CompuScope 1610 product introduction

CompuScope 1610 is 16 bit dual channel, 10 MS/s waveform digitizer card for the PCI Bus.

Recognizing that until very recently, almost all multi-Megahertz data acquisition was done using Digital Storage Oscilloscopes under GPIB control, GaGe has ported all the features of these DSOs onto the CompuScope card. This means that you do not have to rethink the solution in terms of a completely unknown data acquisition card. You can simply develop the data acquisition system as if an oscilloscope were being used, but instead use a CompuScope card to take advantage of its attractive price and performance.

Of course, CompuScope cards are much more than just another DSO under GPIB control:

- CS1610 features up to 1 billion samples of on-board acquisition memory.
- Multi-card Master/Slave systems provide from 2 to 16 channels of simultaneous A/D conversion, something normal DSOs simply cannot do.
- Data transfer rates from CompuScope memory to PC memory run as high as 50 MB/s for the CS1610 as compared to a few hundred KB/s for GPIB.
- CompuScope cards are easier to program, as Software Development Kits are available for C/C#, MATLAB, and LabVIEW. Operation under Visual Basic.NET and LabWindows/CVI is also possible from the C/C# Software Development Kit.
- CompuScope cards are installed inside the PCI bus chassis, so there is no external box such as a DSO.
- CS1610 cards have standard features such as Multiple Record, which help optimize the use of the on-board memory by stacking data from successive bursts.
- You can also write software for a multi-card system in which all the cards are not in a Master/Slave configuration. GaGe drivers support all these multi-card configurations.

Special features of the CompuScope 1610 include:

- Bus Mastering
  CompuScope 1610 cards are fully capable of becoming a bus master in order to transfer data at the maximum rate of 50 MB/s.

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

- External Clock
  CompuScope 1610 comes standard with External Clocking capability that allows synchronization of the digitizers with an external system. It should be noted that the frequency of the External Clock must be twice the desired sampling frequency.

CompuScope 1610 connectors and headers

CompuScope cards connect to the outside world through connectors, both analog (BNC) and digital (PCI Bus, Master/Slave, etc.). This section describes these connectors for the CS1610 card.

The connectors and headers on the CS1610 card are shown below:

