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Find the *DynamicSignals / GaGe CompuScope 1602-8M* at our website: *Click HERE*

We offer the widest range of high-speed and high-resolution digitizers available on the market today. Our powerful PC-based instrumentation products allow you to create reliable, flexible and high-performance solutions quickly and easily.

Reduce development time and costs for testing complex applications such as radar, wireless communications, spectroscopy, etc. by using our GageScope software or SDKs.

APPLICATIONS

Non-destructive testing
Military & Aerospace
Communications & wireless
Electro-optic
Radar
Laser
High energy physics
Embedded digitizer

CompuScope 1602

Ultra-fast waveform digitizer card for PCI bus

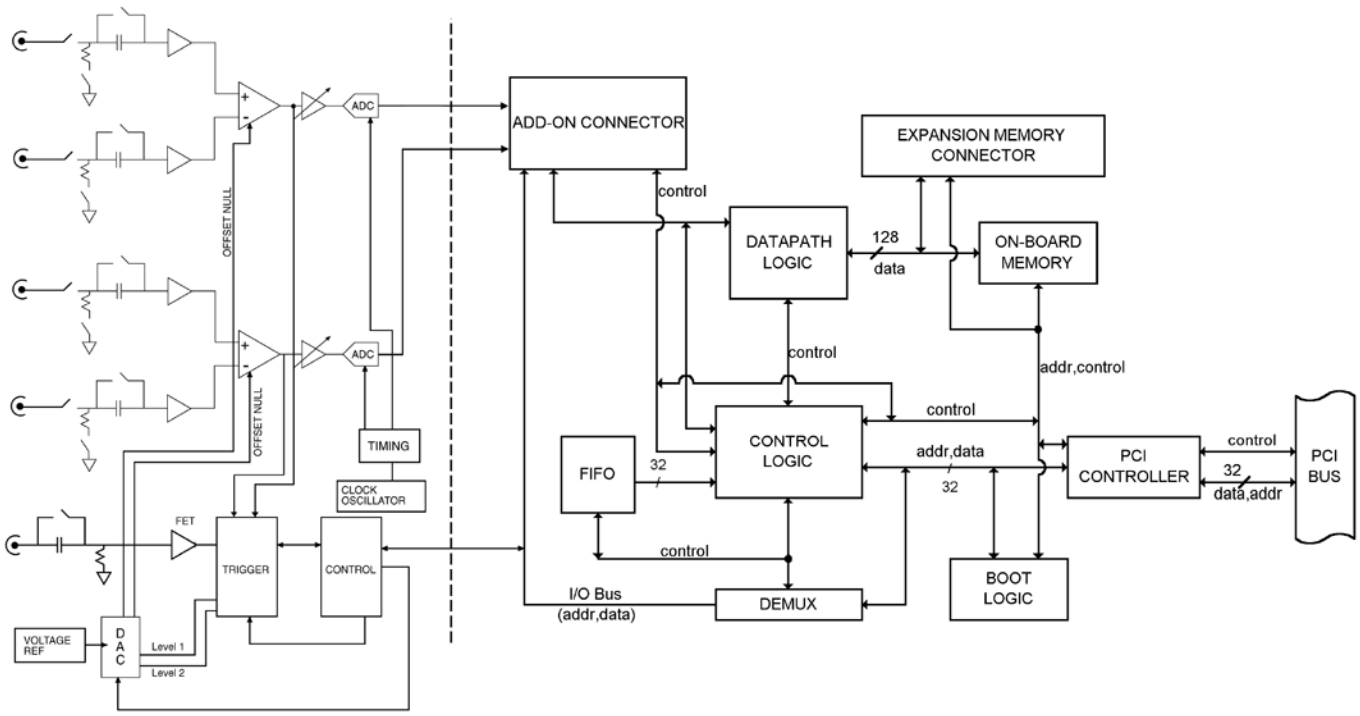


Lower cost alternative for high precision measurements.

FEATURES

- 16 bit, 2.5 MS/s A/D sampling on two simultaneous channels
- Differential or single-ended inputs
- Up to 1 GigaSamples of on-board acquisition memory
- 75 dB signal to noise ratio
- Multi-card systems of up to 16 simultaneous channels at 2.5 MS/s
- Fast data transfer rate to system RAM
- Programming-free operation with GageScope® oscilloscope software
- Software Development Kits available for LabVIEW, MATLAB, C/C#

CompuScope 1602 Simplified Block Diagram



COMPUSCOPE 1602
A CompuScope 1602 card for PCI bus can simultaneously sample two analog signals at speeds up to 2.5 MS/s with 16 bit resolution and store the data in the on-board memory.

