

DC140

1 GHz
2 GS/s

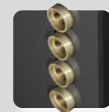


DC135

0.5 GHz
1 GS/s



Dual-Channel
3U PXI/CompactPCI
High-Speed Digitizers



Ctrl I/O

PXI

Main Features

- Synchronous dual-channel mode with independent gain and offset on each channel
- Interleaved single-channel mode, on either input, software selectable
- Up to 1 GHz analog bandwidth in all FS ranges (500 MHz with the DC135)
- Up to 2 GS/s sampling rate in single-channel mode (1 GS/s with the DC135)
- Fully-featured 50 Ω mezzanine front-end design with internal calibration and input protection
- Up to 16 Mpoints of acquisition memory
- Complete pre- and post-triggering
- Multipurpose I/O connectors (Ctrl I/O) for trigger, clock, reference and control signals
- 3U single-slot high-speed digitizer with exceptionally low power consumption characteristics
- Compliant to both the PXI and CompactPCI standards
- Optional firmware for Frequency Counter functionality (FC)
- Built-in 5 ps Trigger Time Interpolator (TTI) for accurate timing measurements
- Low dead-time sequential recording with time stamps for up to 8000 segments
- Device drivers for Windows 95/98/NT4.0/2000/XP, Linux, Phar Lap ETS and Wind River VxWorks
- Auto-install software with application code examples for C/C++, Visual Basic, MATLAB, National Instruments LabVIEW and LabWindows/CVI

Single-Slot High-Speed Data Acquisition

Dual-Channel Waveform Recording

Using the latest SiGe (silicon-germanium) technology, the DC140 and DC135 digitizers provide the highest genuine dual-channel data acquisition performance of any single-slot PXI 3U module. They can be plugged directly into any PXI or CompactPCI crate.

Top of the line is the DC140, which offers a sampling rate of 1 GS/s on each channel, wide 1 GHz bandwidth and long 128 kpoint/channel acquisition memory (optional 8 Mpoints) and up to 2 GS/s and 256 kpoints of acquisition memory (optional 16 Mpoints) in single-channel mode.

As a cost effective solution, the DC135 uses the same SiGe technology and overall architecture as the DC140. It has dual-channel sampling rates of up to 500 MS/s (1 GS/s in single-channel mode), 500 MHz bandwidth and 64 kpoints/channel of memory (optional 2 Mpoints).

The DC140 and DC135 digitizers' ultrafast sampling rates and bandwidths combine to allow the accurate

capture of signals up to 1 GHz and 500 MHz, respectively. Moreover, the cards' long acquisition memories (up to 16 Mpoints) enable them to record complex signals over long periods of time.

The digitizers 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 cards' time base circuit clocks the ADCs of each channel at the same time. The independent SiGe front-end circuitry ensures that timing skew (between channels) is kept to a ± 100 ps typical.

The 1 GHz bandwidth of the DC140 makes it ideal for measuring signal phenomena (rise-, fall-time, pulse width, etc.) well down into the sub-nanosecond range. Alternatively, the DC135 is the perfect solution for cost-effective dual-channel measurements on signals in the 10 to 500 MHz frequency range.

Model	BW	Dual-Channel Mode			Single-Channel Mode		
		Max. SR	Max. Samples/Channel		Max. SR	Max. Samples/Channel	
			Opt. Memory	Std. Memory		Opt. Memory	Std. Memory
DP140	1 GHz	1 GS/s	8 M	128 k	2 GS/s	16 M	256 k
DP135	500 MHz	500 MS/s	2 M	64 k	1 GS/s	4 M	128 k

PXI Compliant for Modular Instrumentation

PXI Both the DC140 and DC135 digitizers are fully PXI compliant. Designed to benefit from fast data interfaces, the products can be integrated with other test and automation modules in both PXI and CompactPCI chassis.

The PXI format offers high performance in a small, rugged package. An ideal deployment platform for automated test systems, a wide array of complementary instrumentation modules exists, with over 800 PXI products currently available, including multimeters, waveform generators, and switch multiplexers.

About PXI

PCI eXtensions for Instrumentation (PXI), is a modular instrumentation platform. With PXI, you can select the modules you need to integrate into a single PXI system from multiple vendors. Combining the high-speed PCI bus (132 MB/s) with integrated timing and synchronisation allows easy communication between various modules for integration as compact instrument systems.

