

20+ YEARS OF INDUSTRY LEADERSHIP

VTI IS AT THE CORE OF VIRTUALLY EVERY MAJOR ATE TESTER

VTI's signal switch/measure and control components are employed worldwide in a broad spectrum of applications for aerospace, defense, telecommunications, test and measurement, contract manufacturing, automotive, medical, and commercial functional test.

VTI presides over the VXIbus consortium, co-founded the LXI standard, and is an active member of many other consortiums that drive test and measurement industry standards. Our commitment to long-term open-platform standards has enabled system integrators to develop common ATE systems that are not impacted by the effects of obsolescence using standard products that are designed to maintain active production status in excess of 15 years.

The EX1200 is our next generation family that leverages our reputation for delivering innovative, modular high-density designs with common hardware and software architectures that can be leveraged throughout the life cycle of a product.

Leading Supplier of
Data Acquisition
Hardware and Software

INDUSTRY LEADING DATA ACQUISITION AND PRECISION
INSTRUMENTATION PROVIDER
GLOBALLY RANKED 6TH BY FROST & SULLIVAN
WORLDWIDE SALES, SERVICE & SUPPORT

Design and Deliver Precision
Modular Instrumentation and
Data Acquisition Systems

ELECTRONIC TEST
EMBEDDED ELECTRONIC APPLICATIONS
MECHANICAL / ENVIRONMENTAL MONITORING & TEST

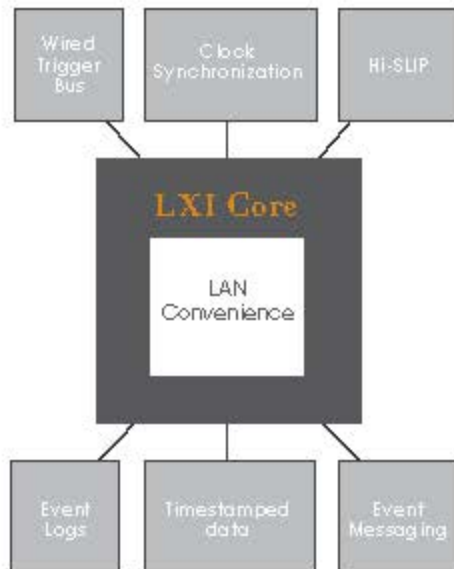
Serve High Reliability Markets
Where Measurement
Performance is Critical

MILITARY / AEROSPACE
ENERGY / POWER GENERATION
HIGH-END CONSUMER GOODS AND MEDICAL DEVICES

Industry Recognition from
Peers and Customers



LXI – The T&M Standard for Ethernet



LXI EXTENDED FUNCTIONS

In 2005, VTI cofounded LXI[®], an industry standard for Ethernet-based test instrumentation, and is also the industry leader in open platform switching solutions. LXI stands for LAN eXtension for Instrumentation. It extends on traditional LAN, adding instrument interoperability requirements, timing and synchronization options, and enhanced performance, that makes it ideal as an instrumentation platform.

The EX1200 family incorporates LXI core technology as well as optional extended function capabilities, to take full advantage of the benefits the specification offers. The EX1200 family's powerful synchronization and triggering capabilities provide the confidence that it can be integrated within any LXI, GPIB, PXI or VXI hybrid system

- Distributed switching and measurement systems over LAN
- Synchronized measurement data to IEEE 1588 precision
- Highly deterministic hardware-based triggering using the LXI Wired Trigger Bus
- Protection against PC bus obsolescence
- Assurance of multi-vendor instrument interoperability
- Scalable solutions that optimize rack space
- LAN eXtensions for Instrumentation

OVERVIEW

The EX1200 product family is a modular and scalable series of multifunction switch/measure units that can be configured to address a variety of applications in the mechanical data acquisition and electronic test environments.

THIS FAMILY CONTAINS THE FOLLOWING CORE COMPONENTS:

MAINFRAMES

PLUG-IN CARDS

ACCESSORIES AND CONNECTIVITY

Mainframes

- PROVIDING POWER TO THE PLUG-IN CARDS
- ANALOG BUS FOR ROUTING MEASUREMENTS FROM PLUG-IN CARDS TO DMM
- A SHARED COMMUNICATION BUS AND SYSTEM CLOCK
- SYNCHRONIZATION

Slots for inserting plug-in cards for specific functionality.

LXI wired trigger bus for precision synchronization with other instruments.

5-lane analog bus capable of routing signals up to 300 V, 3 A internally to the DMM for measurement.

Optional 6.5 digit DMM capable of measuring DCV, ACV, DCI, ACI, 2W Ω , 4W Ω , temperature transducers and frequency.



LXI interface allows users to control instrument and acquire data using Ethernet

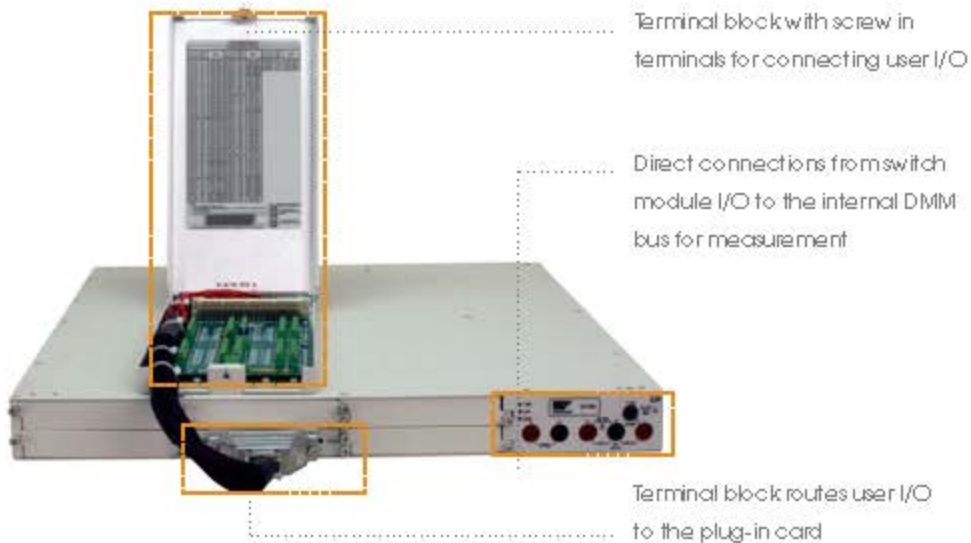
Plug-in Cards

- GENERAL PURPOSE AND MULTIPLEXER SWITCHING 300 V, 3 A
- POWER SWITCHING UP TO 16 A
- HIGH VOLTAGE SWITCHING UP TO 1000 V
- RTD SIMULATOR
- COMPARATOR/THRESHOLD DETECTOR
- RF/MICROWAVE SWITCHING
- SOURCES / TACHOMETER / COUNTERS
- DIGITAL I/O



Robust I/O Interface

- CONNECTIVITY OPTIONS GIVE USERS CONVENIENT AND EASY METHODS TO CONNECT THE I/O TO THE INSTRUMENT



A Single, Modular, Scalable Solution

Internal 5-wire bus routes directly to DMM
1/2 rack, 1U with 2 slots



EX1202-Front View

Robust connectors provide durable interface

Full-featured 6.5 digit DMM
Full rack, 1U with 6 slots

Modules plug in from the front – minimizes system wiring



EX1206A with optional DMM

Internal bus extension
Digital alarm outputs
LAN/LXI status LEDs

Standard LAN connectivity

8-line LXI Wired Trigger Bus –
precision hardware handshaking



EX1206A-Rear View

Full rack, 3U with 16 slots



EX1208A with optional DMM

Full rack 8U with 14 slots

Integrated mass interconnect receive on plug-in cards

Access points in rear to interface with I/O



EX1214-ICA

High-Density Switching and Data Acquisition Systems

APPLICATIONS

- High-performance switching for ATE, DC to 26.5 GHz
- Power supply switching
- Temperature monitoring (RTD, thermocouple, thermistor)
- Automotive ECM testing
- High voltage monitor
- Data logging applications
- Cable/harness testing
- Battery test
- RTD/sensor simulation
- White Goods Testing

HIGHLIGHTS

- Modular, scalable architecture in half and full rack 1U, 3U and 8U versions provides low cost-per-channel across a wide range of channel count
- Small footprint for switching/scanning applications with up to 576 2-wire channels in 1U
- Optional EXLab "Set Up and Run" software simplifies data acquisition and analysis
- Measurement support for all thermocouple types, RTDs, and thermistors with built-in cold junction compensation
- Scan list architecture, tightly synchronized with internal 6.5 digit DMM, increases test throughput
- Analog and digital plug-in modules provide control capability of external devices
- Multiple calibration sets yield more accurate data across temperature range (up to eight per module)
- LXI communication interface eliminates platform obsolescence and support cost concerns
- Tightly synchronized measurements in a distributed architecture using IEEE 1588
- Highly deterministic handshaking using the LXI Wired Trigger Bus
- Web-based access for monitoring and control of devices, from anywhere in the world, using any web-enabled device



