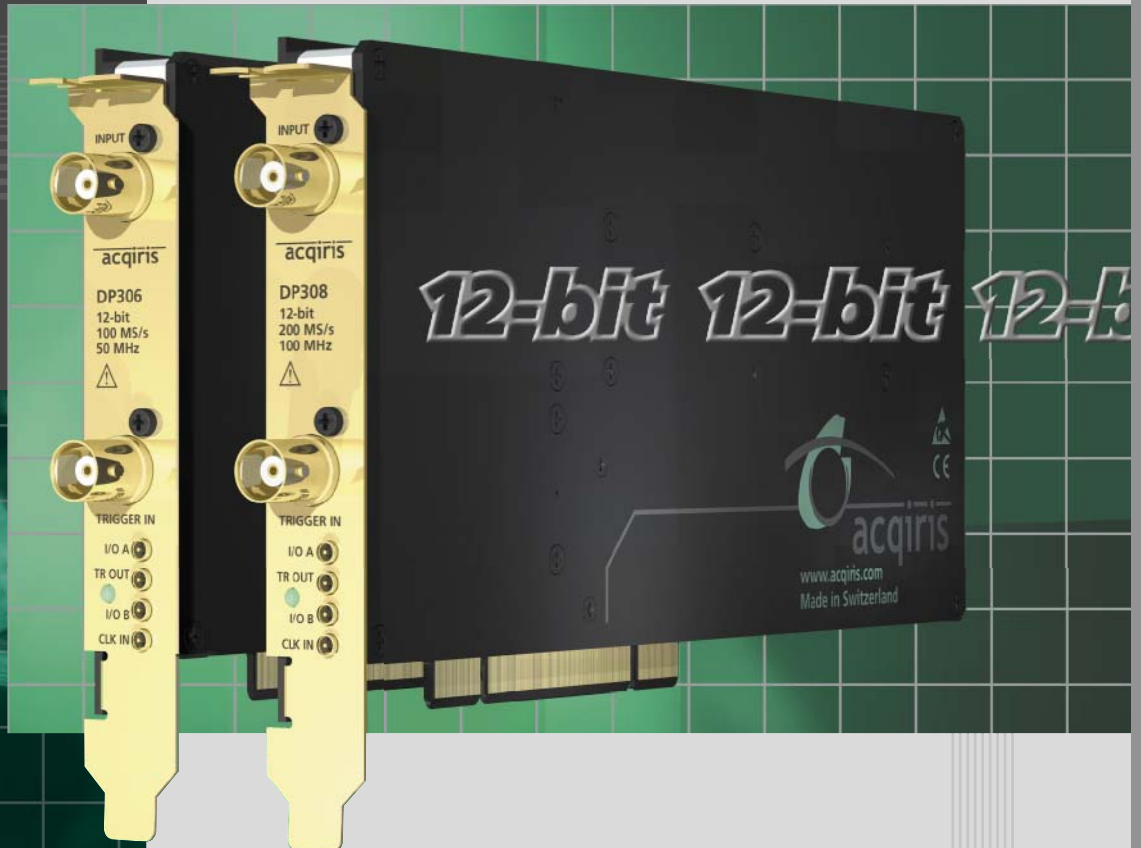


# DP308

12-bit  
100 MHz  
200 MS/s

# DP306

12-bit  
50 MHz  
100 MS/s



Single-Channel  
High-Resolution  
PCI Digitizer Cards



Ctrl I/O

## Main Features

- **Cost-effective, high-resolution, single-channel digitizers**
- **12-bit monolithic ADCs, SFDR > 73 dB, SNR > 61 dB**
- **Up to 100 MHz DC-coupled input**
- **Up to 200 MS/s sample rate**
- **4 Mpoint acquisition memory**
- **External clock/reference input for custom or high-precision frequency standard**
- **50  $\Omega$  mezzanine front end with large full-scale dynamic range and input protection**
- **Complete pre- and post-triggering**
- **Low dead-time (< 1  $\mu$ s) sequential recording with time stamps**
- **PCI standard**
- **Low power consumption (< 17 W)**
- **Device drivers for Windows 95/98/NT4.0/2000/XP, VxWorks and Linux**
- **Auto-install software with application code examples for C/C++, Visual Basic, National Instruments LabVIEW and LabWindows/CVI**
- **“Plug & Play” installation**
- **High-speed PCI bus transfers data to host PC at sustained rates up to 100 MB/s**

## High-Resolution, Cost-Effective Waveform Recording

### High-Resolution Waveform Recording

The Models DP308 and DP306 12-bit digitizers set new standards in cost-effective PCI-based high-resolution data acquisition by using the latest SiGe (silicon-germanium) technology.

