TempScan/1100™ & MultiScan/1200™

High-Speed Temperature & Voltage Scanning Instruments

TempScan/1100™

- Measures thermocouples, volts, and RTDs at up to 960 channels/s
- Accepts optional scanning modules for measuring thermocouples, RTDs, or DC volts
- Expandable up to 992 channels

MultiScan/1200™

- Measures isolated temperature, DC volts, AC volts, and waveforms in one compact instrument
- Scans thermocouples and DC volts at up to 147 channels/s
- Single-channel burst mode for digitizing waveforms at rates up to 20 kHz
- Two scanning modules available for measuring 24 channels of thermocouples/volts or high voltage, respectively
- Expandable up to 744 channels

Common Features

- IEEE 488 and RS-232/422 interfaces
- 32 TTL digital alarm outputs and 8 TTL-compatible digital inputs
- Custom thermocouple types for user-defined linearization tables
- Two programmable scan rates for:
  - pre- and post-trigger sampling
  - accelerated sampling on-event detection
- 128 Kreadings of memory, expandable up to 4 Mreadings
- Built-in real-time clock:
  - synchronizes acquisition to time of day
  - provides time and date stamping for trend monitoring

Software

- ChartView™, an *Out-of-the-Box™* data logging application for effortless setup, acquisition, & real-time display
- eZ-PostView™ included free with *Out-of-the-Box™* application software
- ScanCal™, calibration software

The TempScan/1100 and MultiScan/1200 offer high-speed temperature and voltage measurement in compact, 19 in. rack-mountable enclosures

Temperature Series Selection Guide

	TempScan/1100	MultiScan/1200
Measurement Parameters		
A/D resolution	16 bit w/oversampling	16 bit w/oversampling
Accuracy (w/J thermocouple)	±0.5°C	±0.5°C
Thermocouples supported	J,K,T,E,R,S,B,N	J,K,T,E,R,S,B,N
RTD	✓	—
DCV	✓	✓
ACV	—	✓
Channel-to-channel isolation	10V	500V or 200V
Channel-to-system isolation	500V	500V
AC line rejection	✓	✓
Scanning Parameters		
Switching technology	solid state multiplexers	mechanical relays
Max scan rate	960 channels/s	147 channels/s
Max single-channel scan rate	60 Hz	20 kHz
Min channel configuration	32 channels	24 channels
Max channel configuration	992 channels	744 channels
Data Handling		
Built-in memory	256 Kbyte	256 Kbyte
Max memory with expansion	8 Mbyte	8 Mbyte
IEEE 488 interface	✓	✓
RS-232 interface	✓	✓
RS-422 interface	✓	✓
Time and date stamping	✓	✓
Triggering		
Digital trigger input	✓	✓
Analog trigger input	✓	✓
Trigger on time of day	✓	✓
Pre-trigger scan rate	programmable	programmable
Post-trigger scan rate	programmable	programmable
Digital Inputs	8	8
Programmable Alarm Outputs	32	32
Software		
ChartView	included	included
ChartView Plus	optional	optional
LabVIEW drivers	✓	✓
Hardware Options		
32-ch TC scanning card	TempTC/32B	—
32-ch voltage scanning card	TempV/32B	—
16-ch RTD scanning card	TempRTD/16B	—
24-ch TC/voltage scanning card	—	MTC/24
24-ch high voltage scanning card	—	MHV/24X
2-slot expansion chassis	Exp/10A	Exp/10A
10-slot expansion chassis	Exp/11A	Exp/11A

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TempScan/1100™ & MultiScan/1200™

High-Speed Temperature & Voltage Scanning Instruments

The TempScan/1100 and MultiScan/1200 are high-speed, compact, rack-mountable instruments that measure up to 992 or 744 channels of temperature or voltage, respectively.

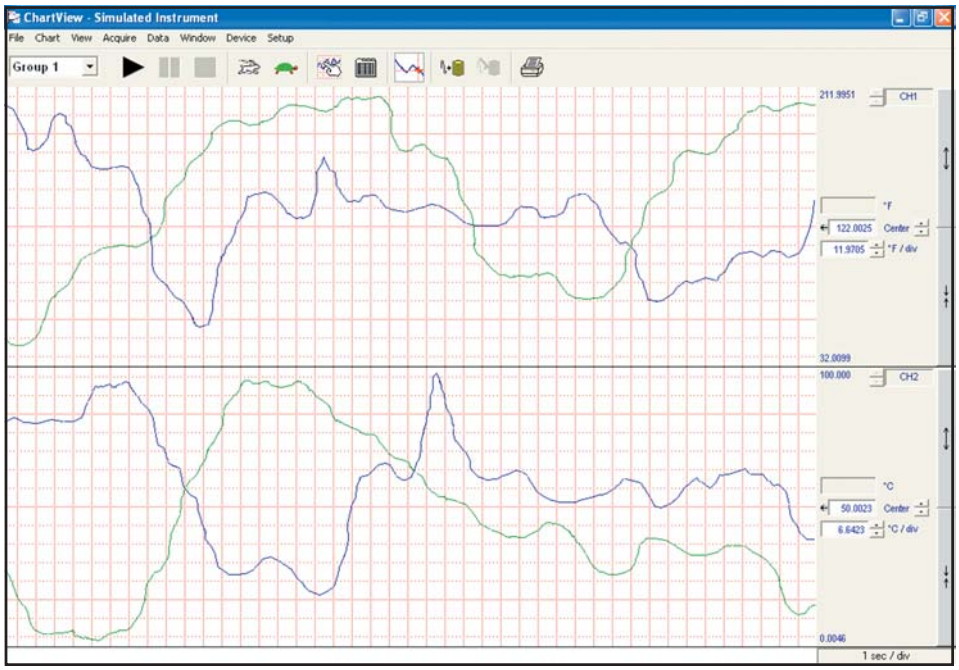
Because of their unique architecture, both instruments offer unrivaled low cost per channel. They connect to a computer via IEEE 488, RS-232/422, or Hayes-compatible modem and can be disconnected from the PC for stand-alone operation.

