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DP110

DP105

Main Features

- **1 GS/s Sampling Rate (DP110), 500 MS/s (DP105)**
- **250 MHz Bandwidth (DP110), 150 MHz (DP105)**
- **50 Ω and 1 MΩ Input Impedance**
- **128 kpoints Acquisition Memory (2 or 8 Mpoints optional)**
- **Full Front-end Amplification with Internal Calibration**
- **Mezzanine Front-end with Input Protection**
- **Complete Pre and Post Triggering**
- **Low Dead-Time (< 800 ns) Sequential Recording with Time Stamps**
- **±50 ppm Clock Accuracy**
- **Built-In High Resolution Trigger Time Inter polator (TTI) for Accurate Timing Measure ments**
- **Single Slot PCI Short Card**
- **Low Power (<15 W)**
- **AcqirisLive Applications for Windows 95/ 98/NT4.0/2000/XP**
- **Drivers complete with application code examples for C/C++, Microsoft Visual Basic, National Instruments LabVIEW and LabWindows/CVI**
- **Supported Operating Systems are Windows 95/98/NT4.0/2000/XP and VxWorks and LINUX**
- **"Plug & Play" Installation**
- **High-Speed PCI bus transfers data at sustained rates up to 100 Mbytes/s to processor**

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 8 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!

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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 consumption (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. The Acqiris DP cards deliver a genuine cost-effective high-performance solution for users who need modularity and scalability with PCI bus simplicity.

Fast Data Transfer and Connectivity

With data transfer rates up to 100 MB/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

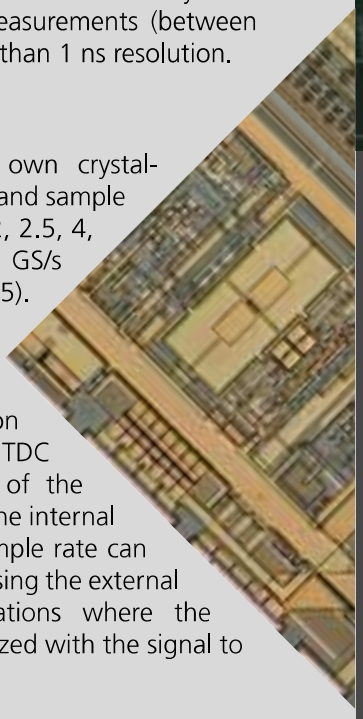
The signal input of each PCI card has a programmable amplifier that provides a complete set of voltage ranges (from 50 mV to 5 V full scale in a 1, 2, 5 sequence) and variable voltage offset. The inputs have selectable impedance (50 Ω or 1 MΩ) and are fully protected against over-voltage signals. The 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 800 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.

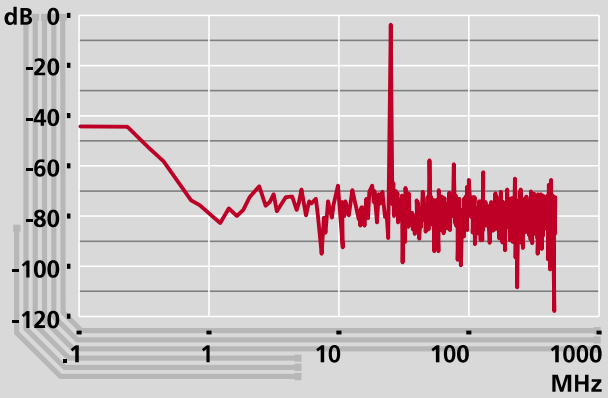


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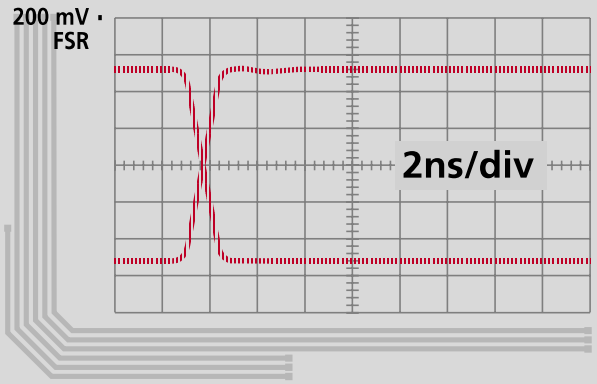
High Fidelity Measurements