The Model DP308 digitizer features one input channel with fast sample rates up to 200 MS/s and wide bandwidth of 100 MHz. The Model DP306 uses the same SiGe technology and overall architecture as the DP308 and it has sampling rates of up to 100 MS/s and 50 MHz bandwidth.

Both units have long 4 Mpoint acquisition memories, while the Model DP308 also has a selectable 35 MHz bandwidth limiter filter.

The DP308 and DP306 12-bit digitizers have their own crystal-controlled precision time base (better than  $\pm 2$  ppm). Sampling rates can be chosen among a discrete number of values that cover the full range between 100 S/s up to 200 MS/s (100 MS/s for the DP306). The DP308 and DP306 flexibility in terms

of sample rate selection and bandwidth combine to allow the high-resolution capture of signals up to 100 MHz (50 MHz) with a high spurious-free dynamic range (SFDR > 73 dB) and a high signal-to-noise ratio (SNR > 61 dB).

Additional outstanding specifications include total harmonic distortion (THD) of less than -71 dB, very low noise floor spectrum at -90 dB and effective bits (ENOB) of more than 10. Such specifications make the Models DP308 and DP306 a perfect match for cost-effective tests and measurements for applications in the areas of automotive, vibrations, ultrasounds and medical imaging, lidar, NDT and high-accuracy analytical instruments.

Waveforms are transferred directly into the digitizers' large acquisition memories so that complex signals can be stored over very long time periods. Large memories are essential for maintaining fast sampling rates and therefore timing resolution.

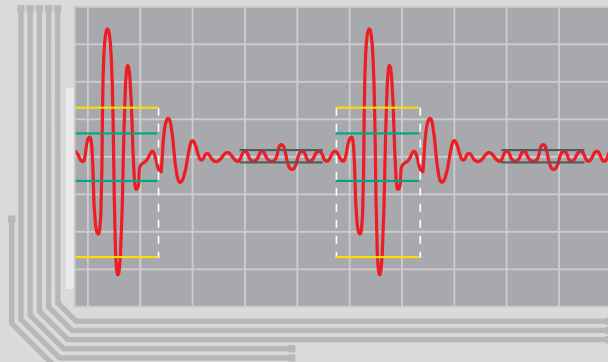
## PCI Simplicity and Performance

Using the DP308 and DP306 digitizers is just like driving a familiar digital oscilloscope with the advantage of obtaining high resolution. Windows-based software allows adjustment of the key acquisition settings such as time base, trigger and sensitivity while state-of-the-art front-end electronics enable high-fidelity recording with full control over gain and offset.

Data recorded by the DP308 and DP306 can be transferred directly to a host PC at rates up to 100 MB/s. Combining the fast transfer rates with today's most powerful PC processors makes it possible to perform measurements and calculations hundreds of times faster than with conventional instruments.

You can also 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 interface directly to your desktop PC and 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.

For high resolution in high-frequency cost-effective applications such as automotive, vibrations, ultrasounds, lidar, medical imaging, NDT, life science systems and high-accuracy analytical instruments the DP308 and DP306 are the ideal compromise with a high performance-to-price ratio.



*The DP Series digitizers use large-scale integrated circuit technology to reduce size and power requirements. This essential technology allows the DP308 and DP306 to deliver the highest performance-to-price ratio of any 12-bit digitizer in the standard PCI package.*

## Advanced Features for Input Stage, Trigger and Time Base

### Mezzanine Front End

The DP308 and DP306 digitizing channel is located on a separate mezzanine hosting the front-end electronics. The signal input of both models has programmable front-end electronics that provide a complete set of input voltage ranges (from 250 mV to 10 V full scale in a predefined sequence) and variable voltage offsets.

The 50  $\Omega$  input is protected against over-voltage signals while the front-end amplifier features internal calibration (no need to disconnect input signals) and very fast recovery from out-of-range signals. The fact that the input buffer amplifier and ADCs are mounted on a removable mezzanine card guarantees that, in the event of accidental damage or as components fatigue over time, replacement is fast and efficient.

