GaGe

The GaGe Razor™ family of multi-channel digitizers features up to 4 channels in a single-slot PCI card with 200 MS/s sampling per channel, and up to 2 GS of on-board acquisition memory.

Combine several Razor cards for up to 32 channels in a single system.

Razor CompuScope 14X2

### 14-Bit Family of Multi-channel Digitizers for the PCI Bus

The Razor family of 14-bit digitizers represents a new generation of high-speed, high-resolution data acquisition cards from GaGe. Razor digitizers offer many powerful advanced features including:

APPLICATIONS

Radar Design and Test
Disk Drive Testing
Manufacturing Test
Signal Intelligence
Lidar Systems
Communications
Non-Destructive Testing
Spectroscopy
High-Performance Imaging
Ultrasound Test

FEATURES

- 2 or 4 digitizing channels
- 200 MS/s maximum sampling per channel
- 14 bits vertical resolution
- 128 MS to 2 GS on-board acquisition memory
- 125 MHz bandwidth
- Full-size, single-slot PCI card
- Full-featured front-end, with software control over input ranges, coupling and impedances
- 32 bits, 66 MHz PCI standard for 200 MB/s transfer to PC memory
- Ease of integration with External or Reference Clock In and Clock Out, External Trigger In and Trigger Out
- Programming-free operation with GageScope® oscilloscope software
- Software Development Kits available for LabVIEW, MATLAB, C/C#

Razor CompuScope 14X2 Simplified Block Diagram
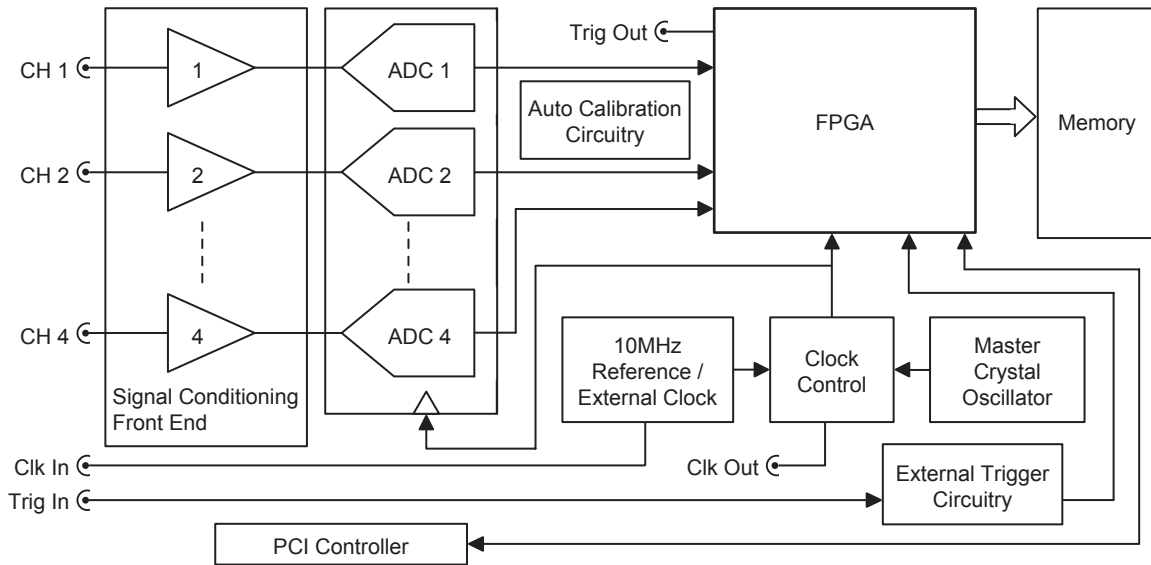
A/D SAMPLING

Number of Inputs:	2 or 4
Resolution:	14 bits

Dynamic Parameters (see Note 1):

SNR	68.3 dB
THD	-77.2 dB
SINAD	67.8 dB
ENOB (SINAD)	11.0
SFDR	83.2 dB
Noise Floor	-110.6 dB

