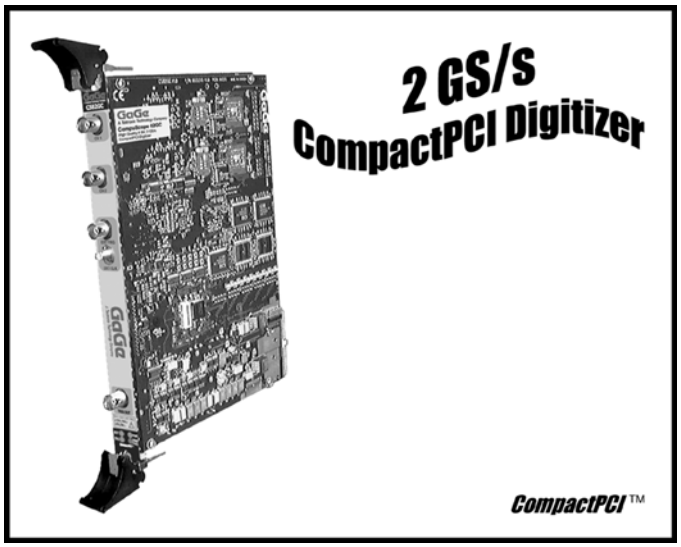
CompuScope 82GC

Ultra-fast waveform digitizer card for CompactPCI/PXI bus



Top performance general-purpose digitizer with the versatility and ease of integration to satisfy the most demanding applications.

FEATURES

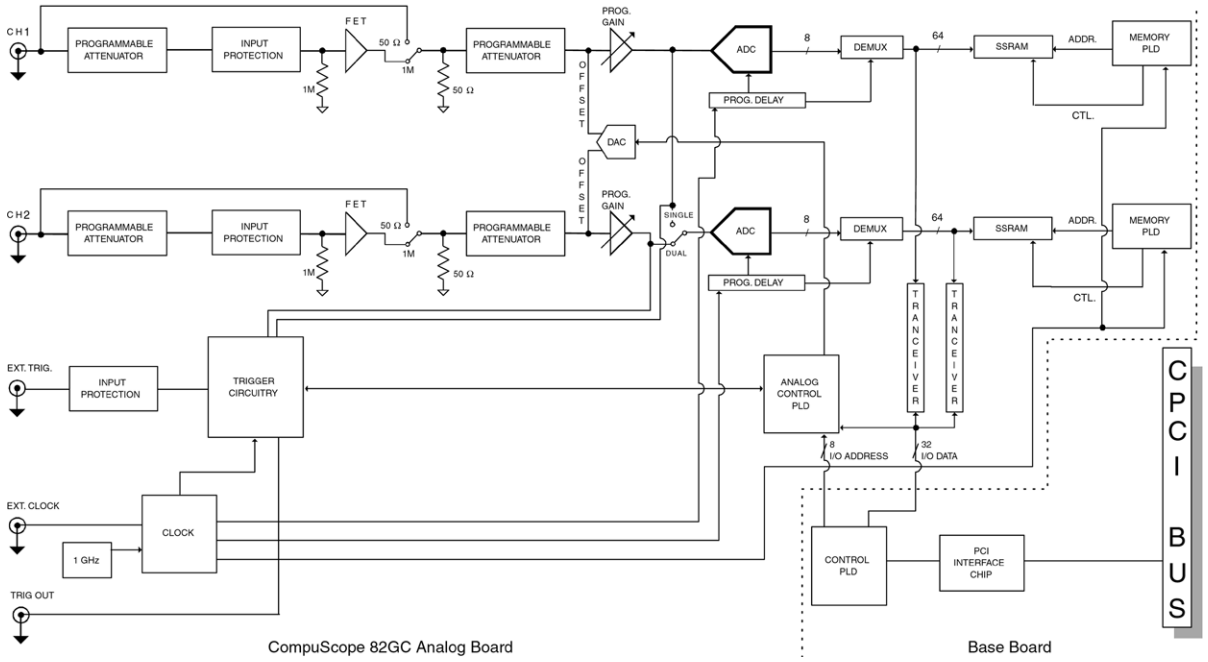
- 2 GS/s A/D sampling
- 8 bit resolution
- Up to 16 MegaSamples acquisition memory
- Up to 1.2 GHz bandwidth
- Multi-card systems of up to 2 channels at 2 GS/s (4 channels at 1 GS/s)
- Pre-Trigger Multiple Record mode
- Fast data transfer rate to system RAM
- SDKs for C/C++, MATLAB, LabVIEW & LabWindows/CVI under Win 95/98/ ME and Win NT/2000/XP

APPLICATIONS

Communications & wireless
Military & Aerospace
Non-destructive testing
Synthetic instrumentation
Electro-optic
Laser/Radar
High energy physics
Embedded digitizer
Scope replacement

GaGe
www.gage-applied.com

CompuScope 82GC Simplified Block Diagram



COMPUSCOPE 82GC

CompuScope 82GC is a 6U form factor CompactPCI card that can sample analog signals at speeds up to 2 GS/s with 8 bit resolution and store the data in the on-board memory.

