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VTI Instruments

SCALABLE

HIGH-DENSITY

PERFORMANCE GRADE

COST-EFFECTIVE

SET UP AND RUN





EX1200 Series

High-Density Switch/Measure and Control Systems

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Highlights

Scalable architecture in half and full rack 1U and 3U 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

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 Class A 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 trigger bus

DAC Express “Set Up and Run” software simplifies data acquisition and analysis

Web-based access for monitoring and control of devices, from anywhere in the world, using any web-enabled device

EX1200 Series

High-Density Switch/Measure and Control Systems

Applications

- General purpose signal switching
- RF signal routing
- Power supply switching
- Temperature monitoring (RTD, thermocouple, thermistor)
- Automotive ECM testing
- Process monitor
- Data logging applications
- Cable/harness testing
- Battery test

Overview

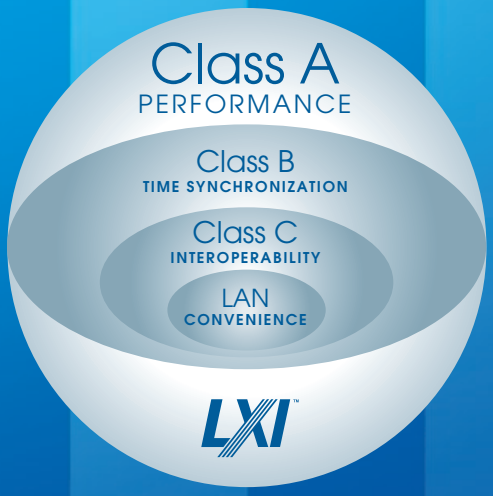
High-Density Switch Subsystem with Scanning Measurement and Control

The EX1200 series is the highest density scanning switch/measure and control subsystem on the market today with the capacity to switch up to 576 channels of voltage or temperature in a single rack U mainframe. Mix and match a variety of modules to build a comprehensive signal switching subsystem that performs data logging, level detection and control.

Optimized Performance and Scalability

The EX1200 series is designed to leverage capital investments in one common hardware and software platform that can be used in development, manufacturing and field service. A compact 1U design provides granularity to address small channel requirements while a high-density 3U mainframe can be used in large channel count applications. Multiple EX1200 series mainframes and other VTI instrumentation, such as EX1000 and EX1629 precision temperature and strain devices, can be easily connected with the LXI communications interface to create a highly synchronized, distributed measurement system.

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LXI Class Definition

Open Architecture Solutions – The Freedom to Choose

Open Hardware – Maximize Performance, Minimize Risk

VTI cofounded LXI*, an industry standard for Ethernet-based test instrumentation, and is also the industry leader in VXI and VME-based switch modules. VTI switching solutions incorporate LXI Class A technology, the superset of the LXI specification that delivers backplane-like performance in the footprint of a box. Why buy "LXI-lite" (Class B or C) products when you can have it all?

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

*LAN eXtensions for Instrumentation



Device Identification over the Web

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.

- An API that conforms to the industry standard IVI specification
- Transportable front panels that monitor and control instruments from anywhere, on any web-enabled device
- OS independence with drivers that work seamlessly in Linux and Windows
- C++ LabVIEW, LabWindowsTM/CVI, Visual Basic driver support
- Auto-instrument discovery using NI-MAX and Agilent Connection Expert

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Scalable "A"– Class Technology

Internal 5-wire bus routes directly to DMM

Half-rack, 1U with 2 slots



EX1262-Front View

19" rackmount options

Robust connectors provide durable interface



EX1206-Front View

Full-featured 6.5 digit DMM

Full rack, 1U with 6 slots

Modules plug in from the front – Minimizes system wiring

Optional benchtop protective mounts



EX1266-Front View

Analog bus extension

Digital alarm outputs

LAN/LXI status LEDs

Standard LAN connectivity

8-line LXI Class A trigger bus – Precision hardware handshaking



EX1266-Rear View

Screw terminal block with internal CJC



EX1200-TB104

Full rack, 3U with 16 slots



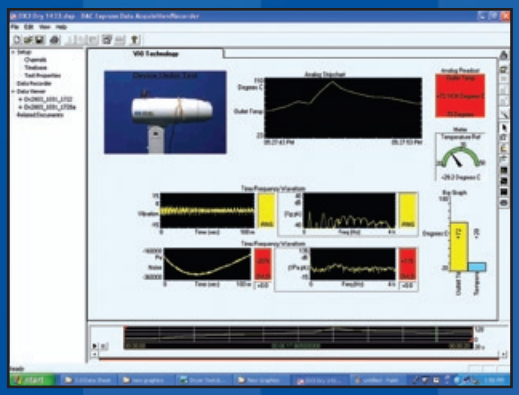
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Embedded Web Interface



DAC Express

Powerful Software Options, Designed for Ease of Use

Easy-to-Use Graphical Control

VTI delivers a variety of software utilities and options that reduce the time it takes to begin using the EX1200 family of products. The series is delivered with an embedded web interface that provides virtual monitoring and control of all switches and instruments without the need for third-party software.

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.

DAC Express - Set Up and Run

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

With DAC Express and an EX1200 mainframe, engineers can design a mixed-signal distributed measurement system that includes voltage, thermocouple, RTD, and digital inputs. A wide range of graphical displays are available to generate customized views of multiple channels simultaneously. DAC Express systems save time and reduce the frustration normally associated with software development efforts.

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, LabWindowsTM/CVI, C++ and Visual Basic. The EX1200 drivers allow a programmer to:

- Achieve faster development time through path-level programming
- Plan routine maintenance by automatically tracking relay closures
- Precisely synchronize distributed measurements through IEEE-1588
- Use the LXI Class A trigger bus for highly deterministic hardware handshaking

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. Therefore, low-level coding is not required to access the full capability of the instrument.

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EX1200 Series Quick Reference

Mainframes

Model	Slots	DMM	Size	LAN Specification	Backplane Extension Lines
EX1266	6	6.5 digits	Full rack, 1U	LXI Class A 10/100T	5
EX1206	6	No	Full rack, 1U	LXI Class A 10/100T	5
EX1262	2	6.5 digits	Half rack, 1U	LXI Class A 10/100T	5
EX1202	2	No	Half rack, 1U	LXI Class A 10/100T	5
EX1208	16	No	Full rack, 3U	LXI Class A 10/100T	5
EX1268	16	6.5 digits	Full rack, 3U	LXI Class A 10/100T	5
EX1269	6-M/8	6.5 digits	Full rack, 3U	LXI Class A 10/100T	24 Matrix/5 DMM

Switches

Model	Channels	Configuration	Switched V/A	Switched Power (max)	Bandwidth -3dB
EX1200-2001	20	SPST (Form A)	125 V/16 A	480 W DC, 2000 VA	10 MHz
EX1200-2002	12	SPDT (Form C)	125 V/16 A	480 W DC, 2000 VA	10 MHz
EX1200-2007A	24	2/4-wire multiplexer	1000 V/1 A	25 W DC	15 MHz
EX1200-3048	48	2/4-wire multiplexer	300 V/2 A	60 W DC, 125 VA	40 MHz
EX1200-3048S	48	2/4-wire FET multiplexer	250 V/0.2 A	25 W DC, 25 VA	10 MHz
EX1200-3072	72	2/4-wire multiplexer	300 V/2 A	60 W DC, 125 VA	40 MHz
EX1200-3096	96	2/4-wire multiplexer	100 V/1 A	30 W DC	10 MHz
EX1200-3164	64	(16) 1 x 4 2-wire multiplexer	300 V/2 A	60 W DC, 125 VA	50 MHz
EX1200-4003	128 xpoint	Dual 4 x 16 2-wire matrix	250 V/2 A	60 W DC, 62.5 VA	45 MHz
EX1200-4128	512 xpoint	4 x 128 1-wire matrix	150 V/0.5 A	10 W DC/AC	10 MHz
EX1200-5001	80	SPST (Form A)	300 V/2 A	60 W DC, 125 VA	10 MHz
EX1200-5002	30	SPDT (Form C)	300 V/2 A	60 W DC, 125 VA	30 MHz
EX1200-5001	40	SPST (Form A)	300 V/2 A	60 W DC, 125 VA	10 MHz
EX1200-5007	12	SPDT (Form C)	300 V/2 A	60 W DC, 125 VA	30 MHz
EX1200-6101	10	SP4T coaxial trees	100 V/0.5 A	10 W	1.3 GHz
EX1200-6111	5	SP4T coaxial trees	100 V/0.5 A	10 W	1.3 GHz
EX1200-6216	2	Dual 1 x 16 coaxial trees	100 V/0.5 A	10 W	1 GHz
EX1200-6301	4	SP4T coaxial trees	30 V/0.5 A	10 W	3 GHz

Digital I/O

Model	Channels	Sample Rate	Memory	Type	Iout max (sink)	Vout max
EX1200-7500	(8) 8-bit ports	2 MHz	2 MB	Open collector/TTL	< 300 mA	60 V

Comparator/Edge Detector

Model	Channels	Voltage Range	Min Pulse Width	Memory
EX1200-7416	16 DE or SE	±10/100 V	1 us	1 M event

Analog Output/Control

Model	Channels	Voltage Range	Current Range	Max Isolation	Sample Rate	Memory
EX1200-3604	4 V/I, 16-bit	±0.1/1/10/20 V	±20 mA	100 V DC/100 V AC peak	400 kSa/s	1 Msample
EX1200-3608	8 V/I, 16-bit	±0.1/1/10/20 V	±20 mA	100 V DC/100 V AC peak	400 kSa/s	1 Msample

Terminal Blocks (with built-in CJC)

Model	Connector Compatibility
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

*Contact factory for latest module releases. All information and specifications subject to change without notice.

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EX1200 Series Specifications

System Specifications

Physical Dimensions	
EX1202/EX1262	Half rack U mainframe (17 ¼" D, TBD" W, 1.75" H)
EX1206/EX1266	1 rack U mainframe (17 ¼" D, 17 ¼" W, 1.75" H)
EX1208/EX1268/EX1269	3 rack U mainframe (19" D, 17 ¼" W, 5.25" H)
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) 10% - 90% non-condensing @ 60 °C with conformal coating
Storage temperature	-40° C – 70° C
Storage altitude	15,000 ft (4,500 m) maximum
Storage humidity	5% – 95%, non-condensing
Shock and vibration	Per 3.8.5 of MIL-PRF-28800F, Class 3
Warm-Up Time	30 min
Line Frequency	Manually set to 50 Hz or 60 Hz (default)
LXI Specifications Compliance	
Clock	LXI Class A
Clock Oscillator Accuracy	+/- 50 ppm
Synchronization Accuracy	Synchronized when <+/- 200 us of the 1588 master clock
Timestamp Accuracy	As good as time synchronization, down to 50 ns
Timestamp Resolution	25 ns
IEEE 1588-Based Trigger Timing	
Alarm Trigger Time Accuracy	As good as time synchronization, down to 50 ns
Alarm Time to Trigger Delay	50 ns
Receive LAN[0-7] Event	
Trigger Time Accuracy	As good as time synchronization, down to 50 ns
Time to Trigger Delay	
Future Timestamp	50 ns typical
Past/Zero Timestamp	1 ms maximum
LXI Trigger Bus	
Time to Trigger Delay	55 ns typical
DIO Bus	
Time to Trigger Delay	57 ns typical
Software	
Operating Systems	Windows, Linux®
API/Driver Support	IVI (C/COM), LabVIEW, LabWindows™/CVI, VEE, Visual Basic, C/C++, .NET

Ordering Information (Mainframes)

EX1202	2-slot, 1 U mainframe (half rack)
EX1206	6-slot, 1 U mainframe
EX1208	16-slot, 3U mainframe
EX1262	2-slot, 1 U mainframe, plus 6.5 Digit DMM (half rack)
EX1266	6-slot, 1 U mainframe, plus 6.5 Digit DMM
EX1268	16-slot, 3 U mainframe, plus 6.5 Digit DMM
EX1269	8-slot standard, 6-slot matrix, 3U Mainframe, plus 6.5 digit DMM
70-0361-102	Rack ear kit with rear support bracket, full rack width 1U (EX1206/EX1266)
70-0370-102	Rack ear kit with rear support bracket, full rack width, 3U (EX1208/EX1268/EX1269)
70-0373-103	Rack ear kit with rear support bracket, half rack width, 1U (EX1202/EX1262)
70-0373-104	Rack ear kit with rear support bracket, dual half rack width, 1U (EX1202/EX1262)
70-0361-100	Tabletop guard kit
41-0472-012	Blanking Panel

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DMM Specifications (EX1262/EX1266/EX1268/EX1269)

Measurement Functions	DC voltage, AC voltage (true rms), DC current, AC current (true rms), 2-wire ohms, 4-wire ohms, temperature and frequency
Warm-Up Time	30 min
Memory	65,536 readings (with timestamp), old data overwritten by new data if not read. Timestamp is relative to a trigger event with microsecond resolution.
Saved States	8 user configuration states in non-volatile memory
Measurement Integration Time	Programmable as multiple of power line cycle (PLC) from 0.01 PLC to 100 PLC or as time from 167 µs to 2 s
Line Frequency	Manually set to 50 Hz or 60 Hz (default)
Limits	Programmable lower and upper limit values
Reading Buffer Statistics	Count, Minimum, Maximum, Average
Trigger	
Type	LXIsync, Automatic or programmable delay
Resolution	1 µs resolution from 0 s to 4,294 s
Source	Internal (register-based) or external (front panel or any of 4 BIB trigger lines)
Trigger Count	Programmable 1 to 4,294,967,295
Sample Count	Programmable 1 to 4,294,967,295

Maximum Non-Destructive Inputs

Signal	CAT-I Inputs Limit
HI or Sense HI to LO	450 V
HI or Sense HI to Guard	450 V
HI or Sense HI to Chassis (GND)	450 V
LO or Sense LO to Guard	450 V
LO or Sense LO to Chassis (GND)	450 V
Guard to Chassis (GND)	450 V
Maximum common mode voltage	±450 V
Using external probe	1.5 kV
Current input protection	3 A, 250 V fuse, externally accessible

NOTE: All accuracy specifications on the following pages are based on 30 minute warm-up and 6 ½ digits with trigger auto-delay, range auto-delay, and auto-zero ON, max operating temperature of 50 °C.

