Low-Cost E Series Multifunction I/O – 200 kS/s, 12-Bit, 16 Analog Inputs

6023E/6024E/6025E Families

6023E Family
PCI-6023E
6024E Family
PCI-6024E
6025E Family
PCI-6025E
PXI-6025E

Analog Inputs
16 single-ended, 8 differential channels
200 kS/s sampling rate
200 kS/s stream-to-disk rate
12-bit resolution

Analog Output (6024E and 6025E only)
2 channels, 12-bit resolution

Digital I/O
8 (5 V/TTL) lines (6023E and 6024E)
32 (5 V/TTL) lines (6025E)

Counter/Timers
2 up/down, 24-bit resolution

Triggering
Digital

Driver Software
NI-DAQ
Windows 2000/NT/9x
*Mac OS**
**not for all hardware,*
refer to page 192

Application Software
LabVIEW
LabWindows/CVI
ComponentWorks
VirtualBench
Measure
BridgeVIEW
Lookout

Calibration Certificate Included!
(refer to page 216)

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Family	Bus	Analog Inputs	Resolution	Sampling Rate	Input Range	Analog Outputs	Resolution	Output Rate	Output Range	Digital I/O	Counter/ Timers	Triggers
6023E	PCI	16 SE/8 DI	12 bits	200 kS/s	±0.05 to ±10 V	–	–	–	–	8	2, 24-bit	Digital
6024E	PCI	16 SE/8 DI	12 bits	200 kS/s	±0.05 to ±10 V	2	12 bits	10 kS/s[1]	±10 V	8	2, 24-bit	Digital
6025E	PCI, PXI/CPCI	16 SE/8 DI	12 bits	200 kS/s	±0.05 to ±10 V	2	12 bits	10 kS/s[1]	±10 V	32	2, 24-bit	Digital

[1] 10 kS/s system dependent when using the single DMA channel for analog output. 1 kS/s system dependent when using the single DMA channel for either analog input or counter/timer operations.

Table 1. 6023E/6024E/6025E Families Channel, Speed, and Resolution Specifications *(refer to page 304 for more detailed specifications)*

Overview

The 6023E, 6024E, and 6025E are our lowest cost families of devices that use E Series technology to deliver high performance and reliable data acquisition capabilities in a wide range of applications. You get up to 200 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 200 kS/s.

These E Series devices feature digital triggering capability, as well as two 24-bit, 20 MHz counter/timers; and 8 digital I/O lines. The 6024E and 6025E also feature two 12-bit analog outputs. An additional 24 lines of 5 V/TTL I/O makes the 6025E family the best value of any PCI data acquisition device available.

For a more detailed hardware overview, refer to the E Series Multifunction I/O Overview on page 220.

Ordering Information

6023E Family

PCI-6023E *and NI-DAQ for*
Windows 2000/NT/9x.....777742-01
Mac OS 777742-02

6024E Family

PCI-6024E *and NI-DAQ for*
Windows 2000/NT/9x.....777743-01
Mac OS 777743-02

6025E Family

PCI-6025E *and NI-DAQ for*
Windows 2000/NT/9x.....777744-01
Mac OS 777744-02
PXI-6025E**.....777798-01**

Includes NI-DAQ for Windows 2000/NT/9x on CD unless otherwise noted. See pages 192 and 210 for more details.

Example Configurations

Family	DAQ Board	Cable (page 296)	Accessory (page 292)
6023E	PCI-6023E	R6868 (182482-01)	CB-68LP (777145-01)
6024E	PCI-6024E	R6868 (182482-01)	CB-68LP (777145-01)
6025E	PCI-6025E	R1005050 (182762-01)	Two CB-50LPs (777101-01)
	PXI-6025E	R1005050 (182762-01)	Two CB-50LPs (777101-01)

For more detailed cable and accessory options, refer to page 286-299.

Low-Cost E Series Multifunction I/O – 200 kS/s, 12-Bit, 16 Analog Inputs

	Absolute Accuracy							Relative Accuracy	
	% of Reading				Noise + Quantization (mV)			Resolution (mV)	
Nominal Range (V)	24 Hrs	90 Days	1 Year	Offset (mV)	Single Pt.	Averaged	Temp Drift (%/°C)	Single Pt.	Averaged
±10	0.072%	0.074%	0.076%	6.385	3.906	0.975	0.0010	5.892	1.284
±5	0.027%	0.029%	0.031%	3.203	1.953	0.488	0.0005	2.946	0.642
±0.5	0.072%	0.074%	0.076%	0.340	0.195	0.049	0.0010	0.295	0.064
±0.05	0.072%	0.074%	0.076%	0.054	0.063	0.006	0.0010	0.073	0.008

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. See page 300 for example accuracy calculations.