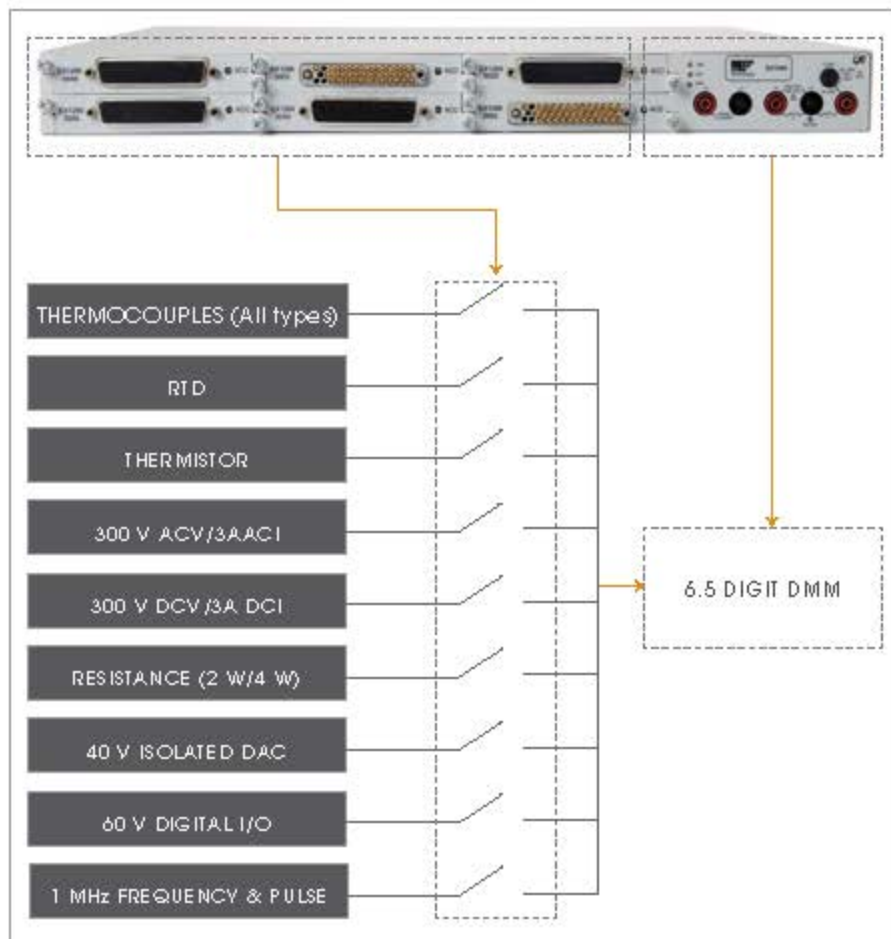
RELIABLE DATA FIRST TIME EVERY TIME

Data Acquisition

SWITCH/MEASURE AND CONTROL FOR DATA ACQUISITION

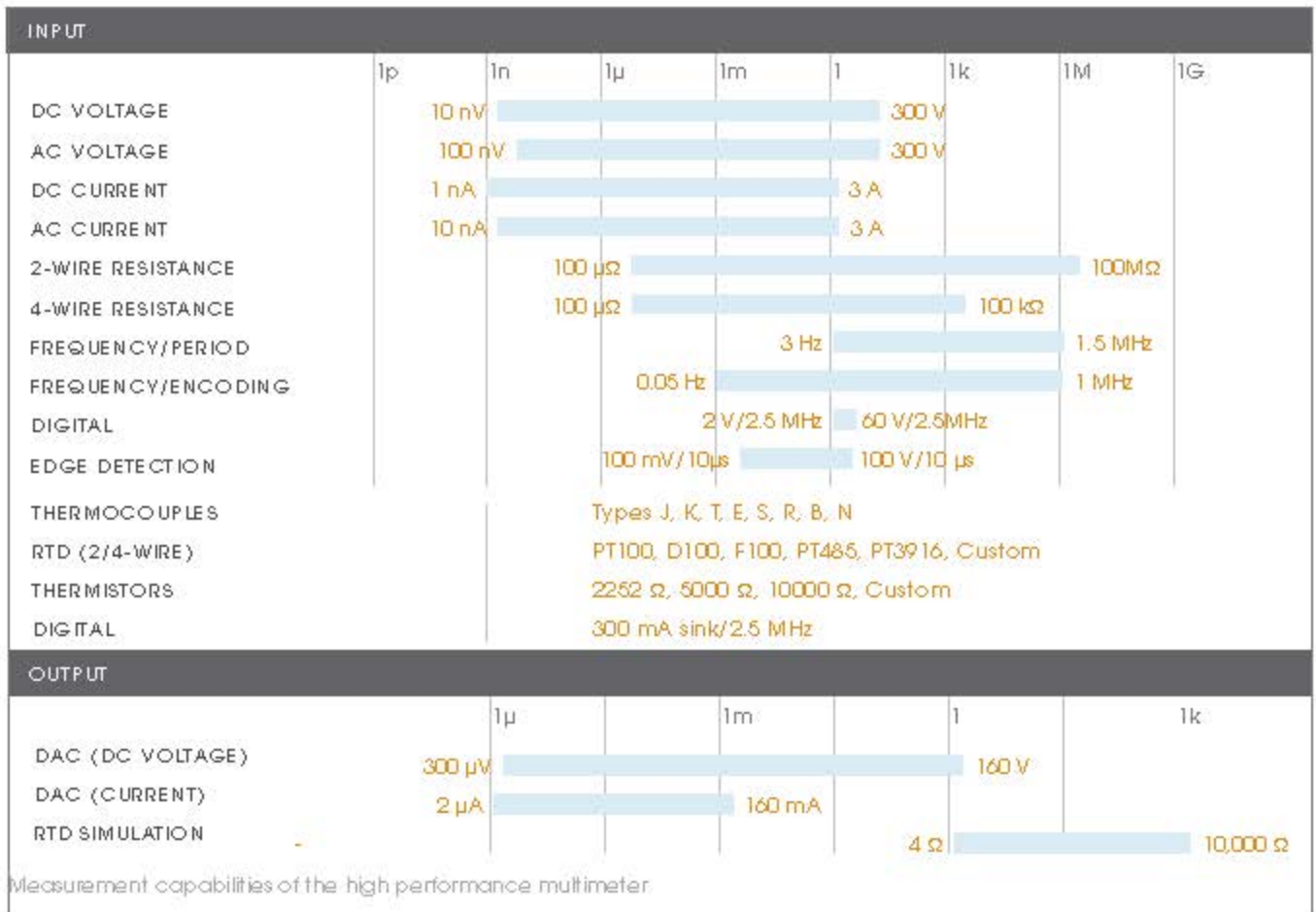
When installed with the optional 6.5 digit DMM, the EX1200 family can be configured as a cost-effective, high-density, scanning measurement and control instrument capable of acquiring data from thermocouples, RTDs, thermistors, and voltage/current sensors at rates up to 1000 samples per second.

Plug-in switch/multiplexer modules are used to expand the number of channels that can be scanned in a single system. Additional plug-in modules extend the capabilities of this instrument for data acquisition by adding precision analog and digital outputs for controlling external devices, as well source/tach for measurements on rotating machinery.



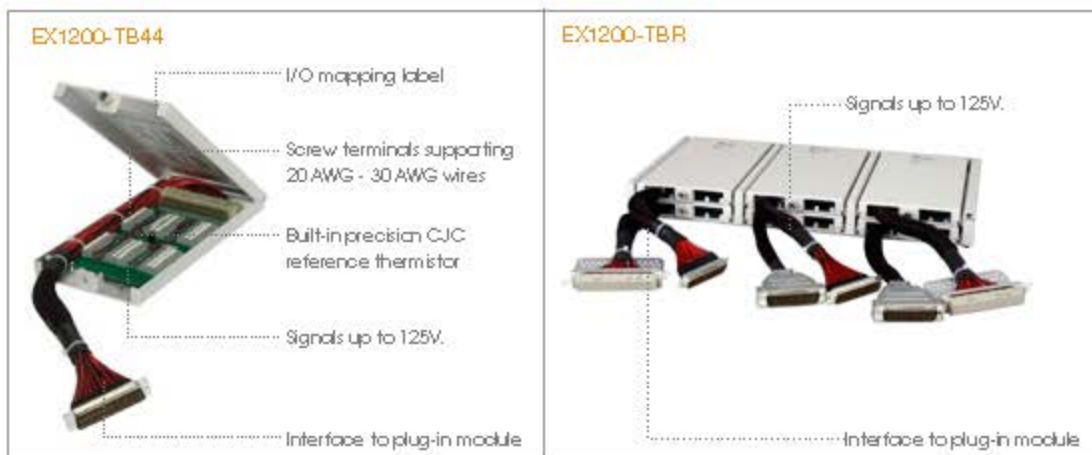
EX1200 SERIES

MEASUREMENT CAPABILITY



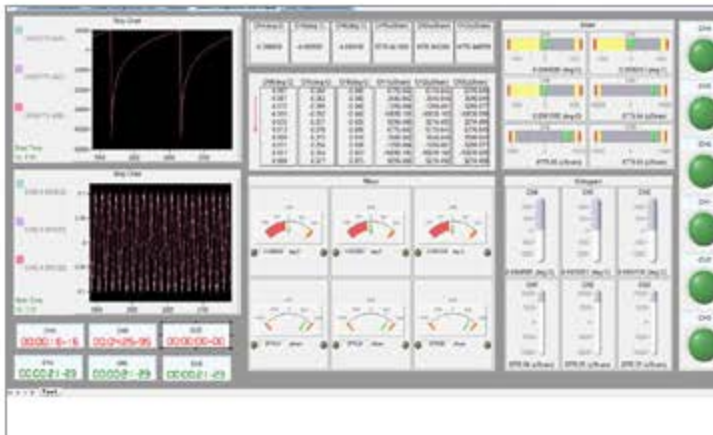
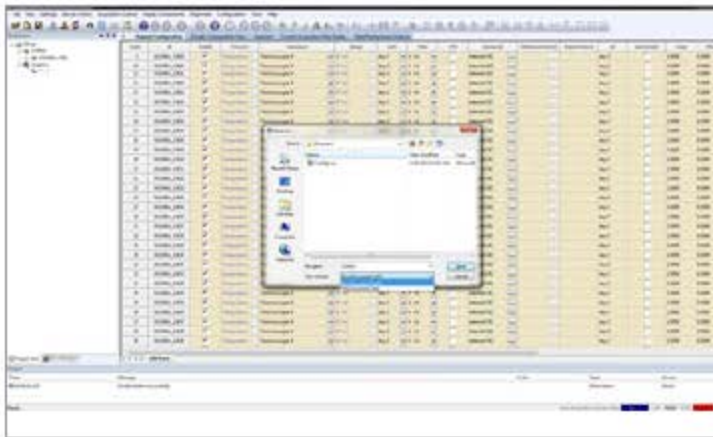
TERMINAL BLOCKS

Terminal blocks provide wired cable assemblies with screw terminal breakout points that allow users to probe connections between instruments.



RELIABLE DATA FIRST TIME EVERY TIME

Powerful Easy to Use Turn-key Software



EXLab

SET UP AND RUN

The EX1200 series is supported by the popular EXLab turn-key software package. The EXLab's intuitive GUI significantly shortens time-consuming test setup and configuration. Test engineers can begin monitoring, recording, and analyzing data within minutes.

With EXLab and the EX1200 family, engineers can design a mixed-signal distributed measurement system that includes voltage, thermocouple, RTD, and digital inputs.

- Wide range of graphical displays to generate customized views of multiple channels
- Simultaneously Record and store time-stamped data in open data formats
- Easy instrument discovery and connectivity on startup
- Save and import configurations for repeat tests
- Easily configure alarms and triggers
- Simplified options for timing and synchronization
- Self-calibration routines accessible in software
- Calculated and virtual channels supported

Powerful Easy to Use Turn-key Software

EASY-TO-USE GRAPHICAL CONTROL

The EX1200 series is delivered with an embedded web interface that provides virtual monitoring and control of all switches and instruments without the need for any third-party software.

The web interface is accessible from any web-enabled device, including smart phones and tablets, and provides easy to use tools for test sequencing and scanning. Power on your instrument and start taking data in less than a minute.



BUILT-IN TEST SEQUENCING

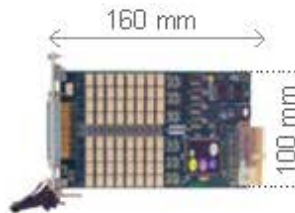
A powerful embedded application dedicated to scanning measurement and control is provided. Each measurement channel can be configured independently with pass/fail limits that can be evaluated on the fly.

Stimulus and switch settings can be modified as part of the test sequence and input channels can be measured to verify how they respond to these changes. This robust utility minimizes processor overhead and test execution time.



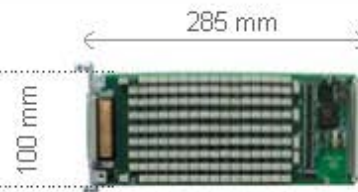
ATE Solutions

TYPICAL PC-BASED 2 A MATRIX



Dual 4 x 8; 64 two-wire crosspoints
25 MHz bandwidth

LXI-BASED EX1200-4003 2 A MATRIX



Dual 4 x 16; 128 two-wire crosspoints
45 MHz bandwidth

HIGH DENSITY SWITCHING, INSTRUMENTATION AND I/O

The EX1200 family is the highest density switch and I/O instrument on the market with the ability to mix low-level, power, and RF switch modules in a single mainframe.

This scalable family of products is designed to leverage capital investments in one common hardware and software platform that can be used in development, manufacturing, and field service.

Mix and match a variety of modules to build a comprehensive signal switching subsystem that can be supplemented with precision analog and digital I/O modules.

DON'T COMPROMISE DENSITY FOR PERFORMANCE

Typical switch cards that conform to the 3U Eurocard footprint (e.g. PXI) have a limited amount of available working space and manufacturers are often forced to make design trade offs between density and performance.

To achieve higher channel counts on a PXI card, smaller relays are tightly packed on a switch module. This puts signal carrying traces closer to one another and limits the channel-to-channel crosstalk immunity as well as current carrying capacity.

