VTI Instruments

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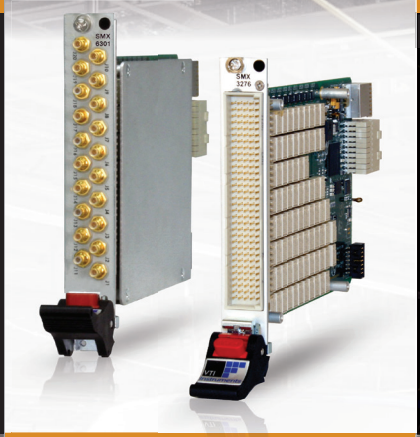
Unmatched configurability, scalability, and throughput



CoreATE™ PXIe and LXI

FUNCTIONAL TEST SOLUTIONS

AMETEK®

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20180110

RELIABLE DATA FIRST TIME EVERY TIME

The CoreATE™ PXIe and LXI Functional Test Platform

Building Better ATE Solutions with LXI and PXI Express

For more than two decades, the engineers at AMETEK VTI Instruments have been designing robust building blocks for creating automated test equipment systems. Our innovative products are widely used in demanding applications in industries ranging from defense/aerospace and energy generation to automotive and electronics, and many others. Today, we continue to focus on innovations that help system integrators maximize the value of their test equipment investments by providing flexible, readily reconfigurable and scalable solutions that ensure high throughput, superior data integrity, and long-term reliability.

Our most recent innovations for PXI Express (or PXIe), the fastest data acquisition platform now on the market, combine the advantages of extremely high bandwidth with sub-microsecond latency. PXIe-based systems are ideal for data-intensive applications like high-speed digitization, signal generation, and communication interfaces that demand both high sample rates and high channel counts. However, for some applications, the Ethernet-based LXI (LAN eXtensions for Instrumentation) platform offers a better approach, so our PXIe systems are designed for interoperability with LXI and tight integration into a hybrid test system.

For example, our PXIe controllers are uniquely designed with IEEE-1588 distribution on the backplane to enable synchronization with external LXI systems. Our LXI and PXIe products leverage common instrument drivers or common API structure to simplify application development in multi-platform systems.

The CoreATE™ Approach to Switching

Building automated test systems based on "common core" of switching allows individual modules to be readily repurposed, reduces spares inventories, and leverages development time and costs. Our PXIe-based CoreATE components are designed to maximize test throughput and performance, while preserving software development and capital equipment investment. These modular, scalable, reconfigurable solutions provide the basis for a flexible core that can be easily and inexpensively modified to meet changing test requirements, while our commitment to open platform development ensures solution longevity.

By taking advantage of advances in integrated chip technology and model-based programming, VTI Instruments incorporates all PXI infrastructure into an embedded System-on-a Chip (SoC). That means our products aren't dependent on the continuing availability of controller chips from a specific chip maker and it enables us to offer long-term product support. The high-speed serial bus architecture also supports unmatched data transfer rates for our high-performance data acquisition instruments.

Our PXIe products are designed to simplify integration with equipment based on multiple platforms.

ATE systems must often leverage the strengths of multiple instrumentation platforms in order to achieve the best performing or most cost-effective solution. There's no need to scrap legacy test equipment to incorporate new capabilities; our LXI and PXIe products are designed to simplify integration with equipment based on other platforms. Simply integrate our CoreATE PXIe modules into your existing setup as needed without worrying about incompatibility or proprietary manufacturer lock-outs.

To ensure maximum test signal integrity, our PXIe switching modules incorporate advanced circuit board layout techniques that minimize the effects of unwanted transmission stubs, shield against radiated signals in adjacent card slots, and extend the usable bandwidth of the test system as a whole.

An innovative software driver approach, based on IVI industry standards, enables a single driver session to control multiple modules as a subsystem, providing an application development environment that minimizes development time. Advanced triggering and module-to-module synchronization reduce test execution time, while the chassis' smart health-monitoring and relay odometers provide the data necessary to perform predictive maintenance.

Contents

CoreATE Products

The selector guides in this brochure make it easy to identify the CoreATE products you need to develop or expand your test application. For constantly updated information on these product categories, simply visit the web address provided for each section.

Switching

System designers use our switching modules in applications ranging from aerospace to oil and gas. A full line of PXIe cards (covering the SMX-xxxx series) is available to suit any test and measurement setup and is further broken up into categories. All of these cards employ advanced shielding and circuit board layouts to ensure quality signals, the same design philosophy that keeps VTI Instruments an industry leader in signal integrity. They have embedded virtual schematics for easy and quick setup.

Power Switching

VTI's power switching line comes with 10 channels with 16 amps per channel. Ideal for use in AC line power supplies, relays, solenoids, and automotive applications, they deliver dependable, high-voltage and current performance.

Multiplexer Switching

This line of cards includes multiplexers that work well with medium- to high-density automated test systems. With a max switching voltage of 300 VDC or 300 VAC at 2 A, and a flexible software control panel, the SMX-3xxx series can work in the most demanding setups. Available in 1, 2, or 4 wire configurations, in 1x128, 1x64, or 1x32 options, respectively, for maximum flexibility.

Matrix Switching

This line includes matrix cards designed for medium- to high-density ATE systems. They are available with software configurable options to allow one card to serve more than one role in different testing environments. Built-in health monitoring assures reliability. Options include (4) 4x10 2-wire fully configurable cards, or (4) 4x10 2-wire, (2) 4x20 2-wire, (1) 4x40 2-wire, (2) 8x10 2-wire options.

General Purpose Switching

VTI's general purpose switching cards are used in discrete switching applications. With built-in health monitoring and the ability to engage relays independent of any application software, these switches cover many kinds of applications.

Radio Frequency (RF) Switching

Our RF switches allow engineers to switch in radio frequency applications requiring 50 Ω. Both SMB and PKZ front panel formats are available to allow easy integration into any test setup with its non-blocking configuration.

Microwave Switching

Our microwave switching modules allow engineers to use standard PXIe software and hardware rather than stand-alone microwave hardware. Single- and dual-slot configurations using SPDT, SP4T, SP6T, and Transfer switch configurations are all available. The pass-through adapters available allow extended functionality with programmable line drives for attenuators and other devices.

Digitizers

Our EMX Series digitizers are widely used in noise, vibration, and harshness (NVH) tests, machine condition monitoring, rotational analysis, acoustic test, modal test, as well as general purpose high-speed digitization and signal analysis. These digitizers are scalable and offer best-in-class analog design.

Controllers

VTI introduced the industry's first Gigabit Ethernet LXI-based PXIe interface, the EMX-2500. This innovation allows Ethernet's widespread use and robust architecture to mesh with the instrument-tailored, rugged functionality that PXIe provides. The range includes wired trigger buses, IEEE-1588-2008 standards, and enables connections to laptops, tablets, and more. From the test chamber to the office, VTI's PXIe controllers make it easy to interoperate any configuration of equipment.

Programmable Resistors

EMX-700x Series Programmable Resistors can be used to simulate sensors, potentiometers, thermocouples, pressure sensors, strain gauges, and more. They easily integrate into functional test applications in automotive, aerospace, and medical settings. It can even be used for fault insertion or as a low-power load simulator. Connect channels in series or parallel to increase range or to simulate potentiometers as needed.

Static Digital Input/Output Cards

Our static digital I/O EMX-75xx cards can send and receiving up to 300 mA on up to 64 channels. With a 2 V to 60 V range, these cards are capable of working in any test setup and can drive relays when needed as well.

Chassis

Extendable, rugged, and high bandwidth chassis (the CMXxx series) from VTI are designed to hold all the cards a CoreATE system requires. Totally manufacturer independent, they can also hold cards from other suppliers using standardized communication protocols. Compatible across the entire line of VTI's PXIe cards, chassis offer a convenient place to organize, power, and connect a full test and measurement setup.

PXIe Product Selection

Switching: Built on 20 years of experience ensuring signal quality and integrity, VTI Instruments' switching cards find applications in everything from aerospace to oil and gas. A full line of PXIe-enabled cards are available to suit any test and measurement setup. All of these cards employ advanced shielding and circuit board layouts to ensure quality signals, the same design philosophy that keeps VTI Instruments an industry leader in signal integrity.

