cRIO-9039 Specifications

Contents

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This document lists the specifications for the NI cRIO-9039 and NI cRIO-9039 Sync. The following specifications are typical for the -20 °C to 55 °C operating temperature range unless otherwise noted.

For more information about timing and synchronization capabilities of NI cRIO-9039 Sync, visit ni.com/info and enter the Info Code cRIO9039sync .

In this document, the NI cRIO-9039 and NI cRIO-9039 Sync are inclusively referred to as the cRIO-9039.

Caution Do not operate the cRIO-9039 in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to NI for repair.

Processor

CPU	Intel Atom E3845
Number of cores	4
CPU frequency	1.91 GHz
On-die L2 cache	2 MB (shared)

Operating System

Note For minimum software support information, visit ni.com/info and enter the Info Code swsupport.

Note LabVIEW FPGA Module is not required when using Scan Interface mode. To program the user-accessible FPGA on the cRIO-9039, LabVIEW FPGA Module is required.

Note C/C++ Development Tools for NI Linux Real-Time is an optional interface for C/C++ programming of the cRIO-9039 processor. Visit ni.com/info and enter Info Code RIOCdev for more information about the C/C++ Development Tools for NI Linux Real-Time.

Supported operating system	NI Linux Real-Time (64-bit)

Software requirements

Application software

LabVIEW	LabVIEW 2014 SP1 or later, LabVIEW Real-Time Module 2014 SP1 or later, LabVIEW FPGA Module 2014 SP1 or later,
C/C++ Development Tools for NI Linux Real-Time	Eclipse Edition 2014 or later
Driver software	NI CompactRIO Device Drivers February 2015 or later

Sync

Supported operating system	NI Linux Real-Time (64-bit)

Software requirements

Application software

LabVIEW	LabVIEW 2016 or later, LabVIEW Real-Time Module 2016 or later, LabVIEW FPGA Module 2016 or later,
C/C++ Development Tools for NI Linux Real-Time	Eclipse Edition 2016 or later
Driver software	NI CompactRIO Device Drivers August 2016 or later

Network/Ethernet Port

Number of ports	2
Network interface	10Base-T, 100Base-TX, and 1000Base-T Ethernet
Compatibility	IEEE 802.3
Communication rates	10 Mbit/s, 100 Mbit/s, 1000 Mbit/sauto-negotiated
Maximum cabling distance	100 m/segment

RS-232 Serial Port

Maximum baud rate	115,200 bps
Data bits	5, 6, 7, 8
Stop bits	1, 2
Parity	Odd, even, mark, space

Flow control	RTS/CTS, XON/XOFF, DTR/DSR
RI wake maximum low level	0.8 V
RI wake minimum high level	2.4 V
RI overvoltage tolerance	±24 V

RS-485/422 (DTE) Serial Port

Maximum baud rate	115,200 bps
Data bits	5, 6, 7, 8
Stop bits	1, 2
Parity	Odd, even, mark, space
Flow control	XON/XOFF
Wire mode	4-wire, 2-wire, 2-wire auto
Isolation voltage	60 VDC continuous, port to earth ground

Note The RS-485 serial port ground and shield are not connected to chassis ground. This isolation is intended to prevent ground loops and does not meet UL ratings for safety isolation.

Cable requirement	Unshielded, 30 m maximum length (limited by EMC/surge)

Note RS-485 is capable of 1.2 km (4,000 ft) length without surge limitation.

USB Ports

Number of ports	
Device ports	1 standard B connector
Host ports	2 standard A connectors

Note The USB device port is intended for use in device configuration, application deployment, debugging, and maintenance.

USB interface	USB 2.0, Hi-Speed
Maximum data rate	480 Mb/s per port
Maximum current (USB host ports)	1 A (aggregate)

Mini DisplayPort

Maximum resolution	2560 × 1600 at 60 Hz

SD Card Slot

SD card support	SD and SDHC standards

Memory

Nonvolatile[1]

SD removable (user supplied)	Up to 32 GB
Solid-state drive	16 GB

Note Visit ni.com/info and enter the Info Code ssdbp for information about the life span of the nonvolatile memory and about best practices for using nonvolatile memory.

Volatile

Processor memory

Density	2 GB
Type	DDR3L
Maximum theoretical data rate	10.67 GB/s

FPGA memory

Density	128 MB
Type	DDR3
Maximum theoretical data rate	1.6 GB/s

Data throughput

System memory to SD removable storage[2]	10 MB/s

Module slots to system memory	20 MB/s, application- and system-dependent

Reconfigurable FPGA

FPGA type	Xilinx Kintex-7 7K325T
Number of flip-flops	407,600
Number of 6-input LUTs	203,800
Number of DSP slices (18 × 25 multipliers)	840
Available block RAM	16,020 kbits
Number of DMA channels	16
Number of logical interrupts	32

Internal Real-Time Clock

Accuracy	200 ppm; 40 ppm at 25 °C

CMOS Battery

Typical battery life with power applied to power connector	10 years
Typical battery life when stored at temperatures up to 25 °C	7.8 years
Typical battery life when stored at temperatures up to 85 °C	5.4 years

Power Requirements

Note Some C Series modules have additional power requirements. For more information about C Series module power requirements, refer to the C Series module(s) documentation.