EX1200 series switching modules offer nearly double the available working space and increased channel count capacity to ensure the highest degree of signal integrity in the same vertical footprint as PXI.

For lower density switching applications, VTI also offers a comprehensive family of performance PXI Express switch modules.

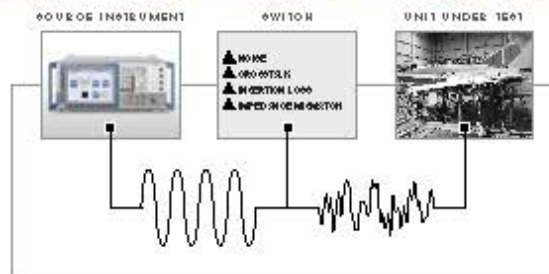
ATE Solution

TREATING THE SIGNAL SWITCH IN ATE AS AN INSTRUMENT

A key factor that differentiates VTI Instruments from competitors is that we view signal switching subsystems as precision instruments and not just a collection of relays on a card. The quality of a switch is not determined by what it does, rather by what it doesn't do; the ideal switch instruments transmit signals exactly as they come in, without attenuating, adding noise, or reducing signal integrity in any way.

With years of experience in designing precision switch instruments and a widespread install-base in virtually every major ATE system world-wide, VTI Instruments has proven that, when it comes to signal transparency, the performance offered by our switch cards is unmatched.

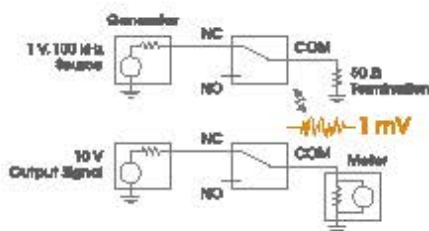
SWITCH SYSTEMS THAT LACK SIGNAL TRANSPARENCY DESTROY SIGNAL INTEGRITY



WHY INVEST IN A 6.5 DIGIT DMM WHEN 1.5 DIGITS CAN BE LOST IN SWITCH NOISE?

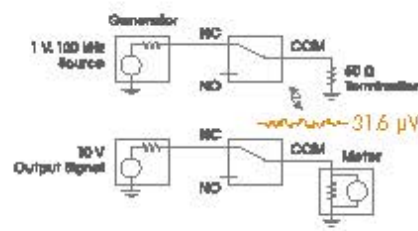
TYPICAL PC-SWITCH CARD

- -60 dB crosstalk @ 100 kHz
- 1 V aggressor adds 1 mV of noise to 10 V signal
- >30x error when compared to higher integrity switch card
- 1.5 digits are lost off a measurement instrument due to the crosstalk

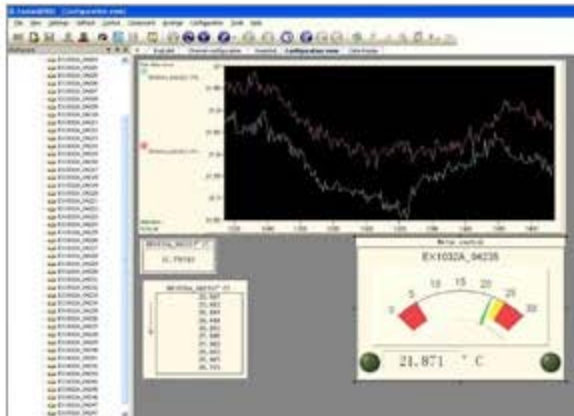


TYPICAL VTI SWITCH CARD

- -90 dB crosstalk @ 100 kHz
- 1 V aggressor adds only 31.6 μ V noise to 10 V signal
- Maximize full range of measurement instrument capability



Open Software – Expedite System Readiness



THE MOST SIGNIFICANT INVESTMENT OF ANY AUTOMATED TEST PROJECT RESIDES IN THE SYSTEM SOFTWARE. VTI'S COMMITMENT TO DELIVERING OPEN ARCHITECTURE SOLUTIONS EXTENDS TO SOFTWARE UTILITIES AND TOOLS THAT REDUCE DEVELOPMENT TIME WHILE MAXIMIZING THE FLEXIBILITY TO CHOOSE THE APPLICATION DEVELOPMENT ENVIRONMENT.

FLEXIBLE APPLICATION PROGRAMMING OPTIONS

Every EX1200 series module is delivered with an application programming interface (API) that conforms to industry standard IVI specifications.

The IVI drivers can be used directly in the most common application development environments such as LabVIEW™, LabWindows/CV™, C++ and Visual Basic. The EX1200 drivers allow a programmer to :

- Achieve faster development time through system wide path-level programming
- Plan routine maintenance by automatically tracking relay closures
- Precisely synchronize distributed measurements through IEEE 1588
- Use the LXI Wired Trigger Bus for highly deterministic hardware handshaking
- Auto-instrument discovery using NHMAX™ and Agilent Connection Expert™

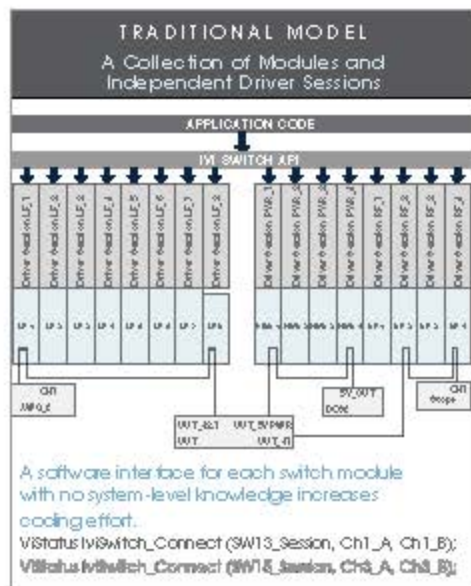
OPERATING SYSTEM INDEPENDENCE

VTI's innovative approach to driver development provides system developers with true OS independence without sacrificing the convenience that instrument drivers deliver.

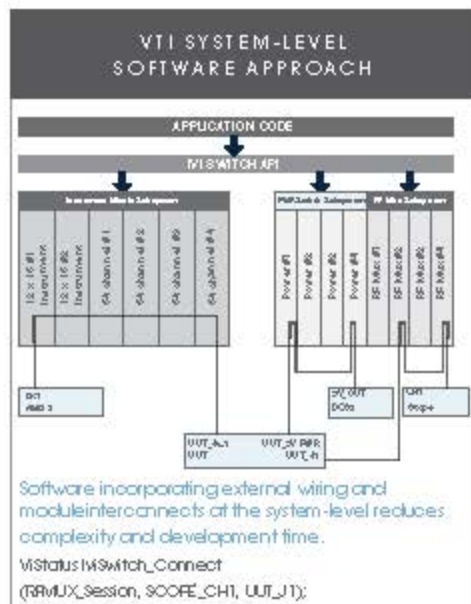
An IVI-like API can be imported into Linux® and other operating systems. The intuitive APIs simplify programming, making low-level coding unnecessary to access the full capability of the instrument.

BUILT-IN PATH-LEVEL SWITCH CONFIGURATOR

System-level (not just card level) I/O can be logically named such that an entire path consisting of multiple relays can be connected with a single function call. On-board intelligence ensures that there are no conflicts with shared resources. With the EX1200 family there is now no need for expensive switch configurator utilities.



vs



CONFIDENCE CHECKING

Internal feedback provides assurance of relay closure

EXTENSIVE TRIGGERING

Extensive hardware and LAN-based handshaking with other system devices increases test throughput by limiting communication with a host PC.

AUTOMATIC SCANNING

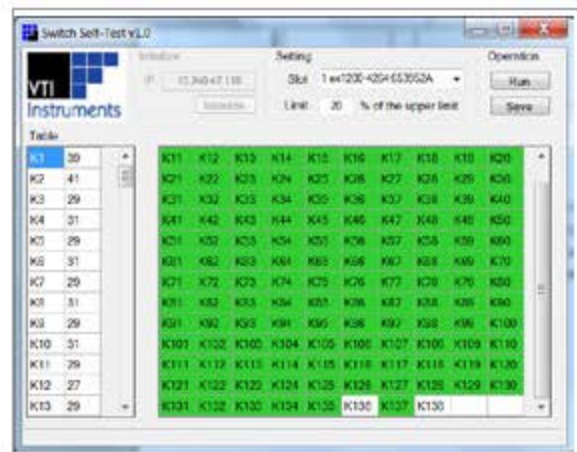
Predefined channel lists can be stored on-board to simplify programming setup and reduce test execution time.

SAFETY INTERRUPT

This failsafe feature forces all relays to a default state in the event of a fault condition. This allows hazardous voltages to be automatically removed from the interface panels.

PROGRAMMABLE TIMING DELAY

Delays can be programmed into the modules to account for the settling of other system devices. When used with triggers and scan lists, a highly deterministic measurement system can be easily configured.



RELAY HEALTH MONITORING

A relay odometer keeps track of the number of times a relay has been actuated and can be used to predict routine maintenance. Switch self-test is supported on select switch instruments and tracks path resistance across relays to monitor relay health.

Connectors and Cabling

PROTECTING SIGNAL INTEGRITY END-TO-END

The performance of a switch system goes beyond just the relays and the switch card PCB. Everything in the signal path, including the cabling and connectors from the DUT and to the measurement instruments, can add noise and degrade the signal.

VTI optimizes the system-level performance by providing easy to use connectivity options that minimize signal loss.

TYPICAL VTI HIGH-DENSITY CONNECTOR



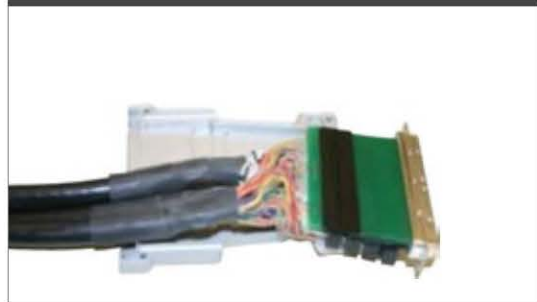
CRIMP/POKE SIMPLIFIES CABLE
CONSTRUCTION INCREASES DURABILITY

WIRES TERMINATE DIRECTLY INTO
CONNECTOR, MAXIMIZING PERFORMANCE

22 AWG WIRE ALLOWS FOR 2 A CARRY

INCREASED PIN SEPARATION EXTENDS
VOLTAGE RATING TO 300 V

TYPICAL PC HIGH-DENSITY CONNECTOR



PC BOARD REQUIRED FOR SUCCESSFUL
TERMINATION

NOT RECOMMENDED TO BE BUILT BY END USER

ADDITIONAL CONNECTION POINT INCREASES
INSERTION LOSS AND ADDS ANOTHER POINT
OF FAILURE

MAXIMUM 28 AWG WIRE RESTRICTS CURRENT
CARRYING CAPABILITY TO 1 A CARRY

MINIMAL PIN SEPARATION LIMITS SWITCHED
VOLTAGE TO 100 V

Connectors and Cabling

CONNECTORS AND ACCESSORIES

For each product in the EX1200 series, VTI Instruments offers a range of connectivity options that give users different options to interface to the instruments. There are four basic types of connectivity options:



DISCRETE ACCESSORIES

PRE-ASSEMBLED CABLES

TERMINAL BLOCKS

INTERFACE TEST ADAPTERS

DISCRETE ACCESSORIES

VTI Instruments offers discrete components for all its connectors that allow users to build their own cable assemblies. This includes:



MATING CONNECTORS

STRAIN RELIEF ACCESSORIES

CRIMP TOOLS

CRIMP PINS

TEFLON/PVC COATED WIRES

INSERTION AND EXTRACTION TOOLS

HOODS/COVERS

NYLON SHROUDS

Connectors and Cabling

PRE-ASSEMBLED CABLES

VTI Instruments offers fully assembled cables that have mating connectors on one end and loose wires on the other end. Different options for cable length are available for many of the connectors.