Table 2. 6023E/6024E/6025E Families Analog Input Accuracy Specifications

	Absolute Accuracy				
	% of Reading				Temp
Nominal Range (V)	24 Hrs	90 Days	1 Year	Offset (mV)	Drift (%/°C)
±10	0.018%	0.020%	0.022%	5.93	0.0005

Note: Temp Drift applies only if ambient is greater than ±10 °C of previous external calibration. See page 300 for example calculations.

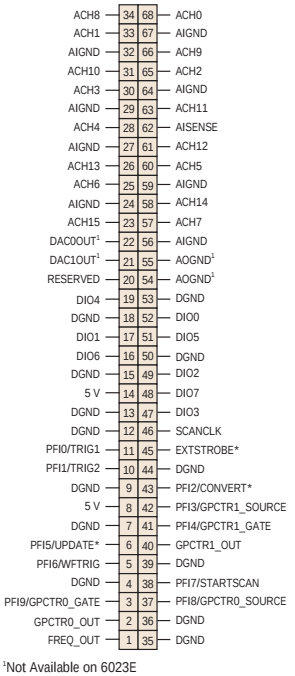
Table 3. 6024E and 6025E Families Analog Output Accuracy Specifications

Refer to page 304 for more detailed specifications.

	Analog Input			Analog Output			Available	PCI Bus
Product	Sample Rate	Polarity	Range Selections	Update Rate	Polarity	FIFO Size	DMA Channels	Master
PCI-6023E/6024E/6025E	200 kS/s	Bipolar	20 V, 10 V, 1 V, 100 mV	Up to 10 kS/s[1]	Bipolar	–	1	✓
PCI-6040E	250 kS/s	Unipolar or Bipolar	20 V, 10 V, 5 V, 2 V, 1 V 500 mV, 200 mV, 100 mV	Up to 1 MS/s	Unipolar or Bipolar	512 Samples	3	✓
PCI-6070E	1.25 MS/s	Unipolar or Bipolar	20 V, 10 V, 5 V, 2 V, 1 V 500 mV, 200 mV, 100 mV	Up to 1 MS/s	Unipolar or Bipolar	2,048 Samples	3	✓

[1] 10 kS/s system dependent when using the single DMA channel for analog output. 1 kS/s system dependent when using the single DMA channel for either analog input or counter/timer operations.

Table 4. How To Choose between the PCI-6024E, PCI-6040E, and PCI-6070E Families *This table highlights the differences between these three families of products. Use the table to determine which device has the features your application requires.*