Voltage input range (measured at the cRIO-9039 power connector)	
V1	9 V to 30 V
V2	9 V to 30 V
Maximum power consumption	46 W

Note The maximum power consumption specification is based on a fully populated system running a high-stress application at elevated ambient temperature and with all C Series modules and USB devices consuming the maximum allowed power.

Typical standby power consumption	3.4 W at 24 V DC input
Recommended power supply	100 W, 24 V DC

Typical leakage current from secondary power input (V2) while system is powered from primary power input (V1)	
At 9 V	0.4 mA
At 30 V	1.93 mA

Notice Do not connect V2 to a DC mains supply or to any supply that requires a connecting cable longer than 3 m(10 ft). A DC mains supply

is a local DC electricity supply network in the infrastructure of a site or building.

EMC ratings for inputs as described in IEC 61000	
V1	Short lines, long lines, and DC distributed networks
V2	Short lines only
Power input connector	4-position, 3.5 mm pitch, pluggable screw terminal with screw locks, Sauro CTF04BV8-AN000A

Physical Characteristics

Tip For two-dimensional drawings and three-dimensional models of the cRIO-9039, visit ni.com/dimensions and search by module number.

Weight (unloaded)	2,250 g (4 lbs, 15 oz)
Dimensions (unloaded)	328.8 mm × 88.1 mm × 121.2 mm (12.94 in. × 3.47 in. × 4.77 in.)
Screw-terminal wiring	
Gauge	0.5 mm^2 to 2.1 mm^2 (20 AWG to 14 AWG) copper conductor wire
Wire strip length	6 mm (0.24 in.) of insulation stripped from the end
Temperature rating	85 °C
Torque for screw terminals	0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.)
Wires per screw terminal	One wire per screw terminal

Connector securement	
Securement type	Screw flanges provided
Torque for screw flanges	0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.)

Safety Voltages

Connect only voltages that are below these limits.

V1 terminal to C terminal	30 V DC maximum, Measurement Category I
V2 terminal to C terminal	30 V DC maximum, Measurement Category I
Chassis ground to C terminal	30 V DC maximum, Measurement Category I

Environmental

Temperature	
Operating	-20 °C to 55 °C
Storage	-40 °C to 85 °C

Humidity	
Operating	10% RH to 90% RH, noncondensing
Storage	5% RH to 95% RH, noncondensing

Ingress protection	IP20
Pollution Degree	2

Maximum altitude	5,000 m

Shock and Vibration

Operating vibration	5 Hz to 500 Hz, 0.3 g RMS
Non-operating vibration	5 Hz to 500 Hz, 2.4 g RMS
Operating shock	30 g, half-sine, 11 ms pulse

To meet the shock and vibration specifications, you must mount the cRIO-9039 system directly on a flat, rigid surface as described in the user manual, affix ferrules to the ends of the terminal wires, install an SD card cover (SD Door Kit, 783660-01), and use retention accessories for the USB host ports (NI Industrial USB Extender Cable, 152166-xx), USB device port (NI Locking USB Cable, 157788-01), and mini DisplayPort connector (NI Retention Accessory for Mini DisplayPort, 156866-01). All cabling should be strain-relieved near input connectors. Take care to not directionally bias cable connectors within input connectors when applying strain relief.

Hazardous Locations

U.S. (UL)	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nA IIC T4 Gc
Canada (C-UL)	Class I, Division 2, Groups A, B, C, D, T4; Ex nA IIC T4 Gc
Europe (ATEX) and International (IECEx)	Ex nA IIC T4 Gc DEMKO 12 ATEX 1202658X IECEx UL 14.0089X

Shock and Vibration

To meet these specifications, you must mount the cRIO-9039 system directly on a flat, rigid surface as described in the user manual, affix ferrules to the ends of the terminal wires, install an SD card cover (SD Door Kit, 783660-01), and use retention accessories for the USB host ports (NI Industrial USB Extender Cable, 152166-xx), USB device port (NI Locking USB Cable, 157788-01), and mini DisplayPort connector (NI Retention Accessory for Mini DisplayPort, 156866-01). All cabling should be strain-relieved near input connectors. Take care to not directionally bias cable connectors within input connectors when applying strain relief.

Operating vibration	
Random	5 g RMS, 10 Hz to 500 Hz
Sinusoidal	5 g, 10 Hz to 500 Hz
Operating shock	30 g, 11 ms half sine; 50 g, 3 ms half sine; 18 shocks at 6 orientations

Safety Compliance and Hazardous Locations Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1
- EN 60079-0, EN 60079-7
- IEC 60079-0, IEC 60079-7
- UL 60079-0, UL 60079-7
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-7

Note For safety certifications, refer to the product label or the Product Certifications and Declarations section.

Electromagnetic Compatibility

CE Compliance CE

- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the **Engineering a Healthy Planet** web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

EU and UK Customers

- Waste Electrical and Electronic Equipment (WEEE)—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

Battery Replacement and Disposal

- Battery Directive—This product contains a long-life coin cell battery. If you need to replace it, use the Return Material Authorization (RMA) process or contact an authorized NI service representative. For more information about compliance with the EU Battery Directive 2006/66/EC about Batteries and Accumulators and Waste Batteries and Accumulators, visit ni.com/environment/batterydirective.

电子信息产品污染控制管理办法（中国 RoHS）

- 中国 RoHS— NI 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 NI 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

[1] 1 MB is equal to 1 million bytes. 1 GB is equal to 1 billion bytes. The actual formatted capacity might be less.

[2] Consult the manufacturer specifications of your SD removable storage.