

DC438

12-bit

100 MHz

200 MS/s

DC436

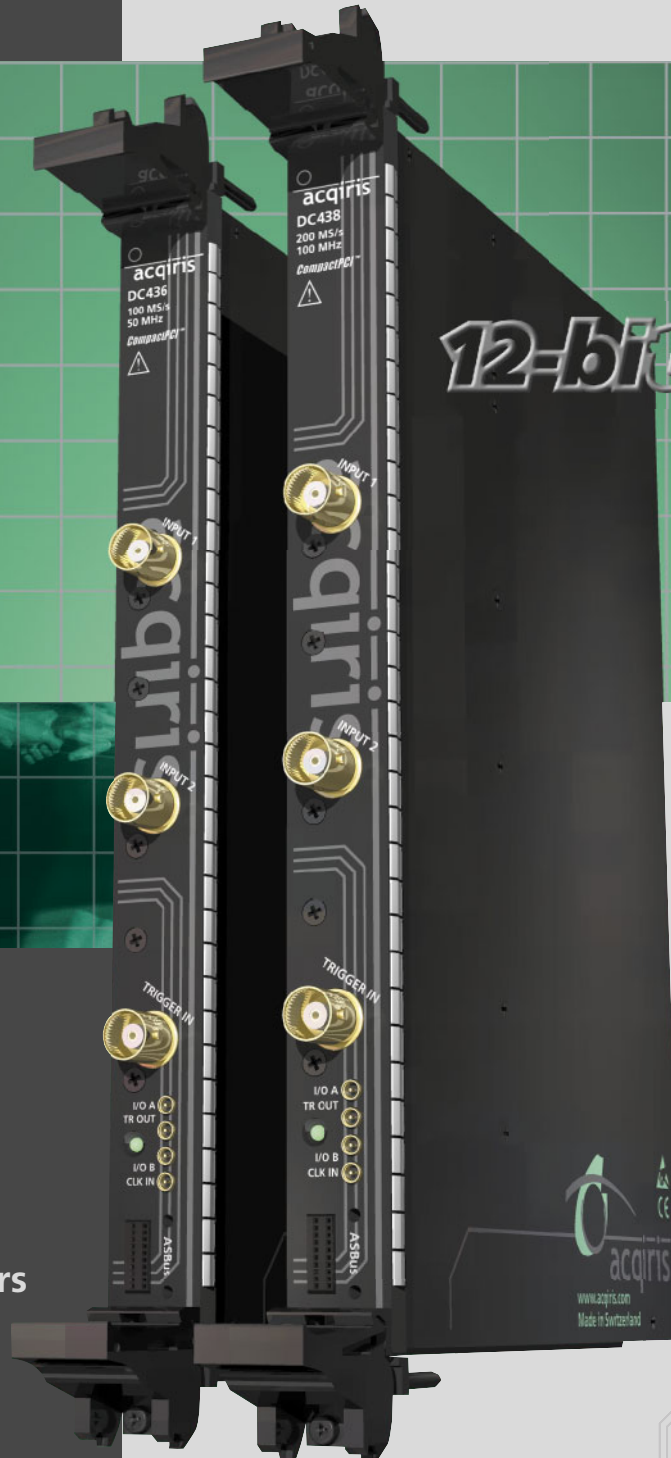
12-bit

50 MHz

100 MS/s

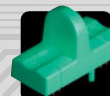


acqiris



12-bit 12-bit 12-bit

Dual-Channel
High-Resolution
Waveform Digitizers



ASBus
Auto Synchro Bus



Ctrl I/O

Main Features

- **Cost-effective, high-resolution, dual-channel digitizers**
- **12-bit monolithic ADCs, SFDR > 75 dB, SNR > 62 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 Ω mezzanine front end with large full-scale dynamic range and input protection**
- **Complete pre- and post-triggering**
- **Low dead-time (< 1 μ s) sequential recording with time stamps**
- **Auto-Synchronous Bus System (ASBus) for trigger and clock signal distribution**
- **Modular, 6U CompactPCI® standard (PXI compatible)**
- **Low power consumption (< 25 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 DC438 and DC436 12-bit digitizers set new standards in cost-effective CompactPCI-based high-resolution data acquisition by using the latest SiGe (silicon-germanium) technology.

The Model DC438 digitizer features two input channels with fast sample rates up to 200 MS/s and wide bandwidth of 100 MHz. The Model DC436 uses the same SiGe technology and overall architecture as the DC438 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 DC438 also has a selectable 35 MHz bandwidth filter.

The DC438 and DC436 12-bit digitizers have their own crystal-controlled precision time base (better than ± 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 DC436). The DC438 and DC436 flexibility in terms

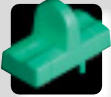
of sample rate selection and bandwidth combine to allow the high-resolution capture of signals up to 100 MHz (50 MHz) with a high spurious-free dynamic range (SFDR > 75 dB) and a high signal-to-noise ratio (SNR > 62 dB).

