

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

eInstrument-PC

12/20/10

Windows/Linux/VxWorks Embedded Computer with dual XMC IO Sites, integrated timing and GPS support

FEATURES

- Combines an industry-standard COM Express CPU module with dual XMC IO modules in a compact, stand alone design
- Small form factor: 3" H x 7 .7" W x 9 .8" D
- Stand-alone operation: able to operate diskless and headless
- Windows, Linux, and VxWorks OS support
- Dual PCI Express XMC IO module sites. Add anything from RF receivers to industrial control modules.
- PCI Express IO sites (VITA 42.3) deliver >600MB/s to CPU memory**
- Integrated timing and triggering support for IO includes optional GPS-disciplined clock
- Supports Innovative X3, X5, and X6 IO module features for private data channels, triggering and timing features
- USB2.0 x6, Gb Ehernet, SATA x4, VGA, HD audio
- System expansion supported with Cabled PCI Express – use other eInstruments
- Up to 4 SSD or HDD (2.5 in)
- Optional GPS with high precision option.
- FPGA for custom IO and interfaces
- AC or DC operation

APPLICATIONS

- Embedded instrumentation
- Remote, autonomous IO
- Mobile instrumentation
- Distributed data acquisition

SOFTWARE

- Windows, Linux and VxWoks compatible
- Runs standard desktop applications
- MSVC++ Developers Kit supporting IO integration and customization
- Device drivers, example software and support applets supplied for all peripherals

** Data rate dependent on the COM Express module capabilities



Compact PC with XMC IO Sites

DESCRIPTION

The eInstrument-PC is a user-customizable, turnkey embedded instrument that includes a full Windows/Linux PC and supports a wide assortment of ultimate-performance XMC modules. With its modular IO, scalable performance, and easy to use PC architecture, the eInstrument-PC reduces time-to-market while providing the performance you need.

Distributed Data Acquisition – Put the eInstrument-PC at the data source and reduce system errors and complexity. Optional GPS-synchronized timing, triggering and sample control is available for remote IO. Limitless expansion via multiple nodes. Up to 4 HDD for data logging.

Uniquely customizable - dual XMC sites for IO, user-programmable FPGA for IO interfaces, triggering and timing control, USB ports.

Remote or Local Operation - Continuous data streaming up to 220MB/s (5m, cabled-PCIe LAN) or 1Gb/s Ethernet. Optional, stand-alone, autonomous operation with GPS-synchronized sampling.

Rugged – SSD boot drive support in a compact, rugged 250x170mm footprint that is ready for embedded operation.

9-18V DC-Only Operation - Perfect for portable or automotive data loggers or waveform generators.

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Innovative Integration products and disclaimers thereto appears at the end of this data sheet. All trademarks are the property of their respective owners.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Innovative Integration standard warranty. Production processing does not necessarily include testing of all parameters.

