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## COMPUSCOPE 1012

The CompuScope 1012 digitizes analog signals with a resolution of 12 bits at a sampling rate of up to 20 MHz and stores the resulting digital pattern in the on-board memory.

The IBM PC is then allowed to access the memory and retrieve the data for further processing.

## 20 MSPS, 12 BIT SAMPLING

The CompuScope 1012 uses two monolithic flash A/D converters, each running at 10 MSPS.

In the single channel mode the two ADCs are clocked in a "ping-pong" mode to achieve up to 20 MSPS sampling. On-board programmable gain amplifiers and offset control circuits ensure measurement accuracy and long term thermal stability.

## SYSTEM ARCHITECTURE

Architecturally, CompuScope 1012 is very similar to a Digital Storage Oscilloscope. Even the front-end electronics are designed to be of oscilloscope quality and specifications.

This was done so that the user can design the data acquisition system the same way as he or she would have if an oscilloscope, the best-known of all electronic instruments, were being used.

Once the system has been designed, a CompuScope 1012 can easily be substituted for the oscilloscope to take advantage of the small size, low power, high data transfer rate, simple programming, straightforward interface to PC without GPIB and low cost offered

by the CompuScope 1012 over a comparable DSO and GPIB solution.

## MEMORY DEPTH

CompuScope 1012 is currently available with memory depth of 512 Ksamples, 1Msamples, 2Msamples, 4Msamples, 8Msamples and 16Msamples. Models with 8M and 16M occupy two full length slots.

In the single channel mode, the maximum number of sample points is equal to the memory depth of the CompuScope 1012 model being used, whereas in the dual channel mode the maximum number of sample points is half the memory depth.

For example, in the 512 KB model there are 512K sample points for channel A in the single channel mode and 256K points per channel in the dual channel mode.

Each sample is a 12 bit word.

The data stored in the CompuScope 1012 memory can be transferred to the PC memory or hard disk for post processing without any interface bus (no GPIB or IEEE 488 bus required). In fact, the CompuScope 1012 memory is mapped into the memory map of the IBM PC, so it can be accessed just as easily and quickly as the PC's own memory.

According to benchmarks, data throughput to the PC memory is in excess of 1 Megawords per second on a 80486DX66 based machine.

## HIGH TRANSFER RATE

The fast data transfer rate to PC's memory allows the CompuScope 1012 to be used in applications which have a high Pulse Repeat Frequency (PRF).

Data can be captured by CompuScope 1012 and transferred to PC's memory in a tight loop up to thousands of times per second.

Of course, the maximum achievable repeat frequency depends upon the amount of data being transferred.

## INTERRUPT CAPABILITY

CompuScope 1012 can be made to interrupt the 80x86 processor upon receiving a trigger or upon completion of data storage or upon filling up the memory.

Interrupts are selected via switches on the card.

## PRE-TRIGGER DATA

Due to the digital nature of the CompuScope 1012, it is capable of storing both pre and post-trigger data, making it a very powerful tool for transient analysis.

The amount of post-trigger data can be specified in a GageScope menu or via software, the remaining memory is pre-trigger memory

## SHIELDED ANALOG INPUT

The shielded section of the CompuScope 1012 contains programmable gain amplifiers which control the input amplification of the two channels.

In addition to the shielding, the six layer CompuScope 1012 printed circuit board also protects sensitive analog signals with three power planes.

## FLEXIBLE TRIGGERING

CompuScope 1012 features state-of-the-art windowed triggering. Two independent comparators provide triggering from either one or both channels, or from an external signal or a logical combination of them all at two independent trigger levels.

In the case of a Multi-Card system, it is possible to have up to 32 trigger sources.

## FREE GAGESCOPE DIGITAL OSCILLOSCOPE SOFTWARE

CompuScope 1012 is accompanied by a free copy of the powerful, full color GageScope software which allows the CompuScope 1012 to be used as a digital oscilloscope.

Software features include real-time screen updates, real-time control of

oscilloscope parameters, cursor measurements, zoom capability, optional X-Y display, optional FFT, optional Averaging etc.

Please see the specification sheet on GageScope for more details.

### **DRIVERS AND OEM SUPPORT**

Gage's OEM Support Program offers qualified developers and OEMs the support to make the CompuScope 1012 a part of their products.

Gage supplies source code drivers for the CompuScope 1012 in Borland C, Visual C and Quick BASIC. The source code routines, along with a sample program are accompanied by a detailed reference manual.