PXIe POWER SWITCHING

Overview

10 channels with 16 amps per channel. Ideal for use in AC line power supplies, relays, solenoids, and automotive applications.

SMX-2002

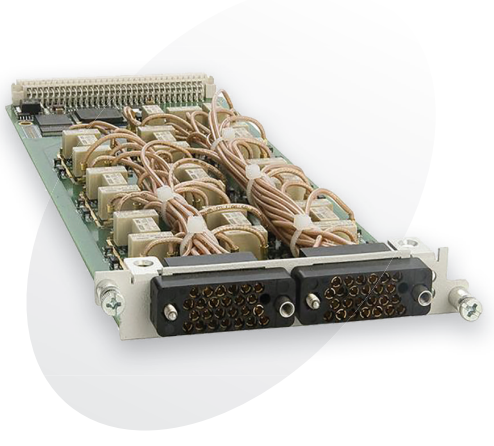
Specifications	
Maximum Switching Voltage	250 VAC / 120 VDC
Maximum Switching Current	16 A
Maximum Switching Power	480 W DC, 4000 VA Breaking Capacity
Switching Time	< 7 ms
Path Resistance	< 100 m
Insulation Resistance	> 1 X 10^9
Rated Switch Operations	
Mechanical	1 X 10^7
Electrical	1 X 10^5 (full load)

RF/Coax

Overview

VTI Instruments' radio frequency (RF) switching line allows engineers to switch RF at 50 Ω. Both SMB and PKZ front panel formats are available to allow easy integration into any test setup with its non-blocking configuration.

SMX-6101 (10) 1X4 Coax Muxes
SMX-6101-SMB (10) 1X4 Coax Muxes
SMX-6111 (5) 1X4 Coax Muxes
SMX-6111-SMB (5) 1X4 Coax Muxes
SMX-6106 (2) 1X16 Coax Muxes
SMX-6106-SMB (2) 1X16 Coax Muxes
SMX-6116 (1) 1X16 Coax Muxes
SMX-6116-SMB (1) 1X16 Coax Muxes
SMX-6105 (4) 1X8 Coax Muxes
SMX-6105-SMB (4) 1X8 Coax Muxes
SMX-6115 (2) 1X8 Coax Muxes
SMX-6115-SMB (2) 1X8 Coax Muxes
SMX-6103 (1) 1X32 Coax Muxes
SMX-6103-SMB (1) 1X32 Coax Muxes
SMX-6144 (1) 4X4 Coax Matrix
SMX-6144-SMB (1) 4X4 Coax Matrix



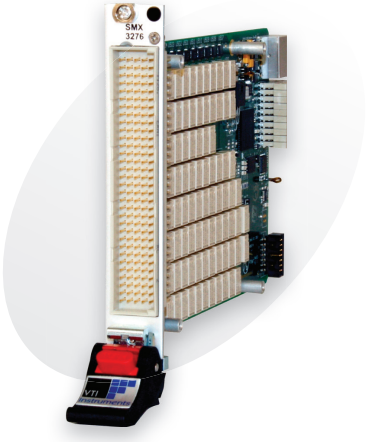
Specifications	
Maximum Switching Voltage	250 VAC / 220 VDC
Maximum Switching Current	2 A
Maximum Switching Power	50 W DC, 62.5 VA
Rated Switch Operations	
Mechanical	1×10^5
Electrical	1×10^5
Switching Time	< 5 ms
RF Impedance	< 50 Ω
Connector	SMB or PKZ
Path Resistance	< 250 mΩ
Bandwidth	> 2 GHz
Crosstalk	< 50 dB @ 2 GHz
Isolation	< 50 dB @ 2 GHz

PXIe MULTIPLEXERS

Software Configurable

Overview

The SMX-3XXX line of multiplexers function well with medium- to high-density automated test systems (ATE). With a max switching voltage of 300 VDC or 300 VAC at 2 A, and flexible software control, the SMX-3XXX series can work in the most demanding setups. Available in 1, 2, or 4 wire configurations, in 1 x128, 1 x 64, or 1 x 32 options, respectively, for maximum flexibility.



SMX-3001 (8) 1x8, 2-wire Multiplexer, Fully Configurable
SMX-3276 (2) 1x38, 2-wire Multiplexer, Fully Configurable

Specifications	
Maximum Switching Voltage	300 VDC / 300 VAC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 62.5 VA
Bandwidth	> 30 MHz (typical)
Switching Time	< 3 ms
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 X 10^9 Ω
Rated Switch Operations	
Mechanical	1 X 10^7
Electrical	1 X 10^5
Capacitive Discharge Relays	Internal
Configurable Bussing Relays	Internal
End-to-End Signal Path Shielding	Yes
Software Configurable	SMX-3001 (8) 1x8 muxes SMX-3276 (2) 1x38 muxes

PXIe MULTIPLEXERS

Fixed Configuration

Overview

The SMX-3XXX line of multiplexers function well with medium- to high-density automated test systems (ATE). With a max switching voltage of 300 VDC or 300 VAC at 2 A, and flexible software control, the SMX-3XXX series can work in the most demanding setups. Available in 1, 2, or 4 wire configurations, in 1 x128, 1 x 64, or 1 x 32 options, respectively, for maximum flexibility.

SMX-3002 (8) 1x8, 2-wire Multiplexer, Fixed
SMX-3003 (4) 1x16, 2-wire Multiplexer, Fixed
SMX-3004 (2) 1x32, 2-wire Multiplexer, Fixed
SMX-3005 (1) 1x64, 2-wire Multiplexer, Fixed
SMX-3006 (1) 1x128, 1-wire Multiplexer, Fixed
SMX-3007 (2) 1x64, 1-wire Multiplexer, Fixed
SMX-3277 (2) 1x76, 1-wire Multiplexer, Fixed
SMX-3278 (2) 1x38, 2-wire Multiplexer, Fixed
SMX-3279 (1) 1x76, 2-wire Multiplexer, Fixed

Specifications	
Maximum Switching Voltage	300 VDC / 300 VAC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 62.5 VA
Bandwidth	> 30 MHz (typical)
Switching Time	< 3 ms
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 X 10^9 Ω
Rated Switch Operations	
Mechanical	1 X 10^7
Electrical	1 X 10^5
Capacitive Discharge Relays	Internal
Configurable Bussing Relays	Internal
End-to-End Signal Path Shielding	Yes

PXIe MATRIX

Overview

SMX-4XXX matrix cards are designed for medium- to high-density ATE systems. They are available with software-configurable options to allow one card to serve more than one role in different testing environments. Built-in health monitoring assures reliability. Options include (4) 4x10 2-wire fully configurable cards, or (4) 4x10 2-wire, (2) 4x20 2-wire, (1) 4x40 2-wire, (2) 8x10 2-wire options.

SMX-4410 (4) 4x10, 2-wire, Fully Configurable

Specifications	
Maximum Switching Voltage	300 VDC / 300 VAC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 62.5 VA
Bandwidth	> 30 MHz (typical)
Switching Time	< 3 ms
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 X 10^9 Ω
Rated Switch Operations	
Mechanical	1 X 10^7
Electrical	1 X 10^5
Capacitive Discharge Relays	Internal
Configurable Bussing Relays	Internal
End-to-End Signal Path Shielding	Yes
Software Configurable	SMX-4410 (4) 4x10 muxes

PXIe MATRIX

Overview

SMX-4XXX matrix cards are designed for medium- to high-density ATE systems. They are available with software-configurable options to allow one card to serve more than one role in different testing environments. Built-in health monitoring assures reliability. Options include (4) 4x10 2-wire fully configurable cards, or (4) 4x10 2-wire, (2) 4x20 2-wire, (1) 4x40 2-wire, (2) 8x10 2-wire options.

SMX-4411 (4) 4x10 2-wire Matrix
SMX-4412 (2) 4x20 2-wire Matrix
SMX-4413 (1) 4x40 2-wire Matrix
SMX-4414 (2) 8x10 2-wire Matrix

Specifications	
Maximum Switching Voltage	300 VDC / 300 VAC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 62.5 VA
Bandwidth	> 30 MHz (typical)
Switching Time	< 3 ms
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 X 10^9 Ω
Rated Switch Operations	
Mechanical	1 X 10^7
Electrical	1 X 10^5
Capacitive Discharge Relays	Internal
Configurable Bussing Relays	Internal
End-to-End Signal Path Shielding	Yes

PXIe GENERAL PURPOSE

Overview

General purpose PXIe switching cards are ideal for discrete switching applications. With built-in health monitoring and the ability to engage relays independent of any application software, these switches come in two variations and cover applications in aerospace, defense, and automotive.

