cDAQ-9177 Specifications

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Contents

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These specifications apply to the cDAQ-9177.

Revision History

Version	Date changed	Description
379136A-01	March 2025	Initial release.

Looking For Something Else?

For information not found in the specifications for your product, such as operating instructions, browse ***Related Information***.

Related information:

- cDAQ-9170/9173/9177 User Manual
- Software and Driver Downloads
- Dimensional Drawings
- Product Certifications
- Letter of Volatility
- Discussion Forums
- NI Learning Center

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**—describes the performance met by a majority of models.

- **Nominal**—describes an attribute that is based on design, conformance testing, or supplemental testing.

Values are ***Typical*** unless otherwise noted.

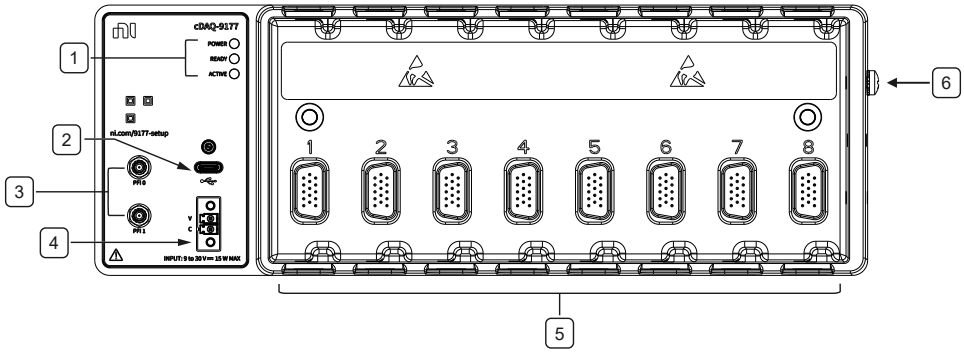
Conditions

Specifications are valid at 25 °C unless otherwise noted.

cDAQ-9177 Front Panel

Refer to the front panel diagram to understand the connectors, LEDs, and other features of the cDAQ-9177.

Figure 2. cDAQ-9177 Front Panel



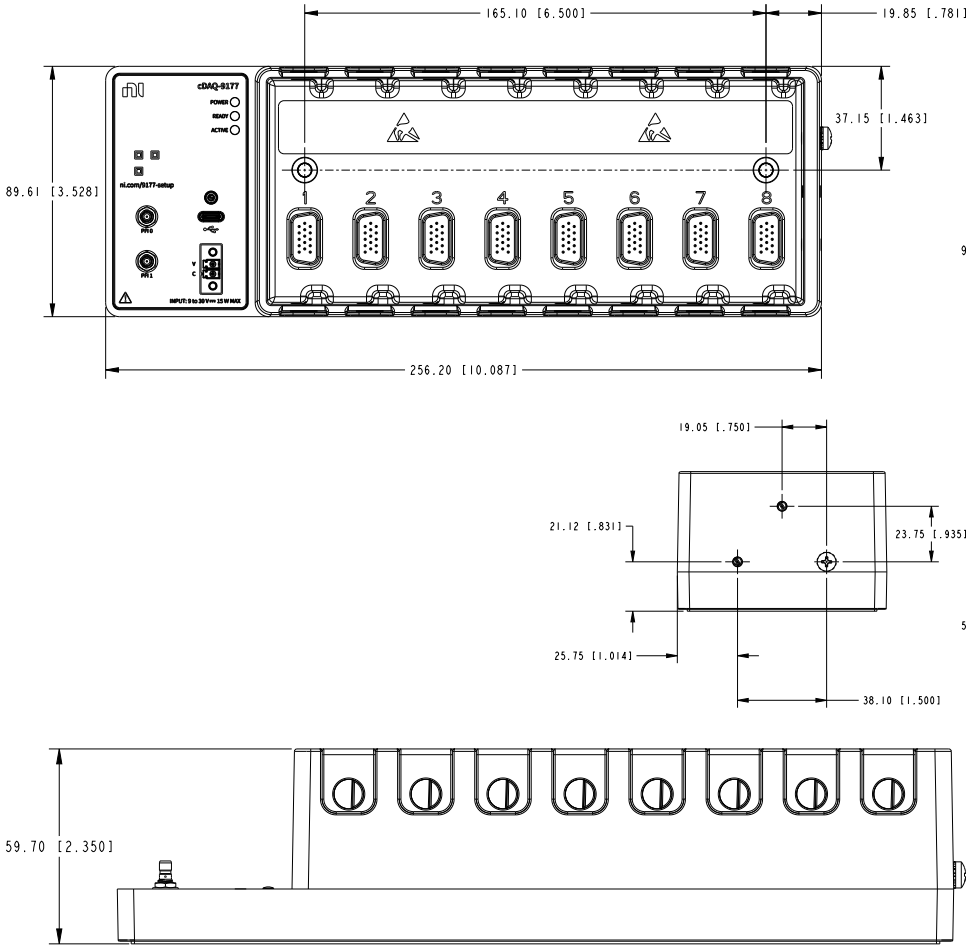
1. POWER, STATUS, and ACTIVE LEDs
2. USB-C Port, with strain relief
3. PFI 0 and PFI 1 SMB Connectors
4. Power Connector
5. Module Slots
6. Chassis Grounding Screw