Maximum Sampling Rate Per Channel:	200 MS/s
Sampling Rates:	200 MS/s, 100 MS/s, 50 MS/s, 25 MS/s, 10 MS/s, 5 MS/s, 2 MS/s, 1 MS/s, 500 kS/s, 200 kS/s, 100 kS/s, 50 kS/s, 20 kS/s, 10 kS/s, 5 kS/s, 2 kS/s, 1 kS/s
Connector:	SMA
Impedance:	1 MΩ or 50 Ω; (software-selectable)
Coupling:	AC or DC; (software-selectable)
AC Coupled Bandwidth(1MΩ):	10 Hz to 65 MHz
DC Coupled Bandwidth(50Ω):	DC to 125 MHz
Flatness (see Note 2):	Within ±0.5 dB of ideal response 50/100 MHz
DC Accuracy (see Note 3):	±0.5 %
Input Voltage Ranges:	±100 mV, ±200 mV, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V , ±20 V, ±50 V (3 highest ranges only available on 1 MΩ)
DC User Offset	± 1xFull Range (above ±5 V is limited to ±2.5 V)

Absolute Max Input:	±15 V (50 Ω), ±75 V (1 MΩ on all but two lowest Input Ranges, where Max is +/- 25V)

LOW-PASS FILTER

Type:	3-pole, 1 per channel
Cut-off Frequency:	25 MHz
Operation:	Individually software-selectable

ACQUISITION MEMORY

Available acquisition memory:	(Total on-board memory)/(# of active channels)

TRIGGERING

Trigger Engines:	2 per channel, 1 for external trigger
Source:	CH 1 to 4, EXT or Software
Input Combination:	All combinations of sources logically OR'ed
Trigger Level Accuracy:	Less than ±2% of Full Scale for channel triggering
Slope:	Positive or Negative; software-selectable
Sensitivity:	±2% of Full Scale This implies that signal amplitude must be at least 4% of full scale to cause a trigger to occur. Smaller signals are rejected as noise.
Post-Trigger Data:	32 points minimum. Can be defined with a 32 point resolution.

EXTERNAL TRIGGER

Impedance:	2 kΩ
Amplitude:	Absolute maximum ±15 V
Voltage Range:	±1 V, ±5 V (software-selectable)
Bandwidth:	>100 MHz
Coupling:	AC or DC
Connector:	SMA

TRIGGER OUT

Impedance:	50 Ω compatible
Amplitude:	0-1.8 V
Connector:	SMA

INTERNAL CLOCK

Accuracy:	±1 ppm (0 to 50°C ambient)

EXTERNAL CLOCK

Maximum Frequency:	Maximum Razor sample rate
Minimum Frequency:	10 MHz
Signal Level:	Minimum 1 V RMS Maximum 2 V RMS
Termination Impedance:	50 Ω
Duty Cycle:	50% ±5%
Connector:	SMA
Coupling:	AC

EXTERNAL REFERENCE

The External Reference timebase is used to synchronize the Internal Sampling Clock

Frequency:	10 MHz ±1000 ppm; (software-selectable)
Signal Level:	Minimum 1 V RMS Maximum 2 V RMS
Impedance:	50 Ω
Duty Cycle:	50% ±5%
Connector:	SMA
Coupling:	AC

CLOCK OUT

Maximum Frequency:	Maximum product sample rate
Minimum Frequency:	10 MHz (from External Clock) 1 kHz (from Internal Clock)
Signal Level:	0-1.8 V
Impedance:	50 Ω compatible
Duty Cycle:	50% ±10%
Connector:	SMA

MULTIPLE RECORD

Pre-trigger Data:	Up to virtually full record length
Record Length:	32 points minimum. Can be defined with a 32 points resolution.

TIMESTAMPING

Resolution:	One sampling interval
Counter turnover:	>48 hours continuous

CARD SIZE

Single-slot, full-length PCI

SYSTEM REQUIREMENTS

PCI-based computer, minimum Pentium II 500 MHz, with at least one free full-length PCI slot, 128 MB RAM, 100 MB hard disk.

