

# CompactDAQ Sound and Vibration Measurement Hardware

Modular Data Acquisition Options for measuring sound and vibration sensors such as accelerometers and microphones.

## Use this hardware for:

- Quick sound and vibration logging
- System-level validation
- Frequency testing
- Measurement and acoustic characterization



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# CompactDAQ Sound and Vibration Measurement Hardware

This is a high-level comparison. If there are certain specifications you need to meet your application, please review the datasheet for each module.

## Sound and Vibration Sensor Measurement C Series Modules

C Series modules for sound and vibration sensors. Includes built-in signal conditioning.

System Need	Model	Image	Part number	Front Connection Type*	Channels	Sample Rate	IEPE Excitation
Lowest Module Cost	NI-9230		784396-01	BNC	3	12.8 kS/s/ch	4 mA
			783824-01	Screw Terminal			
High Channel Count	NI-9231**		783610-01	10-32 Coaxial	8	51.2 kS/s/ch	2 mA
Highest sample rate and excitation	NI-9232		784397-01	BNC	3	102.4 kS/s/ch	4 mA
			782000-01	Screw Terminal			
General purpose; popular	NI-9234**		779680-01	BNC	4	51.2 kS/s/ch	2 mA
Lower cost for high sample rate	NI-9250		783827-01	BNC	2	102.4 kS/s/ch	2 mA

\*Some modules have multiple options based on how you can connect sensors – [Learn More](#)

\*\*This module is part of a CompactDAQ Measurement Bundle – [View Bundle Options](#)

## Complete Your Test System

You can either build your own system or purchase a pre-configured hardware bundle ([view below](#)) and add relevant software. Along with the modules for measuring sound and vibration, consider the following to complete your test system:



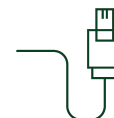
### CompactDAQ Chassis

Modules need to be in a CompactDAQ Chassis to have power and send data.



### Software

The software will collect, store, and analyze the data. NI has options based on your testing needs.



### Accessories

Cables, mounts, or other accessories may be helpful or needed for your system.

## Sensor Connectivity – Module Front Connection Type Options

Some modules have various options based on how you can connect sensors (Front Connection Type). The model number will be the same but will have a different part number based on the front connector type.

- Ideal for low channel count as they do not provide a quick multi-channel connect/disconnect solution.
  - **Spring Terminals:** Connect bare-wired sensors via a spring locking mechanism.
  - **Screw Terminal:** Connect bare-wired sensors by tightening a screw.
- Can be good for quick multi-channel connect/disconnect solutions.
  - **D-SUB:** Contains two or more parallel rows of pins or sockets surrounded by a D-shaped metal. Widely used for serial communication. **Note:** NI offers D-SUB to Screw Terminal accessories.
- Ideal for single-ended measurements
  - **BNC:** Two-pin coupling nut twist connector. It doesn't provide a true differential measurement, which requires three pins.
- Multi-connector standards
  - **LEMO:** This push/pull connector works with several connector standards to offer high-quality connections with a variety of options so you can achieve high measurement quality.
- Specialized Accelerometer/Microphone Connector for Space Savings
  - **10-32 Coaxial:** Also called "Microdot," uses two pins for the connection with a threaded collar to screw the cable in place.

## CompactDAQ Sound and Vibration Measurement Bundles

Bundles include a CompactDAQ Chassis, C Series Module(s), and any relevant accessories. Switch out or add more C Series measurement modules and pair them with compatible DAQ software for a complete system.

Needs	Model	Image	Part Number	Module	Chassis	Empty Slots
Space saving and high-channel-count	cDAQ-SV1100		865665-01	NI-9230	cDAQ-9171	0
General purpose; popular measurement module	cDAQ-SV1101		865664-01	NI-9234	cDAQ-9171	0
General purpose + Expandable	cDAQ-SV4202		868017-01	NI-9234 (x2)	cDAQ-9174	2*

\*You can add other measurement modules for your tests – [View Popular C Series Measurement Modules](#)

# CompactDAQ Chassis Options and Comparisons





NI C Series modules need to be inside a chassis to collect and log data.

## Chassis Considerations

- What bus communication do you need (**USB or Ethernet**)?
- How many different measurement modules will you need in a specific location (**Slot Count**)?
- Do you need an **onboard trigger**?
- What is the **temperature range of the environment** you will be testing in?
- Is **synchronization** of measurements across multiple test systems a test requirement?




## USB Bus Connected Chassis

USB is practical for portable measurements and convenient because connectivity is easy and ubiquitous. USB devices are not recommended for closed-loop control applications.