TempScan/1100

The TempScan/1100 is well suited for temperature and lower-voltage measurement because its solid state scanning provides temperature readings at speeds up to 960 channels/s, an important feature in applications that require monitoring of tens or hundreds of channels.

MultiScan/1200

The MultiScan/1200 is ideal for temperature and voltage measurements that require more channel-to-channel isolation than the TempScan/1100 can offer. The unit provides up to 500V of channel-to-channel isolation for voltage and 200V of channel-to-channel isolation for thermocouples. The MultiScan/1200 uses relays to provide isolation and to scan thermocouples and volts at up to 147 channels/s. The unit can also digitize waveforms on a single channel at up to 20 kHz.



The TempScan/1100 and MultiScan/1200 include ChartView Out-of-the-Box™ software, a Microsoft Windows® application that enables measurements without programming

Software

The TempScan/1100 and MultiScan/1200 include ChartView, one of IOtech's *Out-of-the-Box™*, Windows®-based setup and acquisition applications. ChartView provides a graphical spreadsheet-style user interface that lets you easily configure your hardware, acquisition, and display parameters. Compatible with all versions* of Windows®, ChartView features a no-programming approach that enables data collection and display within minutes of taking your TempScan/1100 or MultiScan/1200 *Out-of-the-Box™*.

In addition to ChartView data-logging software, every TempScan/1100 and MultiScan/1200 also ships with eZ-PostView™, a post-acquisition data-review program, and ScanCal™, an application that automates instrument calibration.

Free software drivers are also available for a wide range of programming environments, including LabVIEW® for Windows®.

* Windows® 98 or higher. Requires Windows 2000 or Windows XP for the link to Excel 2000 to operate.

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TempScan/1100™ & MultiScan/1200™

Scanning Modules

Scanning Modules

The TempScan/1100 and MultiScan/1200 eliminate the need for external signal conditioning, multiplexers, and custom cables, thereby saving you both time and money. Their user-installable scanning modules provide all required signal conditioning and amplification.

The units' scanning modules contain screw-terminal sockets for quick and easy input connections. The modules slide into a metal, shielded enclosure within the TempScan/1100 or MultiScan/1200, keeping noise to a minimum and maintaining a constant internal temperature.

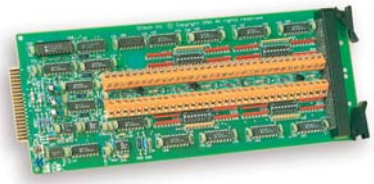
When equipped with the Exp/10A or Exp/11A expansion chassis, the TempScan/1100 and MultiScan/1200 can accept multiple scanning modules, allowing you to create systems of up to 992 channels (TempScan/1100) and 744 channels (MultiScan/1200).

TempScan/1100 Modules

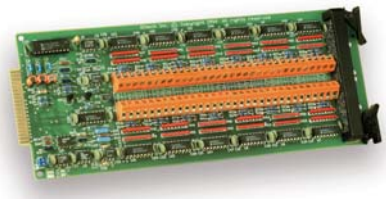
TempScan/1100 Scanning Module Selection Guide

Scanning Modules	TempTC/32B	TempRTD/16B	TempV/32B
Applications			
Temperature	✓	✓	—
Low voltage	—	—	✓
High voltage	—	—	—
No. of channels	32	16	32

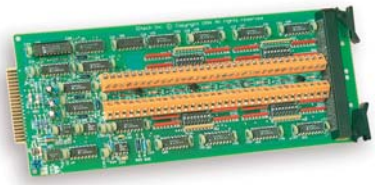
The TempScan/1100 is supported by three solid-state scanning modules including:



TempTC/32B Thermocouple Scanning Module. The TempTC/32B thermocouple scanning module contains 32 differential input channels, each of which may be configured for thermocouple types J, K, T, E, R, S, B, and N, or for a ±100 mV input. Measurements may be designated in units of ˚C, ˚F, ˚K, ˚R, or volts.



TempRTD/16B RTD Scanning Module. The TempRTD/16B scanning module supports 16 channels of 3- or 4-wire RTDs. Measurements may be designated in units of ˚C, ˚F, ˚K, or ˚R.



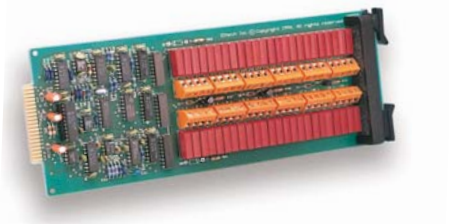
TempV/32B Voltage Scanning Module. The TempV/32B scanning module contains 32 differential input channels and is capable of measuring voltage with programmable ranges of ±10V, ±5V, ±1V, and ±100 mV.

MultiScan/1200 Modules

MultiScan/1200 Scanning Module Selection Guide

Scanning Modules	MTC/24	MHV/24X
Applications		
Temperature	✓	—
Low voltage	✓	—
High voltage	—	✓
No. of channels	24	24

The MultiScan/1200 can accept one of two available scanning modules, each of which features 24 input channels. These scanning modules include:



MTC/24 Thermocouple/Volt Scanning Module. The MTC/24 provides 24 isolated differential input channels, and per-channel programmability for thermocouple types J, K, T, E, R, S, B, and N, or for ±10V, ±5V, ±1V, and ±100 mV inputs. Channel-to-channel isolation is 200 VDC peak.

MHV/24X High-Voltage Scanning Module. The MHV/24X provides 24 differential voltage-input channels, and per-channel programmability for ±250V, ±25V, and ±2.5V. Channel-to-channel isolation is 500 VDC peak.

