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PRODUCT BROCHURE

NI Multifunction DAQ

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Overview of NI Multifunction DAQ Devices

As an industry leader in PCI/PCI Express, PXI, and USB DAQ devices for decades, NI gives you the hardware and software you need for quality measurement. Use our selection of premium hardware to say "yes" to that good idea you have to make a better product or drive your research forward.

The following product families are featured in this brochure:

Multifunction I/O devices include a combination of ±10 V input/output, digital input/output, and counters on the same device. These are great multipurpose measurement devices with a ton of flexibility.

Analog output devices have several channels that generate ±10 V signals at up to 1 MS/s for waveform generation and signal simulation.

Counter/timer devices include multiple counters on a single device for more PWM signals, quadrature encoders, or frequency counters.

Digital I/O devices offer more industrial features such as higher voltage-level support, more current drive, channel-channel isolation, programmable start-up states, and filtering.

Why Choose NI DAQ Hardware?

NI DAQ hardware is designed and tested to deliver high-quality data from sensors and electrical signals. Only NI combines quality measurement hardware with a complete selection of test and measurement software so that engineers can dominate their measurement tasks. NI hardware is:

Software-Defined—From free logging software to development support using LabVIEW, Python, or C/C++, with NI DAQ hardware, you decide which method is best for obtaining the data you need.

Quality—Don't worry about repeating expensive tests or slowing manufacturing. With NI quality inherent in every device, you can have complete confidence in datasheets, calibration cycles, and measurement accuracy.

Leading DAQ Technology—Complex designs need high-speed measurements, synchronization, streaming data, and more to ensure product quality while innovating.

Future-Proof and Flexible—Support thousands of measurement combinations and incorporate more than 100 PXI instruments to solve your test challenges. NI helps you scale your test to keep up with change and growth.

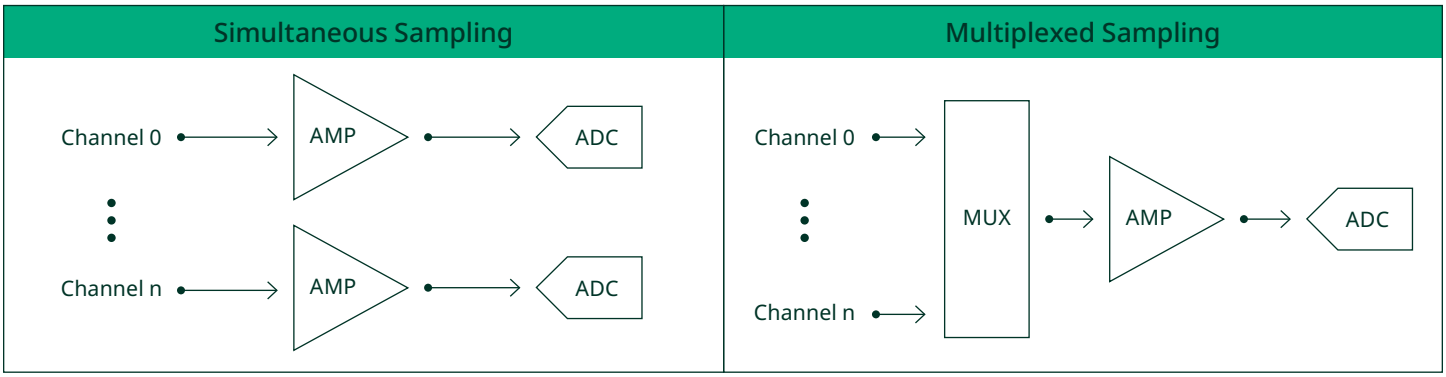
NI DAQ Device Key Features

High-speed measurement with options for simultaneous measurement paths

Engineers select NI devices because of the quality required for high-speed measurements. NI DAQ devices have input rates up to 3.8 MS/s (million samples per second).

Many NI DAQ devices have simultaneous ADC architectures, meaning that each channel (signal path) has its own analog-to-digital converter. This design improves measurement quality and provides synchronized data for time correlation, important for tests like stimulus/response, modal analysis, impact, electronics power characterization, beam forming, and more.

A simultaneous vs. multiplexed architecture is a cost vs. quality decision. Learn more from the KnowledgeBase article, **"How Do I Eliminate Ghosting from My Measurements?"**. For high-channel systems with synchronized, simultaneous channels, NI recommends Ethernet CompactDAQ systems or PXI systems.



Synchronize with Advanced Timing Controllers and Counters

Several NI DAQ devices include a system timing controller for precise, hardware-timed operations across analog and digital subsystems. Internal clocks are derived from a 100 MHz timebase and drive counters, pulse generation, event counting, quadrature encoder input, PWM output, triggering, and more.

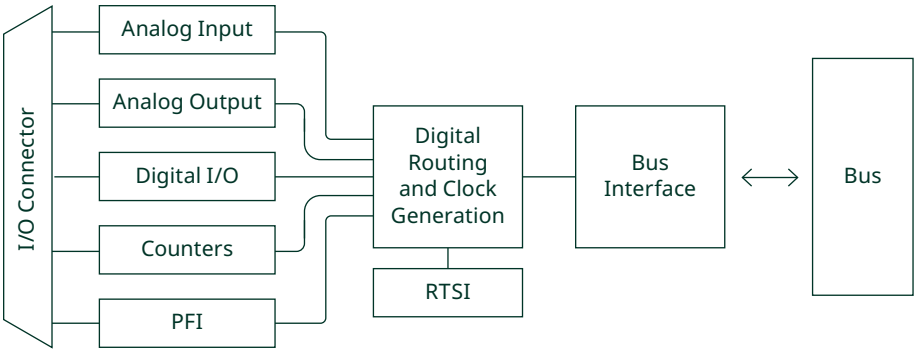
NI Counter Functions and Benefits

Function	Benefit
100 MHz Timebase	Improved timing precision on derived clocks and triggers
Event Counting	Buffered event counting and timestamping for high-speed digital signal analysis
Pulse Generation	Hardware-timed single-point and waveform generation for real-time control loops
Quadrature Encoder Input	Supports quadrature encoder input for motion control applications
PWM Output	Pulse-width modulation output for precise control of actuators and other devices
Synchronization Support	Multidevice synchronization using NI-TClk and PXI trigger lines
Triggering	Start, pause, and reference triggers
Digital Waveforms	High-speed digital waveform generation and acquisition
Clock Routing	Route many internal clocks to external pins to synchronize/ coordinate with other instruments or DAQ devices

Note: Not all features are available on all devices; see user manual and specifications documents to confirm feature inclusion.

Dedicated Timing Engines for Measurement Tasks

Use the DAQmx API to address analog, digital, and counter subsystems separately for simplified programming, or synchronize them together for more complicated test systems. This flexibility scales development effort with the complexity of the system so you can start small, simple, and fast, and keep the option to add complexity when needed. NI FlexLogger™ DAQ software manages this complexity under the hood.



NI multifunction DAQ devices have advanced timing and clock routing so software development can scale from simple to complex.

Do More with Digital

NI's family of digital I/O devices include features such as:

- Programmable power-up states
- I/O watchdogs
- Software-selectable filtering
- Higher current drives for solid-state relays
- High-speed frequency measurement
- Bank and channel-channel isolation options
- Port-selectable input/output functionality
- Up to 60 V, 2 A digital output lines

Confidence in Your Measurements with Built-In Calibration

Whether you're deploying in a lab or a field environment, NI's calibration architecture ensures your data remains trustworthy and traceable. NI multifunction DAQ devices are engineered for long-term measurement accuracy with robust calibration support, including onboard calibration technology, sometimes referred to as "M-CAL," for self-calibration. Key benefits include:

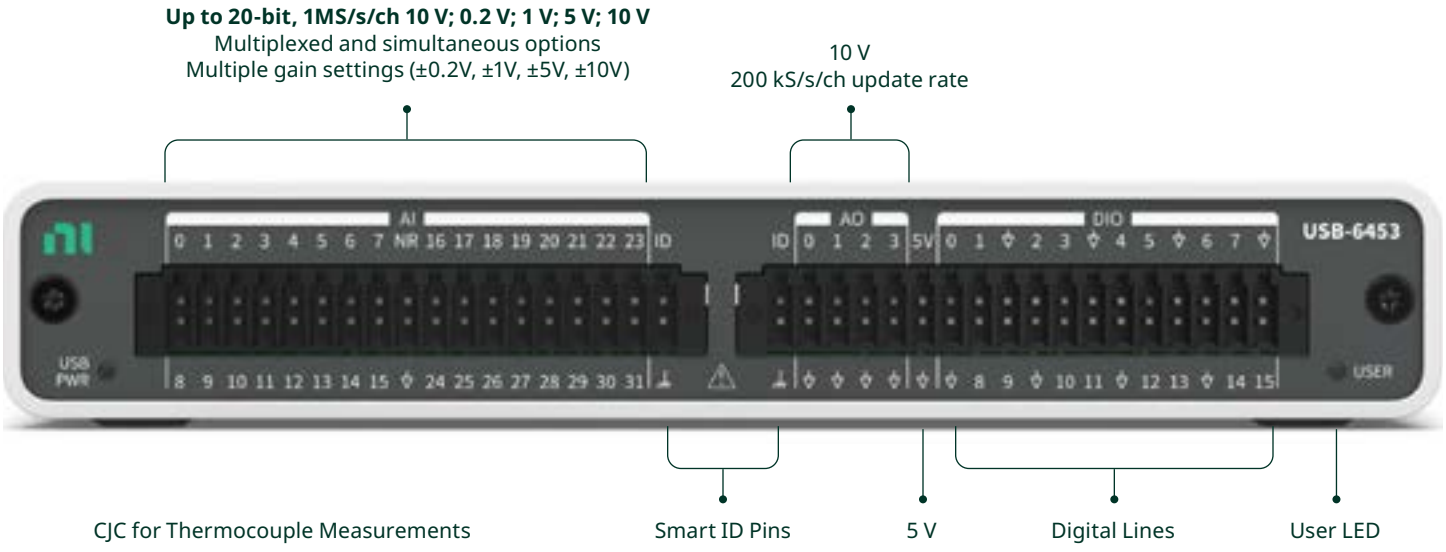
On-Device Self-Calibration: Maintain measurement accuracy over time with automated, software-triggered calibration routines.