### Flexible Trigger

The DP308 and DP306 digitizers include 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 digitizers also provide a sophisticated sequential trigger mode with less than 1  $\mu$ s dead-time (DP308) between successive triggers (2  $\mu$ s for DP306). This 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 (lidar, vibration testing, ultrasound and medical imaging, NDT etc.). The sequential trigger

mode and low dead-time greatly extend the digitizers timing range and resolution. Each event can be individually time-stamped and relative time measurements (between events) can be made with better than 100 ps accuracy.

Furthermore the units' TV trigger capability makes them ideal for use in wideband video signal applications such as those based on fast CCD cameras for imaging readout. The TV trigger mode is for positive video modulation and allows line and frame selection (odd & even) for the common standards B/G (625 lines/50 frames, PAL), L (625 lines/50 frames, SECAM) and M (525 lines/60 frames, NTSC).

### Front-Panel Multi I/O Ports



Ctrl I/O

The control over the trigger and time base is made even more flexible by the addition of high-density, high-frequency front-panel connectors. The four MMCX-type front-panel connectors enable the use of an external clock (up to 200 MHz for the DP308 and 100 MHz for the DP306) or reference signal (10 MHz), a trigger output and two additional I/O digital control lines. The latter can be used for monitoring or modifying the digitizer's status and configuration; an example of the control available is trigger gating. Furthermore, the I/O outputs can be used as a 10 MHz built-in source for autonomous board test purposes.

## High Reliability

### Low Parts Count

A very high degree of integration is needed in order to achieve the level of performance obtained with the Models DP308 and DP306 digitizers. By drastically reducing the number of components the integration delivers clear benefits in terms of reliability and lowers total power consumption. To maintain quality measurements the DP308 and DP306 also 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 minimizing measurement errors caused by temperature variation.



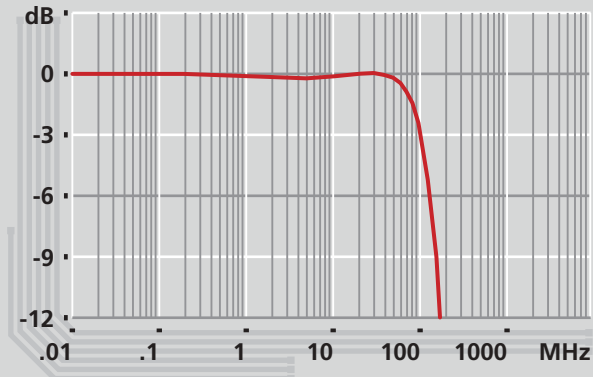
## High-Fidelity Measurements

### Quality Acquisitions

Acqiris digitizers are designed to provide superior measurement precision and accuracy. Key acquisition specifications (such as DC accuracy, integral and differential linearity, phase noise) are optimized to

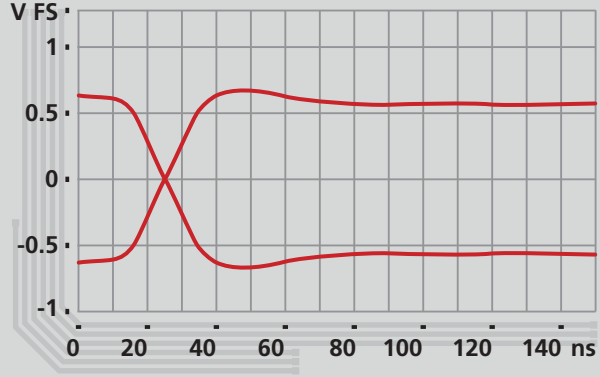
deliver maximum measurement fidelity. Careful circuit layout, custom ICs and special packaging techniques are all used to reduce overall system noise.

### Frequency Response



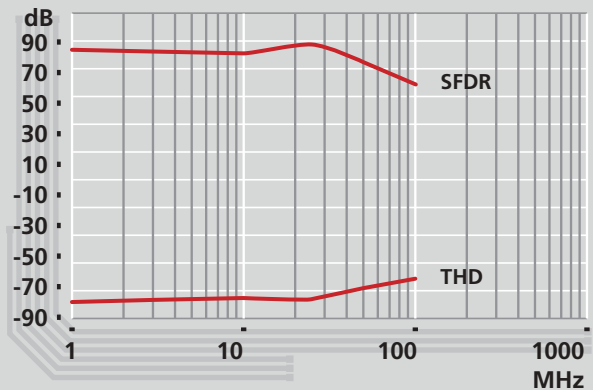
Frequency response is flat and system bandwidth for 1 V FS exceeds the specified 100 MHz.