SMX-5001 (80) SPST/Form A
SMX-5002 (50) SPDT/Form C

Specifications	
Maximum Switching Voltage	300 VDC / 300 VAC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 62.5 VA Breaking Capacity
Bandwidth	> 50 MHz (typical)
Switching Time	< 3 ms
Path Resistance	< 300 mΩ
Insulation Resistance	> 1 X 10^9 Ω
Rated Switch Operations	
Mechanical	1 X 10^7
Electrical	1 X 10^5
End-to-End Signal Path Shielding	Yes
Relay Cycle Count Odometer	Yes

MICROWAVE

Overview

Instead of using stand-alone microwave hardware, VTI Instruments microwave switching PXIe products allow engineers to use standard PXIe software and hardware. Single and dual slot configuration using SPDT, SP4T, SP6T, and Transfer switch configurations are all available. The pass-through adapters available allow engineers to extend functionality with programmable line drives for attenuators and other devices.

SMX-7121 Single Slot Microwave Carrier with (1) SPDT 26.5 GHz switch
SMX-7122 Single Slot Microwave Carrier with (2) SPDT 26.5 GHz switches
SMX-7241 Dual Slot Microwave Carrier with (1) SP4T 26.5 GHz switch
SMX-7242 Dual Slot Microwave Carrier with (2) SP4T 26.5 GHz switches
SMX-7243 Dual Slot Microwave Carrier with (3) SP4T 26.5 GHz switches
SMX-7261 Dual Slot Microwave Carrier with (1) SP6T 26.5 GHz switch
SMX-7262 Dual Slot Microwave Carrier with (2) SP6T 26.5 GHz switches
SMX-7263 Dual Slot Microwave Carrier with (3) SP6T 26.5 GHz switches
SMX-7100 Single Slot Microwave Switch carrier w/relay driver
SMX-7200 Dual Slot Microwave Switch carrier w/relay driver
SMXR-7200 Pass Through Adapter, 6 drive lines
SMXR-7202 (1) 26.5 GHz SPDT Relay
SMXR-7204 (1) 26.5 GHz SP4T Relay
SMXR-7206 (1) 26.5 GHz SP6T Relay
SMXR-7222 (1) 26.5 GHz Transfer Switch

Specifications	
Bandwidth	> 26.5 GHz
Average Power per Channel	< 40 W
RF Impedance	< 50 mΩ
Switching Time	< 15 ms
Connector Type	SMA

PROGRAMMABLE RESISTOR

Overview

The EMX-700X Series can be used to simulate sensors, potentiometers, thermocouples, pressure sensors, strain gauges, and more. It easily integrates into functional test applications in automotive, aerospace, and medical settings. It can even be used for fault insertion or as a low-power load simulator. Connect channels in series or parallel to increase range or to simulate potentiometers as needed.

EMX-7004
EMX-7005
EMX-7006
EMX-7007
EMX-7014
EMX-7015
EMX-7016

Specifications

4 independent channels, 4 decades per channel
Accurate steps from 1 Ω to 16,383 Ω in 1 Ω increments (±0.02% of the programmed value ±0.5 Ω)
Precision sensor simulation
Low thermal offset (≤±25 µV)
Independent sense feedback
Operates in parallel or series
Dynamic soft front panel interface or API
IVI-COM, IVI-C, and LabVIEW® drivers available

STATIC DIGITAL INPUT/OUTPUT CARD

Overview

Static digital input/output cards are capable of sending and receiving up to 300 mA on up to 64 channels. With a 2 V to 60 V range, these cards work in any test setup and can drive relays when needed.

EMX-7510
EMX-7511
EMX-7512
EMX-7513
EMX-7514
EMX-7515

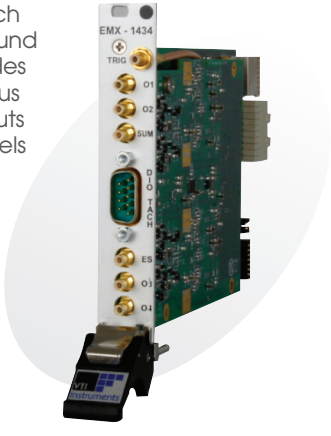
Specifications

Static digital input/output
64 channels total (8 ports of 8 bits each), bi-directional
High current (300 mA), on each channel
Voltage inputs and outputs from 2 V to 60 V on each channel
Embedded soft front panel interface
Common IVI software drivers available
Multiple digital logic levels: LV TTL, TTL
Optical isolation at 1500 Vrms

ARBITRARY WAVEFORM GENERATOR

Overview

The EMX-1434 is a high performance arbitrary source / tach modular PXI Express instrument designed especially for sound and vibration applications. It supports various output modes such as sine, burst sine, chirp, burst-random and continuous random. It also provides two channels of 64-bit tacho inputs each of which has a 16 k-word FIFO as well as four channels of digital I/O.



EMX-1434

Specifications

4-channel 204.8 kSa/s/ch Arbitrary Waveform Generator
Multiple standard waveforms include DC, sine, ramp up, ramp down, triangle and square waves
Programmable parameters include frequency, duty cycle, initial phase, offset and amplitude
20 M Sample buffer size suitable for complex waveforms
Integrated tachometer input and 4-ch DIO can be synchronized with output waveform

Description	204.8 kSa/s, 24-bit AWG/Source
Channels	4 AO, 4 DIO
Output Range	± 10 V
Max Current	25 mA
SFDR	-115 dBfs ,<51.2 kHz

DIGITIZER

Overview

VTI Instruments' digitizers are used in noise, vibration, and harshness (NVH) tests, machine condition monitoring, rotational analysis, acoustic test, modal test, as well as general purpose high speed digitization and signal analysis. These digitizers are scalable and offer the best in class analog design methodology available.

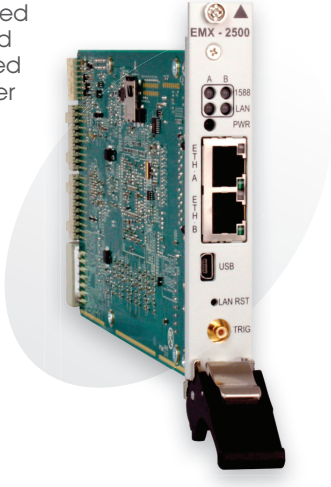
Specifications	
EMX-4250	204.8 kSa/s/channel, 24-Bit ADCs, 16-Channel (4250) or 8-Channel (4251)
EMX-4251	Differential inputs deliver superior common mode performance Flexible analog and user defined digital filter combinations -105 dB SFDR Seven auto-ranging input ranges from 100 mV to 10 V Deterministic channel-to-channel, card-to-card, and chassis-to-chassis phase response
EMX-4350	625 kSa/s/channel, 24-Bit ADC, 4-Channel True Differential, IEPE or Voltage, AD/DC Inputs Flexible analog and user defined digital filter combinations Best-in-class noise immunity Highest quality instrumentation grade ADCs outperform commonly used audio grade ADCs Best-in-class -125 dB SFDR Unparalleled fully programmable excitation (2 mA to 20 mA) Deterministic channel-to-channel, card-to-card, and chassis-to-chassis phase response
EMX-4380	First integrated data acquisition instrument to support IEPE, charge, and voltage inputs 625 kSa/s/channel, 24-Bit ADC, 4-Channel Flexible analog and user defined digital filter combinations True differential inputs with 25 V Isolation Exceptional noise immunity Highest quality instrumentation grade ADCs outperform commonly used audio grade ADCs Fully programmable excitation (2 mA to 20 mA) Deterministic channel-to-channel, card-to-card, and chassis-to-chassis phase response

CONTROLLER

Overview

The EMX-2500 is the industry's first Gigabit Ethernet LXI-based PXIe interface. The EMX-2500 allows Ethernet's widespread use and robust architecture to meet the instrument-tailored functionality that PXIe provides. These include wired trigger busses, IEEE-1588-2008 standards, and connections to laptops, tablets, and more.

