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Portable E Series Multifunction DAQ 12 or 16-Bit, up to 1.25 MS/s, 16 Analog Inputs

E Series – Portable

- 16 analog inputs at up to 1.25 MS/s, 12 or 16-bit resolution
- Up to 2 analog outputs at up to 1 MS/s, 12 or 16-bit resolution
- 8 digital I/O lines (TTL/CMOS); two 24-bit counter/timers
- Analog and digital triggering
- 4 analog input signal ranges
- NI-DAQ Measurement Services simplifies configuration and measurements

Operating Systems

- Windows 2000/NT/XP

Recommended Software

- LabVIEW
- LabWindows/CVI
- Measurement Studio
- VI Logger

Other Compatible Software

- Visual Basic, C/C++, and C#

Measurement Services Software (included)

- NI-DAQ 7



Products	Bus	Analog Inputs	Input Resolution	Max Sampling Rate	Input Range	Analog Outputs	Output Resolution	Output Rate	Output Range	Digital I/O	Counter/Timers	Triggers	Measurement Services Software ¹
DAQCard-6036E	PCMCIA	16 SE/8 DI	16 bits	200 kS/s	±0.05 to ±10 V	2	16 bits	1 kS/s	±10 V	8	2	Digital	NI-DAQmx
DAQCard-6062E	PCMCIA	16 SE/8 DI	12 bits	500 kS/s	±0.05 to ±10 V	2	12 bits	850 kS/s	±10 V	8	2	Analog, digital	NI-DAQmx
DAQCard-6024E	PCMCIA	16 SE/8 DI	12 bits	200 kS/s	±0.05 to ±10 V	2	12 bits	1 kS/s	±10 V	8	2	Digital	NI-DAQmx
DAQPad-6052E	IEEE 1394	16 SE/8 DI	16 bits	333 kS/s	±0.05 to ±10 V	2	16 bits	333 kS/s	±10 V	8	2	Analog, digital	Traditional NI-DAQ
DAQPad-6070E	IEEE 1394	16 SE/8 DI	12 bits	1.25 MS/s	±0.05 to ±10 V	2	12 bits	1 MS/s	±10 V	8	2	Analog, digital	Traditional NI-DAQ
DAQPad-6020E	USB	16 SE/8 DI	12 bits	100 kS/s	±0.05 to ±10 V	2	12 bits	100 kS/s	±10 V	8	2	Digital	Traditional NI-DAQ

¹For up-to-date information on NI-DAQ, visit ni.com/support/daq/versions.htm

Table 1. NI Portable E Series Model Guide

Overview and Applications

National Instruments portable E Series DAQ products deliver the same functionality available in PCI and PXI E Series DAQ devices – in a portable format. The DAQPad devices are hot swappable and available in up to three different configurations. The 15 cm enclosure is ideal for desktop or portable applications and features a 68-pin shielded connector. The 30 cm enclosure with mass termination offers a low-profile package that fits under your laptop computer. It features a 68-pin shielded connector to connect signals from our SCC modular signal conditioning products or from our CA-1000 custom connectivity enclosure. The 30 cm enclosure with BNC connectivity is ideal for applications where portability and quick connectivity are needed, such as in-vehicle automotive or aircraft testing and portable data logging.

NI DAQCards are Type II, PC Card compliant and provide performance equivalent to their PCI or PXI counterparts. However, due to their compact design, they can be used in applications where space constraints are an important concern, such as field service and research.

Highly Accurate Hardware Design

NI portable E Series DAQ devices provide the functionality of E Series data acquisition devices in a portable format:

Temperature Drift Protection Circuitry – Designed with components that minimize the effect of temperature changes on measurements to less than 0.0010% of reading per °C.

Resolution Improvement Technologies – Carefully designed noise floor maximizes the resolution.

Onboard Self-Calibration – Precise voltage reference included for calibration and measurement accuracy. Self-calibration is completely software controlled, with no potentiometers to adjust.

NI DAQ-STC – Timing and control ASIC designed to provide more flexibility, lower power consumption, and a higher immunity to noise and jitter than off-the-shelf counter/timer chips.

NI MITE – ASIC designed to optimize data transfer for multiple simultaneous operations using bus mastering with DMA channels, interrupts, or programmed I/O.



