

The GaGe Octopus™ family of multi-channel digitizers features up to 8 channels in a single-slot PCI Express or PCI card with up to 125 MS/s sampling per channel, and up to 32 GB of on-board acquisition memory. Combine several Octopus cards for up to 64 channels in a single system.

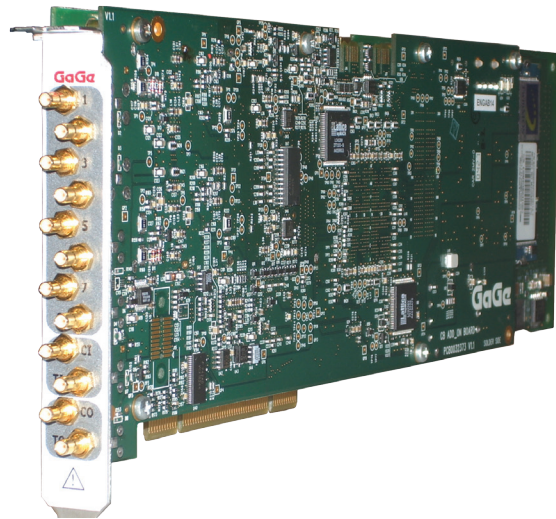
With more than 35 new digitizers to choose from, we offer you many more options than ever before.

## APPLICATIONS

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

## Octopus CompuScope 82XX

**12-Bit Family of Multi-channel Digitizers for the PCI Express and PCI Bus**

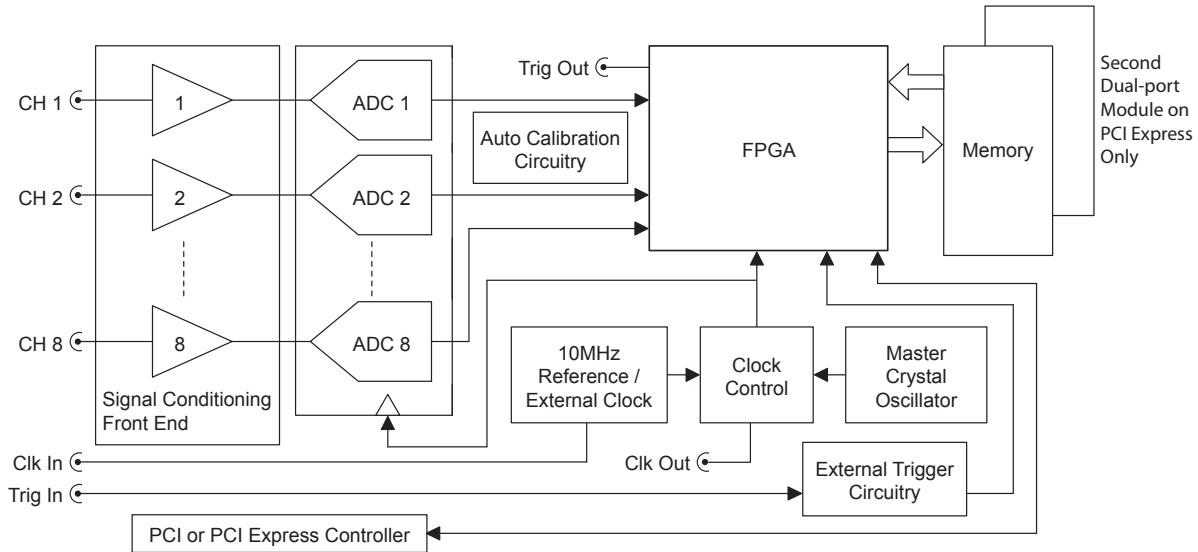


The Octopus family provides high performance and high channel density on the PCI Express or PCI platform.

## FEATURES

- 2, 4, or 8 digitizing channels
- 10, 25, 50, 65, 100, or 125 MS/s sampling per channel
- 12 bits vertical resolution
- 128 MS to 16 GS on-board acquisition memory
- More than 100 MHz bandwidth
- Full-size, single-slot PCI Express or PCI card
- Full-featured front-end, with software control over input ranges, coupling and impedances
- Dual-port memory and data streaming at up to 3.1 GB/s on PCI Express models
- 32 bits, 66 MHz PCI 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 Event Out
- Programming-free operation with GageScope® oscilloscope software
- Software Development Kits available for LabVIEW, MATLAB, C/C#
- Custom FPGA firmware available