16 BIT 2.5 MS/s SAMPLING
CompuScope 1602 uses state-of-the-art data conversion technology to provide dual-channel simultaneous sampling rate of 2.5 MS/s with 16 bit resolution. Each channel has its own ADC chip, eliminating the need for multiplexing the inputs.

DIFFERENTIAL INPUTS
Differential inputs allow the user to fully exploit the 16-bit A/D of the CompuScope 1602. Differential input circuitry automatically eliminates noise picked up by the signal and its reference. With over 80 dB CMRR (Common Mode Rejection Ratio) for low frequency inputs, differential inputs eliminate any ground loop problems.

Single-ended inputs are also available through a simple software command. This command simply connects the negative input of the differential pair to zero volts, allowing single-ended operation.

HIGH IMMUNITY TO DIGITAL NOISE
In order to isolate the high-frequency analog circuitry from PCI bus-related digital electronics, a two-board piggyback configuration is used. This allows maximum separation of analog and digital grounds, thereby providing high immunity to digital noise.

MEMORY DEPTH
CompuScope 1602 is available with memory depths of 1M, 4M, 8M, 64M, 256M, 512M and 1G (16-bit samples). This memory can be used as a circular buffer for storage of pre- and post-trigger data.

Memory is divided equally between the two input channels, i.e. a 1 Meg board provides 512 Ksamples of memory per channel.

The data stored in the CompuScope 1602 memory can be transferred to the system RAM for post-processing, display or storage to hard disk without any interface bus (no GPIB bus required).

FLEXIBLE TRIGGERING
CompuScope 1602 features flexible, oscilloscope-like analog triggering.

An analog comparator provides triggering from any one of the two input channels, from an external signal or from software.

In addition to the trigger source, trigger level and slope are also selectable by software, making the trigger system similar to traditional oscilloscopes.

BUILT-IN DECIMATION FILTER
CompuScope 1602 uses a unique architecture to provide 16-bit resolution. The input signal is over-sampled by a factor of 8 and the resulting data stream is fed into an on-chip decimation filter and error-correction circuitry which enhances the effective resolution and dynamic range by eliminating high frequency noise and by providing the lower order bits of the digital output.

MULTIPLE RECORD
Even though the PCI bus allows very fast data throughput to system RAM, there may still be applications in which data bursts cannot be off-loaded either due to very fast trigger repeat frequency or due to software limitations.

Multiple Recording allows CS1602 to capture data on successive triggers and stack it in the on-board memory. Up to 4,194,304 triggers can be captured in multiple record mode.

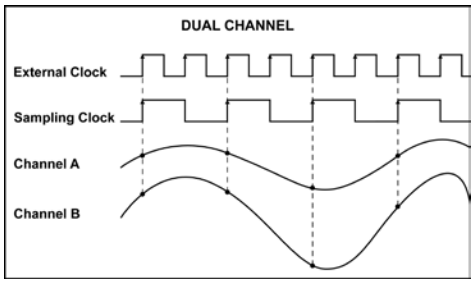
Once the CompuScope 1602 finishes capturing a Multiple Record segment, the trigger circuitry is automatically re-armed within 5 sample clock cycles to start looking for the next trigger - with no software intervention.

EXTERNAL CLOCK UPGRADE

An external clock upgrade can be ordered if A/D sampling must be coherent with a system clock. The external clock must be 8 times faster than the required sample rate, i.e. if 1 MS/s sampling is required, external clock must be 8 MHz.

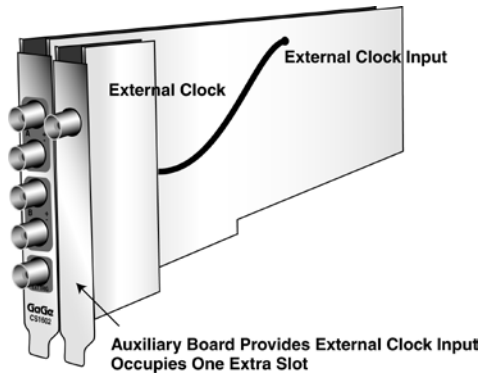
The External Clock must be a TTL signal with a maximum frequency of 20 MHz and minimum frequency of 8 kHz.