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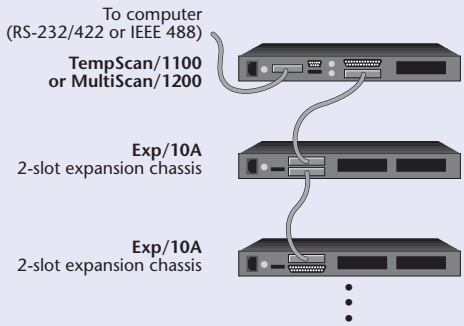
TempScan/1100™ & MultiScan/1200™

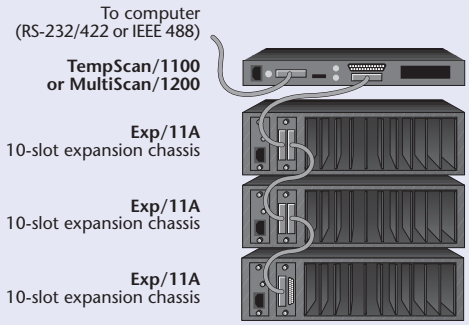
Expansion Architecture

Exp/10A 2-slot expansion chassis

Exp/11A 10-slot expansion chassis



Up to 15 Exp/10A expansion chassis can be attached to a TempScan/1100 or MultiScan/1200



The TempScan/1100 or MultiScan/1200 can support up to three Exp/11A expansion chassis

The TempScan/1100 and MultiScan/1200 can each accept one scanning module, which provides all of the required signal conditioning. If your application demands more channels than are available on a single module, you can use either the 2-slot Exp/10A or the 10-slot Exp/11A expansion chassis. Multiple Exp/10A and Exp/11A chassis can be daisy chained to a TempScan/1100 or MultiScan/1200, providing up to 30 additional slots. Regardless of the number of expansion chassis connected, there is only one link to the computer, via its IEEE 488 or serial interface. As a result, the TempScan/1100 or MultiScan/1200 appears to the PC as one unified multichannel instrument.

TempScan/1100 & MultiScan/1200 Expansion

The TempScan/1100 and MultiScan/1200 instruments can each control up to 15 Exp/10A two-slot expansion chassis. The Exp/10A's form factor is identical to that of either instrument. When attached to the TempScan/1100, each Exp/10A is configurable for 32 or 64 input channels, providing a total expansion capacity of up to 992 channels. When attached to the MultiScan/1200, each Exp/10A is configurable for 24 or 48 input channels, providing a total expansion capacity of up to 744 channels.

For TempScan/1100 systems consisting of more than 96 channels, the 10-slot Exp/11A expansion chassis provides an economical and convenient solution. One Exp/11A provides up to 320 input channels in a compact and convenient enclosure. Multiple Exp/11A chassis can be connected to one TempScan/1100 to provide a total system capacity of up to 992 channels.

For MultiScan/1200 systems of more than 72 channels, the 10-slot Exp/11A is recommended and accommodates up to 240 input channels. Multiple Exp/11A chassis can be connected to one MultiScan/1200 providing a total system capacity of up to 744 channels.

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TempScan/1100™ & MultiScan/1200™

Measurement Modes

TempScan/1100

Scan Technique. The TempScan/1100 uses a technique whereby groups of 16 consecutive channels are scanned during every AC line cycle (i.e., channels 1 to 16 are scanned during the first AC line cycle, channels 17 to 32 are scanned during the subsequent AC line cycle, and so forth). This results in maximum measurement rates of 960 channels per second (60 Hz) or 800 channels per second (50 Hz).

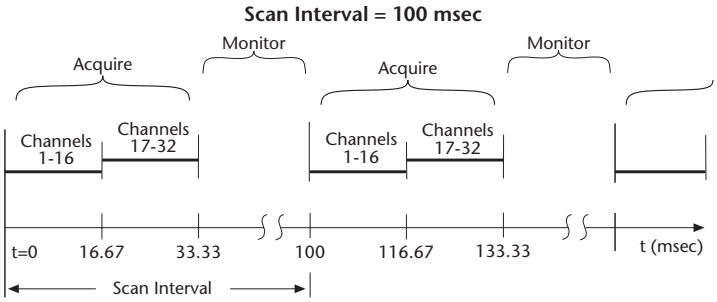
Number of Channels	Per Channel Scan Rate (Hz)	
	60 Hz	50 Hz
1-16	60	50
17-32	30	25
33-48	20	16.7
49-64	15	12.5
65-80	12	10
81-96	10	8.3
97-112	8.6	7.1
113-128	7.5	6.25
◊		
785-800	1.2	1.0
◊		
945-960	1.0	.83
961-976	.98	.82
977-992	.97	.81

Per Channel Scan Rate[1,2,3,4]: *The rate at which individual channel values are updated depends on the total number of channels scanned and the AC line frequency (60/50 Hz)*

1. All thermocouple measurements are cold-junction compensated and linearized
2. Per-channel scan rate may be lower if channels are skipped
3. The per-channel scan rate may be calculated using the formula at right:
4. Divide the per-channel scan rate by 4 if using thermocouple wire > 500 ft.

$$\text{INT}\left[\frac{\text{AC line frequency}}{\frac{\text{Number of channels} + 15}{16}}\right]$$

Scan Interval. For applications that require the logging of data at a specified time interval, the TempScan/1100 offers a programmable scan interval. The effect of the scan interval is illustrated in the example below.



Acquire: Data, alarms, and high, low, and last statistics are updated

Monitor: Only alarms and high, low, and last statistics are updated

The TempScan/1100's programmable scan interval controls the time between successive channel scans, as illustrated in the above example for a 32-channel system

MultiScan/1200

The MultiScan/1200 offers three measuring modes for application flexibility. These include a line-cycle integration mode, a high-speed multichannel scanning mode, and a single-channel burst mode. A discussion of the particular attributes of each measuring mode follows.

	Measurement Mode		
	Line Cycle Integration	High-Speed Multichannel Scanning	Single-Channel Burst Mode
T/C	✓	✓	—
DCV	✓	✓	✓
ACV	✓	—	✓

Line-Cycle Integration Mode. The MultiScan/1200's ability to sample and average 32 measurements per line cycle makes it useful for high-accuracy applications and is recommended for thermocouple measurements. What's more, when engaged in line-cycle averaging, the unit provides AC or DC voltage, or linearized and compensated thermocouple-based temperature readings at up to 44 channels/s. The MultiScan/1200's AC voltage measurement capability is ideal for power-line monitoring applications. For each measurement, the unit calculates the equivalent true RMS voltage based on 32 samples it acquires during each AC line cycle.

