

Low-Cost M Series Multifunction DAQ 16-Bit, 250 kS/s, up to 80 Analog Inputs

NI M Series – Low-Cost

- NI recommends high-speed M Series for 5X faster sampling rates or high-accuracy M Series for 4X higher resolution
- 16, 32, or 80 analog inputs at 16-bit, 250 kS/s
- Up to 4 analog outputs at 16 bits, 833 kS/s (6 μ s full-scale settling time)
- Programmable input range (± 10 , ± 5 , ± 1 , ± 0.2 V) per channel
- Up to 48 TTL/CMOS digital I/O lines (up to 32 hardware-timed at 1 MHz)
- Two 32-bit, 80 MHz counter/timers
- Digital triggering
- NI-MCal calibration technology for improved measurement accuracy
- 6 DMA channels for fast data throughput
- 3-year warranty

Operating Systems

- Windows 2000/NT/XP
- Mac OS X
- Linux

Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio

Other Compatible Software

- SignalExpress
- VI Logger
- Visual Studio .NET
- C/C++/C#

Measurement Services Software (included)¹

- NI-DAQmx driver software
- Measurement & Automation Explorer configuration utility
- VI Logger Lite data-logging software

¹Mac OS X and Linux users must download NI-DAQmx Base driver.



Family	Bus	Analog Inputs	Analog Input Resolution (bits)	Analog Outputs	Output Resolution (bits)	Max Output Rate (kS/s)	Output Range (V)	Digital I/O	Correlated (clocked) DIO
NI 6220	PCI, PXI	16	16	—	—	—	—	24	8, up to 1 MHz
NI 6221	PCI, PXI	16	16	2	16	833	± 10	24	8, up to 1 MHz
NI 6221 (37-Pin) ¹	PCI	16	16	2	16	833	± 10	10	2, up to 1 MHz
NI 6224	PCI, PXI	32	16	—	—	—	—	48	32, up to 1 MHz
NI 6225	PCI, PXI	80	16	2	16	833	± 10	24	8, up to 1 MHz
NI 6229	PCI, PXI	32	16	4	16	833	± 10	48	32, up to 1 MHz

¹ 37-Pin multifunction DAQ devices are not compatible with NI SCC or SCXI platforms.

Table 1. Low-Cost M Series Selection Guide

Overview and Applications

National Instruments M Series low-cost multifunction data acquisition (DAQ) devices provide optimized functionality for cost-sensitive applications. Low-cost M Series devices have up to 80 analog inputs, 48 digital I/O lines, four analog outputs, two counter/timers, and digital triggering. All low-cost M Series devices have a three-year manufacturing warranty and a one-year calibration interval. For applications requiring better accuracy, faster speeds, and extended calibration services, consider the high-speed and high-accuracy M Series devices. M Series devices are ideal for applications including test, control, and design.

M Series for Test

For test, you can use 16-bit, 250 kS/s analog inputs and 1 MHz digital lines in conjunction with NI signal conditioning for applications including data logging and sensor measurements. Low-cost M Series devices are compatible with National Instruments SCC and SCXI signal conditioning platforms, which provide amplification, filtering, and power for virtually every type of sensor. These platforms also are compliant with IEEE 1451.4 smart transducer electronic data sheet (TEDS) sensors, which provide digital storage for sensor data sheet information.

M Series for Control

M Series digital lines can drive 24 mA for relay and actuator control. With up to four analog outputs, two 80 MHz counter/timers, and six DMA channels, M Series devices can execute multiple control loops simultaneously. Low-cost M Series devices also have direct support for encoder measurements, protected digital lines, and digital debounce filters for control applications. With up to 80 analog inputs, 32 clocked digital lines at rates of 1 MHz, and four analog outputs, you can execute multiple control loops with a single device. For higher-count control loops, you can use M Series devices in conjunction and tightly synchronized with National Instruments analog output devices for 64 or more loops.

M Series for Design

For design applications, you can use the wide range of I/O – from 80 analog inputs to 48 digital lines – to measure and verify prototype designs. M Series devices and National Instruments SignalExpress interactive measurement software bring benchtop measurements to the PC. With NI SignalExpress interactive configuration-based steps, you can quickly create design verification tests. The fast acquisition and generation rates of high-speed M Series devices along with SignalExpress provide on-the-fly design analysis. You can convert

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your tested and verified SignalExpress projects to NI LabVIEW applications for immediate M Series DAQ use and bridge the gap between test, control, and design applications.

