

## SPECIFICATIONS

# NI cDAQ™ -9174

## NI CompactDAQ Four-Slot USB Chassis

These specifications are for the National Instruments CompactDAQ 9174 chassis only. These specifications are typical at 25 °C unless otherwise noted. For the C Series I/O module specifications, refer to the documentation for the C Series I/O module you are using.

### Analog Input

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Input FIFO size.....	127 samples per slot
Maximum sample rate <sup>1</sup> .....	Determined by the C Series I/O module or modules
Timing accuracy <sup>2</sup> .....	50 ppm of sample rate
Timing resolution <sup>3</sup> .....	12.5 ns
Number of channels supported.....	Determined by the C Series I/O module or modules

### Analog Output

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Number of channels supported	
Hardware-timed task	
Onboard regeneration.....	16
Non-regeneration.....	Determined by the C Series I/O module or modules

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<sup>1</sup> Performance dependent on type of installed C Series I/O module and number of channels in the task.

<sup>2</sup> Does not include group delay. For more information, refer to the documentation for each C Series I/O module.

<sup>3</sup> Does not include group delay. For more information, refer to the documentation for each C Series I/O module.

Non-hardware-timed task.....	Determined by the C Series I/O module or modules
Maximum update rate	
Onboard regeneration.....	1.6 MS/s (multi-channel, aggregate)
Non-regeneration.....	Determined by the C Series I/O module or modules
Timing accuracy.....	50 ppm of sample rate
Timing resolution.....	12.5 ns
Output FIFO size	
Onboard regeneration.....	8,191 samples shared among channels used
Non-regeneration.....	127 samples per slot
AO waveform modes.....	Non-periodic waveform, periodic waveform regeneration mode from onboard memory, periodic waveform regeneration from host buffer including dynamic update

## Digital Waveform Characteristics

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Waveform acquisition (DI) FIFO.....	127 samples per slot
Waveform generation (DO) FIFO.....	2,047 samples
Digital input sample clock frequency	
Streaming to application.....	System-dependent memory
Finite.....	0 to 10 MHz
Digital output sample clock frequency	
Streaming from application.....	System-dependent memory
Regeneration from FIFO.....	0 to 10 MHz
Finite.....	0 to 10 MHz
Timing accuracy.....	50 ppm

# General-Purpose Counters/Timers

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Number of counters/timers.....	4
Resolution.....	32 bits
Counter measurements.....	Edge counting, pulse, semi-period, period, two-edge separation, pulse width
Position measurements.....	X1, X2, X4 quadrature encoding with Channel Z reloading; two-pulse encoding
Output applications.....	Pulse, pulse train with dynamic updates, frequency division, equivalent time sampling
Internal base clocks.....	80 MHz, 20 MHz, 100 kHz
External base clock frequency.....	0 to 20 MHz
Base clock accuracy.....	50 ppm
Output frequency.....	0 to 20 MHz
Inputs.....	Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down
Routing options for inputs.....	Any module PFI, analog trigger, many internal signals
FIFO.....	Dedicated 127-sample FIFO

# Frequency Generator

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Number of channels.....	1
Base clocks.....	20 MHz, 10 MHz, 100 kHz
Divisors.....	1 to 16 (integers)
Base clock accuracy.....	50 ppm
Output.....	Any module PFI terminal

# Module PFI Characteristics

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Functionality.....	Static digital input, static digital output, timing input, and timing output
Timing output sources <sup>4</sup> .....	Many analog input, analog output, counter, digital input, and digital output timing signals
Timing input frequency.....	0 to 20 MHz
Timing output frequency.....	0 to 20 MHz

# Digital Triggers

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Source.....	Any module PFI terminal
Polarity.....	Software-selectable for most signals
Analog input function.....	Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase
Analog output function.....	Start Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase
Counter/timer function.....	Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down

# Module I/O States

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At power-on.....	Module-dependent. Refer to the documentation for each C Series I/O module.
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**Note** The chassis may revert the input/output of the modules to their power-on state when the USB cable is removed.

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<sup>4</sup> Actual signals available dependent on type of installed C Series I/O module.

# Power Requirements

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**Caution** You must use a National Electric Code (NEC) Class 2 power source with the NI cDAQ-9174 chassis.



**Note** Some C Series I/O modules have additional power requirements. For more information about C Series I/O module power requirements, refer to the documentation for each C Series I/O module.



