

DP110

250 MHz
1 GS/s



DP105

150 MHz
500 MS/s



PCI Digitizer Cards
with Oscilloscope
Characteristics

Main Features

- 1 GS/s Sampling Rate (DP110), 500 MS/s (DP105)
- 250 MHz Bandwidth (DP110), 150 MHz (DP105)
- 50 Ω and 1 M Ω Input Impedance
- 128 kpoints Acquisition Memory (1 or 2 Mpoints optional)
- Full Front-end Amplification with Internal Calibration
- Mezzanine Front-end
- Input Protection
- Complete Pre and Post Triggering
- Low Dead-Time (<500 ns) Sequential Recording with Time Stamps
- Built-In High Resolution TDC for Accurate Timing Measurements
- Single Slot PCI Short Card
- Low Power (<15 W, standard class 2)
- AcqirisLive Software for Windows 95/98/NT
- "Plug & Play" Installation
- National Instrument LabVIEW and LabWindows/CVI Drivers
- Crystal Controlled Clock (0.01%)
- External Trigger, Reference and Clock
- Very High Data Transfer Rate to PC


High Speed Waveform Recording in a PC or PCI Card Chassis

Precision Waveform Acquisition - The DP105 and DP110 Digitizer Cards deliver a technology breakthrough for plug-in PCI data acquisition modules. The cards feature the fastest sampling rates (up to 1 GS/s), wide bandwidth (up to 250 MHz) and long acquisition memories (up to 2 Mpoints). It's a performance combination that allows the capture of high frequency signals with precision and ease. The fast sampling rate improves timing resolution and accuracy while the wide bandwidth reduces signal distortion and attenuation. The deep acquisition memories allow the storage of massive amounts of data over a long period of time and also help to preserve timing resolution. Digitizers with short memory must trade off sampling rate (and therefore timing resolution) when they try to capture long complex signals. A reduction in sampling rate also means important events (like glitches or high-frequency bursts) may be missed or incorrectly recorded.

Long Acquisition Memory - In contrast, the long memory of the Acqiris DP cards preserves the sampling rate and ensures waveforms are captured with total confidence. For example, a Model DP110 with 2 Mpoints of memory can record a signal over a two millisecond period with a sampling rate of 1 GS/s (1 ns per point). The fast sampling rate ensures that all

high frequency signal components, up to the full 250 MHz bandwidth of the card, are accurately recorded. If the memory was reduced to 20 kpoints the sampling rate would have to fall to just 10 MS/s (20,000 points per 2 ms). Frequencies above 5 MHz would then be incorrectly digitized and important events may be missed completely!

Easy to Setup and Use - Once installed in a PC the cards operate just like a digital oscilloscope. Familiar Windows based software allows adjustment of all the key acquisition settings such as time-base, trigger, sensitivity, and coupling. All settings are fully programmable so configuration changes can be made rapidly with no messy jumpers to slow you down. Waveforms are displayed live on the PC's screen. There's no need to buy or install any additional cables, interfaces or housings and you don't need to do any programming. The small size (PCI standard short card) and low power (class 2) of the DP cards also makes it possible to run with more than one card in the same PC. You will not overload your systems power supply and cooling system or be restricted by "power saving" software that limits run times and insists on annoying cooling cycles. The Acqiris DP cards deliver a genuine cost-effective high-performance solution for users who need more than one channel systems.



Fast Data Transfer and Connectivity - With data transfer rates up to 100 Mbytes/s over the PCI bus, the DP110 and DP105 cards bring high speed to applications that require rapid data throughput. The fast transfer rate enables the user to utilize the power of their PC to quickly perform measurements and analysis. You can store hundreds of waveforms directly on the PC's hard disk or make hard copies instantly on your printer. Archiving important

waveforms has never been easier. Furthermore, you can use the Internet (or a local network) to send important information to others anywhere and at anytime. The result is flexibility and performance that can dramatically reduce testing times, increase measurement throughput and lower overall cost. These important features make the DP110 and DP105 ideal for automated testing applications both in the laboratory and in production environments.

