

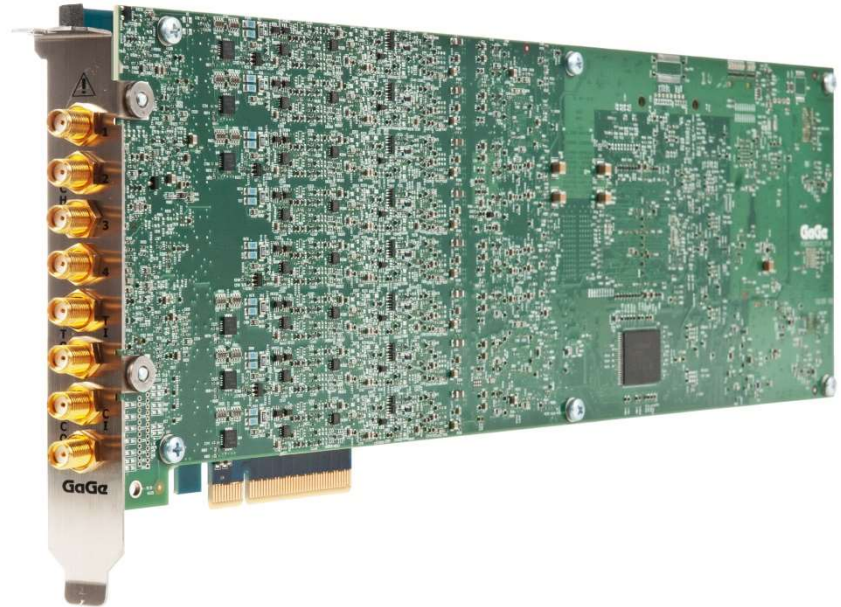
GaGe is a worldwide industry leader in high speed data acquisition solutions featuring a portfolio of the highest performance digitizers, PC oscilloscope software, powerful SDKs for custom application development, and turnkey integrated PC-based measurement systems.



## APPLICATIONS

RADAR Design and Test  
Signals Intelligence (SIGINT)  
Ultrasonic Non-Destructive Testing  
LIDAR Systems  
Communications  
Spectroscopy  
High-Performance Imaging  
Time of Flight  
Life Sciences  
Particle Physics

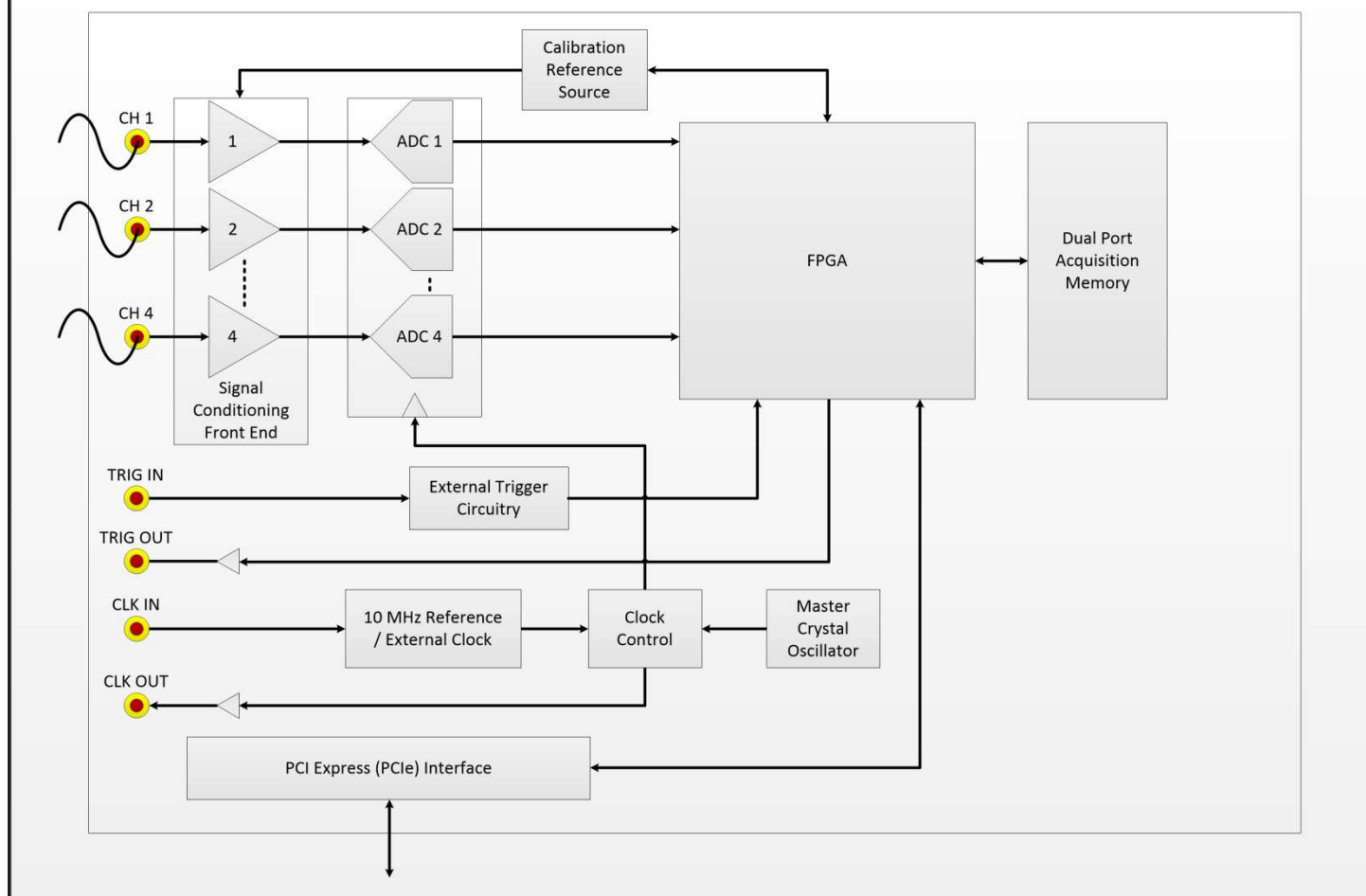
## Octave Express CompuScope 2-4 CH, 25 to 125 MS/s, 14/16-Bit PCIe Digitizer



