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Find the *National Instruments AT-MIO-16E-10* at our website: *Click HERE*

E Series Multifunction DAQ – 100 kS/s, 12-Bit, 16 Analog Inputs

NI 6020E, NI 6021E

- 100 kS/s, 12-bit resolution, 16 single-ended analog inputs
- Two 12-bit analog output channels
- 8 or 32 digital I/0 lines (5 V/TTL); two 24-bit counter/timers
- Digital triggering
- Available for USB and ISA
- NI--DAQ driver software simplifies configuration and measurements

Models

NI 6020E
- DAQPad-6020E for USB
- AT-MIO-16E-10

NI 6021E
- AT-MIO-16DE-10

NI Application Software

- LabVIEW
- Measurement Studio
- VI Logger

Operating System Compatibility

- Windows 2000/NT/Me/9x*
- Windows 2000/Me/98 only for USB

Accessories

See page 224

Calibration Certificate Included

See page 24

*Visit *ni.com/info* and enter winxp for the latest operation system information.



Overview

The NI 6020E and NI 6021E DAQ devices use E Series technology to deliver high performance and reliable data acquisition capabilities to meet a wide range of application requirements. You get up to 100 kS/s, 12-bit performance on 16 single-ended analog inputs. Depending on your type of hard drive, these devices can stream to disk at rates up to 100 kS/s.

These E Series DAQ devices feature digital triggering capability, as well as two 12-bit analog outputs; two 24-bit, 20 MHz counter/timers; and 8 or 32 digital I/O lines.

See the E Series Multifunction DAQ Overview on page 230 for a detailed hardware overview.

DAQPad Configurations



The DAQPad-6020E for USB is available in 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 right under your laptop. It features a 68-pin shielded connector to connect signals from our SCC Series 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 is needed, such as in-vehicle automotive or aircraft testing.

INFO CODES

For more information or to order products online, visit *ni.com/info* and enter:

daqpad6020e
atmio16e10
atmio16de10

BUY ONLINE!

DAQPad-6020E Power

The DAQPad-6020E is powered by an AC to DC adapter unit. With this unit, you can power the DAQPad-6020E from any standard AC source. You can also power the DAQPad-6020E with any 9 to 30 VDC supply. In addition, with an optional BP-1 rechargeable battery pack, you can power the DAQPad-6020E for up to 2.5 hours between charges.

If you are looking for a PCI solution, consider our NI 6040E DAQ devices. See page 243.

Family	Bus	Analog Inputs	Resolution	Sampling Rate S/s	Input Range	Analog Outputs	Resolution	Output Rate	Output Range	Digital I/O	Counter/ Timers	Triggers
NI 6020E	USB, ISA	16 SE/8 DI	12 bits	100 kS/s	±0.05 to ±10 V	2	12 bits	100 kS/s	up to ±10 V	8	2, 24-bit	Digital
NI 6021E	ISA	16 SE/8 DI	12 bits	100 kS/s	±0.05 to ±10 V	2	12 bits	100 kS/s	up to ±10 V	32	2, 24-bit	Digital

Table 1. NI 6020E and NI 6021E Channel, Speed, and Resolution Specifications (See page 266 for detailed specifications.)

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E Series Multifunction DAQ – 100 kS/s, 12-Bit, 16 Analog Inputs

DAQ Designer Interactive Configuration CD

For an in-depth, interactive guide to configuring your measurement system, run DAQ Designer – a system configuration utility that helps you select from our wide variety of measurement products. DAQ Designer prompts you for information about your application and its requirements, such as the quantity and types of signals and sensors, filtering, and isolation. When finished, DAQ Designer generates a list of National Instruments products matching your requirements. To request a free Windows-based CD or to run DAQ Designer online, visit *ni.com/daq*



CD available in English, French, German, Italian, Japanese, Korean, Portuguese, and Spanish.



Choose the NI BP-1 battery pack to power your DAQPad-6020E for up to 2.5 hours.

Consider our SCC Series for adding signal conditioning to your DAQPad-6020E. See page 461.

Ordering information

NI 6020E
- DAQPad-6020E for USB[1] in
  - 15 cm enclosure with AC Adapter[2] and USB cable
    - U.S. 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 USB cable
      - U.S. 120 VAC 777704-01
      - Universal Euro 240 VAC 777704-04
      - United Kingdom 240 VAC 777704-06
      - Japan 120 VAC 777704-07
    - BNC termination, AC Adapter[2], and USB cable
      - U.S. 120 VAC 777703-01
      - Universal Euro 240 VAC 777703-04
      - United Kingdom 240 VAC 777703-06
      - Japan 120 VAC 777703-07
  - AT-MIO-16E-10 777521-01

NI 6021E
- AT-MIO-16DE-10 777640-01

Includes NI-DAQ driver software. USB products include 1 m USB cable.

[1]Windows 2000/98/Me only for USB.

[2]The AC adapter is universal. The difference between these kits is the power cable.

Accessories

BP-1 Rechargeable battery pack
- 120 VAC charger 776896-01
- 230 VAC charger 776896-31

For information on extended warranty and value-added services, see page 22.