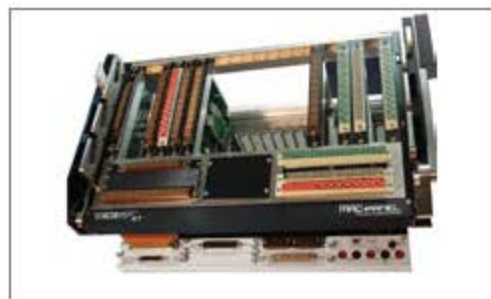


70-0363-506	41-pin, Unterminated Cable Assembly, 3 ft
70-0363-502	44-pin, Unterminated Cable Assembly, 3 ft
70-0363-501	104-pin, Unterminated Cable Assembly, 3 ft
70-0363-505	160-pin, Unterminated Cable Assembly, 3 ft

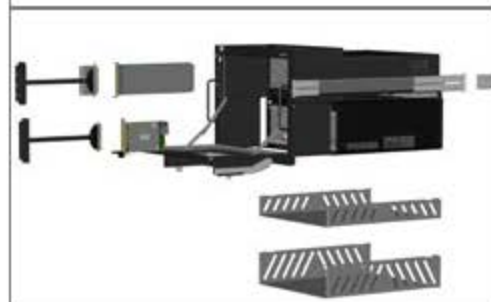
* To match plug-in card to connector type, see table on page 20

INTERFACE TEST ADAPTERS

Interface test adapters are used in automated test stations to interface between test instruments in the test rack and the device under test. VTI offers pre-configured mainframes with interface receivers and all associated cabling and wiring. Please refer to VTI's creatEX series data sheets.



CMX24-XT	Integrated 18-slot PXI Express/EX1206A mainframe with pull-through receiver
CMX34-G-18	Integrated 18 slot PXI Express/EX1208A mainframe, with cabled receiver



PXIe Switching

PXI EXPRESS SWITCHING

For applications where the channel counts for signal switching are not large, VTI offers the SMX series - a broad range of "precision instrumentation grade" switch modules on the PXIe platform.

The SMX series is an extension to the EX 1200 series, and can be controlled using the same instrument drivers. This allows smaller systems within PXI to be upgraded, or larger systems to be downsized very easily.



Unlike traditional PXI switch modules available in the market that pack relays onto cards to maximize density while ignoring performance, SMX series is designed with VTI's core philosophy of high-density without compromising on performance.

- Best-in-class signal switching performance on PXI/PXIe form factor
- PXIe as opposed to PXI - mitigates obsolescence and is based on faster, newer, and forward looking instrumentation platform
- Relay health monitoring and self-test within matrix cards
- Software benefits - path level switching, confidence checking, and safety interrupts

PXI EXPRESS SWITCH MODULES

SMX-3276	76 channel, dual (1x38) 2-wire, 300V/2A multiplexer
SMX-4410	160 crosspoint, four (4x10), 2-wire, 300V/2A matrix
SMX-2002	12-channel, 16A, Form C (SPDT) switch
SMX-6001	80-channel, 2A, Form A (SPST) switch
SMX-6301	Four SP4T multiplexer tree, 3 GHz
SMX-7300	DC to 26.5 GHz, microwave switch carrier and relay driver

EX1200 Series Quick Reference

MAINFRAMES

Model	Slots	Note	Size	LAN Specifaion	Backplane Extension Lines
EX1202	2		Half Rack, 1U	LXI 10/100T	5
EX1262	2	With 6.5 digit DMM	Half Rack, 1U	LXI 10/100T	5
EX1206A	6		Full Rack, 1U	LXI 10/100T	5
EX1208A	16		Full Rack, 3U	LXI 10/100T	5
EX1214-ICA	14	6U slots with integrated mass interconnect receiver	Full Rack, 8U	LXI 10/100T	6

SWITCHES

Model	Channels	Configuration	Switched V/A	Switched Power (max)	Bandwidth (-3 dB)
DISCRETE					
EX1200-2001	20	SPST	250 VAC/300 VDC, 16 A	480 W, 4000 VA	40 MHz
EX1200-2002	12	SPDT	250 VAC/300 VDC, 16 A	480 W, 4000 VA	40 MHz
EX1200-5001	80	SPST	300 V, 2 A	60 W, 125 VA	80 MHz
EX1200-5002	32	SPDT	300 V, 2 A	60 W, 125 VA	40 MHz
EX1200-5004	32	SPDT	250 VAC/110 VDC, 5 A	150 W, 1250 VA	40 MHz
EX1200-5006	40	SPST	300 V, 2 A	60 W, 125 VA	80 MHz
EX1200-5007	12	SPDT	300 V, 2 A	60 W, 125 VA	80 MHz
MULTIPLEXER					
EX1200-2007A	48	2x (1x24) 1-wire, 2x (1x12) 2-wire	1000 VDC/700 VAC, 2 A	25 W, 25 VA	60 MHz
EX1200-2008H	30	3x (1x10) 1-wire	1000 VDC/700 VAC, 2 A	25 W, 25 VA	60 MHz
EX1200-2087	8	Mux; 2 x (1 x 2) 2-wire	1000 V/1 A	25 W/25 VA	400 kHz
EX1200-3001	128	8x (1x16) 1-wire, 8x (1x8) 2-wire, 4x (1x8) 4-wire	300 V, 2 A	60 W, 125 VA	50 MHz
EX1200-3048	48	2x (1x24) 2-wire, (1x24) 4-wire plus 2x 3A channels	300 V, 2 A	60 W, 125 VA	35 MHz
EX1200-3048S	48	2x (1x24) 2-wire, (1x24) 4-wire FET mux	250 V, 0.2 A	6 W, 4.2 VA	10 MHz
EX1200-3072	72	2x (1x36) 2-wire, (1x36) 4-wire	300 V, 2 A	60 W, 125 VA	40 MHz
EX1200-3096	96	2x (1x48) 2-wire, (1x48) 4-wire	240 VAC/120 VDC, 1 A	30 W, 37.5 VA	20 MHz
EX1200-3164	64	16x (1x4) 2-wire, 8x (1x4) 4-wire	300 V, 2 A	60 W, 125 VA	45 MHz
MATRIX					
EX1200-4003	128	2x (4x16) 2-wire	300 VAC/300 VDC, 2 A	60 W, 62.5 VA	45 MHz
EX1200-4128	512	(4x128) 1-wire	250 VAC/220 VDC, 1 A	60 W	10 MHz
EX1200-4264	128	2x (2x32) 2-wire	300 VAC/300 VDC, 2 A	60 W, 62.5 VA	45 MHz

EX1200 Series Quick Reference

SWITCHES

Model	Channels	Configuration	Switched V/A	Switched Power (max)	Bandwidth (-3 dB)
RF					
EX1200-6101	40	10x SP4T	250 VAC/220 VDC, 2 A	50 W 62.5 VA	1.3 GHz
EX1200-6111	20	5x SP4T	250 VAC/220 VDC, 2 A	50 W 62.5 VA	1.3 GHz
EX1200-6102	17	SPDT	250 VAC/220 VDC, 2 A	50 W 62.5 VA	1.3 GHz
EX1200-6216	32	2x (1x16)	250 VAC/220 VDC, 2 A	50 W 62.5 VA	1 GHz
EX1200-6216HV	32	2x (1x16)	500 V, 2A	10 W	250 MHz
EX1200-6301	16	4x SP4T	250 VDC/220 VAC, 2 A	60 W, 62.5 VA	3 GHz
EX1200-6301T	16	4xSP4T terminated	250 VDC/220 VAC, 2 A	60 W 62.5 VA	3 GHz
EX1200-7100	3 banks	DC-26.5 GHz switch carrier	30V/0.5 A	40 W	26.5 GHz

EX1200-ICA SWITCHES

Model	Channels	Configuration	Switched V/A	Switched Power (max)	Bandwidth (-3 dB)
EX1200-2011ICA	20	12 SPDT 5 SP4T, 2 Dual Ganged SPDT, 1 SPDT	115 VAC/28 VDC, 12 A 115 VAC/28 VDC, 25A	300 W 700 W	1 kHz
EX1200-6100ICA	14	11 SP4T, 3 SPDT	30 V, 0.5 A	10 W	1 GHz
EX1200-5111ICA	56	21 SP4T, 35 SPDT	220 VDC/250 VAC, 2 A	60 W, 125 VA	20 MHz
EX1200-4464ICA	64	64 channel 4-pole hybrid star matrix	30 V, 0.5 A	10 W	500 MHz

DIGITAL I/O

Model	Channels	Sample Rate	Memory	Iout max (Sink)	Vout max
EX1200-7500	8x 8-bit ports	2 MHz	2 MB	< 300 mA	60 V

COUNTER/MULTIFUNCTION

Model	Channels	Sample Rate	Memory	Output	Min Pulse Width
EX1200-1538	8 counter	1 MHz	256 k reading	NA	50 ns
	16 DIO	Static	NA	TTL	NA
	2 bipolar DAC	Static	NA	±10 V	NA

DMMs

Model	Mainframe	Digits (Min/Max)	Functions	Max V/I	Max Frequency (ACV)	Max Reading Rate
EX1200-2165	EX1206A	3.5/6.5	ACV, DCV, DCI, ACI, 2/4 wire RES, FREQ, TEMP	300 V/3 A	1.5 MHz	2,000/s
EX1200-2365	EX1208A	3.5/6.5	ACV, DCV, DCI, ACI, 2/4 wire RES, FREQ, TEMP	300 V/3 A	1.5 MHz	2,000/s

EX1200 Series Quick Reference

ANALOG OUTPUT/CONTROL

Model	Channels	Voltage/Current Range	Sample Rate	Max Isolation	Memory
EX1200-3604	4 V/I, 16 bit	$\pm 1/2/5/10/20$ V, ± 20 mA	500 kSa/s	200 VDC/200 VAC peak	1 Msample
EX1200-3608	8 V/I, 16 bit	$\pm 1/2/5/10/20$ V, ± 20 mA	500 kSa/s	200 VDC/200 VAC peak	1 Msample

COMPARATOR/EDGE DETECTOR

Model	Channels	Modes	Voltage Range	Min Pulse Width	Memory
EX1200-7416	16 DE/SE	Edge detect, Window, Pulse	± 10 V/100 V	1 μ s	128k events

PROGRAMMABLE LOAD

Model	Channels	Range	Switched V/A	Switched Power
EX1200-7600	1	0.5 - 1,499,999 Ω at 0.1 Ω increments	200 V/ 0.5 A	5 W

RTD SIMULATOR

Model	Channels	Accuracy	Range	RTD Types
EX1200-7008	8	± 0.1 $^{\circ}$ C	4 Ω - 6.5 k Ω	Pt-100, Pt-200, Pt-500, Pt-1000, Cu-100, Ni-100, Ni-120

BREADBOARD

Model	Type	Connectors
EX1200-7000	Prototyping	44p, 104p, 160p

TERMINAL BLOCKS*

Model	Connector compatibility
EX1200-TB44	44-pin HD D-sub
EX1200-TB104	104-pin HD D-sub
EX1200-TB160	160-pin DIN
EX1200-TB200	200-pin HD SCSI
EX1200-TBR	6-slot terminal block receiver