Temperature-Aware Compensation: Many NI DAQ devices continuously monitor internal temperature and adjust calibration coefficients in real time.

Longer Calibration Cycles: Reduce maintenance costs by calibrating less often. NI's latest DAQ hardware releases have accuracy calculations for two- and 10-year calibration intervals. See the accuracy table in device specifications for calibration interval.

Factory and External Calibration Support: Many devices ship with NIST-traceable factory calibration and support external calibration for compliance with ISO 17025 and other standards.

mioDAQ Features (Models USB-6421, -6423, -6451, -6453)



NI mioDAQ multifunction I/O devices have features not found in other NI DAQ devices:

- Flexible DIO lines—Independently set each pin to input or output, or route to one of the four counters. Set the threshold for all pins to values of 5 V, 3.3 V, 2.5 V, or 1.8 V
- Smart ID pin—Use mioDAQ to read/write from an EEPROM in your cable/connector to store configuration information, operator instructions, or DUT information
- Programmable user LED

What You Can Do with Multifunction DAQ Devices

The ±10 V input/output and TTL digital signal ranges cover a large variety of data acquisition needs. Many of the ±10 V input channels have gain/amplification capability so you can set the measurement range to ±0.200 V for more accurate low-voltage signal measurements.

Measure

- ±10 V signals at up to 20-bit resolution
- Sensors that output ±10 V
- High-speed voltage signals up to 4,000,000 samples/s/ch.
- Voltage drops across a shunt resistor for current measurement
- Battery cell voltages (±10 V peak cell measurement)
- Power rails on USB/battery-powered electronic boards (PCBs)
- Pulse and event counting
- Digital
- Quadrature encoder
- String pots, line pots
- Rotary potentiometers
- Low-voltage current sensors
- Low-voltage potential transformers

Generate and Control

- Voltage output (±10 V) at up to 1MS/s
- Digital output (TTL) at up to 60 V, 2 A
- External relay (control with digital lines)
- Generate pulse-width modulated signals
- Simulate sensors/signals
- Connect to LEDs

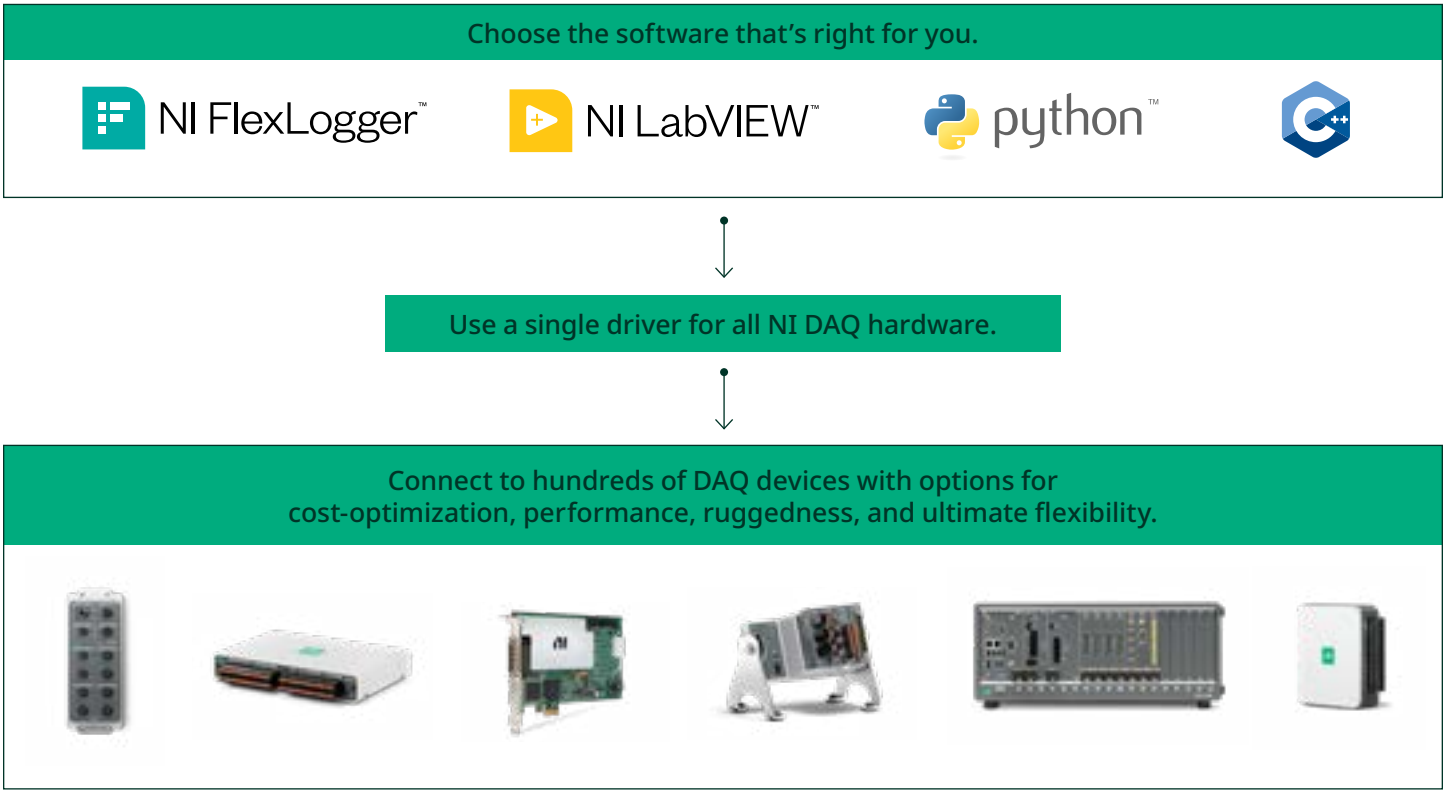
Other Needs

- For higher-input-range options, choose CompactDAQ module NI-9225, NI-9242/44, or PXIe-4310
- For higher-resolution measurements of low-voltage signals, check out PXIe-4309 or NI's catalog of PXI-based DMMs for precision voltage measurements
- For a more rugged system, direct sensor coverage, and more input resolution options, consider a CompactDAQ system
- For waterproof, ultrarugged DAQ hardware, choose NI FieldDAQ™ hardware

One Powerful Software Driver for All NI DAQ Hardware

Connect NI's entire catalog of hardware with some of the best documented software support in the industry so you can be confident that you can measure what you want using the software you want.

NI knows how much you invest in software, whether it's learning how to use application software or developing custom test software. Use the NI-DAQmx driver to keep your software investment as you move between various hardware in the catalog. The API call for a 10 V measurement on a pocket-sized USB device is the same API call for a high-resolution, high-speed measurement in a PXI system.

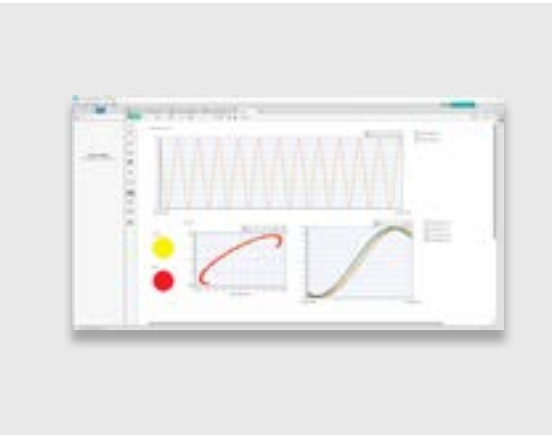


Keep your software investment as your measurement requirements change and expand.

