

# ZT4440 Series Specifications

Digital Storage Oscilloscope  
14-bit, 800 MS/s, 300 MHz, 2 or 4 Channels  
PCI, PXI, VXI, or LXI



**M-Class**



## Contents

Terminology .....	2
Acquisition.....	2
Vertical.....	4
Horizontal .....	6
Trigger.....	7
Trigger, Analog Input .....	7
External Input .....	8
External Output .....	8
Event Outputs.....	9
Arm .....	9
Measurements.....	9
Reference Waveforms .....	10
Calculations.....	10
Data Processing & Download.....	11
Instrument Setup Storage .....	11
PCI/PXI Data Interface .....	11
VXI Data Interface.....	11
LXI Data Interface.....	12
PXI XJ4 Trigger & Clock Pin Usage.....	12
PCI Timing Expansion Connector Pin Usage.....	12
LED Indicators .....	13
Status Reporting .....	13
Identification.....	13
Power .....	14
AC Power (LXI) .....	14
Physical .....	15
Operating and Storage Conditions.....	15
Safety .....	16
Electromagnetic Compatibility .....	16
CE Compliance .....	16

## Terminology

### Numeric Prefixes

When referring to large numeric values this manual will use SI (International System of Units) and IEC (International Electrotechnical Commission) standard prefixes.

Prefix	Multiplier
n (nano)	1/(1000x1000x1000)
μ (micro)	1/(1000x1000)
m (mili)	1/1000
k (kilo)	1000
M (Mega)	1000x1000
G (Giga)	1000x1000x1000
Ki (Kibi)	1024
Mi (Mebi)	1024x1024
Gi (Gibi)	1024x1024x1024

## Acquisition

### Sampling Modes

Normal: single-shot acquisition  
Average: multiple-capture averaging  
Envelope: multiple-capture minimum & maximum detection  
Equivalent time: multiple-capture high-rate reconstruction  
Peak detect: single-shot 10X over-sampling envelope detection  
High resolution: single-shot 10X over-sampling averaging  
Fast: multiple acquisitions

### Multiple-Capture Count

2 to 65536 waveforms in powers of 2

### Segmented Memory

View & compare history of previous waveforms in memory  
View component waveforms in memory when averaging

## Sample Rate

20 kS/s to 400 MS/s, non-interleaved real-time  
 800 MS/s, interleaved real-time or equivalent-time  
 800 MS/s to 40 GS/s, equivalent-time  
 80 GS/s, interleaved equivalent-time

Any sample rate that is an integer multiple of an available sample rates can be created using interpolation.

Mode	Sample Rate
Non-Interleaved Real-Time	20 kS/s
	25 kS/s
	40 kS/s
	50 kS/s
	100 kS/s
	200 kS/s
	250 kS/s
	400 kS/s
	500 kS/s
	1 MS/s
	2 MS/s
	2.5 MS/s
	4 MS/s
	5 MS/s
	10 MS/s
	20 MS/s
	25 MS/s
	40 MS/s
	50 MS/s
	100 MS/s
200 MS/s	
400 MS/s	
Interleaved or Equivalent Time	800 MS/s
Equivalent Time	1.6 GS/s
	2.4 GS/s
	4 GS/s
	8 GS/s
	16 GS/s
	20 GS/s
40 GS/s	
Interleaved Equivalent Time	80 GS/s

## Non-Interleaved Acquisition

2-channels @ up to 400 MS/s real-time (ZT4441)  
 4-channels @ up to 400 MS/s real-time (ZT4442)

## Interleaved Acquisition

1-channel @ 800 MS/s real-time (ZT4441)  
 2-channels @ 800 MS/s real-time (ZT4442)

## Acquisition Re-Arm Time

≤ 5 μs

Total Memory Options

Product Option	Total Memory
ZT4441	256 MiSamples
ZT4442	512 MiSamples

Maximum Record Length

Non-Interleaved	Interleaved
128 MiSamples	256 MiSamples

Waveform Size

Acquisition Mode	Minimum Waveform Size	Maximum Waveform Size
Normal or Fast	10 Samples	Maximum Record Length (see above)
All other modes	10 Samples	512 KiSamples

Maximum Segments

32 Ki waveforms @ ≤4 KiSamples

## Vertical

Number of Channels

ZT4441: Quantity 1 (interleaved acquisition)  
 ZT4441: Quantity 2 (non-interleaved acquisition)  
 ZT4442: Quantity 2 (interleaved acquisition)  
 ZT4442: Quantity 4 (non-interleaved acquisition)