Scope-Like Characteristics: Amplifier, Trigger and Time Base

Mezzanine Front-end - The signal input of each PCI card has a programmable amplifier that provides a complete set of voltage ranges (from 50 mV to 5 V full scale in a 1, 2, 5 sequence) and variable voltage offset. The inputs have selectable impedance (50 Ω or 1 M Ω) and are 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. In the event of accidental damage, or as components fatigue over time (e.g. relays in high duty cycle automated testing applications), the mezzanine card allows for fast and efficient replacement.

Flexible Trigger - The cards feature a precision trigger system with full pre and post trigger adjustment. User selectable coupling is combined with internal or external trigger sources for maximum flexibility. The cards also provide a sophisticated sequential trigger mode with less than 500 ns dead time between successive triggers. This extremely low dead time enables events, which may occur at very high repetition rates, to be captured and stored in

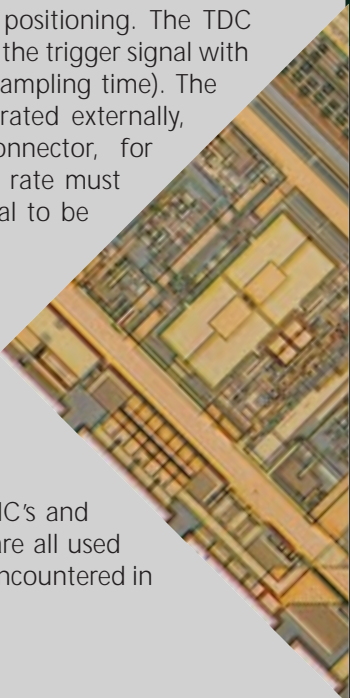

their correct arrival sequence. This trigger mode is perfect for "impulse-response" type applications (RADAR, SONAR, LIDAR, Time-of-Flight, Ultrasonic, Medical & Biomedical research, etc.). The sequential trigger mode and very low dead time greatly extends the digitizer's timing range and resolution. Each event can be individually time stamped and relative time measurements (between events) can be made with less than 1 ns resolution.

Precision Time Base - Each DP card 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 S/s to 1 GS/s (500 MS/s for the Model DP105). An internal Time-to-Digital Converter (TDC) with high timing resolution is used to assist with timing calibration and trigger positioning. The TDC permits accurate positioning of the trigger signal with regards to the internal clock (sampling time). The sample rate can also be generated externally, using the external input connector, for applications where the sample rate must be synchronized with the signal to be acquired.

High Fidelity Measurements

Quality Acquisitions - 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 IC's and special packaging techniques are all used to reduce system noise, often encountered in the harsh PC environment.



High Reliability

Low Parts Count - A very high level of integration is needed in order to achieve the level of performance obtained with the Model DP105 and DP110 Digitizer Cards. By drastically reducing the number of components the integration also has clear benefits on reliability and lowers the total power consumption. To maintain quality measurements in the severe, poorly

cooled PC environment the cards utilize 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 minimizing measurement errors caused by temperature variation.

Ease of Installation, Ease of Use and AcqirisLive Software

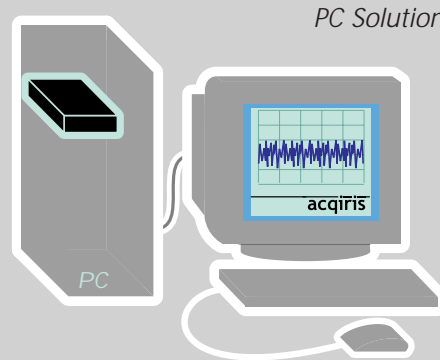
Ease of use - Installing and operating your data acquisition system is easy thanks to "Plug and Play" modularity and Windows based installation software (on CD). Just insert the CD in your PC's drive, run the installation program, power down and install the DP card(s). Installation problems are quickly resolved using Acqiris' diagnostic tool-set and on-line help. Run AcqirisLive, a complimentary card control and waveform display software package, and start making acquisitions immediately. Now you can leverage the power of your PC to perform rapid data analysis without paying the overhead costs associated with GPIB based stand-alone test instruments.

be stored in ASCII format for convenient use in spreadsheet programs such as Excel.

AcqirisLive - AcqirisLive is supplied not only as an executable for immediate use, but also in source code as a starting-point for application-specific developments with "off-the-shelf" software packages such as National Instruments' LabWindows/CVI and LabVIEW. The software drivers make system integration fast and affordable. Acqiris data acquisition cards are ideal in applications (laboratory or production) where low cost and high-speed measurements are required.