Recommended Configurations

Family	DAQ Device	Accessory	Cable
NI 6020E	DAQPad-6020E (15 cm enclosure)	SCB-68 (776844-01)	SH6868-EP (184749-01)
	DAQPad-6020E (30 cm enclosure, mass termination)	CA-1000[3] (777664-01)	SH6868-EP (184749-01)
	DAQPad-6020E (30 cm enclosure, BNC termination)	None	None
	AT-MIO-16E-10	SCB-68 (776844-01)	SH6868-EP (184749-01)
NI 6021E	AT-MIO-16DE-10	SCB-100 (776990-01)	SH100100 (182853-01)

[3]See page 257 for more details on the CA-1000.

For E Series accessory and cable information, see page 256.

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E Series Multifunction DAQ – 100 kS/s, 12-Bit, 16 Analog Inputs

Absolute Accuracy		Relative Accuracy								
Nominal Range (V)		% of Reading		Offset	Noise + Quantization (mV)		Temp	Absolute Accuracy	Resolution (mV)	
Positive FS	Negative FS	24 Hrs	1 Year	(mV)	Single Pt.	Averaged	Drift (%/°C)	at Full Scale (mV)	Single Pt.	Averaged
10.0	-10.0	0.072	0.076	6.380	3.467	0.846	0.0010	14.826	5.729	1.114
5.0	-5.0	0.019	0.021	3.198	1.733	0.423	0.0005	4.6710	2.865	0.557
2.5	-2.5	0.072	0.076	1.608	0.867	0.211	0.0010	3.7190	1.432	0.278
1.0	-1.0	0.072	0.076	0.653	0.347	0.085	0.0010	1.4980	0.573	0.111
0.5	-0.5	0.072	0.076	0.335	0.173	0.042	0.0010	0.7570	0.286	0.056
0.25	-0.25	0.072	0.076	0.176	0.105	0.021	0.0010	0.3870	0.151	0.028
0.1	-0.1	0.072	0.076	0.081	0.061	0.008	0.0010	0.1650	0.074	0.011
0.05	-0.05	0.072	0.076	0.049	0.049	0.004	0.0010	0.0910	0.056	0.006
10.0	0.0	0.019	0.021	3.198	1.733	0.423	0.0005	5.7210	2.865	0.557
5.0	0.0	0.072	0.076	1.608	0.867	0.211	0.0010	5.6190	1.432	0.278
2.0	0.0	0.072	0.076	0.653	0.347	0.085	0.0010	2.2580	0.573	0.111
1.0	0.0	0.072	0.076	0.335	0.173	0.042	0.0010	1.1370	0.286	0.056
0.5	0.0	0.072	0.076	0.176	0.105	0.021	0.0010	0.5770	0.151	0.028
0.2	0.0	0.072	0.076	0.081	0.061	0.008	0.0010	0.2410	0.074	0.011
0.1	0.0	0.072	0.076	0.049	0.049	0.004	0.0010	0.1290	0.056	0.006

Note: Accuracies are valid for measurements following an internal E Series Calibration. Averaged numbers assume dithering and averaging of 100 single-channel readings. 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. See overview on page 234 for an example calculation of this type.

Table 2. NI 6020E, NI 6021E Analog Input Accuracy Specifications

		Absolute Accuracy					
Nominal Range (V)		% of Reading				Temp	Absolute Accuracy
Positive FS	Negative FS	24 Hrs	90 Days	1 Year	Offset (µV)	Drift (%/°C)	at Full Scale (mV)
10	-10	0.018	0.020	0.022	5.93	0.0005	8.133
10	0	0.018	0.020	0.022	3.49	0.0005	5.691

Note: Temp Drift applies only if ambient is greater than ±10 °C of previous external calibration. See page 234 for example calculations.

Table 3. NI 6020E, NI 6021E Analog Output Accuracy Specifications.

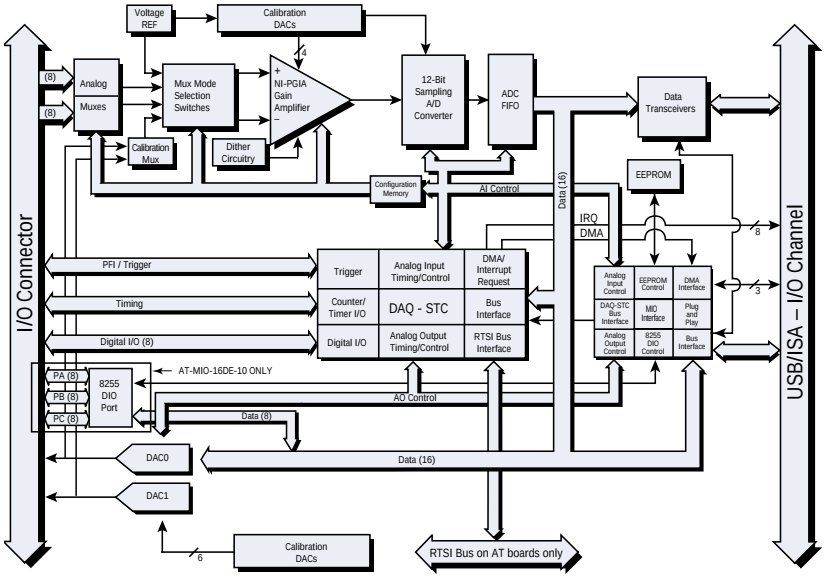


Figure 3. NI 6020E and NI 6021E Hardware Block Diagram

See page 233 in the E Series Multifunction DAQ Overview for I/O connector diagrams.

See page 266 for detailed specifications.

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