Compare NI DAQ Software Options

	FlexLogger Lite	LabVIEW	LabVIEW+ Suite
OS Support	Windows	Windows, Linux[1]	Windows, Linux
Hardware Compatibility			
NI DAQ hardware	✓[2]	✓	✓
Other NI hardware	—	✓	✓
Other vendor devices	—	✓	✓
Development			
Native graphical programming	—	✓	✓
Multithreaded code execution	—	✓	✓
Code debugging	—	✓	✓
Analog output waveform generation	—	✓	✓
Create user interfaces with pre-built data display elements	✓	✓	✓
Analysis and Signal Processing			
Standard math functions, probability, and statistics	—	✓	✓
Additional analysis and signal processing functions, including linear algebra, curve fitting, signal conditioning, wavelet analysis, and more	—	✓	✓
Advanced analysis functions, including regression, order analysis, and more	—	—	✓
Software Interoperability			
Integrate Python, C/C++, .NET, or MathWorks® MATLAB® software code	—	✓	✓
Test System Development			
Create and edit test sequences and create deployable test systems	—	—	✓
Configure and capture data from NI PXI instruments	—	✓	✓
Accelerate and automate measurement data insights with ready-to-use test data visualization, processing, and reporting tools	—	—	✓
Create web applications	—	—	✓

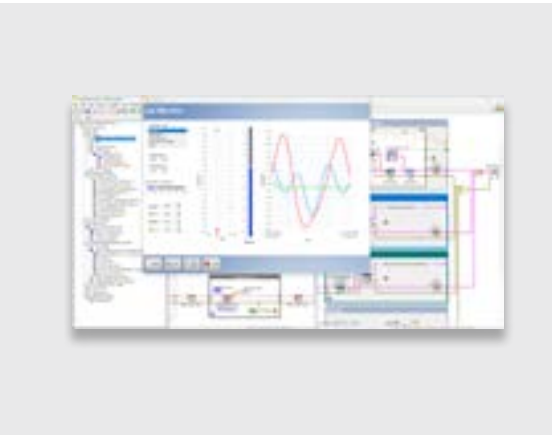
[1] Linux is not supported on LabVIEW Base edition.
[2] FlexLogger supported hardware (subset of NI-DAQmx supported hardware).



NI FlexLogger

FlexLogger enables quick sensor configuration and mixed signal data logging—no programming required. FlexLogger comes in a full-featured and a free Lite edition.

Learn more about FlexLogger



NI LabVIEW

LabVIEW is a graphical programming environment with unique productivity accelerators for developing test and measurement systems. With graphical programming, engineering-specific analysis functions, and an integrated user interface, LabVIEW has what you need to build automated test systems, fast.

Learn more about LabVIEW

NI LabVIEW+ Suite

The LabVIEW+ Suite is a collection of powerful tools for test professionals involved in electronic and electromechanical testing. Comprehensive and versatile, LabVIEW+ helps engineers optimize every part of their workflow. The LabVIEW+ Suite includes LabVIEW, FlexLogger, and the following software:

- NI TestStand for creating and editing test sequences and building deployable test systems
- NI InstrumentStudio™ software for interactive PXI measurements
- NI DIAdem for instant data visualization plus automated analysis and reporting

Learn more about LabVIEW+ Suite

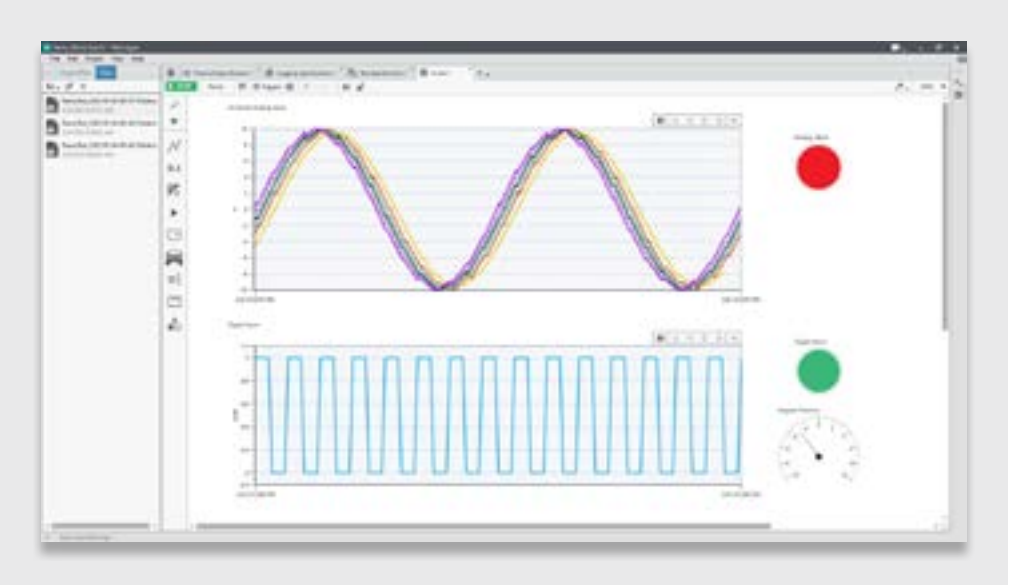
NI DAQ for Linux

See the NI Platform on Linux Desktop User Manual and NI Hardware and Software Operating System Compatibility for information regarding hardware support and Linux OS compatibility.

Application Software Included

Use FlexLogger Lite with your NI DAQ hardware to configure measurements, build a custom real-time display, and log data in minutes. Upgrade FlexLogger to unlock the plug-in repository, triggering, test operator mode, redundant log files, and more. FlexLogger works with high-speed, low-speed, voltage, digital, and sensor signals.

Need something custom? Use LabVIEW or Python to develop a custom plug-in for FlexLogger to get the special analysis, third-party hardware data, or file formatting options you need for your logging or test application.



Customize real-time displays in FlexLogger with live data editing so you can interact with and explore your measurements.

NI DAQ for OEM Applications

NI empowers OEMs with cutting-edge hardware and software solutions. Several NI DAQ devices are available in OEM board-only kits with IDC connectors. Available models include:

- USB-6501 (Digital I/O)
- USB-6001 (Entry-level multifunction)
- USB-6002 (Entry-level multifunction)
- USB-6421 (NI mioDAQ)
- USB-6423 (NI mioDAQ)
- USB-6451 (NI mioDAQ)
- USB-6453 (NI mioDAQ)

Multifunction DAQ Device Product Selection

NI DAQ devices for ±10 V input, output, and digital I/O are sorted by how they connect to a computer: USB, PCI Express, and PXI, and by product family.

The table below lists common abbreviations used throughout the product selection tables.

Abbreviation	Meaning
A/I or A/O	Analog input or analog output.
DI/SE	An analog input channel configuration setting. DI is differential mode, with two pins per measurement—a positive and a negative. SE is single-ended, with one pin used for the signal and a shared reference pin (or ground) for the other.
Sample Rate	How many times per second a measurement point is taken.
Update Rate	For analog output channels, how many times per second the device can update the channel with a new value.
DIO	Digital input/output. Devices typically contain 5 V/TTL logic pins.
Absolute Accuracy	Maximum uncertainty based on value of signal measurement, noise, and time/temp deviation from last calibration. See specifications for more.
Counters	Number of counter subsystems on a device; for example, four counters to measure four quadrature encoders at once.
PCI/PCI Express	Peripheral Component Interconnect (PCI) is a communication bus used for communication between computer components on a motherboard. PCI Express is the latest version in modern systems. PCI should be considered legacy and is harder to find in new systems.

USB Devices

This section includes DAQ devices that connect to a computer via a USB cable. All of the USB devices featured in this catalog are powered by the USB connection to the computer, making them the simplest and most portable choice for a test system. But don't let "simple" fool you: The latest USB-6453 device can measure 16 channels of ±10 V inputs at 1,000,000 samples/s/ch.

USB Multifunction I/O Devices

USB multifunction I/O devices are simple, portable, and flexible. The software you use with the lowest-cost entry-level device is the same as you use with the latest bus-powered data streaming powerhouse, the USB-6453 mioDAQ device.

Category	Model	Part Number	DI/SE	AI Sample Rate	A/O and DIO Channels	A/O Update Rate	Counters	A/I Absolute Accuracy	A/I Resolution
Entry-Level (USB 2.0)	USB-6000	782602-01	0/8	10 kS/s	A/O: 0 DIO:	—	1	26 mV	16 b
	USB-6001	782604-01	4/8	20 kS/s	A/O: 2 DIO: 13	5 kS/s	1	26 mV	16 b
	USB-6002	782606-01	4/8	50 kS/s	A/O: 2 DIO: 13	5 kS/s	1	26 mV	16 b
	USB-6003	782608-01	4/8	100 kS/s	A/O: 2 DIO: 13	5 kS/s	1	26 mV	16 b
General-Purpose (USB-C)	USB-6421	789887-01	8/16	250 kS/s	A/O: 2 DIO: 16	250 kS/s/ch	4	2.61 mV	16 b
	USB-6423	789882-01	16/32	250 kS/s	A/O: 4 DIO: 16	250 kS/s/ch	4	2.61 mV	16 b
Simultaneous-Sampling (USB-C)	USB-6451	789888-01	8/16	1 MS/s/ch	A/O: 2 DIO: 16	250 kS/s/ch	4	1.3 mV	20 b
	USB-6453	789884-01	16/32	1 MS/s/ch	A/O: 4 DIO: 16	250 kS/s/ch	4	1.3 mV	20 b

mioDAQ (USB-6453) is a high-quality device with metal housing.