Resolution

PLC Multiple (50 Hz OR 60 Hz)	
10	6 ½ digits
1.0	5 ½ digits
0.1	4 ½ digits
0.01	4 digits

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DC Voltage

RANGE	RESOLUTION	INPUT RESISTANCE*	1 YEAR ACCURACY 23° C ± 5° C % READING	1 YEAR ACCURACY 23° C ± 5° C % RANGE	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % READING/° C	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % RANGE/° C
100 mV	0.1 µV	> 1 GΩ, 10 MΩ	0.0050	0.0050	0.0005	0.0005
1 V	1 µV	> 1 GΩ, 10 MΩ	0.0050	0.0010	0.0005	0.0001
10 V	10 µV	> 1 GΩ, 10 MΩ	0.0050	0.0010	0.0005	0.0001
100 V	100 µV	10 MΩ	0.0050	0.0010	0.0005	0.0001
300 V	100 µV	10 MΩ	0.0050	0.0030	0.0005	0.0003

** Selectable input resistance to support external high-voltage probe, 10.0 MΩ ± 1%.*
Over-range: 20% of range, except 300 V range
Normal Mode Rejection Ratio (NMRR) at power line frequency ±0.1%: 60 dB for 1 PLC, 10 PLC, 100 PLC.
Common Mode Rejection Ratio (CMRR): 140 dB at DC.
Input bias current: < 100 pA typical at 23° C.

DC Current

RANGE	RESOLUTION	MAXIMUM INPUT VOLTAGE	1 YEAR ACCURACY 23° C ± 5° C % READING	1 YEAR ACCURACY 23° C ± 5° C % RANGE	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % READING/° C	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % RANGE/° C
1 mA	1 nA	< 0.1 V	0.0700	0.0200	0.0050	0.0020
10 mA	10 nA	< 0.1 V	0.0700	0.0200	0.0050	0.0020
100 mA	100 nA	< 0.6 V	0.0700	0.0050	0.0060	0.0005
1 A	1 µA	< 1.0 V	0.1500	0.0100	0.0050	0.0010
3 A	1 µA	< 2.0 V	0.1500	0.0300	0.0050	0.0020

** Add 0.15% of reading above 2 A.*
Over-range: 20% of range, except 3 A range

2-Wire, 4-Wire Resistance*

RANGE	RESOLUTION	TEST CURRENTS**	1 YEAR ACCURACY 23° C ± 5° C % READING	1 YEAR ACCURACY 23° C ± 5° C % RANGE	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % READING/° C	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % RANGE/° C
100 Ω	100 uΩ	1 mA	0.0100	0.0040	0.0006	0.0005
1 kΩ	1 mΩ	1 mA	0.0100	0.0010	0.0006	0.0001
10 kΩ	10 mΩ	100 µA, 500 µA	0.0100	0.0010	0.0006	0.0001
100 kΩ	100 mΩ	10 µA, 50 µA	0.0100	0.0010	0.0006	0.0001
1 MΩ	1 Ω	5 µA	0.0100	0.0010	0.0010	0.0002
10 MΩ	10 Ω	700 nA ‖ 10 MΩ	0.0540	0.0010	0.0030	0.0004
***30 MΩ	100 Ω	700 nA ‖ 10 MΩ	***0.1300	***0.0100	0.1500	0.0002
100 MΩ	100 Ω	700 nA ‖ 10 MΩ	0.8000	0.0100	0.1500	0.0002

** 4-wire specified for 100 Ω - 100 kΩ ranges only*
*** Selectable test current on 10 kΩ, 100 kΩ ranges*
**** Applies to 100 MΩ range up to 30 MΩ readings only*
Open circuit test voltage: 10 V
Maximum 4-wire lead resistance 10% of range per lead for 100 Ω range and 1 kΩ range. 1 kΩ per lead for all other ranges.
Percentage of range specification for the 30 MΩ is based on the use of the 100 MΩ circuitry.

System Speed For DC Measurements*

EVENT	
Function change	9 / s
Range change	9 / s
Auto-range time	< 30 ms
Max. reading rate	1000/s (see DC Voltage Reading Rate tables on next page)
Max. internal trigger rate	1000/s
Max. ext. trig. rate to memory	1000/s

** Auto-zero off, trigger and sample delay = 0, 0.01 PLC*

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DC Voltage Reading Rate*

Rate	READINGS/SECOND [60 HZ (50 HZ)]	DIGITS	NMRR	CMRR
10 PLC	5.9 (4.9)	6 ½	60 dB	140 dB
1 PLC	59 (49)	5 ½	60 dB	140 dB
0.1 PLC	599 (499)	4 ½	--	80 dB
0.01 PLC	1000 (1000)	4	--	80 dB

** Auto-zero off, trigger and sample delay = 0*

AC Voltage

RANGE	RESOLUTION	FREQUENCY RANGE	1 YEAR ACCURACY 23° C ± 5° C % READING	1 YEAR ACCURACY 23° C ± 5° C % RANGE	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % READING/° C	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % RANGE/° C
100 mV	100 nV	3 Hz - 5 Hz	1.0000	0.0400	0.1000	0.0040
		5 Hz - 10 Hz	0.3500	0.0400	0.0350	0.0040
		10 Hz - 20 kHz 0	.0600	0.0400	0.0050	0.0040
		20 kHz - 50 kHz	0.1200	0.0500	0.0110	0.0050
		50 kHz - 100 kHz	0.6000	0.0800	0.0600	0.0080
		100 kHz - 300 kHz	5.0000	0.5000	0.0200	0.0200
1 V 10 V *100 V	1 µV 10 µV 100 µV	3 Hz - 5 Hz	1.0000	0.0300	0.1000	0.0030
		5 Hz - 10 Hz	0.3500	0.0300	0.0350	0.0030
		10 Hz - 20 kHz	0.0600	0.0300	0.0050	0.0030
		20 kHz - 50 kHz	0.1200	0.0500	0.0110	0.0050
		*50 kHz - 100 kHz	0.6000	0.0800	0.0600	0.0080
		*100 kHz - 300 kHz	5.0000	0.5000	0.2000	0.0200
*300 V	100 µV	3 Hz - 5 Hz	1.0000	0.0900	0.1000	0.0030
		5 Hz - 10 Hz	0.3500	0.0900	0.0350	0.0030
		10 Hz - 20 kHz	0.0600	0.0900	0.0050	0.0030
		20 kHz - 50 kHz	0.1200	0.1500	0.0110	0.0050
		*50 kHz - 100 kHz	0.6000	0.2400	0.0600	0.0080
		*100 kHz - 300 kHz	5.0000	1.5000	0.2000	0.0200

Specifications are for sine wave input > 5% of range for 100 mV – 100 V ranges, >15% for 300 V range, with slow ac filter selected.
** Volt-hertz product is limited to $1.5x10^7$ V•Hz.*
Over-range: 20% beyond range, except 300 V range.
Input Impedance: 1 MΩ ± 2% in parallel with < 100 pF.

AC Voltage Reading Rate

FILTER SETTING	
Slow*	3 readings/second
Medium*	20 readings/second
Fast	Auto-zero, delay, line frequency, and integration time dependent. Refer to DC voltage reading rates.

** Slow and medium filter settings ignore line frequency, integration time, and auto-zero settings.*

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AC Current

RANGE	RESOLUTION	FREQUENCY RANGE	1 YEAR ACCURACY 23° C ± 5° C % READING	% RANGE	TEMPERATURE COEFFICIENT 0° C - 18° C; 28° C – 50° C % READING/° C	% RANGE/° C
10 mA	100 nA	20 Hz - 45 Hz	2.0000	0.2000	0.1000	0.0060
		45 Hz - 100 Hz	2.0000	0.2000	0.0350	0.0060
		**100 Hz - 20 kHz	2.0000	0.2000	0.0150	0.0060
100 mA	100 nA	20 Hz - 45 Hz	1.0000	0.0600	0.1000	0.0060
		45 Hz - 100 Hz	0.4000	0.0600	0.0350	0.0060
		**100 Hz - 20 kHz	0.4500	0.0600	0.0150	0.0060
1 A	1 µA	20 Hz - 45 Hz	0.3500	0.0400	0.0350	0.0060
		**45 Hz - 20 kHz	0.1500	0.0400	0.0150	0.0060
		**20 kHz - 50 kHz	0.4000	0.0400	0.0150	0.0060
*3 A	1 µA	20 Hz - 45 Hz	0.9500	0.0600	0.0350	0.0060
		**45 Hz - 20 kHz	0.7500	0.0600	0.0150	0.0060
		**20 kHz - 50 kHz	0.7800	0.0600	0.1500	0.0600

Specifications are for sine wave input > 5%, with slow AC filter.
** Valid to 2 A, 20 Hz to 5 kHz; add 0.25% of reading above 2 A.*
*** Specifications above 5 kHz are typical.*

Burden Voltage

AC CURRENT RANGE	
10 mA	< 0.1 V rms
100 mA	< 0.6 V rms
1 A	< 1 V rms
3 A	< 2 V rms

Over-range: 20% of range, except 3 A range

Crest Factor*

ADDITIONAL ERROR (% READING)	
1 – 2	0.05%
2 – 3	0.15%
3 – 4	0.30%
4 – 5	0.40%

** For non-sine wave inputs*

AC Filter Bandwidth

FILTER TYPE	
Slow	3 Hz - 300 kHz
Medium	20 Hz - 300 kHz
Fast	200 Hz - 300 kHz

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Additional Low Frequency Filter Errors*

FREQUENCY	SLOW AC FILTER	MEDIUM AC FILTER	FAST AC FILTER
10 Hz – 20 Hz	0.0000	0.7400	N/A
20 Hz – 40 Hz	0.0000	0.2200	N/A
40 Hz – 100 Hz	0.0000	0.0600	0.7300
100 Hz – 200 Hz	0.0000	0.0100	0.2200
200 Hz – 1 kHz	0.0000	0.0000	0.1800
>1 kHz	0.0000	0.0000	0.0000

** AC voltage and AC current (%Reading)*

Additional Low Frequency Sampling Errors*

FREQUENCY	6½ DIGIT RESOLUTION	5½ DIGIT RESOLUTION	4½ DIGIT RESOLUTION
3 Hz – 5 Hz	0.0000	0.1200	0.1200
5 Hz – 10 Hz	0.0000	0.1700	0.1700
10 Hz – 40 Hz	0.0000	0.2000	0.2000
40 Hz – 100 Hz	0.0000	0.0600	0.2100
100 Hz – 300 Hz	0.0000	0.0300	0.2100
300 Hz – 1 kHz	0.0000	0.0100	0.0700
> 1 kHz	0.0000	0.0000	0.0002

** AC voltage and AC current (%Reading)*

Front Panel Connector

TYPE
5 banana jacks

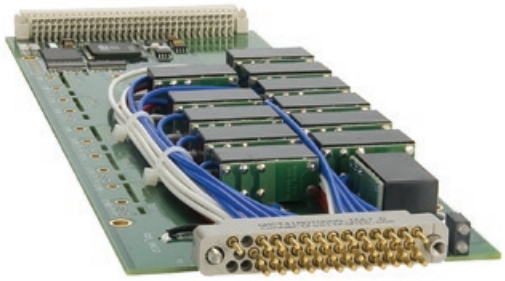
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EX1200-2001

20 Channel 16 A Form A (SPST) Switch

EX1200-2002

12 Channel 16 A Form C (SPDT) Switch



EX1200-2002

Overview

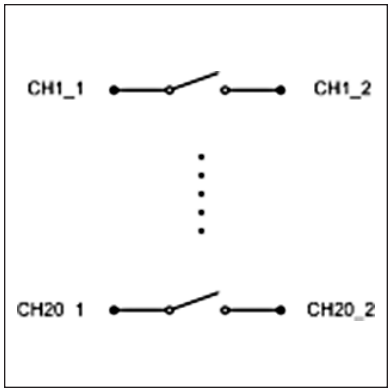
The EX1200-2001 and EX1200-2002 are the only switch modules in their class with the ability to switch up to 16 As. Some applications include: AC line power switching, switching of DC or AC power supplies, controlling or driving relays for industrial machines (robotics, numerical control machines), automotive engine control, and solenoid switching.