Line Cycle Integration					
Line Cycles per Reading	DC Volts & Thermocouples		AC Volts		Maximum Channel Number
	50 Hz	60 Hz	50 Hz	60 Hz	
1	38.5*	44*	38.5*	44*	741
2	19.2*	22*	—	—	431
4	9.6*	11*	—	—	234
8	4.8*	5.5*	—	—	122

* channels/s

High-Speed, Multichannel Scanning Mode. When the MultiScan/1200's line-cycle averaging is disabled, the unit can average 1, 2, 4, 8, 16, or 32 samples per channel. When the unit is configured to take one sample per channel, it can scan 147 channels/s—or all of its potential 744 expansion channels in approximately 5 seconds. This is important if the application involves monitoring tens to hundreds of channels. By contrast, data loggers and other temperature measuring instruments typically acquire readings at only 5 to 20 channels/s.

Single-Channel Burst Mode. In single-channel burst mode, the MultiScan/1200 can sample at up to 20 kHz on a single channel and store the data in its memory, which can be expanded up to 8 Mbytes. When performing post-acquisition waveform analysis such as Fast Fourier Transforms (FFTs), the unit can return each data point in a waveform to your program. Alternatively, the unit can provide a true RMS value of the equivalent AC voltage.

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TempScan/1100™ & MultiScan/1200™

General Information

Scanning Capabilities

The TempScan/1100 and the MultiScan/1200 provide an array of scanning capabilities to meet your application requirements. Because data-logging applications frequently require the logging of readings at fixed time intervals, the TempScan/1100 and the MultiScan/1200 use the standard hours-minutes-seconds (hh:mm:ss.s) format to specify the time interval between channel scans. Users can configure the units to begin and end data logging on a specified event—such as a TTL signal, temperature level, IEEE GET, alarm condition, or absolute time of day—or upon completion of a specified number of readings.

Two Programmable Scan Rates. The TempScan/1100 and the MultiScan/1200 offer two programmable scan rates for applications that require acceleration of the measurement rate on a specified event, such as an alarm condition. For example, you can program the instruments to sample once per minute and then, upon the occurrence of a specified alarm condition, switch to sampling once per second. Upon cessation of the alarm condition, the units resume sampling at the rate of once per minute.

Accuracy

The TempScan/1100 and the MultiScan/1200 have a number of features and capabilities that enable them to deliver the high accuracy demanded by many research applications.

High Resolution. Each unit is equipped with a high-speed 16-bit A/D converter. This enables the TempScan/1100 to offer up to 0.1˚C and 3.05 µV resolution with the TempTC/32B scanning module and allows the MultiScan/1200 to offer the same with the MTC/24 scanning module.

Noise Filtering. The TempScan/1100 filters AC line cycle noise by sampling and averaging 16 measurements per line cycle. The MultiScan/1200 does so by sampling and averaging 32 measurements per line cycle. The MultiScan/1200 also offers the additional flexibility to average across multiples of 1, 2, 4, or 8 line cycles.

High-Accuracy Cold Junction Compensation. The TempTC/32B and the MultiScan/1200's MTC/24 thermocouple/volt scanning modules both feature multiple, strategically located temperature sensors that provide high-accuracy, cold-junction compensation across all of its inputs.

Accurate Linearization. The TempScan/1100 and the MultiScan/1200 enable quick and accurate linearization by providing built-in lookup tables for popular thermocouple types, including J, K, T, E, R, S, B, and N.

Alarms

Many process-control applications require periodic monitoring until the occurrence of an alarm condition; then they require the acceleration of measurement and the provision of closed-loop control signals until the process returns to a steady state.

The TempScan/1100 and the MultiScan/1200 offer a number of capabilities and features that facilitate such applications. For example, they provide 32 digital alarm outputs that can be activated on a per-channel basis via user-specified alarm conditions, and they automatically return their alarm outputs to steady state once limit conditions are resolved.

The units' ability to automatically update alarm outputs in real-time affords you greater control of your applications and reduces your programming burden by eliminating the need for constant, per-channel monitoring by the controlling computer.

In addition, the units can update alarmed output channels in real time, at their programmed scan rates, and can alert the host computer of active alarm conditions via an IEEE 488 service request (SRQ).

Real-Time Clock

The TempScan/1100 and the MultiScan/1200 each feature a real-time clock that allows you to synchronize acquisition to a specific time of day. During acquisition, the TempScan/1100 and the MultiScan/1200 store the time and date of every data scan in memory, enabling later retrieval of this information for use in plotting and analyzing measurements over time. The instruments also time and date stamp each channel's high and low excursions, providing a precise time record of a channel's minimum and maximum values.

Memory

For high-speed and long-term data logging, the TempScan/1100 and the MultiScan/1200 are equipped with 128 Kreadings of data storage. Because individual measurements are not necessary for all data logging applications, the units make each channel's high, low, and last readings available throughout acquisition.