Quality Acquisitions

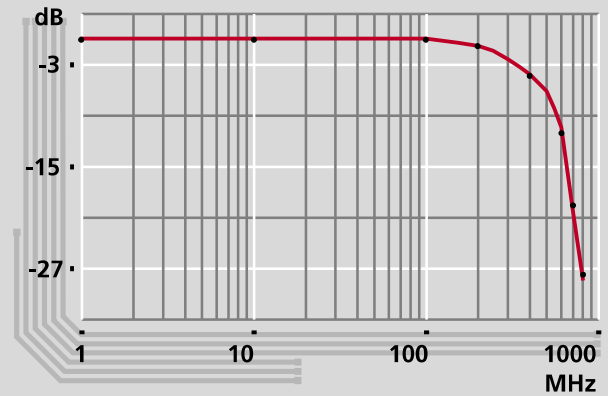
Acqiris digitizers are designed to provide superior measurement precision and accuracy. Key acquisition specifications (such as DC accuracy, integral and differential linearity) are optimized to deliver maximum measurement fidelity. Careful circuit layout, custom IC's and special packaging techniques are all used to reduce system noise, often encountered in the harsh PC environment.



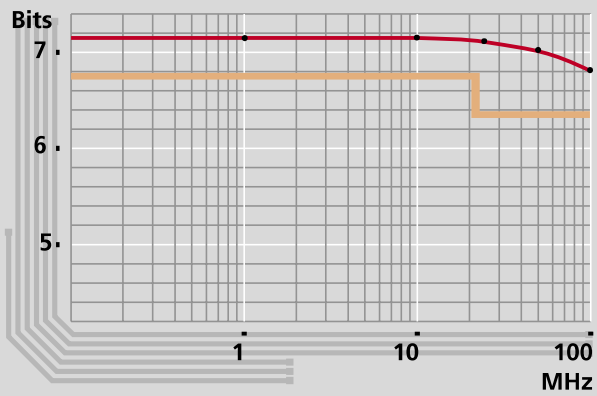
FFT analysis of a pure 25MHz sinewave, measured at 500 mV full scale, shows very low noise floor and little harmonic distortion



Positive and negative step responses show little or no overshoot or undershoot



Frequency response is very flat and system bandwidth reaches well beyond the specified 250 MHz



Effective bits (top graph) are significantly higher than the minimum guaranteed performance (bottom graph)

High Reliability and Low Power Design

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.

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Ease of Installation, Ease of Use and AcqirisLive Software

Ease of use

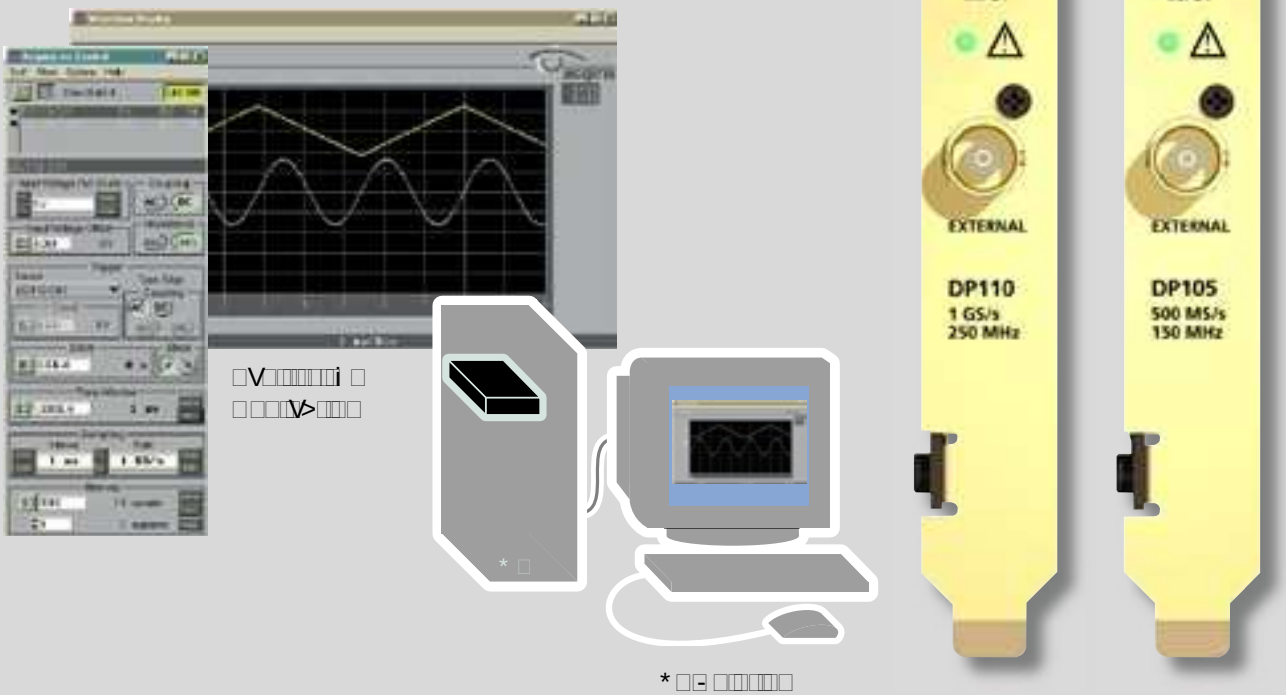
Installing and operating your data acquisition system is easy thanks to "Plug and Play" modularity and Windows based installation software (on CD). Just insert the CD in your PC's drive, run the installation program, power down and install the DP card(s). Run AcqirisLive, a complimentary card control and waveform display software package, and start making acquisitions immediately. Installation problems are quickly resolved using Acqiris' diagnostic tool-set and on-line help. 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.