Since these modules typically switch power to the UUT or interface, the digital input lines on the EX1200 series mainframes support the ability to force all relays automatically to their normally open state if a fault condition occurs. This approach instantly removes all power to the UUT or interface. These modules can be automatically configured in the setup phase at the beginning of each scan step to facilitate test sequencing and control.

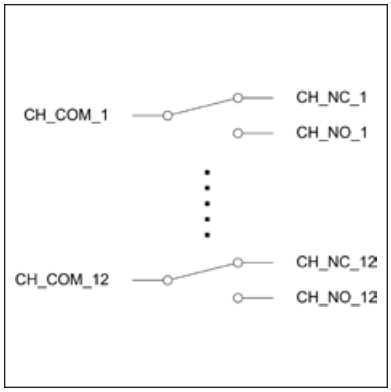
Features

- Large switching capacity in a small footprint
- High breakdown voltage (1,000 V rms between open contacts)
- Ideal for switching AC or DC power supplies and current sources
- Fail-safe interrupt inputs that can detect a fault condition automatically open up relays to their default state
- Combine with other EX1200 switch modules to form a switching subsystem

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EX1200-2001



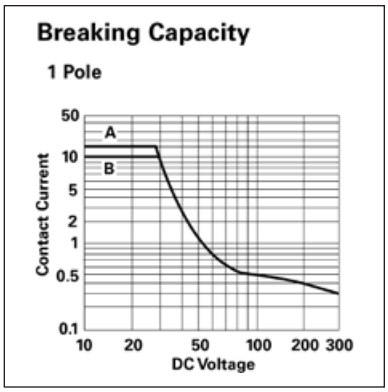
EX1200-2002

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EX1200-2001 20 Channel 16 A Form A (SPST) Switch
EX1200-2002 12 Channel 16 A Form C (SPDT) Switch

Specifications

Number of Channels	20 SPST (2001)
	12 SPDT (2002)
Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	250 V AC 125 V DC
Maximum Switching Current	16 A
Maximum Switching Power	480 W DC, 2000 VA per channel
Path Resistance	< 100 mΩ
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
Per Channel (HI-LO)	< 50 µV
Capacitance	
Open Channel	< 20 pF
Channel-Mainframe	< 20 pF
Bandwidth (-3 dB)	10 MHz typical
Insertion Loss	
100 kHz	< 0.2 dB
1 MHz	< 0.5 dB
10 MHz	< 1.0 dB
Crosstalk	
100 kHz	< -75 dB
1 MHz	< -50 dB
10 MHz	< -40 dB
Rated Switch Operations	
Mechanical	5 x 10^7
Electrical	1 x 10^5 at full load
Switching Time	< 10 ms
Connector Type	41-pin Positronic



Ordering Information

EX1200-2001	20 channel, 16 A Form A (SPST) switch
EX1200-2002	12 channel, 16 A Form C (SPDT) switch
70-0190-001	Connector kit (includes 1 each connector and backshell plus 44 pins)
46-0012-000	Crimp tool and turret head
46-0014-000	Insertion tool, pin extractor, size 16 contact, A M series
46-0015-000	Extraction tool, contact insertion, Positronic power/coaxial
27-0087-000	Contact, female, crimp, power connector, 14 - 16 GA (Order qty: 44 per board)
27-0087-041	Connector, power, female with backshell, insulated, 41 PLC



16 A connectors and tooling

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EX1200-2007A

48 channel 1000 V Multiplexer

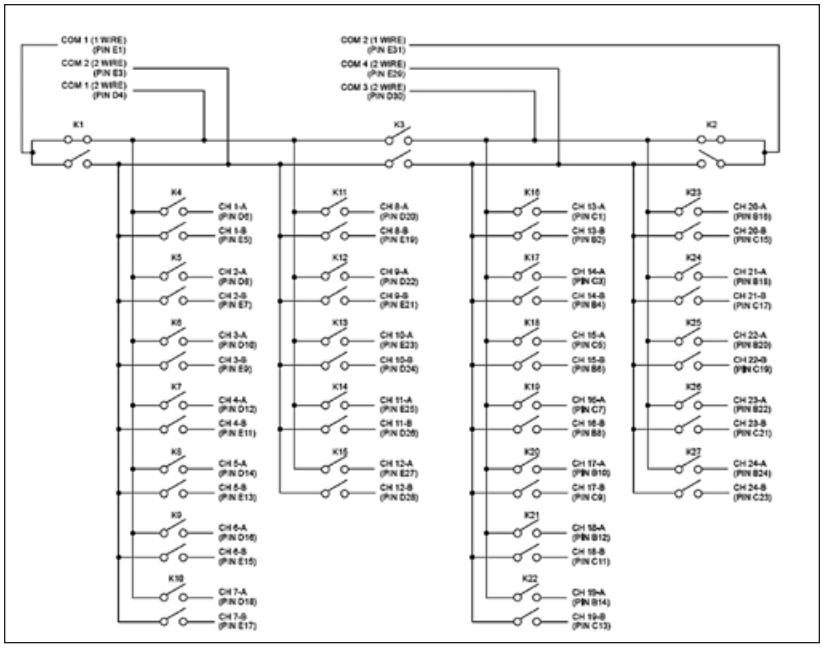
Overview

The EX1200-2007A is designed for scanning multiple high-voltage points to a common bus in either 1- or 2- wire configurations. It consists of two individual (1 x 12) 2-wire multiplexers, or dual (1 x 24) 1-wire multiplexers that can be interconnected under program control (via bussing relays) to configure larger multiplexers as required. This reduces the need for external cabling and helps reduce unterminated stub effects.

When switching high voltages, the need for signal shielding becomes critical. The EX1200-2007A has been designed to include large shield planes that reduce crosstalk and voltage spikes to adjacent channels.

A fail-safe interrupt line is provided on the front panel that can be used when switching high-voltage source/measure units, or power supplies. This interrupt can be programmed to open up all relays automatically in the event of a fault condition and, thus instantly removing power from the user interface.

Up to 144 2-wire channels can be accommodated in a single EX1200 series mainframe for maximum density, or combined with other EX1200 series modules to create a flexible system switch.



EX1200-2007A

Features

High-density 1000 V DC multiplexing/ scanning (up to 144 two-wire channels in 1U footprint)

Built-in configuration relays expand the individual building blocks

Ideal for hipot, cable breakdown, source measure unit and power supply switching

Extensive signal shielding employed on-board for excellent signal fidelity

Fail-safe interrupts can detect fault condition and automatically open up relays to a default state

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EX1200-2007A 48 channel 1000 V Multiplexer

Specifications

Channel Count	(1 x 24) 2-wire, Dual (1 x 12) 2-wire, or Dual (1 x 24) 1-wire
Relay Type	Reed
Maximum Switching Voltage	1000 V DC
Maximum Switching Current	1 A
Maximum Carry Current	2 A
Maximum Switching Power	25 W dc
Path Resistance	< 1 Ω
Insulation Resistance	> 1 x 10^7 Ω
Bandwidth (-3 dB)	15 MHz typical
Rated Switch Operations	
Mechanical	1 x 10^8
Electrical	1 x 10^6 at full load
Switching Time	< 1 ms
Front Panel Connector	160-pin DIN (1/2 populated)

Ordering Information

EX1200-2007A	48 channel 1000 V multiplexer
52-0109-000	100 crimp pins
46-0010-000	Crimp tool
46-0011-000	Extraction tool
70-0363-504	Strain relief bracket kit (includes connector – recommended accessory)
70-0363-503	Strain relief bracket kit (no connector)
27-0088-160	Mating connector



DIN connectors and tooling

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EX1200-3048

48 channel 300 V/ 2 A Multiplexer



Overview

The EX1200-3048 high-density multiplexer modules is designed for scanning of multiple points to a common bus, in either 2- or 4-wire configurations, either synchronously with the EX1200 system DMM scan function, or asynchronously as a system switch to other devices through LXI LAN messages or the hardware trigger bus. Up to 288 two-wire (or 144 four-wire) channels can be accommodated in a single EX1200 full rack mainframe for maximum density, or mixed and matched with other EX1200 plug-ins for flexibility. Applications include cable harness testing, temperature/voltage monitoring, PCB testing, and those in which multiple points need to be switched to a common resource. All relays also have individual control, and each path allows for hot switching of up to 300 V and 2 A (60 W dc max). Two dedicated channels the capability to directly measure current up to 3 As.

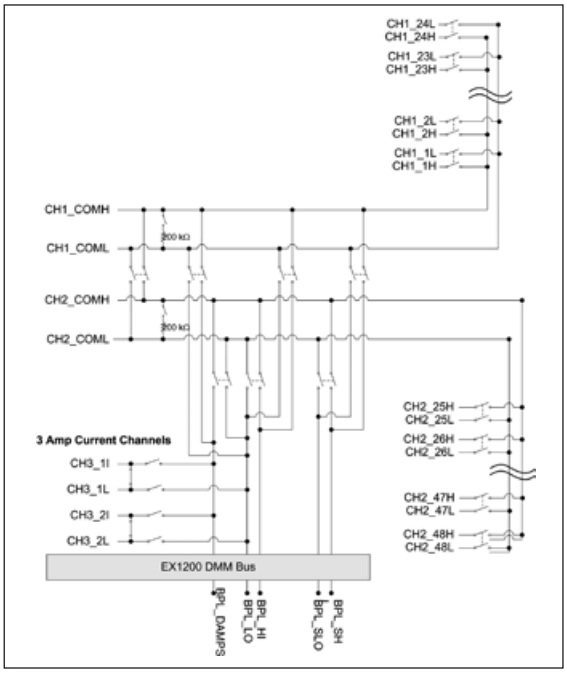
The EX1200-3048 consists of dual (1x24) 2-wire multiplexer banks. Each bank can be interconnected within a module under program control (via bussing relays) to form a 1 x 48 multiplexer. The EX1200 analog bus can be used to configure larger multiplexers which eliminates external wiring and helps reduce unterminated stub effects.

Internal residual voltage discharge relays can be enabled to momentarily short out the measurement path when changing from one input channel to the next. This dissipates any voltage held by the wiring and instrument input capacitance. These relays protect sensitive devices, such as CMOS circuits, from residual voltages caused by previous high-voltage measurements. This feature can also be disabled in low-voltage applications where maximum throughput speed is important.

An optional terminal block provides screw termination points for external field wiring. This terminal block also includes cold junction compensation reference for more precise temperature measurements.

Features

- High-density 300 V/2 A multiplexing scanning (up to 288 two-wire channels in 1U footprint)
- Configure as 2 or 4-wire multiplexers under program control
- Internal capacitive discharge relays keep high voltages from disturbing sensitive measurement points
- Supports thermocouple, RTD and thermistor measurements
- Optional screw-terminal junction box includes built-in cold-junction compensation
- Direct measurement of current, up to 3 As
- Direct routing to DMM through internal analog measurement bus simplifies field wiring



EX1200-3048

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EX1200-3048 48 channel 300 V/ 2 A Multiplexer

Specifications

Channel Count	(1 x 48) 2-wire, Dual (1 x 24) 2-wire, or (1 x 24) 4-wire plus 2 Current @ 3 A
Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	300 V AC, 300 V DC
Maximum Switching Current	2 A
Maximum Switching Power	60 W dc, 125 VA
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
Per Channel (HI-LO)	< 3 µV
Capacitance	
Open Channel	< 50 pF
Channel-Mainframe	< 20 pF
High-Low	< 50 pF
Bandwidth (-3 dB)	40 MHz typical
Crosstalk (bank 1 to bank 2)	
1 MHz	< -90 dB
10 MHz	< -60 dB
Rated Switch Operations	
Mechanical	1 x 10^8 (no load)
Electrical	1 x 10^5 @ 50 V dc, 0.1 A resistive or 10 V dc, 10 mA (resistive)
Switching Time	< 3 ms
Front Panel Connector	104-pin HD D-sub

Ordering Information

EX1200-3048	48 channel, 300 V/2A multiplexer
EX1200-TB104	Terminal block, 104-pin HD D-sub connector with internal CJC reference
27-0389-104	104-pin HD D-sub mating connector with hood and pins, fixed contacts (no crimp tool required)
27-0390-104	104-pin HD D-sub mating connector, backshell and pins, crimp style
70-0297-001	Crimp tooling, includes handle and positioner, 22 AWG
70-0363-501	104-pin HD D-sub mating connector and backshell, with 3 ft unterminated 22 AWG wire
70-0367-001	EX1200-TB104, differential module



HD D-sub Connectors

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EX1200-3048S

48 Channel FET Multiplexer



Overview

The EX1200-3048S is a high-density FET multiplexer module designed for scanning of multiple points to a common bus, in either 2- or 4-wire configurations, either synchronously with the EX1200 system DMM scan function, or asynchronously as a system switch to other devices through LXI LAN messages or the hardware trigger bus. The solid-state design delivers maximum switching speed and near infinite life. Up to 288 two-wire (or 144 four-wire) channels can be accommodated in a single EX1200 full rack mainframe for maximum density, or mixed and matched with other EX1200 plug-ins for flexibility. Typical applications include temperature and voltage data acquisition and datalogging at up to 1000 scans per second.