Additional outstanding specifications include total harmonic distortion (THD) of less than -73 dB, very low noise floor spectrum at -90 dB and effective bits (ENOB) of more than 10. Such specifications make the Models DC438 and DC436 a perfect match for cost-effective tests and measurements for multichannel-based 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.

High-Resolution Multichannel DAQ System under PC Control

Up to 14 Channels in One Crate



ASBus

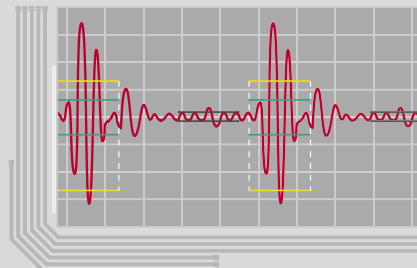
The Models DC448 and DC436 are dual-channel CompactPCI® (6U) modules that are ideal for use in high-resolution multichannel applications. For example, a single 8-slot 6U cPCI/PXI crate (CC108) can house up to 7 modules (plus an interface) to make a 14-channel benchtop data acquisition system. The low power consumption of the DC438 and DC436 (< 25 W and < 22 W respectively) results in a 14-channel system that uses less power than most comparable multichannel VXI-based systems. The Model DC438 and DC436 include Acqiris' ASBus, a proprietary high-bandwidth auto-synchronous bus system. In multichannel applications, ASBus is a vital tool designed to deliver all necessary trigger and clock signals. The system improves trigger flexibility by allowing any module input to be used as the trigger source for all the digitizers. For synchronous data acquisition, ASBus allows all the digitizers to be clocked at precisely the same time. Synchronous digitizing improves the accuracy of cross-channel measurements and is essential for accurate time correlation. The ASBus can also be used to phase-synchronize all the digitizers to an external standard (such as a 10 MHz reference).

PC Control and Convenience

Using the DC438 and DC436 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 enables high-fidelity recording with full control over gain and offset.

Data recorded by the DC438 and DC436 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.



The DC Series digitizers use large-scale integrated circuit technology to reduce size and power requirements. This essential technology allows the DC438 and DC436 to deliver the highest performance-to-price ratio of any 12-bit digitizer in the standard CompactPCI form factor.



Advanced Features for Input Stage, Trigger and Time Base

Mezzanine Front End

The DC438 and DC436 digitizing channels are located on two separate mezzanines 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 Ω input is protected against overvoltage 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 DC438 and DC436 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 μ s dead-time (DC438) between successive triggers (2 μ s for DC436). 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 about 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 DC438 and 100 MHz for the DC436) 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 DC438 and DC436 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 DC438 and DC436 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.



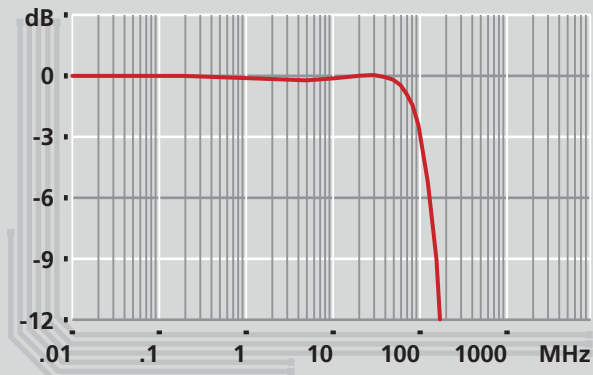
High-Fidelity Measurements

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

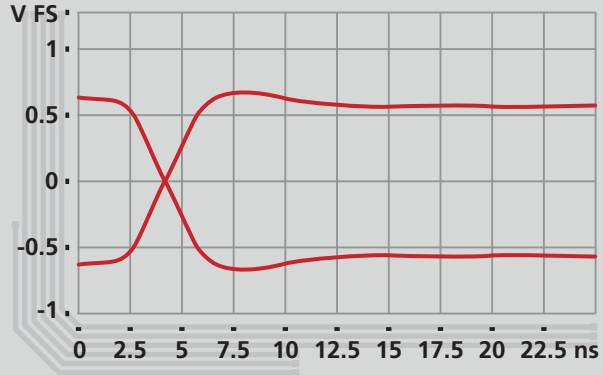
deliver maximum measurement fidelity. Careful circuit layout, custom ICs and special packaging techniques are all used to reduce overall system noise.

Frequency Response



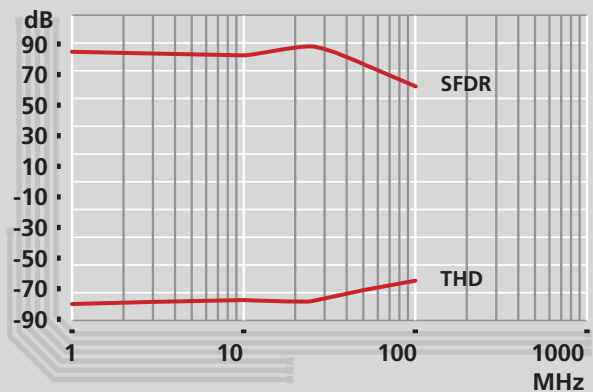
Frequency response is flat and system bandwidth for 1 V FS exceeds the specified 100 MHz.