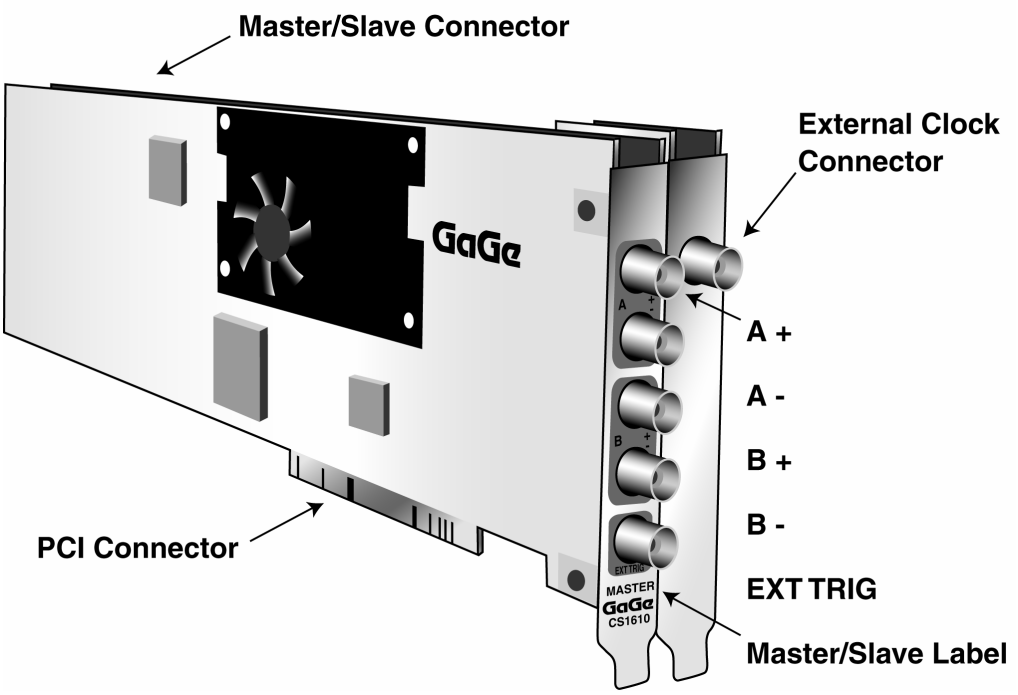

Figure 1: Connectors on CS1610

- **A+ BNC** connector operates differently when using the two different CS1610 input signaling schemes. When the single-ended scheme is selected, **A+** is the single-ended signal input for Channel 1. When the differential scheme is selected, **A+** is the positive differential input for Channel 1. This applies to an independent CompuScope card or the Master card in a Master/Slave multi-card system. Refer to the section on CompuScope digitizer channel enumeration for more information on channel enumeration in Master/Slave multi-card systems.
- **A- BNC** connector operates differently when using the two different CS1610 input signaling schemes. When the single-ended scheme is selected, **A-** is not used. When the differential scheme is selected, **A-** is the negative differential input for Channel 1. This applies to an independent CompuScope card or the Master card in a Master/Slave multi-card system. Refer to the section on CompuScope digitizer channel enumeration for more information on channel enumeration in Master/Slave multi-card systems.
- **B+ BNC** connector operates differently when using the two different CS1610 input signaling schemes. When the single-ended scheme is selected, **B+** is the single-ended signal input for Channel 2. When the differential scheme is selected, **B+** is the positive differential input for Channel 2. This applies to an independent CompuScope card or the Master card in a Master/Slave multi-card system. Refer to the section on CompuScope digitizer channel enumeration for more information on channel enumeration in Master/Slave multi-card systems.
- **B- BNC** connector operates differently when using the two different CS1610 input signaling schemes. When the single-ended scheme is selected, **B-** is not used. When the differential scheme is selected, **B-** is the negative differential input for Channel 2. This applies to an independent CompuScope card or the Master card in a Master/Slave multi-card system. Refer to the section on CompuScope digitizer channel enumeration for more information on channel enumeration in Master/Slave multi-card systems.

- **External Trigger BNC** connector is used to input an analog or digital signal, which may be used as an External Trigger. External Trigger is defined exactly as in an oscilloscope: this signal can be used to trigger the system but cannot be viewed or digitized.
- **Master/Slave connector.** The Master/Slave connector is located near the top edge of the CompuScope 1610 card. In case of an Independent card (i.e. a card not upgraded to either a Master or a Slave), this connector may not be present.

  The Master/Slave Timing Module is used to pass all the signals necessary to synchronize Slave CompuScope 1610 cards with the Master.
- **External Clock connector.** You will be supplied with an Auxiliary Board that houses the External Clock BNC Connector. This Auxiliary Board occupies an additional slot adjacent to the CompuScope card. In Master/Slave multi-card systems, only one Auxiliary Board is required and it is attached to the Master card. Please note that the Auxiliary Board housing the External Clock BNC connector can not be removed.

  The reason for mounting the External Clock connector on the Auxiliary Board is that the standard PCI bracket does not have room for more than 5 BNC connectors.

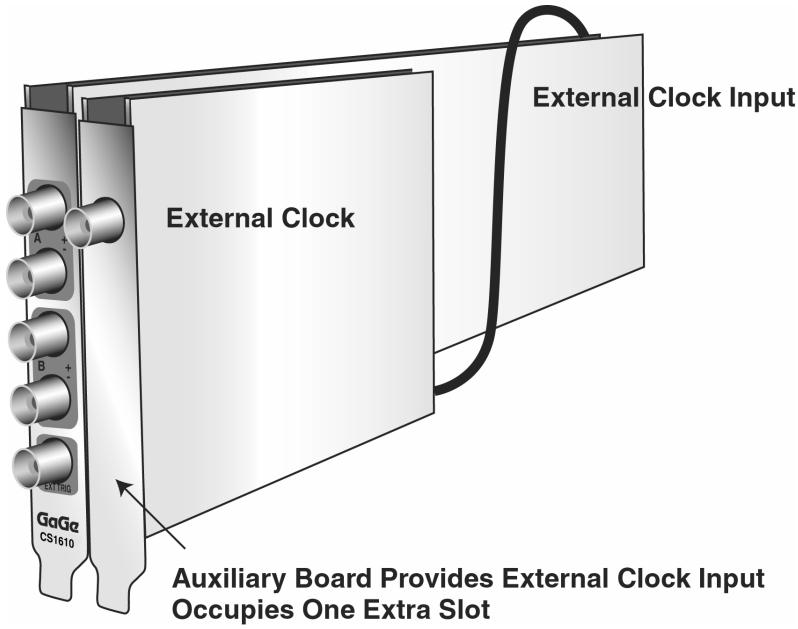

Figure 2: Auxiliary board for External Clock

NOTE FOR COMPUSCOPE 1610 DEEP MEMORY BOARD USERS:
IF Y-CABLES ARE NOT CONNECTED BETWEEN THE POWER CONNECTORS OF YOUR COMPUSCOPE DEEP MEMORY CARD(S) AND THE POWER SUPPLY OF THE CHASSIS, THE DEEP MEMORY CARD(S) WILL NOT FUNCTION PROPERLY.