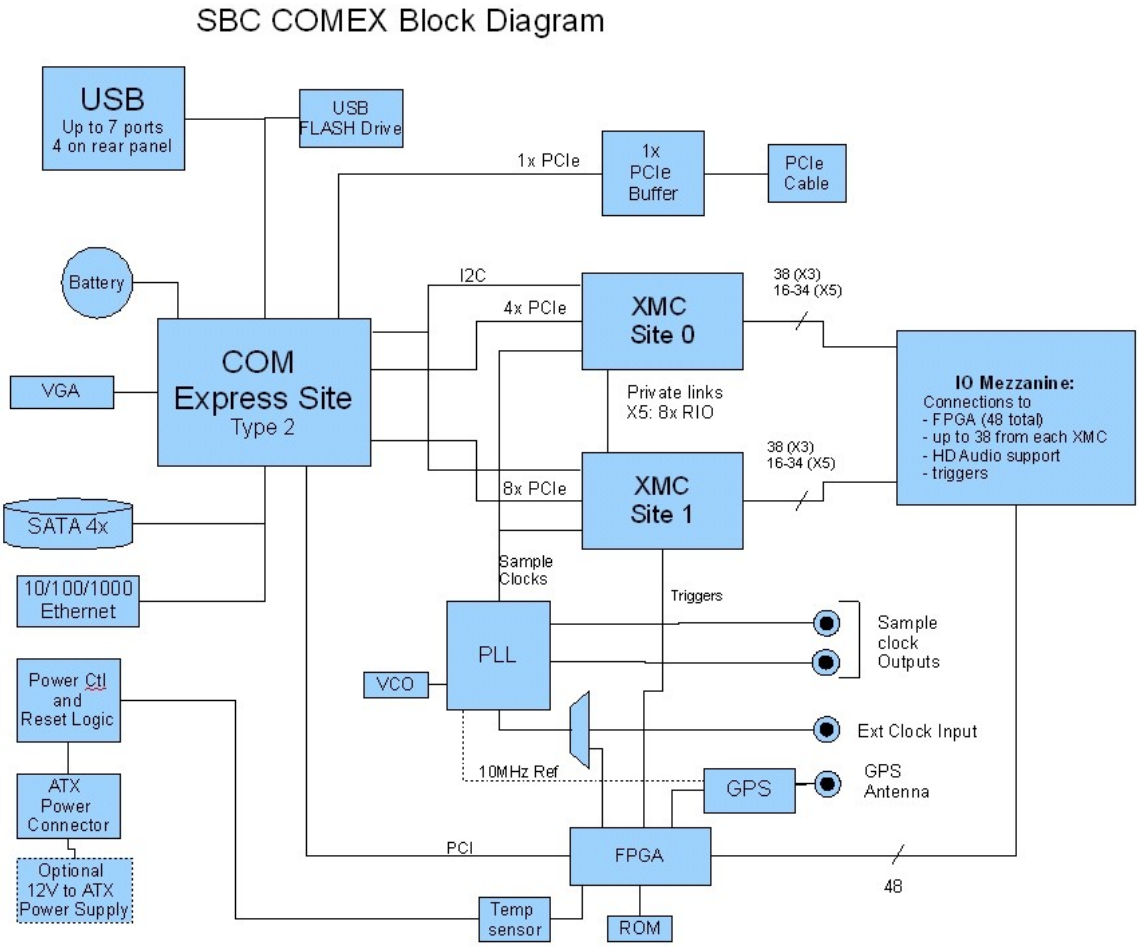
© 2007 Innovative Integration • phone 805.578.4260 • fax 805.578.4225 • www.innovative-dsp.com

eInstrument-PC

ORDERING INFORMATION

Product	Part Number	Description
eInstrument-PC	90200-6	eInstrument-PC – (i7 CPU) User-customizable, turnkey embedded instrument consisting of SBC-ComEx with 2.53 GHz i7-610e Dual Core CPU with active heat sink and fan, 4 GB DDR3 RAM, 1066 MHz FSB, 4 SATA 300, 4 USB 2.0, 9-18V DC power supply, rugged enclosure, AC to DC Power adapter included (specify locale). 10-945 MHz SI570 VCO. 64GB SSD boot drive. 50W.
Storage Options		
1TB HDD	36030	Hard disk drive, 1 TB, 5200rpm, 8MB cache, 2.5", SATA 300 (may install up to 4 of these)
64GB SSD	36033	Fast, rugged, solid-state disk drive with 64 GB capacity, 2.5", SATA 300 (may install up to 4 of these)
160GB SSD	36019	Fast, rugged, solid-state disk drive with 160 GB capacity, 2.5", SATA 300 (may install up to 4 of these)
GPS Options		
Low Cost GPS + antenna	90196-0	GPS receiver module, NavSync CW25. Mounts onto SBC-ComEx carrier. Includes antenna, Active, +25dB, 3.3V, SMA cable
Precision GPS + antenna	90197-1	GPS receiver module, Trimble Mini-T. Mounts in eInstrument PC chassis (REV D REQUIRED). Includes Trimble 53110-15, 5V Bullet III antenna and interface cable.
Cable Options		
SMA to BNC Cable	67048	50 Ohm SMA to BNC Cable (for reference clock input or sample clock outputs)
Mezzanine Card	80208-1	Mezzanine card for eInstrumentPC and SBC-ComEx Card exposes J16 signals from XMC sites 0 and 1, plus SBC-ComEx baseboard digital I/O signals. HD audio port with line/headphone output and microphone input.