†POWER (IN WATTS, PER CARD)

25.0 W (typical)

†Measured on a typical 4-channel Razor card.

PCI BUS INTERFACE

Plug-&-Play:	Fully supported
Bus Mastering:	Fully supported
Scatter-Gather:	Fully supported
Bus Width:	32 bits
Bus Speed:	66 MHz or 33 MHz
Bus Throughput:	180 MB/s to PC memory (66 MHz PCI; dependent on motherboard and number of PCI-PCI bridges)
Compatibility:	PCI-compliant, v.2.2 Also v.2.1 systems that supply 3.3 V to PCI slot

MULTI-CARD SYSTEMS

Operating Mode:	Master/Slave or multiple independent
Number of Cards:	

    Master/Slave: 2 to 8 cards

    Multiple/Independent: Limited only by backplane and power supply

OPERATING SYSTEMS

Windows Vista:	All Versions (32/64-bit)
Windows XP:	SP1 or higher (32/64-bit)
Windows Server:	2003, 2008

APPLICATION SOFTWARE

GageScope: Windows-based software for programming-free operation

LITE Edition:	Included with purchase, provides basic functionality
Standard Edition:	Provides limited functionality of advanced analysis tools, except for Extended Math
Professional Edition:	Provides full functionality of all advanced analysis tools

SOFTWARE DEVELOPMENT KITS (SDK)

CompuScope SDK for C/C# for Windows*
CompuScope SDK for MATLAB for Windows
CompuScope SDK for LabVIEW for Windows

*C/C# SDK is CLR compatible and is compatible with LabWindows/CVI 7.0+ compiler.
Visual Basic.NET support available with purchase of C/C# SDK.

Contact your GaGe Sales Agent for information on Linux support.

WARRANTY

One year parts and labor
Certificate of NIST Traceable Calibration is included.

All specifications subject to change without notice.

Notes to specifications:

1) Dynamic parameter measurements were done by acquiring a high purity 10 MHz sine wave with an amplitude of 95% of the Input Range. These measurements were taken on the +/500 mV Input Range using 50 Ohm termination and DC coupling and the anti-aliasing filter was applied. Dynamic parameter calculations were done from a 16 kiloSample Fourier Spectrum after applying a 7-term Blackman Harris Windowing Function to the time-domain waveform.

2) Measured at 100 MS/s in the ±500 mV range with 50 Ω input impedance with an amplitude of 95% of full scale.

3) Measured on ±500 mV, ±1 V, ±2 V input ranges for both 50 Ω and 1 MΩ input impedance settings.

ORDERING INFORMATION

Hardware & Upgrades

CS1422 (2 channel)	RAZ-002-300
CS1442 (4 channel)	RAZ-004-300
Memory Upgrade: 128 MS to 256 MS	RAZ-181-001
Memory Upgrade: 128 MS to 512 MS	RAZ-181-003
Memory Upgrade: 128 MS to 1 GS	RAZ-181-005
Memory Upgrade: 128 MS to 2 GS	RAZ-181-007
Set 1 Cable SMA to BNC	ACC-001-031
Set 4 Cable SMA to BNC	ACC-001-033
Master Multi-Card Upgrade	RAZ-181-002
Slave Multi-Card Upgrade	RAZ-181-003

eXpert™ Firmware Options

eXpert Signal Averaging Firmware Option	250-181-001

GageScope® Software

GageScope: Lite Edition	Included
GageScope: Standard Edition (with Purchase of CompuScope Hardware)	300-100-351
GageScope: Professional Edition (with Purchase of CompuScope Hardware)	300-100-354

Software Development Kits (SDKs)

GaGe SDK Pack on CD	200-113-000
CompuScope SDK for C/C#	200-200-101
CompuScope SDK for MATLAB	200-200-102
CompuScope SDK for LabVIEW	200-200-103

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www.gage-applied.com

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