## FEATURES

- 2 or 4 Digitizing Input Channels
- 125 MS/s, 100 MS/s, 65 MS/s or 25 MS/s Max. Sampling Rate per Channel
- 100 MHz or 20 MHz Analog Input Bandwidth
- 14-Bit or 16-Bit Vertical A/D Resolution
- 2 GS (4 GB) Onboard Memory Standard, Expandable up to 8 GS (16 GB)
- Dual Port Memory with Sustained PCIe Data Streaming at 1.0 GB/s
- Full-Featured Front-End with AC/DC Coupling and 50  $\Omega$  /1M  $\Omega$  Inputs
- Software Control of Input Voltage Ranges, Coupling and Impedances
- Ease of Integration with External or Reference Clock In & Clock Out
- External Trigger In & Trigger Out
- Synchronized Multi-Card Systems up to 8 Cards for 32 Channels
- Full-Height Full-Length PCI Express (PCIe) Generation 2.0 x8 Card
- Programming-Free Operation with GaGeScope PC Oscilloscope Software
- Software Development Kits Available for C/C#, LabVIEW and MATLAB
- Windows 10/8/7 and Linux Operating Systems Supported

## Octave Express CompuScope Simplified Block Diagram



### MAIN SPECIFICATIONS

Model #	CSE8322	CSE8422	CSE8325	CSE8327	CSE8329	CSE8342	CSE8442	CSE8345	CSE8347	CSE8349
# of Input Channels	2	2	2	2	2	4	4	4	4	4
Vertical A/D Resolution	14-bit	16-bit	14-bit	14-bit	14-bit	14-bit	16-bit	14-bit	14-bit	14-bit
Max. Rate per Channel	25 MS/s	25 MS/s	65 MS/s	100 MS/s	125 MS/s	25 MS/s	25 MS/s	65 MS/s	100 MS/s	125 MS/s

### DYNAMIC PARAMETER PERFORMANCE

	14-bit A/D	16-bit A/D
ENOB	11.1 Bits	12.0 Bits
SNR	68.7 dB	74.0 dB
THD	-81.9 dB	-84.7 dB
SINAD	68.5 dB	73.5 dB
SFDR	84.6 dB	85.0 dB

Dynamic parameter measurements are done by acquiring a high purity 10 MHz sine wave with amplitude of 95% of the input range sampling at maximum 125 MS/s @ 14-bit and 25 MS/s @ 16-bit. These measurements were taken on the  $\pm 500$  mV input range using 50  $\Omega$  termination and DC coupling and with applied anti-aliasing filter. Dynamic parameter calculations are done from a 16 kiloSample Fourier Spectrum after applying a 7-term Blackman Harris Windowing Function to the time-domain waveform.