Connectors

BNC

Impedance

1 MΩ || 12 pF or 50 Ω

Impedance Accuracy

± 1%

Input Bias

≤ ±10 μA (50 Ω)  
 ≤ ±1 nA (1 MΩ)

Coupling

DC or AC

AC Coupling

200 kHz high-pass (50Ω)  
 10 Hz high-pass (1 MΩ)

Analog Filter

20 MHz or Bypass  
 Filter Stopband Rejection: approximately 3dB @ 20 MHz

Probe Attenuation

0.9 to 1000:1

Maximum Input (50 Ω)

±5 V (DC + peak AC), CAT I  
 Input load protection @ ±6 VDC

Maximum Input (1 MΩ)

±210 V [DC + peak AC (<100 kHz)], CAT I  
 Peak AC, de-rated 20 dB/decade above 100 kHz

## Full Scale Input Range & Offset Adjust<sup>123</sup>

Impedance	Range	Full Scale	Offset	Maximum Range + Offset
1 M $\Omega$	5 V/div	50 Vpp	0V	$\pm 25V$
	2.5 V/div	25 Vpp	$\pm 12.5V$	$\pm 25V$
	1 V/div	10 Vpp	$\pm 10V$	$\pm 15V$
	500 mV/div	5 Vpp	$\pm 10V$	$\pm 12.5V$
	200 mV/div	2 Vpp	$\pm 2V$	$\pm 3V$
	100 mV/div	1 Vpp	$\pm 2V$	$\pm 2.5V$
	40 mV/div	400 mVpp	$\pm 400mV$	$\pm 600mV$
	20 mV/div	200 mVpp	$\pm 400mV$	$\pm 500mV$
	10 mV/div	100 mVpp	$\pm 400mV$	$\pm 450mV$
	5 mV/div	50 mVpp	$\pm 400mV$	$\pm 425mV$
50 $\Omega$	2.5 mV/div	25 mVpp	$\pm 400mV$	$\pm 412.5mV$
	1.25 mV/div	12.5 mVpp	$\pm 400mV$	$\pm 406.25mV$
	1 V/div	10 Vpp	0V	$\pm 5V$
	500 mV/div	5 Vpp	$\pm 2.5V$	$\pm 5V$
	200 mV/div	2 Vpp	$\pm 2V$	$\pm 3V$
	100 mV/div	1 Vpp	$\pm 2V$	$\pm 2.5V$
	40 mV/div	400 mVpp	$\pm 400mV$	$\pm 600mV$
	20 mV/div	200 mVpp	$\pm 400mV$	$\pm 500mV$
	8 mV/div	80 mVpp	$\pm 80mV$	$\pm 120mV$
	4 mV/div	40 mVpp	$\pm 80mV$	$\pm 100mV$
50 $\Omega$	2 mV/div	20 mVpp	$\pm 80mV$	$\pm 90mV$
	1 mV/div	10 mVpp	$\pm 80mV$	$\pm 85mV$

### Analog Bandwidth

DC to 300 MHz typical, 250 MHz minimum

Due to an impedance mismatch between the signal generator and the oscilloscope, passing this test with a 200 MHz signal verifies 250 MHz performance on the 1  $\Omega$  path.

### Analog Bandwidth, Probe ZT6103 Passive X10<sup>4</sup>

DC to 300 MHz typical, 250 MHz minimum

### Rise time<sup>5</sup>

1.15 ns

### Slew Rate

2,000 V/ $\mu$ s

### DC Gain Accuracy

<  $\pm 0.25\%$  full scale range

### DC Offset Accuracy (+25 $^{\circ}$ C)

<  $\pm(0.25\%$  full scale range + 0.5% offset + 1 mV) (50 $\Omega$ )

<  $\pm(0.25\%$  full scale range + 0.5% offset + 5 mV) (1M $\Omega$ )

### DC Offset Drift (per $^{\circ}$ C)

<  $\pm(0.05\%$  full scale range + 200  $\mu$ V) (50 $\Omega$ )

<  $\pm(0.05\%$  full scale range + 1 mV) (1M $\Omega$ )

### Input VSWR (50 $\Omega$ )

$\leq 1.3:1$ , DC to 250 MHz

1 Full-scale range assumes 10 divisions for vertical axis

2 Magnification is used below 4 mV/div range for 50 $\Omega$ . Full-scale range for accuracy specifications is defined as 40 mV