EMX-2500



Specifications	
Slot Requirement	1-slot, 3U PXI Express System Controller Plugin Module
Interface/Ports	
Ethernet Two	10/100/1000BASET Gigabit Ethernet Ports, RJ-45 connector
One Port	(ETH-A) for instrument control and data transfer
SMB Connector	For high-precision triggering on PXI trigger lines
Maximum Data Throughput	100 MB/s sustained streaming
PCIE/PXIE Configuration	Four links (1 link x2 lanes, 3 links x1 lane)
Clock Specifications	
Clock Oscillator Accuracy	+ 50 ppm
Timestamp Resolution	10 ns
Front Panel Connectors	Dual RJ45 Ethernet, USB MiniAB
Temperature	
Operating Temperature	0˚ C to 55˚
Storage Temperature	-40˚ C to 70˚ C
Humidity	5% to 95% (non-condensing)
Altitude	Up to 3,000 m
Shock And Vibration	Conforms to MIL-PRF-28800F, Paragraphs 4.5.5.3.1 (random vibration test), 4.5.5.3.2 (sinusoidal vibration test), and 4.5.5.4.1 (functional shock test)

CHASSIS

Overview

Extendable, rugged, and high bandwidth chasses designed to hold all the cards a CoreATE system requires. Compatible across the entire line of PXIe cards.

Specifications	
CMX 09	9-slot PXI Express chassis with 1 system controller slot, 6 peripheral slots, 1 hybrid slot and 1 timing slot
	High bandwidth PCIe Gen 2 backplane with 2 GB/s slot bandwidth and 8 GB/s system bandwidth
	Combine with EMX-2500 LXI controller for Ethernet connectivity and distributability in the EMX09
	True 4U chassis
	Rugged construction with extended temperature range
	Smart switch display for health monitoring and control
	First PXI Multicomputing (PXImc) ready chassis
	Rack mount, custom front panels, and bolt-down option available
CMX 18	18-slot PXI Express chassis with 1 system controller slot, 6 peripheral slots, 10 hybrid slots, and 1 timing slot
	High bandwidth PCIe Gen 2 backplane with 2 GB/s bandwidth per slot (4 GB/s on high-bandwidth slots) and 8 GB/s system bandwidth
	Rugged construction with extended temperature range
	True 4U chassis
	IEEE-1588 distributed instrument synchronization
	Built-in system monitoring provides confidence in system operation and simplifies debugging

LXI EX1200 Series | High-Density Switching and Data Acquisition

EX1200 Series | A Single, Modular, Scalable Solution

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.

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

Robust connectors provide durable interface

EX1262–Front View

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

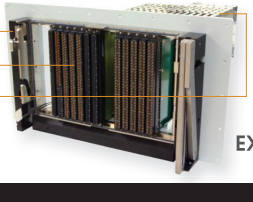
Internal bus extension
Digital alarm outputs
LAN/LXI status LEDs
Standard LAN connectivity
8-line LXI Wired Trigger Bus–precision hardware handshaking

EX1206A–Rear View

Full rack, 3U with 16 slots

EX1208A with optional DMM

Full rack 8U with 14 slots
Integrated mass interconnect receiver on plug-in cards
Access points in rear to interface with I/O



EX1214-ICA

EX1200 Series | High-Density Switching and Data Acquisition Systems

Applications

- High-performance switching for ATE, DC to 26.5GHz
- 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 counts
- 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

EX1200-1538 | Multifunction Counter, DAQ, and DIO

Applications

- Single frequency measurement range from 0.05Hz to 1MHz
- 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

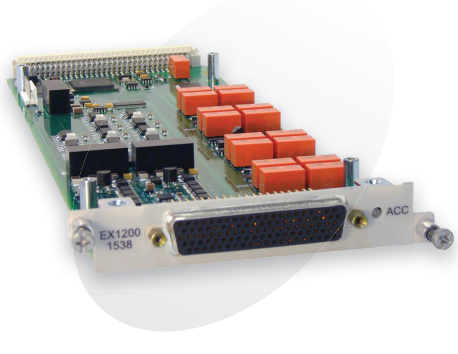
- 8 frequency counter channels, 16 isolated digital I/O, 2 isolated DAC channels per card
- Highly stable 50MHz, TCXO base clock along with 32-bit counter for frequency measurement
- Counter channel accepts both analog and digital inputs with ±48V differential input range eliminates need for signal conditioning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

Specifications

Frequency/ Counter Inputs	
Number of Channels	8 (analog/digital)
Digital Input Signal Range	TTL
Analog Input Signal Range	±48V
Common Mode Input	250V peak
Sensitivity	±500mV
Threshold and Hysteresis	Programmable, 1mV step
Signal Frequency Range	
3Hz - 1MHz in AC Coupling Mode	0.05 Hz - 1MHz in DC coupling mode
Main Time Base Clock	50MHz
Time Base Clock Stability	±1ppm
Counter Type	32-bit, reciprocal counting type
50ns on Digital Channel	
Minimum Detectable Pulse	600ns on analog channel
RPM Measurement Range	3RPM to 90,000 RPM
Sample Data Correlation	IEEE-1588 timestamp
On-Board Memory	256,000 readings
Averaging Methods	Moving average and simple average
Aperture Time Window	1ms to 30s (1ms programming steps)

Specifications (continued)

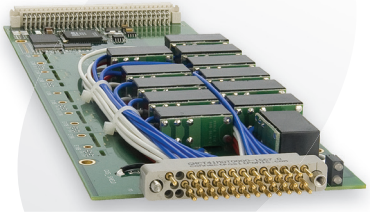
Maximum data	
Sampling speed	1,000,000 samples/s (into on-board buffer)
Triggering	Software, immediate, EX1200-based LXI triggers
Quadrature measurement	Two channels to be paired for each encoder input
Digital Input/ Output	
Number of channels	16
DIO input signal level	
Logical high	2.5V to 60V
Logical low	< 2.5V
DIO isolation	Channel-to-channel
DIO output signals	Optically isolated solid state switch
Output signal compatibility	50mA sink/source, up to 60V (AC/DC)
Update control	Software paced
DAC Outputs	
Number of channels	2
Output type	Constant voltage or constant current
Output mode	Static or dynamic mode (frequency to volt./current conversion)
Voltage mode range	±10V, up to 20mA per channel
Current mode range	±20mA, drive up to 250Ω load
Output resolution	16-bit
Isolation	Channel-to-channel, galvanic
Protection	Open and short circuit for short duration
Connector type	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

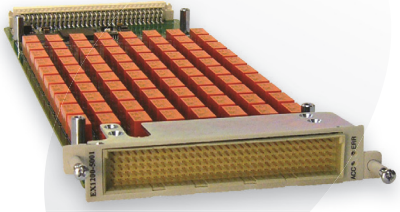
- Switch up to 16A current – highest in its class
- Large switching capacity in a small footprint
- High breakdown voltage (1,000V rms between open contacts)
- Failsafe interrupt detects fault conditions and opens relays to their default state. This protects the test object from damage if a fault occurs.