### Step Response



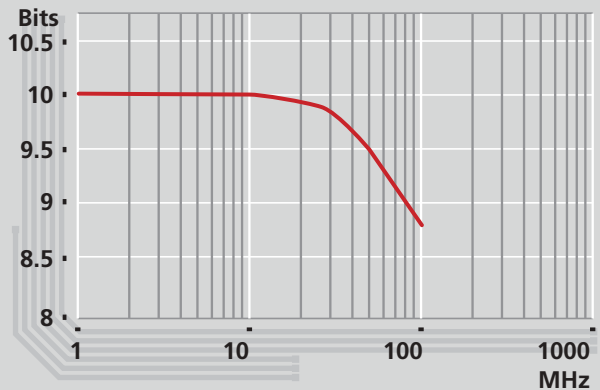
Positive and negative step responses show minimal overshoot and undershoots at 200 MS/s.

### SFDR & THD



SFDR & THD values at 170 MS/s SR and 80% of 1 V FS are remarkably high.

### Effective Bits



Effective bits at 170 MS/s SR and 80% of 1 V FS are  $\geq 10$

## Ease of Installation, Ease of Use

### Acqiris Software

Installing and operating your data acquisition system is easy thanks to "Plug&Play" modularity and Windows-based installation software (on CD). Just insert the CD in your PC drive, run the installation program, power down and install the digitizers. Installation problems are quickly resolved using the Acqiris diagnostic tool

set and on-line help. Use the complimentary digitizer control and waveform display software package to 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 standalone test instruments.

# Single-Channel High-Resolution PCI Digitizer Cards

## Model DP308

Single-channel, 12-bit, 100 MHz, 200 MS/s, 4 Mpoint acquisition memory

## Model DP306

Single-channel, 12-bit, 50 MHz, 100 MS/s, 4 Mpoint acquisition memory

### Signal Input

#### Bandwidth (-3 dB)

DC to 100 MHz (DP308)  
DC to 50 MHz (DP306)

#### Full Scale Range (FSR)

250 mV, 500 mV, 1 V, 2 V, 5 V and 10 V

#### Impedance

50  $\Omega$   $\pm$  1% @ DC

#### Connector

BNC, gold-plated

#### Offset

$\pm$ 1 V for 250, 500 mV and 1 V FS  
 $\pm$ 2 V for 2 V FS  
 $\pm$ 5 V for 5 V FS  
 $\pm$ 10 V for 10 V FS

#### Channels

One

#### Coupling

DC

#### Maximum Input Voltage

$\pm$ 10 V DC (2 W) or 10 V RMS at 50  $\Omega$

#### Bandwidth Limit Filter

35 MHz 2-pole Bessel filter (DP308)  
None (DP306)

### Digital Conversion

#### Sample Rate

100 S/s to 200 MS/s (DP308)  
100 S/s to 100 MS/s (DP306)

#### Resolution

12 bits (1:4096)

#### SR Adjustment Granularity

< 10% of SR (DP308)  
< 50% of SR (DP306)

#### Differential Nonlinearity

$\pm$ 0.5 LSB

#### Acquisition Memories

4 Mpoint

### Clock or Reference Input

#### Connector

MMCX, gold-plated

#### Minimum Amplitude

1 V pk-pk

#### Ext. Clock Threshold

Variable between -2 V and +2 V

#### Impedance

50  $\Omega$

#### Maximum Input Voltage

$\pm$ 2 V DC

#### Ext. Reference Frequency

10 MHz  $\pm$  10%

#### Ext. Clock Frequency

From 50 MHz to 200 MHz (DP308)  
From 50 MHz to 100 MHz (DP306)  
SR defined with sparsing

### Time Base

#### Clock Accuracy

Better than  $\pm$ 2 ppm

#### Sampling Jitter

< 1 ps RMS for 10 ms record length

#### Acquisition Modes

Single shot  
Sequence: 1 to 8000 segments  
Dead-time: < 1  $\mu$ s (DP308), < 2  $\mu$ s (DP306)

#### Residual Phase Modulation

0.2° RMS typical @ 200 MS/s  
from 100 Hz to 10 MHz

### Trigger (Internal and External)

#### Internal Trigger Input

Bandwidth DC to 100 MHz (-3 dB)  
Threshold adjust range: same as vertical FSR  
Trigger sensitivity DC to 100 MHz > 10% FSR