3 Magnification is used below 20 mV/div range for 1M $\Omega$ . Full-scale range for accuracy specifications is defined as 200 mV

4 See ZTEC catalog for detailed specifications on all probes.

5 Rise time is calculated from  $t_r = 0.35 / \text{bandwidth}$ .



Skew Adjust                     $\pm 10 \mu\text{s}$  channel-to-channel skew adjustment  
1 sample interval resolution  
 $\pm 1$  sample interval accuracy

## Trigger

Sweep Modes                    Auto or normal triggered

Trigger Source                    Channels 1 to 2, Channels 3 to 4 (ZT4442), External Input, Pattern, Software, TTL Trigger 0-7, Star Trigger (PXI), ECL Trigger 0-1 (VXI)

Trigger Slope/Polarity            Positive or Negative

Trigger B                        Qualify trigger on second source for edge trigger event

Trigger A Holdoff                Programmable delay after trigger A before recognizing next trigger A event

Trigger B Holdoff                Programmable delay after trigger A before recognizing trigger B event

Trigger A or B Holdoff Range    0 to 100 seconds

Trigger A or B Event Counter    Qualify trigger on N<sup>th</sup> trigger event, N = 1 to 65536

Trigger A Modes                 Edge, Pattern, State, Pulse Width, Video

Trigger B Modes                 Edge, Pattern

Edge Trigger Mode                Rising or falling edge

Pattern Trigger Mode             Pattern match true or false

Pattern Sources                 Channels 1 to 2, Channels 3 to 4 (ZT4442), External Input, Pattern, Software, TTL Trigger 0-7, Star Trigger (PXI), ECL Trigger 0-1 (VXI)

State Trigger Mode               Edge event when pattern match true or false  
Pattern source used as Arm qualifier

Pulse Width Trigger Mode        Triggers on pulse width greater than, less than, within limits, or outside limits

Pulse Width Type                < limit1, > limit1, < limit1 & > limit2, > limit1 & < limit2

Pulse Width Limits               10 ns to 500 ms, 5ns resolution,  $\pm 5\text{ns}$  accuracy

Pulse Width Minimum            2 ns pulse width captured for < limit1

Video Trigger Mode               PAL (50 Hz), NTSC (60 Hz), SECAM (50 Hz)  
Standard, Field, Line selectable

Trigger Timestamp                100 ns resolution, 1 second rollover

## Trigger, Analog Input

Analog Input Triggers            Channels 1 & 2, Channels 3 & 4 (ZT4442)

Trigger Level                    (offset – full scale range/2) to (offset + full scale range/2)

Trigger Hysteresis	2.5% (overdrive required)
Trigger Level Resolution	0.025% of full scale range
Trigger Level Accuracy	$\pm(2\% \text{ full scale range} + 5\text{mV} + \text{offset accuracy})$
Trigger Sensitivity	5% of full scale range (DC to 100 MHz) 10% of full scale range (> 100 MHz)
Trigger Bandwidth	DC to 300 MHz typical, 250 MHz minimum
Glitch Detection	$\geq 500$ ps glitch captured in edge trigger mode

## External Input

Functionality	External Trigger, External 10 MHz Timebase Reference, or External Arm
Maximum Input	$\pm 5$ V (DC + peak AC), CAT I
Threshold Adjustment	$\pm 2$ V
Threshold Accuracy	$\pm 20$ mV
Threshold Resolution	0.5 mV
Input Impedance	1 M $\Omega$    30 pF or 50 $\Omega$
Impedance Accuracy	$\pm 2\%$
Input Bandwidth	300 MHz typical 250 MHz minimum
Input Hysteresis	20 mV (overdrive required)
Connector	BNC (VXI, LXI) SMB (PCI, PXI)

## External Output

Functionality	Trigger Output, 10 MHz Timebase Reference Output, Event Output, Programmable Clock Output, Programmable Pulse Output, Limit Test Successful, and 10 kHz Probe Compensation Output
Output Level	TTL Compatible into High Impedance ( $\geq 200 \Omega$ ) $\pm 24$ mA Output Drive Capability
Output Enable	Tri-State Output Capability
Output Source	Arm Event, Trigger A Event, Trigger B Event, Trigger Complete Event, Capture Complete Event, Operation Complete Event, Master Summary Status event, Constant Level, Reference Clock, Programmable Clock, Programmable Pulse, Limit Test Successful Event, Probe Compensation
Output Event Pulse	Programmable from 50 ns to 0.163 seconds