### A/D SAMPLING

Rates per Channel, Model dependent (software selectable)	: 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
Rate Accuracy	: $\pm 1$ part-per-million (0° to 50° C ambient)

### ACQUISITION MEMORY

Acquisition memory size is shared and equally divided among all active input channels (1, 2, or 4).

Standard Size	: 2 GS (4 GB)
Optional Sizes	: 4 GS (8 GB), 8 GS (16 GB)
Architecture	: Dual Port
Data Streaming	: Yes



## ANALOG INPUT CHANNELS

Connectors	: SMA
Impedance	: 50 $\Omega$ or 1M $\Omega$ (software selectable)
Coupling	: AC or DC (software selectable)
Analog Bandwidth	: DC (50 $\Omega$ ) = DC to 100 MHz (14-bit) or DC to 20 MHz (16-bit) AC (1M $\Omega$ ) = 10 Hz to 100 MHz (14-bit) or 10 Hz to 20 MHz (16-bit)
Voltage Ranges	: $\pm 100$ mV, $\pm 200$ mV, $\pm 500$ mV, $\pm 1$ V, $\pm 2$ V, $\pm 5$ V, $\pm 10$ V (software selectable; $\pm 10$ V only available on 1M $\Omega$ )
Flatness	: Within $\pm 5$ dB of ideal response to 90 MHz (14-bit) or 7 MHz (16-bit). Measured at 125 MS/s & 50 MS/s in the $\pm 500$ mV range with 50 $\Omega$ input impedance and 95% of full scale amplitude.
DC Accuracy	: $\pm 0.5\%$ . Measured on $\pm 500$ mV, $\pm 1$ V, $\pm 2$ V input ranges for both 50 $\Omega$ and 1M $\Omega$ input impedance settings.
DC User Offset	: $\pm 1 \times$ Full Range (above $\pm 5$ V is limited to $\pm 2.5$ V)
Absolute Max. Input	: $\pm 15$ V (50 $\Omega$ ), $\pm 75$ V (1M $\Omega$ on all but two lowest Input Ranges, where Max is $\pm 25$ V)

## LOW-PASS FILTER (14-bit Models Only)

Type	: 3-pole, 1 per Channel
Cut-Off Frequency	: 24 MHz
Operation	: Individually Software Selectable

## TRIGGERING

Engines	: 2 per Channel, 1 for External Trigger
Source	: Any Input Channel, External Trigger or Software
Input Combination	: All Combinations of Sources Logically OR'ed
Slope	: Positive or Negative (software selectable)
Sensitivity	: $\pm 2\%$ of Full Scale Input Range of Trigger Source. 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.
Accuracy	: Less than $\pm 2\%$ of Full Scale for Channel Triggering
Post-Trigger Data	: 128 points minimum. Can be defined with 64 point resolution.

## EXTERNAL TRIGGER

Connector	: SMA
Impedance	: 2k $\Omega$
Coupling	: AC or DC
Bandwidth	: $>100$ MHz
Voltage Range	: $\pm 1$ V, $\pm 5$ V (software selectable)

## TRIGGER OUT

Connector	: SMA
Impedance	: 50 $\Omega$
Amplitude	: 0 – 2.5 V

## CLOCK IN

Connector	: SMA
Signal Level	: Minimum 1 V RMS, Maximum 2 V RMS
Impedance	: 50 $\Omega$
Coupling	: AC
Duty Cycle	: 50% $\pm 5\%$
Input Modes	: External Clock or 10 MHz Reference Clock
External Clock Mode Rates	: Minimum 10 MHz to Maximum Sampling Rate of 125 MHz (14-bit) or 25 MHz (16-bit).
External Reference Clock Mode Rate	: 10 MHz $\pm 1000$ ppm; the external reference time base is used to synchronize the internal sampling clock.