Simultaneous and Intelligent Data Acquisition

When you need to obtain performance from a data acquisition device beyond the capabilities of a multifunction DAQ device, National Instruments provides simultaneous sampling with NI S Series and intelligent DAQ with NI R Series. The S Series architecture dedicates an ADC per channel to provide higher aggregate sampling rates compared to multiplexed devices. S Series devices are ideal for applications including IF digitization, transient recording, ultrasound and sonar testing, and high-energy physics.

The National Instruments multifunction R Series data acquisition devices contain a 1M/3M gate FPGA that is reconfigurable using the National Instruments LabVIEW FPGA Module. The multifunction R Series devices have up to eight independent 16-bit analog inputs with up to 200 kHz simultaneous sampling, up to eight independent 16-bit analog outputs with up to 1 MHz simultaneous update rates, and up to 96 digital I/O lines configurable at rates up to 40 MHz. You can customize these devices to develop capabilities such as complete control over the synchronization and timing of all signals and operations; user-defined onboard decision-making logic; and digital lines individually configurable as input, output, counter/timers, PWM, flexible encoder inputs, or user-defined communication protocols.

Recommended Accessories

Signal conditioning is required for sensor measurements or voltage inputs greater than 10 V. National Instruments SCXI is a versatile, high-performance signal conditioning platform optimized for high-channel-count applications. NI SCC provides portable, flexible signal conditioning options on a per-channel basis. Refer to ni.com/sigcon for resources on available NI signal conditioning. The new National Instruments PCI-6221 (37-Pin) is the first M Series device to offer the 37-pin D-Sub connector that lowers connectivity cost by

80 percent. The D-Sub connector makes the NI PCI-6221 (37-Pin) ideal for OEM applications. For applications that do not require signal conditioning, refer to Table 2 for recommended cabling and accessories.

Recommended Software

National Instruments measurement services software, built around NI-DAQmx driver software, includes intuitive application programming interfaces, configuration tools, I/O assistants, and other tools designed to reduce system setup, configuration, and development time. National Instruments recommends using the latest version of NI-DAQmx driver software for application development in National Instruments LabVIEW, LabWindows/CVI, and Measurement Studio. To obtain the latest version of NI-DAQmx, visit ni.com/support/daq/versions. Linux and Mac OS X users can program M Series devices with NI-DAQmx Base driver software. M Series devices are compatible with the following versions (or later) of NI application software – LabVIEW, LabWindows/CVI, or Measurement Studio versions 7.x; SignalExpress 1.x; VI Logger 2.0; or LabVIEW with the LabVIEW Real-Time Module 7.1. M Series devices are not compatible with the Traditional NI-DAQ (Legacy) driver.

System Description	Cable	Terminal Block
High-performance	SHC-68-68-EPM	SCB-68, BNC-2110, BNC-2111, BNC-2120, BNC-2090
Basic shielding	SHC68-68	
Custom connectivity	SHC68-68M-EPM, SHC68-NT-S	CR-68LPR, TBX-68, CA-1000
D-Sub connectivity	SH37F-37M-1	CB-37F-1P

Table 2. Recommended Accessories (Two cables and accessories are required to access all pins on the NI 6224, NI 6225, and NI 6229 devices.)

Ordering Information

PCI

NI PCI-6220	779065-01
NI PCI-6221	779066-01
NI PCI-6221 (37-Pin)	779418-01
NI PCI-6224	779067-01
NI PCI-6225	779295-01
NI PCI-6229	779068-01

PXI

NI PXI-6220	779112-01
NI PXI-6221	779113-01
NI PXI-6224	779114-01
NI PXI-6225	779296-01
NI PXI-6229	779115-01

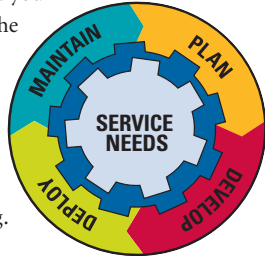
Includes data acquisition driver software.

BUY NOW!

For complete product specifications, pricing, and accessory information, call (800) 813 3693 (U.S. only) or go to ni.com/daq.

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Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with ni.com/pxiadvisor.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit ni.com/calibration.

Repair and Extended Warranty

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit ni.com/services.



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