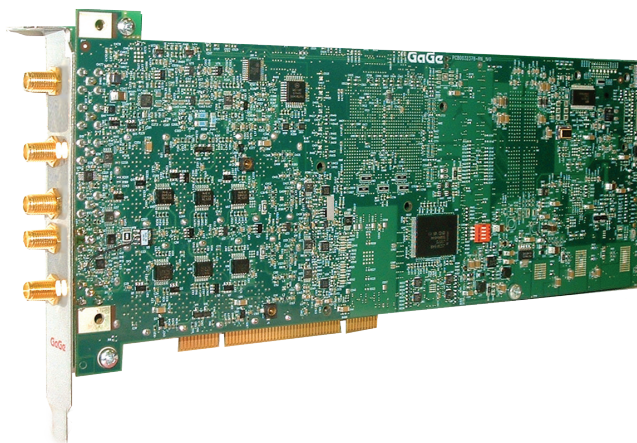# GaGe

The GaGe CobraMax™ family of digitizers features up to 2 channels in a single-slot PCI card with up to 4 GS/s sampling per channel, and up to 4 GB of on-board acquisition memory. Combine several CobraMax cards for up to 16 simultaneous channels in a single system.

CobraMax CompuScope Family
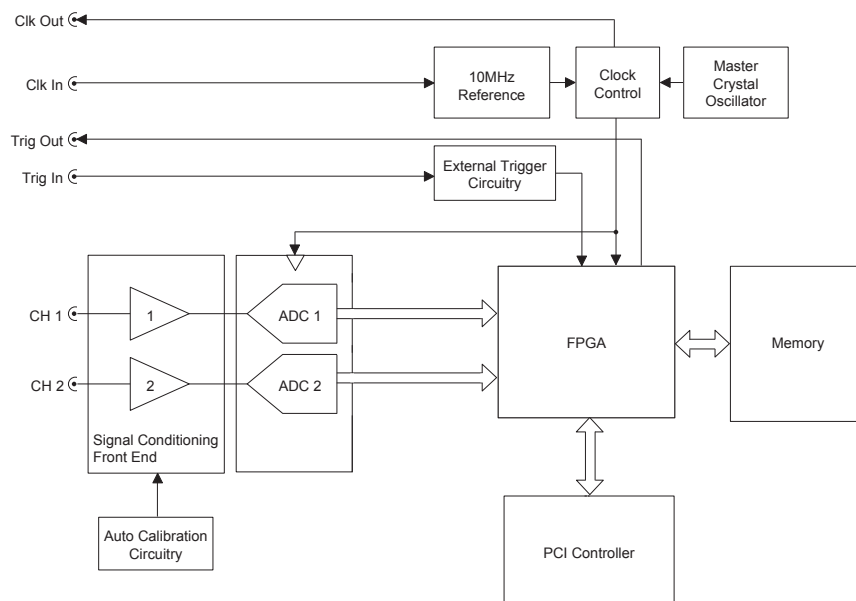
Ultra High-Speed Digitizers for the PCI Bus

The CobraMax CompuScope family of GaGe ultra high-speed 8-bit digitizers provides the most powerful combination of speed, memory, and bandwidth as well as a wide portfolio of advanced acquisition features.

APPLICATIONS

Wireless Communications
Military & Aerospace
Manufacturing Test
Signal Intelligence
Non-destructive Testing
Synthetic instrumentation
Electro-optic
Radar/Lidar
Laser Optics
Embedded digitizer
Scope replacement

FEATURES

- 1 or 2 digitizing channels
- 3 or 4 GS/s maximum sampling rate per channel
- 8 bits vertical resolution
- 256 MS to 4 GS on-board acquisition memory
- 1.5 GHz bandwidth
- Full-size, single-slot PCI card
- Full-featured front-end, with software selection of all signal conditioning settings
- 32 bits, 66 MHz PCI standard for 200 MB/s transfer to PC memory
- Ease of integration with 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# and more

CobraMax CompuScope Simplified Block Diagram

A/D SAMPLING

Resolution:	8 bits
Maximum Sampling Rate:	3 or 4 GS/s (model-dependent)
Sampling Rates:	4 GS/s, 3 GS/s, 2 GS/s, 1.5 GS/s, 1 GS/s, 750 MS/s, 500 MS/s, 375 MS/s, 250 MS/s, 125 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

ACQUISITION MEMORY

Available on-board memory:	256 MS, 512 MS, 1 GS, 2 GS, 4 GS

INPUT CHANNELS

Number of Inputs:	1 or 2 (model-dependent)
Connector:	SMA
Input Voltage Ranges:	±50 mV, ±100 mV, ±200 mV, ±500 mV, ±1 V, ±2 V, ±5 V
DC Accuracy:	±1 % (see Note 1)
Protection:	Diode-clamped
Absolute Maximum Input Voltage (see Note 2):	6 V RMS
Impedance:	50 Ω
Coupling:	AC or DC
ENOB (see Note 3):	7.6
SNR (see Note 3):	47.2 dB
THD (see Note 3):	-59.3 dB
SINAD (see Note 3):	47.0 dB
SFDR (see Note 3):	56.5 dB
DC Coupled Bandwidth:	DC to 1.2 GHz for CSX3G8 (1.5 GHz for CS14G8)
AC Coupled Bandwidth:	20 kHz to 1.2 GHz for CSX3G8 (1.5 GHz for CS14G8)
Flatness:	Within ±1 dB of ideal response to 800 MHz signal frequency

LOW-PASS FILTER

Type:	3-pole Bessel, 1 per channel
Cut-off Frequency:	200 MHz
Operation:	Individually software-selectable

DC OFFSET

A software-adjustable DC offset voltage may be independently applied to each input channel in order to optimize input range usage.