## Octopus CompuScope 82XX Simplified Block Diagram



### A/D SAMPLING

Number of Inputs:	2, 4 or 8
Resolution:	12 bits
ENOB (see Note 1):	10.3 bits
SNR (see Note 1):	64 dB
SFDR (see Note 1):	79 dB
SINAD (see Note 1):	63.6 dB
Maximum Sampling Rate Per Channel (product-dependent):	10, 25, 50, 65, 100 or 125 MS/s
Sampling Rates (product-dependent):	125 MS/s, 100 MS/s, 65 MS/s, 50 MS/s, 40 MS/s, 25 MS/s, 20 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:	SMB
Impedance:	1 M $\Omega$ or 50 $\Omega$ ; (software-selectable)
Coupling:	AC or DC; (software-selectable)
AC Coupled Bandwidth:	10 Hz to >100 MHz (see Note 2)
DC Coupled Bandwidth:	DC to >100 MHz (50 $\Omega$ see Note 5, slightly less for 1 M $\Omega$ )
Flatness (see Note 3):	Within $\pm 0.5$ dB of ideal response to 90 MHz
DC Accuracy (see Note 4):	$\pm 0.5$ %
Input Voltage Ranges:	$\pm 100$ mV, $\pm 200$ mV, $\pm 500$ mV, $\pm 1$ V, $\pm 2$ V, $\pm 5$ V, $\pm 10$ V ( $\pm 10$ V is only available in 1 M $\Omega$ )
DC Offset	$\pm 1 \times$ Full Range (above $\pm 5$ V is limited to $\pm 2.5$ V)

### LOW-PASS FILTER

Type:	3-pole Bessel, 1 per channel
Cut-off Frequency:	24 MHz
Operation:	Individually software-selectable

### ACQUISITION MEMORY

Octopus Model	Available memory options				
CS82XX (PCI)	128 MS	256 MS	512 MS	1 GS	2 GS
CSE82XX (PCI Express)	1 GS	2 GS	4 GS	8 GS	16 GS

**Note:** All memory sizes are expressed in Samples, not Bytes

**Note:** Memory may be shared among 1, 2, 4, or 8 channels

Octopus Model	Memory Architecture	Data Streaming?
CS82XX (PCI)	Single Port	No
CSE82XX (PCI Express)	Dual Port	Yes

### TRIGGERING

Trigger Engines:	2 per channel, 1 for external trigger
Source:	CH 1 to 8, EXT or Software
Input Combination:	All combinations of sources logically OR'ed
Trigger Level Accuracy:	Less than $\pm 2\%$ of Full Scale for channel triggering
Slope:	Positive or Negative; software-selectable
Sensitivity:	$\pm 2\%$ 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:	128 points minimum. Can be defined with a 64 point resolution.
Maximum Record Length:	Maximum memory depth

### EXTERNAL TRIGGER

Impedance:	2 k $\Omega$
Amplitude:	Absolute maximum $\pm 15$ V
Voltage Range:	$\pm 1$ V, $\pm 5$ V (software-selectable)

Bandwidth: >100 MHz  
Coupling: AC or DC  
Connector: SMB

#### TRIGGER OUT

Impedance: 50  $\Omega$  compatible  
Amplitude: 0-2.5 V  
Connector: SMB

#### INTERNAL CLOCK

Accuracy:  $\pm 1$  ppm (0 to 50°C ambient)

#### EXTERNAL CLOCK

Maximum Frequency: Maximum product sample rate  
Minimum Frequency: 2 MHz  
Signal Level: Minimum 1 V RMS  
Maximum 2 V RMS  
Termination Impedance: 50  $\Omega$   
Sampling Edge: Rising  
Duty Cycle: 50%  $\pm 5\%$   
Connector: SMB  
Coupling: AC

#### EXTERNAL REFERENCE

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

Frequency: 10 MHz  $\pm 1000$  ppm; (software-selectable)  
Signal Level: Minimum 1 V RMS  
Maximum 2 V RMS  
Impedance: 50  $\Omega$   
Sampling Edge: Rising  
Duty Cycle: 50%  $\pm 5\%$   
Connector: SMB

#### CLOCK OUT

Maximum Frequency: Maximum product sample rate  
Minimum Frequency: 2 MHz (from External Clock)  
1 kHz (from Internal Clock)  
Signal Level: 0-2.5 V  
Impedance: 50  $\Omega$  compatible  
Duty Cycle: 50%  $\pm 10\%$   
Connector: SMB

#### MULTIPLE RECORD

Pre-trigger Data: Up to virtually full record length  
Record Length: 128 points minimum.  
Can be defined with a 64 points resolution.

#### TIMESTAMPING

Resolution: One sampling interval  
Counter turnover: >24 hours continuous

#### CARD SIZE

Single-slot, full-length PCI or PCI Express (8 or 16 Lane)

#### †POWER (IN WATTS, PER CARD)

25.0 W (typical)

†Measured on a typical 4-channel Octopus card.

#### SYSTEM REQUIREMENTS

PC computer, minimum Pentium II 500 MHz, with at least one free full-length PCI or PCI Express (8 or 16 Lane) slot, 128 MB RAM, 200 MB of free hard disk space.