The rise and fall times of the clock signal must be better than 8 ns for proper operation at the peak sample rates. A minimum pulse width of 22.5 ns must be respected.



The figure above illustrates a 2 to 1 ratio between the External Clock and the Sampling Clock. The CS1602 uses an 8 to 1 ratio, that is the clock edges result in one sample conversion.

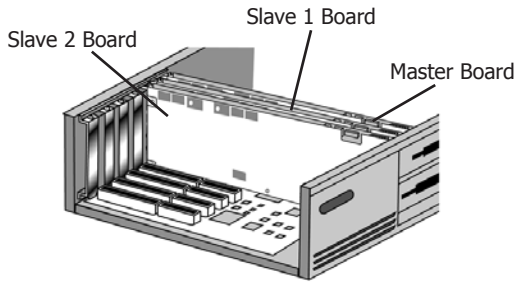
If you order an external clock upgrade, the external clock is provided through a BNC connector which is housed on an auxiliary board attached to the CompuScope 1602 via a cable. The auxiliary board occupies an additional slot adjacent to the CS1602.



MULTI-CARD SYSTEMS

A Multi-Card system, comprised of one Master and up to 7 Slave CS1602 boards, can be ordered from the factory if the user wants to capture more than two channels with a common clock and trigger. A board-to-board interconnect is supplied with the system. This interconnect carries all the signals needed for proper synchronization. Refer to the detailed spec for available configurations for different memory models.

GageScope can then display all channels from these boards on the same screen.



SYSTEM REQUIREMENT

PCI-based computer with at least one free full length PCI slot, 128 MB RAM, 50 MB hard disk and SVGA video.

SIZE

Plugs into 1 full length PCI Slot, 13" x 4.1"

Memory Depth:	Board Width occupies:
1M	1 full length slot
4M and 8 M	2 full length slots
64M, 256M, 512M, 1G	3† full length slots

† Contact factory for optional 2-slot deep memory solution.

POWER (IN WATTS)

+5 V		
Acquisition Memory	Worst case	Typical
1M	25.0	17.5
4M	28.0	20.5
8M	28.0	20.5
64M	30.0	21.5
256M	32.5	23.5
512M	32.5	23.5
1G	32.5	23.5

Note: Power connector on the deep memory board of 64M, 256M, 512M and 1G models must also be connected using a Y-cable

CHANNELS A & B

Inputs per card:	2 differential inputs
Impedance:	1 MΩ, 35 pF or 50 Ω; software-selectable
Coupling:	AC or DC
Resolution:	16 bits
A/D Type:	Monolithic, 16-bit oversampling with decimation filter
Analog Bandwidth:	DC to 1.25 MHz (DC) 10 Hz to 1.25 MHz (AC) DSP FIR filter limits the signal bandwidth to Nyquist Frequency. Actual analog bandwidth is 4 MHz.
Single-Ended Input Voltage Ranges:	±500 mV, ±1 V, ±2 V, ±5 V, ±10 V
Common Mode Input Voltage:	±7.5 V (DC+peak AC) maximum
Common Mode Rejection Ratio:	80 dB at 60 Hz
Absolute Maximum Amplitude:	
1 MΩ Impedance:	±15 Volts (continuous)
50 Ω Impedance:	±5 Volts (continuous) ±15 Volts (for 1 ms duration)
DC Accuracy relative to Full Scale Input:	±0.5% of full scale input
Sampling Rate:	MS/s: 2.5, 1 kS/s: 500, 200, 100, 50, 20, 10, 5, 2, 1
Protection:	
1 MΩ Impedance:	Diode Clamped
50 Ω Impedance:	No protection
Connector:	2 BNCs per input

DYNAMIC PARAMETERS

Measured using 98 kHz sine wave input at 2.5 MS/s with amplitude of 95% of full scale on the ±1 V range. Typical values listed below:

SNR:	75 dB
SFDR:	77 dB
SINAD:	74 dB
THD:	-76 dB
ENOB:	12.15 bits

ACQUISITION MEMORY

Data Storage:	In on-board memory
Memory Depth:	1M, 4M, 8M, 64M, 256M, 512M, 1G
Maximum Depth:	Up to half on-board memory per channel

TRIGGERING

Number of Trigger Inputs:	2 per card
Trigger Source:	CH A, CH B, EXT or Software
Input Combination:	Wired-OR
Type:	Analog triggering
Sensitivity:	±20% of full scale
Level Accuracy:	±10% of full scale
Slope:	Positive or Negative; software-selectable
Post Trigger Data:	64 points minimum in single record acquisition 128 points minimum in multiple record acquisition Can be defined with 64 point resolution.