* EX1200 Data Sheet for more info

EX1200 Mainframe Specifications

1U MAINFRAMES			
Model	Description	Dimensions	Weight
EX1202	Two standard plug-in module slots	Half rack 1U mainframe (20.25" D, 8.61" W, 1.75" H)	4.9 lbs (2.3 kg)
EX1262	Two standard plug-in module slots plus 6.5 digit DMM	Half rack 1U mainframe (20.25" D, 8.61" W 1.75" H)	5.3 lbs (2.4 kg)
EX1206A	Six standard plug-in module slots (optional 6.5 digit DMM)	Full rack 1U mainframe (17.17" D, 17.27" W, 1.75" H)	7.1 lbs (3.2 kg)

3U MAINFRAMES			
Model	Description	Dimensions	Weight
EX1208A	Sixteen standard plug-in module slots (optional 6.5 digit DMM)	Full rack 3U mainframe (17.65" D, 16.72" W, 1.75" H)	16.2 lbs (7.4 kg)

8U MAINFRAMES			
Model	Description	Dimensions	Weight
EX1214-ICA	Fourteen 6U high-density slots	Full rack 8u mainframe (23.5" D, 23.9" W, 14" H)	57.5 lbs (26.1 kg)

General Specifications

ENVIRONMENTAL SPECIFICATIONS

OPERATING TEMPERATURE	0 °C – 55 °C
OPERATING ALTITUDE	10,000 ft (3,000 m) maximum
OPERATING HUMIDITY	5% - 95% non-condensing @ 0 °C - 30 °C, 5% - 75% non-condensing @ 30 °C – 40 °C, 5% - 45% non-condensing @ 40 °C – 50 °C (per 3.8.2 of MIL-PRF-28800F Class 3)
STORAGE TEMPERATURE	-40 °C – 70 °C
STORAGE ALTITUDE	15,000 ft (4,500 m) maximum
STORAGE HUMIDITY	5% – 95%, non-condensing

CLOCK SPECIFICATIONS

CLOCK OSCILLATOR ACCURACY	±50 ppm
SYNCHRONIZATION ACCURACY	Reports "synchronized" when < ±200 μs of the 1588 master clock
TIMESTAMP	
ACCURACY	As good as time synchronization down to 50 ns
RESOLUTION	25 ns

LXI SUPPORTED EXTENSIONS

LXI WTb, LXI Event Log, LXI Event Messaging, LXI IEEE 1588 Clock Synchronization, LXI Timestamped Data

EX1200-2165 | 2365 DMMs

6.5 Digit DMM



EX1200-2165
(for use with EX1206A)



EX1200-2365
(or use with EX1208A)

General Specifications

MEASUREMENT FUNCTIONS

MAX NON-DESTRUCTIVE INPUTS

Using external probe
Current input protection

OVERVIEW

- Modular 6.5 digit DMMs for the EX1200 mainframes
- Tightly integrated into mainframes, allowing high-speed, synchronized scanning measurements without the need for external cabling.
- Input can be routed directly to the DMM or through an internal analog bus on the backplane.
- Super fast scanning with no processor intervention required
- Scanning configuration can be saved in the DMM's non-volatile memory allowing quick recall of saved states
- Integrating ADC for with adjustable integration time depending on the level of accuracy required.
- "True RMS" AC readings
- Frequency and temperature measurements

DC voltage, AC voltage

DC current, AC current

2-wire Ω , 4-wire Ω

Temperature and Frequency

450 V

1.5kV

3A, 250 V fuse, externally accessible



DMM Specifications

6.5 Digit DMM

General Specifications

SYSTEM SPEED

FUNCTION CHANGE

DCV/DCI	9/s
4-W resistance (100 Ω , 1 k Ω)	9/s
2-W resistance (<1 M Ω)	1/s
ACV	0.4/s high filter
ACI (0.01 A and 0.1 A)	0.25/s, high filter

RANGE CHANGE

DCV/DCI	300/s
4-W resistance (100 Ω , 1 k Ω)	300/s
2-W resistance (<1 M Ω)	2/s
ACV (0.01 V to 100 V)	< 1.25/s, high filter
ACI (0.01 A and 0.1 A)	< 0.2/s, high filter

AUTO-RANGE TIME

DCV/DCI	< 30 ms
4-W resistance (100 Ω , 100 k Ω)	< 60 ms
2-W resistance (100 Ω , 100 k Ω)	< 3.0 s
ACV (0.01 V to 100 V)	< 2.0 s, high filter
ACI (0.01 A and 0.1 A)	< 4.0 s, high filter

MAX READING RATE

2,000/s

MAX INTERNAL TRIGGER RATE

2,000/s

MAX. EXTERNAL TRIGGER RATE TO MEMORY

2,000/s

DC VOLTAGE

Range	Input Resistance	Resolution			Accuracy
		6.5 digit	5.5 digit	4.5 digit	
100 mV	10 G Ω / 10 M Ω	0.01 μ V	1 μ V	10 μ V	0.0150%
1 V	10 G Ω / 10 M Ω	1 μ V	10 μ V	100 μ V	0.0060%
10 V	10 G Ω / 10 M Ω	10 μ V	100 μ V	1 mV	0.0035%
100 V	10 M Ω	100 μ V	1 mV	10 mV	0.0050%
300 V	10 M Ω	100 μ V	1 mV	10 mV	0.0055%

DMM Specifications

6.5 Digit DMM



General Specifications

DC CURRENT

Range	Input Resistance	Resolution			Accuracy
		6.5 digit	5.5 digit	4.5 digit	
1 mA	<0.1 V	1 nA	10 nA	100 nA	0.0500 %
10 mA	<0.1 V	10 nA	100 nA	1 μA	0.0500 %
100 mA	<0.6 V	100 nA	1 μA	10 μA	0.0500 %
1 A	<0.4 V	1 μA	10 μA	100 μA	0.0700 %
3 A	<0.9 V	1 μA	10 μA	100 μA	0.1000 %

AC VOLTAGE

Range	Resolution			Accuracy
	6.5 digit	5.5 digit	4.5 digit	
100 mV	100 nV	1 μV	10 μV	Frequency dependent. See manual.
1 V	1 μV	10 μV	100 μV	
10 V	10 μV	100 μV	1 mV	
100 V	100 μV	1 mV	10 mV	
300 V	100 μV	1 mV	10 mV	

AC CURRENT

Range	Resolution			Accuracy
	6.5 digit	5.5 digit	4.5 digit	
10 mA	10 nA	100 nA	1 μA	Frequency dependent. See manual.
100 mA	100 nA	1 μV	10 μA	
1 A	1 μA	10 μA	100 μA	
3 A	1 μA	10 μA	100 μA	

2-WIRE RESISTANCE

Range	Resolution			Accuracy		
	6.5 digit	5.5 digit	4.5 digit	6.5 digit	5.5 digit	4.5 digit
100 Ω	100 μΩ	1 mΩ	10 mΩ	0.1000 %	0.1500 %	0.1500 %
1 kΩ	1 mΩ	10 mΩ	100 mΩ	0.0500 %	0.0550 %	0.1000 %
3 kΩ	10 mΩ	100 mΩ	1 Ω	0.0200 %	0.0250 %	0.0400 %
10 kΩ	10 mΩ	100 mΩ	1 Ω	0.0100 %	0.0110 %	0.0250 %
100 kΩ	100 mΩ	1 Ω	10 Ω	0.0100 %	0.0100 %	0.0180 %
1 MΩ	1 Ω	10 Ω	100 Ω	0.0250 %	0.0260 %	0.0270 %
10 MΩ	100 Ω	100 Ω	1000 Ω	0.0550 %	0.1000 %	0.1200 %
100 MΩ	100 Ω	1000 Ω	10000 Ω	0.1200 %	0.1250 %	0.1300 %



DMM Specifications

6.5 Digit DMM

General Specifications

4-WIRE RESISTANCE

Range	Resolution			Accuracy		
	6.5 digit	5.5 digit	4.5 digit	6.5 digit	5.5 digit	4.5 digit
100 Ω	100 $\mu\Omega$	1 m Ω	10 m Ω	0.1040%	0.0150%	0.0150%
1 k Ω	1 m Ω	10 m Ω	100 m Ω	0.0100%	0.0100%	0.0150%
3 k Ω	10 m Ω	100 m Ω	1 Ω	0.0100%	0.0110%	0.0150%
10 k Ω	10 m Ω	100 m Ω	1 Ω	0.0100%	0.0110%	0.0150%
100 k Ω	100 m Ω	1 Ω	10 Ω	0.0100%	0.0100%	0.0150%

FREQUENCY

Range	Frequency Range	Accuracy	Offset PPM		
			6.5 digit	5.5 digit	4.5 digit
100 mV to 300 mV	3 Hz to 1.5 MHz	60 PPM	0.3	3.0	30.0

TEMPERATURE

Type	Min	Max	-100 °C	0 °C	100 °C	300 °C	500 °C	700 °C	900 °C	1100 °C	1400 °C
J	-200 °C	1200 °C	± 0.25 °C	± 0.20 °C	± 0.20 °C	± 0.25 °C	± 0.30 °C	± 0.30 °C	± 0.35 °C	± 0.45 °C	-
K	-200 °C	1372 °C	± 0.25 °C	± 0.20 °C	± 0.20 °C	± 0.20 °C	± 0.35 °C	± 0.35 °C	± 0.45 °C	± 0.55 °C	± 0.50 °C
T	-200 °C	400 °C	± 0.25 °C	± 0.20 °C	± 0.20 °C	± 0.20 °C	± 0.25 °C	± 0.35 °C	-	-	-
E	-200 °C	900 °C	± 0.25 °C	± 0.20 °C	± 0.20 °C	± 0.20 °C	± 0.25 °C	± 0.30 °C	-	-	-
S	-50 °C	1768 °C	-	± 1.00 °C	± 0.75 °C	± 0.65 °C	± 0.65 °C	± 0.65 °C	± 0.70 °C	± 0.70 °C	± 0.75 °C
R	-50 °C	1768 °C	-	± 1.00 °C	± 0.75 °C	± 0.60 °C	± 0.60 °C	± 0.60 °C	± 0.60 °C	± 0.65 °C	± 0.70 °C
B	-250 °C	1820 °C	-	-	-	± 1.65 °C	± 1.10 °C	± 0.80 °C	± 0.70 °C	± 0.65 °C	± 0.65 °C
N	-200 °C	1300 °C	± 0.40 °C	± 0.25 °C	± 0.25 °C	± 0.25 °C	± 0.30 °C	± 0.35 °C	± 0.40 °C	± 0.40 °C	-

EX1200-1538

Multifunction Counter, DAQ, and DIO



APPLICATIONS

Single frequency measurement
range from 0.05 Hz to 1 MHz

Tooth wheel RPM measurement

Measure position and speed
from quadrature encoder signal

Wide range of measurement
functions makes this ideal for
both electronic functional
test and data acquisition

FEATURES

- 8 frequency counter channels, 16 isolated digital I/O,
2 isolated DAC channels per card
- Highly stable 50 MHz, TCXO base clock along with 32-bit
counter for frequency measurement
- Counter channel accepts both analog and digital inputs
with ± 48 V differential input range eliminates need for signal
conditioning in most applications
- Programmable hysteresis and threshold levels
- Isolated digital
- Precision isolated 16-bit current or voltage source

General Specifications

FREQUENCY/COUNTER INPUTS

NUMBER OF CHANNELS

8 (analog/digital)