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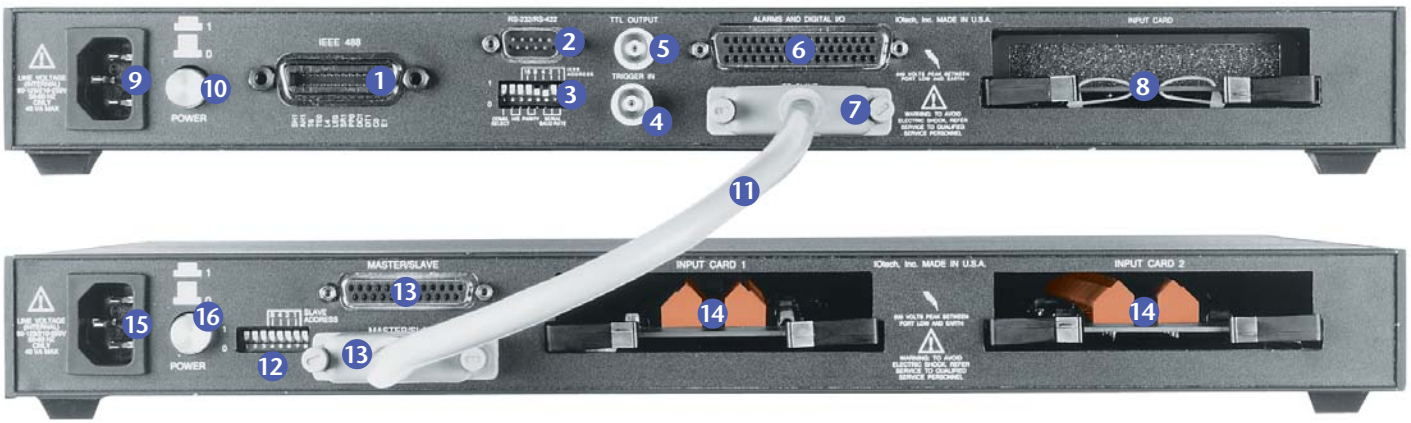
TempScan/1100™ & MultiScan/1200™

Instrument Part Identification

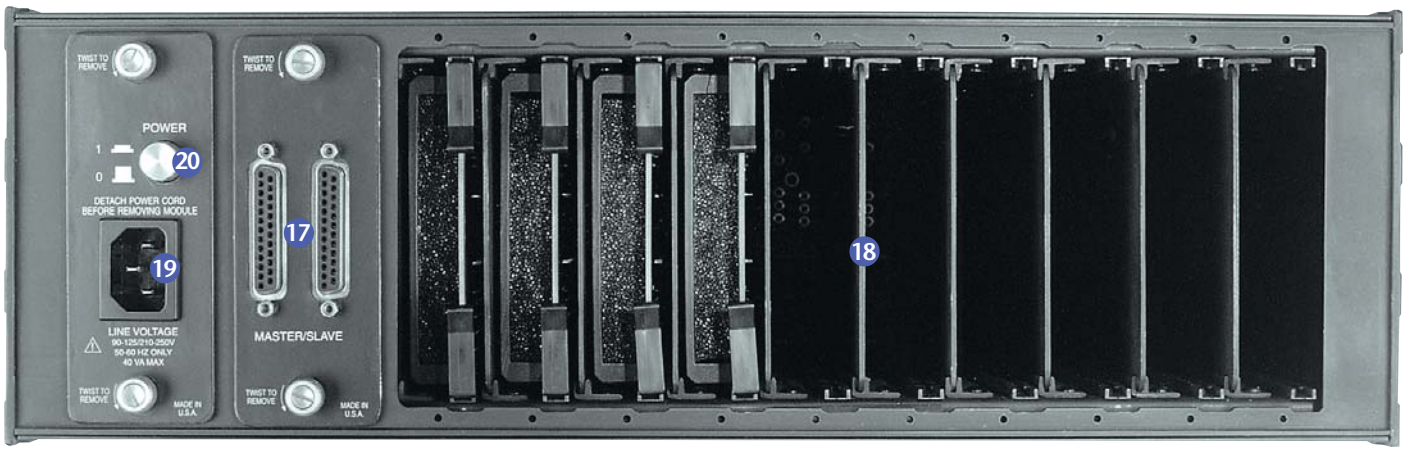
TempScan/1100 and MultiScan/1200 Rear Panel

1. **IEEE 488 connector:** Provides full IEEE 488 control from PCs
2. **RS-232C/RS-422 (DB9) connector:** Serial port for operation at remote distances from controlling computer; supports 300 to 9600 baud using RTS/CTS or XON/XOFF handshaking
3. **DIP switches:** Easy-to-access switches for selecting IEEE 488 or RS-232/422 communication and respective parameters (IEEE 488: Address; RS-232/422: handshaking, parity, and baud rate)
4. **Trigger input (BNC) connector:** For initiating and/or stopping acquisition with TTL input signal
5. **TTL output (BNC) connector:** TTL output signal occurs for each channel scan; used for synchronizing other equipment with TempScan/1100 or MultiScan/1200 acquisition, such as IOtech's Digital488 and DAC488 products
6. **Alarms and digital input/output (DB50) connector:** Provides easy access to 32 TTL digital alarm outputs and 8 digital input lines
7. **Master/slave (DB25) connector:** Connection to Exp/10A or Exp/11A expansion units for greater channel expansion
8. **Shielded enclosure:** Accepts scanning modules (TempTC/32B, TempV/32B, TempRTD/16B, MTC/24 or MHV/24X); designed to keep noise outside and a constant temperature inside
9. **Power input connector:** Internally configurable for either 105-125 or 210-250 VAC, 50/60 Hz, plus fuse circuit breaker
10. **Power on/off switch**
11. **CA-35-1 master/slave cable** (included with both Exp/10A and Exp/11A expansion chassis)



Exp/10A Rear Panel

12. **DIP switches:** Easy-to-access switches for selecting Exp/10A slave ID
13. **Master/slave (DB25) connectors:** Provides connection from the TempScan/1100 or MultiScan/1200 to one or more expansion chassis
14. **Shielded enclosure:** Accepts any combination of scanning modules for use with their respective systems (TempTC/32B, TempV/32B, TempRTD/16B, MTC/24 or MHV/24)
15. **Power input connector:** Internally configurable for either 105-125 or 210-250 VAC, 50/60 Hz, plus fuse circuit breaker
16. **Power on/off switch**



Exp/11A Rear Panel

17. **Master/slave (DB25) connectors:** Provides connection from the TempScan/1100 or MultiScan/1200 to one or more expansion chassis
18. **Shielded enclosure:** Accepts any combination of scanning modules for use with their respective systems (TempTC/32B, TempV/32B, TempRTD/16B, MTC/24, or MHV/24X)
19. **Power input connector:** Internally configurable for either 105-125 or 210-250 VAC, 50/60 Hz, plus fuse circuit breaker
20. **Power on/off switch**