Specifications	
Configuration	
EX1200-2001	(20) x SPST
EX1200-2002	(12) x SPDT
Maximum switching voltage	250VAC, 300VDC
Maximum switching current	16A
Maximum switching power	480W , 4000VA per channel
Rated Switch Operations	
Mechanical	1 x 107
Electrical	1 x 105 at full load
Switching time	< 10ms
Path resistance	> 100mΩ
Insulation resistance	> 1 x 109Ω
Bandwidth	40MHz
Connector type	41-pin

EX1200-5001 I 5002 I 5006 I 5007 I 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 300V / 2A
- Easy to use end-to-end path level switching for simplified programming
- Best bandwidth and crosstalk performance in its class

General Specifications				
Configuration				
EX 1200-4003	300V DC/300V AC			
EX 1200-4264	Dual 2 x 32 (2-wire)			
Maximum switching voltage	300V DC/300V AC			
Maximum switching current	2 A			
Maximum switching power	60W, 125VA			
Rated Switch Operations				
Mechanical	1×10^8			
Electrical	1×10^5 at V DC, 0.1 A (resistive)			
Switching time	< 3ms			
Path resistance	< 300mΩ			
Insulation resistance	> 1×10^9Ω			
	EX1200-5001	**EX1200-5002**	**EX1200-5006**	**EX1200-5007**
Bandwidth	80MHz	40MHz	80MHz	80MHz
Crosstalk	< -55dB	< -55dB	< -60dB	< -60dB
Connector type	160-pin DIN	160-pin DIN	104-pin DSUB	104-pin DSUB

EX1200-5004 | High-Density 5A Switch

Applications

- General pzurpose switching
- Switching power supplies

Features

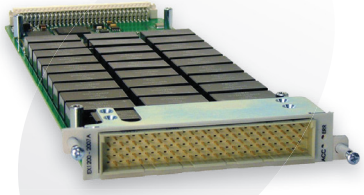
- Switch signals up to 5 A
- Fail-safe interrupt forces relays to open in case of fault condition

General Specifications	
Maximum switching voltage	250V AC, 110V DC
Maximum switching current	5 A
Maximum switching power	150W/1250
Rated Switch Operations	
Mechanical	1 x 10^7
Electrical	5 x 10^5
Switching time	< 3ms
Path resistance	< 150mΩ
Insulation resistance	> 1 x 10^9Ω
Bandwidth	40MHz
Connector Type	104 pin

EX1200-2007, 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

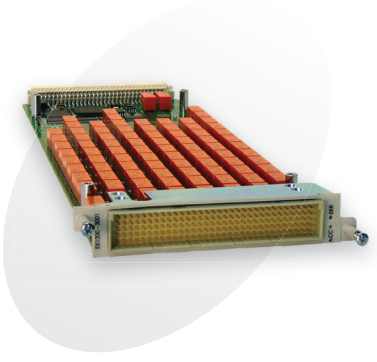
- Switch signals up to 1000V
- Large shield planes used to reduce crosstalk and voltage spikes to adjacent channels
- Failsafe interrupt detects fault conditions and opens relays to their default state. This protects the test object from damage if a fault occurs.
- EX1200-2087A features Continuous Relay 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.

Specifications	
Configuration	
EX1200-2001	(20) x SPST
EX1200-2002	(12) x SPDT
Maximum switching voltage	250VAC, 300VDC
Maximum switching current	16A
Maximum switching power	480W , 4000VA per channel
Rated Switch Operations	
Mechanical	1 x 107
Electrical	1 x 105 at full load
Switching time	< 10ms
Path resistance	> 100mΩ
Insulation resistance	> 1 x 109Ω
Bandwidth	40MHz
Connector type	41-pin

EX1200-3001, 3001DS, 3048, 3072, 3164 I 300V/2 A Multiplexers

Applications

- Applications where multiple points need to be switched to a common resource
- Thermal chamber testing
- Battery test
- Cable harness testing
- Semiconductor and PCB testing



Features

- High density, 300V /2A multiplexers/scanner
- Direct routing to EX1200 series DMM through internal analog measurement bus simplifies field wiring
- Support thermocouple, RT D, and thermistor measurements with optional terminal block with built in CJC reference
- On-board scanning greatly reduces overall test execution time
- Configure as 1- (-3001 only), 2- or 4- wire under program control
- Discharge relays to bleed out stray charge for sensitive measurements

General Specifications	
Configuration	
EX1200-3001/3001DS	(8) 1 x 8 (2-wire)
EX1200-3048	Dual 1 x 24 (2-wire)
EX1200-3072	Dual 1 x 36 (2-wire)
EX1200-3164	(16) 1 x 4 (2-wire)
Maximum switching voltage	300V DC/300V AC
Maximum switching current	2A
Maximum switching power	60W, 125VA
Rated Switch Operations	
Mechanical	1 x 107
Electrical	1 x 105 at full load
Switching time	< 3ms
Path resistance	< 500mΩ
Insulation resistance	> 1 x 109Ω

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 250V AC/250V DC, 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	Dual 1 x 24 (2-wire)
Maximum switching voltage	250V DC
Maximum switching current	1A
Maximum carrying current	2A
Maximum switching voltage	250V
Maximum switching current	0.2A
Maximum switching power	6 W/4.2VA
Rated Switch Operations	Unlimited
Switching time	< 500µs
Path resistance	< 8Ω (per contact)
Insulation resistance	> 1 x 10^9Ω
Bandwidth	10MHz
Relay Type	Solid-state
Connector Type	140-pin

EX1200-3096 | High-Density Multiplexer

Applications

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

Features

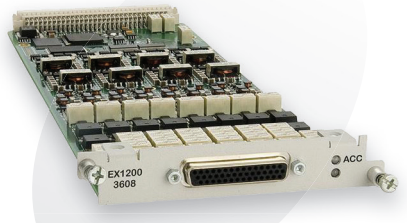
- Dual 1x48, ultra high density multiplexer
- Low cost per channel
- Configure as 2- or 4- wire
- Capacitive discharge relays prevent high voltages from affecting sensitive measurement points

General Specifications	
Configuration	Dual 1 x 48 (2-wire)
Maximum switching voltage	100V
Maximum switching current	0.5A
Maximum switching power	30 W/37.5VA
Rated Switch Operations	
Mechanical	1 x 10^7
Electrical	1 x 10^5
Switching time	< 3ms
Path resistance	< 500mΩ
Insulation resistance	> 1 x 109Ω
Maximum thermal offset	< 7µV
Bandwidth	10MHz
Connector Type	104-pin

EX1200-3608 | 3604 | Analog Output

Applications

- 500kSa/s arbitrary waveform generation
- ±20V, ±10V, ±5V, ±2V and ±1V output ranges
- ±20mA, ±10mA, and ±5mA, output ranges
- Sensor simulation
- Static output



Features

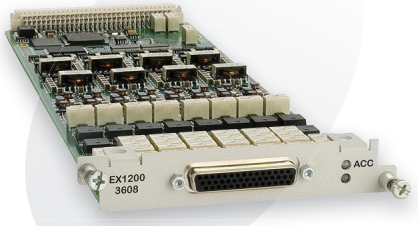
- 4 (-3604) or 8 (-3608) independent, isolated, 16-bit D/A converter
- Isolated outputs can be combined in series to extend range to 160V or in parallel to achieve 160mA
- Extensive triggering capability
- Synchronize level changes with input measurements to facilitate test sequencing
- Sense lines for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

General Specifications	
Resolution	16-bits monotonic
Time domain	
Setting time	5µs to 0.1% of specified value
Rise time	< 800ns
Slew rate	40V/µs
Bandwidth	250kHz
Phase matching	< 100ns when all channels are running synchronized on the internal clock
Voltage Mode	
Bipolar	±20V, ±10V, ±5V, ±2V and ±1V
Unipolar	40V
Autoranging	Supported
Maximum output	±160V when tied in series
Output current	±20mA
Current protection	Current limitation at 50mA and short circuit protection
DCV accuracy	±(0.050% of setting ±0.305mV) @ 1V range ±(0.050% of setting ±7.324 mV) @ 40V range
Isolation	200V

EX1200-3608 I 3604 I Analog Output (continued)

Applications

- 500kSa/s arbitrary waveform generation
- ±20V, ±10V, ±5 V, ±2V and ±1V output ranges
- ±20mA, ±10mA, and ±5mA, output ranges
- Sensor simulation
- Static output



General Specifications	
Current Mode	
Ranges	±20mA, ±10mA, and ±5mA
Maximum output	160mA
Compliance voltage	20V
AWG Specifications	
Update rate	
Programmable	20ns steps
Maximum	500kSa/s
Waveform size	4Sa to 2,097,100Sa
Modes	
Output modes	Standard, arbitrary waveform, arbitrary source
Operation modes	Continuous, burst, sequenced, single step
Standard waveforms	Sine, ramp, triangle, square with independently configurable, initial phase, burst mode, and duty cycle
Connector type	44-pin

EX1200-4003 I 4264 I 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 300V and 2A.
- Best in class switching performance - 45MHz bandwidth
- Extensive signal shielding to preserve signal integrity
- Backplane connectivity on EX1200-4264 allows internal scanning measurements