DIGITAL INPUT SIGNAL RANGE

TTL

ANALOG INPUT SIGNAL RANGE

± 48 V

COMMON MODE INPUT

250 V peak

SENSITIVITY

± 500 mV

THRESHOLD AND HYSTERESIS

Programmable, 1 mV step

SIGNAL FREQUENCY RANGE

0.05 Hz - 1 MHz in DC coupling mode

3 Hz - 1 MHz in AC coupling mode

MAIN TIME BASE CLOCK

50 MHz

TIME BASE CLOCK STABILITY

± 1 ppm

COUNTER TYPE

32-bit, reciprocal counting type

50 ns on digital channel

MINIMUM DETECTABLE PULSE

600 ns on analog channel

RPM MEASUREMENT RANGE

3 RPM to 90,000 RPM

SAMPLE DATA CORRELATION

IEEE 1588 timestamp

ON-BOARD MEMORY

254,000 reading

AVERAGING METHODS

Moving average and simple average

APERTURE TIME WINDOW

1 ms to 30 s (1 ms programming steps)



EX1200-1538

Multifunction Counter, DAQ, and DIO

General Specifications

FREQUENCY/COUNTER INPUTS

MAXIMUM DATA

SAMPLING SPEED

TRIGGERING

QUADRATURE MEASUREMENT

DIGITAL INPUT/OUTPUT

NUMBER OF CHANNELS

DIO INPUT SIGNAL LEVEL

LOGICAL HIGH

LOGICAL LOW

DIO ISOLATION

DIO OUTPUT SIGNALS

OUTPUT SIGNAL COMPATIBILITY

UPDATE CONTROL

DAC OUTPUTS

NUMBER OF CHANNELS

OUTPUT TYPE

OUTPUT MODE

VOLTAGE MODE RANGE

CURRENT MODE RANGE

OUTPUT RESOLUTION

ISOLATION

PROTECTION

CONNECTOR TYPE

1,000,000 samples/s (into on-board buffer)
 Software, immediate, EX1200-based DIO triggers
 Two channels to be paired for each encoder input

16

2.5 V to 60 V
 < 2.5 V

Channel-to-channel

Optically isolated solid state switch

50 mA sink/source, up to 60 V (AC/DC)

Software paced

2

Constant voltage or constant current

Static mode or dynamic mode (frequency to voltage/current conversion)

±10 V, up to 20 mA per channel

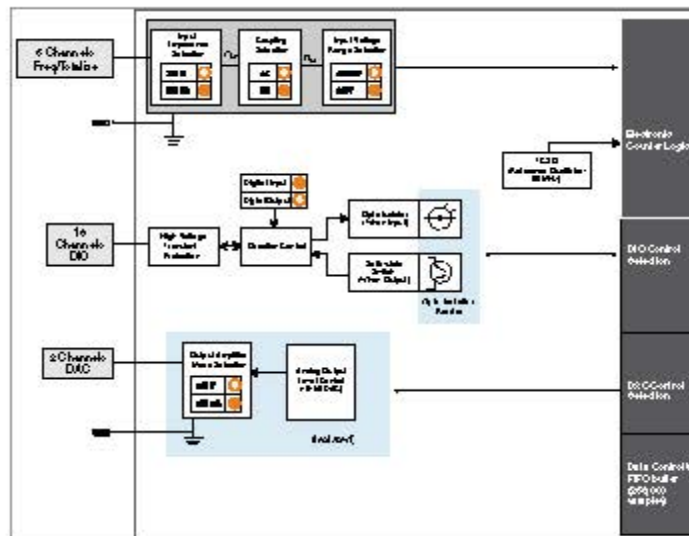
±20 mA, drive up to 250 Ω load

16-bit

Channel-to-channel, galvanic

Open and short circuit for short duration

104-pin HD D-sub



EX1200-2001 | 2002

High Power Switch Modules

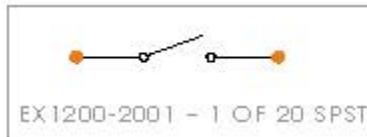


APPLICATIONS

High current/high power switching
 AC line power switching
 Switching AC or DC power supplies
 Driving relays for industrial machines
 Solenoid switching
 Automotive engine control

FEATURES

- Switch up to 16 A current - highest in its class
- Large switching capacity in a small footprint
- High breakdown voltage (1,000 V rms between open contacts)
- Failsafe interrupt detects fault conditions and opens relays to their default state. This protects the test object from damage if a fault occurs.



General Specifications

CONFIGURATION

EX1200-2001
 EX1200-2002

MAXIMUM SWITCHING VOLTAGE

(20) x SPST
 (12) x SPDT

MAXIMUM SWITCHING CURRENT

250 VAC, 300 VDC

MAXIMUM SWITCHING POWER

16A

RATED SWITCH OPERATIONS

480 W, 4000 VA per channel

MECHANICAL

1×10^7

ELECTRICAL

1×10^6 at full load

SWITCHING TIME

< 10 ms

PATH RESISTANCE

< 100 mΩ

INSULATION RESISTANCE

$> 1 \times 10^9 \Omega$

BANDWIDTH

40 MHz

CONNECTOR TYPE

41-pin



EX1200-2007A | 2008H | 2087A

High Voltage Multiplexers

APPLICATIONS

- High voltage multiplexing and scanning
- Hi-pot tests
- Switching source measure unit
- Cable breakdown test
- Power supply switching
- Power generator testing

FEATURES

- Switch signals up to 1000 V
- Large shield planes used to reduce crosstalk and voltage spikes to adjacent channels
- Failsafe interrupt detects fault conditions and opens relays to their default state. This protects the test object from damage if a fault occurs.
- EX1200-2087A features Continuous Relay Self-Monitoring that continuously checks for welded relay contacts and generates an interrupt if detected. This protects the test object by preventing unintentional routing of power.

General Specifications

CONFIGURATION

- EX1200-2007A
- EX1200-2008H
- EX1200-2087

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM CARRYING CURRENT

MAXIMUM SWITCHING POWER

RATED SWITCH OPERATIONS

MECHANICAL

ELECTRICAL

SWITCHING TIME

PATH RESISTANCE

INSULATION RESISTANCE

BANDWIDTH

- 2007A, 2008H
- 2087A

CONNECTOR TYPE

RELAY TYPE

- Dual 1 x 12 (2-wire)
- (3) x 1 x 10 (1 wire)
- (8) SPDT with BT

1000 VDC/700 VAC RMS

1 A

2A

25 W (resistive load)

5×10^8

1×10^6 at full load

< 1 ms

< 1 Ω

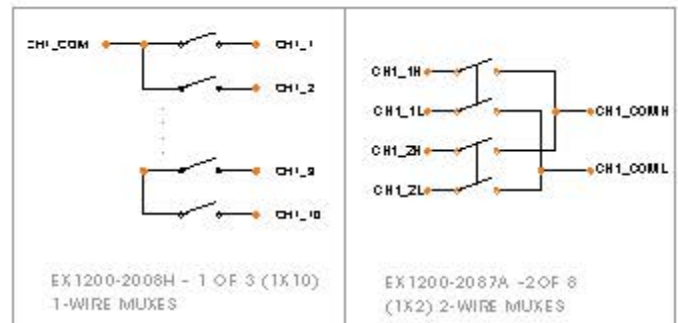
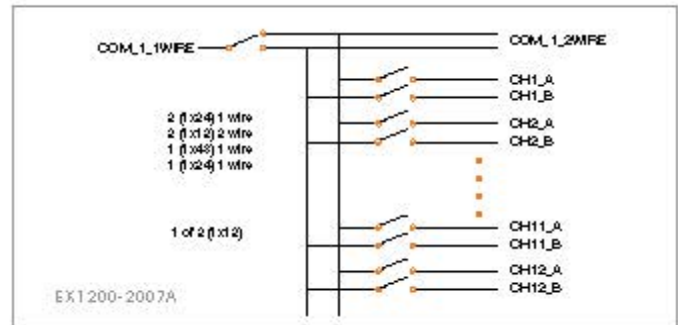
$> 1 \times 10^7 \Omega$

60 MHz

400 kHz

160-pin DIN

Reed





EX1200-3048S

Solid State Multiplexer

APPLICATIONS

High-speed scanning

Applications requiring long periods of continuous scanning where mechanical relays will wear.

Battery test

Thermal/environmental chamber test

FEATURES

- High-density dual 1x48 solid state multiplexer
- Switch up to 250 VAC/250 VDC, highest for a solid state switch module in its class.
- Configure as 2- or 4-wire multiplexer
- Optically isolated design
- Very high-speed scanning - up to 1,000 measurements per second using the internal DMM
- Virtually unlimited relay life

General Specifications

CONFIGURATION

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM CARRYING CURRENT

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM SWITCHING POWER

RATED SWITCH OPERATIONS

SWITCHING TIME

PATH RESISTANCE

INSULATION RESISTANCE

BANDWIDTH

RELAY TYPE

CONNECTOR TYPE

Dual 1 x 24 (2-wire)

250 VDC

1 A

2 A

250 V

0.2 A

6 W/4.2 VA

Unlimited

< 500 μ s

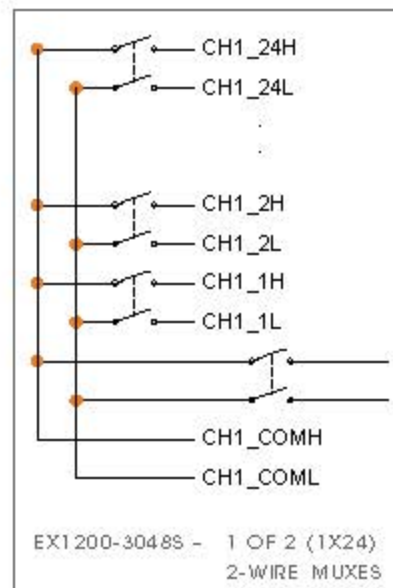
< 8 Ω (per contact)

> 1 x 10⁹ Ω

10 MHz

Solid-state

104-pin



EX1200-3096

High-Density Multiplexer



APPLICATIONS

- High-channel count scanning applications
- Environmental chamber test
- Cable harness test

FEATURES

- Dual 1x48, ultra high density multiplexer
- Low cost per channel
- Configure as 2- or 4- wire
- Capacitive discharge relays prevent high voltages from affecting sensitive measurement points

General Specifications

CONFIGURATION

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM SWITCHING POWER

RATED SWITCH OPERATIONS

MECHANICAL

ELECTRICAL

SWITCHING TIME

PATH RESISTANCE

INSULATION RESISTANCE

MAXIMUM THERMAL OFFSET

BANDWIDTH

CONNECTOR TYPE

Dual 1 x 48 (2-wire)

100 V

0.5 A

30 W/37.5 VA

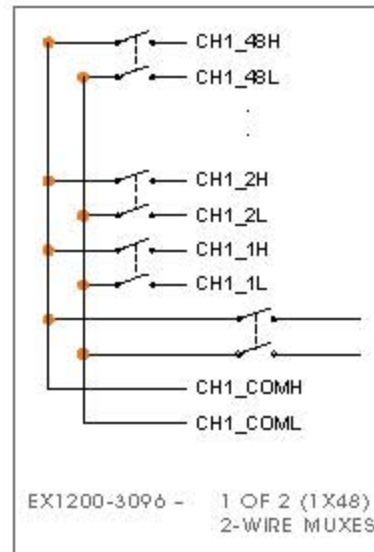
 1×10^7 1×10^6

< 3 ms

< 500 m Ω > $1 \times 10^9 \Omega$ < 7 μ V

10 MHz

104-pin





EX1200-3608 | 3604

Analog Output

APPLICATIONS

500 kSa/s arbitrary
waveform generation

± 20 V, ± 10 V, ± 5 V, ± 2 V and ± 1 V
output ranges

± 20 mA, ± 10 mA, and ± 5 mA,
output ranges

Sensors simulation

Static output

FEATURES

- 4 (-3604) or 8 (-3608) independent, isolated, 16-bit D/A converter
- Isolated outputs can be combined in series to extend range to 160 V or in parallel to achieve 160 mA
- Extensive triggering capability
- Synchronize level changes with input measurements to facilitate test sequencing
- Sense lines for every channel to compensate for cable
- Voltage or current source