Step Response



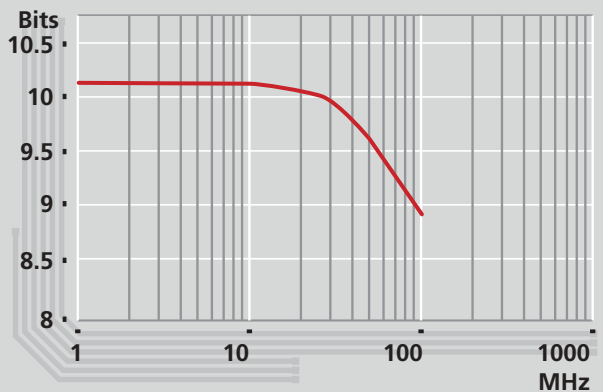
Positive and negative step responses show minimal overshoot and undershoots at 200 MS/s.

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 well above 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.

Dual-Channel High-Resolution Waveform Digitizers

Model DC438

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

Model DC436

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

Signal Input

Bandwidth (-3 dB)

DC to 100 MHz (DC438)
DC to 50 MHz (DC436)

Full Scale Range (FSR)

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

Impedance

50 Ω \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

Two

Coupling

DC

Maximum Input Voltage

\pm 10 V DC (2 W) or 10 V RMS at 50 Ω

Bandwidth Limit Filter

35 MHz 2-pole Bessel filter (DC438)
None (DC436)

Digital Conversion

Sample Rate

100 S/s to 200 MS/s (DC438)
100 S/s to 100 MS/s (DC436)

SR Adjustment Granularity

< 10% of SR (DC438)
< 50% of SR (DC436)

Differential Nonlinearity

\pm 0.5 LSB (DC438)
 \pm 0.75 LSB (DC436)

Resolution

12 bits (1:4096)

Acquisition Memories

4 Mpoints

Clock or Reference Input

Connector

MMCX, gold-plated

Impedance

50 Ω

Ext. Reference Frequency

10 MHz \pm 10%

Minimum Amplitude

1 V pk-pk

Maximum Input Voltage

\pm 2 V DC

Ext. Clock Frequency

From 50 MHz to 200 MHz (DC438)
From 50 MHz to 100 MHz (DC436)
SR defined with sparsing

Ext. Clock Threshold

Variable between -2 V and +2 V

Time Base

Clock Accuracy

Better than \pm 2 ppm

Acquisition Modes

Single shot
Sequence: 1 to 8000 segments
Dead-time: < 1 μ s (DC438), < 2 μ s (DC436)

Residual Phase Modulation

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

Sampling Jitter

< 1 ps RMS for 10 ms record length

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

External Trigger Input

BNC, gold-plated
Impedance: 50 Ω /1 M Ω
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)

Pretrigger

Adjustable to 100% of horizontal full scale

Posttrigger

Adjustable up to 100 Mpoints

Coupling

AC LFReject 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 Ω output impedance, reverse terminated)
Acquisition active
Trigger ready
Acquisition skipping to next segment

Trigger Output

Output Level

Adjustable in range ± 2.5 V (no load)
Amplitude ± 0.8 V (no load)
 ± 15 mA max.

Connector

MMCX

Rise/Fall Time

2.5 ns

Coupling

DC

Output Impedance

50 Ω

System Performance

DC Accuracy

$< \pm 0.5\%$ of FS

Integral Nonlinearity

$< \pm 0.025\%$ of FS

SNR

> 62 dB

> 65 dB with BWL@ 35 MHz

THD (< 25 MHz signal)

< -73 dB

SFDR (< 25 MHz signal)

> 75 dB

Effective Bits (typ.@170 MS/s)

DC–10 MHz, BWL 35 MHz: > 10.3
10–25 MHz, full BW: > 10
25–100 MHz, full BW: > 8.8

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 (DC438)
 < 25 W

At 1 V FS, 100 MS/s (DC436)
 < 22 W

Current Requirements

12 V

5 V

3.3 V

-12 V

DC438

< 0.6 A

< 1.5 A

< 2.2 A

< 0.2 A

DC436

< 0.6 A

< 0.9 A

< 2.2 A

< 0.2 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

6U CompactPCI® standard
233 mm x 160 mm x 20 mm

Front panel complies with IEEE1101.10

CE Certification and Compliance

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

Ordering Information

DC438

Model Number

DC438

Description

Dual-channel, 12-bit, 100 MHz,
200 MS/s, 4 Mpoint memory
CompactPCI digitizer

DC438-W5

5-year extended warranty

DC438-CAL

Calibration certificate

Accessories

XA200

Ctrl I/O MMCX to BNC cable (1m)

DC436

Model Number

DC436

Description

Dual-channel, 12-bit, 50 MHz,
100 MS/s, 4 Mpoint memory
CompactPCI digitizer

DC436-W5

5-year extended warranty

DC436-CAL

Calibration certificate

Items not listed in the current price list may only be available under specific request. Please contact your local representative for more information.

DC438

DC436

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