[1]Not Available on 6023E

Figure 1. 6023E and 6024E Families I/O Connector

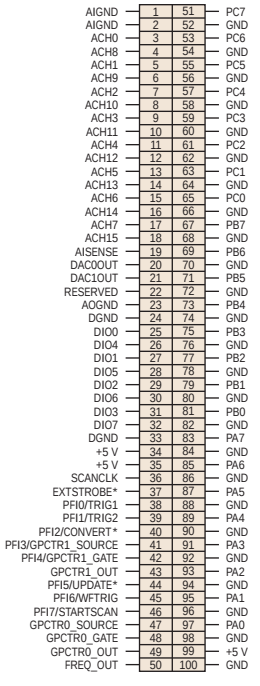


Figure 2. 6025E Family I/O Connector

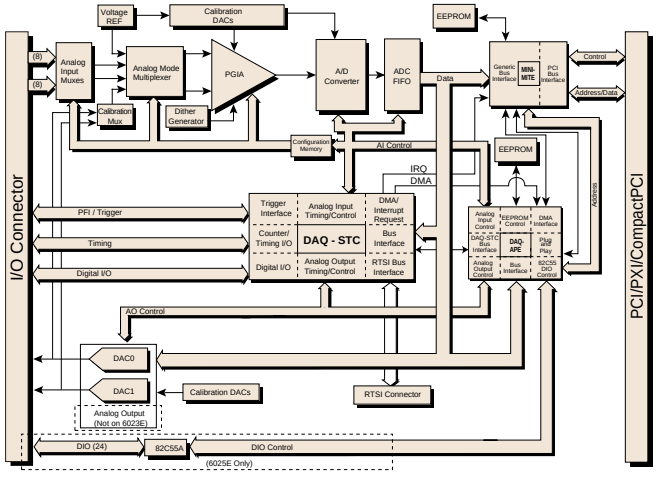


Figure 3. 6023E/6024E/6025E Families Hardware Block Diagram

Specifications

12-Bit E Series *(6070E,6060E,6040E,and 6020E Families)*

These specifications are typical for 25 °C unless otherwise noted.

Analog Input

Accuracy specifications ..... *See related product overview pages*

Input Characteristics

Number of channels

6070E 6060E 604xE 602xE	16 single-ended or 8 differential (software selectable per channel)
6071E 6061E	64 single-ended or 32 differential (software selectable per channel)

Type of ADC ..... *Successive approximation*
Resolution ..... *12 bits, 1 in 4,096*
Maximum sampling rate

607xE	1.25 MS/s
6060E	500 kS/s
604xE	500 kS/s single channel scanning 250 kS/s multichannel scanning
6061E	500 kS/s single channel scanning 333 kS/s multichannel
6023E 6024E 6025E	200 kS/s
6020E 6021E	100 kS/s

Streaming-to-disk rate (system dependent)[1]

607xE	1.25 MS/s
606xE	500 kS/s
604xE	250 kS/s (except for DAQCard)
6023E 6024E 6025E	200 kS/s
6020E 6021E	100 kS/s[2]

[1]Streaming-to-disk rates do not apply to RT series devices

[2]DAQPad-6020E rates with SCSI or DMA-enabled EIDE

Input signal ranges

Device	Range (Software Selectable)	Input Range	
		Bipolar	Unipolar
607xE	20 V	±10 V	–
606xE	10 V	±5 V	0 to 10 V
604xE	5 V	±2.5 V	0 to 5 V
6020E	2 V	±1 V	0 to 2 V
6021E	1 V	±500 mV	0 to 1 V
	500 mV	±250 mV	0 to 500 mV
	200 mV	±100 mV	0 to 200 mV
	100 mV	±50 mV	0 to 100 mV
6023E	20 V	±10 V	–
6024E	10 V	±5 V	–
6025E	1 V	±500 mV	–
	100 mV	±50 mV	–

Input coupling ..... *DC*
Maximum working voltage (signal + common mode) ..... *Input should remain within ±11 V of ground*

Overvoltage protection

Device	Powered On	Powered Off
607xE 606xE 604xE	±25 V	±15 V
6023E 6024E 6025E	±40 V	±25 V
6020E 6021E	±35 V	±25 V

Inputs protected

6070E 6060E 604xE 602xE	ACH<0..15>, AISENSE
6071E 6061E	ACH<0..63>, AISENSE, AISENSE2

FIFO buffer size

AT-MIO-16E-1	8,192 Samples
DAQPad-6020E	4,096 Samples
606xE DAQPad-6070E	2,048 Samples
6041E	1,024 Samples
PCI-MIO-16E-1 PXI-6070E 6071E, 6040E 602xE, except DAQPad	512 Samples

Data transfers
PCI, PXI, AT, VXI, DAQPad for IEEE 1394 .... *DMA, interrupts, programmed I/O*
DAQCard, DAQPad for USB ..... *Interrupts, programmed I/O*
DMA modes
PCI, PXI, VXI, DAQPad for IEEE 1394 ..... *Scatter-gather (single-transfer, demand transfer)*
AT ..... *Single transfer, demand transfer*
Configuration memory size ..... *512 words*

Transfer Characteristics

Relative accuracy

Device	Typical Dithered	Maximum Undithered
607xE 606xE 604xE 6023E 6024E 6025E	±0.5 LSB	±1.5 LSB
6020E 6021E	±0.2 LSB	±1.5 LSB

DNL

Board	Typical	Maximum
607xE 606xE 604xE 6023E 6024E 6025E	±0.5 LSB	±1.0 LSB
6020E 6021E	±0.2 LSB	±1.0 LSB

