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

**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 Ω /1M Ω 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
- 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
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

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 ±500 mV input range using 50 Ω 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 : ±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 Ω or 1M Ω (software selectable)  
Coupling: AC or DC (software selectable)  
Analog Bandwidth:  
- DC (50 Ω) = DC to 100 MHz (14-bit) or DC to 20 MHz (16-bit)  
- AC (1M Ω) = 10 Hz to 100 MHz (14-bit) or 10 Hz to 20 MHz (16-bit)  
Voltage Ranges: ±100 mV, ±200 mV, ±500 mV, ±1 V, ±2 V, ±5 V, ±10 V (software selectable; ±10 V only available on 1M Ω)  
Flatness: Within ±0.5 dB of ideal response to 90 MHz (14-bit) or 7 MHz (16-bit). Measured at 125 MS/s & 50 MS/s in the ±500 mV range with 50 Ω input impedance and 95% of full scale amplitude.  
DC Accuracy: ±0.5%. Measured on ±500 mV, ±1 V, ±2 V input ranges for both 50 Ω and 1M Ω input impedance settings.  
DC User Offset: ±1 x Full Range  
(above ±5 V is limited to ±2.5 V)  
Absolute Max. Input: ±15 V (50 Ω), ±75 V (1M Ω on all but two lowest Input Ranges, where Max is ±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: ±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 ±2% of Full Scale for Channel Triggering  
Post-Trigger Data: 128 points minimum. Can be defined with 16 point resolution.  

**EXTERNAL TRIGGER**

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

**TRIGGER OUT**

Connector: SMA  
Impedance: 50 Ω  
Amplitude: 0 – 2.5 V  

**CLOCK IN**

Connector: SMA  
Signal Level: Minimum 1 V RMS, Maximum 2 V RMS  
Impedance: 50 Ω  
Coupling: AC  
Duty Cycle: 50% ±5%  
Input Modes: External Clock (not supported on 16-bit CSE8422 & CSE8442) or 10 MHz Reference Clock  
Mode Rates: External Clock  
- Minimum 10 MHz to Maximum Sampling Rate of 125 MHz  
- External Reference Clock Mode Rate  
- External Reference Clock Mode Rate  

**CLOCK OUT**

Connector: SMA  
Signal Level: 0 – 2.5 V  
Impedance: 50 Ω Compatible  
Duty Cycle: 50% ±5%  
Output Modes: Maximum Sampling Clock Frequency or 10 MHz Reference Clock  
Max. Frequency: 125 MHz  
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 16 point resolution.  

**TIME-STAMPING**

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

**MULTI-CARD SYSTEMS**

Independent Mode: Each card operates independently within the system.  
Master/Slave Mode (not supported on Octave Express): Please refer to alternative family model Octopus Express to create larger multi-channel systems with synchronized triggering and sampling on all channels for all cards.  

**DIMENSIONS**

Size: Single Slot, Full Height, Full Length  

**POWER CONSUMPTION**

Power: 25 Watts (typical)  

**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#  

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## ORDERING INFORMATION

### Hardware

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

### 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

### eXpert FPGA Firmware Options

- eXpert PCIe Data Streaming | STR-181-000
- eXpert Signal Averaging | 250-181-001

### 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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