cDAQ™-9181 Specifications

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Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

Characteristics describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- ***Typical*** specifications describe the performance met by a majority of models.
- ***Nominal*** specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are ***Typical*** unless otherwise noted.

Conditions

Specifications are valid at 25 °C unless otherwise noted.

Analog Input

Input FIFO size	127 samples
Maximum sample rate[1]	Determined by the C Series module
Timing accuracy[2][2]	50 ppm of sample rate

1. Performance dependent on type of installed C Series 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 module.

Timing resolution[2]	12.5 ns
Number of channels supported	Determined by the C Series module

Analog Output

Number of channels supported		
Hardware-timed task		
Onboard regeneration	16	
Non-regeneration	Determined by the C Series module	
Non-hardware-timed task	Determined by the C Series module	
Maximum update rate		
Onboard regeneration	1.6 MS/s (multi-channel, aggregate)	
Non-regeneration	Determined by the C Series 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	
Parallel modules	511 samples
Serial modules	63 samples
Waveform generation (DO) FIFO	
Parallel modules	2,047 samples
Serial modules	63 samples
Digital input sample clock frequency	
Streaming to application memory	System-dependent
Finite	0 MHz to 10 MHz
Digital output sample clock frequency	
Streaming from application memory	System-dependent

Regeneration from FIFO	0 MHz to 10 MHz
Finite	0 MHz 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 MHz to 20 MHz

Base clock accuracy	50 ppm
Output frequency	0 MHz 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[3]	Many analog input, analog output, counter, digital input, and digital output timing signals
Timing input frequency	0 MHz to 20 MHz
Timing output frequency	0 MHz to 20 MHz

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

3. Actual available signals are dependent on type of installed C Series module.

Module I/O States

At power-on	Module-dependent. Refer to the documentation for each C Series module.

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[4]
Default MTU size	1500 bytes

4. 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

Safety Voltages

Connect only voltages that are within these limits.

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

Environmental

Operating temperature	0 °C to 55 °C

Notice To maintain product performance and accuracy specifications when the ambient temperature is between 45 and 55 °C, you must mount the chassis horizontally 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	-10 °C to 70 °C
Ingress protection	IP 30
Operating humidity	10% to 90% RH, noncondensing
Storage humidity	5% to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	5,000 m

Shock and Vibration

To meet these specifications, you must direct mount the cDAQ-9181 system and affix ferrules to the ends of the terminal lines.

Operational shock	30 g peak, half-sine, 11 ms pulse
Random vibration	
Operating	5 Hz to 500 Hz,0.3 g_{rms}
Non-operating	5 Hz to 500 Hz,2.4 g_{rms}

Power Requirements

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

Note Sleep mode for C Series modules is not supported in the cDAQ-9181.

Voltage input range	9 V to 30 V
Maximum power consumption[5]	5 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 consuming the maximum allowed power.

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

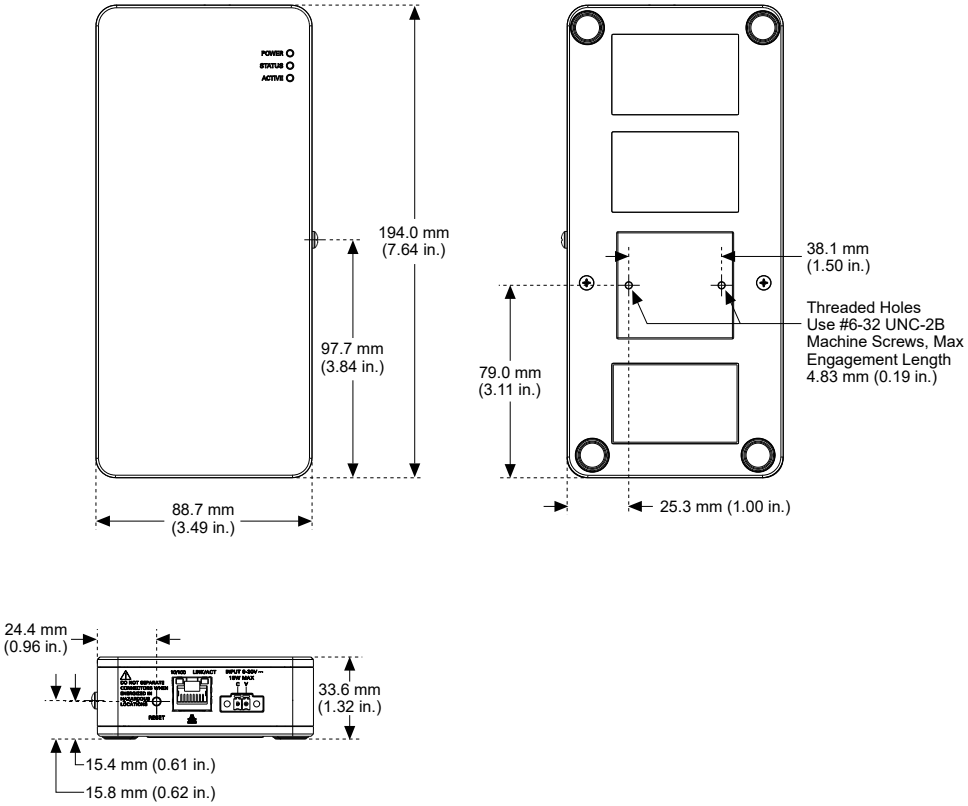
Physical Characteristics

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

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

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.

Figure 1. cDAQ-9181 Dimensions



Power Connector

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.)

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