The EX1200-3048S consists of dual (1x24) 2-wire multiplexer banks. Each bank can be interconnected within a module under program control (via bussing relays) and across modules via the EX1200 analog bus to configure larger multiplexers as required. This eliminates external wiring and helps reduce unterminated stubs.

Internal residual voltage discharge relays can be enabled to momentarily short out the measurement path when changing from one input channel to the next. This dissipates any voltage held by the wiring and instrument input capacitance. These relays protect sensitive devices, such as CMOS circuits, from residual voltages caused by previous high-voltage measurements. This feature can also be disabled in low-voltage applications where maximum throughput speed is important.

An optional terminal block provides screw termination points for external field wiring. This terminal block also includes cold junction compensation reference for more precise temperature measurements.

Features

- High-density solid-state multiplexer, up to 288 2-wire channels per full rack mainframe
- On/off switching < 500 µs
- Configure as 2 or 4-wire multiplexers
- Optically isolated design
- Supports thermocouple, RTD and thermistor measurements
- Optional screw-terminal junction box includes built-in cold-junction compensation
- Direct routing to DMM through internal analog measurement bus simplifies field wiring

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EX1200-3048S 48 Channel FET Multiplexer

Specifications

Channel Count	48 two-wire or 24 four-wire
Relay Type	Opto-isolated solid-state
Maximum Switching Voltage	250 V
Maximum Switching Current	0.2 A
Path Resistance	< 8 Ω
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
Per Channel (HI-LO)	< 7 µV
Capacitance	
Open Channel	< 50 pF
Channel-Mainframe	< 20 pF
High-Low	< 50 pF
Bandwidth (-3 dB)	10 MHz typical
Crosstalk	
100 kHz	< -55 dB
1 MHz	< -45 dB
10 MHz	< -30 dB
Isolation	
100 kHz	< -55 dB
1 MHz	< -40 dB
10 MHz	< -25 dB
Rated Switch Operations	
Mechanical	1 x 10^7
Electrical	5 x 10^5 at full load
Switching Time	< 500 µs
Front Panel Connector	104-pin HD D-sub

Ordering Information

EX1200-3048S	48 channel 2-wire FET multiplexer
27-0389-104	104-pin HD D-sub mating connector with hood and pins, fixed contacts (no crimp tool required)
27-0390-104	104-pin HD D-sub mating connector, backshell and pins, crimp style
70-0297-001	Crimp tooling, includes handle and positioner, 22 AWG
70-0363-501	104-pin HD D-sub mating connector and backshell, with 3 ft unterminated 22 AWG wire
70-0367-001	EX1200-TB104, differential module



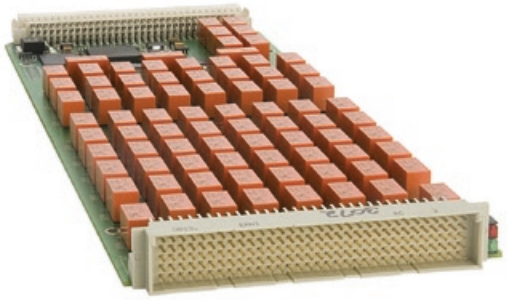
HD D-sub Connectors

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EX1200-3072

72 channel 2-wire 300 V/ 2 A Multiplexer



Overview

The EX1200-3072 high-density multiplexer modules is designed for scanning of multiple points to a common bus, in either 2- or 4-wire configurations, either synchronously with the EX1200 system DMM scan function, or asynchronously as a system switch to other devices through LXI LAN messages or the hardware trigger bus. Up to 432 two-wire (or 216 four-wire) channels can be accommodated in a single EX1200 full rack mainframe for maximum density, or mixed and matched with other EX1200 plug-ins for flexibility. Applications include cable harness testing, semiconductor and PCB testing, and those in which multiple points need to be switched to a common resource. All relays also have individual control, and each path allows for hot switching of up to 300 V and 2 A (60 W dc max).

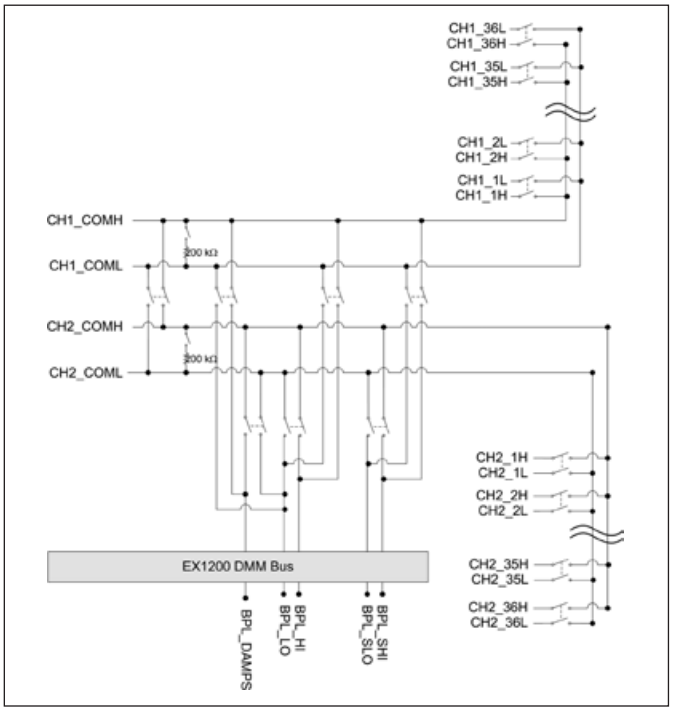
The EX1200-3072 consists of dual (1x36) multiplexer banks. Each bank can be interconnected within a module under program control (via bussing relays) to form a (1 x 72) 2-wire mux. The EX1200 analog bus can be used to configure larger multiplexers as required to eliminate external wiring and helps reduce unterminated stubs effects.

Internal residual voltage discharge relays can be enabled to momentarily short out the measurement path when changing from one input channel to the next. This dissipates any voltage held by the wiring and instrument input capacitance. These relays protect sensitive devices, such as CMOS circuits, from residual voltages caused by previous high-voltage measurements. This feature can also be disabled in low-voltage applications where maximum throughput speed is important.

An optional terminal block provides screw termination points for external field wiring. This terminal block also includes cold junction compensation reference for more precise temperature measurements.

Features

- High-density 300 V/2 A multiplexing scanning (up to 432 two-wire channels in 1U footprint)
- Configure as 2 or 4-wire multiplexers under program control
- Internal capacitive discharge relays keep high voltages from disturbing sensitive measurement points
- Supports thermocouple, RTD and thermistor measurements
- Optional screw-terminal junction box includes built-in cold-junction compensation
- Direct routing to DMM through internal analog measurement bus simplifies field wiring



EX1200-3072

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EX1200-3072 72 channel 2-wire 300 V/ 2 A Multiplexer

Specifications

Channel Count	(1 x 72) 2-wire, Dual (1 x 36) 2-wire, or (1 x 36) 4-wire
Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	300 V AC, 300 V DC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 125 VA
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
Per Channel (HI-LO)	< 3 µV
Capacitance	
Open Channel	< 50 pF
Channel-Mainframe	< 20 pF
High-Low	< 50 pF
Bandwidth (-3 dB)	40 MHz typical
Crosstalk	
1 MHz	< -70 dB
10 MHz	< -50 dB
Isolation	
1 MHz	< -55dB
10 MHz	< -35 dB
Rated Switch Operations	
Mechanical	1 x 10^8 (no load)
Electrical	1 x 10^5 @ 50 V dc, 0.1 A resistive or 10 V dc, 10 mA (resistive)
Switching Time	< 3 ms
Front Panel Connector	160-pin DIN

Ordering Information

EX1200-3072	72 channel, 300V/2 A multiplexer
70-0363-504	Strain relief bracket kit (includes connector – recommended accessory)
70-0363-503	Strain relief bracket kit (no connector)
52-0109-000	Crimp pin (includes 100 crimp pins)
27-0088-160	Mating connector (one per board)
46-0010-000	Crimp tool (DIN)
46-0011-000	Extraction tool (DIN)
70-0367-002	EX1200-TB160-1, differential module



DIN connectors and tooling

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EX1200-3096

96-Channel 100 V/1 A Two-Wire Multiplexer

Overview

The EX1200-3096 high-density multiplexer is designed for scanning of multiple points to a common bus, in either 2- or 4-wire configurations. The sequencing of switch and measure operations can be tightly synchronized as part of the EX1200 embedded scan list to minimize processor overhead and increase test throughput. Up to 576 two-wire (or 288 four-wire) channels can be accommodated in a single EX1200 full rack mainframe for maximum density, or mixed and matched with other EX1200 plug-ins for flexibility. All relays also have individual control, and each path allows for hot switching of up to 100 V and 1 A (30 W dc max).

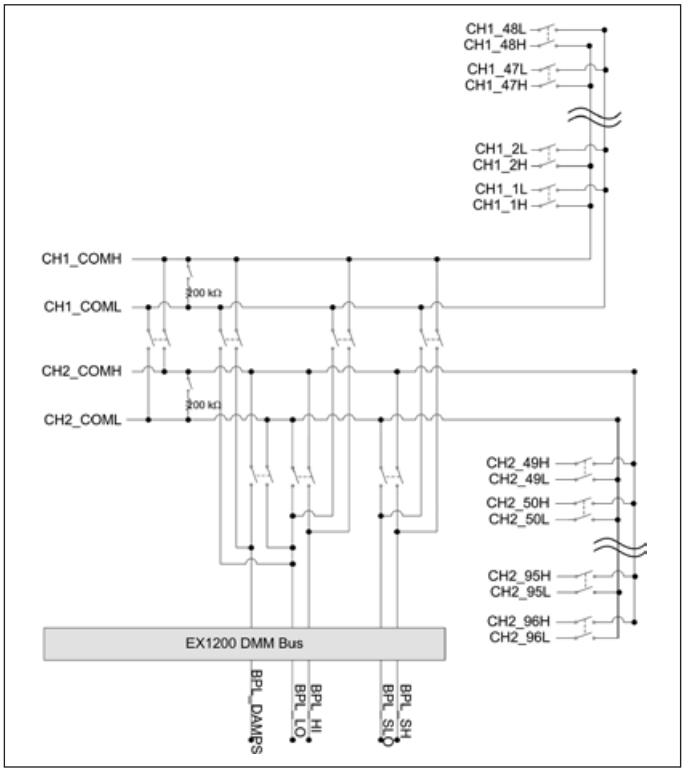
The EX1200-3096 consists of dual (1x48) 2-wire multiplexer banks. Each bank can be interconnected within a module under program control (via bussing relays) and across modules via the EX1200 analog bus to configure larger multiplexers as required. This eliminates external wiring and helps reduce unterminated stubs.

Internal residual voltage discharge relays can be enabled to momentarily short out the measurement path when changing from one input channel to the next. This dissipates any voltage held by the wiring and instrument input capacitance. These relays protect sensitive devices, such as CMOS circuits, from residual voltages caused by previous high-voltage measurements. This feature can also be disabled in low-voltage applications where maximum throughput speed is important.

An optional terminal block provides screw termination points for external field wiring. This terminal block also includes cold junction compensation reference for more precise temperature measurements.