2 GS/S SAMPLING

CompuScope 82GC uses two monolithic A/D converters, each running at 1 GS/s, to provide a dual-channel simultaneous sampling rate of 1 GS/s.

In the single-channel mode the two ADCs are clocked in a "ping-pong" mode to achieve up to 2 GS/s sampling. An on-board crystal-controlled timing circuit ensures timebase accuracy and long-term thermal stability.

HIGH IMMUNITY TO DIGITAL NOISE

In order to isolate the high-frequency analog circuitry from CompactPCI bus–related digital electronics, a two-board piggy-back configuration is used. This scheme allows maximum separation of analog and digital grounds, thereby providing high immunity to digital noise.

MEMORY DEPTH

CompuScope 82GC is available with memory depths of 2 Megasamples, 8 Megasamples and 16 Megasamples (8-bit samples). This memory can be used as a circular buffer for storage of pre- and post-trigger data.

In the single-channel mode, the maximum number of sample points is equal to the memory depth of the CompuScope 82GC model being used, whereas in the dual-channel mode the maximum number of sample points is half the memory depth.

The data stored in the CompuScope 82GC 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).

FAST BUS THROUGHPUT

The high-speed, 32 bit, bus-mastering interface to the CompactPCI bus allows the data from the on-board memory of the CompuScope 82GC to be transferred to system RAM, or any other CompactPCI destination, at sustained rates of up to 80 MB/s under single-tasking operating systems. Under Windows, this rate depends on the architecture of the user application. Under controlled conditions, it is possible to achieve 80 MB/s transfer speed to the system RAM.

BUS MASTERING

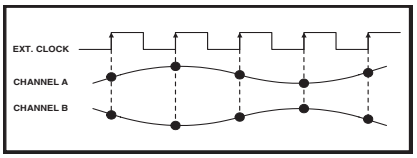
CompuScope 82GC is fully capable of becoming a CompactPCI bus master in order to transfer data at the maximum rate of 80 MB/s.

A CompactPCI bus Master is a card which can take control of the bus and transfer data to any CompactPCI target device such as system RAM without any involvement from the CPU.

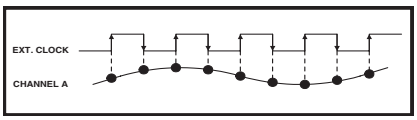
FLEXIBLE TRIGGERING

CompuScope 82GC features state-of-the-art analog triggering.

An analog comparator provides triggering from either one of the input channels, or 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.



EXTERNAL CLOCK

An external clock input is included as standard on the CS82GC as an SMA input for situations where a special sampling frequency is required.

In dual-channel mode, input signals are sampled at every rising edge of the External Clock.

In single-channel mode, Channel 1 is sampled on rising and falling edge of the External clock. Therefore, the sample rate is double that of the external clock supplied. The External Clock must be a sine wave

with a minimum amplitude of 225 mV RMS and a maximum amplitude of 500 mV RMS.

The allowed external clock frequency range is 10 MHz to 1 GHz.

The duty cycle of the External Clock signal must be 50% ± 5% for single and dual channel modes. Any deviation in the duty cycle will create timing errors in the sampling process

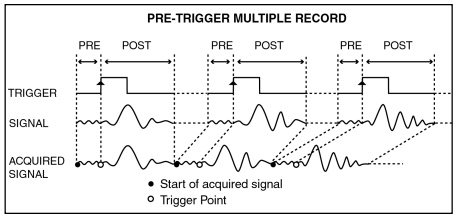
TRIGGER OUT

CompuScope 82GC provides a TTL output that signifies the occurrence of a trigger event on the card. This signal can be used to synchronize other parts of the measurement system to the CompuScope 82GC.

MULTIPLE RECORD

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

Multiple Recording allows CompuScope 82GC to capture data on successive triggers and stack it in the on-board memory.



The minimum record size is 256 samples in dual channel mode and 512 samples in single channel mode. CompuScope 82GC models with 16M of acquisition memory provide up to 21,845 records which can be captured in Multiple Record mode.

The CompuScope 82GC is capable of capturing pre-trigger data in Multiple Record Mode. Software can configure the CompuScope 82GC to capture between 0 to 32K points of pre-trigger data.