#### BUS INTERFACE

	<b>CS82XX (PCI)</b>	<b>CSE82XX (PCI Express)</b>
Plug-&-Play	Fully supported	Fully supported
Bus Mastering	Fully supported	Fully supported
Scatter-Gather:	Fully supported	Fully supported
Bus Width:	32-bits	8 Lanes
Bus Speed:	66 MHz or 33 MHz	40 Gb (Gen2) or 20 Gb (Gen1)
Bus Throughput:	200 MB/s to PC memory (66 MHz PCI; dependent on motherboard and configuration)	3.1 GB/s (Gen2) or 1.6 GB/s (Gen1)
Compatibility:	PCI-compliant, v.2.2. Also v.2.1 systems that supply 3.3 V to PCI slot	PCI Express 2.0 compliant (Also 1.1 at 20 Gb)

#### MULTI-CARD SYSTEMS

Operating Mode: Master/Slave (PCIe Only) or multiple independent  
Number of Cards:

Master/Slave (PCIe Only): 2 to 8 cards

Multiple/Independent: Limited only by backplane and power supply

#### OPERATING SYSTEMS

Windows Vista, XP: All Versions  
Windows 2000: SP1 or higher

#### 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 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.



## ORDERING INFORMATION

### Hardware & Upgrades

Octopus 12-bit Family	PCI CompuScopes			PCI Express CompuScopes	
	2 Channel	4 Channel	8 Channel	8 Channel	
10 MS/s	CS8220: OCT-822-000	CS8240: OCT-824-000	CS8280: OCT-828-000	CSE8280: OCE-828-000	
25 MS/s	CS8222: OCT-822-002	CS8242: OCT-824-002	CS8282: OCT-828-002	CSE8282: OCE-828-002	
50 MS/s	CS8224: OCT-822-004	CS8244: OCT-824-004	CS8284: OCT-828-004	CSE8284: OCE-828-004	
65 MS/s	CS8225: OCT-822-005	CS8245: OCT-824-005	CS8285: OCT-828-005	CSE8285: OCE-828-005	
100 MS/s	CS8227: OCT-822-007	CS8247: OCT-824-007	CS8287: OCT-828-007	CSE8287: OCE-828-007	
125 MS/s	CS8229: OCT-822-009	CS8249: OCT-824-009	CS8289: OCT-828-009	CSE8289: OCE-828-009	
	Memory Upgrade: 128 MS to 256 MS		OCT-181-001	Memory Upgrade: 1 GS to 2 GS	MEM-181-001
	Memory Upgrade: 128 MS to 512 MS		OCT-181-003	Memory Upgrade: 1 GS to 4 GS	MEM-181-003
	Memory Upgrade: 128 MS to 1 GS		OCT-181-005	Memory Upgrade: 1 GS to 8 GS	MEM-181-005
	Memory Upgrade: 128 MS to 2 GS		OCT-181-007	Memory Upgrade: 1 GS to 16 GS	MEM-181-007
				Master Multi-Card Upgrade (PCIe Only)	OCT-181-012
				Slave Multi-Card Upgrade (PCIe Only)	OCT-181-013

#### Cables

36" SMB to BNC male cable	ACC-001-001
36" SMB to BNC male cable - 4 pack	ACC-001-003
6" SMB to BNC female cable	ACC-001-011
6" SMB to BNC female cable - 4 pack	ACC-001-013
6" SMB to SMB jumper cable	ACC-001-021
6" SMB to SMB jumper cable - 4 pack	ACC-001-023

#### eXpert™ Firmware Options

eXpert Signal Averaging Firmware Option	250-181-001
eXpert FIR Filtering Firmware Option	250-181-002
eXpert Peak Detection Firmware Option	250-181-003
eXpert FFT Firmware Option	250-181-004
eXpert Firmware Option bundle (Signal Averaging, FIR Filtering and Peak Detection)	888-100-026

#### 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
eXpert Data Streaming (PCI Express Only)	STR-181-000

All specifications subject to change without notice.

#### Notes to specifications:

- 1) Measured at 125 MS/s in the  $\pm 500$  mV range with  $50 \Omega$  input impedance using a 10 MHz sine wave with an amplitude of 95% of full scale and the on-board filtering capability.
- 2) 10 Hz at 1 M $\Omega$  only.
- 3) Measured at 125 MS/s in the  $\pm 500$  mV range with  $50 \Omega$  input impedance with an amplitude of 95% of full scale.
- 4) Measured on  $\pm 500$  mV,  $\pm 1$  V,  $\pm 2$  V input ranges for both  $50 \Omega$  and 1 M $\Omega$  input impedance settings.
- 5) Measured on  $\pm 1$  V,  $\pm 2$  V,  $\pm 5$  V input ranges using the  $50 \Omega$  input impedance setting.

Unless otherwise specified, all dynamic performance specs have been qualified on engineering boards.

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