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Find the *Acqiris DP240 / U1069A-003* at our website: ***Click HERE***



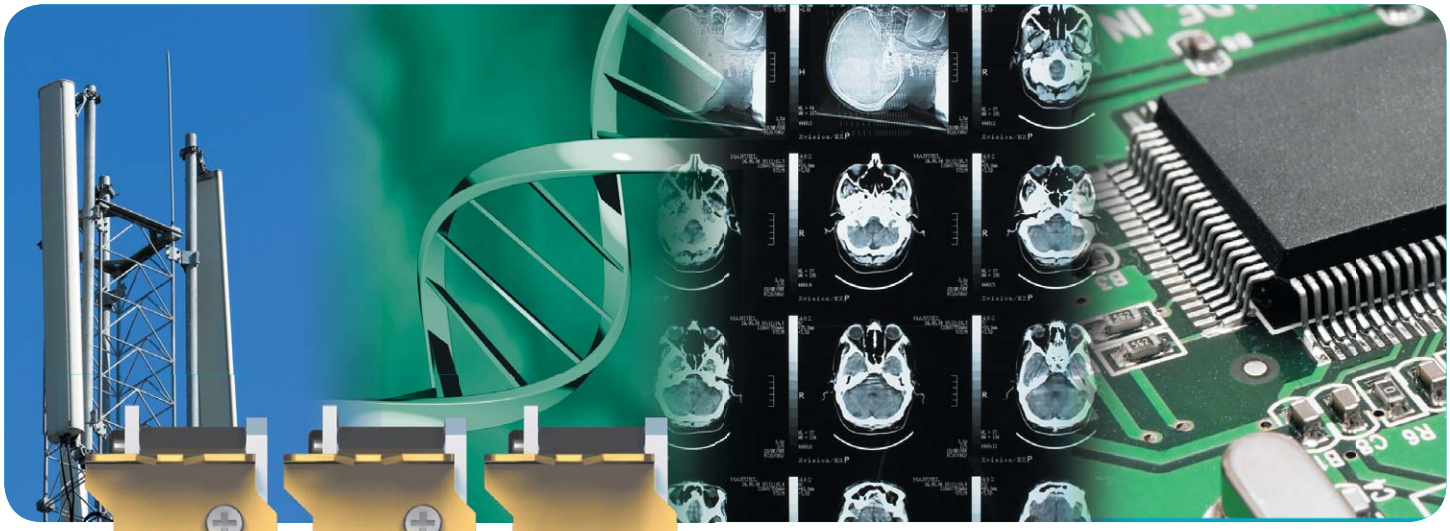
Agilent U1069A

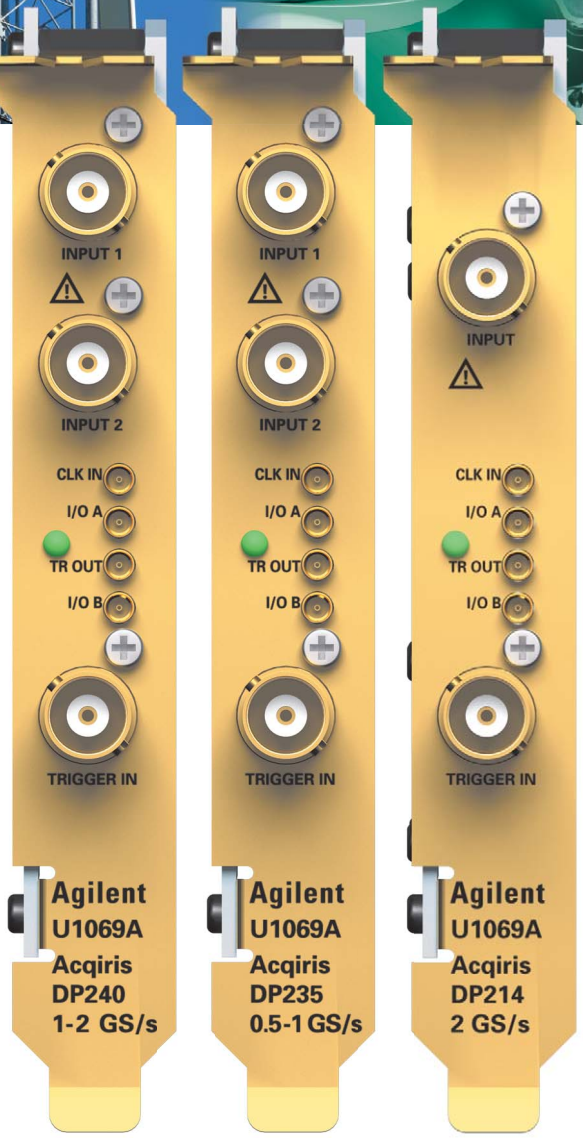
Acqiris High-Speed PCI Digitizers

DP240: 8-bit, 2 ch, 1 GHz, 2 GS/s
DP235: 8-bit, 2 ch, 500 MHz, 1 GS/s
DP214: 8-bit, 1 ch, 1 GHz, 2 GS/s