General Specifications	
Configuration	
EX1200-4003	Dual 4 x 16 (2-wire
EX1200-4264	Dual 2 x 32 (2-wire)
Maximum switching voltage	300V
Maximum switching current	2A
Maximum switching power	60W, 62.5VA per channel
Rated Switch Operations	
Mechanical	1×10^8
Electrical	1×10^5 at full load
Switching time	< 5ms
Path resistance	< 500mΩ
Insulation resistance	> 1 x 10Ω
Bandwidth	45MHz
Crosstalk @ 1MHz	
4003	< -55dB
4264	< -70dB
Connector Type	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

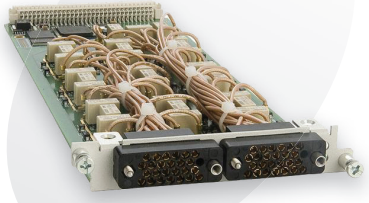
- Ultra high-density 4x128 1-wire matrix
- Switch up to 250 V AC/220 V DC, highest at its density in its class
- Connect rows to internal analog bus to construct larger matrices without external cabling
- Stub breaking relays reduces antenna effect on long open paths and increases switching performance

General Specifications	
Configuration	4 x 128 (1-wire)
Maximum switching voltage	250V AC, 220V DC
Maximum switching current	1 A
Maximum switching power	60 W/63.5VA
Rated Switch Operations	
Mechanical	1 x 10^8
Electrical	1 x 10^5
Switching time	< 5ms
Path resistance	1Ω
Insulation resistance	> 1 x 10^9Ω
Bandwidth	45MHz
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

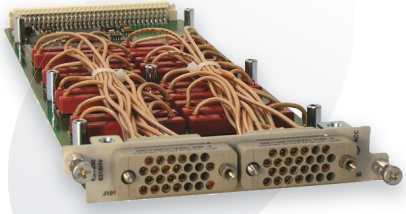
General Specifications

Configuration				
EX1200-6101	10 x SP4T			
EX1200-6102	17 x SPDT			
EX1200-6111	5 x SP4T			
EX1200-6216	Dual 1 x 16			
EX1200-6301	Quad SP4T			
EX1200-6301T	Quad SP4T 50Ω self terminated			
Maximum switching voltage	220V DC/250V AC			
Maximum switching current	2A			
Maximum switching power	50W, 62.5VA			
Rated Switch Operations				
Mechanical	5×10^5			
Electrical	1×10^5			
Switching time	< 5ms			
	EX1200-6101/6111	**EX1200-6102**	**EX1200-6216**	**EX1200-6301/6301T**
Path Resistance	< 250mΩ	<250mΩ	<500mΩ	
Bandwidth	1.3GHz	1.2GHz	1GHz	3GHz
Crosstalk	< -60dB @ 1.3GHz	< -55dB @1.3GHz	< -70dB @ 1.3GHz	< -60dB @ 1GHz
Isolation	< -60dB @1.3GHz	< -55dB @ 1.3GHz	< -70dB @ 1.3GHz	< -65dB @ 1GHz
VSWR	< 2.92:1 @ 1.3GHz	< 2.92:1 @ 1.3GHz	< 2.5:1 @ 1.3GHz	< 1.2:1 @ 1GHz
Connector type	Dual-26-pin	Dual 26-pin	Dual 26-pin	SMB

EX1200-6216HV | High-Voltage RF Switches

Applications

- Ideal for applications using high voltage probes like transient measurements on power supplies
- Differential coaxial switching



Features

- High-density coax switch
- Switch signals up to 500V and 250MHz
- Star configuration allows any channel to be connected to any other channel

General Specifications	
Configuration	Dual 1 x 16
Maximum Switching Voltage	500V AC
Maximum Switching Current	0.5A
Maximum Switching Power	2A
Rated Switch Operations	1 x 10^8 @ 1V, 10mA
Switching Time	< 1 ms
Path Resistance	< 500mΩ
Bandwidth	250MHz
Crosstalk at 100 MHz	< -45dB
Isolation at 100 MHz	< -45 dB
VSWR	< 1.2 : 1
Relay Type	Mercury-wetted Reed
Connector type	Dual 26-pin

Note: Not available in RoHS configuration

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 switches and relay drivers

General Specifications

Plug-in Relay Modules					
EX1200-7102	Dual SPDT, 26.5 GHz, unterminated				
EX1200-7104	SP4T, 26.5 GHz, unterminated				
EX1200-7106	SP6T, 26.5 GHz, unterminated				
EX1200-7122	26.5 GHz, transfer switch				
Average power per channel	40 W, 26.5GHz				
Switching time	< 15ms				
RF impedance	50Ω				
Connector type	SMA				
	DC to 3 GHz	**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	0.5 dB	0.7 dB
VSRW	1.2:1	1.3:1	1.4:1	1.5:1	1.7:1

EX1200-7008 | Sensor Simulation

Applications

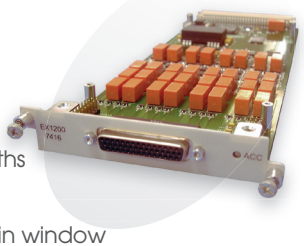
- Simulate platinum/copper/nickel or custom user defined RTD types
- Programmable by temperature or resistance value
- Sensor simulation

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

General Specifications	
Number of channels	8
Range of temperature simulation	As per standards (programmable per channel)
Resolution of temperature simulation	0.1ºC
Accuracy of temperature simulation	±0.1ºC
Range of resistance simulation	4Ω to 500Ω, 40Ω to 5,500Ω, 100Ω to 10,000Ω
Resolution of resistance simulation	0.00125Ω, 0.250Ω, 0.500Ω
Connections	2- or 4-wire
Supported RTD sensor types	
Platinum	(Pt100, Pt200, Pt500, Pt1000)
Copper	(Cu10, Cu100)
Nickel	(Ni100, Ni120)
Temperature scales	ITS-90
Resistance settling time 1	0ms
Excitation / input current	±10.5mA (max) (pulsed/continuous), 10mA @ 1000Ω, 1mA max @ 10 kΩ
Max differential voltage 1	2 V
Max power dissipation	0.1W per channel
DC offset error	< 10µV
Isolation	300 V
Connector type	44-pin

EX1200-7416 | Comparator/Event Detector/Time Stamp



Applications

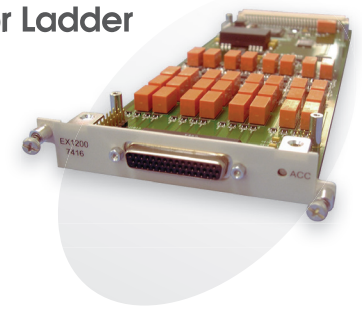
- Constantly monitor input for fault conditions
- Detect edges, out-of-bound conditions, and measure pulse widths
- Can be used as a timestamp module and as a Digital I/O
- "Go/no-go" tests where device needs to perform within a certain window
- Control applications where device or test needs to be shut down if a threshold is exceeded

Features

- Switch signals DC to 26.5 G Hz
- 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 switches and relay drivers

General Specifications	
Number of channels	16
Input ranges	±10 V, ±100 V
Input threshold	±10 V with 82mV resolution (8-bit) ±100 V with 820mV resolution (8-bit), Programmable per channel
Input edge type	Differential
Threshold hysteresis and accuracy	
10 V range	-82mV to 82mV
100 V range	-820mV to 820mV
Input edge detection	Normal (rising) or inverted (falling), Programmable per channel
Modes	
Normal	Edge detect
Paired	Upper/lower bounds
Pulsed	Positive/negative polarity
Debounce time	1µs to 1.6777216 s
Memory	43,960 events
Timestamp accuracy	
EX1200-7416	500ns
Math functions	AND / OR
Connector type	44-pin

EX1200-7600 | Programmable Resistor Ladder



Applications

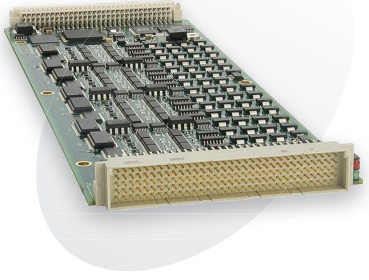
- Unit under test loadingor simulation
- Sensor simulation
- Process control
- ATE calibration