#### Pretrigger

Adjustable to 100% of horizontal full scale

#### Posttrigger

Adjustable up to 100 Mpoints

#### External Trigger Input

BNC, gold-plated  
Impedance: 50  $\Omega$ /1 M $\Omega$   
Bandwidth: DC to 100 MHz (-3 dB)  
Threshold adjust range: -3/+3 V  
Maximum input voltage:  $\pm$ 5 V DC  
Trigger sensitivity DC to 100 MHz > 10% FSR

#### TV Trigger

Trigger for positive modulation  
Line & Frame selection (odd & even)  
Standards:  
B/G (625 lines/50 frames, PAL)  
L (625 lines/50 frames, SECAM)  
M (525 lines/60 frames, NTSC)

#### Coupling

AC LFRreject and DC

#### Modes

Edge, positive and negative

## Control I/O (A & B)

### Connector

MMCX, gold-plated

### Signals

TTL & CMOS compatible (3.3 V)

### Input

Trigger enable

### Output

10 MHz reference clock (with 50  $\Omega$  output impedance, reverse terminated)

Acquisition active

Trigger ready

Acquisition skipping to next segment

## Trigger Output

### Output Level

Adjustable in range  $\pm 2.5$  V (no load)

Amplitude  $\pm 0.8$  V (no load)

$\pm 15$  mA max.

### Connector

MMCX

### Rise/Fall Time

2.5 ns

### Coupling

DC

### Output Impedance

50  $\Omega$

## System Performance

### DC Accuracy

$< \pm 0.5\%$  of FS

### Integral Nonlinearity

$< \pm 0.025\%$  of FS

### SNR

$> 61$  dB

$> 64$  dB with BWL@ 35 MHz

### THD (< 25 MHz signal)

$< -71$  dB

### SFDR (< 25 MHz signal)

$> 73$  dB

### Effective Bits (typ.@170 MS/s)

DC–10 MHz, BWL 35 MHz:  $> 10.2$

10–25 MHz, full BW:  $> 9.8$

25–100 MHz, full BW:  $> 8.7$

## PC System Requirements

### Processor

150 MHz Pentium (or higher)

### Operating System

Windows 95/98/NT4/2000/XP

VxWorks or Linux

### Memory

64 MB RAM (more is recommended when working with several cards with large acquisition memories)

### Hard Drive Space

20 MB minimum

### CD Drive

## General

### Power Consumption (typ.)

At 1 V FS, 200 MS/s (DP308)

$< 17$  W

At 1 V FS, 100 MS/s (DP306)

$< 15$  W

### Current Requirements

12 V

5 V

3.3 V

-12 V

### DP308

$< 0.5$  A

$< 0.8$  A

$< 1.5$  A

$< 0.1$  A

### DP306

$< 0.5$  A

$< 0.4$  A

$< 1.5$  A

$< 0.1$  A

### Warranty

3 years

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

## Environmental and Physical

### Operating Temperature

0° to 40°C

### Required Airflow

$> 3$  l/s (2 m/s)

### Relative Humidity\*

5 to 95% (non-condensing)

### Shock\*

30 G, half-sine pulse

### Vibration\*

5–500 Hz, random

### Safety

Complies with EN61010-1

### EMC Immunity

Complies with EN61326-1

Industrial Environment

### EMC Emissions

Complies with EN61326-1 Class A

for radiated emissions

### Dimensions

PCI short-length standard

Front panel complies with IEEE1101.10

CE Certification and Compliance

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

## Ordering Information

### DP308

Model Number	Description
DP308	Single-channel, 12-bit, 100 MHz, 200 MS/s, 4 Mpoint memory PCI digitizer card
DP308-W5	5-year extended warranty
DP308-CAL	Calibration certificate

### DP306

Model Number	Description
DP306	Single-channel, 12-bit, 50 MHz, 100 MS/s, 4 Mpoint memory PCI digitizer card
DP306-W5	5-year extended warranty
DP306-CAL	Calibration certificate

### Accessories

XA200	Ctrl I/O MMCX to BNC cable (1m)
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Items not listed in the current price list may only be available under specific request. Please contact your local representative for more information.

DP308

DP306

### Acqiris USA

234 Cromwell Hill Rd  
P.O. Box 2203  
Monroe, NY 10950-1430  
USA  
Phone 845 782 6544  
Fax 845 782 4745

### Acqiris Europe

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

### Acqiris Asia-Pacific

Suite 7, 407 Canterbury Road  
PO Box 13  
Surrey Hills 3127  
Australia  
Phone +61 3 9888 4586  
Fax +61 3 9849 0861

For other sales and service representatives around the world, see our website at:

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