Agilent Technologies

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Main Features

- 2 GS/s sampling rate
- Dual- and single-channel modes
- Up to 1 GHz bandwidth
- Up to 16 MSample acquisition memory
- Fully-featured, 50 Ω front end with internal calibration
- Mezzanine front-end design with input protection
- Complete pre- and post-triggering
- Multi-purpose I/O connectors for trigger, clock, reference, and control signals
- Built-in 5 ps trigger time interpolator (TTI) for accurate timing measurements
- Low dead-time (< 800 ns) sequential recording with time stamps for up to 8000 segments
- Device drivers for Windows®, VxWorks, LabVIEW RT, and Linux, with application code examples for MATLAB®, C/C++, Visual Basic, LabVIEW, and LabWindows/CVI

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Acqiris High-Speed Digitizers

The proprietary ADC chipsets in Agilent Technologies Acqiris high-speed digitizers are designed for the specific purpose of optimizing high-speed ADC performance. The analog front-end technology provides the signal conditioning, amplification, and interleaving functions essential to achieving high-speed data acquisition at GS/s rates. The digital data handling components provide vital clock and synchronization signals, to capture and memorize acquired data with maximum data throughput. Together these ASICS make low-power, high-fidelity data acquisition much more accessible and provide maximum data throughput to the host PC or processor to reduce the time and cost of measurement.

The Acqiris product line provides a range of high-speed digitizer cards [1] with 8-, 10-, and 12-bit resolution, wide bandwidth, and large acquisition memory. These products, in PCI, PXI, cPCI, and VME formats, are used in research, and in ATE and OEM applications in industries such as biotechnology, semiconductors, aerospace, physics, and astronomy.

High-Density Multi-Channel Waveform Recording

The Agilent Acqiris U1069A high-speed digitizer delivers either single- or dual-channel data acquisition in a compact card that can plug directly into a PC. The digitizer uses SiGe (silicon-germanium) technology to provide incredible analog performance.

In a U1069A-003 configuration the digitizer offers dual channel operation with a sampling rate of 1 GS/s on each channel and wide 1-GHz bandwidth. It has long 128 kSample/channel acquisition memory (optionally upgradeable to 8 MSample) and up to 2 GS/s and 256 kSample acquisition memory (optional 16 MSamples of memory) in single-channel mode.

The U1069A-002 configuration has dual-channel sampling rates of up to 500 MS/s (1 GS/s in single-channel mode), 500 MHz bandwidth, and 128 kSample/channel of memory (optional 2 MSample available).

The U1069A-001 configuration features single shot sampling rates up to 2 GS/s, wide 1 GHz bandwidth, and long 256 kSample acquisition memory (optional 16 MSample).

The digitizer's ultra-fast sampling rate and bandwidth combine to allow the accurate capture of signals up to 1 GHz. Moreover, the card's long acquisition memory enables it to record complex signals over long periods of time. Long memory is essential for maintaining fast sampling rates and therefore good timing resolution. For example, in single-channel mode, the U1069A-003 with a 16 MSample acquisition memory can record a signal over 8 ms with a sampling rate of 2 GS/s (0.5 ns per point). This fast sampling rate ensures that all high-frequency signal components, up to the full bandwidth of the digitizer, are accurate, complete, and recorded in the correct order.

The dual-channel configurations of the U1069A are designed to perform outstanding cross-channel timing measurements (I/Q, jitter, phase, propagation delay, etc.) thanks to the combination of synchronously-sampling ADCs, well matched front-end electronics and a precision time-base (±2 ppm).

The card's time-base circuit clocks the ADCs of each channel at exactly the same time, while the independent SiGe front-end circuitry ensures that timing skew (between channels) is minimized. With up to 1 GHz bandwidth the digitizer is ideal for measuring high-speed signal phenomena (rise- and fall-times, pulse width, etc.) into the sub-nanosecond range.