eInstrument-PC





SBC COMEX Motherboard with Two XMC modules

eInstrument-PC

Standard Features

COM Express Site	
Standards	PCIMG COM.0 COM Express Base Specification 1.0 Compliant
Type	2
Size	Supports 95 x 125 mm modules
Verified Modules	Adlink Express-CB modules
CPU Types	Low Power:i7-620UE ULV, dual cores, 1.06 GH, 4 MB cache High Performance: i7-610e SV, dual core, 2.53 GHz, 4 MB cache
COM Express Memory	Up to 8 GB (dual channel) DDR3, 1066 MHz See approved memory list
IO Ports	
USB	USB 2.0 2 Type A rear panel ports 5 internal USB ports when using approved COM Express modules
Ethernet	10/100/1000 port on rear panel **Speed depends on COM Express
SATA	4 SATA 300 ports Rear panel support for two eSATA ports
Video	Analog VGA up to QXGA (2048x1536) Integrated graphics engine on i7
Cabled PCI Express	x1 lane (2.5Gbps full duplex) PCIMG PCI Express Cable Specification 1.0
XMC Sites	
Module Sites	2
Standards	VITA 42.3 XMC for PCI Express VITA 20 Conduction cooling
Size	75 x 150 mm, 10mm mezzanine height
PCI Express Connections	XMC Site 0 (4 lanes) XMC Site 1 (8 lanes using PEG interface)
J16 Support	8x High speed serial pairs 38 direct connections to IO mezzanine

HDD Options	
Drives	Up to 4 10mm thick HDD or SSD Up to two 15 mm thick drives
Type	2.5” notebook drives
Interface	SATA 300

Timing and Triggering Support Features	
Sample Clock Sources	PLL, external
PLL Range	SI570 VCO: Type A: 10-950 MHz 0.3 to 950 MHz
PLL Reference	10 MHz reference or optional GPS-disciplined clock
GPS disciplined clock accuracy	Low Cost: +/-100 ns RMS from UTS High Performance: 15 ns 1σ
Trigger Modes	Software, GPS-synchronized, GPS Time, external input
Trigger Outputs	2 per XMC site, two IO Mezzanine
Clock input	Use as sample clock or PLL Reference SMA on rear panel
Clock Outputs	50 ohm, SMA internal connectors < 0.5 ps RMS jitter Sine output
Module Synchronization	Simultaneously trigger both modules Matched clocks
System Synchronization	Output clocks and triggers for system functions

eInstrument-PC

Customization Features	
FPGA	Xilinx Spartan3E 250K gate FPGA Controls triggering and has 48 pin connections to IO Mezzanine PCI Interface to COM Express CPU FrameWork Logic available for FPGA in VHDL
IO Mezzanine	Add functionality and rear terminal connectors for special features 48 bits connections to FPGA HD audio signals from COM Express 38 bits to each XMC J16

GPS Option 1 (Low Cost)	
Type	12 satellite, parallel tracking
Output	PPS
Position Accuracy	3m CEP
Time to first fix (TTFF)	Cold <60s Warm <32s Obscuration recovery <1s
Maker	Navsync CW25
Interface	Serial interface to FPGA (PCI device peripheral to COM Ex CPU)

GPS Option 1 (Precision)	
Type	12 satellite, parallel tracking
Outputs	PPS, 10 MHz
Phase Noise	-120 dBc @ 10 Hz -135 dBc @ 100 Hz -145 dBc for 1kHz and higher
Accuracy	1.16 x 10^{-12} (one day average)
Maker	Trimble Electronics, model MINI-T
Interface	Serial interface to FPGA (PCI device peripheral to COM Ex CPU)