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TempScan/1100™ & MultiScan/1200™

Specifications

Specifications

TempScan/1100 & MultiScan/1200

Number of Slots: 1
Number of Channels
TempScan/1100: Up to 32 differential thermocouple or voltage inputs, or up to 16 RTD inputs; accepts TempTC/32B, TempV/32B, or TempRTD/16B scanning modules
MultiScan/1200: Up to 24 differential thermocouple or voltage inputs; accepts MTC/24 or MHV/24X scanning modules
Channel Attributes: High and low set points; hysteresis value for high and low set points
Scan Sequence: Any combination of temperature and voltage channels may be scanned, but channels are scanned in ascending numerical order
Scan Interval: Absolute time between channel scans; minimum = 1 ms (TempScan/1100), 6.8 ms (MultiScan/1200); maximum = 99:59:59.9 (hh:mm:ss.s)
Scanning Modes
TempScan/1100:
960 channels/s (60 Hz); 800 channels/s (50 Hz)
for thermocouples up to 500 ft.
240 channels/s (60 Hz); 200 channels/s (50 Hz)
for thermocouples over 500 ft.
MultiScan/1200:
147 channels/s (50/60 Hz)
multi-channel scanning
44 channels/s (60 Hz); 38.5 channels/s (50 Hz),
with 32-point line-cycle averaging enabled
1 channel @ 20 Ksamples/s,
single-channel burst mode
Programmable Triggering: Temperature or voltage level (above or below), absolute time of day, alarm condition (on or off), IEEE GET, IEEE TALK, external TTL trigger (rising or falling), specified number of readings
Level Trigger: Programmable value for any one channel
(not available when the MultiScan/1200 is in single-channel burst mode)
TTL Trigger: Programmable for rising or falling edges
Pre-Trigger Count: Programmable (<128K - 1)
Post-Trigger Count: Programmable

Alarms & Digital I/O

Number of Digital Alarm Outputs: 32 bits, TTL-level compatible
Number of Digital Inputs: 8 bits, TTL-level compatible
Connector: 50-pin D-connector; mating connector supplied
Alarm Conditions: May be detected by SRQ or software query (SPOLL or U Command)

Data Storage & Format

Storage: 128 Kreadings standard
Data Formats: ASCII or binary; binary format returns a 16-bit compensated & linearized temperature value (0.1˚C/bit); user programmable for hi byte/lo byte or lo byte/hi byte
Note: High-speed DMA transfers are binary format only
Statistical Parameters: High, low, and last available per channel
(not available when the MultiScan/1200 is in single-channel burst mode)
Time Stamp: Available for each scan group and for each channel's high, low, and last parameters (not available when the MultiScan/1200 is in single-channel burst mode)
Time Format:
1. Absolute date and time (mm/dd/yy hh:mm:ss.s)
2. Relative time (±hh:mm:ss.s)

IEEE 488 Interface

Implementation: SH1, AH1, T6, TE4, L4, LE4, SR1, PP0, RL0, DC1, DT1, C0, & E1
Programmable Parameters: Alarm set points, thermocouple types, temperature units, trigger level, pre-trigger and post-trigger scan interval, trigger mode, SRQ mask, scan count, pre-trigger count, digital input, digital output, real-time clock, data output format, and terminators
Maximum Data Transfer speed: 300 Kbytes/s
Connector: Standard IEEE 488 connector with metric studs

RS-232/422 Interface

Baud Rates: 300, 1200, 2400, 4800, 9600, 19200
Data Bits: 8
Stop Bits: 1
Parity: Even, odd, none
Handshaking: RTS/CTS, XON/OFF
Connector: Male DB-9

Calibration

Calibration Cycle: One year
Calibration Constants: Chassis constants stored in nonvolatile memory; card constants stored in EEPROM; each unit includes ScanCal, example software for automating its calibration procedure; calibration is enabled via software password and by hardware enable switch

General

Front Panel Indicators: LEDs for alarm, scanning, talk, listen, SRQ, error, send, receive, power, and trigger status
Power: 105 to 125 or 210 to 250 VAC, 50/60 Hz; 20 VA max
Warm-Up: One hour to rated accuracy
Environment: 0˚ to 50˚C; 0 to 95% RH, non-condensing to 35˚C; linearly derate 3% RH/˚C from 35˚C to 50˚C
IEEE 488 Connector: Standard IEEE 488 connector with metric studs
RS-232/422 Connector: Male DB-9
Master/Slave Port: Female DB25
Digital I/O and Alarms: Female DB50 (32 alarms, 8 digital inputs, 10 ground pins)
Trigger Input: BNC
TTL Output: BNC
Configuration Switches: IEEE 488 or RS-232/422, IEEE 488 address, handshake, parity, baud rate, and calibration-memory write enable/disable
Dimensions: 425 mm W x 305 mm D x 45 mm H (16.75" x 12" x 1.75")
Weight: 3.62 kg (8 lbs)

Exp/10A Expansion Chassis

Number of Slots: 2
Number of Channels
TempScan/1100: Up to 64 differential voltage or thermocouple inputs, or up to 32 RTD inputs; accepts any combination of two TempTC/32B, TempV/32B, and TempRTD/16B scanning modules
MultiScan/1200: Up to 48 differential voltage or thermocouple inputs; accepts any combination of two MTC/24 and MHV/24X scanning modules
Front Panel Indicators: LEDs for scanning, error, and power
Power: 105 to 125 or 210 to 250 VAC, 50/60 Hz; 20 VA max
Environment: 0˚ to 50˚C; 0 to 95% RH, non-condensing to 35˚C; linearly derate 3% RH/˚C from 35˚ to 50˚C
Rear Panel
Configuration Switches: DIP switch for setting slave ID
Master/Slave Ports: Two female DB25 ports
Cabling: Included for connection to mainframe or other expansion device
Dimensions: 425 mm W x 305 mm D x 45 mm H (16.75" x 12" x 1.75")
Weight: 2.53 kg (5.5 lbs)