No missing codes ..... *12 bits, guaranteed*

Amplifier Characteristics

Input impedance

Device	Normal Powered On	Powered Off	Overload
6070E 606xE 6040E PCI-6071E PXI-6071E	100 GΩ in parallel with 100 pF	820 Ω	820 Ω
VXI-MIO-64E-1 6041E	100 GΩ in parallel with 100 pF	1 kΩ	1 kΩ
602xE	100 GΩ in parallel with 100 pF	4.7 kΩ	4.7 kΩ

Input bias current ..... *±200 pA*
Input offset current ..... *±100 pA*
CMRR, DC to 60 Hz

Device	Range	CMRR
607xE	20 V	95 dB
606xE	10 V	100 dB
	100 mV to 5 V	106 dB
604xE	10 to 20 V	85 dB
	5 V	95 dB
	100 mV to 2 V	100 dB
6023E	10 to 20 V	85 dB
6024E	100 mV to 1 V	90 dB
6025E		
6020E 6021E	100 mV to 20 V	90 dB

12-Bit E Series *(continued)*

Dynamic Characteristics

Bandwidth

Device	Small Signal (-3 dB)	Large Signal (1% THD)
607xE	1.6 MHz	1 MHz
606xE	1 MHz	300 kHz
6041E	800 kHz	400 kHz
6040E	600 kHz	350 kHz
6023E 6024E 6025E	500 kHz	225 kHz
6021E	150 kHz	120 kHz

Settling time to full-scale step

Device	Range	Accuracy ±0.012% (±0.5 LSB)	Accuracy ±0.024% (±1 LSB)	Accuracy ±0.098% (±4 LSB)
6070E	20 V	2 µs typical 3 µs max	1.5 µs typical 2 µs max	1.5 µs typical 2 µs max
	10 V	2 µs typical 3 µs max	1.5 µs typical 2 µs max	1.3 µs typical 1.5 µs max
	200 mV to 5 V	2 µs typical 3 µs max	1.5 µs typical 2 µs max	0.9 µs typical 1 µs max
	100 mV	2 µs typical 3 µs max	1.5 µs typical 2 µs max	1 µs typical 1.5 µs max
PCI-6071E PXI-6071E	20 V	3 µs typical 5 µs max	1.9 µs typical 2.5 µs max	1.9 µs typical 2 µs max
	10 V	3 µs typical 5 µs max	1.9 µs typical 2.5 µs max	1.2 µs typical 1.5 µs max
	200 mV to 5 V	3 µs typical 5 µs max	1.9 µs typical 2.5 µs max	1.2 µs typical 1.3 µs max
	100 mV	3 µs typical 5 µs max	1.9 µs typical 2.5 µs max	1.2 µs typical 1.5 µs max
6060E	All	2 µs typical 4 µs max	1.9 µs typical 2 µs max	1.8 µs typical 2 µs max
6061E VXI-MIO-64E-1	All	3 µs typical 5 µs max	2 µs typical 3 µs max	1.8 µs typical 2 µs max
604xE	All	4 µs typical 8 µs max	4 µs max	4 µs max
6023E 6024E 6025E	All	5 µs typical	5 µs max	5 µs max
6020E 6021E	All	10 µs max	10 µs max	10 µs max

System noise (LSB_{rms}, not including quantization)

Device	Range	Dither Off	Dither On
6070E	1 V to 20 V	0.25	0.5
PCI-6071E	500 mV	0.4	0.6
PXI-6071E	200 mV	0.5	0.7
	100 mV	0.8	0.9
VXI-MIO-64E-1	500 mV to 20 V	0.15	0.5
606xE	200 mV	0.3	0.6
	100 mV	0.5	0.7
604xE	1 V to 20 V	0.2	0.5
	500 mV	0.25	0.5
	200 mV	0.5	0.7
	100 mV	0.9	1.0
6023E	1 V to 20 V	0.1	0.6
6024E	100 mV	0.7	0.8
6025E			
6020E	1 V to 20 V	0.07	0.5
6021E	500 mV	0.12	0.5
	200 mV	0.25	0.6
	100 mV	0.5	0.7

Crosstalk, DC to 100 KHz

Device	Adjacent Channels	All Other Channels
607xE, 606xE, 604xE	-75 dB	-90 dB
602xE	-60 dB	-80 dB