General Specifications

RESOLUTION

TIME DOMAIN

SETTING TIME

RISE TIME

SLEW RATE

BANDWIDTH

PHASE MATCHING

VOLTAGE MODE

BIPOLAR

UNIPOLEAR

AUTORANGING

MAXIMUM OUTPUT

OUTPUT CURRENT

CURRENT PROTECTION

DCV ACCURACY

ISOLATION

16 bits monatomic

5 μ s to 0.1% of specified value

< 800 ns

40 V/ μ s

250 kHz

< 100 ns when all channels are running
synchronized on the internal clock

± 20 V, ± 10 V, ± 5 V, ± 2 V and ± 1 V

40 V

Supported

± 160 V when tied in series

± 20 mA

Current limitation at 50 mA and short circuit
protection

$\pm 0.050\%$ of setting ± 0.305 mV @ 1 V range

$\pm 0.050\%$ of setting ± 7.324 mV @ 40V range

200 V

EX1200-3608 | 3604

Analog Output



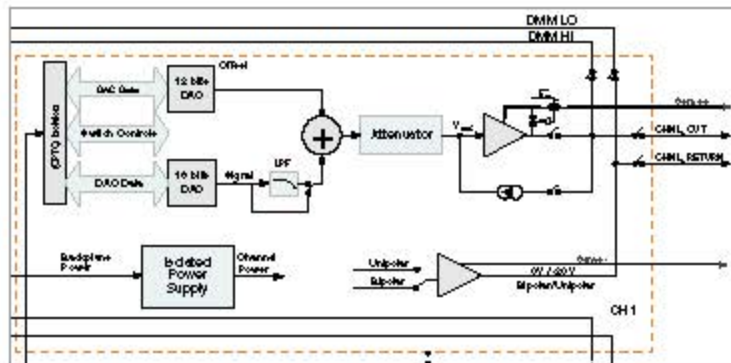
General Specifications

CURRENT MODE

RANGES	± 20 mA, ± 10 mA, and ± 5 mA
MAXIMUM OUTPUT	160 mA
COMPLIANCE VOLTAGE	20 V

AWG SPECIFICATIONS

UPDATE RATE	20 ns steps
PROGRAMMABLE	
MAXIMUM	500 kSa/s
WAVEFORM SIZE	4 Sa to 2,097,100 Sa
MODES	
OUTPUT MODES	Standard, arbitrary waveform, arbitrary source
OPERATION MODES	Continuous, burst
STANDARD WAVEFORMS	Sequenced, single step
	Sine, ramp, triangle, square with independently configurable, initial phase, burst mode, and duty cycle
CONNECTOR TYPE	44-pin





EX1200-4003 | 4264

300 V/2 A Matrices

APPLICATIONS

- Applications where multiple test instruments need to be connected to multiple test points.
- Semiconductor and PCB test
- Functional/production test

FEATURES

- High density programmatically reconfigurable matrices
- Switch signals up to 300 VAC/300 VDC and 2A.
- Best in class switching performance - 45 MHz bandwidth
- Extensive signal shielding to preserve signal integrity
- Backplane connectivity on EX1200-4264 allows internal scanning measurements

General Specifications

CONFIGURATION

EX1200-4003

EX1200-4264

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM SWITCHING POWER

RATED SWITCH OPERATIONS

MECHANICAL

ELECTRICAL

SWITCHING TIME

PATH RESISTANCE

INSULATION RESISTANCE

BANDWIDTH

CROSSTALK @ 1 MHz

4003

4264

CONNECTOR TYPE

Dual 4 x 16 (2-wire)

Dual 2 x 32 (2-wire)

300 VAC/300 VDC

2A

60 W, 62.5 VA per channel

1×10^8

1×10^6 at full load

< 5 ms

< 500 m Ω

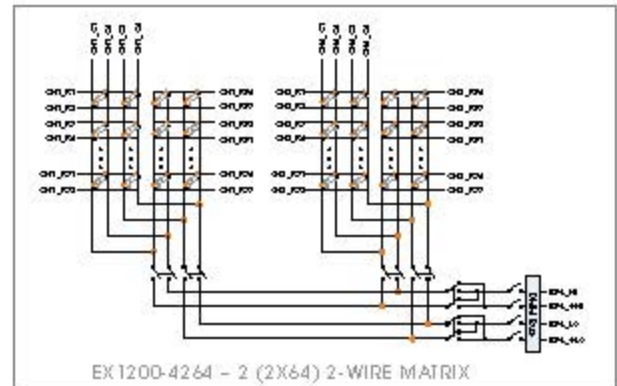
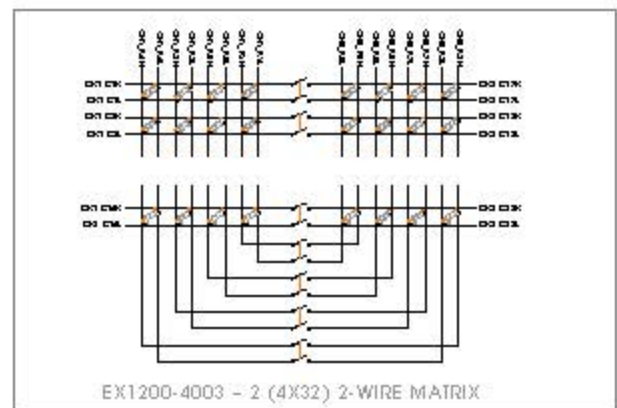
> $1 \times 10^9 \Omega$

45 MHz

< -55 dB

< -70 dB

104-pin



EX1200-4128

High-Density Matrix



APPLICATIONS

Applications where multiple test instruments need to be connected to multiple test points

Semiconductor and PCB test

Functional/production test

FEATURES

- Ultra high-density 4x128 1-wire matrix
- Switch up to 250 VAC/220 VDC, highest at its density in its class
- Connect rows to internal analog bus to construct larger matrices without external cabling
- Stub breaking relays reduces antenna effect on long open paths and increases switching performance

General Specifications

CONFIGURATION

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM SWITCHING POWER

RATED SWITCH OPERATIONS

MECHANICAL

ELECTRICAL

SWITCHING TIME

PATH RESISTANCE

INSULATION RESISTANCE

BANDWIDTH

CONNECTOR TYPE

4 x 128 (1-wire)

250 VAC, 220 VDC

1 A

60 W/63.5 VA

1×10^6

1×10^6

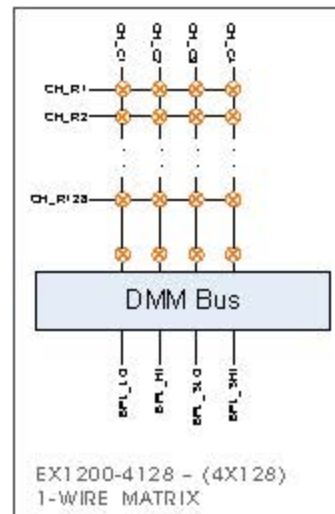
< 5 ms

1 Ω

$> 1 \times 10^9 \Omega$

45 MHz

104-pin





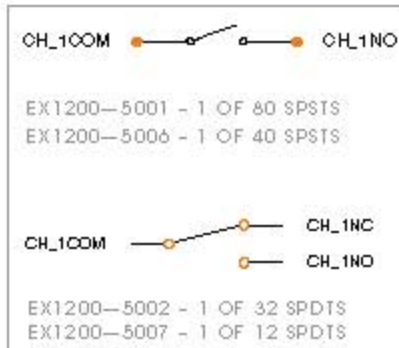
EX1200-5001 | 5002 | 5006 | 5007
General Purpose Switch

APPLICATIONS

- General purpose switching
- Can be combined with external wiring to form complex switch configurations
- Functional/production test

FEATURES

- General purpose switching up to 300 V / 2 A
- Easy to use end-to-end path level switching for simplified programming
- Best bandwidth and crosstalk performance in its class



General Specifications

CONFIGURATION

- EX1200-4003
- EX1200-4264

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM SWITCHING POWER

RATED SWITCH OPERATIONS

MECHANICAL

ELECTRICAL

SWITCHING TIME

PATH RESISTANCE

INSULATION RESISTANCE

Duct 4 x 16 (2-wire)

Duct 2 x 32 (2-wire)

300 VDC/300 VAC

2 A

60 W, 125 VA

1 x 10⁸

1 x 10⁶ at V DC, 0.1 A (resistive)

< 3 ms

< 300 mΩ

> 1 x 10⁹ Ω

	EX1200-5001	EX1200-5002	EX1200-5006	EX1200-5007
Bandwidth	80 MHz	40 MHz	80 MHz	80 MHz
Crosstalk @ 1 MHz	< -65 dB	< -65 dB	< -60 dB	< -60 dB
Connector type	160-pin DIN	160-pin DIN	104-pin DSUB	104-pin DSUB

EX1200-5004

High-Density 5A Switch

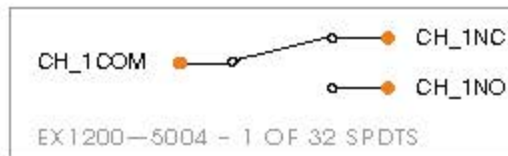


APPLICATIONS

General purpose switching
Switching power supplies

FEATURES

- Switch signals up to 5 A
- Fail-safe interrupt forces relays to open in case of fault condition



General Specifications

MAXIMUM SWITCHING VOLTAGE	250 VAC, 110 VDC
MAXIMUM SWITCHING CURRENT	5 A
MAXIMUM SWITCHING POWER	150 W/1250 V
RATED SWITCH OPERATIONS	
MECHANICAL	1×10^7
ELECTRICAL	5×10^6
SWITCHING TIME	< 3 ms
PATH RESISTANCE	< 150 m Ω
INSULATION RESISTANCE	> $1 \times 10^9 \Omega$
BANDWIDTH	40 MHz
CONNECTOR TYPE	104 pin



EX1200-6101 | 6102 | 6111 6216 | 6301 | 6301T RF Switches

APPLICATIONS

Ideal for applications
switching RF signals

Wireless device/chipset testing

Testing with high-frequency
oscilloscopes or spectrum analyzers

FEATURES

- High-density RF switches and matrices
- 50 W switching power – highest in class
- > 3 GHz bandwidth (6301)
- Stub breaking relays eliminate unterminated stub effect for best switching performance

General Specifications

CONFIGURATION

EX1200-6101

EX1200-6102

EX1200-6111

EX1200-6216

EX1200-6301

EX1200-6301T

MAXIMUM SWITCHING VOLTAGE

MAXIMUM SWITCHING CURRENT

MAXIMUM SWITCHING POWER

RATED SWITCH OPERATIONS

Mechanical

Electrical

SWITCHING TIME

INSULATION RESISTANCE

10 x SP4T

17 x SPDT

5 x SP4T

Dual 1 x 16

Quad SP4T

Quad SP4T 50 Ω self terminated

220 VDC/250 VAC

2 A

50 W, 62.5 VA

5×10^5

1×10^5

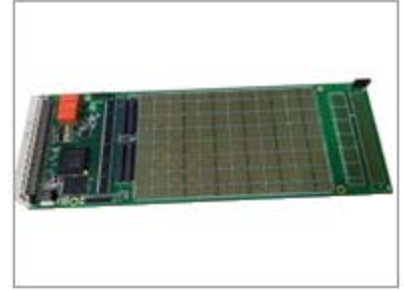
< 5 ms

$> 1 \times 10^9 \Omega$

	EX1200-6101/6111	EX1200-6102	EX1200-6216	EX1200-6301/6301T
Path Resistance	< 280 m Ω	< 280 m Ω	< 600 m Ω	
Bandwidth	1.3 GHz	1.2 GHz	1 GHz	3 GHz
Crosstalk	< -80 dB @ 1.3 GHz	< -66 dB @ 1.3 GHz	< -70 dB @ 1.3 GHz	< -80 dB @ 1 GHz
Isolation	< -80 dB @ 1.3 GHz	< -66 dB @ 1.3 GHz	< -70 dB @ 1.3 GHz	< -66 dB @ 1 GHz
VSWR	< 2.92:1 @ 1.3 GHz	< 2.92:1 @ 1.3 GHz	< 2.6:1 @ 1.3 GHz	< 1.2:1 @ 1 GHz
Connector type	Dual 28-pin	Dual 28-pin	Dual 28-pin	SMB