Features

- Simulate resistance from 0.5Ω to 1.5MΩ
- 0.1Ω step size
- Fault sensing over-voltage, over-current and over-temperature circuits protects unit from damage.
- Internal 5W high-precision power resistors switched in and out using mechanical relays

General Specifications	
Number of channels	16
Input ranges	±10V, ±100V
Input threshold	±10 V with 82mV resolution (8-bit)
	±100 V with 820mV resolution (8-bit), Programmable per channel
Input edge type	Differential
Threshold hysteresis and accuracy	
10 V range	-82mV to 82mV
100 V range	-820mV to 820mV
Input edge detection	Normal (rising) or inverted (falling), Programmable per channel
Modes	
Normal	Edge detect
Paired	Upper/lower bounds
Pulsed	Positive/negative polarity
Debounce time	1µs to 1.6777216 s
Memory	43,960 events
Timestamp accuracy	
EX1200-7416	500ns
Math functions	AND / OR
Connector type	44-pin

EX1200-7500 | Digital I/O



Applications

- Simulate and receive digital data up to 2 MHz sample rate.
- High-current capability for control of external relays – 300 mA sink
- Onboard 1 MB memory can be used for storing and generating patterns

Features

- 64-channel, 2 M Hz Digital I/O
- Each channel configurable as input or output
- Selectable output range from 3.3 V to 60 V
- Input data can be timestamped using EX1200 scan engine

General Specifications	
Number of channels	64
Data input characteristics	
Vout (high)	>2V to 60V
Vout (low)	<1.5 V @ 300mV
Voltage range	
Internal voltage source	±3.3V, ±5.0V, ±12.0V, ±24V
User	>2V up to 60V
Modes	
Immediate	Inputs and outputs read and written via software control
Asynchronous	Channels are latched into memory via external clock
Pattern	Buffered pattern generation and acquisition controller by internal on external clock
Gate (Pattern Mode)	Programmable active low or high
Memory depth	
Output or input enabled	2MB
Output and input enabled	1MB
Maximum external clock rate	
Pattern generation disabled	2.5MHz
Pattern generation enabled	2 MHz
Data input clock source	Internal clock, front panel input
Connector type	160-pin

LXI EX1200 Series | Quick Reference

Mainframes

Model	Slots	Note	Size	LAN Specificaion	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)zzz
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

Switches (continued)

Model	Channels	Configuration	Switched V/A	Switched Power (max)	Bandwidth (-3 dB)
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 V, 2 A	60 W, 62.5 VA	45 MHz

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

LXI EX1200 Series | Quick Reference (continued)

DMMs

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

Analog Output/Control

Model	Channels	Voltage/Current Range	Sample Rate	Max Isolation	Memory
EX1200-3604	4 V/I, 16 bit	±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	±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 µs 1	28k 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 °C	4 Ω - 6.5 kΩ 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

LXI 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

The EX7000 Family

The EX7000 family is the industry's first series of scalable microwave subsystems built on an open-architecture Ethernet/LXI platform. This innovative family of products simplifies the development of custom RF Interface Units (RFIU) requirements with its common hardware platform and software communications interface, while maintaining the look and feel of a standard COTS product.

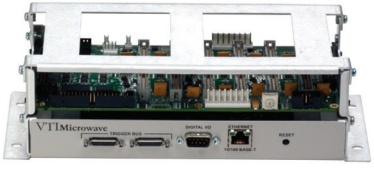
A COTS solution for custom RIFU requirements

- Configured easily into commercial-off-the-shelf products
- Supported and repeatable product builds
- Documented and designed for long-term, worldwide support
- Embedded BOMs, configuration details, and component specifications are accessible via the web from anywhere in the world

A common corporate-wide solution

- Based on LXI, a forward-looking Ethernet-based standard
- Provides the trust required for an OEM solution with VTI's reputation for product longevity
- Supported by an experienced team of RF/microwave engineers who can help you develop your system or develop one for you
- Leverage and build on your existing engineering investment

OEM Interface



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VTI instruments specializes in the design and manufacture of open-architecture solutions for custom microwave subsystems and broadband RF switching. Pioneers in the development of the first miniature microwave relay, VTI leverages the 30+ years of individual experience of our design engineers along with state-of-the-art test and analysis tools, to bring the combined benefits of a custom engineering group and a worldwide service and support infrastructure to our customers. ISO 9001 registered, VTI is an experienced, proven supplier of testing systems for critical applications in the aerospace, defense, manufacturing, medical and process industries.

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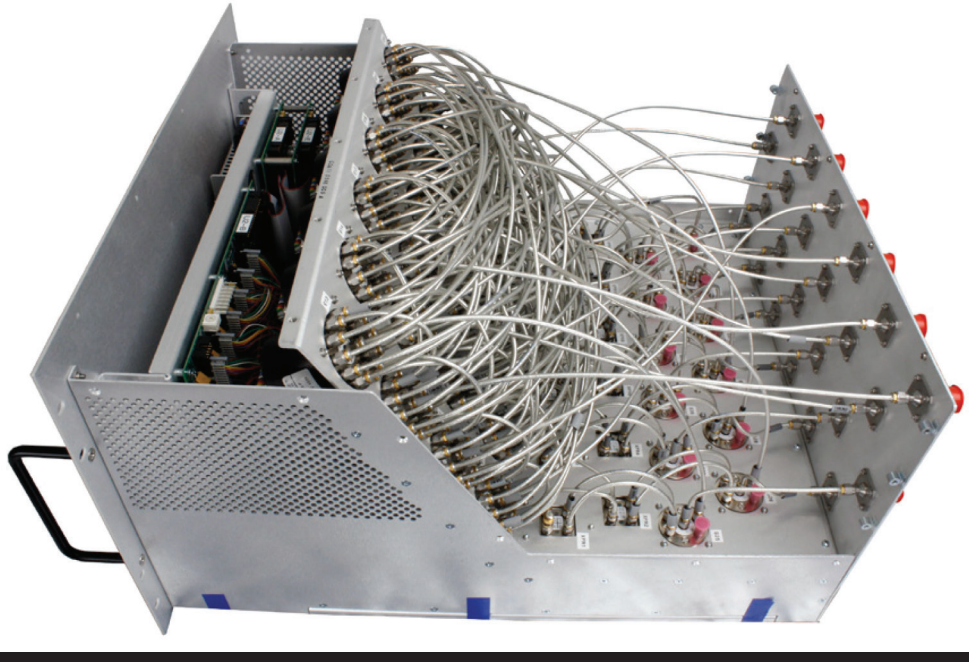
As active and founding members of the LXI, PXI, VXI and IVI consortiums, VTI understands the requirements of today's testing environments along with the complexities of planning for the future from the inside out. Our strong industry commitment combined with close relationships with the leading manufacturers of best-in-class components brings VTI's customers the most cost-effective and comprehensive solutions available in the marketplace today.



EX71HD | High-Density, Modular 26.5GHz Microwave Switch

Features

- Combine up to 12 fail-safe building blocks, dual SPDT, SP4T, SP6T, or transfer switch in a compact 1U footprint
- DC to 26.5GHz operating frequency
- Front pluggable relays facilitate field maintenance
- Embedded web interface provides interactive utility to monitor and control relays from anywhere in the world
- Flexible API supports IVI and Linux development environments minimizing software investment
- Dimensions: 1.72''H x 17.3''W x 17.8''D

General Specifications			
	VSWR	Insertion loss	Isolation
DC-4 GHz	1.20:1	0.20dB	80dB
4-8 GHz	1.30:1	0.30dB	75dB
8-12 GHz	1.40:1	0.40dB	0dB
12-18 GHz	1.50:1	0.50dB	60dB
18-26.5 GHz	1.60:1	0.60dB	55dB

Switching Frequency	DC to 26.5GHz
Switching Time	< 15ms
RF Impedance	50Ω
Connector	SMA
Lifespan	1 million cycles

Ordering Information	
Standard low profile modules	
EX71HD	1U, 12-slot microwave switch mainframe
7100	Pass through adapter with 6 drive lines
7102	Dual SPDT
7104	SP4T
7106	SP6T
7122	Transfer switch

EX7204A | EX7204L | High-Performance Modular Microwave Switch

Features

- Combine up to 32 SPDT or 16 multiport high-performance relays in a compact 2U footprint
- Dual LXI/USB communication control
- External power supply included AC/DC power adapter included (100-240 V AC, 50-60 Hz) Max DC Power Capacity - 204A: 24V 50W 7204L: 12V 60W
- Dimensions: 3.5"H x 8.6"W x 14.5"D