Span:	±100 % on all input ranges
Accuracy:	1 %

TRIGGERING

Source:	CH 1 or 2, EXT or manual
Trigger Level Accuracy:	Internal: ±2% of Full Scale
	External: ±10% of Full Scale
Slope:	Positive or Negative
Sensitivity:	5% of Full Scale
	Signal swing must be at least 5% of full scale in order to cause a trigger event. Smaller signals are rejected as noise.
Post-Trigger Data:	64 points minimum
	May be increased with 64 point resolution.
Trigger Engines:	2 per channel, 1 for External Trigger
Source Combination:	All trigger source combinations may be logically OR'ed together

TRIGGER IN (EXTERNAL TRIGGER)

Impedance:	2 kΩ or 50 Ω
Amplitude:	Absolute Maximum 6 V RMS
Voltage Range:	±1 V, ±5 V
Bandwidth:	>300 MHz

Coupling: AC or DC
Connector: SMA

TRIGGER OUT
Amplitude: 0 to 1.5 V into 50 Ω load
Impedance: 50 Ω compatible
Connector: SMA

INTERNAL CLOCK
Accuracy: ±1 ppm (0 to 50°C ambient)

EXTERNAL REFERENCE CLOCK IN
A 10 MHz External Reference signal may be used to synchronize Internal Sampling Clock
Signal Type: Square Wave
Frequency: 10 MHz ±50 ppm
Signal Level: Minimum 200 mV RMS
Maximum 500 mV RMS
Impedance: 50 Ω
Connector: SMA

CLOCK OUT
Frequency: 10 MHz
Signal Level: ±300 mV into 50 Ω Load
Connector: SMA

10 MHz reference signal may be used as output for synchronizing other instruments.

MULTIPLE RECORD
Pre-trigger Data: Up to almost full on-board memory
Record Length: 64 points minimum.
May be increased with 64 points resolution

TIMESTAMPING
Resolution: One sampling interval
Counter turnover: >24 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, 1 GB hard drive.

POWER CONSUMPTION (IN WATTS, PER CARD)

DC Supply Voltage	Worst Case	Typical
+5 Volts	TBA	TBA
- 5 Volts	TBA	TBA
+3.3 Volts	TBA	TBA
+12 Volts	TBA	TBA
-12 Volts	TBA	TBA

Note: The 4 GS CobraMax model consumes an extra 3 Watts of power from the +5 Volts supply, as compared with the 256 MS model. Intermediate memory models consume extra power proportionately.

PCI BUS INTERFACE
Bus Mastering: Fully supported
Scatter-Gather: Fully supported
Bus Width: 32 bits
Bus Speed: 66 MHz or 33 MHz
Bus Throughput: 200 MB/s to PC memory
(PCI-X compatible at 66 MHz bus speed)
Compatibility: PCI-compliant, v.2.2
Also operates in 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

Note: In contrast to external multi-card synchronization methods, the CobraMax CompuScope's internal rigid bridge-board Master/Slave architecture provides true simultaneous sampling, triggering and arming of all channels within a Master/Slave system.

CobraMax CompuScopes automatically self-configure as Master, Slave or Independent cards depending upon detection of the Master/Slave bridge-board.

OPERATING SYSTEMS
Windows Vista, XP: All Versions (32-/64-bit 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.
All specifications subject to change without notice.

Notes to specifications:

1) DC accuracy is ±1% on all input ranges

2) On the ±5 V Input Range, the maximum input is 8.5 V RMS Voltage

3) Measured using a 10 MHz sine wave with an amplitude of 95% of full scale. No on-board filtering is used.

ORDERING INFORMATION
Hardware & Upgrades

CobraMax Model	Number of channels	Max. Single Channel Sampling Rate	Max. Dual Channel Sampling Rate	Part Number
CS14G8	1	4 GS/s	-	CBX-014-000
CS23G8	2	3 GS/s	1.5 GS/s	CBX-023-000
CS13G8	1	3 GS/s	-	CBX-013-000

Memory Upgrade: 256 MS to 512 MS	CBX-181-001
Memory Upgrade: 256 MS to 1 GS	CBX-181-003
Memory Upgrade: 256 MS to 2 GS	CBX-181-005
Memory Upgrade: 256 MS to 4 GS	CBX-181-007
Master Multi-Card Upgrade	CBX-181-012
Slave Multi-Card Upgrade	CBX-181-013
Set 1 Cable SMA to BNC	ACC-001-031
Set 4 Cable SMA to BNC	ACC-001-033
eXpert Signal Averaging Firmware Option	Call Factory

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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