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

- An automatic installation program
- Plug & Play» drivers for Windows 95/98/NT4.0/ 2000/XP, VxWorks and Linux, capable of managing several digitizers simultaneously. The drivers work with C/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 be stored in ASCII format for convenient use in spreadsheet programs such as Microsoft Excel.

Getting Started

Acqiris also supplies simple application examples in source code as a starting-point for application-specific developments in C/C++ or Visual BASIC, as well as with test environments such as LabWindows/CVI and LabView. The software drivers make system integration fast and affordable. Acqiris data acquisition systems are ideal in applications (laboratory or production) where low cost and high-speed measurements are required.



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Waveform Digitizer

● Model DP110

250 MHz, 8 bit, 1 GS/s, from 128 kpoints up to 8 Mpoints, Single Channel

○ Model DP105

150 MHz, 8 bit, 500 MS/s, 128 kpoints or 2 Mpoints, Single Channel

Identical specifications for both digitizers except where indicated by ● for the DP110 and ○ for the DP105

Signal Input

Bandwidth
● DC to 250 MHz (-3 dB)
○ DC to 150 MHz (-3 dB)

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

Impedance
1 MΩ//10 pF; 50 Ω ±1%

Connector
BNC, gold plated

Offset
±2 V at 500 mV FS
and below, ±20 V above

Coupling
AC, DC

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

Digital Conversion

Conversion Rate
● 100 S/s to 1 GS/s
○ 100 S/s to 500 MS/s

Resolution
8 bits (1:256)

Differential Nonlinearity
±0.7 LSB

Acquisition Memories
● 128 kpoints, 2 Mpoints
or 8 Mpoints (opt.)
○ 128 kpoints or 2 Mpoints (opt.)

Time Base

Range
● Up to 128 µs at 1 GS/s,
(up to 8 ms opt.)
Up to 1280 s at 100 S/s,
(up to 80 ks opt.)
○ Up to 256 µs at 500 MS/s,
(4 ms opt.)
Up to 1280 s at 100 S/s,
(20 ks opt.)

Clock Accuracy
Better than ±50 ppm

Trigger Time Interpolator
80 ps resolution

Sampling Jitter
< 7 ps RMS typical

Acquisition Modes
Single shot
Sequence: 1 to 200 segments
(○ 4000 opt. ● 4000 or 8000 opt)
Dead Time: ● < 800 ns
○ < 1.1 ns

Trigger (Internal and External)

Slope
Positive and Negative

Coupling
AC LFReject and DC

Pretrigger
Adjustable to 100% of full scale

Trigger Sensitivity
Channel setting in internal
>500 mV in external
● From DC to 250 MHz >10% FS
○ From DC to 150 MHz >10% FS

Posttrigger
Adjustable up to 200 Mpoints

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External Input for Trigger, Clock & Reference

Impedance
1 MΩ or 50 Ω

Maximum Input Voltage
±5 V DC (500 mW)

Bandwidth
500 MHz (-3 dB)

External Trigger Threshold
Variable between -3 V and +3 V

External Clock Frequency
10 MHz to 500 MHz

External Clock/Ref Threshold
Variable between –2 V and +2 V

Minimum Clock/Ref Amplitude
1 V pkpk

External Reference Frequency
10 MHz

System Performance

DC Accuracy
±2% of FS

Integral Nonlinearity
< ±1% of FS

Effective Bits (At Maximum Sampling Rate)
> 6.5 @ 10.7 MHz
> 6.0 @ 99.5 MHz

PC System Requirements

Processor
150 MHz Pentium (or higher)