Power Management	
Power States	Low power states supported including wake features from PCI Express and LAN
Temperature Monitors	2 total : COM Express module and eInstrument-PC assembly each have a temperature sensor
Alarms	Programmable warning and failure levels
Over-temp Monitor	Disables power supplies
Conductive Cooling	Conduction cooling supported for eInstrument-PC assembly includes heat conduction bars on each edge and VITA20 pattern for each XMC module
Fans	Two integrated, 12 CFM fans Active cooling assembly for COM Express module also has an integrated fan

Physicals	
Dimensions (LxWxH)	9.8 x 7.7 x 3.0 in [250 x 195 x 77 mm]
Weight	5.9 lbs/ 2.68 kg (typical includes HDD)
Hazardous Materials	Lead-free and RoHS compliant

Power Requirements	
Input	9 to 18V DC
Consumption ** Power is highly dependent on CPU and peripheral use. The stated power is typical use.	*Varies according to XMC and COM Express module requirements* 25W: eInstrument-PC with i7-620UE SLV 1.06 GHz COM Express module, 2GB memory and NO XMCs 50W: eInstrument-PC with i7-610E SV 2.53 GHz COM Express module, 4GB memory and NO XMCs
Hazardous Materials	Lead-free and RoHS compliant

Reliability	
MTBF	>25000 Hours (SSD boot drive)

ABSOLUTE MAXIMUM RATINGS

Exposure to conditions exceeding these ratings may cause damage!

Parameter	Min	Max	Units	Conditions
Input Voltage Range	9	20	V	High and Ultra performance COM Express modules
Operating Temperature	0	60	C	Non-condensing, forced air cooling required
Storage Temperature	-65	+150	C	
ESD Rating	-	1k	V	Human Body Model
Vibration	-	5	g	9-200 Hz, Class 3.3 per ETSI EN 300 019-1-3 V2.1.2 (2003-04)
Shock	-	40	g peak	Class 3.3 per ETSI EN 300 019-1-3 V2.1.2 (2003-04)

eInstrument-PC

Architecture and Features

The eInstrument-PC combines a Windows/Linux compatible embedded PC with XMC IO modules and supporting peripherals to create a customizable instrument for a variety of applications.

Embedded PC

The eInstrument-PC architecture is Windows/Linux compatible – it runs the same applications as a desktop computer. The COM Express CPU module is a PC on a module and provides the computing engine, available with the advanced Intel i7 processors.

COM Express Advantages

- Intel compatible PC runs Windows, Linux, VxWorks
- Scalable performance
- Latest technologies: PCI Express, Gb Ethernet, USB 2.0
- Upgradeable as requirements change and evolve
- Compact 95 x 125 mm form-factor
- Industry-standard, multi-vendor

The COM Express module provides the PCI Express bus that links the XMC modules to the CPU. XMC modules install just like PCI Express add-in cards on the PC and are software compatible with PC applications. The PCI Express bus tightly couples the CPU to the XMC modules and outperforms previous generation systems by 2 to 4 times. Data transfer rates to CPU memory at 600 MB/s for XMC site 0 and up to 1 GB/s for XMC site 1.

The eInstrument-PC provides familiar PC interfaces for expansion and connectivity: Gigabit Ethernet, USB ports, and SATA HDD. System expansion using a cabled PCI Express port is also provided for high performance IO supporting up to ~180MB/s transfer rates to external devices such as other eInstruments.

The VGA video port and USB keyboard/mouse make operating the eInstrument-PC to operate just like any PC. Standard PC screens supporting VGA up to 2048x1536 are supported. "Headless" operation is also supported for truly embedded applications without keyboard/monitor/mouse attached. In the headless mode, the eInstrument-PC can be remotely controlled and accessed over Ethernet.

XMC IO Sites

Dual XMC IO module sites enable the eInstrument-PC to be configured with a wide variety of IO modules. The XMC sites are for PCI Express mezzanine cards conforming to VITA 42.3 standard, which are 75 x 150 mm modules (IEEE 1386). Each module site has a cooling fan mounted directly under the module.