Gage also supplies a Windows 3.x DLL which supports Borland C, Visual C, and Visual BASIC.

Yet other drivers are available for programmers who intend to use third party software packages such as LabView, LabWindows for DOS, LabWindows CVI, HyperSignal, or DasyLab.

### **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, comprising one Master and up to 7 Slave 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 cable will be supplied with the system. This cable carries all the signals needed for proper synchronisation.

GageScope Multi-Card software can then display up to 32 channels from these boards on the same screen.

Software drivers also support such Master/Slave systems.

### **EXTERNAL CLOCK**

An external clock option can be ordered from the factory in

situations where a special sampling frequency is desirable.

In the single-channel mode, the input signal is sampled at every rising edge of the External Clock. In the dual channel mode, sampling is done on every other edge of the External Clock, i.e. sample rate is half the frequency of the External Clock.

External Clock must be a TTL signal with a maximum frequency of 20 MHz and minimum frequency of 40 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 5 ns must be respected.

### **GATED DIGITIZATION**

A Gated Digitization option can be ordered from the factory. Data is stored in the RAM only when the external TTL GATE input is HIGH.

This can be useful when it is desirable to stack successive data captures in the on-board memory.

Rise and fall times of the GATE signal must be better than 50 ns.

### **MULTIPLE RECORDING**

Multiple Recording, a standard option, allows CS1012 to capture data on successive triggers and stack it in the on-board memory.

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

This is useful for applications in which a series of bursts of data have to be captured in quick succession.

## **DSPLINK**



DSPLINK is a 32 bit mezzanine bus supported by Digital Signal Processing cards from a number of vendors. It allows data to be transferred from the data buffer on a CompuScope 1012 card to a DSP card without having to go through the ISA bus.

Data transfer rates of up to 10 Megasamples per second are supported, where each sample is 12 bits long.

This interface consists of a full-length ISA bus card which attaches to the CompuScope 1012 ANALOG BOARD via expansion headers, thus replacing the standard MEMORY BOARD. Up to 16 Megasamples of memory can be populated on the DSPLINK Interface Board.

Contact the factory for the latest list of CS1012 - compatible DSP boards

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## **COMPUSCOPE 1012 SPECIFICATIONS**

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## SYSTEM REQUIREMENT

IBM PC AT, 386, 486, Pentium or ISA compatible PC with 640 kilobytes of RAM, VGA, EGA, CGA or Hercules graphics card and monitor and 1MB hard disk space. 80x87 coprocessor recommended.

## SIZE

Single slot full length 16 bit ISA PC board  
Models with 8M and 16M memory occupy two slots

## POWER

17 Watts at + 5 Volt  
0.6 Watt at + 12 Volt  
6 Watt at - 12 Volt  
0.05 Watt at - 5 Volt

## CHANNELS A & B

Inputs per card : 2

Impedance : 1 M $\Omega$ , 20 pF

Coupling : AC or DC

Bandwidth : 10 MHz

Resolution : 12 bits

Voltage Range :  $\pm 100\text{mV}$ ,  $\pm 200\text{mV}$ ,  
 $\pm 500\text{mV}$ ,  $\pm 1\text{V}$ ,  $\pm 5\text{V}$

Amplitude : Absolute Max  $\pm 15$  Volts

Accuracy :  $\pm 0.5\%$

Sampling Rate

Channel A: 20 MSPS max  
10 MSPS, 5MSPS,  
1MSPS,...

Channel B: 10 MSPS max  
5 MSPS, 1 MSPS,...

Aperture jitter : 10 ps, rms

Memory Depth Programmable with 64  
(128) sample resolution in  
dual (single) channel mode

Channel A : up to full on-board memory

Channel B : up to half on-board memory

SNR : 65 dB @ 10 MSPS  
1 MHz input in +/- 1V  
range

Protection : Diode Clamped

Connector : BNC

## MEMORY DEPTHS

### AVAILABLE

Memory Depth : 512K, 1M, 2M, 4M, 8M  
and 16M samples (12 bit  
samples)