EX1200-7000

Prototyping Card



APPLICATIONS

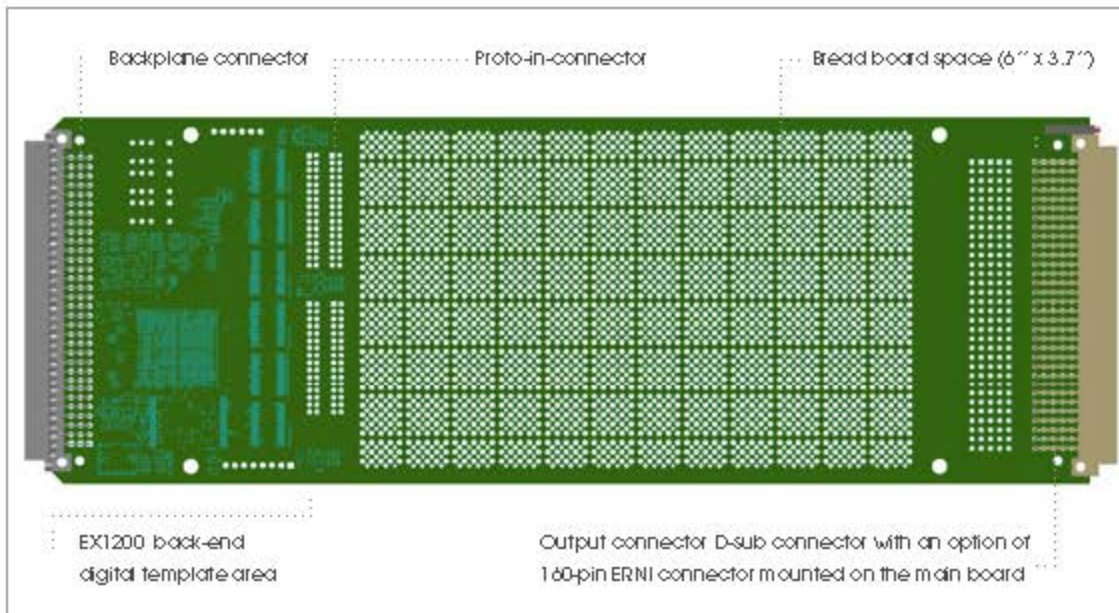
22 square inches through hole pattern breadboard space for user defined designs

Handles back end LXI communication and access to LXI trigger bus and allows user designed front end

12.5 MHz clock for complex designs

FEATURES

- 96 Digital I/O lines configurable as input or output
- Three power supply rails
- Multiple front panel connector options
- IVI driver simplifies software development





EX1200-7100

Microwave Switch

APPLICATIONS

RF and microwave component/
equipment testing

Ideal for switching multiple test
points to spectrum/network
analyzers, high frequency
oscilloscopes, or RF sources

Radar and satellite testing

Cell phone and wireless
devices testing

Semiconductor chipset testing

FEATURES

- Switch signals DC to 26.5 GHz
- Microwave building blocks are pluggable from the front
- Building blocks range from dual SPDT relays to SP6T relays, transfer switches and relay drivers
- Competitively priced to suit OEM/system integration model

General Specifications

PLUG-IN RELAY MODULES

EX1200-71 02

EX1200-71 04

EX1200-71 06

EX1200-71 22

AVERAGE POWER PER CHANNEL

SWITCHING TIME

RF IMPEDANCE

CONNECTOR TYPE

Dual SPDT, 26.5 GHz, unterminated

SP4T, 26.5 GHz, unterminated

SP6T, 26.5 GHz, unterminated

26.5 GHz, transfer switch

40 W, 26.5 GHz

< 15 ms

50 Ω

SMA

	DC to 3GHz	3-8 GHz	8-12.4 GHz	12.4-18 GHz	18-26.5 GHz
Isolation (dB min)	80 dB	70 dB	60 dB	60 dB	45 dB
Insertion loss (dB max)	0.2 dB	0.4 dB	0.4 dB	0.6 dB	0.7 dB
VSWR	1.2:1	1.3:1	1.4:1	1.6:1	1.7:1

EX1200-7008

Sensor Simulation



APPLICATIONS

Simulate platinum/copper/nickel or custom user defined RTD types

Programmable by temperature or resistance value

Sensor simulation

General Specifications

NUMBER OF CHANNELS

RANGE OF TEMPERATURE SIMULATION

RESOLUTION OF TEMPERATURE SIMULATION

ACCURACY OF TEMPERATURE SIMULATION

RANGE OF RESISTANCE SIMULATION

RESOLUTION OF RESISTANCE SIMULATION

CONNECTIONS

SUPPORTED RTD SENSOR TYPES

PLATINUM

COPPER

NICKEL

TEMPERATURE SCALES

RESISTANCE SETTING TIME

EXCITATION / INPUT CURRENT

MAX DIFFERENTIAL VOLTAGE

MAX POWER DISSIPATION

DC OFFSET ERROR

ISOLATION

CONNECTOR TYPE

FEATURES

- 8-channel, 2- or 4- wire RTD simulator
- Solid state servo mechanism produces fast, monotonic, glitch free resistance value programming
- Synchronize level changes with input measurements to facilitate test sequencing

8

As per standards (programmable per channel)

0.1 °C

±0.1 °C

4 Ω to 500 Ω, 40 Ω to 5,500 Ω, 100 Ω to 10,000 Ω

0.00125 Ω, 0.250 Ω, 0.500 Ω

2- or 4-wire

(Pt100, Pt200, Pt500, Pt1000)

(Cu10, Cu100)

(Ni100, Ni120)

ITS-90

10ms

±10.5 mA (max) (pulsed/continuous), 10 mA @ 1000 Ω, 1 mA max @ 10 kΩ

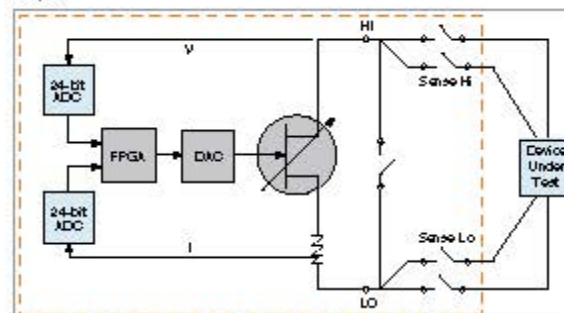
12 V

0.1 W per channel

< 10 μV

300 V

44-pin





EX1200-7416

Comparator/Event Detector/Time Stamp

APPLICATIONS

Constantly monitor input
for fault conditions

Detect edges, out-of-bound
conditions, and measure pulse widths

Can be used as a timestamp
module and as a Digital I/O

"Go/no-go" tests where
device needs to perform
within a certain window

Control applications where
device or test needs to be shut
down if a threshold is exceeded

FEATURES

- 16-Channel analog comparator/event detector
- Programmable debounce circuitry prevents erroneous readings
- 10 V and 100 V input ranges
- Onboard memory stores events with 1588 timestamps
- Inputs can be masked, inverted and combined to produce interrupts

General Specifications

NUMBER OF CHANNELS	16
INPUT RANGES	$\pm 10\text{V}$, $\pm 100\text{V}$
INPUT THRESHOLD	$\pm 10\text{V}$ with 82 mV resolution (8-bit) $\pm 100\text{V}$ with 820 mV resolution (8-bit), Programmable per channel
INPUT EDGE TYPE	Differential
THRESHOLD HYSTERESIS AND ACCURACY	-82 mV to 82 mV -820 mV to 820 mV
10 V range	
100 V range	
INPUT EDGE DETECTION	Normal (rising) or inverted (falling), Programmable per channel
MODES	Edge detect Upper/lower bounds Positive/negative polarity
DEBOUNCE TIME	1 μs to 1.6777216 s
MEMORY	43,960 events
TIMESTAMP ACCURACY	500ns
EX1200-7416	
MATH FUNCTIONS	AND / OR
CONNECTOR TYPE	44-pin

EX1200-ICA Solutions

Integrated ICA and Switching Mainframe



FEATURES

- Integrated receiver and switch modules eliminate lossy cabling
- 14 high-density switch and I/O slots
- Integrated analog backplane expands measurement capability
- Matrix switching allows for flexible use of receiver I/O
- 270 V dc power option

The EX1200-ICA is an 8U signal switching mainframe with 6U tall plugin cards with integrated receiver modules. It is used at the core of the US Navy CASS program as the enhanced general purpose interface subsystem.

These receiver modules greatly simplify cabling and maintenance, and also improves performance by eliminating cable losses between switch system and receiver.

The EX1214-ICA has access points in the rear that can be used to interface the I/O to internal test system resources such as spectrum analyzers and RF synthesizers. It also has a removable power supply that supports AC/DC inputs with remote enable/disable.

EX1214-ICA	14-Slot, 8U mainframe
EX1200-2011ICA	12 SPDT 12 A and 5 SP4T 5 A power switch module
EX1200-6100ICA	1 GHz coax switch module, 11 SP4T, 3 SPDT
EX1200-6111ICA	250 V / 2 A switch module, 21 SP4T, 35 SPDT
EX1200-4464ICA	64-channel, coax hybrid star/matrix switch module

CUSTOM INTEGRATION SERVICES

VTI employs an innovative, modular approach to our standard product designs that allows us to quickly make customer-requested modifications that address specific application requirements. These 'custom' products are then documented and supported just like our standard products. This relieves our customers of the burden of managing a custom development project and the associated long-term support issues, while helping them optimize their size and overall cost.

SYSTEM-LEVEL EXPERIENCE

Our application engineering team has years of experience in integrating a wide range of instrumentation products into larger test systems. We work with customers during the project definition phase to help architect solutions that best meet the application requirements. Our expert knowledge of industry standards, such as LXI, VXI, IVI, PXI and VME, at the hardware and software level has helped test developers reduce the time to 'system readiness' in the following applications:

- DATA ACQUISITION
- FUNCTIONAL / AUTOMATED TEST
- SIGNAL SWITCHING AND DISTRIBUTION

It is with this experience that we are able to provide our customers with a world-class selection of automated test and data acquisition solutions.



SERVICE AND SUPPORT

VTI Instruments has a worldwide sales, service, and support infrastructure, along with a staff of applications and technical sales people who have years of experience configuring and specifying test requirements. By utilizing state-of-the-art technology in all phases of product development, VTI Instruments is able to provide a level of worldwide support that is unique in the industry.

VTI is committed to preserving our customers' initial capital investment in our products through a dedicated sustaining engineering program that continuously designs out component obsolescence. This approach enables us not only to enhance products, but also to considerably extend their life and support cycles. We strive to maintain hardware and software backward compatibility with our installed base whenever possible so as not to impact our customers' existing test program sets.