Acqiris is an executive member of the PXI Systems Alliance, an organization chartered to promote the PXI standard, ensure interoperability and maintain the PXI specification.

www.pxisa.org

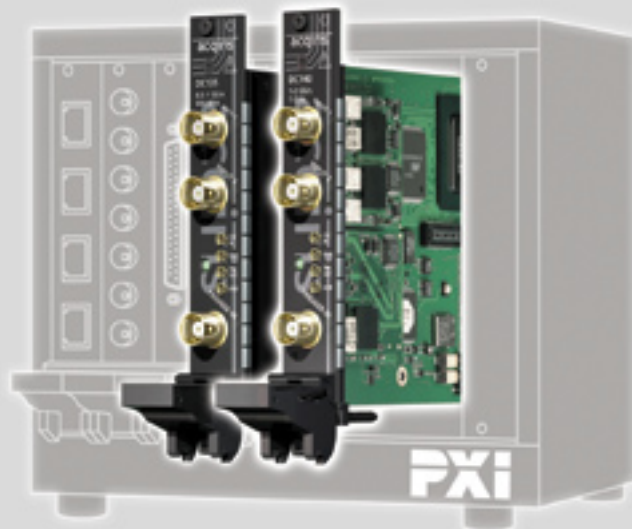
Easily Integrated

Acqiris understand that in production test environments, the time taken to integrate all the required test modules needs to be kept to a minimum. In semiconductor production testing for example, the addition of high speed functionalities in on-chip design, such as Ethernet, Wi-Fi, and Bluetooth, have led to a growing requirement for high-speed data conversion tools. It is important that the digitizer module chosen for this task can be simply and easily integrated into the already existent component testing system, minimizing down-time.

Acqiris reduces the time to integration by supplying the digitizers with all necessary software to enable a system to be up and running in next to no time. Supplied software includes AcqirisLive, a digitizer control program that enables "out-of-the-box" use of the digitizers, and a full set of driver libraries.

The digitizers are fully programmable under Microsoft Windows 95/98/2000/NT4/XP, Linux, Phar Lap ETS and Wind River VxWorks operating systems.

In addition, both the DC140 and DC135 digitizers can be used with off-the-shelf software packages such as National Instruments' LabWindows™/CVI, LabVIEW™ and The Mathworks' MATLAB®.



Extended Functionality

Optional Firmware for Frequency Counting

With the optional frequency counter firmware (DC140/DC135-FC), both the DC140 and DC135 digitizers can be used to perform real-time frequency measurement up to 400 MHz.

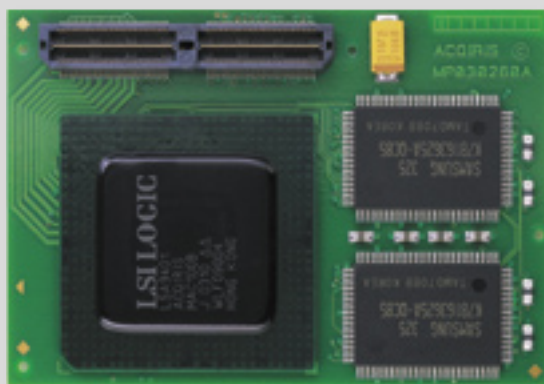
For user selectable intervals in the range 1 ms to 1000 s the module will count the number of triggers generated on the selected input signal, in the range of 1 to over 4 billion ($2^{32}-1$) counts. From this measurement, together with a small correction for the actual trigger time, it is possible to extract the average frequency, signal period, or the measured trigger count itself.

The option can also be used to totalize the number of triggers occurring during some user defined gate interval as given by a hardware signal on a Ctrl I/O input. In this case the input frequency should not exceed 125 MHz.