Exp/11A Expansion Chassis

Number of Slots: 10
Number of Channels
TempScan/1100: Up to 320 differential voltage or thermocouple inputs, or up to 160 RTD inputs; accepts any combination of 10 TempTC/32B, TempV/32B, and TempRTD/16B scanning modules
MultiScan/1200: Up to 240 differential voltage or thermocouple inputs; accepts any combination of 10 MTC/24 and MHV/24X scanning modules
Front Panel Indicators: LEDs for scanning, error, and power
Power: 105 to 125 or 210 to 250 VAC, 50/60 Hz; 20 VA max
Environment: 0˚ to 50˚C; 0 to 95% RH, non-condensing to 35˚C; linearly derate 3% RH/˚C from 35˚ to 50˚C
Rear Panel
Configuration Switches: DIP switch for setting slave ID
Master/Slave Ports: Two female DB25 ports
Cabling: Included for connection to mainframe or other expansion device
Dimensions: 425 mm W x 305 mm D x 135 mm H (16.75" x 12" x 5.25")
Weight: 6.36 kg (14 lbs)

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TempScan/1100™ & MultiScan/1200™

Specifications

TempScan/1100 Scanning-Module Specifications

TempTC/32B — Thermocouple Scanning Module

Number of Channels: 32 differential; programmable by channel for specific thermocouple type or a millivolt input
Input Types: J, K, T, E, N, R, S, B, N14, & N28, custom thermocouple, & millivolts
Input Connectors: Screw terminal
Thermocouple Wire: #16 AWG max, #24 AWG min
#20 AWG recommended for type J, K, T, E, and N
#24 AWG recommended for type R, S, and B
Temperature Range & Accuracy:

Type	Range	Accuracy*	Resolution**
J	-200˚ to +760˚C	±0.5˚C	0.10˚C
K	-200˚ to +1372˚C	±0.5˚C	0.10˚C
T	-200˚ to +400˚C	±0.5˚C	0.10˚C
E	-200˚ to +1000˚C	±0.5˚C	0.10˚C
N	-200˚ to +1300˚C	±0.5˚C	0.10˚C
R	0.0˚ to +1768˚C	±1.0˚C	0.10˚C
S	0.0˚ to +1768˚C	±1.0˚C	0.10˚C
B	+350˚ to +1820˚C	±1.0˚C	0.10˚C
N14	0.0˚ to +1300˚C	±0.5˚C	0.10˚C
N28	-270˚ to +400˚C	±0.5˚C	0.10˚C

* 18˚ to 28˚C, 1 year; includes cold junction compensation; excludes thermocouple errors; thermocouple readings based on NIST Monograph 175
** Typical
Temperature Units: ˚C, ˚F, ˚K, ˚R, and mV
Fault Detection: Open T/C may be detected by software query
Cold Junction Sensors: One for every 8 input channels
Linearization: Performed by lookup table; support included for storing up to two user-defined linearization tables in NVRAM
Input Impedance: 1M Ohm typ
Input Bias Current: 20 nA max
Maximum Allowable Input: ±35V peak
Channel-to-Digital Low Isolation: 500V max
Channel-to-Channel Isolation: ±10V peak
Channel-to-Channel Cross Talk: 100 dB min
Temperature Coefficient: ≤0.03 ˚C/˚C
Digital Filtering: Averages 16 samples at 50/60 Hz for line cycle noise rejection
Voltage Range/Resolution: ±100 mV/3.05 µV
Voltage Accuracy: ±0.02%
Voltage Units: Volts, counts

TempRTD/16B — RTD Scanning Module

Number of Inputs: 16 (3- or 4-wire)
Alpha: 0.00385
Input Connectors: Screw terminal
Temperature Range & Accuracy:

Type	Range	Accuracy	Resolution
100 Ohm platinum	-100˚C to +630˚C	±0.2˚C	0.1˚C
	-270˚C to -100˚C	±0.4˚C	0.2˚C

Excitation Current: <1 mA peak
Temperature Coefficient: <0.1%/˚C
Temperature Units: ˚C, ˚F, ˚K, ˚R, and counts
Linearization: Performed by lookup table; support included for storing user-defined linearization tables in NVRAM

1. Specified for coupling impedance > 30M Ohm and common mode frequency < 60 Hz
2. 300 VDC or AC peak before equipment damage occurs
3. 18˚ to 28˚C, 1 year; includes cold junction compensation
4. Typical; excludes thermocouple errors
5. Add ±5˚C for common mode voltages greater than 25 VAC
6. Maximum peak-to-peak signal for AC volts
7. For AC voltages where the frequency of the input signal is an integer multiple of the AC line cycle ±1%
8. 700 VDC or AC peak before equipment damage occurs
9. 325 VDC or AC peak if used in the same system with the MTC/24 scanning module
10. With line cycle integration enabled
11. Contact factory for availability of higher voltage card

Scanning Module Compatibility Guide

Expansion Boards	MTC/24	MHV/24X	TempTC/32B	TempRTD/16B	TempV/32B
MultiScan/1200	✓	✓	—	—	—
TempScan/1100	—	—	✓	✓	✓

TempV/32B —Voltage Scanning Module

Number of Inputs: 32 differential
Input Connectors: Screw terminal
Range/Resolution:

Range	Resolution
±100 mV	3.05 µV/bit
±1V	30.5 µV/bit
±5V	153 µV/bit
±10V	306 µV/bit

Accuracy: ± 0.02%
Digital Filtering: Averages 16 samples at 50/60 Hz for line cycle noise rejection
Temperature Coefficient: <0.01%/˚C
Input Impedance: 1M Ohm typ
Input Bias Current: 40 nA max
Common Mode Rejection: 100 dB typ
Maximum Allowable Input: 25V rms max
Channel-to-Digital Low Isolation: 500V max
Channel-to-Channel Isolation: ±10V peak
Channel-to-Channel Cross Talk: 100 dB min