Portable E Series Multifunction DAQ

12 or 16-Bit, up to 1.25 MS/s, 16 Analog Inputs

Models		NI 6052E	NI 6070E	DAQCard-6062E	DAQPad-6020E	DAQCard-6036E	DAQCard-6024E
Measurement Sensitivity* (mV)		0.0025	0.009	0.010	0.006	0.004	0.009
Nominal Range (V)							
Positive FS	Negative FS	Absolute Accuracy (mV)					
10	-10	4.747	14.369	17.945	14.826	8.653	19.012
5	-5	0.876	5.193	6.983	4.671	2.357	6.517
2.5	-2.5	1.190	3.605	4.502	3.719	–	–
1	-1	0.479	1.452	1.813	1.498	–	–
0.5	-0.5	0.243	0.735	0.917	0.757	0.454	0.0972
0.25	-0.25	0.137	0.379	0.474	0.387	–	–
0.1	-0.1	0.064	0.163	0.203	0.165	–	–
0.05	-0.05	0.035	0.091	0.113	0.091	0.067	0.119
10	0	1.232	6.765	8.55	5.721	–	–
5	0	2.119	5.391	6.288	5.619	–	–
2	0	0.850	2.167	2.528	2.258	–	–
1	0	0.428	1.092	1.274	1.137	–	–
0.5	0	0.242	0.558	0.653	0.577	–	–
0.2	0	0.111	0.235	0.274	0.241	–	–
0.1	0	0.059	0.127	0.149	0.129	–	–

Note: Accuracies are valid for measurements following an internal Calibration. Measurement accuracies are listed for operational temperatures within ± 1 °C of internal calibration temperature and ± 10 °C of external or factory-calibration temperature. One-year calibration interval recommended. The Absolute Accuracy at Full Scale calculations were performed for a maximum range input voltage (for example, 10 V for the ± 10 V range) after one year, assuming 100 pt averaging of data.*Smallest detectable voltage change in the input signal at the smallest input range.

Table 2. NI Portable E Series Analog Input Absolute Accuracy Specifications

Models		NI 6052E	NI 6070E	DAQCard-6062E	DAQPad-6020E	DAQCard-6036E	DAQCard-6024E
Nominal Range (V)							
Positive FS	Negative FS	Absolute Accuracy (mV)					
10	-10	1.405	8.127	10.568	8.133	2.547	10.568
10	0	1.176	5.685	–	5.691	–	–

Table 3. NI Portable E Series Analog Output Absolute Accuracy Specifications

NI PGIA – Measurement and instrument class amplifier that guarantees settling times at all gains. Typical commercial off-the-shelf amplifier components do not meet the settling time requirements for high-gain measurement applications.

PFI Lines – Eight programmable function input (PFI) lines that can be used for software-controlled routing of intraboard digital and timing signals.

RSE Mode – In addition to differential and nonreferenced single-ended modes, NI portable E Series devices offer referenced single-ended (RSE) mode for use with floating signal sources in applications with channel counts higher than eight.

Onboard Temperature Sensor – Included for monitoring the operating temperature of the device to ensure that it is operating within the specified range.

Analog and Digital Triggering – Some portable E Series devices provide the ability to set a trigger based on the level of an analog signal, in addition to the ability to trigger off an edge of a digital signal.

High-Performance, Easy-to-Use Driver Software

Measurement Services Software includes NI-DAQ, the robust driver software that makes it easy to access the functionality of your data acquisition hardware, whether you are a beginning or advanced user. Helpful features include:

Automatic Code Generation – The DAQ Assistant is an interactive guide that steps you through configuring, testing, and programming measurement tasks and generates the necessary code automatically for LabVIEW, LabWindows/CVI, or Measurement Studio.

Cleaner Code Development – Basic and advanced software functions have been combined into one easy-to-use yet powerful set to help you build cleaner code and move from basic to advanced applications without replacing functions.

High-Performance Driver Engine – Software-timed single point input (typically used in control loops) with NI-DAQ achieves rates of up to 50 kHz. NI-DAQ also delivers maximum system throughput I/O with a multithreaded driver.

Test Panels – With NI-DAQ, you can test all of your device functionality before you begin development.

Scaled Channels – Easily scale your voltage data into the proper engineering units using the NI-DAQ measurement-ready virtual channels by choosing from a list of common sensors and signals or creating your own custom scale.

LabVIEW Integration – All NI-DAQ functions use the waveform data type, which carries acquired data and timing information directly into more than 400 LabVIEW built-in analysis routines for display of results in engineering units on a graph.