XMC Modules for IO

- Flexible, modular IO
- Industry-standard VITA 42.3
- PCI Express with up to 1 GB/s transfer rates
- X6 modules: SDR, high speed analog with Virtex6 FPGA
- X5 modules: IF Rx, Tx, GSPS A/D with Virtex5 FPGA
- X3 modules: Analog and digital IO with FPGA
- Industry-standard, multi-vendor

Innovative offers two lines of XMC IO modules: the X3 and X5 families. The X3 and X5 module families off a range of analog performance mated to high performance FPGA computing cores, with the X5 family featuring the Xilinx Virtex5 and the X3 using the Xilinx Spartan3 family. Innovative's Velocia architecture data packet system allows these modules to stream data continuously to system memory at rates up to 1 GB/s – making the eInstrument-PC well suited for data logging and playback functions.

Special features support Innovative X3, X5, and X6 module families in the eInstrument-PC for simultaneously sampling, triggering, controls and private inter-module communications. System triggers and matched clocks from an on-card PLL provide simultaneously sampling for the two modules. X6/X5 modules can communicate over private Rocket IO links at

over 1 GB/s in each direction for real-time applications demanding low latency and deterministic performance. Each X3 module has J16 interface also has 20 single-ended connections to the IO Mezzanine for custom applications, X6/X5 modules have up to 38 connections to the IO Mezzanine directly connected to the module FPGA.

Triggering and Sample Clocks

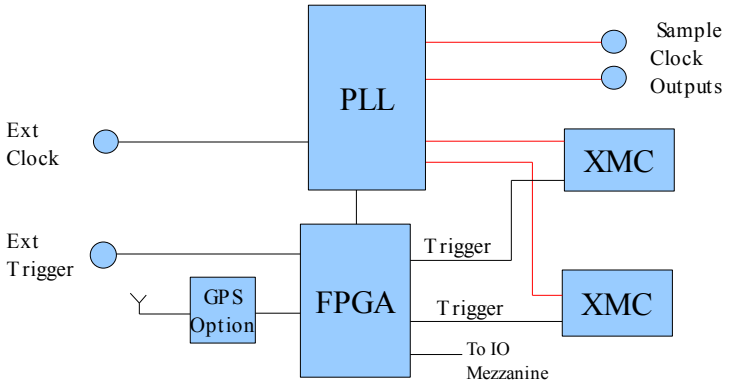
The eInstrument-PC has unique clocking and triggering features for the XMC modules. Each module receives two triggers from the Application FPGA and two clock inputs through its J16 connector. Innovative X3 and X5 modules can use these to support simultaneous sampling and unique trigger scenarios using the Application FPGA.

Sample clocks for the XMC modules can be generated using an on-card PLL or from an external clock input. The PLL can use either the external clock input or an GPS-disciplined clock as a reference. The GPS-disciplined clock allows multiple, remote instruments to sample simultaneously and act cooperatively. Position and time data is also available from the GPS when installed. A precision GPS option using Trimble Mini-T GPS has exceptionally low phase noise and accuracy.

Remote Operation

eInstrument-PC can be operated using Ethernet as a remote computer or embedded instrument. For pure embedded operation, the eInstrument-PC can operate "headless" without monitor, keyboard or mouse. The system boots from a SATA SSD or HDD.

Sample Controls and Clocking



Application FPGA

The Application FPGA allows the eInstrument-PC to be customized for many IO functions, such as triggering and control features. The FPGA is a PCI bus peripheral to the COM Express CPU. New functions can added to the system as PCI devices by adding them to the FPGA design. FPGA logic is provided in the FrameWork Logic tools, which includes the standard functionality that can be modified or used as an example.

The FPGA device is a Xilinx Spartan3E, 250K gate device. The logic is loaded from an on-card ROM that is field reprogrammable. Development uses a Xilinx USB JTAG cable and Xilinx ISE development tools (free download at www.xilinx.com).

IO Mezzanine Expansion

The eInstrument-PC can be expanded using the IO Mezzanine. The IO Mezzanine has 48 connections to the application FPGA, and HD audio port, and 38 connections to each XMC J16 connector. The IO Mezzanine is used to provide application-specific rear connectors and is large enough to integrate IO buffers and other logic.

The HD audio port provides support for standard PC sound ports functions on the IO mezzanine card.