USB 2.0 Digital I/O Devices

Use NI USB digital I/O devices for simple, portable digital systems.

The USB-6501/25 on the left has built-in screw terminals. The USB-6509 on the right has a mass-termination connector and needs accessories. See the Cables for PCIe-6509/12/13/14/15/28 below, and the USB-6509 (SCSI Connector) table on page 23 for accessory selection.

Cables for PCIe-6509/12/13/14/15/28 and USB-6509

Category	Model	Part Number	Logic Level	D/I Voltage Range	DIO Channels	D/I Only Channels	D/O Only Chanels	Output Voltage	Output Current
5 V TTL/ CMOS	USB-6501	779205-01	5 V	0 V—5 V	24	—	—	0 V—5 V	8.5 mA
	USB-6509	779975-01	5 V	0 V—5 V	96	—	—	0 V—5 V	1.5 mA
Ch-Ch Isolated	USB-6525	779640-01	60 V	+/-60 V	0	8	8	0 V—60 V	500 mA

USB mioDAQ Accessories

NI mioDAQ devices (models USB-6421, -6423, -6451, and -6453) ship with a USB-C-to-USB-C cable and all connector accessories needed to connect a signal wire and begin taking measurements. This section is for extra or replacement parts and mounting accessories specific to mioDAQ.

Description	Part Number	
USB-C to USB-C with top screw lock, 2 m Included with mioDAQ. Purchase as spare/ replacement.	789956-02	
USB-C to USB-C right-angle, 2 m (optional accessory)	789957-02	
Screwdriver sized for spring terminals (quantity: 15)	781015-01	
Backshell for 36-position spring terminal connector with mioDAQ. Purchase as spare/ replacement. (quantity: 1)	785080-01	
Mounting kit: DIN only for horizontal DIN mount	789986-01	

Description	Part Number	
Mounting kit: vertical DIN, panel, or keyhole Includes USB-C cable with right-angle connector (PN 789957-02).	789955-01	
Mounting kit for 19” rack (1U) (mount up to two mioDAQ devices) Includes two USB-C cables with right-angle connector (PN 789957-02).	789953-01	
36-position front mount spring terminal connector with mioDAQ. Purchase as spare/ replacement (0.13 mm^2 to 1.5 mm^2) (26 AWG to 16 AWG) (quantity: 1)	785502-01	

PCI/PCI Express Devices

PCI/PCI Express devices are installed on the motherboard inside a desktop or industrial computer, similar to installing a new graphics card. Choose a PCI/PCI Express device for better streaming and single-point read/write performance vs. USB at a generally lower cost per channel. PCI/PCI Express systems are more common for lab test benches and manufacturing test systems.

Multifunction I/O Devices for PCI Express | Multiplexed

Multifunction devices combine ±10 V inputs with ±10 V outputs and digital/TTL signals. They are the most popular style of DAQ device for their wide coverage of signal types and general flexibility. Engineers across the world have been using NI's multifunction I/O devices for research, validation, and manufacturing test for decades.

PCI Express devices, like the PCIe-6341 shown, install in a PCIe x1 slot on a PC motherboard.

PCIe-6341

Model	Part Number	16-bit A/I Channels (DI/SE)	Sample Rate	DIO Channels	A/O Channels	A/O Update Rate	Counters	A/I Absolute Accuracy
PCIe-6320	781043-01	8/16	250 kS/s	24	0	—	4	2,200 µV
PCIe-6321	781044-01	8/16	250 kS/s	24	2	900 kS/s	4	2,200 µV
PCIe-6323	781045-01	16/32	250 kS/s	48	4	900 kS/s	4	2,200 µV
PCIe-6340	790586-01	8/16	500 kS/s	24	0	—	4	2,190 µV
PCIe-6341	781046-01	8/16	500 kS/s	24	2	900 kS/s	4	2,190 µV
PCIe-6342	790587-01	16/32	500 kS/s	48	0	900 kS/s	4	2,190 µV
PCIe-6343	781047-01	16/32	500 kS/s	48	4	900 kS/s	4	2,190 µV
PCIe-6350	790588-01	8/16	1 MS/s	24	0	—	4	1,520 µV
PCIe-6351	781048-01	8/16	1.25 MS/s	24	2	2.86 MS/s	4	1,520 µV
PCIe-6352	790589-01	16/32	1 MS/s	48	0	900 kS/s	4	1,520 µV
PCIe-6363	781051-01	16/32	2 MS/s (1-ch) 500 kS/s (all)	48	4	2.86 MS/s	4	1,660 µV

All devices shown in the table are multiplexed and share a single analog-to-digital converter for all channels. The sample rate shown is shared by all channels in the software task.

Multifunction DAQ Device Accessories

Every PCI/PCI Express DAQ device needs accessories for signal connection. Use the tables below to select the accessories that are compatible with your selected device.

Example configuration of a PCI Express MIO device with cable and connector block.
The PCI Express MIO device would be installed in a desktop computer.

How Many Cables Does Your PCI Express DAQ Device Need?

PCI Express DAQ devices have between one and four VHDCI connectors, each with 68 pins. Purchase a cable and connector block for each VHDCI connector to connect signal wires.
Note: Not all cables are compatible with all connectors. Use the tables below to match the correct number and type of cable to your device.

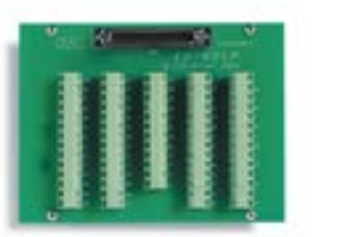
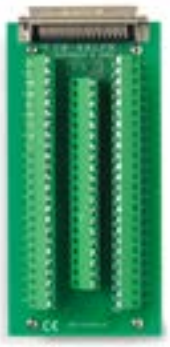
SHC68-68-EPM Cable Compatibility

Model	Part Number	Cable for Connector 0	Cable for Connector 1	Cable for Connector 2	Cable for Connector 3
PCIe-6320	781043-01	SHC68-68-EPM	—	—	—
PCIe-6321	781044-01	SHC68-68-EPM	—	—	—
PCIe-6323	781045-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PCIe-6340	790586-01	SHC68-68-EPM	—	—	—
PCIe-6341	781046-01	SHC68-68-EPM	—	—	—
PCIe-6342	790587-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PCIe-6343	781047-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PCIe-6350	790588-01	SHC68-68-EPM	—	—	—
PCIe-6351	781048-01	SHC68-68-EPM	—	—	—
PCIe-6352	790589-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PCIe-6363	781051-01	SHC68-68-EPM	SHC68-68-EPM	—	—

Cables to Connect Multifunction PCI Express DAQ Devices to Terminal Blocks

Recommendation	Part Number	Length	
Best performance if compatible with your device. SHC68-68-EPM Separates DIO from A/I signals in cable to reduce crosstalk.	192061-0R5	0.5 m	
	192061-01	1 m	
	192061-02	2 m	
	192061-05	5 m	
	192061-10	10 m	
Any device connection not supported by the EPM cable. Works on any multifunction I/O device and connector. Basic Shielded SHC68-68	191945-0R5	0.5 m	
	191945-01	1 m	
	191945-02	2 m	
Ribbon cable for low-cost systems. Not recommended for noisy environments. Works on any multifunction I/O device and connector. RC68-68	187252-0R25	0.25 m	
	187252-0R5	0.5 m	
	187252-01	1 m	

Screw Terminal Accessories for Multifunction I/O PCI Express Devices

Description	Model	Part Number	Shielded	
Most common desktop accessory for NI DAQ devices. Metal breakout box with removable magnetic lid covering screw terminals. SCB-68A	SCB-68A	782536-01	✓	
Low-Cost Terminal Block (Wide Layout) CB-68LP	CB-68LP	777145-01	—	
Low-Cost Terminal Block (Narrow Layout) CB-68LPR	CB-68LPR	777145-02	—	
DIN Rail-Mountable Terminal Connector Block TBX-68	TBX-68	777141-01	—	

BNC Accessories for Multifunction PCI Express DAQ Devices

Description and Model	Part Number	
Shielded BNC Connector Block BNC-2110	777643-01	
Single-Ended Shielded BNC Connector Block BNC-2111[1]	779347-01	
Shielded BNC Connector Block with Onboard Function Generator and Quadrature Encoder BNC-2120	777960-01	
Rack-Mountable Accessory for 68-Pin Multifunction DAQ BNC-2090A	779556-01	

[1]BNC-2111 cannot be used with NI 6356/6358/6366/6368/6374/6376/6378/6386/6396 simultaneous I/O X Series devices.

For more accessory compatibility information, see the following online knowledge base articles.

