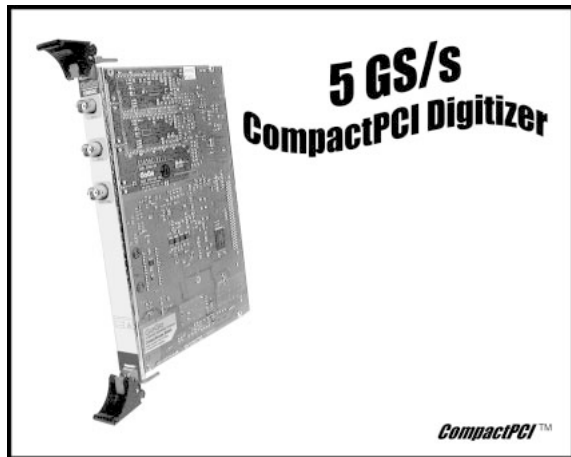


# CompuScope 85GC

## World's Fastest Waveform Digitizer Card for CompactPCI Bus

CompuScope 85GC is a 5 GS/s, 8 bit, 6U form factor CompactPCI waveform digitizer card based on advanced technology from Tektronix



### COMPUSCOPE 85GC

CompuScope 85GC is a 6U form factor CompactPCI card capable of performing 8 bit A/D conversion at sampling rates up to 5 GS/s (Billion Samples Per Second) on two simultaneous channels with 500 MHz analog bandwidth.

Oscilloscope-like analog amplifiers provide low noise, flexible signal conditioning for a wide variety of applications.

### 5 GS/S SAMPLING - BLAZING!

The CompuScope 85GC uses advanced FISO (Fast In Slow Out) technology from Tektronix to provide two simultaneous, high-quality input channels with wide analog bandwidth and blazing sample rate, all at a very reasonable price.

An on-chip clocking circuit combined with a robust calibration method ensures timebase accuracy and long-term thermal stability of sampling rates.

### PROVEN FISO TECHNOLOGY

FISO technology uses a patented technique of performing analog sampling using standard semiconductor technology.

Samples are stored as electric charge in each of the 10,000 on-chip cells. The number of cells in the sampling chip determines the maximum record length a FISO based sampling system can support.

Once the analog sampling has finished, a slow speed, very accurate 9-bit A/D converter is used to convert the stored analog values into digital code.

A dedicated signal processor chip is then used to perform error correction on the digitized data before making the corrected, 8-bit data available to the user.

Hence the name: Fast In, Slow Out.

### MEMORY DEPTH

Due to the FISO based nature of the CompuScope 85GC, the acquisition memory is limited to 10,000 points. This memory can be used as a circular buffer for storage of pre- and post-trigger data.

It is also possible for users to select fewer than 10,000 points of acquisition for shorter records.

The data stored in the CompuScope 85GC memory can be transferred to system RAM for post-processing, display or storage to hard disk without any interface bus (no GPIB or IEEE 488 bus required).

### PROGRAMMABLE, LOW NOISE INPUT AMPLIFIERS

CompuScope 85GC 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 from Tektronix has allowed Gage to provide such optimal noise performance combined with flexibility, all programmable using high level commands.

### FLEXIBLE TRIGGERING

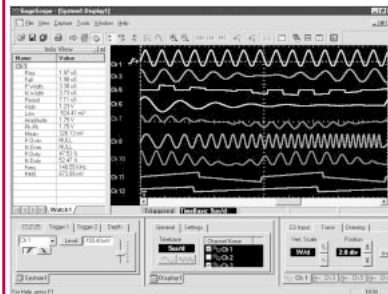
CompuScope 85GC features state-of-the-art analog triggering.

Analog comparator circuitry provides triggering from the input channel, 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 very similar to traditional oscilloscopes.

### GAGESCOPE SOFTWARE

CompuScope 85GC is compatible with the powerful and easy-to-use GageScope Software which has become an industry standard for high speed data capture from A/D cards.