Innovative offers an application mezzanine that breaks out all XMC and FPGA IO to connectors and has an HD audio port. Mechanicals and schematics for the IO Mezzanine are available for design support.

Software Tools

Software development tools for the eInstrument-PC provide comprehensive support application development including device drivers, peripheral configuration and control, and utilities that allow developers to be productive from the start.

eInstrument-PC

Software classes provide C++ developers a powerful, high-level interface to the system devices that makes system integration and achieving real-time, high speed data acquisition easier.

Software for data logging and analysis are provided with every Innovative X3 and X5 module. Data can be logged to system memory at full rate or to disk drives at rates supported by the drive and controller. Triggering and sample rate controls are provided to support data acquisition applications without writing code. Innovative software applets include *Binview* which provides data viewing, analysis and import to MATLAB for large data files.

Support for MS Visual C++ is provided. Supported OS include Windows, Linux and VxWorks. For more information, the software tools User Guide and on-line help may be downloaded.

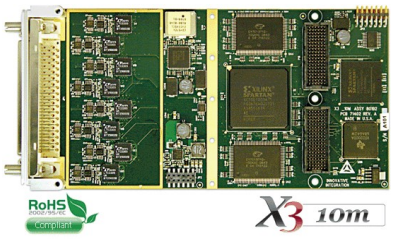
Logic Tools

Customized IO interfaces, triggering and other unique features may be added to the eInstrument-PC by modifying the FPGA logic. The FrameWork Logic tools provide support for VHDL/Verilog developments. Application logic can be modified by building upon the Innovative components for hardware interfaces and system functions. Each design is provided as a Xilinx ISE project with VHDL source for top level logic with a ModelSim testbench illustrating logic functionality.

XMC Modules

Plug XMC modules into the eInstrument-PC to build your custom, turnkey embedded instrument. Innovative Integration offers an array of ultra-performance, PCI Express XMC modules to create your solution.

Innovative X3, X5, and X6 XMC module families feature analog and digital IO with FPGA computing cores on high performance PCI Express modules. The FrameWork Logic development tools allow you to design in MATLAB and VHDL and rapidly implement high speed signal processing on the XMC.

X5 Module Family **Xilinx Virtex6** **LX240T/SX315T/SX475T** **2GB/s PCIe** **4GB DRAM**	**X5 Module Family** **Xilinx Virtex5 SX95T** **1GB/s PCIe** **512MB DRAM** **8MB QDR SRAM**	**X3 Module Family – Multi-channel IO with FPGA** **Analog/Digital IO** **Xilinx Spartan3A DSP 1.4 Mgate** **PCI Express** **4 MB SRAM**
		

See the selection of XMC IO and FPGA modules at

http://www.innovative-dsp.com/by.php?cat=FormFactor&type=5&sort=Type

eInstrument-PC

IMPORTANT NOTICES

Innovative Integration Incorporated reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to Innovative Integration's terms and conditions of sale supplied at the time of order acknowledgment.

Innovative Integration warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with Innovative Integration's standard warranty. Testing and other quality control techniques are used to the extent Innovative Integration deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Innovative Integration assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using Innovative Integration products. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

Innovative Integration does not warrant or represent that any license, either express or implied, is granted under any Innovative Integration patent right, copyright, mask work right, or other Innovative Integration intellectual property right relating to any combination, machine, or process in which Innovative Integration products or services are used. Information published by Innovative Integration regarding third-party products or services does not constitute a license from Innovative Integration to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from Innovative Integration under the patents or other intellectual property of Innovative Integration.

Reproduction of information in Innovative Integration data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice.

Innovative Integration is not responsible or liable for such altered documentation. Resale of Innovative Integration products or services with statements different from or beyond the parameters stated by Innovative Integration for that product or service voids all express and any implied warranties for the associated Innovative Integration product or service and is an unfair and deceptive business practice. Innovative Integration is not responsible or liable for any such statements.

For further information on Innovative Integration products and support see our web site:

www.innovative-dsp.com

Mailing Address: Innovative Integration, Inc.

2390A Ward Avenue, Simi Valley, California 93065

Copyright ©2007, Innovative Integration, Incorporated

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP