cDAQ-9178

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NI cDAQ-9178 Specifications

These specifications are for the National Instruments CompactDAQ 9178 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 per slot
Maximum sample rate[1]	Determined by the C Series I/O module or modules
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 or modules

Analog Output

Number of channels supported	
Hardware-timed task	
Onboard regeneration	16

Non-regeneration	Determined by the C Series I/O module or modules
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

Waveform acquisition (DI) FIFO	127 samples per slot
Waveform generation (DO) FIFO	
Slots 1 to 4	2,047 samples
Slots 5 to 8	1,023 samples

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.

Digital input sample clock frequency	
Streaming to application memory	System-dependent
Finite	0 to 10 MHz
Digital output sample clock frequency	
Streaming from application memory	System-dependent
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	Any module PFI, chassis PFI BNC, analog trigger, many internal signals

inputs	
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 chassis PFI BNC or 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

Chassis PFI Characteristics

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

Table 1. Input/Output Voltage Protection

Voltage	Minimum	Maximum
Input	-20 V	25 V
Output	-15 V	20 V

Maximum operating conditions[5]	
I_{OL} output low current	8 mA maximum
I_{OH} output high current	-8 mA maximum

Table 2. DC Input Characteristics

Voltage	Minimum	Maximum
Positive going threshold	1.43 V	2.28 V
Negative going threshold	0.86 V	1.53 V
Hysteresis	0.48 V	0.87 V

Table 3. DC Output Characteristics

Voltage	Conditions	Minimum	Maximum
High	-	-	5.25 V
	Sourcing 100 µA	4.65 V	-
	Sourcing 2 mA	3.60 V	-
	Sourcing 3.5 mA	3.44 V	-
Low	Sinking 100 µA	-	0.10 V
	Sinking 2 mA	-	0.64 V
	Sinking 3.5 mA	-	0.80 V

Digital Triggers

Source	Any chassis PFI BNC 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 I/O module.

Power Requirements

Caution You must use a National Electric Code (NEC) Class 2 power source with the NI cDAQ-9178 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-9178.

Input voltage range	9 to 30 V
Maximum required input power[6]	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	Sauro CTF020V8, Phoenix Contact 1714977, or equivalent

connector	
Power consumption from USB, 4.10 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[7]

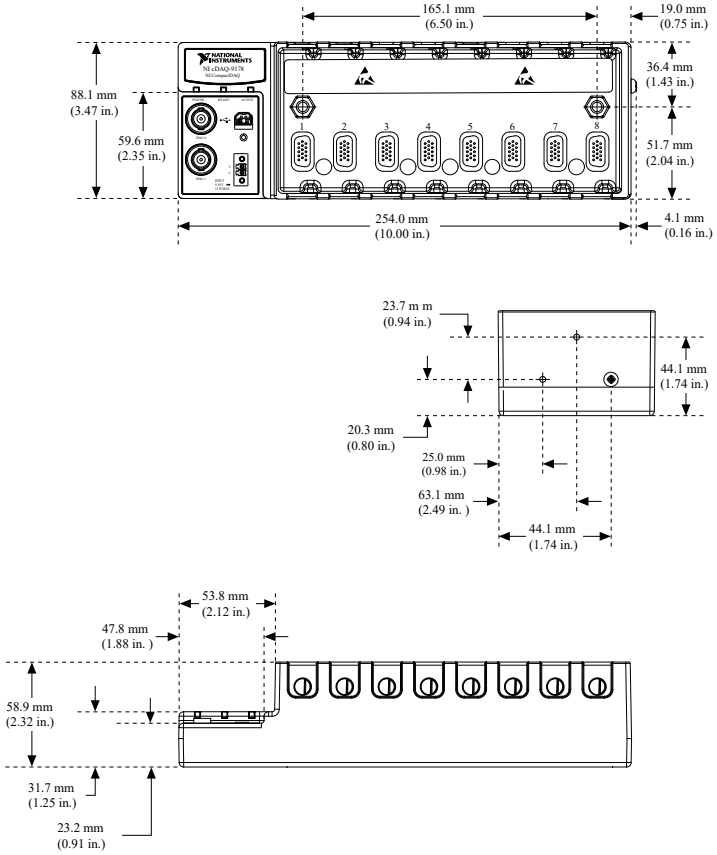
Note If you are connecting the NI cDAQ-9178 chassis to a USB hub, the hub must be externally powered.

Physical Characteristics

Weight (unloaded)	Approx. 878 g (31.0 oz)
Dimensions (unloaded)	254.0 mm × 88.1 mm × 58.9 mm (10 in. x 3.47 in. × 1.31 in.) Refer to the following figure.

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

Figure 1. NI cDAQ-9178 Dimensions



Environmental

Operating temperature[8]	-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

To meet these specifications, you must panel mount the NI cDAQ-9178 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_{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）



中国客户 National Instruments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National Instruments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.)

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