The installation and operation of Model DP110 and DP105 is supported by the following software components:

- An automatic installation program (on CD) for the software components listed below
- "Plug & Play" drivers for Windows 95/98, capable of managing several digitizers simultaneously. The drivers work with Visual C++ as well as Visual BASIC.
- Drivers for National Instruments' LabVIEW and LabWindows/CVI environments
- AcqirisLive, which permits the interactive operation of the digitizers 'right-out-of-the-box'. Data files can



PC Solution

DP110

DP105

Waveform Digitizer Model DP110

250 MHz, 8 bit, 1 GS/s, 128 kpoints or 2 Mpoints, Single Channel

Signal Input

Bandwidth

DC to 250 MHz (-3 dB)

Full scale range (FSR)

50 mV, 100 mV, 200 mV,
500 mV, 1 V, 2 V and 5 V

Impedance

1 M Ω /10 pF; 50 Ω \pm 1%

Connector

BNC

Offset

\pm 2 V at 500 mV FSR
and below, \pm 20 V above

Coupling

AC, DC

Maximum Input Voltage

100 V (DC+ peak AC < 10 kHz)
at 1 M Ω
 \pm 5 V DC (500 mW) or 5 V RMS
at 50 Ω

Digital Conversion

Conversion Rate

100 S/s to 1 GS/s

Resolution

8 bits (1:256)

Aperture Uncertainty

\pm 10 ps

Differential Linearity

\pm 0.7 LSB

Acquisition Memories

128 kpoints or 2 Mpoints (opt.)

Time Base

Range

Up to 128 μ s at 1 GS/s, (2 ms opt.)
Up to 1280 s at 100 S/s, (20 ks opt.)

Clock Accuracy

Better than \pm 0.01%

Acquisition Modes

Single shot
Sequence: 1 to 200 segments
(4000 opt.)

Trigger (Internal + External)

Slope

Positive and Negative

Coupling

AC LReject and DC

Pre-Trigger

Adjustable to 100% of full scale

Trigger Sensitivity

DC to 250 MHz >10% FSR

Post-Trigger

Adjustable up to 200 Mpoints

External Input for Trigger, Clock & Reference

Impedance

1 M Ω or 50 Ω

Input Voltage

\pm 4 V

Bandwidth

500 MHz (-3 dB)

External Trigger Threshold

Variable between -4 V and +4 V

External Clock Frequency

10 MHz to 500 MHz

External Clock/Ref Threshold

Variable between -2 V and +2 V

Minimum Clock/Ref Amplitude

750 mV pkpk

External Reference Frequency

10 MHz

System Performance

DC Accuracy

\pm 2% FSR

Integral Linearity

< \pm 1% FSR

Effective Bits (at 1 GS/s)

DC-50 MHz: > 6.5
50-250 MHz: > 6.0

PC System Requirements

Processor

150 MHz Pentium (or higher)

Operating system

Windows 95/98/NT

CD Drive

Memory

32 Mbyte RAM (more is
recommended when working
with several cards with 2M
acquisition memories)

Hard Drive Space

20 Mbyte Minimum

Slot

One PCI slot is required
for each DP card

General

Power < 15 W	Current Requirements +12 V 0.65 A +5 V 0.9 A +3.3 V 0.35 A (1.05 A with M2M)	Warranty 3 years
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High-speed PCI bus transfers data at rates up to 100 Mbytes/s peak to host processor

Environmental and Physical

Operating Temperature* 0°C to 50°C	Shock* 30 G, half-sine pulse	EMC Emissions Complies with EN50081-1, EN55022 Class B for radiated emissions
Relative Humidity* 5% to 95% (noncondensing)	Vibration* 5-500 Hz, random	
	EMC Immunity Complies with EN50082-1	

Certification and Compliance 

* As defined by MIL-T-28800E Class 3

PCI standard, short card (106.6 mm x 174.6 mm)