Features

- Ultra High-density multiplexing/scanning (1x576 2-wire channels in full rack mainframe)
- Configure as 2- or 4-wire multiplexers under program control
- Internal capacitive discharge relays keep high voltages from disturbing sensitive measurement points
- Supports thermocouple, RTD and thermistor measurements
- Optional screw-terminal junction box includes built-in cold-junction compensation
- Direct routing to DMM through internal analog measurement bus simplifies field wiring



EX1200-3096

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EX1200-3096 96-Channel 100 V/1 A Two-Wire Multiplexer

Specifications

Channel Count	(1 x 96) 2-wire, Dual (1 x 48) 2-wire, or (1 x 48) 4-wire
Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	100 V AC, 100 V DC
Maximum Switching Current	1 A
Maximum Switching Power	30 W DC, 125 VA
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
Per Channel (HI-LO)	< 7 µV
Capacitance	
Open Channel	< 50 pF
Channel-Mainframe	< 20 pF
High-Low	< 50 pF
Bandwidth (-3 dB)	10 MHz typical
Crosstalk	
1 MHz	< -70 dB
10 MHz	< -50 dB
Isolation	
1 MHz	< -50 dB
10 MHz	< -35 dB
Rated Switch Operations	
Mechanical	1 x 10^7
Electrical	5 x 10^5 at full load
Switching Time	< 3 ms
Front Panel Connector	200-pin HD SCSI style

Ordering Information

EX1200-3096	96 channel 2-wire, 100 V/ 1 A multiplexer
27-0388-200	200-pin mating connector
41-0472-034	Strain relief bracket
70-0367-004	EX1200-TB200, differential module

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EX1200-3164

16 (1x4) 2-wire 300 V/ 2 A Multiplexer

Overview

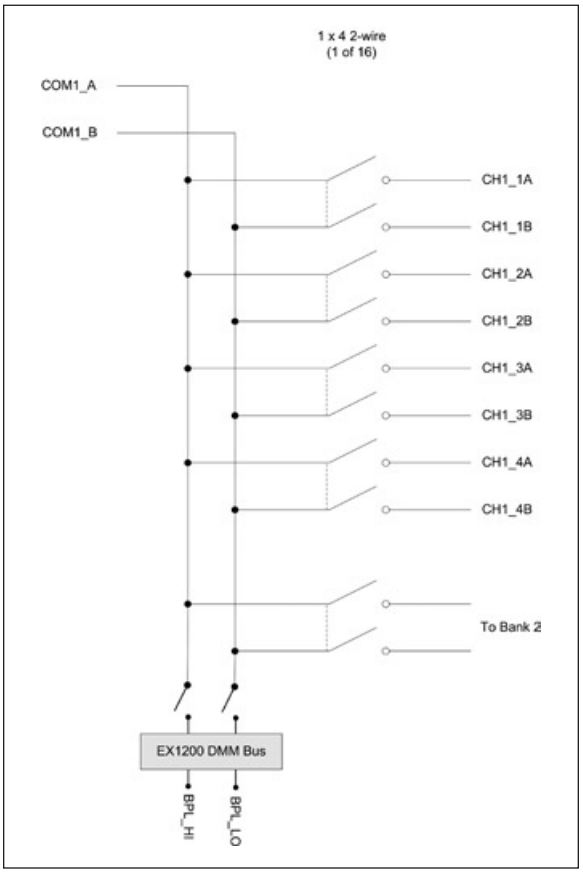
The EX1200-3164 high-density multiplexer module is designed to provide a flexible switching multiplexing architecture with 16 individual 1 x 4 2-wire multiplexers. Up to 96 1 x 4 two-wire channels can be accommodated in a single EX1200 full rack mainframe for maximum density, or mixed and matched with other EX1200 plug-ins for flexibility. Applications include cable harness testing, semiconductor and PCB testing, and those in which multiple points need to be switched to a common resource. All relays also have individual control, and each path allows for hot switching of up to 300 V and 2 A (60 W dc max).

Each bank can be interconnected within a module under program control (via bussing relays) to form larger 2-wire muxes, up to a maximum of 1 x 64. The EX1200 analog bus can be used to configure larger multiplexers across modules as required to eliminate external wiring and helps reduce unterminated stubs effects. The analog bus can also be routed directly to the optional EX1200 series 6.5 digit DMM for direct measurements across the backplane further reduce external wiring. Stub-breaking relays remove the module from the analog bus to minimize a module's effect on measurements being made through other modules.

An optional terminal block provides screw termination points for external field wiring. This terminal block also includes cold junction compensation reference for more precise temperature measurements.

Features

- High-density 300 V/2 A multiplexing scanning (up to 384 two-wire channels in 1U footprint)
- Configure as 2 or 4-wire multiplexers under program control
- Supports thermocouple, RTD and thermistor measurements
- Optional screw-terminal junction box includes built-in cold-junction compensation
- Direct routing to DMM through internal analog measurement bus simplifies field wiring
- Stub-breaking relays isolate the module from interfering with measurements being made on other modules



EX1200-3164

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EX1200-3164 16 (1 x 4) 2-wire, 300 V/2 A Multiplexer

Specifications

Channel Count	Configured as either 16 (1x4), 8 (1x8), 4 (1x16), 2 (1x32) or 1 (1x64) 2-wire multiplexers
Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	300 V AC, 300 V DC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 125 VA
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
Per Channel (HI-LO)	< 3 µV
Capacitance	
Open Channel	< 50 pF
Channel-Mainframe	< 20 pF
High-Low	< 50 pF
Bandwidth (-3 dB)	40 MHz typical (1 x 4)
Crosstalk	
1 MHz	< -70 dB
10 MHz	< -50 dB
Isolation	
1 MHz	< -55 dB
10 MHz	< -35 dB
Rated Switch Operations	
Mechanical	1 x 10^8 (no load)
Electrical	1 x 10^5 @ 50 V dc, 0.1 A resistive or 10 V dc, 10 mA (resistive)
Switching Time	< 3 ms
Front Panel Connector	160-pin DIN

Ordering Information

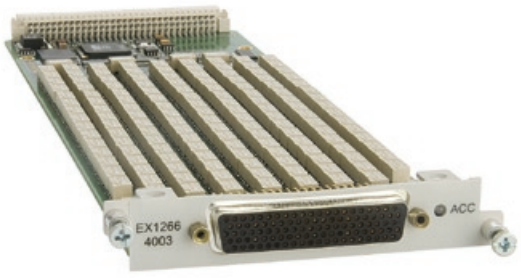
EX1200-3164	16 (1x4) 2-wire, 300 V/2A multiplexer
70-0363-504	Strain relief bracket kit (includes connector – recommended accessory)
70-0363-503	Strain relief bracket kit (no connector)
52-0109-000	Crimp pin (includes 100 crimp pins)
27-0088-160	Mating connector (one per board)
46-0010-000	Crimp tool (DIN)
46-0011-000	Extraction tool (DIN)
70-0367-008	EX1200-TB160-2, differential module

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VTI Instruments

EX1200-4003

Dual 4 x 16 Two-wire Matrix, 250 V/2 A



Overview

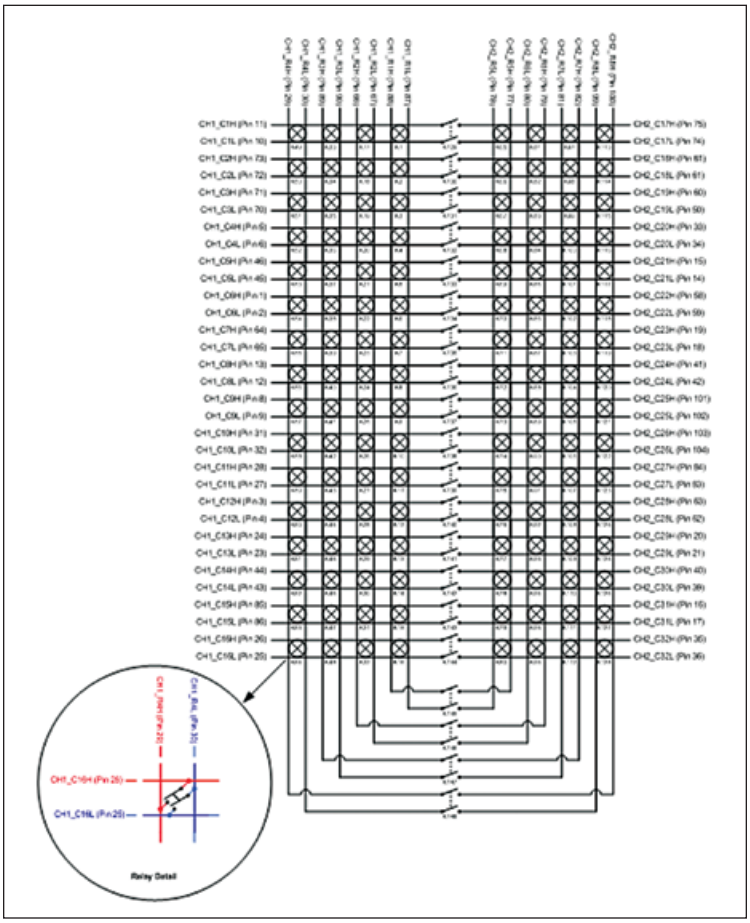
The EX1200-4003 high-density matrix module allow the user to connect any input row to any output column, with a DPST relay at every row/column crosspoint. This architecture provides the framework for flexible switch system designs where multiple test instruments need to be connected to common test points. For example, a digital multimeter, counter/timer and digitizers can be connected to the input rows, and each of these devices can be connected to any of the output columns depending on the measurement function that is desired during the test. The connections between rows and columns occur internal to the module which greatly reduces external cabling.

The smallest building block is a (4x16) 2-wire matrix, and rows and columns can easily be expanded to form larger matrices. A (4x192) 2-wire matrix can be accommodated in an EX1200 series full rack mainframe. The two banks of matrices can be connected under program control to further simplify field wiring.

Relays capable of switching up to 250 V and up to 2 A are used to maximize the range of application spaces that can be addressed with this module. All relays are failsafe which ensures that no undesired signals are present at the user interface in the case of power interruption.

Features

- Dual (4x16) 2-wire configuration
- Configure as (8x16) or (4x32) under program control
- High-density 2 A capable of switching up to 250 V
- Extensive signal shielding employed on PCBs for excellent signal fidelity
- Internal configuration relays can be used to construct larger building blocks (e.g. 8 x 16)
- EX1200 series can support 4 x 192, or 8 x 96 configurations in a full rack mainframe



EX1200-4003

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EX1200-4003 Dual 4 x 16 Two-wire Matrix, 250 V/2 A

Specifications

Relay Type	Electromechanical, Fail-safe
Configurations	Dual 4 x 16, 8 x 16, 4 x 32 (programmable)
Maximum Switching Voltage	250 V ac, 250 V dc
Maximum Switching Current	2 A
Maximum Switching Power	60 W dc, 62.5 VA
Path Resistance	< 500 mΩ
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
per Channel (HI-LO)	< 3 µV
Bandwidth (-3 dB)	45 MHz typical (4 x 16)
Capacitance	
Open Channel	< 50 pF
Channel-Mainframe	< 80 pF
High-Low	< 50 pF
Crosstalk	
1 MHz	< -70 dB
10 MHz	< -50 dB
Isolation	
1 MHz	< -60 dB
10 MHz	< -50 dB
Rated Switch Operations	
Mechanical	1 x 10^7
Electrical	5 x 10^5 at full load
Switching Time	< 3 ms
Connector Type	104-pin HD D-sub

Ordering Information

EX1200-4003	Dual 4 x 16 two-wire matrix, 250 V/2 A
27-0389-104	104-pin HD D-sub mating connector with hood and pins, fixed contacts (no crimp tool required)
27-0390-104	104-pin HD D-sub mating connector, backshell and pins, crimp style
70-0297-001	Crimp tooling, includes handle and positioner, 22 AWG
70-0363-501	104-pin HD D-sub mating connector and backshell, with 3 ft unterminated 22 AWG wire
70-0367-001	EX1200-TB104, differential module



HD D-sub Connectors

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EX1200-4128

4 x 128 One-wire Matrix, 150 V/0.5 A

Overview

The EX1200-4128 is an ultra high-density matrix module that allows the user to connect any input row to any output column, with an SPST relay at every row/column crosspoint. This architecture provides the framework for flexible switch system designs where multiple test instruments need to be connected to common test points. The one-wire architecture allows for any of the 128 row inputs to be connected to any of the 4 column outputs.

The four output columns can be routed to the EX1200 series internal analog backplane to build large matrices, or to connect to the optional 6.5 digit DMM, which also limits the amount of external cabling required. A (4 x 512) 1-wire matrix can be accommodated in only four slots of an EX1200 series mainframe, as an example.

Stub-breaking relays can remove a matrix module from the backplane to increase signal integrity of measurements being made on other modules. All relays are failsafe which ensures that no undesired signals are present at the user interface in the case of power interruption.