DAQ Multifunction I/O Accessory Guide

DAQ Multifunction I/O Cable Guide

NI Cable and Accessory Guides

Digital Input/Output Devices for PCI/PCI Express

These devices are great to add more digital lines to systems in manufacturing test or other industrial environments—and with the higher current output, you can directly drive solid-state relays. Many devices (PCIe-6509, for example) include features such as configuring each port for input or output, programmable power-up states, I/O watchdogs, and software-selectable programmable input filters.

PCIe-6509

Category	Model	Part Number	Logic Levels	D/I Voltage Range	DIO Channels	D/I-Only Channels	D/O-Only Channels	Output Voltage	Output Current1
5 V TTL/ CMOS	PCI-6503	777690-01	5 V TTL/ CMOS	0 V—5 V	24	—	—	0 V—5 V	2.4 mA
5 V TTL/ CMOS	PCIe-6509	778966-01	5 V TTL/ CMOS	0 V—5 V	96	0	0	0 V—5.5 V	24 mA
Industrial	PCI-6512	778970-01	—	-30 V—30 V	—	—	64	0 V—30 V	350 (75) source mA
	PCI-6513	778836-01	—	—	—	—	64	0 V—30 V	500 (120) sink mA
	PCI-6514	778835-01	24 V	-30 V—30 V	—	32	32	+/-30 V	350 (75) source mA
	PCI-6515	779082-01	24 V	-30 V—30 V	—	32	32	+/-30 V	500 (120) sink mA
	PCI-6516	779083-01	—	—	—	—	32	0 V—30 V	350 (75) mA
	PCI-6518	779085-01	24 V	30 V—30 V	—	16	16	+/-30 V	350 (75) mA
Ch-Ch Isolated	PCI-6520	778833-01	60 V	+/-30 V	—	8	8	+/-60 V	2 A
	PCI-6528	777690-01	60 V	+/-60 V	—	24	24	+/-60 V	150 mA

See user manuals for min/max voltage levels for low/high digital values.

1When using all lines at a 100% duty cycle, the maximum drive current for the -6512, -6514, -6516, and -6518 is 75 mA. It is 120 mA for the -6513, -6515, and -6519. When using only one output line in each bank at a 100% duty cycle, the maximum drive current for the -6512, -6514, -6516, and -6518 is 350 mA. It is 500 mA for the -6513, -6515, and -6519.

Digital I/O Device Accessory Compatibility

The digital I/O devices in the table above need a cable and connector block to connect any signal wires. Please use the tables below to find yours based on device model number.

Cable for PCI-6503 (IDC Connector)

Description	Model	Part Number	
Low-Cost Ribbon Cable	NB1	180524-05	

Terminal Block Options for PCI-6503 (IDC Connector)

Description	Model	Part Number	
Screw Terminal Block for DIN Rail Mount	CB-50	776164-90	
Screw Terminal Block – Standoffs	CB-50LP	777101-01	

Cables for PCIe-6509/12/13/14/15/28 and USB-6509 (SCSI Connector)

Description	Model	Part Number	Length	
Shielded Cable (Recommended)	SH100M-100M Flex	185095-01	1 m	
		185095-02	2 m	
Unshielded split cable that converts device connection to 2x 50-pin connectors. Purchase 2x 50pin terminal blocks.	R1005050	182762-02	2 m	

Terminal Block Options for PCIe-6509/12/13/14/15/28 and USB-6509 (SCSI Connector)

Description	Model	Part Number	
Shielded Screw Terminal Block	SCB-100A	785024-01	
Unshielded Screw Terminal Block, DIN Rail Mount	CB-50	776164-90	
Unshielded Screw Terminal Block	CB-50LP	777101-01	

Cables for PCI-6516/18/20 (D-SUB Connector)

Description	Model	Part Number	Length	
Shielded Cable (Recommended)	SH37F-37M	778621-02	2 m	
Unshielded Ribbon Cable	R37F-37M	779195-0R25	0.25 m	
		779195-0R5	0.5 m	
		779195-01	1 m	

Connector Blocks for PCI-6516/18/20 (D-SUB Connector)

Description	Model	Part Number	Shielded	
Horizontal DIN-Rail-Mount Terminal Block	CB-37FH	778676-01	—	
Vertical DIN-Rail-Mount Terminal Block	CB-37FV	778672-01	—	
DIN-Rail-Mount for High-Voltage Signals up to 150 V. UL-Recognized.	CB-37F-HVD	779491-01	—	
D-SUB-to-Screw Terminal Conversion. Connects to D-SUB Connector on Device. No Cable Needed.	CB-37F-LP	779353-01	—	

High-Speed Digital I/O Devices for PCI Express

High-speed digital devices are designed for interfacing and testing image sensors, display panels, and applications such as pattern I/O, change detection, protocol emulation, or other custom digital tasks. These devices feature selectable voltage levels and per-channel directional control of the digital lines.

PCIe-6535B Device

Model	Part Number	Logic	Maximum Clock Rate	Voltage Range	DIO Channels	Output Range	Output Current
PCIe-6535B	782629-01	5 V	10 MHz	0 V—5 V	32	0 V—5 V	32 mA
PCIe-6536B	782630-01	5 V	25 MHz	0 V—5 V	32	0 V—5 V	32 mA
PCIe-6537B	782631-01	5 V	50 MHz	0 V—5 V	32	0 V—5 V	32 mA

PCI Express High-Speed Digital I/O Accessory Compatibility (VHDCI connector)

Description	Model	Part Number	Length	
Shielded Cable	SHC68-C68-D4	781013-01	0.5 m	
		196275-01	1 m	
		781293-01	2 m	
		132625-03	3 m (Lower DC Resistance)	
Unshielded Cable	C68-C68-D4	195949-01	1 m	

Connector Blocks for High-Speed Digital I/O Devices

Description	Model	Part Number	Shielded	
Connector block designed for high-speed DIO devices (recommended)	SCB-68 HSDIO	782914-01	✓	
Low-cost terminal block (wide layout) CB-68LP	CB-68LP	777145-01	—	
Low-cost terminal block (narrow layout) CB-68LPR	CB-68LPR	777145-02	—	
DIN-rail-mountable terminal connector block TBX-68	TBX-68	777141-01	—	

±10 V Analog Output Devices for PCI Express

A/O devices for PCI Express are high-speed, high-density devices designed for simultaneous multichannel updates for control and waveform output applications such as simple function generation, and stimulus-response tests including acoustic distortion testing and three-phase power simulations. Each device includes digital I/O lines and four counters for digital triggering and external clocking.

PCIe-6738 Devices

Model	Part Number	A/O Channels	A/O Resolution	A/O Voltage	Max. Update Rate	DIO	Counters
PCIe-6738	783800-01	32	16 b	-10 V—10 V	1 MS/s	8	4
PCIe-6739	783801-01	64	16 b	-10 V—10 V	1 MS/s	20	4

Analog Output Device Accessories

Analog output devices require a cable and terminal block for each connector as follows:

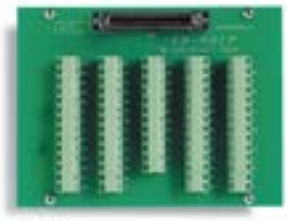
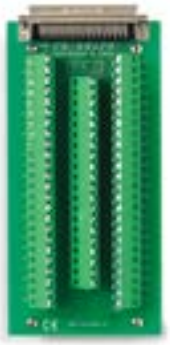
PCIe-6738 has two connectors on the front and requires two each of cables and connector blocks

PCIe-6738 has four connectors on the front and requires four each of cables and connector blocks

Cables for PCIe-6739/6738 Analog Output Devices

Description	Model	Part Number	Length	
Shielded 68-pin VHDCI to 68-pin SCSI cable for use with the PXIe-6738 and PXIe-6739.	SHC68-68-A2	157599-0R5	0.5 m	
		157599-01	1 m	
		157599-05	2 m	

Connector Blocks for PCIe-6739/6738 Analog Output Devices

Description	Model	Part Number	Shielded	
Most common desktop accessory for NI DAQ devices. Metal breakout box with removable magnetic lid covering screw terminals. SCB-68A	SCB-68A	782536-01	✓	
Low-cost terminal block (widexlayout) CB-68LP	CB-68LP	777145-01	—	
Low-cost terminal block (narrow layout) CB-68LPR	CB-68LPR	777145-02	—	
DIN-rail-mountable terminal connector block TBX-68	TBX-68	777141-01	—	
BNC connector block for PCIe-6612 with built-in quadrature encoders, square wave generator, button for digital trigger	BNC-2121	778289-01	—	

Counter/Timer Device for PCI Express

Use the PCIe-6612 for encoder position measurement, event counting, period measurement, pulse-width measurement, pulse generation, pulse-train generation, and frequency measurement. It features eight counter/timers, digital debouncing filters, and TTL/CMOS-compatible digital I/O.

PCIe-6612 Device

Model	Part Number	Logic Level	Counters	DIO Channels	Measure Frequency
PCIe-6612	782352-01	5 V TTL	8	40	80 MHz

Counter Device Accessories for PCIe-6612

Select one cable and one connector block accessory for each PCIe-6612.