GageScope Software, which sells separately, allows the user to capture data in a Windows environment without having to write a single line of programming code.

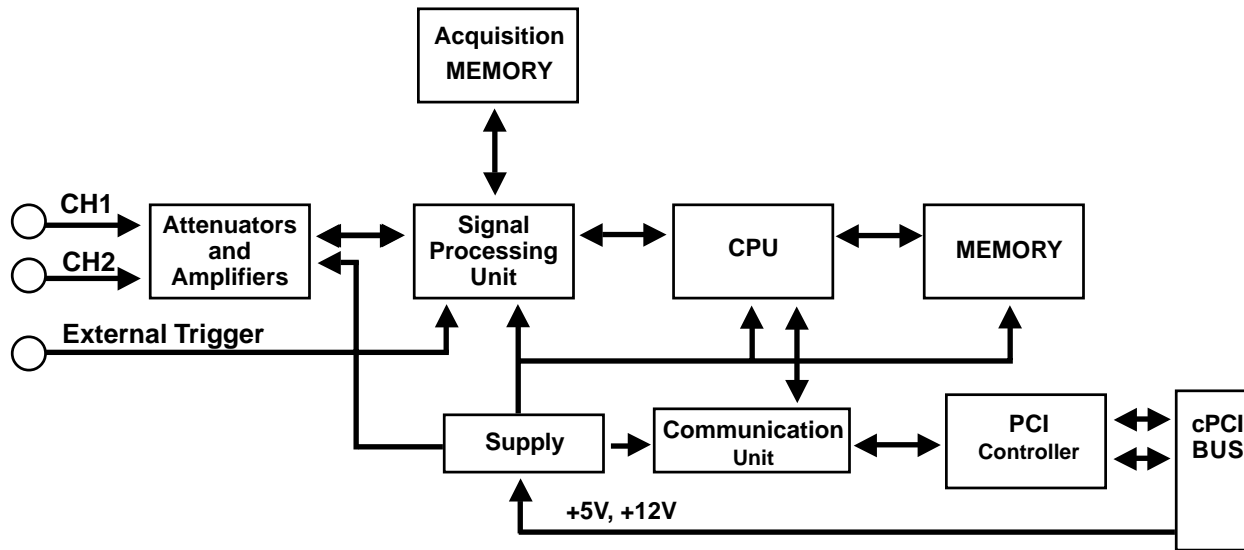
Not only can data be captured, manipulated and shared, GageScope allows easy storage of signal files which you can e-mail to your colleagues and share the data.

Some of the powerful features of GageScope include FFT, Averaging, Waveform Parameters, unattended transient capture, remote operation etc.

### COMPUSCOPE 85GC FEATURES

- ◆ 5 GS/s A/D Sampling on Two Simultaneous Channels
- ◆ 500 MHz Bandwidth
- ◆ 8 Bit Resolution
- ◆ CompactPCI Form Factor
- ◆ Based on Advanced Tektronix Technology
- ◆ Compatible with GageScope Software
- ◆ SDKs for C/C++, MATLAB, LabVIEW under Win 95/98/ME and Win NT/2000/XP

# BLOCK DIAGRAM FOR COMPUSCOPE 85GC



## HIGH IMMUNITY TO DIGITAL NOISE

In order to isolate the high-frequency analog circuitry from CompactPCI bus-related digital electronics, a two-board piggyback configuration is used.

All CompactPCI related circuitry is on the base board that slides into the CompactPCI slot, whereas all analog circuitry is on the piggyback.

This scheme allows maximum separation of analog and digital grounds, thereby providing high immunity to digital noise.

Both boards are multi-layer printed circuit boards. This was done to ensure proper impedance for critical signals both in the analog section as well as CompactPCI bus section.

## IDEAL FOR EMBEDDED APPLICATIONS

CompuScope 85GC is an ideal solution for OEMs and other system integrators who need ultra-fast waveform digitizing with high signal integrity, all at a very reasonable price.