Mezzanine Front-End

The signal input of the digitizer has programmable front-end electronics that provide a complete set of input voltage ranges (from 50 mV to 5 V, full scale, in a 1, 2, 5 sequence) and variable voltage offset. The precise input impedance (50 Ω) is fully protected against over-voltage signals. The amplifiers feature internal calibration (no need to disconnect input signals) and fast recovery from out-of-range signals. The input buffer is mounted on a removable mezzanine card so replacement is fast and efficient in the event of accidental damage or as components fatigue over time (e.g. relays in high duty cycle automated testing applications).

Flexible Trigger

The digitizer includes a precision trigger system with full pre- and post-trigger adjustments. User-selectable coupling is combined with internal or external trigger sources for maximum flexibility. The digitizer also provides a sophisticated sequential trigger mode with less than 800 ns dead time between successive triggers. This extremely low dead time enables events to be captured and stored, that occur at high repetition rates. This trigger mode is perfect for "impulse-response" type applications (radar, sonar, lidar, ultrasonic, medical and biomedical research, etc.). The sequential trigger mode and low dead time greatly extend the digitizer's timing range and resolution. Each event can be individually time stamped and relative time measurements (between events) can be made with less than 1 ns resolution.

1) 500 MS/s, 1 GS/s, 2 GS/s, 4 GS/s and 8 GS/s high-speed digitizer cards

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Precision Time Base

Each digitizer also has its own crystal-controlled precision time base, and sample rates can be selected, in a 1, 2, 2.5, 4, 5 sequence, from 100 Samples/s to 2 GS/s. An internal time-to-digital converter (TDC) with high timing resolution allows accurate positioning of the trigger signal with respect to the internal clock (sampling time). The sample rate can also be generated externally using the dedicated MMCX CLK IN connector for applications where the sample rate must be synchronized with the signal to be acquired.

Front Panel Multi I/O Ports

Control over the trigger and time base is made even more flexible by the provision of high-frequency, front-panel connectors. Two MMCX-type connectors enable the use of an external clock (up to 2 GHz), input of a reference clock signal (10 MHz), and use of trigger output. Two additional I/O digital control lines are available for monitoring or modifying the digitizer's status and configuration, including controlling trigger gating and the 10-MHz reference clock output.

Quality Acquisitions

Agilent Acqiris digitizers are designed to provide superior measurement precision and accuracy. Key acquisition specifications (such as DC accuracy, integral and differential linearity) are optimized to deliver maximum measurement fidelity. Careful circuit layout, custom ICs, and special packaging techniques are all used to reduce overall system noise. The low noise and low harmonic distortion are best demonstrated by the following Fourier transform performed on an acquired signal. Other important qualities of the digitizer include its step response, frequency response, and high effective bit score. The figures below show typical measurements.

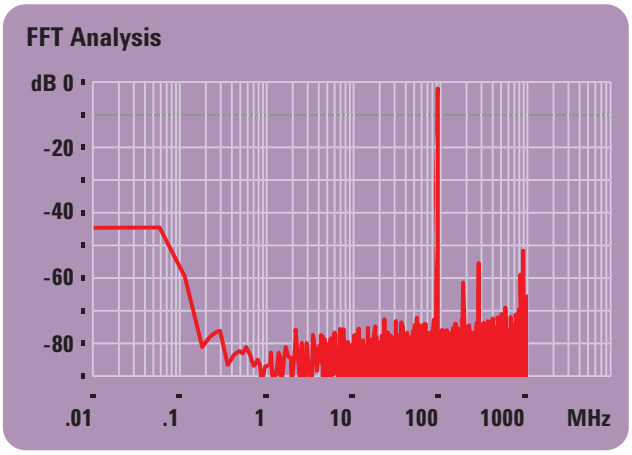


Figure 1: FFT analysis of a pure 100 MHz sine wave at 2 GS/s shows very low noise floor, high SFDR and little harmonic distortion.

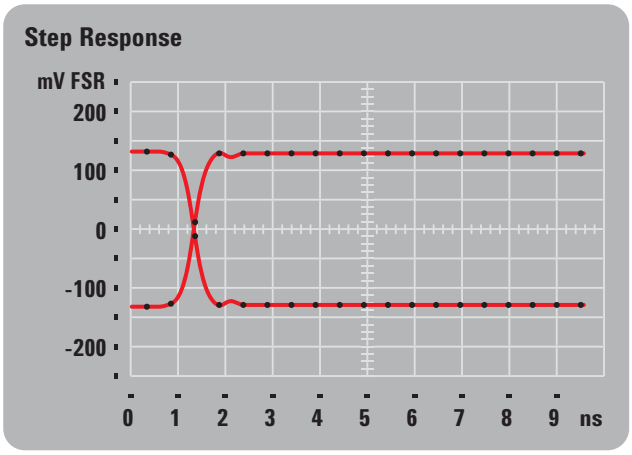


Figure 2: Positive and negative step response with 700 MHz BWL show minimal overshoot and undershoot at 2 GS/s sampling rate.