Cables for PCIe-6612

Description	Model	Part Number	Length	
Shielded cable to connect PCIe-6612 to terminal block. (SCSI to SCSI)	SH68-68-D1	183432-0R4	0.4 m	
		183432-01	1 m	
		183432-10	2 m	
Unshielded Ribbon Cable	R68-R68	182482-OR25	0.25 m	
		182482-01	1 m	

Connector Block Accessories for PCIe-6612

Description	Model	Part Number	Shielded	
Most common desktop accessory for NI DAQ devices. Metal breakout box with removable magnetic lid covering screw terminals. SCB-68A	SCB-68A	782536-01	✓	
Low-cost terminal block (wide layout) CB-68LP	CB-68LP	777145-01	—	
Low-cost terminal block (narrow layout) CB-68LPR	CB-68LPR	777145-02	—	
DIN-rail-mountable terminal connector block TBX-68	TBX-68	777141-01	—	
BNC connector block for PCIe-6612 with built-in quadrature encoders, square wave generator, button for digital trigger	BNC-2121	778289-01	—	

PXI/PXI Express Devices

Choose PXI systems for DAQ when you need:

- Large datasets from high-speed or high-channel-count systems
- High-channel system synchronization, or advanced synchronization with external devices
- Clock sharing
- More channels in less space (save rack or workbench space)
- Measurement accuracy (PXI typically has the most accurate measurements for a specific signal type)
- Systems that combine ±V DAQ and sensor measurements with instrumentation including DMMs, SMUs, and scopes.

PXI Multifunction I/O Devices

Multifunction devices combine ±10 V inputs with ±10 V outputs and digital/TTL signals. They are the most popular style of DAQ device for their wide signal type coverage and general flexibility. Engineers across the world have been using NI's multifunction I/O devices for research, validation, and manufacturing test for decades.

Multifunction I/O | Multiplexed

In multiplexed measurement devices, all voltage input channels share a single analog-to-digital converter through a mux/switch. For high-speed signals (~10 kS/s) that require synchronous measurement, NI recommends devices with a simultaneous architecture, as shown in the next section.

Category	Model	Part Number	A/I Channels (DI/SE)	Sample Rate	A/O and DIO Channels	Update Rate (All Channels Combined)	Counters	Absolute Accuracy	Resolution (Input/ Output)
Lowest Cost	PXIe-6321	790590-01	8/16	250 kS/s	A/O: 2 DIO: 24	900 kS/s	4	2,200 µV	16 b/16 b
	PXIe-6323	790591-01	16/32	250 kS/s	A/O: 4 DIO: 48	900 kS/s	4	2,200 µV	16 b/16 b
	PXIe-6341	781052-01	8/16	500 kS/s	A/O: 2 DIO: 24	900 kS/s	4	2,190 µV	16 b/16 b
	PXIe-6343	790592-01	16/32	500 kS/s	A/O: 4 DIO: 48	900 kS/s	4	2,190 µV	16 b/16 b
	PXIe-6345	783631-01	40/80	500 kS/s	A/O: 2 DIO: 24	2.86 MS/s	4	1,520 µV	16 b/16 b
Highest Speed	PXIe-6351	790593-01	8/16	1.25 MS/s	A/O: 2 DIO: 24	2.86 MS/s	4	1,660 µV	16 b/16 b
	PXIe-6353	790594-01	16/32	1.25 MS/s	A/O: 4 DIO: 48	2.86 MS/s	4	1,660 µV	16 b/16 b
	PXIe-6355	783632-01	40/80	1.25 MS/s	A/O: 2 DIO: 24	2.86 MS/s	4	1,520 µV	16 b/16 b
	PXIe-6357	790595-01	104/208	1.25 MS/s	A/O: 2 DIO: 24	2.86 MS/s	4	1,660 µV	16 b/16 b
	PXIe-6361	781055-01	8/16	2.0 MS/s	A/O: 2 DIO: 24	2.86 MS/s	4	1,660 µV	16 b/16 b
	PXIe-6363	781056-01	16/32	2.0 MS/s	A/O: 4 DIO: 48	2.86 MS/s	4	1,660 µV	16 b/16 b
	PXIe-6365	783633-01	72/144	2.0 MS/s	A/O: 2 DIO: 24	2.86 MS/s	4	1,520 µV	16 b/16 b
	PXIe-6375	783634-01	104/208	3.8 MS/s	A/O: 2 DIO: 24	2.86 MS/s	4	1,660 µV	16 b/16 b
Best Resolution	PXI-6289	779639-01	16/32	625 kS/s	A/O: 4 DIO: 48	2.86 MS/s	2	980 µV	18 b/16 b

Multifunction I/O | Simultaneous

In simultaneous measurement devices, each voltage input channel has a dedicated analog-to-digital converter for a parallel signal path. This design is recommended for best possible measurement quality and when high-speed signals need data acquired at the same time.

Sample Rate	Model	Part Number	A/I Channels (DI Only)	DIO Channels	A/O Channels	Update Rate (per Channel)	Counters	Absolute Accuracy	Resolution (Input/ Output)
500 MS/s	PXIe-6349	785808-01	32	24	2	900 kS/s	4	3,225 µV	16 b/16 b
1.25 MS/s	PXIe-6356	781053-01	8	24	2	3.3 MS/s/ch	4	2,688 µV	16 b/16 b
	PXIe-6358	781054-01	16	48	4	3.3 MS/s/ch	4	2688 µV	16 b/16 b
2MS/s	PXIe-6366	781057-01	8	24	2	3.3 MS/s/ch	4	2,688 µV	16 b/16 b
	PXIe-6368	781058-01	16	48	4	3.3 MS/s/ch	4	2,688 µV	16 b/16 b
3.3 MS/s	PXIe-6376	781475-01	8	24	2	3.3 MS/s/ch	4	2,688 µV	16 b/16 b
	PXIe-6378	781476-01	16	48	4	3.3 MS/s/ch	4	2,688 µV	16 b/16 b
4 MS/s	PXIe-6124	780536-01	4	24	2	4 MS/s/ch	2	3,147 µV	16 b/16 b
14 MS/s	PXIe-6386	785926-01	8	24	2	3.3 MS/s/ch	4	1,769 µV	16 b/16 b
	PXIe-6396	785927-01	8	24	2	3.3 MS/s/ch	4	1,769 µV	18 b/16 b

Accessories for Multifunction DAQ Devices

How Many Cables Does Your PXI Express DAQ Device Need?

PXI Express DAQ devices offer between one and four VHDCI connectors, each with 68 pins. Purchase a cable and connector block for each VHDCI connector to connect signal wires. Note: Not all cables are compatible with all connectors. Use the tables below to match the correct number and type of cable to your device.

For the cables in the table below, both "Shielded (EPM)" and the "SHC68-68" cables are shielded. The difference between the two is that the EPM cable accounts for the specific mix of analog and digital signal types by separating/twisting some of the pairs. NI recommends using shielded and shielded EPM cables wherever possible for the best measurement quality.

SHC68-68-EPM Cable Compatibility

Model	Part Number	Cable for Connector 0	Cable for Connector 1	Cable for Connector 2	Cable for Connector 3
PXI-6289	779639-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6124	780536-01	SHC68-68-EPM	—	—	—
PXIe-6321	790590-01	SHC68-68-EPM	—	—	—
PXIe-6323	790591-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6341	781052-01	SHC68-68-EPM	—	—	—
PXIe-6343	790592-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6345	783631-01	SHC68-68-EPM	SHC68-68	—	—
PXIe-6349	785808-01	SHC68-68-EPM	SHC68-68	—	—
PXIe-6351	790593-01	SHC68-68-EPM	—	—	—
PXIe-6353	790594-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6355	783632-01	SHC68-68-EPM	SHC68-68	—	—
PXIe-6356	781053-01	SHC68-68-EPM	—	—	—
PXIe-6357	790595-01	SHC68-68-EPM	SHC68-68	SHC68-68	SHC68-68
PXIe-6358	781054-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6361	781055-01	SHC68-68-EPM	—	—	—
PXIe-6363	781056-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6365	783633-01	SHC68-68-EPM	SHC68-68	SHC68-68	—
PXIe-6366	781057-01	SHC68-68-EPM	—	—	—
PXIe-6368	781058-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6375	783634-01	SHC68-68-EPM	SHC68-68	SHC68-68	SHC68-68
PXIe-6376	781475-01	SHC68-68-EPM	—	—	—
PXIe-6378	781476-01	SHC68-68-EPM	SHC68-68-EPM	—	—
PXIe-6386	785926-01	SHC68-68-EPM	—	—	—
PXIe-6396	785927-01	SHC68-68-EPM	—	—	—

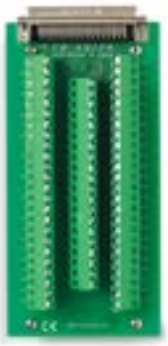
Cables to Connect Multifunction PXI Express DAQ Devices to Terminal Blocks

Recommendation	Part Number	Length	
Best performance if compatible with your device. SHC68-68-EPM[1] Separates DIO from A/I signals in cable to reduce crosstalk.	192061-0R5	0.5 m	
	192061-01	1 m	
	192061-02	2 m	
	192061-05	5 m	
	192061-10	10 m	
Any device connection not supported by the EPM cable. Works on any multifunction I/O device and connector. Shielded SHC68-68	191945-0R5	0.5 m	
	191945-01	1 m	
	191945-02	2 m	
Ribbon cable for low-cost systems. Not recommended for noisy environments. Works on any multifunction I/O device and connector. RC68-68[2]	187252-0R25	0.25 m	
	187252-0R5	0.5 m	
	187252-01	1 m	

[1] Compatible with Connector 0 of all devices and Connector 1 of 6289/6323/6343/6353/6363/6358/6368/6378. Does not work on 6345/6349/6355/6357/6365/6375 Connectors 1, 2, or 3.

