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TECHNOLOGY GROUP

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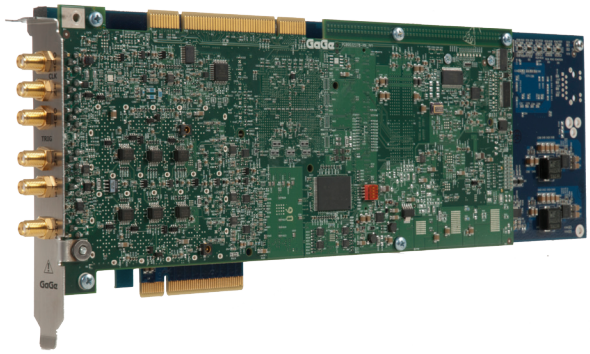
The GaGe Cobra™ family of digitizers features up to 2 channels in a single-slot PCI Express or PCI card with up to 2 GS/s sampling per channel, and up to 32 GB of on-board acquisition memory. Combine several Cobra cards for up to 16 simultaneous channels in a single system.

APPLICATIONS

Wireless Communications
Military & Aerospace
Manufacturing Test
Signal Intelligence
Non-destructive Testing
Time-of-Flight Mass Spectrometry
Electro-optic
Radar/Lidar
Laser Optics
Embedded digitizer
Scope replacement

Cobra CompuScope Family

Next-Generation High-Speed Digitizers for the PCI Express and PCI Bus



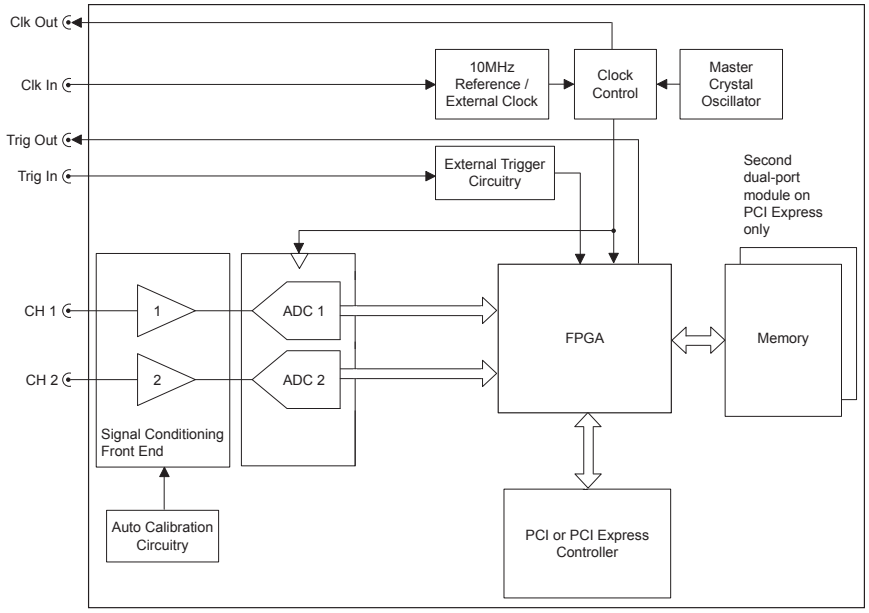
The Cobra CompuScope family of high-speed 8-bit digitizers provide a powerful combination of speed, memory, and bandwidth as well as a wide portfolio of advanced acquisition features on a single PCI Express or PCI card.

FEATURES

- 1 or 2 digitizing channels
- 1 or 2 GS/s maximum sampling rate per channel
- 8 bits vertical resolution
- 256 MS to 32 GS on-board acquisition memory
- Up to 1 GHz bandwidth
- Full-size, single-slot PCI or PCI Express 2.0 x8 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
- Dual-port memory and data streaming at up to 3.1 GB/s on PCI Express models
- Custom FPGA firmware available

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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

Cobra Model	Available memory options				
PCI Cobra	256 MS	512 MS	1 GS	2 GS	4 GS
PCI Express Cobra	2 GS	4 GS	8 GS	16 GS	32 GS

Cobra Model	Memory Architecture	Data Streaming?
PCI Cobra	Single Port	No
PCI Express Cobra	Dual Port	Yes

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

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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)

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 Ω
Duty Cycle:	50% ±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 ±50 ppm
Signal Level:	Minimum 200 mV RMS Maximum 500 mV RMS
Impedance:	50 Ω
Connector:	SMA

CLOCK OUT

Maximum Frequency:	1 GHz
Minimum Frequency:	10 MHz
Signal Level:	±300 mV into 50 Ω 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 Express (8 lanes) or PCI

SYSTEM REQUIREMENTS

PCI-based computer, minimum Pentium II 500 MHz, with at least one free full-length PCI or PCI Express slot, 128 MB RAM, 1 GB hard drive.

POWER CONSUMPTION (IN WATTS, PER CARD)

DC Supply Voltage	PCI	PCI Express
+5 Volts	8 W	0 W
+3.3 Volts	20 W	3.3 W
+12 Volts	0.6 W	30.5 W
-12 Volts	0.6 W	0 W
Total	29.2 W	33.8 W

Note 1: 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.

Note 2: The 16 GS Cobra Express model consumes an extra 3 Watts of power from the +12V supply, as compared with the 2 GS model. Data for the 32 GS Cobra Express model is dependent upon module availability.

PCI BUS INTERFACE	(PCI)	(PCI Express)
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 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 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 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 depending upon detection of the Master/Slave bridge-board.

OPERATING SYSTEMS

Windows 7, 8, Vista and XP:	All Versions (32/64-bit)

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

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SOFTWARE DEVELOPMENT KITS (SDK)

CompuScope SDK for C/C# for Windows (Includes LabWindows/CVI and Visual Basic.NET support)
CompuScope SDK for MATLAB for Windows
CompuScope SDK for LabVIEW for Windows
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 at maximum sample rate using a 10 MHz sine wave with an amplitude of 95% of full scale. No on-board filtering is used.

ORDERING INFORMATION

Hardware & Upgrades

Cobra Model	Platform	Number of channels	Max. Single Channel Sampling Rate	Max. Dual Channel Sampling Rate	Part Number
CS22G8	PCI	2	2 GS/s	1 GS/s	COB-022-000
CS21G8	PCI	2	1 GS/s	500 MS/s	COB-021-000
CS11G8	PCI	1	1 GS/s	-	COB-011-000
CSE22G8	PCIe	2	2 GS/s	1 GS/s	CBE-022-000
CSE21G8	PCIe	2	1 GS/s	500 MS/s	CBE-021-000

	PCI	PCI Express
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	
Memory Upgrade: 2 GS to 4 GS		MEM-181-101
Memory Upgrade: 2 GS to 8 GS		MEM-181-103
Memory Upgrade: 2 GS to 16 GS		MEM-181-105
Memory Upgrade: 2 GS to 32 GS		MEM-181-107
Master Multi-Card Upgrade	COB-181-002	CBE-181-012
Slave Multi-Card Upgrade	COB-181-003	CBE-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	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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