

SPECIFICATIONS

NI cDAQ™ -9181

NI CompactDAQ One-Slot Ethernet Chassis

These specifications are for the National Instruments CompactDAQ 9181 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

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

Analog Output

Number of channels supported	
Hardware-timed task	
Onboard regeneration.....	16
Non-regeneration.....	Determined by the C Series I/O module
Non-hardware-timed task.....	Determined by the C Series I/O module
Maximum update rate	
Onboard regeneration.....	1.6 MS/s (multi-channel, aggregate)
Non-regeneration.....	Determined by the C Series I/O module

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

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

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

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
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

Waveform acquisition (DI) FIFO.....	127 samples
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

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

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

Functionality.....	Static digital input, static digital output, timing input, and timing output
Timing output sources ⁴	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

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

Digital Triggers

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

At power-on.....	Module-dependent. Refer to the documentation for each C Series I/O module.
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Network Interface

Network protocols.....	TCP/IP, UDP
Network ports used.....	HTTP:80 (configuration only), TCP:3580; UDP:5353 (configuration only), TCP:5353 (configuration only); TCP:31415; UDP:7865 (configuration only), UDP:8473 (configuration only)
Network IP configuration.....	DHCP + Link-Local, DHCP, Static, Link-Local
High-performance data streams.....	6
Data stream types available.....	Analog input, analog output, digital input, digital output, counter/timer input, counter/timer output, NI-XNET ⁵
Default MTU size.....	1500 bytes

⁵ 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.

Ethernet

Network interface.....	100 Base-TX, full-duplex; 100 Base-TX, half-duplex; 10 Base-T, full-duplex; 10 Base-T, half-duplex
Communication rates.....	10/100 Mbps, auto-negotiated
Maximum cabling distance.....	100 m/segment

Power Requirements



Caution The protection provided by the NI cDAQ-9181 chassis can be impaired if it is used in a manner not described in the *NI cDAQ-918x/919x User Manual*.



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-9181.

Voltage input range.....	9 to 30 V
Maximum required input power ⁶	5 W
Recommended power supply.....	15 W secondary
Power input connector.....	2 positions 3.5 mm pitch mini-combicon screw terminal with screw flanges, Phoenix Contact 1727566
Power input mating connector.....	Sauro CTF020V8, Phoenix Contact 1714977, or equivalent

⁶ Includes maximum 1 W module load per slot across rated temperature and product variations.

Physical Characteristics

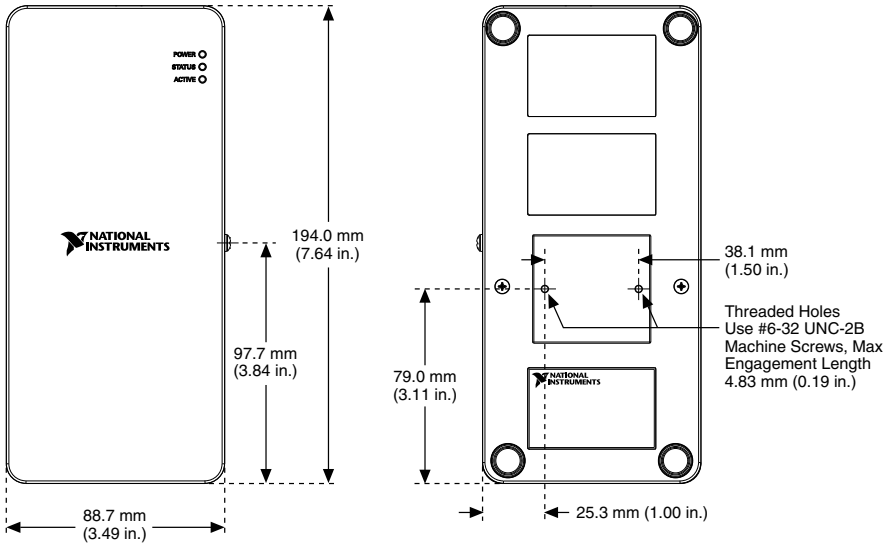
Weight (unloaded).....Approx. 470 g (16.6 oz)

Dimensions (unloaded).....194.0 mm × 88.7 mm × 33.6 mm
 (7.64 in. × 3.49 in. × 1.32 in.) Refer to the following figure.

Torque for power connector screws.....0.4 N · m (3.5 lb · in.)

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

Figure 1. NI cDAQ-9181 Dimensions



Safety Voltages

Connect only voltages that are within these limits.

V terminal to C terminal.....30 V maximum, Measurement Category I

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.



Caution Do not connect the system to signals or use for measurements within Measurement Categories II, III, or IV.

Environmental

Operating temperature.....0 to 55 °C
(IEC-60068-2-1 and IEC-60068-2-2)



Caution To maintain product performance and accuracy specifications when the ambient temperature is between 45 and 55 °C, you must mount the chassis to a metal panel or surface using the screw holes or the panel mount kit. Measure the ambient temperature at each side of the CompactDAQ system 63.5 mm (2.5 in.) from the side and 25.4 mm (1.0 in.) from the rear cover of the system. For further information about mounting configurations, go to ni.com/info and enter the Info Code `cdaqmounting`.

Storage temperature (IEC-60068-2-1.....-10 to 70 °C
and IEC-60068-2-2)

Ingress protection.....IP 30

Operating humidity.....10 to 90% RH, noncondensing
(IEC-60068-2-56)

Storage humidity (IEC-60068-2-56).....5 to 95% RH, noncondensing

Pollution Degree (IEC 60664).....2

Maximum altitude.....5,000 m

Indoor use only.

Hazardous Locations

U.S. (UL).....	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nC IIC T4
Canada (C-UL).....	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, Ex nL IIC T4
Europe (DEMKO).....	Ex nA IIC T4 Gc

Shock and Vibration

To meet these specifications, you must panel mount the NI cDAQ-9181 system 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 _{rms}
Non-operating.....	5 to 500 Hz, 2.4 g _{rms} (Tested in accordance with IEC 60068-2-64. Non-operating test profile exceeds the requirements of MIL PRF-28800F, Class 3.)

Safety

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

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

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

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

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 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. 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.

电子信息产品污染控制管理办法（中国 RoHS）



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