Integration into the user's system is eased by the high quality, robust software development kits (SDKs) offered by Gage.

Applications for such embedded use includes telecom testing, general ATE, disk drive testing, high energy physics, wireless, radar etc.

## MULTI-CARD SYSTEMS

More than one CompuScope 85GC cards can be housed in the same CompactPCI chassis to yield a multi-channel sampling system.

Unlike other CompuScope models, the CompuScope 85GC does not use the same physical clock signal to synchronize sampling across multiple boards.

Users can synchronize sampling across multiple cards by providing a common trigger signal to all cards.

## COMBINED TECHNOLOGY FROM GAGE & TEKTRONIX

CompuScope 85GC A/D system is based on data conversion circuitry developed by Tektronix for their line of stand-alone digital oscilloscopes.

Decades of design experience at Tektronix and Gage have resulted in a product that makes measurements just as cleanly as an oscilloscope, but is available on the popular CompactPCI bus.

## ON-BOARD SIGNAL PROCESSING

A dedicated, DSP based signal processing ASIC is used on the CompuScope 85GC to perform error correction functions on the data captured by FISO digitizers.

This error correction is necessary for maintaining signal fidelity even at the very highest bandwidths.

Error correction is based on the data collected during calibration. This data is stored in non-volatile memory on-board the CompuScope 85GC.

## NIST TRACEABLE CALIBRATION

Calibration of CompuScope 85GC has been designed to be traceable to NIST standards.

This traceability provides the user with the ability to make accurate and repeatable measurements.

## FAST DATA THROUGHPUT

Unlike GPIB-controlled digital oscilloscopes, CompuScope 85GC uses dedicated circuitry to transfer data from acquisition memory into system RAM.

This high speed circuitry allows very rapid capture and transfer of data.

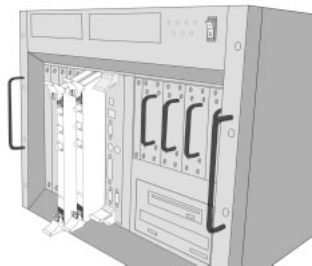
For a full 10,000 point acquisition on two channels, CompuScope 85GC can capture and transfer data more than 100 times per second, i.e. PRF (Pulse Repeat Frequency) of greater than 100 Hz.

## TV TRIGGERING

The CompuScope 85GC provides a TV triggering mode so that it may be triggered off of standard TV signals. TV signal protocols supported are NTSC and PAL.

The CompuScope 85GC allows triggering off of even or odd signal fields or off of any horizontal line which is specified by a line number.

## MULTI-CARD SYSTEMS



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

A Multiple/Independent Multi-Card system, comprising up to 8 CompuScope 85GC boards, can be configured easily within one chassis.

This produces a system with as many as 16 channels in the same chassis.

Due to its unique architecture, CompuScope 85GC cannot be configured as a Master/Slave system, i.e. a system in which all CompuScope cards share the same sampling clock.

Current versions of GageScope Software can display channels from only one of these boards in the same window.

All software development kits fully support such Multiple/Independent Multi-card systems.

## GageScope Software

### WORLD'S MOST POWERFUL OSCILLOSCOPE SOFTWARE

GageScope is a solutions-oriented software package allowing you to control all parameters of CompuScope cards with the click of a mouse – plus view and analyze the captured signals using the power of a Pentium processor and Microsoft Windows.

GageScope not only captures data using CompuScopes, it can also analyze the data and automatically calculate the result, which is displayed in InfoView.

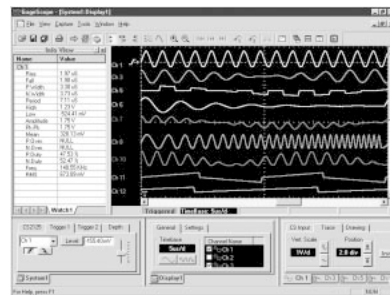
An infinite number of signals and setups can be saved using GageScope. Saving signal files allows you to post-process the data from within your own software. Signal files can also be read by analysis packages such as MATLAB.