Physical Characteristics

Weight (unloaded)	924 g (32.59 oz)

Dimensions (unloaded)	256.20 mm × 89.61 mm × 59.70 mm (10.087 in. × 3.528 in. × 2.350 in.)
USB connector securement	
USB securement type	Jackscrew provided on locking USB cable (part number 758787-01 or 769493-01)
Torque for jackscrew	0.41 N · m (3.6 lb · in.)
Chassis ground	
Gauge	1.31 mm^2 (16 AWG) or larger wire
Torque for ground screw	0.76 N · m (6.7 lb · in.)

Figure 3. cDAQ-9177 Dimensions



Analog Input

Table 1. Analog Input

Input FIFO size	127 samples per slot
Maximum sample rate[1]	Determined by the C Series module or modules
Timing accuracy[2]	50 ppm of sample rate
Timing resolution	12.5 ns
Number of channels supported	Determined by the C Series module or modules

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.

Analog Output

Table 2. Number of channels supported (hardware-timed task)

Regeneration	Channels Supported
Onboard regeneration	16
Non-regeneration	Determined by the C Series module or modules

Table 3. Number of channels supported (non-hardware-timed task)

Channels supported	Determined by the C Series module or modules

Table 4. Maximum update rate

Onboard regeneration	1.6 MS/s (multi-channel, aggregate)
Non-regeneration	Determined by the C Series module or modules

Table 5. Analog Output Timing

Timing accuracy	50 ppm of sample rate
Timing resolution	12.5 ns

Table 6. Output FIFO size

Onboard regeneration	8,191 samples shared among channels used
Non-regeneration	127 samples per slot

Table 7. Analog Output Waveform

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

Table 8. Waveform acquisition (DI) FIFO

Parallel modules	127 samples per slot per slot

Table 9. Waveform generation (DO) FIFO

Slots 1 to 4	2,047 samples per slot
Slots 5 to 8	1,023 samples per slot

Note When modules are installed in slots 1 through 4, FIFO is 2,047 samples per slot for all slots. When any module is installed in slots 5 through 8, FIFO is 1,023 samples per slot for all eight slots.

Table 10. Digital input sample clock frequency

Streaming to application memory	System-dependent
Finite	0 MHz to 10 MHz

Table 11. 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

Table 12. Digital waveform timing

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, chassis PFI, analog trigger, many internal signals
FIFO	Dedicated 127-sample FIFO

Frequency Generator

Table 13. Freqency generator

Number of channels	1
Base clocks[3]	20 MHz, 10 MHz, 100 kHz
Divisors	1 to 16 (integers)
Base clock accuracy	50 ppm
Output	Any chassis PFI or module PFI terminal

Module PFI Characteristics

Table 14. 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 MHz to 20 MHz
Timing output frequency	0 MHz to 20 MHz

Chassis PFI Characteristics

Table 15. Chassis PFI Characteristics

Maximum input or output frequency	1 MHz
Cable length	3 m (10 ft)
Cable impedance	50 Ω
PFI 0, PFI 1	SMB
Power-on state	High impedance

3. Base clocks can be synchronized with other chassis using the network synchronization feature.
4. Actual available signals are dependent on type of installed C Series module.

Digital Triggers

Table 16. Digital triggers

Source	Any chassis PFI or 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 module.

Note The cDAQ-9177 may revert the input/output of the modules to their power-on state when the USB cable is removed.

Power Requirements

Caution You must use a National Electric Code (NEC) Class 2 power source with the cDAQ-9177 chassis.

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-9177.

Input voltage	9 V to 30 V

range	
Maximum required input power	15 W
Power input connector	2 positions 3.5 mm pitch pluggable screw terminal with screw locks similar to Sauro CTMH020F8
Power input mating connector	Sauro CTF020V8, Phoenix Contact 1714977, or equivalent
Power consumption from USB, 4.10 V to 5.25 V	500 µA maximum

Bus Interface

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

Note 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.

Note If you are connecting the cDAQ-9177 to a USB hub, the hub must be externally powered.

Environmental Characteristics

Temperature	
Operating	-20 °C to 55 °C
Storage	-40 °C to 85 °C
Humidity	
Operating	10% to 90% RH, noncondensing
Storage	5% to 95% RH, noncondensing
Ingress Protection	IP 40
Pollution Degree	2
Maximum altitude	5,000 m

Shock and Vibration

To meet these specifications, you must panel mount the cDAQ-9177 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
Random vibration	
Operating	5 to 500 Hz, 0.3g_{rms}
Non-operating	5 to 500 Hz, 2.4g_{rms}