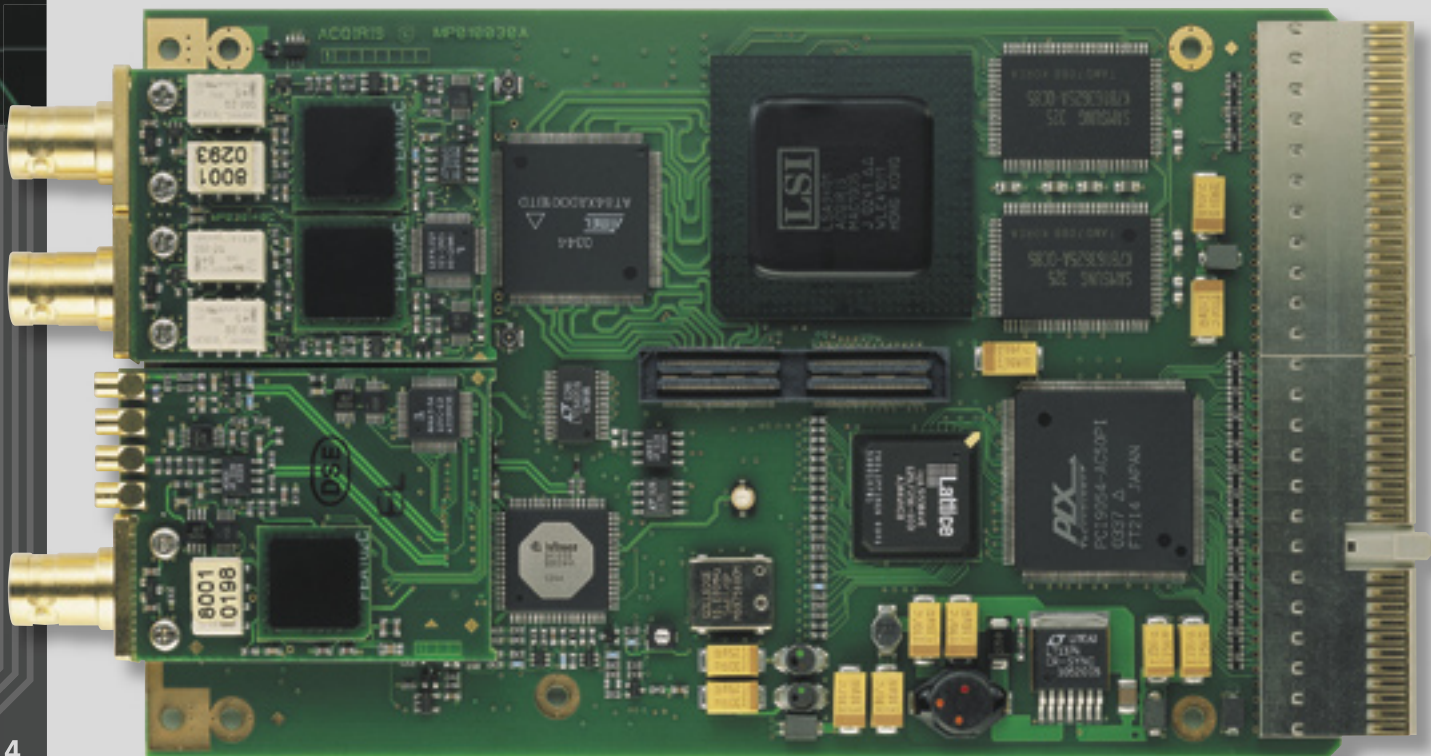
Frequency measurement accuracy benefits from the high (± 2 ppm) internal clock accuracy of the modules with no additional requirement for any external reference. An external reference source can also be used if higher precision is desired.

DC140

The DC140/DC135 digitizers use large-scale integrated circuit technology to reduce size and power requirements. This essential technology allows the DC140 to deliver the fastest sampling rate, highest bandwidth of any digitizer in a 3U PXII/CompactPCI package.



DC140 digitizer mezzanine card.



High-Performance Front-End Electronics, Trigger and Time Base

Mezzanine Front End

The channel inputs of the digitizers have programmable front-end electronics with 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 50 Ω input impedance front end is fully protected against overvoltage signals. The amplifiers feature internal calibration and very fast recovery from out-of-range signals. The input buffer and amplifier are mounted on a removable mezzanine card so that, in the event of accidental damage or as components fatigue over time (e.g. relays in high duty cycle automated testing applications), replacement is fast and efficient.

Multipurpose I/O Ports



Ctrl I/O

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

Precision Time Base

Each digitizer 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 2 GS/s (1 GS/s for the DC135). 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.

Flexible Trigger

The 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 extremely low dead time, enabling events, which may occur at very high repetition rates, to be captured and stored. This greatly extends the digitizer's timing range and resolution. Each event can be individually time-stamped and relative time measurements, between events, made with better than 1 ns resolution.

High-Fidelity Measurements

Quality Acquisitions

Acqiris digitizers are designed to provide superior measurement precision and accuracy. Key acquisition specifications (such as DC accuracy, channel timing skew, 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.

High Reliability and Low-Power

Low Parts Count

A very high degree of integration is needed in order to achieve the level of performance obtained with the DC140/DC135 digitizers. By drastically reducing the number of components, the integration has clear benefits in terms of reliability and lowers total power consumption. To maintain quality measurements, the DC140 and DC135 also use a patented 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 variations.

