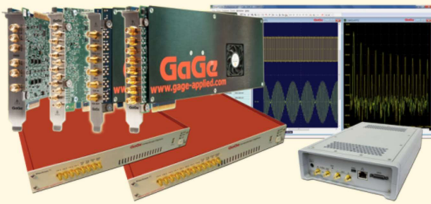


GaGe is a worldwide industry leader in high speed data acquisition solutions featuring a portfolio of the highest performance digitizers, PC oscilloscope software, powerful SDKs for custom application development, and turnkey integrated PC-based measurement systems.



## APPLICATIONS

Automatic Test Equipment  
Military & Commercial Testing – ATE  
Wideband RF Signal Analysis  
RADAR Design and Test  
Real-Time Spectrum Operations  
Electronic Warfare  
Ultrasonic Non-Destructive Testing  
LIDAR Systems  
Communications  
Optical Coherence Tomography  
Spectroscopy  
High-Performance Imaging  
Time of Flight  
Life Sciences  
Particle Physics

## 4-Channel 16-Bit PXIe Gen3 RazorMax Express

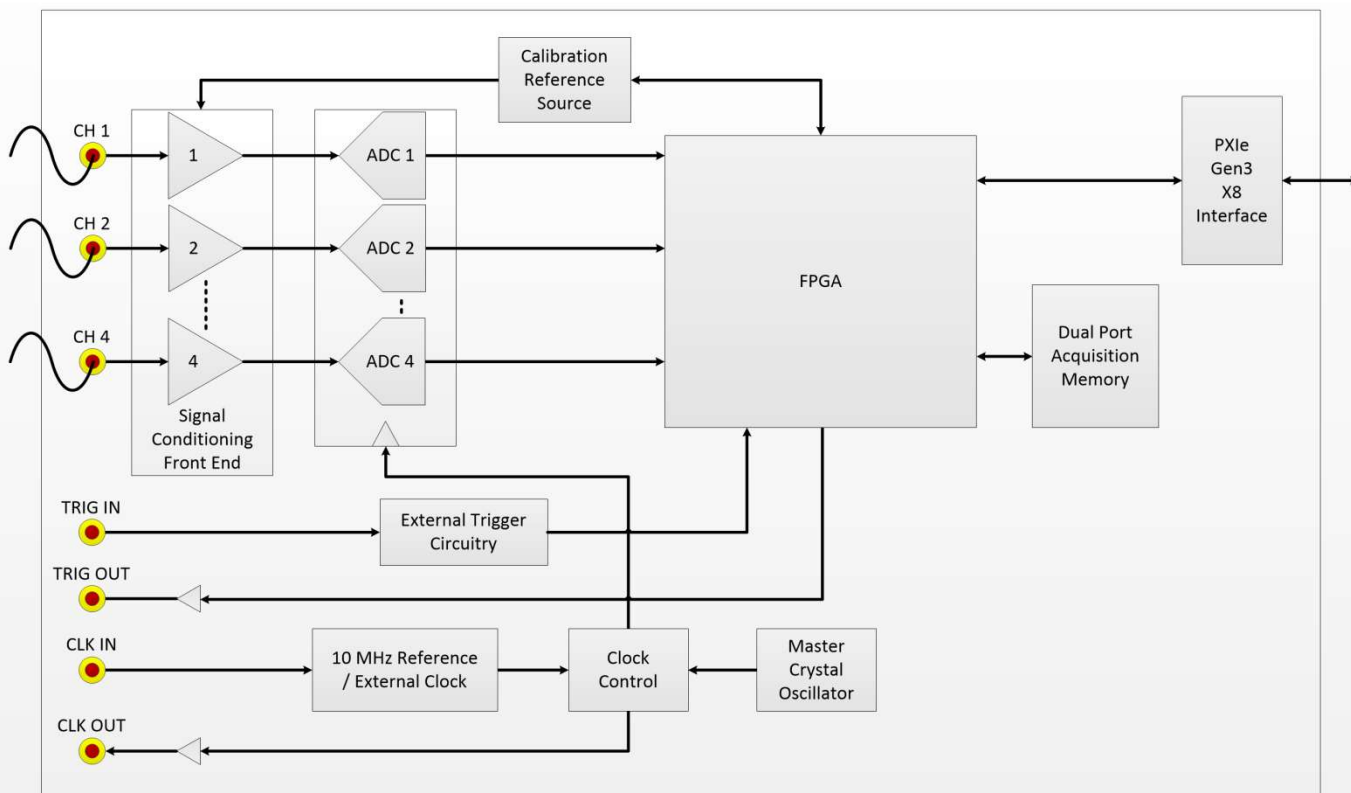
**Unprecedented Speed & Resolution in a 1 GS/s Streaming Digitizer  
700 MHz Bandwidth with Stream Rates at 4+ GB/s**



## FEATURES

- 16-Bit Vertical A/D Resolution with 4 or 2 Digitizing Input Channels
- 1 GS/s or 500 MS/s Maximum Sampling Rate per Channel
- 31 Software Selectable Sampling Rates from 1 kS/s to 1 GS/s
- Optional ADC Modes: Decimate-by-2 Filter, Decimate-by-4 Filter with Digital Mixer, Decimate-by-4 Filter with IQ Outputs
- 700 MHz Bandwidth @ 1 GS/s or 350 MHz Bandwidth @ 500 MS/s
- 4 GS (8 GB) Onboard Sample Memory Standard
- FPGA Based Applications for Real-Time DSP Functions
- Dual Port Memory with Sustained PXIe Gen3 Data Streaming at 4+ GB/s
- Full-Featured Front-End with DC Coupling (AC Optional) and 50  $\Omega$  Inputs
- Software Control of Input Voltage Ranges
- Ease of Integration with External or Reference Clock In & Clock Out
- External Trigger In & Trigger Out
- 3U PXIe Generation 3.0 x8 Single-Slot 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