Operating system
Windows 95/98/NT4/2000/XP/ VxWorks and Linux

CD Drive
To install the software

Memory
64 MB RAM (more is recommended when working with several cards with 2M acquisition memories)

Display Resolution
At least 800x600 (for use of AcqirisLive)

Hard Drive Space
20 MB Minimum

Slot
One PCI slot is required for each DP card



General

Power
< 15 W

Current Requirements

+12 V	0.5 A
+5 V	1.3 A (1.6 A with option)
+3.3 V	0.35 A (1.05 A with M2M)

Warranty
3 years

High-speed PCI bus transfers data at sustained rates up to 100 Mbytes/s to local processor

Front panel led indicates digitizer status
green: ready for trigger yellow: module identification red: triggered

Environmental and Physical

Operating Temperature*
0°C to 50°C

Relative Humidity*
5% to 95% (noncondensing)

Shock*
30 G, half-sine pulse

Vibration*
5-500 Hz, random

EMC Immunity
Complies with EN50082-1

EMC Emissions
Complies with EN50081-1, EN55022 Class B for radiated emissions

CE Certification and Compliance
PCI standard, short card (106.6 mm x 174.6 mm)

* As defined by MIL-PRF-28800F Class 3

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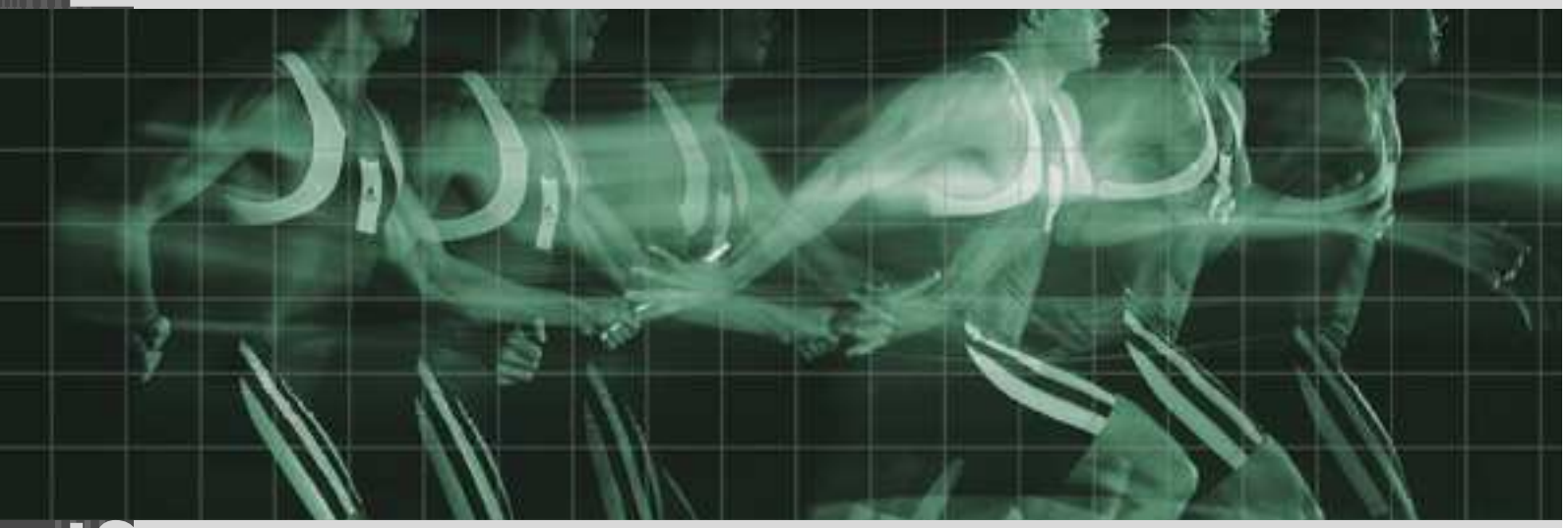
Ordering Information

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-M8M	8 Mpoints acquisition memory option
DP110-W5	5 year repair warranty
DP110-CAL	Calibration certificate
P001	300 MHz 10:1 10 MΩ passive probe

DP105

Model Number	Description
DP105	Single channel, 150 MHz, 500 MS/s, 128 kpoints PCI digitizer card
DP105-M2M	2 Mpoints acquisition memory option
DP105-W5	5 year repair warranty
DP105-CAL	Calibration certificate
P001	300 MHz 10:1 10 MΩ passive probe



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