Programmable Clock	Clock Period: 26.667 ns to 100 seconds 50% Duty Cycle
Programmable Pulse	Pulse Repetition Interval: 26.667 ns to 100 seconds Pulse Width: 26.667 ns
Probe Compensation	10kHz Clock which can be used to compensate probes
Limit Test Successful	1 $\mu$ s pulse after each capture upon limit or mask test success
Connector	BNC (VXI, LXI) SMB (PCI, PXI)

## Event Outputs

Functionality	Event Output Signals
Outputs	TTL Trigger 0-7, ECL Trigger 0-1 (VXI) Timing Expansion Connector (PCI)
Source	Arm Event, Trigger A Event, Trigger B Event, Trigger Complete, Capture Complete, Operation Complete, Master Summary Status, Constant Level
Output Event Pulse	Programmable from 50 ns to 0.163 seconds

## Arm

Functionality	Arm to qualify trigger event
Source	External Input, TTL Trigger 0-7, Star Trigger (PXI), ECL Trigger 0-1 (VXI), Software
Polarity	Positive or Negative

## Measurements

Measurements	AC RMS, Amplitude, Average, Cycle Average, Cycle Frequency, Cycle Period, Cycle RMS, DC RMS, Duty Cycle High, Duty Cycle Low, ENOB, Number of Falling Edges, Fall Crossing Time, Fall Overshoot, Fall Preshoot, Fall Time, Frequency, High, Low, Maximum, Mid, Minimum, Peak-to-Peak, Period, Phase, Pulse Width Positive, Pulse Width Negative, Number of Rising Edges, Rise Crossing Time, Rise Overshoot, Rise Preshoot, Rise Time, SFDR, SINAD, SNR, Standard Deviation, THD, Time of Maximum, Time of Minimum
Edge Measurements	Nth edge selectable, N = 1 to 65535
Maximum Measurements	Nth maximum selectable, N = 1 to 100, Applies to Maximum and Time of Maximum measurements
Measurement Methods	Entire Waveform, Gated by Time, Gated by Points, Gated by Frequency, Gated by Cursors
Measurement Levels	Low, Mid, High reference levels for edge measurements set in absolute voltages or relative percentages

Cursors	Quantity 2 Horizontal & Vertical Axis Location Markers X, Y, $\Delta X$ & $\Delta Y$ Measurements
Measurement Lists	Quantity 4 Lists Up to eight measurements that are performed upon acquisition Stored for rapid measurement setup
Measurement Trending	History buffer of past measurement data stored in Calculate channel (See Calculate section.)
Measurement Accuracy	Delta DC Voltage $\pm$ (DC gain accuracy) Absolute DC Voltage $\pm$ [(DC gain accuracy)+(offset accuracy)] Time $\pm$ (time resolution) Frequency $\pm$ [1/(time resolution)]  Note: time resolution = one sample interval, one equivalent-time sample interval, or one interpolated-time sample interval (depending upon acquisition mode)

## Reference Waveforms

Reference Channels	Quantity 4
Reference Storage	Non-volatile memory storage
Reference Size	32 KiSample maximum waveform size

## Calculations

Calculate Channels	Quantity 4
Calculate Size	512 KiSample maximum waveform size
Calculate Data	32-bit resolution
Calculate Functions	Add, Subtract, Multiply, Copy, Invert, Integral, Derivative, Absolute Value, Limit Test, Mask Test, Frequency Transform, Time Transform, Histogram, Measurement Trending
Limit Test	Measurement Limit Range Testing or Waveform Mask Testing
Limit Test Reporting	Measurement maximum, minimum, average, current value, pass/fail counts
Frequency Transform	FFT Magnitude
FFT Windowing	Rectangular, Hamming, Hanning, Blackman, Flattop
FFT Data Format	Linear Magnitude, Logarithmic Magnitude, Phase, Real, Imaginary
Time Transform	Digital Infinite Impulse Response (IIR) filter
IIR Filter Type	Auto-generate: low-pass, 2 to 40 data point smoothing
Histogram	65536 bins for up to 16-bit histogram horizontal resolution

Measurement Trending      Historical waveform of past measurement data  
Provides trend data of 1 measurement point per capture

## Data Processing & Download

Auto Scale      Automatic adjust to input signals: Input Range, Offset, Sample Rate, Trigger Source, and Trigger Level

Waveform Download Mode      Normal:      every real-time data point  
Decimated:      every Nth real-time point (N = 2 to 100,000)  
Interpolated:      N points for every real-time point (N = 2 to 100),  
points interpolated by sin(x)/x reconstruction