## RazorMax Express CompuScope Simplified Block Diagram



### MAIN SPECIFICATIONS

Model #	: <u>CSX16502</u>	<u>CSX16504</u>	<u>CSX161G2</u>	<u>CSX161G4</u>
# of Input Channels	: 2	4	2	4
Vertical A/D Resolution	: 16-bit	16-bit	16-bit	16-bit
Max. Rate per Channel	: 500 MS/s	500 MS/s	1 GS/s	1 GS/s

### A/D SAMPLING

Rates per Channel, Model dependent (software selectable)	: 1 GS/s, 875 MS/s, 800 MS/s, 750 MS/s, 650 MS/s, 600 MS/s, 525 MS/s, 500 MS/s, 425 MS/s, 400 MS/s, 375 MS/s, 325 MS/s, 300 MS/s, 250 MS/s, 200 MS/s, 100 MS/s, 50 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 ( $0^\circ$ to $50^\circ$ C ambient)

### Optional ADC Modes (Consult Factory)

Decimate-by-2 Filter	: DDC block providing decimation FIR half-band filter with 41 taps for each ADC channel.
Decimate-by-4 Filter with Digital Mixer	: DDC block providing band-pass decimation filter with digital mixer and 3 concatenated FIR filters.
Decimate-by-4 Filter with IQ Outputs	: DDC block providing a fixed digital $f_s / 4$ mixer with IQ pass band approximately at $\pm 110$ MHz centered at $f_s / 4$ with 41 taps for decimation filter.

### ACQUISITION MEMORY

Acquisition memory size is shared and equally divided among all active input channels (1, 2 or 4).	
Standard Size	: 4 GS (8 GB)
Architecture	: Dual Port
Data Streaming	: Yes



### ANALOG INPUT CHANNELS

Connectors	: SMA
Impedance	: 50 $\Omega$
Coupling	: DC (standard) or AC (option, consult factory)
Analog Bandwidth	: DC to 700 MHz at 1 GS/s Sample Rate DC to 350 MHz at 500 MS/s Sample Rate
Voltage Ranges	: $\pm 200$ mV, $\pm 500$ mV, $\pm 1$ V (software selectable)
DC User Offset	: Spans Full Scale Input Range (FSIR) (software selectable)
Absolute Max. Input	: $\pm 3$ V (over-voltage protection included)

### 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	: $\pm 5\%$ of Full Scale Input Range of Trigger Source. Signal amplitude must be at least 10% of full scale to cause a trigger to occur. Smaller signals are rejected as noise.
Post-Trigger Data	: 32 points minimum. Can be defined with 32 point resolution.

### EXTERNAL TRIGGER

Connector	: SMA
Impedance	: $\approx 1k \Omega$
Coupling	: AC
Bandwidth	: $>100$ MHz
Voltage Range	: 0-3 V (unipolar)

### TRIGGER OUT

Connector	: SMA
Impedance	: 50 $\Omega$
Amplitude	: 0 – TTL

### CLOCK OUT

Connector	: SMA
Signal Level	: 0 – 1.5 V
Impedance	: 50 $\Omega$ Compatible
Duty Cycle	: 50%
Output Modes	: Maximum Sampling Clock Frequency or 10 MHz Reference Clock
Max. Frequency	: 1 GHz
Min. Frequency	: 250 MHz
10 MHz Reference Clock Mode Rate	: 10 MHz from Internal Reference

### CLOCK IN

Connector	: SMA
Signal Level	: Minimum 0.2 V RMS, Maximum 0.5 V RMS
Impedance	: 50 $\Omega$
Coupling	: DC
Duty Cycle	: 50% $\pm 5\%$
Input Modes	: External Clock or 10 MHz Reference Clock
External Clock Mode Rates	: Minimum 250 MHz, Maximum 1 GHz
External Reference Clock Mode Rate	: 10 MHz $\pm 1000$ ppm; the external reference time base is used to synchronize the internal sampling clock.
Variable/Inactive External Clock Mode	: Supports variable rate k-clocking or inactive external clock, particularly useful for OCT applications.

### MULTIPLE RECORD

Pre-Trigger Data	: Up to FPGA Memory Size
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### TIME-STAMPING

Timing Resolution	: One Sample Clock Cycle
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### DIMENSIONS

Size	: Single Slot, 3U Height
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### POWER CONSUMPTION

Power	: 30 Watts (typical)
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### SYSTEM REQUIREMENTS

PX1e Slot	: 1 Free 3U Single Slot PX1e Gen1, Gen2 or Gen3
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	Input Bandwidth	Memory Size	Order Part Number
CSX16502	16-bit	2	500 MS/s	350 MHz	4 GS (8 GB)	RMX-X65-020
CSX16504	16-bit	4	500 MS/s	350 MHz	4 GS (8 GB)	RMX-X65-040
CSX161G2	16-bit	2	1 GS/s	700 MHz	4 GS (8 GB)	RMX-X61-G20
CSX161G4	16-bit	4	1 GS/s	700 MHz	4 GS (8 GB)	RMX-X61-G40

### Front End Options

AC-Coupled Front End Option (Consult Factory)	RMX-FAC-001
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### 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
eXpert Fast Fourier Transform (FFT)	250-181-004
eXpert Optical Coherence Tomography (OCT)	250-181-006

### 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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