Analog Output

Output Characteristics

Number of channels

607xE 606xE 6040E 6020E 6021E 6024E 6025E	2 voltage outputs
6041E 6023E	None

Resolution ..... *12 bits, 1 in 4096*

Maximum update rate

Device	Waveform Generation: FIFO Mode, Internally Timed	FIFO Mode, Externally Timed	Non-FIFO Mode, 1 Channel	Non-FIFO Mode, 2 Channels
607xE 606xE 6040E	1 MS/s	950 kS/s	800 kS/s, system dependent	400 kS/s, system dependent
6023E 6024E 6025E	N/A	N/A	10 kS/s with DMA 1 kS/s with interrupts system dependent	10 kS/s with DMA 1 kS/s with interrupts system dependent
6020E; except DAQPad-6020E	N/A	N/A	100 kS/s, system dependent	100 kS/s, system dependent
DAQPad-6020E	N/A	N/A	20 S/s, system dependent	20 S/s, system dependent

Type of DAC ..... *Double buffered, multiplying*

FIFO buffer size

607xE 606xE	2,048 samples
6040E	512 samples
602xE	None

Data transfers

PCI, PXI, AT, VXI, DAQPad for IEEE-1394 .... *DMA, interrupts, programmed I/O*

DAQPad for USB, DAQCard ..... *Interrupts, programmed I/O*

DMA modes

PCI, PXI, VXI, DAQPad ..... *Scatter-gather (single transfer, demand transfer)*

AT ..... *Single transfer, demand transfer*

Transfer Characteristics

Relative accuracy

After calibration ..... *±0.3 LSB typical, ±0.5 LSB max*

Before calibration ..... *±4 LSB max*

DNL

After calibration ..... *±0.3 LSB typical, ±1.0 LSB max*

Before calibration ..... *±3 LSB max*

Monotonicity ..... *12 bits, guaranteed after calibration*

Gain error (relative to external reference) ..... *0% to +0.67% of output max, not adjustable*

Voltage Output

Ranges

607xE 606xE 6040E 6020E 6021E	±10 V, 0 to 10 V, ±EXTREF, 0 to EXTREF; software selectable
6023E 6024E 6025E	±10 V

Output coupling ..... *DC*

Output impedance ..... *0.1 Ω max*

Current drive ..... *±5 mA max*

Protection ..... *Short-circuit to ground*

Power-on state ..... *0 V (±200 mV)*

Specifications

12-Bit E Series *(continued)*

External reference input (not available on 6024E or 6025E)

Range ..... *±11 V*

Overvoltage protection

607xE 606xE 604xE	±25 V powered on, ±15 V powered off
602xE	±35 V powered on, ±25 V powered off

Input impedance ..... *10 kΩ*

Bandwidth (-3 dB)

607xE 606xE 604xE	1 MHz
602xE	300 kHz

Dynamic Characteristics

Settling time and slew rate

Device	Settling Time for Full-Scale Step	Slew Rate
607xE 606xE 6040E	3 µs to ±0.5 LSB accuracy	20 V/µs
602xE	10 µs to ±0.5 LSB accuracy	10 V/µs

Noise ..... *200 μV_{rms}, DC to 1 MHz*

Glitch energy (at mid-scale transition)

Magnitude

Device	Reglitching Disabled	Reglitching Enabled
DAQPad-6070E PCI-MIO-16E-1 PCI-6071E PXI-6070E PXI-6071E	±20 mV	±4 mV
AT-MIO-16E-1 606xE 604xE	±200 mV	±30 mV
VXI-MIO-64E-1	±70 mV	±40 mV
6023E 6024E 6025E	±12 mV	N/A
6020E 6021E	±100 mV	N/A

Duration

607xE 606xE 604xE	1.5 µs
6023E 6024E 6025E	2 µs
6020E 6021E	3 µs

Stability

Gain temperature coefficient

External reference ..... *±25 ppm/°C*

Digital I/O

6021E 6025E	32 input/output
All others	8 input/output

Number of channels

Compatibility ..... *5 V/TTL*

Power-on state ..... *Input; high impedance*

Digital logic levels

DIO<0..7> on all boards

Level	Minimum	Maximum
Input low voltage Input high voltage	0 V 2 V	0.8 V 5 V
Output low voltage (I_{out} = 24 mA) Output high voltage (I_{out} = 13 mA)	– 4.35 V	0.4 V –