The SuperRes Mode in GageScope allows you to enhance the effective resolution well beyond 24 bits using proprietary oversampling techniques and built-in signal processing.

**Professional Edition** of GageScope includes powerful features such as:

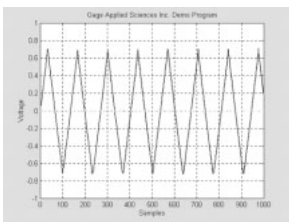
- ◆ FFT for spectral analysis – with up to 4 Million Point FFTs possible
- ◆ Waveform Parameters – automatically measure and display Rise Time, Fall Time, Pulse Width, Frequency, Amplitude and many other parameters
- ◆ AutoSave – save transient signals to disk with time and date stamp. Save both pre- and post-trigger data. Completely unattended operation.
- ◆ Averaging – average virtually unlimited acquisitions to cancel random noise. Up to 32 bit co-adding is also available.
- ◆ Extended Math – allows auto- and cross-correlation, differentiation and integration

Please see the specification sheet on GageScope Software for more detailed information.



## SOFTWARE SUPPORT

For customers who need more flexibility, Gage has Software Development Kits (SDKs) available for C/C++, MATLAB and LabVIEW under Windows 95/98/ME/NT/2000/XP.



Each SDK includes a manual and several sample programs demonstrating the operation of CompuScope cards in various modes. The sample programs are well documented to facilitate their integration into the user application.

- SDK for C/C++ for Windows
- SDK for MATLAB for Windows
- SDK for LabVIEW for Windows

## APPLICATIONS

- Automated Test Equipment (ATE)
- Disk Drive Testing
- Non Destructive Testing
- Military & Aerospace
- Communications & Wireless
- Electro-Optic
- RADAR
- Laser
- High Energy Physics
- Embedded Digitizer

For More Applications visit:

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

## ORDERING INFORMATION

### Hardware

CompuScope 85GC 785-001-002

### 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

*All Upgrades performed at the factory.*

COMPACTPCI  
DIGITIZER CARDS

# COMPUSCOPE 85GC SPECIFICATIONS

## SYSTEM REQUIREMENTS

CompactPCI-based computer with at least one free 6U slot, 64 MB RAM, 10 MB hard disk and SVGA video.

## SIZE

6U CompactPCI

## POWER

	Worst	Typical
5 V	25.0 Watts	22.0 Watts
12 V	12.0 Watts	10.0 Watts

## A/D SAMPLING

No. of Inputs: 2  
Connector: BNC  
Impedance: 1 M $\Omega$  / 15 pF or 50 $\Omega$ , software selectable  
Coupling: AC or DC, software selectable

DC Coupled Bandwidth:

All ranges except $\pm 20$ mV	DC to 500 MHz
$\pm 20$ mV	DC to 300 MHz

AC Coupled Bandwidth:

10 Hz when  
AC - 1M $\Omega$  coupled  
140 KHz when  
AC - 50 $\Omega$  coupled

Full Scale Input Voltage Ranges:

1 M $\Omega$  Input:  $\pm 20$ mV,  $\pm 50$ mV,  $\pm 100$ mV,  $\pm 200$ mV,  $\pm 500$ mV,  $\pm 1$ V,  $\pm 2$ V,  $\pm 5$ V,  $\pm 10$ V,  $\pm 20$ V  
50 $\Omega$  Input:  $\pm 20$ mV,  $\pm 50$ mV,  $\pm 100$ mV,  $\pm 200$ mV,  $\pm 500$ mV,  $\pm 1$ V,  $\pm 2$ V,  $\pm 5$ V