Portable E Series Multifunction DAQ 12 or 16-Bit, up to 1.25 MS/s, 16 Analog Inputs

Worldwide Support and Services

NI provides you with a wealth of resources to help you get your application up and running more quickly, including:

Technical Support – Purchase of NI hardware or software gives you access to application engineers all over the world as well as Web resources with more than 3,000 measurement examples and more than 9,000 KnowledgeBase entries. – ni.com/support

Calibration – Includes NIST-traceable basic calibration certificates, services for ANSI/NCCL-Z540 and periodic calibration – ni.com/calibration

Extended Warranty – Meet project life-cycle requirements and maintain optimal performance in a cost-effective way – ni.com/services

For more information on NI services and support, please visit ni.com/services

Visit ni.com/oem for information on our quantity discounts.

For information on device support in NI-DAQ 7, visit ni.com/dataacquisition

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, intended for high-channel-count applications. NI SCC products provide portable, flexible signal conditioning options on a per-channel basis. Both signal conditioning platforms are designed to increase the performance and reliability of your DAQ System, and are up to 10X more accurate than terminal blocks (please visit ni.com/sigcon for more details). Refer to the table below for more information:

Sensor/Signals (>10 V)			
System Description	DAQ Device	Signal Conditioning	
High performance	DAQCard-60xxE, DAQPad-60xxE	SCXI	
Low-Cost, portable	DAQCard-60xxE, DAQPad-60xxE	SCC	

Signals (<10 V) ¹			
System Description	DAQ Device	Terminal Block	Cable
Shielded	DAQPad-60xxE	SCB-68	SH6868-EP
Shielded	DAQCard-60xxE	SCB-68	SHC6868-EP
Low-Cost	DAQPad-60xxE	CB-68LP	R6868
Low-Cost	DAQCard-60xxE	CB-68LP	RC6868

¹Terminal Blocks do not provide signal conditioning (ie. filtering, amplification, isolation, etc.), which may be necessary to increase the accuracy of your measurements.

Table 4. Recommended Accessories

Ordering Information

NI DAQCard-6036E	778561-01
NI DAQCard-6062E	777976-01
NI DAQCard-6024E	778269-01
NI DAQPad-6052E ¹ for FireWire (IEEE 1394) with Mass termination, AC Adapter ² , and 4 m FireWire cable	
US 120 VAC	778535-01
Universal Euro 240 VAC	778535-04
United Kingdom 240 VAC	778535-06
BNC termination, AC Adapter ² , and 4 m FireWire cable	
US 120 VAC	778536-01
Universal Euro 240 VAC	778536-04
United Kingdom 240 VAC	778536-06
NI DAQPad-6070E for FireWire ¹ (IEEE 1394) with Mass termination, AC Adapter ² , and 4 m FireWire cable	
US 120 VAC	777867-01
Universal Euro 240 VAC	777867-04
United Kingdom 240 VAC	777867-06
BNC termination, AC Adapter ² , and 4 m FireWire cable	
US 120 VAC	777803-01
Universal Euro 240 VAC	777803-04
United Kingdom 240 VAC	777803-06
NI DAQPad-6020E for USB ¹ in 15 cm enclosure with AC Adapter ² , and 1 m USB cable	
US 120 VAC	777474-01
Universal Euro 240 VAC	777474-04
United Kingdom 240 VAC	777474-06
Japan 120 VAC	777474-07

30 cm enclosure with mass termination, AC Adapter ² , and 1 m USB cable	
US 120 VAC	777704-01
Universal Euro 240 VAC	777704-04
United Kingdom 240 VAC	777704-06
Japan 120 VAC	777704-07
30 cm enclosure with BNC termination AC Adapter ² , and 1 m USB cable	
US 120 VAC	777703-01
Universal Euro 240 VAC	777703-04
United Kingdom 240 VAC	777703-06
Japan 120 VAC	777703-07

Includes NI-DAQ software

¹Windows 2000/XP only for DAQCards

²The AC Adapter is universal. The difference between these kits is the power cable.

DAQPad Accessories

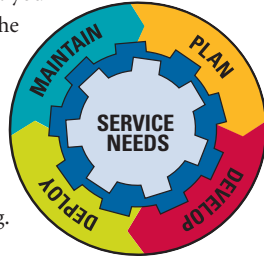
BP-1 rechargeable battery pack	
120 VAC charger	776896-01
230 VAC charger	776896-31
Rack-mount kit	777665-01
Stacking kit	777666-01
PCI-to-IEEE 1394 adapter	Please call
CardBus-to-IEEE 1394 adapter	Please call

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We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit ni.com/ssp.

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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