Features

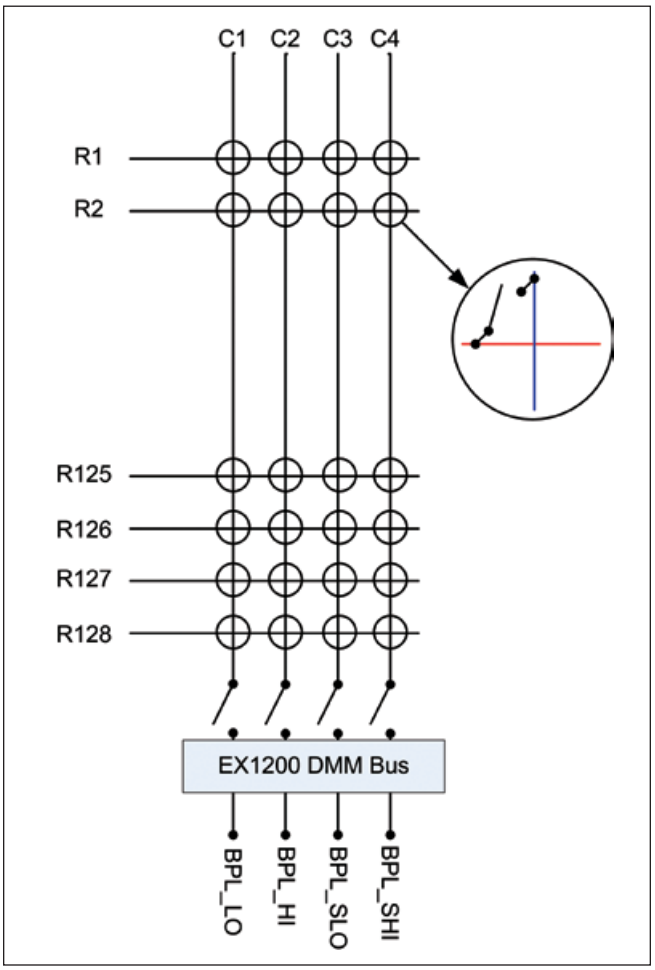
4 x 128 1-wire configuration

High density 0.5 A relays capable of switching up to 150 V

Connect rows to internal analog bus to construct larger matrices without external cabling

Crosspoint architecture enables multiple testpoints to share instrument I/O

Stub-breaking relays increase overall system performance



EX1200-4128

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EX1200-4128 4 x 128 One-wire Matrix, 150 V/0.5 A

Specifications

Relay Type	Reed
Configuration	4 x 128 one-wire crosspoint matrix
Maximum Switching Voltage	150 V ac, 150 V dc
Maximum Switching Current	0.5 A
Maximum Switching Power	10 W dc
Path Resistance	< 1 Ω
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset	
per Channel (HI-LO)	< 7 µV
Bandwidth (-3 dB), typical	10 MHz
Crosstalk	
1 MHz	< -45 dB
10 MHz	< -30 dB
Isolation	
1 MHz	< -60 dB
10 MHz	< -50 dB
Rated Switch Operations	
Mechanical	1 x 10^7
Electrical	5 x 10^5 at full load
Switching Time	< 3 ms
Connector Type	160-pin DIN

Ordering Information

EX1200-4128	4 x 128 one-wire matrix, 150 V/0.5 A
70-0363-504	Strain relief bracket kit (includes connector – recommended accessory)
70-0363-503	Strain relief bracket kit (no connector)
70-0367-005	EX1200-TB160SE, single-ended module
52-0109-000	Crimp pin (includes 100 crimp pins)
27-0088-160	Mating connector (one per board)
46-0010-000	Crimp tool (DIN)
46-0011-000	Extraction tool (DIN)

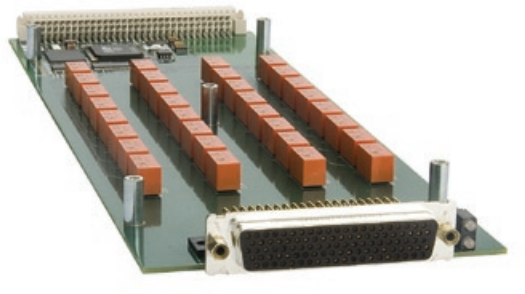
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EX1200-5001

80 Channel 2 A Form A (SPST) Switch

EX1200-5002

30 Channel 2 A Form C (SPDT) Switch



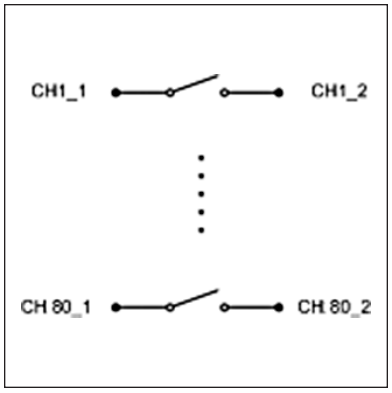
Overview

The EX1200-5001 and -5002 are high-density general purpose 2 A switch modules designed for systems where individual relays can be used to route signals to/from the units under test (UUT), or combined externally to form user-defined configurations. These relays are commonly used to create complex signal distribution networks that can be reconfigured through different wiring in test adapters. For example, three relays on a -5002 module can be configured as a SP4T tree, and seven relays can be configured as a SP8T tree. Up to 180 individual SPDT or 480 SPST relays can be accommodated in a full rack mainframe for maximum density. The modules can also be configured with other EX1200 series switch modules as part of a flexible system switch design.

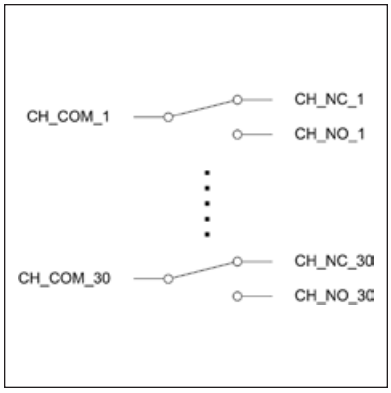
Since these modules may be used to switch power to the UUT or interface, the digital input lines on the EX1200 series mainframes support the ability to force all relays automatically to their normally open state if a fault condition occurs. This approach instantly removes all power to the UUT or interface. These modules can be automatically configured in the setup phase at the beginning of each scan step to facilitate test sequencing and control.

Features

- Can be mixed and matched to create application specific configurations
- Ideal for general purpose switching of up to 300 V (AC/DC) or 2 As
- Can be used to switch a common point to either power or ground (Form C)
- Connect together using external wiring for flexible switch design
- Easy to use configuration software facilitates end-end path level switching for simplified programming



EX1200-5001



EX1200-5002

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EX1200-5001 80 Channel 2 A Form A (SPST) Switch
EX1200-5002 30 Channel 2 A Form C (SPDT) Switch

Specifications

Channel Count	30 SPDT (5002), 80 SPST (5001)
Maximum Switching Voltage	300 V AC, 300 V DC
Maximum Switching Current	2 A
Maximum Switching Power	60 W DC, 125 VA
Path Resistance	< 300 mΩ
Insulation Resistance	> 1 x 10^9 Ω
Maximum Thermal Offset per Channel (HI-LO)	< 7 µV
Capacitance	
Open Channel	< 50 pF
Channel-Mainframe	< 80 pF
High-Low	< 50 pF
Bandwidth (-3 dB)	30 MHz typical (-5002), 10 MHZ typical (-5001)
Crosstalk	
100 kHz	< -80 dB
1 MHz	< -60 dB
Isolation	
100 kHz	< -50 dB
1 MHz	< -45 dB
Rated Switch Operations	
Mechanical	1 x 10^8 (no load)
Electrical	1 x 10^5 @ 50 V dc, 0.1 A resistive or 10 V dc, 10 mA (resistive)
Switching Time	< 3 ms
Connector Type	160-pin DIN (Form A modules)
	104-pin HD D-sub (Form C modules)

Ordering Information

EX1200-5001	80 Channel 300 V/2 A SPST switch
EX1200-5002	30 Channel 300 V/2 A SPDT switch
EX1200-5006	40 Channel 300 V/2 A SPST switch
EX1200-5007	12 Channel 300 V/2 A SPDT switch
27-0389-104	104-pin HD D-sub mating connector with hood and pins, fixed contacts (no crimp tool required)
27-0390-104	104-pin HD D-sub mating connector, backshell and pins, crimp style
70-0297-001	Crimp tooling, includes handle and positioner, 22 AWG
70-0363-501	104-pin HD D-sub mating connector and backshell, with 3 ft unterminated 22 AWG wire
70-0367-003	EX1200-TB104SE, single-ended module for EX1200-5002
70-0367-005	EX1200-TB160SE, single-ended module for EX1200-5001
70-0363-504	Strain relief bracket kit (includes connector – recommended accessory)
70-0363-503	Strain relief bracket kit (no connector)
52-0109-000	Crimp pin (includes 100 crimp pins)
46-0010-000	Crimp tool (DIN)
46-0011-000	Extraction tool (DIN)
27-0088-160	Mating connector



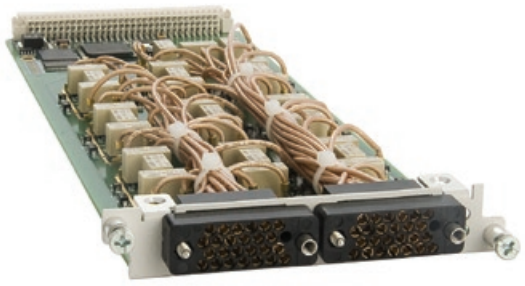
HD D-sub Connectors

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VTI Instruments

EX1200-6101

(10) SP4T 50 Ω RF Multiplexers, 1.3 GHz



Overview

The EX1200-6101 and -6111 are high-density RF switch modules with either five or ten individual SP4T coaxial trees that are isolated from each other and system ground to provide a high-fidelity switch path for switching signals in excess of 1.3 GHz in a 50 ohm environment. On-board jumpers can be added to connect all shields together or to system ground if desired. Excellent crosstalk and isolation is maintained by using very short low-loss coaxial runs from the connector directly to the relays.

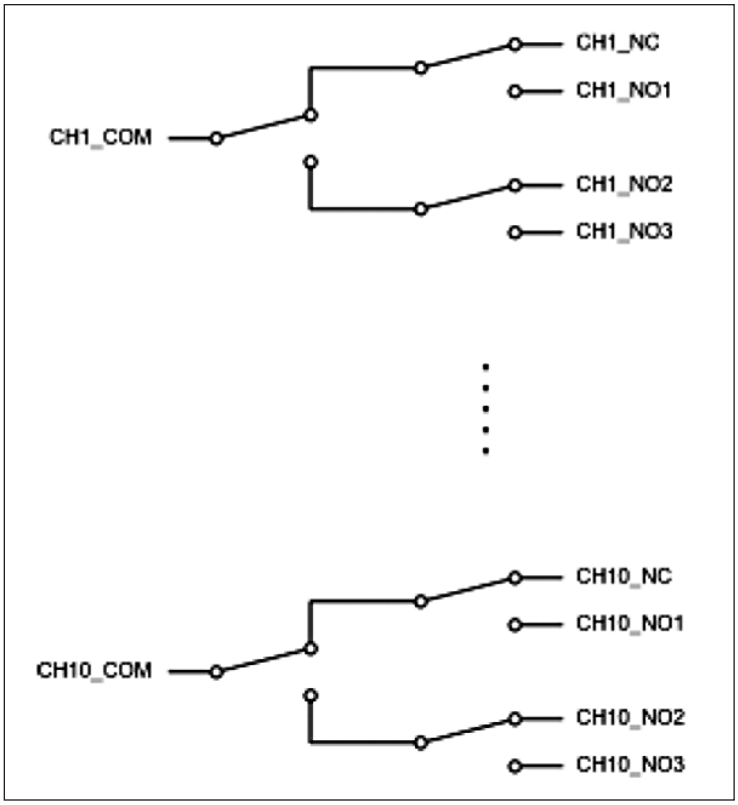
All modules are also configured to avoid any unterminated stub effects. This improves overall signal integrity and allows for high frequency matrix designs or large multiplexer configurations while preserving bandwidth and maintaining low VSWR. The front panel utilizes two high-density, 26-pin coaxial connectors designed for high reliability and low insertion loss.

Six of the modules can be accommodated in a single EX1200 full rack mainframe to provide a very flexible RF switch network. For example, a single -6101 module can be configured through external cabling to provide dual 1 x 16 multiplexers into two channels of a scope, or as a single 4 x 4 RF matrix. The modules can also be combined with other EX1200 switch cards to configure a general purpose subsystem to switch DC to > 1.3 GHz.