[2] RC68-68 is not compatible with the PXIe-6345/6349/6355/6357/6365/6375 due to mechanical constraints (i.e., the larger backshell may interfere with neighboring cables where there are multiple connectors or the ejector handle where the connectors are situated directly above it). Shielded cables such as the SHC68-68-EPM1 or SHC68-68 may be used in place of the RC68-68 when connecting to unshielded connector blocks.

Screw Terminal Accessories for Multifunction I/O PCI Express/PXI Express Devices

Description	Model	Part Number	Shielded	
Mounts to the front of a PXI Express device installed in a PXI chassis. No cable is required. Note: This will block Connector 1, rendering it unusable, even on compatible devices. See the note below for compatibility. TB-2706[1]	TB-2706	779183-01	✓	
Most common desktop accessory for NI DAQ devices. Metal breakout box with removable magnetic lid covering screw terminals. SCB-68A	SCB-68A	782536-01	✓	
Low-cost terminal block (wide layout) CB-68LP	CB-68LP	777145-01	—	
Low-cost terminal block (narrow layout) CB-68LPR	CB-68LPR	777145-02	—	
DIN-rail-mountable terminal connector block TBX-68	TBX-68	777141-01	—	

[1]Not for use with NI 6345/6346/6349/6355/6365/6375. Connects to Connector 0 of the compatible PXI Express module. After installation, Connector 1 cannot be used.

BNC Accessories for Multifunction PXI Express DAQ Devices

Description and Model	Part Number	
Shielded BNC Connector Block BNC-2110	777643-01	
Single-Ended Shielded BNC Connector Block BNC-2111[1]	779347-01	
Shielded BNC Connector Block with Onboard Function Generator and Quadrature Encoder BNC-2120	777960-01	
Rack-Mountable Accessory for 68-Pin Multifunction DAQ BNC-2090A	779556-01	

[1] BNC-2111 cannot be used with NI 6356/6358/6366/6368/6374/6376/6378/6386/6396 simultaneous I/O X Series devices.

For more accessory compatibility information, see the following online knowledge base articles.

DAQ Multifunction I/O Accessory Guide

DAQ Multifunction I/O Cable Guide

NI Cable and Accessory Guides

PXI Digital I/O Devices

These devices are great to add more digital lines to systems in manufacturing test or other industrial environments—and with the higher current output, you can directly drive solid-state relays. Many devices (PXIe-6509, for example) include features such as configuring each port for input or output, programmable power-up states, I/O watchdogs, and software-selectable programmable input filters.

PXIe-6509

Category	Model	Part Number	Bus Connector	Digital I/O Logic Levels	Digital Input Voltage Range	Max Clock Rate	Bidirectional Digital Channels	Digital Input-Only Channels	Digital Output-Only Channels	Output Voltage Range	Signaling Type	Single-Ended Digital I/O Channel
30 V High-Channel D/I	PXI-6511	778967-01	PXI Hybrid	24 V	-30 V to 30 V	—	—	64	—	—	Single-Ended	—
30 V High-Channel D/O	PXI-6512	778969-01	PXI Hybrid	24 V	—	—	—	—	64	0 V to 30 V	Single-Ended	350 mA
30 V Sink/Source D/I, Source D/O	PXI-6514	778965-01	PXI Hybrid	24 V	-30 V to 30 V	—	—	32	32	-30 V to 30 V	Single-Ended	350 mA
Highest-Channel Current Drive (475 mA), 32 D/I, 32 D/O	PXI-6515	778964-01	PXI Hybrid	24 V	-30 V to 30 V	—	—	32	32	-30 V to 30 V	Single-Ended	475 mA
60 V Sink/Source D/I, D/O; Channel-Channel Isolated	PXI-6528	778543-01	PXI Hybrid	60 V	-60 V to 60 V	—	—	24	24	-60 V to 60 V	Single-Ended	150 mA
Lowest Cost	PXIe-6509	787358-01	PXI Express	5 V	0 V to 5 V	—	96	0	0	0 V to 5.5 V	Single-Ended	24 mA
Programmable Logic Level	PXIe-6535	780695-0	PXI Express	2.5 V 3.3 V 5 V TTL	-1 V to 6 V	10 MHz	32	—	—	0 V to 5 V	Single-Ended	32 mA

PXI Digital I/O Accessories

Step 1: Locate the model number of your selected device.

Step 2: Use the Digital I/O Accessory Compatibility table below to select compatible accessories. You will need one cable and terminal block for each connector unless you select a front mounting terminal block.

Step 3: Use the Digital I/O Cable and Connector Block Accessories table for images and part numbers of compatible accessories.

Digital I/O Accessory Compatibility

Digital I/O Model	Description	Cable Compatibility	Cable Adapter	Connector Block Compatibility
PXI-6511/6512/6514/6515/6528 PXIe-6509	Shielded	SH100M-100M FLEX	—	SCB-100A
	Unshielded	R1005050	—	CB-50 CB-50LP
		CB-100		
PXIe-6535	Shielded	SHC68-C68-D4 SHC68-C68-D4, Low Leakage SHC68-C68-D4, Lower DC Resistance	—	SCB-68HSDIO SMB-2163
			653x Cable Adapter1	SCB-68A[2]
	Shielded cable backshell to unshielded flying leads	SHC68-H1x38	—	—
	Unshielded—to connector block	C68-C68-D4	—	CB-2162
			653x Cable Adapter[1]	CB-68LP CB-68LPR TBX-68

[1]The cable adapter is only required when connecting to accessories with a 68-pin SCSI connector. It is not required for accessories with 68-pin VHDCI connectors.

[2]SCB-68A must be configured in direct feedthrough mode.

Digital I/O Cable and Connector Block Accessories

Accessory Type	Accessory (Part Number)	Description	
Cable	C68-C68-D4 (195949-01) 1 m	Unshielded cable for high-speed digital I/O, 2x 68-pin male VHDCI cable	
	R1005050 Cable[1] (182762-01) 1 m (182762-02) 2 m (182762-0R5) 0.5 m	Unshielded ribbon cable with 100-pin SCSI to two 5-pin IDC connectors	
	SHC68-C68-D4 (196275-01) 1 m (781293-01) 2 m SHC68-C68-D4, Low Leakage (152870-01) 1 m SHC68-68-D4, Lower DC Resistance (132625-03) 3 m	Shielded cable for high-speed digital I/O, 2x 68-pin male VHDCI	
	SHC68-H1x38 (192681-1R5) 1.5 m	Shielded cable for high-speed digital I/O, 68-pin male VHDCI to 76-pin female flying leads	
	SH37F-37M (778621-01) 1 m (778621-02) 2 m	Shielded 37-Pin D-SUB cable, high-voltage-rated for CAT II, 150 VDC/VAC	

Cable	SH100M-100M FLEX (185095-01) 1 m (185095-02) 2 m	Shielded 100-pin SCSI cable	
	635x Cable Adapter (195846-01)	Cable adapter for high-speed digital I/O, 68-pin VHDCI to 68-pin SCSI	
Connector Block	CB-2162[2] (778592-01)	Single-Ended I/O connector block for high-speed digital I/O, 68-pin VHDCI to genderless solder cup terminal	
	CB-50 (776164-90)	Unshielded I/O connector block with 50 screw terminals and one 50-pin IDC connector, DIN rail mount	
	CB-50LP (777101-01)	Unshielded I/O connector block with 50 screw terminals and one 50-pin IDC connector, panel mount	
	CB-68LP (77714 5-01)	Unshielded I/O connector block with 68 screw terminals and one 68-pin vertical mounted SCSI connector	
	CB-68LPR (777145-02)	Unshielded I/O connector block with 68 screw terminals and one 68-pin vertical mounted SCSI connector	

Connector Block	SCB-68A (782536-01)	Shielded I/O connector block with 68 screw terminals and 68-pin SCSI connector	
	SCB-68 HSDIO (782914-01)	Shielded I/O connector block with 72 screw terminals and 68-pin VHDCI connector	
	SCB-100A (785024-01)	Noise-rejecting, shielded I/O connector block with 100 screw terminals and 100-pin SCSI connector	
	TBX-68 (777141-01)	Unshielded DIN-rail-mountable I/O connector block with 68 screw terminals and one 68-pin SCSI connector	

[1]Requires two 50-pin connector blocks to enable connection to all lines.