MultiScan/1200 Scanning-Module Specifications

MTC/24—Thermocouple Scanning Module

Number of Channels: 24 differential; programmable by channel for specific thermocouple type or a voltage input
Input Types: J, K, T, E, R, S, B, N, custom thermocouple, and voltage
Input Connectors: Screw terminal
Maximum Allowable Input: ±25V rms
Input Impedance: 1M Ohm
Input Bias Current: 20 nA max
Maximum Common Mode Voltage [1,2,11]**:** 200 VDC or AC peak
Maximum Normal Mode Voltage[11]**:** 10 VDC or AC peak
Channel-to-Power Ground Isolation: 200V peak
Channel-to-Channel Isolation[11]**:** 200V peak
Temperature Coefficient: <(0.1 x rated accuracy)%/˚C
Digital Filtering: Averages 32 samples at 50/60 Hz for line-cycle noise rejection (DCV and thermocouple measurements)
Temperature Specifications
Thermocouple Wire: #20 AWG recommended (#16 AWG max/#24 AWG min)
Temperature Range and Accuracy [3,4]**:**

Type	Range	Accuracy[5, 10]	Resolution
J	-100˚ to +760˚C	±0.5˚C	0.10˚C
	-200˚ to -100˚C	±0.8˚C	0.20˚C
K	-100˚ to +1372˚C	±0.6˚C	0.10˚C
	-200˚ to -100˚C	±0.8˚C	0.20˚C
T	-100˚ to +400˚C	±0.5˚C	0.15˚C
	-200˚ to -100˚C	±0.8˚C	0.25˚C
E	-100˚ to +1000˚C	±0.7˚C	0.10˚C
	-200˚ to -100˚C	±0.9˚C	0.20˚C
R	0.0˚ to +1780˚C	±2.0˚C	0.40˚C
S	0.0˚ to +1780˚C	±2.0˚C	0.40˚C
B	+350˚ to +1820˚C	±2.0˚C	0.50˚C
N	-100˚ to +1300˚C	±0.6˚C	0.15˚C
	-200˚ to -100˚C	±0.9˚C	0.20˚C

Temperature Units: ˚C, ˚F, ˚K, ˚R, and mV
Fault Detection: Open thermocouple may be detected by software query
Cold Junction Sensors: One for every 8 input channels
Linearization: Performed by lookup table; includes support for storing up to 2 user-defined linearization tables in NVRAM
Range/Resolution:

Range[6]	Resolution
±100 mV	3.05 µV/bit
±1V	30.5 µV/bit
±5V	153 µV/bit
±10V	306 µV/bit

Accuracy: ±0.02% of range[7, 10]

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TempScan/1100™ & MultiScan/1200™

Specifications & Ordering Information

MHV/24X—High Voltage Scanning Module

Number of Inputs: 24 differential; programmable by channel for any input range
Input Connectors: Screw terminal
Range/Resolution:

Range[6]	Resolution
±2.5V	78.14 µV/bit
±25V	781.4 µV/bit
±250V	7.81 mV/bit

Accuracy: ±0.02% of range[7,10]
Digital Filtering: Averages 32 samples at 50/60 Hz for line-cycle noise rejection (DCV measurements)
Temp Coefficient: <0.01%/°C
Input Impedence: 10M Ohm
Input Bias Current: 20 pA max
Maximum Common Mode Voltage[1,8,9]: 500 VDC or AC peak
Maximum Normal Mode Voltage: 500 VDC or AC peak
Common Mode Rejection: 100 dB typ
Maximum Allowable Overload-to-Channel Input: 400 VDC
Channel-to-Power Ground Isolation: 500V peak
Maximum Channel-to-Channel Voltage: 500V peak[9]

Ordering Information

TempScan/1100

Description	Part No.
High-speed temperature measurement system, includes IEEE 488* & RS-232/422 interfaces; ChartView™ and eZ-PostView software; DB50 digital I/O port mating connector; and rack-mount kit	TempScan/1100**
32-channel thermocouple scanning module for the TempScan/1100	TempTC/32B
32-channel voltage scanning module for the TempScan/1100	TempV/32B
16-channel RTD scanning module for the TempScan/1100	TempRTD/16B
8 Mbyte memory expansion option	MEMX8

MultiScan/1200

High-speed isolated temperature and voltage measurement instrument, includes IEEE 488* and RS-232/422 interfaces; ChartView and eZ-PostView software; DB50 digital I/O port mating connector; and rack-mount kit	MultiScan/1200†
24-channel thermocouple/volts scanning module for the MultiScan/1200	MTC/24
24-channel isolated high-voltage input module for the MultiScan/1200; 500 VDC max common mode voltage	MHV/24X
2-slot expansion chassis, including rack-mount kit and CA-35-1 master/slave cable	Exp/10A
10-slot expansion chassis, including rack-mount kit and CA-35-1 master/slave cable	Exp/11A
8 Mbyte memory expansion option	MEMX7

Software

Description	Part No.
ChartView Plus™	ChartView Plus

Cables

PC serial port (9- and 25-pin sub D) to TempScan/1100 or MultiScan/1200 (9-pin sub D) RS-232/422 cable, 6 ft.	CA-47
Shielded IEEE 488 cable, 6 ft.	CA-7-3

For complete information on accessories and cables, visit **www.iotech.com/acc**

Related Products

Hardware
Personal488/PCI
Personal488/AT
Personal488
Personal488/CARD

Software
eZ-TimeView
ChartView (included)

CA-35-1, TempScan/1100 or MultiScan/1200 master/slave interface cable, 1 ft. (included with Exp/10A and Exp/11A at no additional charge)

CA-47, PC/XT/AT, RS-232/422 serial port to TempScan/1100, MultiScan/1200 or ChartScan/1400 cable, 6 ft.

(Refer to previous page for numbered references)
* A Personal488 series product is required for IEEE 488 operation of TempScan/1100 or MultiScan/1200 with ChartView software
** TempTC/32B, TempV/32B, and TempRTD/16B scanning modules must be ordered separately
† MTC/24, and MHV/24X scanning modules must be ordered separately

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