Features

- Up to (10) SP4T RF multiplexer trees, 1.3 GHz bandwidth
- Suitable for switching RF signals to/from high bandwidth measurement devices such as oscilloscopes and function generators
- Coax shields are isolated from system ground to minimize ground loop effects
- 10 W maximum switching power
- No unterminated stub effects ensure maximum signal fidelity
- Supports configurations such as dual 1 x 16 multiplexers and 4 x 4 matrix through external cabling

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EX1200-6101

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EX1200-6101 (10) SP4T 50 W RF Multiplexers, 1.3 GHz

Specifications

Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	100 V DC/100 V AC
Maximum Switching Current	0.5 A
Maximum Switching Power	10 W
Path Resistance	< 1 Ω
Insulation Resistance	> 1 x 10^9 Ω
Bandwidth (-3 dB)	1.3 GHz typical
Insertion Loss	
500 MHz	< 0.5 dB
1.3 GHz	< 3.0 dB
Crosstalk	
500 MHz	< -60 dB
1.3 GHz	< -55 dB
Isolation	
500 MHz	< -65 dB
1.3 GHz	< -55 dB
VSWR	
100 MHz	< 1.2:1
1.3 GHz	< 1.5:1
Rated Switch Operations	
Mechanical	5 x 10^6
Electrical	1 x 10^5 at full load
Switching Time	< 5 ms
Connector Type	Dual 26-pin A

Ordering Information

EX1200-6101	(10) SP4T RF multiplexers, 1.3 GHz
EX1200-6111	(5) SP4T RF multiplexers, 1.3 GHz
70-0150-000	26-pin connector and housing (2 required)
70-0149-000	10-pin/Ferrule kit (RG316 50 Ohm)
70-0149-001	10-pin/Ferrule kit (RG178 50 Ohm)
46-0018-000	Crimp tool, coax (RG316 50 Ohm)
46-0018-001	Crimp tool, coax (RG178 50 Ohm)
46-0018-002	Crimp tool, coax (RG179 75 Ohm)
46-0021-000	Tool, pin extractor, size 16 contact, A M series



26-pin connectors and tooling

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EX1200-6216

Dual (1x16) 50 W RF Multiplexers, 1 GHz

Overview

The EX1200-6216 is a high-density RF switch module configured as dual 1 x 16 coaxial trees that are isolated from each other and system ground to provide a high-fidelity switch path for switching signals in excess of 1 GHz in a 50 ohm environment. On-board jumpers can be added to connect all shields together or to system ground if desired. Excellent crosstalk and isolation is maintained by using very short low-loss coaxial runs from the connector directly to the relays.

All modules are also configured to avoid any unterminated stub effects. This improves overall signal integrity and allows for high frequency matrix designs or large multiplexer configurations while preserving bandwidth and maintaining low VSWR. The front panel utilizes two high-density, 26-pin coaxial connectors designed for high reliability and low insertion loss.

Six of the modules can be accommodated in a single EX1200 full rack mainframe to provide a very flexible RF switch network. The modules can also be combined with other EX1200 switch cards to configure a general purpose subsystem to switch DC to > 1 GHz

Features

Dual (1 x 16) RF multiplexer trees, 1 GHz bandwidth

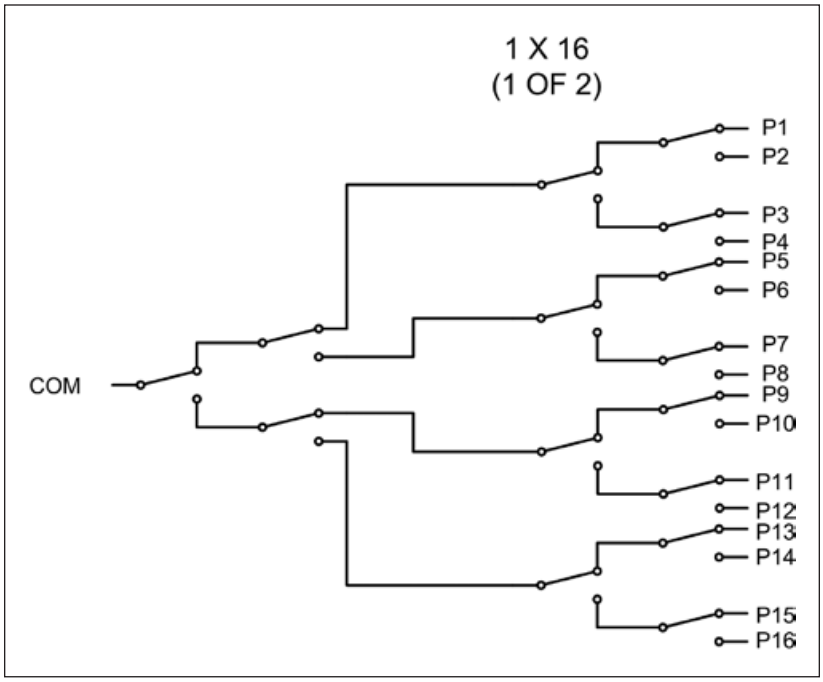
Suitable for switching RF signals to/from high bandwidth measurement devices such as oscilloscopes and function generators

Coax shields are isolated from system ground to minimize ground loop effects

10 W maximum switching power

No unterminated stub effects ensure maximum signal fidelity

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EX1200-6216

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EX1200-6216 Dual (1 x 16) 50 W RF Multiplexers, 1 GHz

Specifications

Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	100 V DC/100 V AC
Maximum Switching Current	0.5 A
Maximum Switching Power	10 W
Path Resistance	< 1 Ω
Insulation Resistance	> 1 x 10^9 Ω
Bandwidth (-3 dB) typical	1 GHz
Insertion Loss	
100 MHz	< 0.5 dB
900 MHz	< 3.0 dB
Crosstalk	
100 MHz	< -60 dB
900 MHz	< -55 dB
Isolation	
100 MHz	< -65 dB
900 MHz	< -55 dB
VSWR	
100 MHz	< 1.2:1
900 MHz	< 1.5:1
Rated Switch Operations	
Mechanical	5 x 10^6
Electrical	1 x 10^5 at full load
Switching Time	< 5 ms
Connector Type	Dual 26-pin A

Ordering Information

EX1200-6216	Dual (1 x 16) RF multiplexers, 1 GHz
70-0150-000	26-pin connector and housing (2 required)
70-0149-000	10-pin/Ferrule kit (RG316 50 Ohm)
70-0149-001	10-pin/Ferrule kit (RG178 50 Ohm)
46-0018-000	Crimp tool, coax (RG316 50 Ohm)
46-0018-001	Crimp tool, coax (RG178 50 Ohm)
46-0018-002	Crimp tool, coax (RG179 75 Ohm)
46-0021-000	Tool, pin extractor, size 16 contact, A M series



26-pin connectors and tooling

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EX1200-6301

(4) SP4T 50 W RF Multiplexers, 3 GHz



Overview

The EX1200-6301 is designed with SMB male connectors for applications that require RF signal switching greater than 3 GHz in a 50 W environment. Excellent crosstalk and isolation performance is achieved by using short low-loss coaxial runs from the connector directly to the relays. All modules are designed to avoid any unterminated stub effects improving overall signal integrity and enabling the construction of larger high frequency multiplexer configurations while maintaining bandwidth and VSWR.

Six of the modules can be accommodated in a single EX1200 full rack mainframe or combined with other switch modules to create a flexible switching configuration that can cover a wide range of applications.

Features

Up to (4) SP4T RF multiplexer trees, > 3 GHz bandwidth

Suitable for switching RF signals to/from high bandwidth measurement devices such as oscilloscopes and function generators

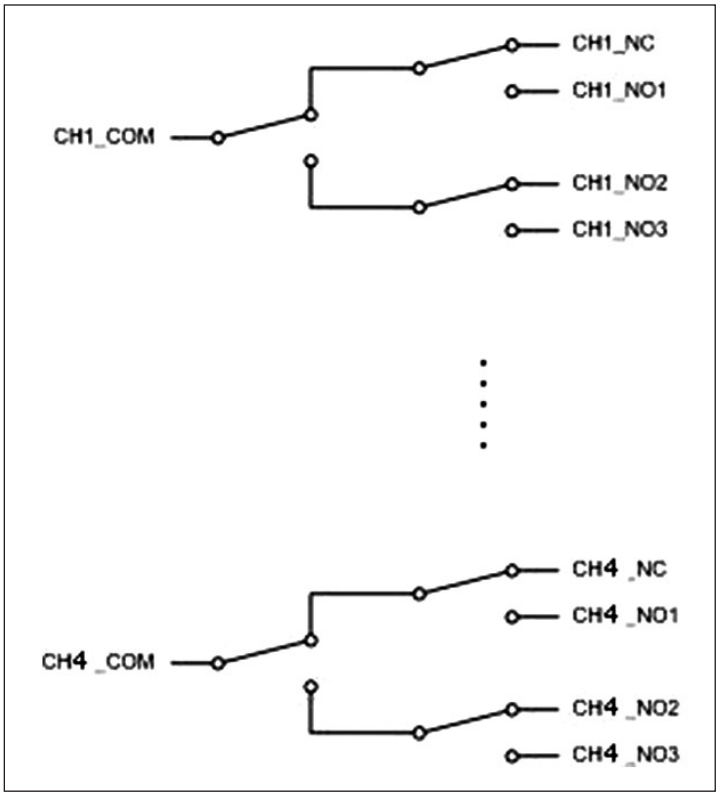
10 W maximum switching power

50 ohm on-board self-termination option

SMB male connectors for high performance

No unterminated stub effects

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EX1200-6301

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EX1200-6301 (4) SP4T 50 W RF Multiplexers, 3 GHz

Specifications

Relay Type	Electromechanical, Fail-safe
Maximum Switching Voltage	30 V DC/30 V AC
Maximum Switching Current	0.5 A
Maximum Switching Power	10 W
Path Resistance	< 1 Ω
Insulation Resistance	> 1 x 10^9 Ω
Bandwidth (-3 dB)	3 GHz
Insertion Loss	
1 GHz	< 0.5 dB
3 GHz	< 3.0 dB
Crosstalk	
1 GHz	< -60 dB
3 GHz	< -55 dB
Isolation	
1 GHz	< -65 dB
3 GHz	< -55 dB
VSWR	
1 GHz	< 1.2:1
3 GHz	< 1.5:1
Rated Switch Operations	
Mechanical	5 x 10^6
Electrical	1 x 10^5 at full load
Switching Time	< 5 ms
Connector Type	SMB (Qty 20)

Ordering Information

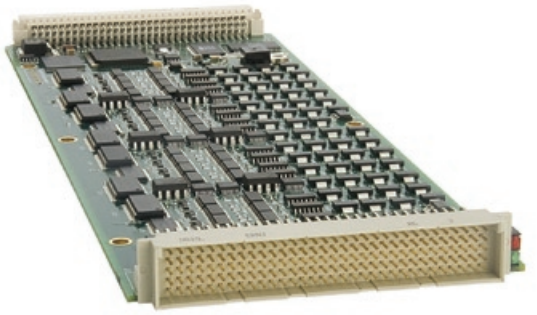
EX1200-6301	(4) SP4T 50 W RF multiplexers, 3 GHz
EX1200-6301T	(4) SP4T 50 W self-terminated RF multiplexers, 1.5 GHz

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VTI Instruments

EX1200-7500

64 Channel 2 MHz Digital Input/Output



Overview

The EX1200-7500 is a high-performance I/O module with eight ports of 8 bits (64 channels). Each 8-bit port may be configured as an input or output under program control. The I/O may be either single buffered to provide real time data access or double buffered to provide synchronized data. As part of the EX1200 series, up to 384 channels can be accommodated in a full rack mainframe, or combined with other plug-ins to configure a measure and control subsystem.

The EX1200-7500 has the flexibility to source the input and output clocks from the front panel, allowing very large numbers of channels to be synchronized to collect or present data to a UUT. Additionally, input data can be timestamped to IEEE-1588 precision as part of the EX1200 scan engine. Deep on-board memory (up to 1 MB) can be used to generate patterns on output channels at rates up to 2 MHz. In order to ease overall system cabling, all clamping diodes and open collector channels can be pulled up internally, rather than on a per-channel basis.