GageScope Software can display the stacked data as individual acquisitions. Software drivers also provide support for accessing Multiple Record data.

Once the CS82GC has finished capturing a Multiple Record segment, the trigger circuitry is automatically re-armed within 152 sample clock cycles in dual channel mode (304 sample clock cycles in single channel mode) to start looking for the next trigger. No software intervention is required.

Multiple Recording is useful for applications in which a series of bursts of data have to be captured in quick succession and there is not enough time to off-load the data to the system RAM.

Another situation in which Multiple Recording may be used is when data storage has to be optimized. These are cases in which only certain portions of the incoming signal are of interest and data capture during the dead-time between successive portions is not useful.

Examples of these situations are radar pulses, ultrasound data, lightning pulses, imaging signals and explosion testing.

PROGRAMMABLE INPUT AMPLIFIERS

CompuScope 82GC offers completely programmable input amplifiers, including coupling, impedance, gain and offset.

Each channel is independently programmable, allowing different settings on different channels.

Use of proprietary amplifier circuitry has allowed Gage to provide such optimal performance combined with flexibility, all programmable using high level commands.

ADVANCED WINDOWS DRIVERS

CompuScope 82GC is supported by Gage's advanced, 32 bit Windows drivers which are fully compatible with Windows 95/98/ME/NT/2000/XP and allow fast data throughput.

With over 30 man-years of register-level programming as well as operating system related coding, these drivers are the most advanced in the industry.

ORDERING INFORMATION

Hardware

CompuScope 82GC - 2M	782-001-002
CompuScope 82GC - 8M	782-001-003
CompuScope 82GC - 16M	782-001-004
CS82GC: Memory Upgrade Charge	782-181-004
CS82GC-2M: 2 Card Master/Slave Set	782-001-010
CS82GC-8M: 2 Card Master/Slave Set	782-001-020
CS82GC-16M: 2 Card Master/Slave Set	782-001-030

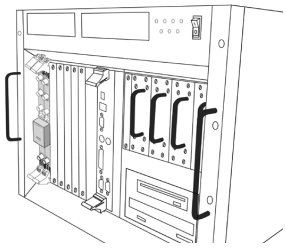
GageScope Software

GageScope: Lite Edition	Included
GageScope: Standard Edition with purchase of hardware	300-100-351
GageScope: Standard Edition purchased independently	300-100-352
GageScope: Professional Edition with purchase of hardware	300-100-354
GageScope: Professional Edition purchased independently	300-100-355

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

MULTI-CARD SYSTEMS



One of the most unique features of the CompuScope cards is the Multi-Card system that can be configured.

A Multi-Card system, comprised of one Master and one Slave CS82GC boards can be ordered 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.

The following CompuScope 82GC Master/Slave Sets can be configured:

- 2 Card Master/Slave Set

GageScope software can then display all channels from these boards on the same screen. Software drivers also support such Master/Slave systems.

Another class of Multi-Card systems is the Multiple/Independent type.

A Multiple/Independent system does not have common clock and triggering but can consist of CompuScope boards of different types and memory depths.

COMPUSCOPE 82GC GENERAL SPECIFICATIONS

SYSTEM REQUIREMENT

CompactPCI-based PICMG compliant computer with at least one free 6U slot, 128 MB RAM, 50 MB hard disk & SVGA video. There must be at least 10A of 5V and 3.3A of 3.3V power available for each CS82GC card.

The CompuScope 82GC must be installed in a slot that supports bus mastering to achieve stated performance.

SIZE

6U CompactPCI: Occupies 1 slot

COMPUSCOPE 82GC SPECIFICATIONS

POWER (IN WATTS)

5 V			
	Worst	Typical	Power Down
All Mem Depths	50	46	7
12 V			
	Worst	Typical	Power Down
All Mem Depths	5	4	4
3.3 V			
	Worst	Typical	Power Down
All Mem Depths	11	10	1
- 12 V			
	Worst	Typical	Power Down
All Mem Depths	3	3	3

CHANNELS 1 & 2

Inputs per card: 2

Impedance: 1 MΩ, 25 pF or 50 Ω, software selectable

Coupling: AC or DC

Resolution: 8 bits

Typical DC Coupled Bandwidth:

	50Ω BW Dual	50Ω BW Single	1MΩ BW Dual	1MΩ BW Single
±100mV	N/A	N/A	250 MHz	200 MHz
±200mV	250 MHz	150 MHz	300 MHz	200 MHz
±500mV	400 MHz	300 MHz	300 MHz	250 MHz
±1V	400 MHz	300 MHz	300 MHz	250 MHz
±2V	400 MHz	300 MHz	300 MHz	250 MHz
±4V	400 MHz	300 MHz	N/A	N/A
±5V	N/A	N/A	300 MHz	250 MHz
±10V	N/A	N/A	300 MHz	250 MHz