PA<0..7>, PB<0..7>, PC<0..7> on remaining 24 lines of 6021E and 6025E

Level	Minimum	Maximum
Input low voltage Input high voltage	0 V 2 V	0.8 V 5 V
Output low voltage (I_{out} = 2.5 mA) Output high voltage (I_{out} = 2.5 mA)	– 3.9 V	0.4 V –

Data transfers

6021E 6025E	Interrupts, programmed I/O
All others	Programmed I/O

Handshaking (6021E and 6025E only)

Direction ..... *Input or output*

Modes *2-wire*

Transfer rate (1 word = 8 bits)

Maximum with NI-DAQ, system dependent

DAQPad-6070E	5 kwords/s
All others	50 kwords/s

Constant sustainable rate ..... *1 to 10 kwords/s, typical*

Timing I/O

General-purpose Up/Down Counter/Timers

Number of channels *2*

Resolution ..... *24 bits*

Compatibility ..... *5 V/TTL*

Digital logic levels

Level	Minimum	Maximum
Input low voltage Input high voltage	0 V 2 V	0.8 V 5 V
Output low voltage (I_{out} = 5 mA) Output high voltage (I_{out} = 3.5 mA)	– 4.35 V	0.4 V –

Base clocks available ..... *20 MHz and 100 kHz*

Base clock accuracy ..... *±0.01%*

Maximum source frequency ..... *20 MHz*

External source selections[1] ..... *PFI0..PFI9, RTSI0..RTSI3/6, Analog trigger; software selectable*

External gate selections[1] ..... *PFI0..PFI9, RTSI0..RTSI3/6, Analog trigger; software selectable*

Minimum source pulse duration ..... *10 ns*

Minimum gate pulse duration ..... *10 ns, edge-detect mode*

Data transfers

PCI, PXI, AT, VXI, DAQPad for IEEE 1394 ..... *DMA, interrupts, programmed I/O*

DAQCard, DAQPad for USB ..... *Interrupts, programmed I/O*

DMA modes

PCI, PXI, VXI, DAQPad for IEEE 1394 ..... *Scatter-gather (single transfer, demand transfer)*

AT ..... *Single transfer, demand transfer*

Frequency Scaler

Number of channels *1*

Resolution ..... *4 bits*

Compatibility ..... *5 V/TTL*

Digital logic levels

Level	Minimum	Maximum
Input low voltage Input high voltage	0 V 2 V	0.8 V 5 V
Output low voltage (I_{out} = 5 mA) Output high voltage (I_{out} = 3.5 mA)	– 4.35 V	0.4 V –

Base clocks available ..... *10 MHz, 100 kHz*

Base clock accuracy ..... *±0.01%*

Data transfers ..... *Programmed I/O*

Triggers

Analog Triggers

Number of triggers

607xE 606xE 604xE	1
602xE	None

12-Bit E Series *(continued)*

Purpose
- *Analog input* ..... *Start and stop trigger, gate, clock*
- *Analog output* ..... *Start trigger, gate, clock*
- *General-purpose counter/timers* ..... *Source, gate*

Source

6070E 6060E 604xE 602xE	ACH<0..15>, PFI0/TRIG1
6071E 6061E	ACH<0..63>, PFI0/TRIG1

Level
- *Internal source, ACH<0..15/63>* ..... *±Full-scale*
- *External source, PFI0/TRIG1* ..... *±10 V*

Slope ..... *Positive or negative; software selectable*
Resolution ..... *8 bits, 1 in 256*
Bandwidth (-3 dB)

Device	Internal Source	External Source
607xE	2 MHz	7 MHz
606xE	1 MHz	7 MHz
604xE	2 MHz	3 MHz

Hysteresis ..... *Programmable*
Accuracy ..... *±5% of full-scale range max*

Digital Triggers *(all boards)*

Number of triggers *2*
Purpose
- *Analog input* ..... *Start and stop trigger, gate, clock*
- *Analog output* ..... *Start trigger, gate, clock*
- *General-purpose counter/timers* ..... *Source, gate*