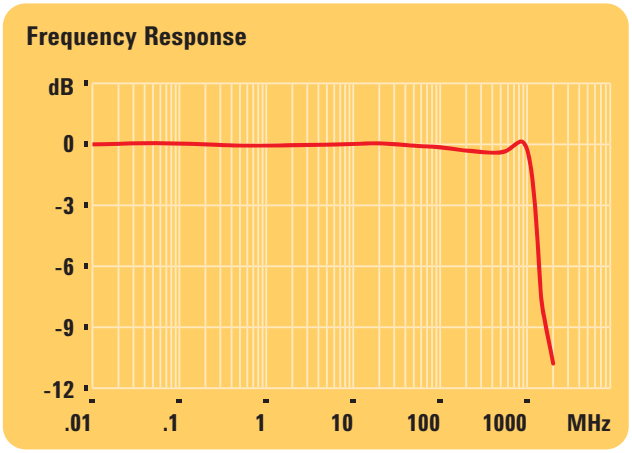


Figure 3: Frequency response is very flat and system bandwidth reaches well beyond the 1 GHz specified for the U1069A-001 and -003.

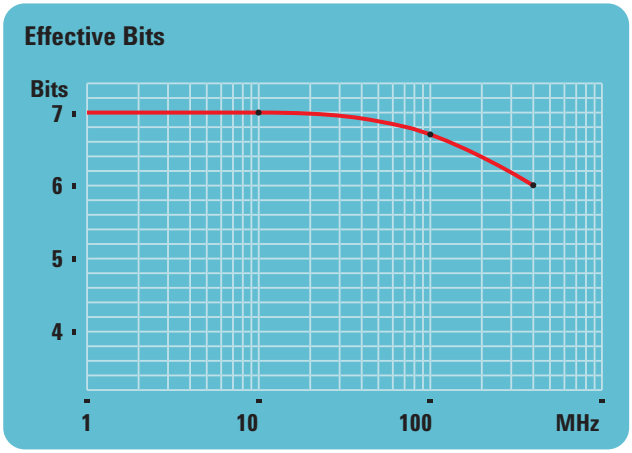


Figure 4: Effective bits at 2 GS/s are maintained at a high level.

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Low Parts Count

A high level of integration is needed to achieve the level of performance obtained with the U1069A digitizers. By drastically reducing the number of components, the integration also has clear benefits for reliability and lower total power consumption. To maintain quality measurements in the severe, poorly cooled PC environment can be difficult. Agilent Acqiris digitizers use a proprietary cooling scheme. This cooling method allows components to run at safe and stable operating temperatures. It helps to extend component life as well as minimize measurement errors caused by temperature variation.

Easily Integrated

In production test environments, the time taken to integrate all the required test modules needs to be minimized.

In semiconductor production testing for example, the addition of high-speed functionality in on-chip design, such as Ethernet, Wi-Fi®, and Bluetooth®, has led to a growing requirement for high-speed data conversion tools. It is important that the digitizer module chosen for this task be simply and easily integrated into the already existent component testing system, minimizing down-time.

Agilent's high-speed Acqiris digitizers are supplied with software drivers for Windows, Linux, LabVIEW RT and VxWorks, and application code examples for MATLAB, C/C++, Visual Basic, LabVIEW, and LabWindows/CVI. These code examples provide digitizer setup and basic acquisition functionality, and are easily modified, so that the card can be quickly integrated into a measurement system.

The flexibility of the driver means that, with minimum software adjustments, any Acqiris digitizer can be swapped out, replaced, or upgraded with the latest high-speed Acqiris digitizer.