Model	Image	Part number	Slot Count	Onboard Trigger	Synchronization Enabled	Operating Temperature Range
cDAQ-9171**		781425-01	1	No	No	-20 °C to 55 °C
cDAQ-917**		781157-01	4			
cDAQ-9178		781156-01	8	Yes		
cDAQ-9179		783597-01	14			

## Ethernet Bus Connected Chassis

Ethernet is ideal for remote and distributed measurements, particularly those that extend beyond the reach of a 5 m USB cable.

Model	Image	Part number	Slot Count	Onboard Trigger	Synchronization Enabled	Operating Temperature Range
cDAQ-9181		781496-01	1	No	No	0 °C to 55 °C
cDAQ-9185		785064-01	4	Yes	Yes	-40 °C to 70 °C
cDAQ-9189		785065-01	8			

\*\*This chassis is part of a CompactDAQ Measurement Bundle – [Learn More](#)

## Popular C Series Measurement Modules - Quick Selection Guide

This section lists some of the most popular C Series measurement modules by category so you can quickly match your needs to the module.

### Temperature (RTD) Sensor Measurement C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here. General purpose	8-Ch, 400 S/s, 0 $\Omega$ – 400 $\Omega$ , PT100	NI-9216	RJ50, D- Sub

### Temperature (Thermocouple) Sensor Measurement C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here. General purpose	16-ch	NI-9213*	Spring Terminal
More accuracy (0.37 $^{\circ}$ C benchmark)	More accurate version of NI-9213	NI-9214	Spring Terminal
Ch-ch Isolation or TC minijack connectors	8-channel, ch-ch iso, mini-TC jacks	NI-9212	TC minijacks, screw terminals

### Sound and Vibration Sensor Measurement C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here.	4-ch, 51.2 kS/s/ch, $\pm$ 5 V	NI-9234*	BNC
2x Faster Sample Rate. 30 V range	3-ch, 102.4 kS/s/ch, $\pm$ 30 V	NI-9232	Screw Terminal, BNC
More channels/module	8-ch, 51.2 kS/s/ch, $\pm$ 5 V	NI-9231*	10-32 Coaxial Jack
Lower Cost	12.8 kS/s/ch version of NI-9232	NI-9230	Screw Terminal, BNC

### Bridge, Strain, Load, Pressure, Torque Sensor Measurement C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here. General purpose. 4-ch,	4-ch, 50 kS/s/ch, 1/4, 1/2, Full-bridge	NI-9237*	RJ50, D-Sub
More than 2x 120 Ohm 1/4 bridge sensors	8-channels	NI-9235	Spring Terminal

### Multi-Sensor Measurement C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here. General purpose.	4-ch, ch-ch iso, 100 S/s/ch, strain gages, RTD, Thermocouple, Load Cell, 1/2-, 1/4-, Full-bridge completion	NI-9219*	Spring Terminals

\*This module is part of a CompactDAQ Measurement Bundle

## Current Input C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here. General purpose	±20 mA, 8-ch, 200 kS/s	NI-9203	Spring Terminal, Screw Terminal
More ch/module, 24-bit, 50/60 Hz rejection	±20 mA, 16-ch, 500 S/s	NI-9208	Spring Terminal, D-Sub
Simultaneous sampling and LED indicators	±20 mA, 8-ch, 200 kS/s	NI-9253	Spring Terminal

## Digital Input/Output C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Industrial DIO	32-ch (16I/16O), 12 V/24 V industrial level	NI-9375	D-Sub, Spring Terminal
High Channel-count 24 V DO 3	32-ch, 12 V/24 V industrial level DO	NI-9476	D-Sub, Spring Terminal
TTL	8-ch, 5 V TTL	NI-9401*	D-Sub
High Channel-count TTL	32-ch, 5 V TTL	NI-9403	D-Sub
High Channel-count 24 V DI	32-ch, 12 V/24 V industrial level DI	NI-9425	D-Sub, Spring Terminal
Relay	250 VAC, 60 VDC, 4 relays	NI-9482	Screw Terminal, Spring Terminal
Industrial DI	8-ch, 12 V/24 V DI	NI-9421	D-Sub, Spring Terminal, Screw Terminal
Industrial DO	8-ch, 12 V/24 V DO	NI-9472	D-Sub, Spring Terminal, Screw Terminal

## Voltage Output C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here. General purpose.	±10 V, 16-ch, 25 kS/s/ch	NI-9264	D-Sub, Spring Terminal
Lower cost and channels. Faster.	±10 V, 4-ch, 100 kS/s/ch	NI-9263	Spring Terminal, Screw Terminal
Ch-ch Isolated Output, 40 V range.	±10 V or ±40 V, 4-ch, 100 kS/s/ch	NI-9269*	Screw Terminal

