

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

## APPLICATIONS

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

## Cobra CompuScope Family

**Next-Generation High-Speed Digitizers for the PCI Bus**

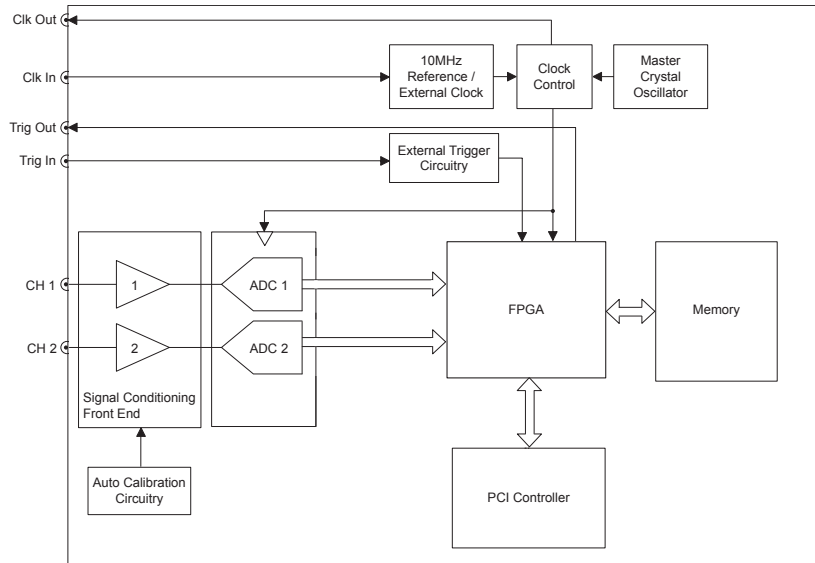


The Cobra CompuScope family is a new generation of GaGe high-speed 8-bit digitizers that provides the most powerful combination of speed, memory, and bandwidth as well as a wide portfolio of advanced acquisition features.

## FEATURES

- 1 or 2 digitizing channels
- 1 or 2 GS/s maximum sampling rate per channel
- 8 bits vertical resolution
- 256 MS to 4 GS on-board acquisition memory
- Up to 1 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 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# and more

## Cobra CompuScope Simplified Block Diagram



### A/D SAMPLING

Resolution:	8 bits
Maximum Sampling Rate:	1 or 2 GS/s (model-dependent)
Sampling Rates:	2 GS/s, 1 GS/s, 500 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, 2 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):	7.4
SNR (see Note 3):	46 dB
THD (see Note 3):	-60 dB
SINAD (see Note 3):	46 dB
SFDR (see Note 3):	60 dB
DC Coupled Bandwidth:	DC to >500 MHz
AC Coupled Bandwidth:	20 kHz to >500 MHz
Flatness:	Within ±1 dB of ideal response to 100 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 except ±5V it is ±20 %
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  $\Omega$  load  
Impedance: 50  $\Omega$  compatible  
Connector: SMA

### INTERNAL CLOCK

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

### CLOCK IN (EXTERNAL CLOCK)

Maximum Frequency: 1 GHz  
Minimum Frequency: 200 MHz  
Absolute Maximum Input Voltage (see Note 1): 6 V RMS  
Signal Level: Minimum 200 mV RMS  
Maximum 500 mV RMS  
Minimum Signal Slew Rate: 2 V/ns  
Termination Impedance: 50  $\Omega$   
Duty Cycle: 50%  $\pm 5\%$   
Connector: SMA  
Coupling: AC

### EXTERNAL REFERENCE

A 10 MHz External Reference signal may be used to synchronize Internal Sampling Clock

Signal Type: Square Wave  
Frequency: 10 MHz  $\pm 50$  ppm  
Signal Level: Minimum 200 mV RMS  
Maximum 500 mV RMS  
Impedance: 50  $\Omega$   
Connector: SMA

### CLOCK OUT

Maximum Frequency: 1 GHz  
Minimum Frequency: 10 MHz  
Signal Level:  $\pm 300$  mV into 50  $\Omega$  Load  
Connector: SMA

Note: 10 MHz reference signal may be selected 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	10 W	8 W
- 5 Volts	0 W	0 W
+3.3 Volts	21 W	20 W
+12 Volts	0.7 W	0.6 W
-12 Volts	0.7 W	0.6 W

Note: The 4 GS Cobra 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: 2 to 8 cards  
Master/Slave: 2 to 8 cards  
Multiple/Independent: Limited only by backplane

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

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

### OPERATING SYSTEMS

Windows Vista, XP/ Win 7: 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.  
 All specifications subject to change without notice.

### Notes to specifications:

- 1) DC accuracy is  $\pm 1\%$  on all input ranges
- 2) On the  $\pm 5$  V Input Range, the maximum input is 8.5 V RMS Voltage
- 3) Measured at maximum sample rate using a 10 MHz sine wave with an amplitude of 95% of full scale. No on-board filtering is used.

## 1 GHz Cobra CompuScope Models

The signal conditioning front-end circuitry of the standard Cobra CompuScope models limits the 3 dB roll-off of their frequency response to slightly more than 500 MHz. On the 1 GHz Cobra CompuScope models, whose names include the post-fix "-1GHz", most front-end signal conditioning circuitry is bypassed so that the 3 dB roll-off frequency is greater than 1GHz. Input protection and AC/DC coupling selection are absent on the 1 GHz Cobra CompuScope models and there is a single input range of  $\pm 200$  mV in both single and dual channel modes. All other standard Cobra CompuScope functionality is preserved.

## ORDERING INFORMATION

### Hardware & Upgrades

Cobra Model	Number of channels	Max. Single Channel Sampling Rate	Max. Dual Channel Sampling Rate	Part Number
CS22G8	2	2 GS/s	1 GS/s	COB-022-000
CS21G8	2	1 GS/s	500 MS/s	COB-021-000
CS11G8	1	1 GS/s	-	COB-011-000
CS22G8-1GHz	2	2 GS/s	1 GS/s	COB-022-001
CS21G8-1GHz	2	1 GS/s	500 MS/s	COB-021-001
CS11G8-1GHz	1	1 GS/s	-	COB-011-001

Memory Upgrade: 256 MS to 512 MS MEM-181-001  
 Memory Upgrade: 256 MS to 1 GS MEM-181-003  
 Memory Upgrade: 256 MS to 2 GS MEM-181-005  
 Memory Upgrade: 256 MS to 4 GS MEM-181-007

Master Multi-Card Upgrade COB-181-002  
 Slave Multi-Card Upgrade COB-181-003

Set 1 Cable SMA to BNC ACC-001-031  
 Set 4 Cable SMA to BNC ACC-001-033

eXpert Signal Averaging Firmware Option 250-181-001

### GageScope® Software

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

### 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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