EXTERNAL TRIGGER

Impedance:	1 MΩ, 30 pF
Input Type:	Single-ended analog
Amplitude:	Absolute Maximum ±15 V
Voltage Range:	±1 V and ±5 V
Bandwidth:	10 MHz
Connector:	BNC

INTERNAL CLOCK

Source:	20 MHz Clock oscillator
Accuracy:	±50 ppm (0 to 70°C)

EXTERNAL CLOCK (OPTIONAL)

Maximum Frequency:	20 MHz, maximum using 8x decimation filter (2.5 MS/s).
Minimum Frequency:	8 kHz
Signal Level:	TTL
Termination Impedance:	50 Ω
Required Duty Cycle:	50% ±5%, -0% at 20 MHz
Coupling:	DC

MULTIPLE RECORD

Pre-trigger Data:	20 points
Record Length:	128 points minimum. Can be defined with a 64 point resolution
Maximum number of Triggers:	4,194,304

MULTI-CARD SYSTEMS

Operating Mode:	Master/Slave or Multiple Independent
Number of Cards in:	
Master/Slave Mode:	
1M models:	2, 4, 6 or 8 cards
4M & 8M models:	2, 3 or 4 cards
64M and higher models:	2 or 3 cards
Multiple Independent Mode:	Limited by backplane
Maximum number of channels in Master/Slave Mode:	16 at 2.5 MS/s (for 1M models)

MASTER/SLAVE SYSTEM TRIGGERING

Number of Trigger Inputs:	2 per card
Trigger Source:	CH A, CH B, EXT or Software
Input Combination:	Wired-OR
Sensitivity:	±20% of full scale
Level Accuracy:	±10% of full scale
Slope:	Positive or Negative; software-selectable

PCI BUS INTERFACE

Plug-&-Play:	Fully supported
Bus Width:	32 bits
Bus Speed:	33 MHz
Compatibility:	5 Volt PCI-compliant slot

OPERATING SYSTEMS SUPPORTED

Windows 98/ME/NT*	CompuScope Driver version 3.60.22
* Version 4, SP3 or higher	
Windows 2000**/XP	CompuScope Driver version 4.xx.xx
** 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.

ENVIRONMENTAL

Operating Temperature:	5°C to 40°C
Relative Humidity:	Less than 80%, non-condensing
Maximum Altitude:	2,000 meters

ELECTROMAGNETIC COMPATIBILITY

EC Council Directive 89/336/EEC

CE Compliant

EN 61326 Class A

- IEC 61000-4-2 Electrostatic Discharge (Performance Criterion B)
- IEC 61000-4-3 RF Electromagnetic Field (Performance Criterion A)
- IEC 61000-4-4 Electrical Fast Transient/Burst (Performance Criterion B)
- IEC 61000-4-5 Power Surge (Performance Criterion B)
- IEC 61000-4-6 Conducted RF (Performance Criterion A)
- IEC 61000-4-11 Voltage Dips & Interruptions (Performance Criterion B)
- EN 61000-3-2 AC Power Line Harmonics Emissions

AS/NZS 2064

Australian emissions standard for Industrial, Scientific & Medical Equipment

Compliance demonstrated on a single card configuration

WARRANTY

One year parts and labor

Certificate of NIST Traceable Calibration is included.

All specifications subject to change without notice;
specifications are not guaranteed under all possible combinations of modes of operation.

ORDERING INFORMATION

Hardware & Upgrades	
CompuScope 1602-1M	162-001-001
CompuScope 1602-4M	162-001-002
CompuScope 1602-8M	162-001-003
CompuScope 1602-64M	162-001-004
CompuScope 1602-256M	162-001-005
CompuScope 1602-512M	162-001-006
CompuScope 1602-1G	162-001-007
CS1602 Memory Upgrades	Contact Factory
External Clock Upgrade	162-181-004
Master Multi-Card Upgrade	162-181-006
Slave Multi-Card Upgrade	162-181-007
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

All Upgrades performed at the factory.

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

Toll-Free (US 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's products visit:

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