies whether or not boot support is enabled for legacy mass storage devices, such as SCSI drives. When enabled, legacy mass storage controllers with boot support will be displayed in the Boot Option Priorities menu. The default value is **Enabled**.
- PXE Network Boot—This setting specifies whether the PXE network boot agent is enabled. The Intel Boot Agent is visible in the Boot Option Priorities menu when enabled, allowing you to boot from a PXE server on the local subnet. The Intel Boot Agent device names are preceded by IBA GE Slot 0200 v1553 in the Boot Option Priorities menu. The system must be restarted for this setting to take effect. The default value is **Disabled**.
- Boot Option Priorities—These settings specify the order in which the BIOS checks for bootable devices, including the local hard disk drive, removable devices such as USB flash disk drives or USB CD-ROM drives, or the PXE network boot agent. The BIOS

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first attempts to boot from the device associated with 1st Boot Device, followed by 2nd Boot Device and 3rd Boot Device. If multiple boot devices are not present, the BIOS setup utility does not display all of these configuration options. To select a boot device, press <Enter> on the desired configuration option and select a boot device from the resulting menu. You can also disable certain boot devices by selecting **Disabled**.

- When the DISABLE RT switch is not set, the only detectable boot options are LabVIEW RT and LabVIEW RT Safe Mode.

Note Only one device of a given type is shown in this list. If more than one device of the same type exists, use the appropriate device BBS priorities submenu to re-order the priority of devices of the same type.

The Boot Setup menu displays the following submenus when one or more bootable devices of the corresponding type is present:

- Hard Drive BBS Priorities Submenu—Use this setting to access the Hard Drive BBS Priorities submenu to re-order or disable bootable hard drive devices.
- CD/DVD ROM Drive BBS Priorities Submenu—Use this setting to access the CD/DVD ROM Drive BBS Priorities submenu to re-order or disable bootable CD/DVD ROM drive devices.
- Floppy Drive BBS Priorities Submenu—Use this setting to access the Floppy Drive BBS Priorities submenu to re-order or disable bootable floppy drive devices.
- Network Device BBS Priorities Submenu—Use this setting to access the Network Device BBS Priorities submenu to re-order or disable bootable network devices.

Boot Settings Configuration Submenu

The Boot Settings Configuration submenu applies alternate configurations to boot settings. The factory default settings provide the most compatible and optimal configuration.

- Setup Prompt Timeout—This setting specifies the number of seconds the system waits for a BIOS Setup menu keypress (the <Delete> key). The default value is **2** seconds.
- Bootup NumLock State—This setting specifies the power-on state of the keyboard NumLock setting. The default value is **On**.

Hard Drive BBS Priorities Submenu

The Hard Drive BBS Priorities submenu specifies the boot priority of hard drive devices.

Boot Option #1, Boot Option #2, Boot Option #3—These settings specify that the main Boot Option Priorities list displays the highest priority device. Optionally, each device can be disabled if the device is not used as a boot device.

CD/DVD ROM Drive BBS Priorities Submenu

The CD/DVD ROM Drive BBS Priorities submenu specifies the boot priority of CD/DVD ROM drive devices.

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Boot Option #1, Boot Option #2, Boot Option #3—These settings specify that the main Boot Option Priorities list displays the highest priority device. Optionally, each device can be disabled if the device is not used as a boot device.

Floppy Drive BBS Priorities Submenu

The Floppy Drive BBS Priorities submenu specifies the boot priority of floppy drive devices.

Boot Option #1, Boot Option #2, Boot Option #3—These settings specify that the main Boot Option Priorities list displays the highest priority device. Optionally, each device can be disabled if the device is not used as a boot device.

Network Device BBS Priorities Submenu

The Network Device BBS Priorities submenu specifies the boot priority of network devices.

Boot Option #1, Boot Option #2, Boot Option #3—These settings specify that the main Boot Option Priorities list displays the highest priority device. Optionally, each device can be disabled if the device is not used as a boot device.

Security Menu

Use this menu to enable BIOS security options.

- Setup Administrator Password—This setting specifies a password that must be entered to access the BIOS Setup Utility. If only the Administrator's password is set, then this only limits access to the BIOS setup utility and is only asked for when entering the BIOS setup utility. By default, no password is specified.
- User Password—This setting specifies a password that must be entered to access the BIOS Setup Utility or to boot the system. If only the User's password is set, then this is a power on password and must be entered to boot or enter the BIOS setup utility. In the BIOS setup utility, the User has Administrator rights. By default, no password is specified.

Save & Exit Menu

The Save & Exit setup menu contains all available options for exiting, saving, and loading the BIOS default configuration. As an alternative to this menu, press <F9> to load optimal BIOS default settings and <F10> to save changes and exit setup.

The Save & Exit setup menu includes the following settings:

- Save Changes and Reset—This setup utility then exits and reboots the cRIO-9082. Any changes made to BIOS settings are stored in NVRAM. The <F10> key also selects this option.
- Discard Changes and Reset—Any changes made to BIOS settings during this session of the BIOS setup utility are discarded. The setup utility then exits and reboots the controller. The <Esc> key can also be used to select this option.
- Save Changes—Changes made to BIOS settings during this session are committed to NVRAM. The setup utility remains active, allowing further changes.

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- Discard Changes—Any changes made to BIOS settings during this session of the BIOS setup utility are discarded. The BIOS setup continues to be active.
- Restore Factory Defaults—This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting. Notice that any nondefault settings such as boot order, passwords, and so on are also restored to their factory defaults. The <F9> key also selects this option.
- Save As User Defaults—This option saves a copy of the current BIOS settings as the User Defaults. This option is useful for preserving custom BIOS setup configurations.
- Restore User Defaults—This option restores all BIOS settings to the user defaults. This option is useful for restoring previously preserved custom BIOS setup configurations.
- Boot Override—This option lists all possible bootable devices and allows the user to override the Boot Option Priorities list for the current boot. If no changes have been made to the BIOS setup options, the system will continue booting to the selected device without first rebooting. If BIOS setup options have been changed and saved, a reboot will be required and the boot override selection will not be valid.

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