CompuScope 1610 compliance statement

Category	Standards or description
EC Declaration of Conformity – EMC	Meets intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities: EN 61326 EMC requirements for Class A electrical equipment for measurement, control and laboratory use. [1, 2, 3] IEC61000-4-2 Electrostatic Discharge (Performance criterion B) IEC61000-4-3 RF Electromagnetic Field (Performance criterion A) IEC61000-4-4 Electrical Fast Transient/Burst Immunity (Performance criterion B) IEC61000-4-5 Power Line Surge Immunity (Performance criterion B) IEC61000-4-6 Conducted RF Immunity (Performance criterion A) IEC61000-4-11 Voltage Dips and Interruptions Immunity (Performance criterion B) EN 61000-3-2 AC Power Line Harmonic Emissions
Australia / New Zealand Declaration of Conformity - EMC	Complies with EMC provision of Radio communications Act per the following standard(s): AS/NZS 2064.1/2 Industrial, Scientific and Medical Equipment: 1992 [1, 2, 3]

1. **High-quality shielded cables must be used to ensure compliance to the above listed standards**
2. **Compliance demonstrated on a single card configuration**
3. **On the host PC used by the customer, all unused back panel slots must be covered with EMI blocking plates**

CompuScope 1610 throughput & maximum PRF

A number of applications require the CompuScope 1610 to acquire data based on a rapidly occurring trigger signal. These high Pulse Repeat Frequency (PRF) applications include imaging, radar, ultrasound and lightning test.

We have performed extensive repetitive capture benchmarks in Single Record mode. In this mode, the signal is captured into on-board CompuScope memory and the captured data are transferred through the PCI bus using PCI bus mastering to PC RAM.

Please note that much higher PRFs will be achieved using CompuScope Multiple Record mode.

The following test results were obtained using a computer configured as follows:

- Pentium III, 1 GHz processor
- 512 MB RAM
- 20 GB disk drive
- Windows 2000
- NT File System
- 33 MHz, 32 bit PCI bus
- All slots support bus mastering

A C application program optimized for fast repetitive capture in single record mode was used for throughput measurements. The CS1610 was operated using this application for many different capture depths and the results are plotted as points in the graph below. The PCI transfer rate was calculated from the linear portion of the curve at high depths.

PCI data transfer rate: 50 MB/s

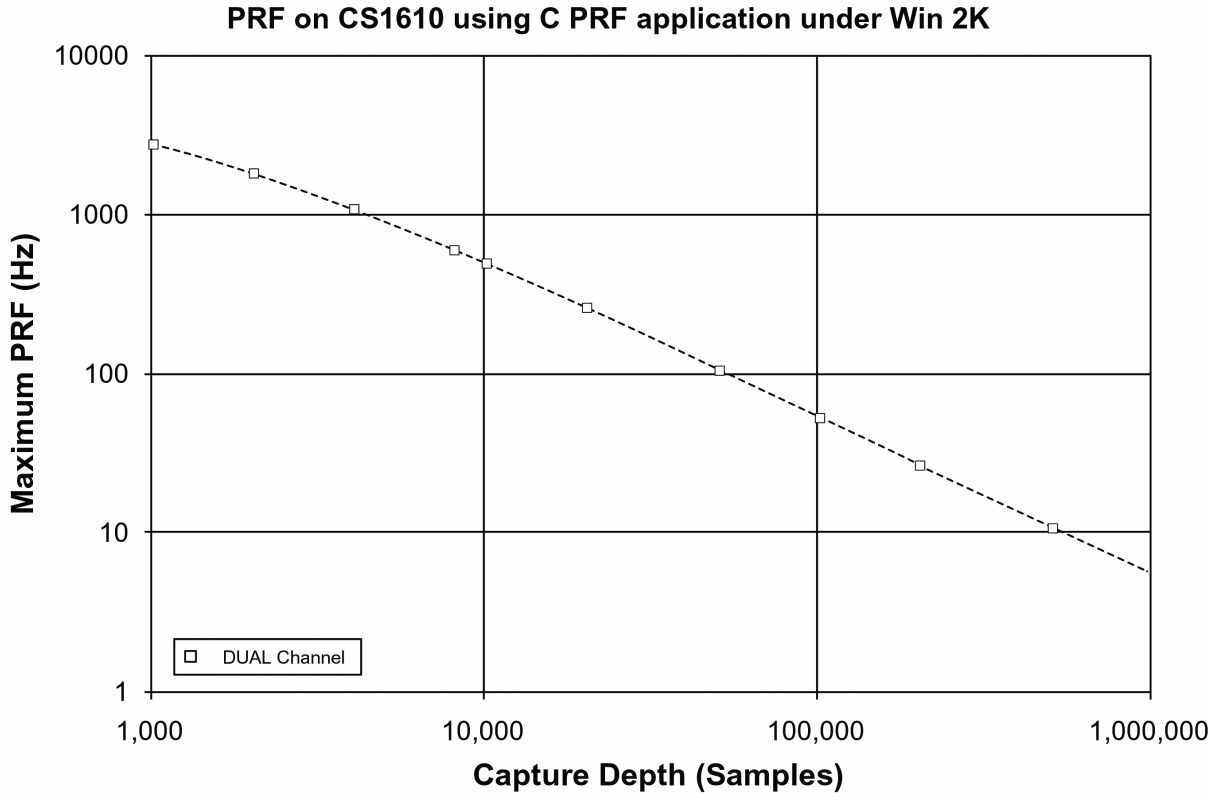

Figure 3: Maximum PRF vs. acquisition length