Lower Frequency Limit
AC Coupled: 1 MΩ Input: 10 Hz
50Ω Input: 20 kHz

Full Scale Input Range:

1 MΩ: ±100mV, ±200mV, ±500mV, ±1V, ±2V, ±5V, ±10V

50Ω: ±200mV, ±500mV, ±1V, ±2V, ±4V

Absolute Max. Amplitude:

1 MΩ: ±15 Volts (continuous)
50Ω: ±5 Volts (continuous)

DC Accuracy relative to full scale input:

All ranges: ±2 % of full scale

Protection:
1 MΩ Impedance: Diode Clamped
50Ω Impedance: No Protection

Connector: BNC

Sampling Rate

Single-channel Mode (Channel 1 only):
GS/s: 2, 1
MS/s: 500, 250, 200,100, 40,20

Dual-Channel Mode
(Channels 1 and 2 simultaneously):
GS/s: 1
MS/s: 500, 250,125, 100, 50, 20, 10, 5, 2, 1
kS/s: 500, 200, 100

DYNAMIC PARAMETERS

Measured using a sine wave input at 1 GS/s, dual channel with amplitude of 95% of full scale on the ±1V range with a 50Ω input. Typical values listed.

Using Input of:	10 MHz	100 MHz
SNR:	45 dB	43 dB
SFDR:	54 dB	50 dB
SINAD:	44 dB	42 dB
THD:	-52 dB	-48 dB
ENOB:	7.2 bits	6.85 bits

ACQUISITION MEMORY

Data Storage: In on-board memory

Memory Sizes: 2M, 8M, 16M (8 bit samples)

Maximum Memory Depth:
Single-channel: Up to full on-board memory
Dual-Channel: Up to half on-board memory per channel

TRIGGERING

Source: CH 1, CH 2, EXT or Software

Type: Analog triggering

Sensitivity: ± 10% of full scale

Level Accuracy: ± 5% of full scale

Slope: Positive or Negative, software selectable

Post Trigger Data: 256 *(512)* points min. Can be defined with a 128*(256)* point resolution in dual *(single)* channel mode

EXTERNAL TRIGGER

Impedance: 1 MΩ, 25 pF

Amplitude: Absolute Max ±15V

Voltage Range: ±1V and ±5V

Bandwidth: 300 MHz

Coupling: AC or DC

Connector: BNC

TRIGGER OUTPUT

Signal Type: TTL

Active Edge: Rising (low-to-high)

Synchronization: Synchronized to on-board system clock

INTERNAL CLOCK

Source: 1 GHz SAW oscillator

Accuracy: ±200 ppm

EXTERNAL CLOCK

Max. Frequency: 1 GHz

Min. Frequency: 10 MHz

Signal Type: Sine Wave

Connector: SMA

Signal Level: MIN 225 mV RMS
MAX 500 mV RMS

Impedance: 50Ω

Sampling Edge:
Single: Rising and Falling
Dual: Rising

Coupling: AC

Duty Cycle: 50% ± 5% Single/Dual

MULTIPLE RECORD

Pre-trigger Data: Up to 32K points

Record Length: 256 *(512)* points minimum; can be defined with a 128 *(256)* point resolution in dual *(single)* channel mode

Max. # Triggers: 21,845 (with 16M model)

Re-Arm Time: 152 (304) sample clock cycles in dual (single) channel mode

MULTI-CARD SYSTEMS

Operating Mode: Master/Slave or Multiple Independent

Number of Cards:
Master/Slave: 2 cards
Multiple/Ind: Limited by backplane

Power Required: At least 10A of 5V and 3.3A of 3.3V for each card

Max. # Channels in Master/Slave Mode: 4 at 1 GS/s, 2 at 2 GS/s

MASTER/SLAVE TRIGGERING

of Trigger Inputs: 1 per system

Trigger Source: CH 1, CH 2, EXT or Software (Master Board Only)

Sensitivity : ± 10% of full scale

Level Accuracy : ± 5% of full scale

Trigger Slope: Positive or Negative, software selectable

OPERATING SYSTEMS

Windows 95/98/ME/NT*/2000/XP Support

*Version 4, SP3 or higher

ELECTROMAGNETIC COMPATIBILITY

CE Compliant

1 Card: CE Compliant
2 Card M/S Set: CE Compliant

MATERIALS SUPPLIED

One CompuScope 82GC card
One Hardware Manual
One Gage Software Disk on CD
One GageScope Lite Edition Software

WARRANTY

One year parts and labor

All specifications subject to change without notice
Specification Last Updated: February 2003