Source[1] ..... *PFI0..PFI9, RTSI0..RTSI3/6*
Slope ..... *Positive or negative; software selectable*
Compatibility ..... *5 V/TTL*
Response ..... *Rising or falling edge*
Pulse width ..... *10 ns minimum*
External input for digital or analog trigger ..... *(PFI0/TRIG1)*
Impedance ..... *10 kΩ*
Coupling ..... *DC*
Protection
- *Digital trigger* ..... *-0.5 to Vcc + 0.5 V*
- *Analog trigger*
  - *On/Off/Disabled* ..... *±35 V*

Calibration

Recommended warm-up time ..... *15 minutes; 30 minutes for DAQCard and DAQPad*
Calibration interval ..... *1 year*
Onboard calibration reference
- *DC Level* ..... *5.000 V (±3.5 mV); (±0.5 mV for VXI) over full operating temperatures, actual value stored in EEPROM*
- *Temperature coefficient* ..... *±5 ppm/°C max; (±0.6 ppm/°C max for VXI)*
- *Long-term stability* ..... *±15 ppm/ $\sqrt{1000\ h}$; (±6 ppm/ $\sqrt{1000\ h}$ for VXI)*

RTSI *(PCI, DAQPad-6070E for IEEE 1394, and ISA only)*

Trigger lines
- *PCI, ISA* *7*
- *DAQPad for IEEE 1394* *4*

PXI Trigger Bus *(PXI only)*

Trigger lines *6*
Star trigger *1*

VXI Trigger Bus *(VXI only)*

Trigger lines ..... *5 (5 V/TTL), 2 ECL*

Bus Interface

PCI, PXI, DAQPad for IEEE 1394 ..... *Master, slave*
AT, DAQCard, DAQPad for USB, VXI ..... *Slave*

Power Requirements[1,3]

Device	+5 VDC (±5%)*	Power Available at I/O Connector
607xE	1.1 A	+4.65 to +5.25 VDC, 1 A
606xE 6040E	1.0 A	+4.65 to +5.25 VDC, 1 A
602xE, (except DAQPad)	0.7 A	+4.65 to +5.25 VDC, 1 A
DAQCard-AI-16E-4	280 mA typical 400 mA maximum	+4.65 to +5.25 VDC, 250 mA
*Excludes power consumed through I/O connector.		

Device	Power	Power Available at I/O Connector
DAQPad-6020E	15 W[5], +9 to +30 VDC	+4.65 to +5.25 VDC, 1 A
DAQPad-6070E	17 W[5], +9 to +25 VDC	+4.65 to +5.25 VDC, 1 A

Discharge time with BP-1 battery pack
- *IEEE 1394 DAQPads* ..... *2.5 hours, typical*
- *USB DAQPads* ..... *3 hours, typical*

Physical[2]

Dimensions (not including connectors)[2]
- *PCI*[3] ..... *17.5 by 9.9 cm (6.9 by 3.9 in.)*
- *PXI* ..... *16.0 by 10.0 cm (6.3 by 3.9 in.)*
- *AT (long)* ..... *33.8 by 9.9 cm (13.3 by 3.9 in.)*
- *AT (short)* ..... *17.5 by 9.9 cm (6.9 by 4.2 in.)*
- *DAQPad (30 cm enclosure)* ..... *25.4 by 30.5 by 4.6 cm (10 by 12 by 1.8 in.)*
- *DAQPad (15 cm enclosure)* ..... *14.6 by 21.3 by 3.8 cm (5.8 by 8.4 by 1.5 in.)*
- *DAQCard* ..... *Type II PC Card*

I/O connector[2]

6070E 6060E 6040E 6020E 6023E 6024E	68-pin male 0.050 D-type
6071E 6061E 6021E 6025E	100-pin female 0.050 D-type
DAQCard-AI-16E-4	68-pin female PCMCIA

Environment

Operating temperature ..... *0 to 55 °C; DAQCard case temperature should not exceed 55 °C while in PCMCIA slot; 0 to 50 °C for DAQPads*
Storage temperature ..... *-20 to 70 °C*
Relative humidity ..... *10 to 90%, noncondensing*

Certifications and Compliances

CE Mark Compliance CE

[1] *Refer to RTSI specifications for available RTSI trigger lines.*
[2] *For VXI power requirements, dimensions, and I/O connections, refer to the VXI Solutions Product Guide.*
[3] *For RT Series devices power requirements and dimensions, refer to page 247.*