**Note** Sleep mode for C Series I/O modules is not supported in the NI cDAQ-9174.

Input voltage range.....	9 to 30 V
Maximum required input power <sup>5</sup> .....	15 W
Power input connector.....	2 positions 3.5 mm pitch pluggable screw terminal with screw locks similar to Sauro CTMH020F8-0N001
Power input mating connector.....	Sauro CTF020V8, Phoenix Contact 1714977, or equivalent
Power consumption from USB,.....	500 $\mu$ A maximum 4.10 to 5.25 V

## Bus Interface

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USB specification.....	USB 2.0 Hi-Speed
High-performance data streams.....	7
Data stream types available.....	Analog input, analog output, digital input, digital output, counter/timer input, counter/timer output, NI-XNET <sup>6</sup>



**Note** If you are connecting the NI cDAQ-9174 chassis to a USB hub, the hub must be externally powered.

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<sup>5</sup> Includes maximum 1 W module load per slot across rated temperature and product variations.

<sup>6</sup> When a session is active, CAN or LIN (NI-XNET) C Series modules use a total of two data streams regardless of the number of NI-XNET modules in the chassis.

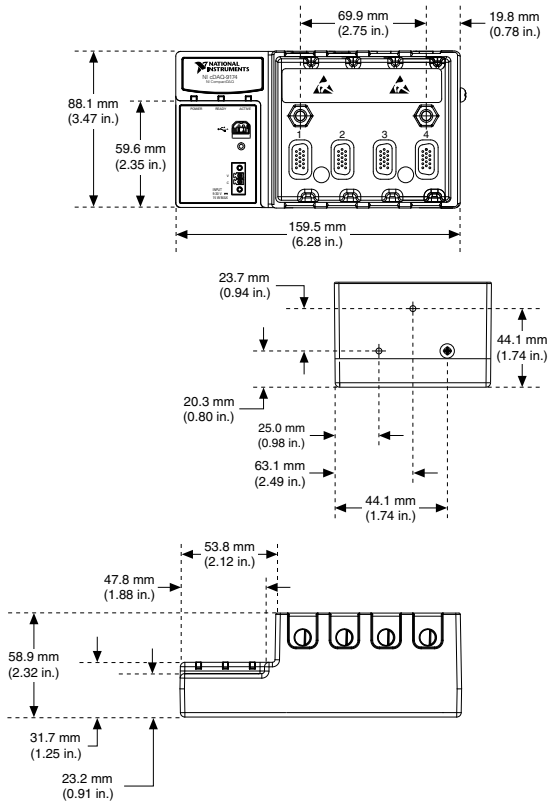
# Physical Characteristics

Weight (unloaded).....Approx. 574 g (20.2 oz)

Dimensions (unloaded).....159.5 mm × 88.1 mm × 58.9 mm  
 (6.28 in. × 3.47 in. × 2.3 in.) Refer to the following figure.

If you need to clean the chassis, wipe it with a dry towel.

**Figure 1. NI cDAQ-9174 Dimensions**



# Environmental

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Operating temperature <sup>7</sup> .....	-20 °C to 55 °C (IEC-60068-2-1 and IEC-60068-2-2)
Storage temperature.....	-40 °C to 85 °C (IEC-600068-2-1 and IEC-60068-2-2)
Ingress protection.....	IP 30
Operating humidity.....	10 to 90% RH, noncondensing (IEC-60068-2-56)
Storage humidity.....	5 to 95% RH, noncondensing (IEC-60068-2-56)
Pollution Degree (IEC 60664).....	2
Maximum altitude.....	5,000 m
Indoor use only.	

# Shock and Vibration

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To meet these specifications, you must panel mount the NI cDAQ-9174 system, use an NI locking USB cable, and affix ferrules to the ends of the terminal lines.

Operational shock.....	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)
Random vibration	
Operating.....	5 to 500 Hz, 0.3 g <sub>rms</sub>
Non-operating.....	5 to 500 Hz, 2.4 g <sub>rms</sub> (Tested in accordance with IEC 60068-2-64. Non-operating test profile exceeds the requirements of MIL PRF-28800F, Class 3.)

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<sup>7</sup> When operating the NI cDAQ-9174 in temperatures below 0 °C, you must use the PS-15 power supply or another power supply rated for below 0 °C.

# Safety

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This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1



**Note** For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

# Electromagnetic Compatibility

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This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions



**Note** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.



**Note** Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.



**Note** For EMC declarations and certifications, refer to the *Online Product Certification* section.

# CE Compliance

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This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

# Online Product Certification

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To obtain product certifications and the DoC for this product, visit [ni.com/certification](https://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.



# Environmental Management

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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 not only to the environment but also to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at [ni.com/environment](http://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.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of the product life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit [ni.com/environment/weee](http://ni.com/environment/weee).

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