## TRIGGERING

Source : CH A, CH B, Ext or Kbd or  
an OR product

Type : Analog windowed  
triggering with two trigger  
levels

Mode : Pre, Mid, or Post-trigger

Levels : 256 per trigger level

Slope : Positive or Negative

## EXTERNAL TRIGGER

Impedance: 1 MOhm, 30 pF

Amplitude : Absolute Max  $\pm 15$  Volts

Voltage Range :  $\pm 1\text{V}$  and  $\pm 5\text{V}$

Coupling : AC or DC

Bandwidth : 10 MHz

Connector : BNC

## TEST OUTPUT

Amplitude : 0 to 200 mV square wave

Frequency : 1 kHz, typical

Connector : BNC

## DISPLAY (GAGESCOPE SOFTWARE)

Traces : Up to 32. Either from  
hardware, disk or math

Timebase : 1 Ms/div to 100 ns/div

Vertical Scale : 1KV/div to 100  $\mu\text{V}$  / div

Scrolling : All channels

Trigger Marker : Displayed on screen

Cursors : Absolute,  $\Delta\text{V}$  and  $\Delta\text{T}$

Channel ID : Each channel identified  
at both ends of the trace

Zero Reference : For each channel

Zoom : 1-2-5 sequence

## OUTPUT (GAGESCOPE SOFTWARE)

Hard Copy : HP LaserJet, HP InkJet or  
Epson dot matrix

File Format : GageScope binary format,  
2 column ASCII

## MATHEMATICAL ANALYSIS

Functions : Addition, Subtraction,  
Multiplication or Division  
of up to any three channels.  
All channels must have the  
same sample rate

Optional FFT : Up to 4096 point dual  
channel FFT with  
Rectangular, Parzen, Welch,  
Hanning, Hamming, Exact  
Blackman windows.  
Selectable center frequency,  
span and vertical scale.  
Cursor measurements on the  
FFT curve

Optional X-Y : Upto 4096 point continuous  
or unlimited single shot  
display of any two channels  
from the same CompuScope  
cards or any disk channels

Optional

Averaging: Up to 4096 point  
continuous or unlimited  
single shot display of any  
two channels from the same  
CompuScope card or any  
disk channels.

## SOFTWARE DRIVERS

Available in source code in Borland C, Visual  
C and Quick BASIC. Available for the  
LabWindows and LabView environments.  
Available as a DLL for the Windows 3.x  
environment for Visual BASIC, Visual C++,  
and Turbo Pascal for Windows.

## MATERIALS SUPPLIED

One CompuScope 1012 card

One GageScope software package, including a  
Reference Manual

Two X10 oscilloscope Probes

## WARRANTY

One year parts and labor

*All specifications subject to change without notice*

## ORDERING INFORMATION

Product	Order Number
CompuScope 1012-512K	012-101-002
CompuScope 1012-1M	012-101-004
CompuScope 1012-2M	012-101-005
CompuScope 1012-4M	012-101-006
CompuScope 1012-8M	012-101-007
CompuScope 1012-16M	012-101-008
GageScope Single-Card	Included
GageScope Multi-Card	200-001-002
GageScope: FFT Module	200-001-003
GageScope: X-Y Module	200-001-004
GageScope: Averaging	200-001-005
GageScope: Maintenance Program	200-111-123
512K to 1M Upgrade	012-181-001
512K to 2M Upgrade	012-181-002
512K to 4M Upgrade	012-181-003
512K to 8M Upgrade	012-181-014
512K to 16M Upgrade	012-181-015
1M to 2M Upgrade	012-181-004
1M to 4M Upgrade	012-181-005
1M to 8M Upgrade	012-181-016
1M to 16M Upgrade	012-181-017
2M to 4M Upgrade	012-181-006
2M to 8M Upgrade	012-181-018
2M to 16M Upgrade	012-181-019
4M to 8M Upgrade	012-181-020
4M to 16M Upgrade	012-181-021
8M to 16M Upgrade	012-181-022
External Clock Upgrade	012-181-008
Master Multi-Card Upgrade	012-181-009
Slave Multi-Card Upgrade	012-181-010
Gated Digitization Upgrade	012-181-011
CS1012 Calibration	012-181-012
DSP Link Option	012-181-024
CompuScope C Drivers	200-113-001
CompuScope Quick BASIC Drivers	200-113-002
CS1012 LabWindows Drivers	200-113-004
CompuScope Windows DLL	200-113-005
CompuScope LabVIEW Driver	200-113-006
CompuScope LabWindows CVI	200-113-007
CompuScope Windows NT DLL Driver	200-113-008
X10 / X1 Probe, Extra	220-100-001
X100 Probe	220-100-002

*All Upgrades performed at the factory*



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