Waveform Digitizer Model DP105

150 MHz, 8 bit, 500 MS/s, 128 kpoints or 1 Mpoints, Single Channel

Signal Input

Bandwidth DC to 150 MHz (-3 dB)	Connector BNC	Coupling AC, DC
Full Scale Range (FSR) 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2 V and 5 V	Offset ±2 V at 500 mV FSR and below, ±20 V above	Maximum Input Voltage 100 V (DC+ peak AC < 10 kHz) at 1 MΩ ±5 V DC (500 mW) or 5 V RMS at 50 Ω
Impedance 1 MΩ/10 pF; 50 Ω ±1%		

Digital Conversion

Conversion Rate 100 S/s to 500 MS/s	Aperture Uncertainty ±10 ps	Acquisition Memories 128 kpoints or 1 Mpoints (opt.)
Resolution 8 bits (1:256)	Differential Linearity ±0.7 LSB	

Time Base

Time Range Up to 256 μs at 500 MS/s, (2 ms opt.) Up to 1280 s at 100 S/s, (10 ks opt.)	Clock Accuracy Better than ±0.01%	Acquisition Modes Single shot Sequence: 1 to 200 segments (2000 opt.)
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Trigger (Internal + External)

Slope Positive and Negative	Pre-Trigger Adjustable to 100% of full scale	Post-Trigger Adjustable up to 200 Mpoints
Coupling AC LFRreject and DC	Trigger Sensitivity DC to 150 MHz >10% FSR	

External Input for Trigger, Clock & Reference

Impedance 1 M Ω or 50 Ω	External Trigger Threshold Variable between -4V and +4V	External Clock/Ref Threshold Variable between -2 V and +2 V
Input Voltage ± 4 V	External Clock Frequency 10 MHz to 500 MHz	Minimum Clock/Ref Amplitude 750 mV pkpk
Bandwidth 500 MHz (-3 dB)		External Reference Frequency 10 MHz

System Performance

DC Accuracy $\pm 2\%$ FSR	Integral Linearity < $\pm 1\%$ FSR	Effective Bits (at 500MS/s) DC-50 MHz: > 6.5 50-150 MHz: > 6.0
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PC System Requirements

Processor 150 MHz Pentium (or higher)	Memory 32 Mbyte RAM (more is recommended when working with several cards with 1M acquisition memories)	Hard Drive Space 20 Mbyte Minimum
Operating System Windows 95/98/NT		Slot One PCI slot is required for each DP card
CD Drive		

General

Power < 15 W	Current Requirements +12 V 0.65 A +5 V 0.9 A +3.3 V 0.35 A (0.7 A with M1M)	Warranty 3 years
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High-speed PCI bus transfers data at rates up to 100 Mbytes/s peak to host processor

Environmental and Physical

Operating Temperature* 0°C to 50°C	Shock* 30 G, half-sine pulse	EMC Emissions Complies with EN50081-1, EN55022 Class B for radiated emissions
Relative Humidity* 5% to 95% (noncondensing)	Vibration* 5-500 Hz, random	
	EMC Immunity Complies with EN50082-1	

Certification and Compliance 

* As defined by MIL-T-28800E Class 3

PCI standard, short card (100 mm x 174.6 mm)

Ordering Information

DP110

Model Number	Description
DP110	Single channel, 250 MHz, 1 GS/s, 128 kpoints PCI digitizer card
DP110-M2M	2 Mpoints acquisition memory option
DP110-W5	5 year repair warranty
DP110-CAL	Calibration certificate
P001	300 MHz 10:1 10 M Ω passive probe

DP105

Model Number	Description
DP105	Single channel, 150 MHz, 500 MS/s, 128 kpoints PCI digitizer card
DP105-M1M	1 Mpoints acquisition memory option
DP105-W5	5 year repair warranty
DP105-CAL	Calibration certificate
P001	300 MHz 10:1 10 M Ω passive probe

DP110

DP105

Acqiris USA

234 Cromwell Hill Rd
Monroe,
NY 10950-1430
USA
Tel: +1 914 782 6544
Fax: +1 914 782 4745

Acqiris Europe

18, chemin des Aulx
1228 Plan-les-Ouates
Geneva
Switzerland
Tel: +41 22 884 3390
Fax: +41 22 884 3399

Acqiris Asia-Pacific

Suite 7, 28 Blackburn Road
P.O. Box 317
Blackburn 3130
Australia
Tel: +61 3 9877 9322
Fax: +61 3 9849 0861

For other sales and service representatives around the world, see our web site at:
www.acqiris.com