\*This module is part of a CompactDAQ Measurement Bundle

## Voltage Input Measurement C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Start here. General purpose.	±10 V, 16-ch DI, 32-ch SE, 16-bit, 250 kS mux, gain settings	NI-9205*	D-Sub, Spring Terminal
Faster rate. Still high-density.	±10 V, 16-ch, 100 kS/s/ch simultaneous. No gain.	NI-9220*	D-Sub, Spring Terminal
24-bit resolution. 250 V ch-ch isolation.	±10 V, 4-ch, 50 kS/s/ch	NI-9239	Screw Terminal, BNC
60 V input range	±60 V version of NI-9239	NI-9229	Screw Terminal, BNC
Lowest cost simultaneous sampling	±10 V, 4-ch, 100 kS/s/ch	NI-9215*	Screw Terminal, Spring Terminal
Highest-speed simultaneous sampling	±10 V, 4-ch, 1 MS/s/ch	NI-9223	Screw Terminal, BNC
Medium speed. Medium cost.	±10 V, 4-ch, 500 kS/s/ch	NI-9222	Screw Terminal, BNC
Selectable filter, noise rejection	±10 V, 16-ch, 24-bit, 10 kS/s/ch	NI-9202	D-Sub, Spring Terminal
Digitizer functionality	±20 MS/s/ch digitizer. 14-bit. NI	NI-9775	BNC
Low cost, high-speed 12-bit	±10 V, 8-ch, 12-bit	NI-9201	D-Sub, Screw Terminal, Spring Terminal

## Power C Series Modules

Test System Need	Module Specifications	Module	Front Connection Options
Voltage: start here	3-ph 250 VAC L-N (400 VAC L-L) 50 kS/s/ch	NI-9242	Screw Terminal
Voltage: 480 VAC	3-ph 400 VAC L-N (800 VAC L-L) 50 kS/s/ch	NI-9244	Screw Terminal
Voltage: ch-ch iso Voltage	3 channels, 300 V Pk, 50 kS/s/ch	NI-9225	Screw Terminal
Current Low Voltage Transformer input	Voltage module that connects to 0.33 V CTs	NI-9238	Screw Terminal
Current Low Voltage Transformer input	Voltage module that connects to 0.33 V CTs	NI-9246	Screw Terminal
Current high accuracy, low range	Built-in shunt, 5 A RMS input	NI-9246	Screw Terminal

\*This module is part of a CompactDAQ Measurement Bundle

# Improve Test Performance with NI Software for CompactDAQ

## FlexLogger: No-code or out-of-the-box data logging

- **Configure** quick tests with alarms, test properties, and real-time data displays
- Simplify **sensor measurement** with sensor-specific templates
- **Log test results** to .tdms or .csv files
- **Add calculations** for simple math, filtering, Boolean logic, and more
- **Review data** with an included interactive TDMS file viewer

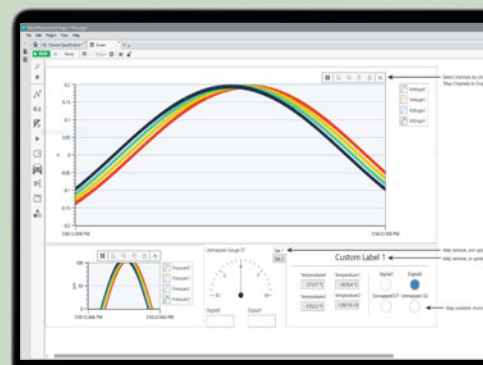
## LabVIEW: Control multiple test systems and more analysis

- **Acquire data** from NI hardware, 3rd party instruments, and many other protocols
- **Create interactive UIs** for monitoring and control.
- **Process** with standard math, probability, and statistical functions.
- **Integrate code** written in Python, C/C++, .NET, and MathWorks MATLAB® software.
- **Save data** to .csv, .tdms, or any custom-defined binary file

## NI DAQmx Driver: Develop with Your Preferred Programming Language

- Python
- C, C+, C#
- .NET
- MATLAB® (Contact MathWorks® for the Data Acquisition Toolbox)

\*MATLAB is a registered trademark of The MathWorks, Inc.



“FlexLogger makes it easier to troubleshoot and verify that the raw data from different sensors are correct before I start my test. This helps shorten test development by saving time typically wasted on redoing configurations.”

- Andy Tarman,  
Lab Test Engineer  
CNH Industrial

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