Input Protection: Diode Clamped for 1 M $\Omega$   
Thermal cut-off for 50 $\Omega$

Resolution: 8 bits

Dual Channel Sampling Rate:

5 GS/s, 2.5 GS/s,  
1GS/s, 500 MS/s,  
250 MS/s, 100 MS/s,  
50 MS/s, 25 MS/s,  
10 MS/s, 5 MS/s,  
2.5 MS/s, 1 MS/s,  
500 KS/s, 100 KS/s,  
50 KS/s, 10 KS/s,  
5 KS/s, 1 KS/s

Absolute

Max Input:  $\pm 30$  Volts continuous, for 1 M $\Omega$  Input  
 $\pm 5$  Volts continuous, for 50 $\Omega$  Input

DC Accuracy:  $\pm 2$  % of full scale input, derated at 0.025%/ $^{\circ}$ C above 30 $^{\circ}$ C

## INTERNAL CLOCK

Internal Sampling  
Clock Source: Crystal oscillator  
Internal Sampling  
Clock Accuracy:  $\pm 50$  ppm

## DYNAMIC PARAMETERS

Measured using 100 MHz sine wave input at 5 GS/s with amplitude of 95% of full scale on the  $\pm 1$ V range

SNR: 38 dB  
SFDR: 47 dB  
SINAD: 37 dB  
THD: -42 dB  
ENOB: 6.01 bits

## ACQUISITION MEMORY

Data Storage: In on-board memory  
Max. On-board  
Memory Size: 10,000 samples on each of the two channels

## TRIGGERING

Source: CH 1, CH 2, EXT or Software  
Type: Slope-and-level and Software  
TV Trigger Mode: Type: NTSC and PAL  
Trigger Level: Controlled by on-board DAC  
Sensitivity:  $\pm 5$  % of full scale (DC to 50 MHz)  
 $\pm 12.5$ % of full scale (50 MHz to 500 MHz)

This number specifies the minimum required signal amplitude to cause a trigger to occur. Smaller signals are rejected as noise.

Level Accuracy:  $\pm 5$  % of full scale  
Slope: Positive or Negative  
Pre-Trigger: From 0 to almost 100% of record length. All captured data that is not part of post-trigger depth, is pre-trigger data  
Post-Trigger Depth: 500 points minimum. Can be defined with a 100 point resolution

## EXTERNAL TRIGGER

Impedance: 1 M $\Omega$ , in parallel with 20 pF  
Amplitude: Absolute Max  $\pm 15$  Volts  
Voltage Range:  $\pm 1$  V and  $\pm 5$  V  
Coupling: AC or DC  
Bandwidth: 300 MHz  
Connector: BNC

## MULTI-CARD SYSTEMS

Operating Mode: Multiple/Independent  
Max Cards: 8

## OPERATING SYSTEMS

Windows 95/98/ME/NT\*/2000/XP  
\*Version 4, SP3 or higher

## COMPACTPCI BUS INTERFACE

Plug-&-Play: Fully supported  
Bus Width: 32 bit  
Compatibility: All cPCI v2.0 compliant computers

## APPLICATION SOFTWARE

Windows Based Software:  
GageScope Lite Edition  
GageScope Standard Edition  
GageScope Professional Edition

## SOFTWARE SUPPORT

Software Development Kit for C/C++  
For Windows 95/98/ME/NT/2000/XP  
Includes Sample Programs in Visual C  
Software Development Kit for MATLAB  
For Windows 95/98/ME/NT/2000/XP  
Software Development Kit for LabVIEW  
For Windows 95/98/ME/NT/2000/XP

## MATERIALS SUPPLIED

One CompuScope 85GC card  
One CompuScope 85GC Hardware Manual  
One Gage Driver Disk on CD  
One Driver Installation Guide  
One GageScope Lite Edition Software

## WARRANTY

One year parts and labor  
All specifications subject to change without notice



**GAGE**  
A Tektronix Technology Company