Dual-Channel 3U PXI/CompactPCI High-Speed Digitizers

Model DC140

Dual-channel, 8-bit, 1 GHz, 1-2 GS/s, 128-256 kpoint or 8-16 Mpoint memory

Model DC135

Dual-channel, 8-bit, 0.5 GHz, 0.5-1 GS/s, 64-128 kpoint or 2-4 Mpoint memory

Signal Input

Bandwidth (-3 dB)

DC to 1 GHz (DC140)
DC to 500 MHz (DC135)

Full Scale Range (FSR)

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

Impedance

50 Ω \pm 1% @ DC

Connector

BNC, gold-plated

Offset

\pm 2 V for 50 to 500 mV FS
 \pm 5 V for 1 to 5 V FS

Channels

Two

Coupling

DC, AC

Maximum Input Voltage

\pm 5 V DC

Digital Conversion

Sample Rate

100 S/s to 2 GS/s (DC140)
100 S/s to 1 GS/s (DC135)

Resolution

8 bits (1:256)

Acquisition Memories

128 kpoints/channel (DC140)
64 kpoints/channel (DC135)

Optional Memory

8 Mpoints/channel (DC140)
2 Mpoints/channel (DC135)

Differential Nonlinearity (typ.)

\pm 0.8 LSB

Clock or Reference Input

Connector

MMCX, gold-plated

Minimum Amplitude

500 mV pk-pk

Ext. Clock Threshold

Variable between -2 V and +2 V

Impedance

50 Ω

Maximum Input Voltage

\pm 2 V DC

Ext. Reference Frequency

10 MHz

Ext. Clock Frequency

From 10 MHz to 2 GHz

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 200 segments
(optional 8000)
Dead-time: < 0.8 μ s (DC140)
< 1.1 μ s (DC135)

Trigger Time Interpolator

5 ps resolution

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 (Internal and External)

Internal Trigger Input

Bandwidth (-3 dB):
DC to 1 GHz (DC140)
DC to 500 MHz (DC135)
Threshold adjust range: same as vertical FSR
Trigger sensitivity:
DC to 1 GHz > 15% FSR (DC140)
DC to 500 MHz > 15% FSR (DC135)

Pretrigger

Adjustable to 100% of horizontal full scale

Posttrigger

Adjustable up to 200 Mpoints

External Trigger Input

BNC, gold-plated
Impedance: 50 Ω
Bandwidth (-3 dB): DC to 1 GHz
Threshold adjust range:
(-FS/2, FS/2) for FS = 0.5, 1, 2 and 5 V
Maximum input voltage: ± 5 V DC
Trigger sensitivity
DC to 1 GHz > 10% FSR

Coupling

DC,
AC LFReject (50 Hz),
HFReject (50 kHz)

Modes

Edge, positive and negative
Window

Trigger Output

Output Level

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

Connector

MMCX, gold-plated

Rise/Fall Time

2.5 ns

Coupling

DC

Output Impedance

50 Ω

System Performance

DC Accuracy (typ.)

< $\pm 2\%$ of FS at 0 V offset
 $\pm 1\%$ of FS (typical)

Integral Nonlinearity (typ.)

< $\pm 1\%$ of FS

PC System Requirements

Processor

150 MHz Pentium (or higher)

Operating System

Windows 95/98/NT4/2000/XP
VxWorks, Phar Lap ETS 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.)

DC140
< 14 W with standard memory
< 16 W with max. memory option
DC135
< 13 W with standard memory
< 14 W with max. memory option

Current Requirements

12 V
5 V
3.3 V
3.3 V with memory option
-12 V

DC140

0.46 A
0.46 A
1.4 A
2.2 A
40 mA

DC135

0.46 A
0.46 A
1.1 A
1.5 A
40 mA

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

3U PXI/CompactPCI® standard
100 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

DC140

Model Number	Description
DC140	Dual-channel, 8-bit, 1 GHz, 1-2 GS/s, 128-256 kpoint memory PXI/cPCI digitizer
DC140-M8M	8-16 Mpoint acquisition memory option
DC140-FC	DC140 frequency counter firmware
DC140-W5	5-year extended warranty
DC140-CAL	Calibration certificate

DC135

Model Number	Description
DC135	Dual-channel, 8-bit, 0.5 GHz, 0.5-1 GS/s, 64-128 kpoint memory PXI/cPCI digitizer
DC135-M2M	2-4 Mpoint acquisition memory option
DC135-FC	DC135 frequency counter firmware
DC135-W5	5-year extended warranty
DC135-CAL	Calibration certificate

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

DC140

DC135

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