[2]You must supply 20-24 AWG stranded conductor wire to complete accessory construction.

PXI Analog Output Devices

A/O devices for PXI are high-speed, high-density devices designed for simultaneous multichannel updates. Use them in control and waveform output applications such as simple function generation, and stimulus-response tests including acoustic distortion and three-phase power simulations. Each device includes digital I/O lines and four counters for digital triggering and external clocking.

PXI-6739

Category	Model	Part Number	Analog Output Resolution	Analog Output Voltage Range	Bus Connector	Max Update Rate	Analog Output Channels	Output Current Range
General Purpose	PXI-6704	777796-01	16 Bits	-10.1 V to 10.1 V	PXI Hybrid	Static	32	0.1 mA to 20.2 mA
Lowest Cost	PXI-6723	778998-01	13 Bits	-10 V to 10 V	PXI Hybrid	800 kS/s	32	—
Fastest Update Rate	PXI-6733	778512-01	16 Bits	-10 V to 10 V	PXI Hybrid	1 MS/s	8	—
	PXIe-6738	783800-01	16 Bits	-10 V to 10 V	PXI Express	1 MS/s	32	—
Highest Channel Count and Fastest Update Rate	PXIe-6739	783801-01	16 Bits	-10 V to 10 V	PXI Express	1 MS/s	64	—

PXI Analog Output Accessories

Step 1: Locate the model number of your selected device.

Step 2: Use the A/O Accessory Compatibility table below to select compatible accessories. You will need one cable and terminal block for each connector, unless you select a front mounting terminal block. Note: The PXI-6723 has different accessory compatibility for each connector on the device.

Step 3: Use the A/O Cable and Connector Block Accessories table for images and part numbers of compatible accessories.

A/O Accessory Compatibility

A/O Device Model	Shielded/ Unshielded	Cable Model Number	Connector Block/Accessory Model Number
PXI-6704	Shielded	SH68F-68F-D1	SCB-68A
	Unshielded	R68-68	TBX-68 CB-LP CB-LPR
PXI-6723 (A/O 0-7 and Digital Connector)	Shielded	SH68-C68-S	BNC-2110 SCB-68A
	Unshielded	RC68-68	CB-68LP CB-68LPR TBX-68
PXI-6723 (A/O 8-31 Connector)	Shielded	SH68-C68-S	SCB-68A
	Unshielded	RC68-68	CB-68LP CB-68LPR TBX-68
PXI-6733	Shielded, Noise-Reducing	SH68-68-EPM	BNC-2110 SCB-68A
		No cable required. Front-mounted to PXI chassis.	TB-2705
	Unshielded	R68-68	CB-68LP CB-68LPR TBX-68
PXIe-6738/6739	Shielded	Shielded, basic: SHC68-68-A2 SH68-C68-S1	SCB-68A (Shielded)
	Unshielded	RC68-68	CB-68LP (Unshielded) CB-68LPR (Unshielded) TBX-68 (Unshielded)

[1]Only for use integrating/migrating the 6738/6739 into a 6723 system. Refer to Connecting the NI 6738/6739 in a NI 6723 System section of the PXIe-6738/39 user manual for more information.

A/O Cable and Connector Block Accessories

	Accessory (Part Number)	Description	
Cables	R68-68 Cable (182482-0R25) 0.25 m (182482-01) 1 m	Low-cost, unshielded 68-68 pin SCSI ribbon cable	
	RC68-68 Cable (187252-0R25) 0.25 m (187252-0R5) 0.5 m (187252-01) 1 m	Low-cost, unshielded 68-pin SCSI to 68-pin VHDCI ribbon cable	
	SHC68-68-A2 Cable (157599-0R5) 0.5 m (157599-01) 1 m (157599-02) 2 m	Shielded 68-pin VHDCI to 68-pin SCSI cable for use with the PXIe-6738 and PXIe-6739	
	SH68F-68F-D1 Cable (183432-02) 2 m	Shielded 68-68 pin SCSI cable for use with the PXI-6704 or other counter/timer I/O modules	
	SH68-68-EPM Cable (199006-01) 1 m (199006-02) 2 m (199006-05) 5 m	Noise-reducing, shielded 68-68 pin SCSI cable	
	SH68-C68-S Cable (186381-01) 1 m (186381-02) 2 m	Shielded 68-pin VHDCI to 68-pin SCSI cable for use with the PXI-6723	

A/O Cable and Connector Block Accessories

	Accessory (Part Number)	Description	
Connector Blocks	BNC-2110 (777643-01)	Provides BNC connectivity to all analog signals, some digital signals, and spring terminals for other digital signals	
	CB-68LP (77714 5-01)	Unshielded I/O connector block with 68 screw terminals and one 68-pin vertical mounted SCSI connector	
	CB-68LPR (777145-02)	Unshielded I/O connector block with 68 screw terminals and one 68-pin vertical mounted SCSI connector	
	SCB-68A (782536-01)	Shielded I/O connector block with 68 screw terminals and 68-pin SCSI connector	
	TBX-68 (777141-01)	Unshielded DIN rail-mountable I/O connector block with 68 screw terminals and one 68-pin SCSI connector	
PXI Terminal Block	TB-2705 (778241-01)	Shielded front mount terminal block with 62 screw terminals and one 68-pin SCSI connector. Does not require a cable.	

PXI Counter/Timer Devices

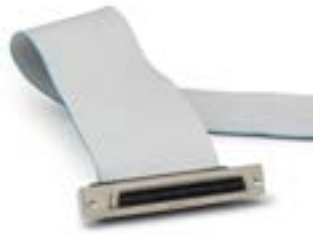
Use the counter/timer devices for encoder position measurement, event counting, period measurement, pulse-width measurement, pulse generation, pulse-train generation, and frequency measurement. Devices feature eight counter/timers, digital debouncing filters, and TTL/CMOS-compatible digital I/O.

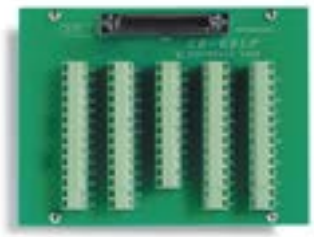
PXIe-6614

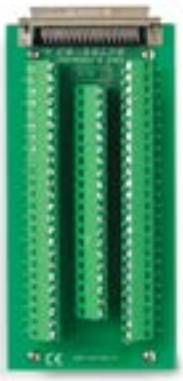
Category	Model	Part Number	Counters/ Timers	Measure Frequency	Onboard High-Precision Oscillator
High-Voltage Option	PXI-6624	778975-01	8	400 MHz	—
Lowest Cost	PXIe-6612	782352-01	8	80 MHz	—
Onboard High-Precision Oscillator	PXIe-6614	782353-01	8	80 MHz	✓

PXI Counter/Timer Device Accessories

Counter/Timer I/O Cable and Connector Block Accessories

Accessory Type	Accessory (Part Number)	Description	
Cable	R68-68 (182482-0R25) 0.25 m (182482-01) 1 m	Low-cost, unshielded 68-pin SCSI ribbon cable	
	R1005050 (182762-01) 1 m (182762-02) 2 m (182762-0R5) 0.5 m	Unshielded ribbon cable with 100-pin SCSI to two 5-pin IDC connectors	
	SH68F-68F-D1 (183432-02) 2 m	Shielded 68-pin SCSI cable for use with the PXI-6704 other counter/timer I/O modules	
	SH100M-100M-FLEX (185095-01) 1 m (185095-02) 2 m	Shielded 100-pin SCSI cable	
	BNC-2121 (778289-01)	Shielded female SCSI to female BNC connector block with eight dedicated and six user-defined BNC connectors and spring terminals, function generator, and encoder	

Accessory Type	Accessory (Part Number)	Description	
Connector Block	CB-50 (776164-90)	Unshielded I/O connector block with 50 screw terminals and one 50-pin IDC connector, DIN rail mount	
	CB-50LP (777101-01)	Unshielded I/O connector block with 50 screw terminals and one 50-pin IDC connector, panel mount	
	SCB-68A (782536-01)	Shielded I/O connector block with 68 screw terminals and 68-pin SCSI connector	
	SCB-100A (785024-01)	Noise-rejecting, shielded I/O connector block with 100 screw terminals and 100-pin SCSI connector	
	CB-68LP (77714 5-01)	Unshielded I/O connector block with 68 screw terminals and one 68-pin vertical-mounted SCSI connector	

Accessory Type	Accessory (Part Number)	Description	
	CB-68LPR (777145-02)	Unshielded I/O connector block with 68 screw terminals and one 68-pin vertical-mounted SCSI connector	
	TBX-68 (777141-01)	Unshielded DIN-rail-mountable I/O connector block with 68 screw terminals and one 68-pin SCSI connector	
Connector Block Kit	CB-100 (777812-01)	I/O connector block kit, two CB-50 I/O connector blocks and a 1 m R1005050 ribbon cable included	
PXI Terminal Block	TB-2715 (778242-01)	PXI front-mount terminal block, screw terminal	

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