Ordering Information

Mainframes

EX7204A	Half-rack 2U, LXI extended class, 4-slot mainframe for non-latching modules
EX7204L	Half-rack 2U, LXI extended class, 4-slot mainframe for latching modules

RELAY MODULES

MODEL NO.	SLOT WIDTH	RELAY	QTY	BAND-WIDTH	RELAY LIFE	CONN-ECTOR	TERMINATION	INSERTION LOSS (6GHZ)	ISOLATION (6GHZ)	VSWR (6GHZ)	REPEATABILITY (6GHZ)
EX7204A-2121S	1	SPDT fail-safe	2	18 GHz	$5x10^6$ cycles	SMA	None	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204A-3121S	1	SPDT fail-safe	3	18 GHz	$5x10^6$ cycles	SMA	None	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204A-4121S	1	SPDT fail-safe	4	18 GHz	$5x10^6$ cycles	SMA	None	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204L-0202T	1	SPDT latching	2	18 GHz	$5x10^6$ cycles	SMA	50 Ω	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204L-0402T	1	SPDT latching	4	18 GHz	$5x10^6$ cycles	SMA	50 Ω	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204L-0602T	2	SPDT latching	6	18 GHz	$5x10^6$ cycles	SMA	50 Ω	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204A-1141S	1	SP4T normally open	1	18 GHz	$5x10^6$ cycles	SMA	None	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204A-2142S	1	SP4T normally open	2	26.5 GHz	$1x10^7$ cycles	SMA	None	0.30 dB	70.0 dB	1.30:1	
EX7204A-1161S	1	SP6T normally open	1	18 GHz	$5x10^6$ cycles	SMA	None	0.20 dB	70.0 dB	1.25:1	0.05 dB
EX7204A-2162S	1	SPDT latching	2	26.5 GHz	$1x10^7$ cycles	SMA	None	0.30 dB	70.0 dB	1.30:1	
EX7204L-0202T/0106T	2	SPDT latching SP6T latching	2 1	18 GHz 18 GHz	$5x10^6$ cycles $5x10^6$ cycles	SMA SMA	50 Ω 50 Ω	0.20 dB 0.20 dB	70.0 dB 70.0 dB	1.25:1 1.25:1	0.05 dB 0.05 dB

EX72SF | High-Performance Modular Microwave Switch

Features

- Combine up to 6 SPDT and 6 multiport high-performance building blocks in 2U footprint
- Switch signals up to 40 GHz
- Relays employ patented self-cleaning technology that maximizes repeatability (< 0.03 dB) over lifetime minimizes measurement uncertainty
- Extended life and self-terminating options provide maximum design flexibility
- Latching relay design reduces power consumption and improves repeatability and thermal stability
- Dimensions: 3.5''H x 17.3''W x 14.5''D

General Specifications

	VSWR	Insertion loss	Insertion (EL*)
DC-4 GHz	1.20:1	0.36dB	90dB (100db)
4-8 GHz	1.35:1	0.42dB	90dB (100db)
8-12 GHz	1.35:1	0.48dB	90dB (100db)
12-15 GHz	1.45:1	0.52dB	70dB (80db)
15-18 GHz	1.45:1	0.57dB	65dB (70db)
18-20 GHz	1.70:1	0.60dB	65dB (70db)
20-26.5 GHz	1.70:1	0.70dB	60dB (65db)
26.5-40 GHz	1.95:1	1.10dB	65dB

*(EL) = With Extended Life Option

Switching Frequency	DC to 40 GHz	DC to 26.5 GHz	DC to 20 GHz
Switching Time	< 15ms		
RF Impedance	50Ω		
Connector	DC-26.5GHz: SMA	DC-40GHz: 2.92 (f)	
Lifespan	2 million cycles (5 million cycles)		

Ordering Information

Model	Description
EX72SF	2U, 12-slot high-performance RF/microwave switch mainframe
7200	Adapter, 6 universal 24V driver lines
7202-20	SPDT, latching 20GHz
7202-26	SPDT, latching 26.5GHz
7202-20T	SPDT, self-terminated, 20GHz
7202-26T	SPDT, self-terminated, 26.5GHz
7202-20TEL	SPDT, self-terminated, EL, 20GHz
7202-26TEL	SPDT, self-terminated, EL, 26.5GHz
7222-26	Transfer, 26GHz
7222-26EL	Transfer, EL, 26GHz
7204-20	SP4T, latching 20GHz
7204-26	SP4T, latching 26.5GHz

Ordering Information (continued)	
Model	**Description**
7204-20T	SP4T, self-terminated, 20GHz
7204-26T	SP4T, self-terminated, 26.5GHz
7204-20TEL	SP4T, self-terminated, EL, 20GHz
7204-26TEL	SP4T, self-terminated, EL, 26.5GHz
7204-40TEL	SP4T, self-terminated, EL, 40GHz
7206-20	SP6T, latching 20GHz
7206-26	SP6T, latching 26.5GHz
7206-20T	SP6T, self-terminated, 20GHz
7206-26T	SP6T, self-terminated, 26.5GHz
7206-20TEL	SP6T, self-terminated, EL, 20GHz
7206-26TEL	SP6T, self-terminated, EL, 26.5GHz
7206-40TEL	SP6T, self-terminated, EL, 40GHz

Features

- Integrated EX7000-OEM device control and relay driver interface
- LXI communications with IEEE-1588 and wired trigger-bus promotes seamless integration with other instrumentation
- 150 W power supply for the most complex designs
- Built-in fans for cooling
- Removable tray for mounting components and interconnect cables
- Supports custom RF/Microwave, optical, or power interface subassemblies while minimizing the time spent developing a software and communications interface.
- I/O access through rear or front panel for increased design flexibility
- 72 drive channels standard, expandable to 576 channels and 32-bit TTL I/O per driver board, expandable to 256
- Industry standard IVI driver set provides a well-documented software API that minimizes development time
- 128 element configuration table for quick recall of common setups
- Graphical XML configuration utility generates custom box "personality"
- Embedded web GUI for monitor and control of components

Ordering Information		
Model	**Description**	**Dimention**
EX7300	3U mainframe with EX7000-OEM	32.6mm (5.3") h x 444.5mm (17.5") W x 609.6mm (24.0") D
EX7400	4U mainframe with EX7000-OEM	177.1mm (7.0") h x 444.5mm (17.5") W x 609.6mm (24.0") D
EX7500	OEM	1.5mm (8.8") h x 444.5mm (17.5") W x 609.6mm (24.0") D
EX7600	6U mainframe with EX7000-OEM	266.0mm (10.5") h x 444.5mm (17.5") W x 609.6mm (24.0") D

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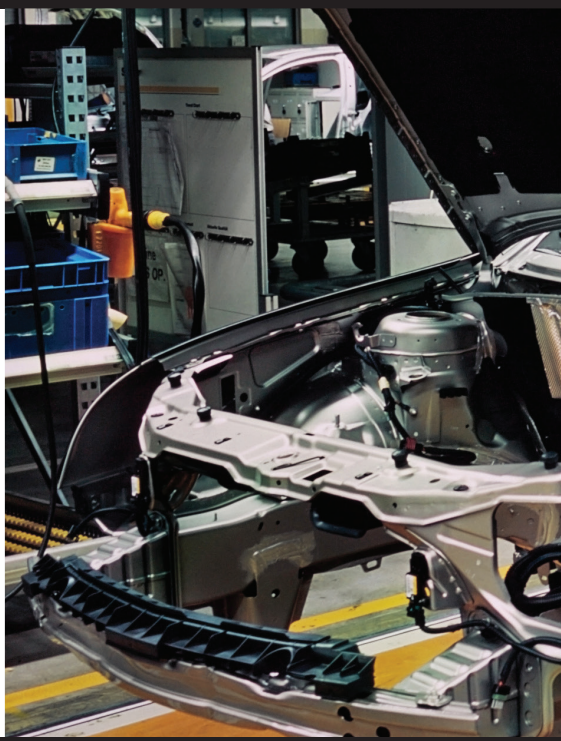

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