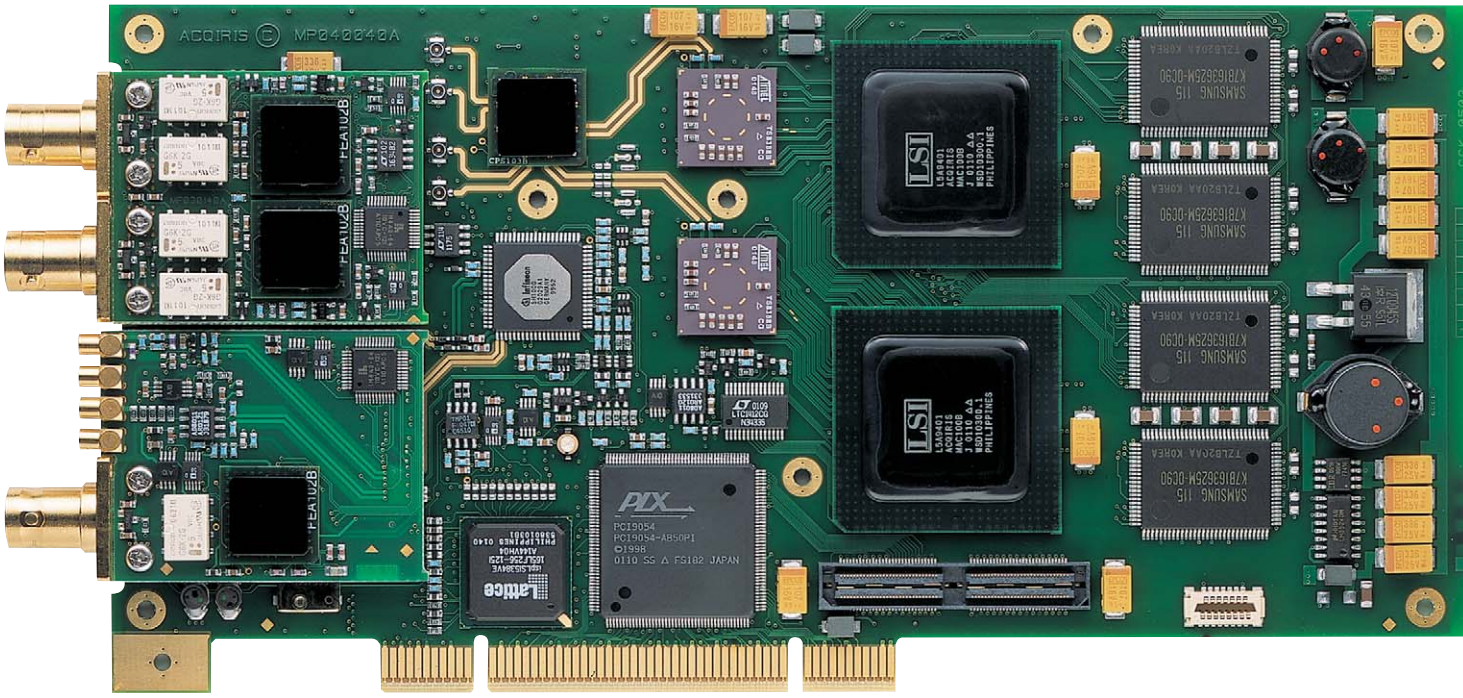


Figure 5: The U1069A digitizer uses large-scale integrated circuit technology to reduce size and power requirements. This essential technology allows the digitizer to deliver fast sampling, high bandwidth and deep memory in a standard PCI package.

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Acqiris High-Speed PCI Digitizers

Model DP240

Dual-channel, 8-bit, 2 GS/s, 1 GHz bandwidth

Model DP235

Dual-channel, 8-bit, 1 GS/s, 500 MHz bandwidth

Model DP214

Single-channel, 8-bit, 2 GS/s, 1 GHz bandwidth

Signal input

Channels
U1069A-001: Single at 2 GS/s
U1069A-002: Dual at 500 MS/s, Single at 1 GS/s
U1069A-003: Dual at 1 GS/s, Single at 2 GS/s

Bandwidth (-3 dB)
-001 and -003: DC to 1 GHz
-002: DC to 500 MHz

Bandwidth limit filter
-001 and -003: 700 MHz, 200 MHz, and 20 MHz
-002: 200 MHz and 20 MHz

Full scale (FS)
50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2 V, and 5 V

Offset range
±2 V for 50 mV to 500 mV FS
±5 V for 1 V to 5 V FS

Maximum input voltage
±5 V DC

Coupling
AC, DC

Impedance
50 Ω ± 1%

Connectors
BNC or SMA, gold plated

Digital conversion

Sample rate
-001 and -003: 100 S/s to 2 GS/s
-002: 100 S/s to 1 GS/s
in 1, 2, 2.5, 4, 5 sequence