Self-Calibration      Automatic internal calibration: Input DC Offset Zero, Input DC Offset Adjust Scale Factor

Waveform Data Formats      16-bit or 32-bit signed integer  
32-bit or 64-bit floating point,  
Intel or Motorola Byte Order

## Instrument Setup Storage

Reset      Non-volatile storage of default instrument setup configuration

Save & Recall      Non-volatile storage of 30 instrument setup configurations

## PCI/PXI Data Interface

PCI Bus      33 MHz, 32 bit

PCI Data Transfer Rate      132 MByte/s burst  
up to 120 MByte/s sustained<sup>7</sup>

PCI Voltage      Universal, +3.3V or +5V

PCI Compatibility      Version 2.2

PXI Compatibility      PXI Standard Slot and PXI Express Hybrid Slot Compatible

PXI Signals (XJ4 connector)      PXI\_TRIG0-7 input/output selectable  
PXI\_STAR input  
10 MHz reference input  
Left and right side buses not used

Primary ID      3712 (0E80<sub>16</sub>)

## VXI Data Interface

Command Interface      A16 message-based servant, SCPI compatible

Interrupt Operation      Programmable interrupter, Level 1-7

<sup>7</sup> Sustained transfer rates are dependent upon host system configuration.

Manufacturer ID 3712 (0E80<sub>16</sub>)

## LXI Data Interface

Command Interface LAN 10/100,  
USB 2.0 Full-Speed 12 MB/s,  
SCPI compatible

Manufacturer ID 3712 (0E80<sub>16</sub>)

LXI Functional Class C

## PXI XJ4 Trigger & Clock Pin Usage

Pin A5	PXI Trigger 3	(TTL level bi-directional)
Pin A6	PXI Trigger 2	(TTL level bi-directional)
Pin A7	PXI Trigger 1	(TTL level bi-directional)
Pin B5	PXI Trigger 4	(TTL level bi-directional)
Pin B7	PXI Trigger 0	(TTL level bi-directional)
Pin C5	PXI Trigger 5	(TTL level bi-directional)
Pin D6	PXI Star Trigger	(TTL level input)
Pin E5	PXI Trigger 6	(TTL level bi-directional)
Pin E6	PXI CLK10	(TTL level input)
Pin E7	PXI Trigger 7	(TTL level bi-directional)

## PCI Timing Expansion Connector Pin Usage

Pin 1	Reference	(TTL level bi-directional)
Pin 3	Star Trigger	(TTL level bi-directional)
Pin 5	Trigger 7	(TTL level bi-directional)
Pin 7	Trigger 6	(TTL level bi-directional)
Pin 9	Trigger 5	(TTL level bi-directional)
Pin 11	Trigger 4	(TTL level bi-directional)
Pin 13	Trigger 3	(TTL level bi-directional)
Pin 15	Trigger 2	(TTL level bi-directional)
Pin 17	Trigger 1	(TTL level bi-directional)
Pin 19	Trigger 0	(TTL level bi-directional)

## VXIbus P2 Trigger & Clock Pin Usage

Pin A1	ECLTRG0	(ECL level bi-directional)
Pin A3	ECLTRG1	(ECL level bi-directional)
Pin A23	TTLTRG0*	(TTL level bi-directional)
Pin A24	TTLTRG2*	(TTL level bi-directional)
Pin A26	TTLTRG4*	(TTL level bi-directional)
Pin A27	TTLTRG6*	(TTL level bi-directional)
Pin C1	CLK10+	(ECL level input)
Pin C2	CLK10-	(ECL level input)
Pin C23	TTLTRG1*	(TTL level bi-directional)
Pin C24	TTLTRG3*	(TTL level bi-directional)
Pin C26	TTLTRG5*	(TTL level bi-directional)
Pin C27	TTLTRG7*	(TTL level bi-directional)

## LED Indicators

Ready(RDY)	OFF: Hardware failure ON: Unit has passed power-up self-diagnostics TOGGLE: unit has an error pending in error queue
Host(HST/LAN)	OFF: Interface fault ON: Normal interface operation TOGGLE: device identify command received
Trigger(TRG)	OFF: trigger event not detected ON/PULSE: trigger complete event detected
Active(ACT)	OFF: Instrument Idle ON/PULSE: Data acquisition initiated
1588 Clock Status (LXI only)	OFF: IEEE 1588 clock not synchronized or fault ON: clock locked as IEEE 1588 slave TOGGLE @ 1s: clock synchronized as IEEE 1588 master TOGGLE @ 2s: clock synchronized as IEEE 1588 grand master
Power (PWR, LXI only)	ON: Instrument is powered on OFF: Instrument is powered off