Features

Eight ports of 8 I/O bits each

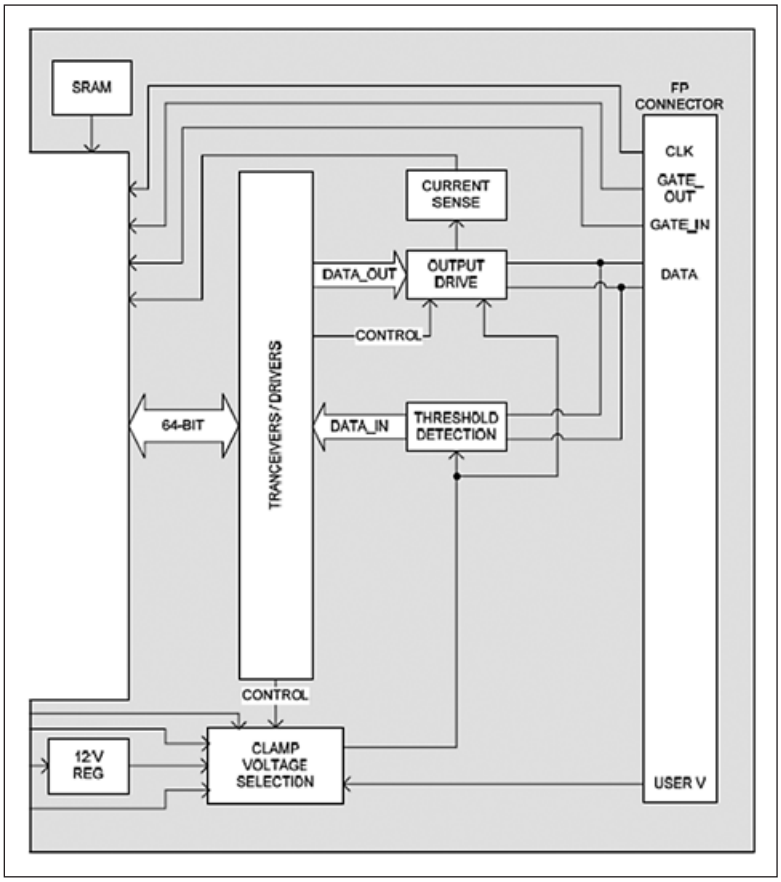
High current capability for control of external relays, 300 mA sink

Simulate and receive digital data at up to 2 MHz sample rates

Selectable output voltages range from 3.3 V to 60 V

Setup outputs and scan inputs as part of EX1200 measurement sequencing engine

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EX1200-7500

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EX1200-7500 64 Channel 2 MHz Digital Input/Output

Specifications

Data Input Characteristics

Vin (high)	> 40% of Vcc
Vin (low)	< 16% of Vcc
Vin (max)	60 V

Data Output Characteristics

Vout (high)	> 2 V - 60 V
Vout (low)	< 1.5 V @ 300 mA

Modes

Immediate : Input channels are read as part of the EX1200 scan list, outputs are updated under software control
Asynchronous : Channels are latched into memory via external clock
Pattern : Buffered pattern generation and acquisition

Gate (Pattern Mode)

Programmable active low or high

Channel Configuration (Pattern Mode)	32 inputs, 32 outputs
Memory Depth	256 kB patterns for input, 256 kB for output
Data Throughput	Programmable to 10 MHz
Data Input Clock Sources	Internal clock, Front panel input
Maximum External Clock Rate	2 MHz

Ordering Information

EX1200-7500	64 channel 2 MHz digital input/output
70-0363-504	Strain relief bracket kit (includes connector – recommended accessory)
70-0363-503	Strain relief bracket kit (no connector)
27-0088-160	Mating connector
52-0109-000	100 Crimp pins
46-0010-000	Crimp tool
46-0011-000	Extraction tool
70-0367-005	EX1200-TB160SE, single-ended module



DIN connectors and tooling

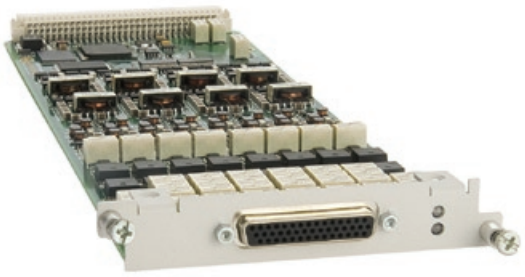
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EX1200-3608

8 channel DAC/400 kHz AWG

EX1200-3604

4 channel DAC/400 kHz AWG



Overview

The EX1200-3608 and EX1200-3604 provide eight or four independent channels of a digital to analog converter (DAC) with 16 bits of resolution. Each channel consists of 12-bit and 16-bit independent DACs combined with an output Alifier. The two DACs allow these modules to achieve fine resolution at very low output range settings. Along with static output operation, the DAC modules provide an arbitrary waveform generation mode (AWG) which supports sophisticated looping and branching to build complex waveforms without the system controller's intervention. The data may be paced out of the instrument by using either a user-supplied clock or the internal programmable timer with output rates up to 400 kSa/s.

Each channel is true-differential, and has sense lines that can be used to compensate for voltage drops that occur over the length of the lead wire between the DAC output and the device under test. Channels can be connected in series to produce outputs in excess of 20 V. An external clock input is available to synchronize output level changes with external events. When used in an EX1200 series mainframe with the optional DMM, the DAC outputs can be routed to the internal analog backplane for verification prior to critical test runs to ensure the device will perform to a high degree of accuracy.

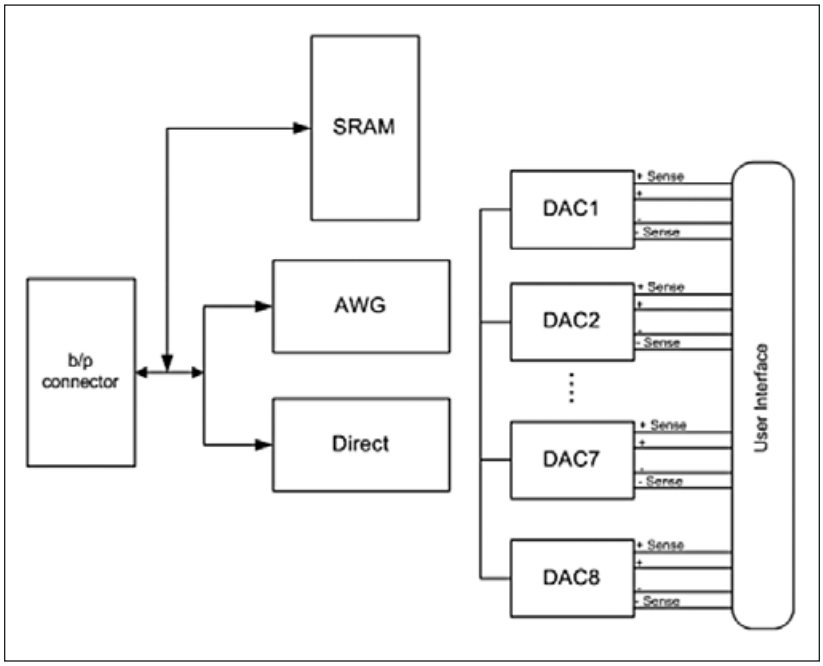
The EX1200-3608 channels are isolated in groups of two, while all four of the channels on the EX1200-3604 are individually isolated. This provides the ability to connect four channels together in series to create an output channel with an extended range to 80 V.

When using the EX1200 scanning measurement feature, the DAC levels can be programmed at the beginning of each scan step. This powerful feature provides the basis for test sequencing completely independent of the host controller, where analog outputs are synchronized with measurement inputs.

Features

- 4 or 8 independent 16-bit D/A converters per instrument
- Ideal for simulating thermocouples and other sensor outputs
- ±20 V, ±10 V, ±1 V ±0.1 V output ranges
- 400 kSa/s arbitrary waveform generation with internal programmable clock
- Extensive triggering capability
- Synchronize level changes with input measurements to facilitate test sequencing

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EX1200-3608

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EX1200-3608 8 channel DAC/400 kHz AWG
EX1200-3604 4 channel DAC/400 kHz AWG

Specifications

Output Ranges (Voltage)	± 0.1 V, ± 1 V, ± 10 V, ± 20 V
Output Range (Current)	± 20 mA
Output Current (Voltage Mode)	±50 mA per channel into short circuit
Resolution	16 bits, 16 bits monotonic
Isolation	100 V
Slew Rate	20 V/µs (50 mA load)
Settling Time	10 µs to 0.1% of specified value
DCV Accuracy	(0.01% of Setting + 0.0076% of Range + 0.1 mV)
Update Rate	Programmable, maximum 400 kSa/s
Trigger Sources	Front panel input, LXISync
Memory	1 MSample
Remote Sense Lines	Per channel
AWG Memory	484 kwords divided by the number of active channels. 996 kword optional.
AWG Data Traces	1 to 4096 unique patterns
AWG Segments	1 to 4096
AWG Loop Count	1 to 1048575 or continuous
AWG Advance	Synchronous waits for the end of Modes the current pattern to advance to the next. Asynchronous advances immediately to the next pattern upon being triggered.
AWG Advance Conditions	Automatic or triggered
AWG Marker Function	Marks the first data in a pattern when enabled. Polarity is software programmable.
AWG Marker Output	Front panel TTL compatible output.
User Connector	44-pin HD D-sub

Ordering Information

EX1200-3608	8-channel DAC/AWG 400 kSa/s
EX1200-3604	4-channel DAC/AWG 400 kSa/s
27-0390-044	44-pin HD D-sub mating connector, backshell and pins, crimp style
70-0363-502	44-pin HD D-sub mating connector and backshell, with 3ft unterminated 22 AWG wire
70-0297-001	Crimp tooling, includes handle and positioner, 22 AWG



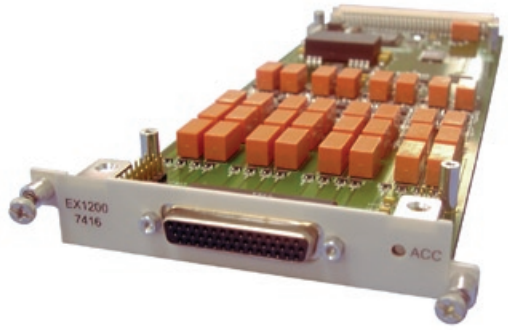
HD D-sub Connectors

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EX1200-7416

16 Channel Comparator/Event Detector



Overview

The EX1266-7416 has 16 true differential channels of analog comparator input, that can be selected to provide an interrupt to the EX1200 system, when the input falls outside the software programmed bounds, independent of the scan list operation. The EX1200-7416 is an ideal device in go/no-go testing where a device fails if the voltage outputs exceed a threshold or window, or even in control applications if a device or test needs to be shut down if a voltage level is exceeded. Using an analog comparator/interrupter in certain applications, as opposed to a traditional scanning approach of the EX1200 series considerably improves the overall response time of the system, providing the ability to 'constantly monitor' signals of interest for fault conditions.

The inputs are independently software programmable, permitting the user to vary input thresholds per channel. Each input signal is also digitally debounced for a programmed time ranging from 1 µs to 500 ms, preventing input signal noise from causing undesired interrupts. The threshold polarity can be programmed to detect either a rising or falling edge or can be masked to prevent unused channels from causing interrupts.

All of the enabled inputs are OR'd together to produce a single interrupt signal. Input can be combined via math functions to create virtual channels when multiple conditions must be satisfied before an event is recorded. On-board memory stores events with precise IEEE-1588 timestamps. The interrupt signal can be routed through the front panel connector for distribution to other devices in the test system for absolute deterministic communication.

There are three modes of operation that satisfy a wide range of applications. In normal mode, any channel crossing a threshold with the programmed polarity will cause an event to be latched into memory. Window mode automatically parallels two adjacent input channels and is used when an input signal is expected to be within upper and lower bounds. The pulse mode provides a means for measuring the pulse width of input signals by automatically changing the threshold polarity at each crossing.

The EX1200-7416, as part of the EX1200 family of switching and I/O, can be combined with up to five other modules and a DMM to form a high-density test subsystem in a 1U footrpint.

Features

- Up to 96 differential channels per full rack mainframe
- Constantly monitor input signals for fault conditions
- Flexible configurations for detecting edges, out-of-bounds conditions and measuring pulse widths
- Inputs can be masked, inverted and combined to produce interrupts
- Programmable debounce circuitry prevents erroneous readings
- ±10 V and ±100 V input ranges
- On-board memory stores events with IEEE 1588 timestamps
- Synchronize reading of input states with other scanned analog channels

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EX1200-7416 16 Channel Comparator/Event Detector

Specifications

Number of Channels	16 differential or SE
Input Ranges	±10 V, ±100 V, (Special ranges available)
Input Threshold	±10 V range with 78 mV resolution (8-bit), per channel
	±100 V range with 780 mV resolution (8-bit), per channel
Input Type	Differential, may be configured for single-ended by grounding the negative input.
Input Impedance	200 kΩ differential
	100 kΩ single-ended
Input Polarity	Rising or falling edge, per channel
Modes	Normal (Edge Detect)
	Window (upper/lower bounds)
	Pulse (Positive/Negative Polarity)
Debounce Time	1 µs to 500 ms
Memory	128k events
Timestamp	IEEE-1588
Math Functions	AND/OR
Input Impedance	> 1 MOhm
Connector	44-pin HD D-sub

Ordering Information

EX1200-7416	16 channel comparator/event detector
27-0390-044	44-pin HD D-sub mating connector, backshell and pins, crimp style
70-0363-502	44-pin HD D-sub mating connector and backshell, with 3ft unterminated 22 AWG wire
70-0297-001	Crimp tooling, includes handle and positioner, 22 AWG



HD D-sub Connectors

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VTI Instruments is the market leader in functional test and data acquisition systems. ISO9001:2000 registered, the company serves the aerospace/defense, avionics, transportation and power and energy markets. The company engineers and produces over 200 components and subsystems to build both custom and standard test systems. With offices in the U.S., Europe and Asia, worldwide product support is provided through a network of VTI-certified engineering representatives. VTI is a sponsor member of the VXI Consortium and a strategic/ founding member of the LXI Consortium.

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