Resolution
8 bits

DNL
±0.9 LSB

Acquisition memory
-001: 256 kSamples/channel
-002, -003: 128 kSamples/channel

Optional memory (-M4M)
-001: 4 MSamples/channel
-002, -003: 2 MSamples/channel

Optional memory (-M16)
-001: 16 MSamples/channel
-002, -003: 8 MSamples/channel

Time base

Clock accuracy
Better than ±2 ppm

Sampling jitter
< 1 ps rms for 20 µs with internal clock and reference

Acquisition modes
Single shot
Sequence: 1 to 200 segments (4000 segments with 4 MSamples, 8000 segments with 16 MSamples)
Dead time:
-001: < 800 ns
-002: < 1.1 µs
-003: < 800 ns

Trigger time interpolator
5 ps resolution

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Internal and external trigger

External trigger input
Threshold adjust range: (FS/2, -FS/2) for FS = 500 mV, 1 V, 2 V, and 5 V
Impedance: 50 Ω
Maximum input voltage: ±5 V DC
Amplitude range: > 10% FS

Coupling
DC, AC (50 Hz LF reject, 50 kHz HF reject)

Modes
Edge, positive and negative
Window
HF: divide by 4

Pre-trigger
Adjustable to 100% of horizontal full scale

Post-trigger
Adjustable up to 200 MSamples

Control I/O (MMCX)

Ctrl I/O A and B signals
TTL & CMOS compatible (3.3 V)

Ctrl I/O A and B output
10 MHz reference clock out with 50 Ω impedance
Acquisition active
Acquisition skipping to next segment
Trigger ready

Ctrl I/O A and B input
Trigger enable

Trigger OUT
Offset: ± 2.5 V (no load)
Amplitude ± 0.8 V (no load), ±15 mA max
Rise/fall time: 2.5 ns into 50 Ω
Coupling: DC
Output impedance: 50 Ω

CLK IN ext. clock/ref
Amplitude: > 1 V pk-pk into 50 Ω
Threshold: variable between -2 V and +2 V
Maximum input voltage: ±5 V DC

CLK IN ext. clock input
10 MHz to 2 GHz

CLK IN ext. reference frequency
9 MHz to 10.2 MHz

System performance

DC accuracy
±2% of FS

Effective bits (max. SR)
7.0 at 10.7 MHz, 200 MHz BWL
6.5 at 99.5 MHz, 200 MHz BWL
5.8 at 407 MHz, 700 MHz BWL

INL
< ±1% FS

General

Host computer and operating system
PC compatible (x86) systems running Microsoft Windows Vista, Windows XP, Windows 2003 Server, Windows 2000, Wind River VxWorks, National Instruments LabVIEW RT, or Linux.
PowerPC systems running Wind River VxWorks.
For more information on which specific processors and operating system versions are supported, please contact us.

Transfer speed
High-speed PCI bus transfers data at sustained rates to host computer:
Up to 100 Mbytes/s for 32-bit/33 MHz operation

Power consumption
Without memory option
< 22 W
With memory option
< 25 W

Current requirements
Without memory option

3.3 V	1.9 A (2.9 A with memory)
12 V	0.9 A
5 V	1.3 A
-12 V	0.05 A

Warranty
1 year

Front-Panel LEDs indicate digitizer status:
Green: ready for trigger
Yellow: module identification
Red: trigger

Environmental and physical

Operating temperature
0° to 40°C

Relative humidity
5 to 95% (non-condensing)

Dimensions
PCI long-length standard

Safety
Complies with EN61010-1

EMC immunity
Complies with EN61326-1
Industrial Environment

EMC emissions
Complies with EN61326-1 Class A for radiated emissions

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Contacts

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Sweden	0200-88 22 55
Switzerland	0800 80 53 53
United Kingdom	44 (0) 118 9276201
Other European Countries:	41 (22) 884 32 90

Revised: March 27, 2008

Ordering Information

Model	Description
U1069A	Acqiris DP240, DP235 and DP214 high-speed 8-bit PCI digitizers
U1069A-001	Single-channel, 1 GHz, 2 GS/s, 256 kSample, DP214
U1069A-002	Dual-channel, 500 MHz, 1 GS/s, 128-256 kSample, DP235
U1069A-003	Dual-channel, 1 GHz, 1-2 GS/s, 128-256 kSample, DP240
U1069A-M16	16 MSample acquisition memory
U1069A-M4M	4 MSample acquisition memory
Accessories	
U1069A-UK6	Calibration Certificate and Cal Data

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For more information on Acqiris product line, sales or services, see our website at:
www.agilent.com/find/acqiris

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