## CLOCK OUT

Connector	: SMA
Signal Level	: 0 – 2.5 V
Impedance	: 50 $\Omega$ Compatible
Duty Cycle	: 50% $\pm 5\%$
Output Modes	: Maximum Sampling Clock Frequency or 10 MHz Reference Clock
Max. Frequency	: 125 MHz (14-bit) or 25 MHz (16-bit)
Min. Frequency	: 10 MHz from External Clock, 1 kHz from Internal Clock

## MULTIPLE RECORD

Pre-Trigger Data	: Up to 32 kS Total
Record Length	: 128 points minimum. Can be defined with 64 point resolution.

## TIME-STAMPING

Timing Resolution	: One Sample Clock Cycle
Counter Turnover	: $>24$ Hours Continuous

## MULTI-CARD SYSTEMS

Master/Slave Mode	: Provides synchronized triggering and sampling on all channels for all cards to create larger multi-channel systems.
Independent Mode	: Each card operates independently within the system.
Number of Cards	: 2 to 8 Cards for up to 32 Channels Total

## DIMENSIONS

Size	: Single Slot, Full Height, Full Length
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## POWER CONSUMPTION

Power	: 25 Watts (typical)
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## PC SYSTEM REQUIREMENTS

PCI Express (PCIe) Slot	: 1 Free Full-Height Full-Length PCIe Gen1, Gen2 or Gen3, x8 or x16 Slot
Operating System	: Windows 10/8/7 (32-bit/64-bit), Linux – Requires SDK for C/C#



## ORDERING INFORMATION

### Hardware

Model Number	A/D Resolution	# of Channels	Max. Sampling Rate per Channel	Memory Size	Order Part Number
CSE8322	14-bit	2	25 MS/s	2 GS (4 GB)	OVE-832-002
CSE8422	16-bit	2	25 MS/s	2 GS (4 GB)	OVE-842-002
CSE8325	14-bit	2	65 MS/s	2 GS (4 GB)	OVE-832-005
CSE8327	14-bit	2	100 MS/s	2 GS (4 GB)	OVE-832-007
CSE8329	14-bit	2	125 MS/s	2 GS (4 GB)	OVE-832-009
CSE8342	14-bit	4	25 MS/s	2 GS (4 GB)	OVE-834-002
CSE8442	16-bit	4	25 MS/s	2 GS (4 GB)	OVE-844-002
CSE8345	14-bit	4	65 MS/s	2 GS (4 GB)	OVE-834-005
CSE8347	14-bit	4	100 MS/s	2 GS (4 GB)	OVE-834-007
CSE8349	14-bit	4	125 MS/s	2 GS (4 GB)	OVE-834-009

### Memory Upgrades

Memory Upgrade: 2 GS (4 GB) to 4 GS (8 GB)	MEM-181-203
Memory Upgrade: 2 GS (4 GB) to 8 GS (16 GB)	MEM-181-205

### Cable Accessories

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

### Master/Slave Upgrades

Master Multi-Card Upgrade	OVE-181-012
Slave Multi-Card Upgrade	OVE-181-013

### eXpert FPGA Firmware Options

eXpert PCIe Data Streaming	STR-181-000
eXpert Signal Averaging	250-181-001
eXpert FIR Filtering	250-181-002
eXpert Peak Detection	250-181-003
eXpert FFT	250-181-004
eXpert Bundle (Signal Averaging, FIR Filtering, Peak Detection)	888-100-026

### GaGeScope Software

GaGeScope: Lite Edition	Included
GaGeScope: Standard Edition	300-100-351
GaGeScope: Professional Edition	300-100-354

### Software Development Kits (SDKs)

GaGe SDK Pack (includes C/C#, MATLAB, LabVIEW SDKs)	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

## WARRANTY

Standard two years parts and labor.

Unless otherwise specified, all dynamic performance specs have been qualified on engineering boards. All specifications subject to change without notice.

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900 N. State St.  
Lockport, IL 60441-2200

### Toll-Free (USA and Canada):

Phone: 1-800-567-4243

Fax: 1-800-780-8411

### Direct:

Phone: 1-514-633-7447

Fax: 1-514-633-0770

### Email:

prodinfo@gage-applied.com

To find your local sales representative or distributor or to learn more about GaGe products visit:

[www.gage-applied.com](http://www.gage-applied.com)