## Status Reporting

IEEE-488.2 Device Status	Reporting Structure including Status Byte, Standard Event Registers, Questionable Registers, Operation Registers
--------------------------	--

## Identification

Secondary ID	PCI/PXI: 4400 (1130 <sub>16</sub> ) VXI/LXI: 440 (1B8 <sub>16</sub> )
--------------	--

## Power

### Power Supplies

Product Option	Platform	Voltage	Typical Current	Maximum Current
ZT4441	PCI or PXI	+3.3 VDC	3.37A	4.19A
		+5 VDC	1.23A	1.80A
		+12 VDC	0.02A	0.02A
		-12 VDC	0.01A	0.01A
	VXI	+5 VDC	3.96A	5.33A
		+12 VDC	0.02A	0.02A
		+24 VDC	0.00A	0.00A
		-2 VDC	0.07A	0.08A
		-5.2 VDC	0.32A	0.36A
		-12 VDC	0.01A	0.01A
LXI	-24 VDC	0.00A	0.00A	
	115 VAC	0.29A	0.32A	
ZT4442	VXI	+5 VDC	6.47A	8.50A
		+12 VDC	0.05A	0.05A
		+24 VDC	0.00A	0.00A
		-2 VDC	0.07A	0.08A
		-5.2 VDC	0.49A	0.57A
		-12 VDC	0.02A	0.02A
		-24 VDC	0.00A	0.00A
	LXI	115 VAC	0.41A	0.47A

### Total Cooling & Power Consumption

Product Option	Platform	Typical Cooling & Power	Maximum Cooling & Power
ZT4441	PCI or PXI	17.6W	23.2W
	VXI	21.9W	29.0W
	LXI	33.6W	36.9W
ZT4442	VXI	35.7W	46.3W
	LXI	47.2W	53.9W

## AC Power (LXI)

Line Voltage	90-264 VAC, 47-63 Hz, automatic selection
Input Protection	AC line fuse, 250 VAC, 2.0 A, fast-acting
Harmonic Distortion	Meets EN61000-3-2
Surge Withstand	Meets EN61000-4
EMI Filtering	Meets CISPR 11 and 22 and FCC Part 15 Class B (conducted)

## Physical

PCI Physical size	Single-Slot Short PCI Card 7.65" x 0.85" x 4.97" (LxWxH) 19.43 cm x 2.16 cm x 12.62 cm (LxWxH)
PXI Physical size	Single-Wide 3U CompactPCI/PXI Instrument 8.25" x 0.79" x 5.25" (LxWxH) 22.23 cm x 2.01 cm x 13.34 cm (LxWxH)
VXI Physical size	Single-Wide C-size VXIbus Instrument 14.45" x 1.20" x 10.35" (LxWxH) 36.70 cm x 3.05 cm x 26.29 cm (LxWxH)
LXI Physical size	Half-Width 1U LXI Instrument 13.35" x 7.25" x 1.75" (LxWxH) 33.91 cm x 18.42 cm x 4.45 cm (LxWxH)
PCI Weight	12.3 oz or 349 g
PXI Weight	12.3 oz or 349 g
VXI Weight	2.82 lbs or 1.28 kg (ZT4441) 3.11 lbs or 1.41 kg (ZT4442)
LXI Weight	4.48 lbs or 2.03 kg (ZT4441) 4.77 lbs or 2.16 kg (ZT4442)

## Operating and Storage Conditions

### Temperature Range

Operating	0 °C to +50 °C Ambient
Storage	-40 °C to +75 °C
Over-Temperature	Automatic shutdown if internal temperature exceeds +70 °C
Calibration Range	+20 °C to +30 °C Ambient, after a 20 minute warm-up period, to meet all calibration specification accuracies.

### Relative Humidity

Operating or Storage	10 to 90%, non-condensing, up to +40 °C
----------------------	---

### Altitude

Operating	Up to 3,000 m Up to 5,000 m with Maximum Input (1 M $\Omega$ ) of $\pm$ 100 V
Storage	Up to 15,000 m

## Safety

This product is designed to meet the requirements of the following standard of safety for electrical equipment for measurement, control and laboratory use:

EN 61010-1

## Electromagnetic Compatibility

CE Marking EN 61326-1:1997 with A1:1998 and A2:2001 Compliant

FCC Part 15 (Class A) Compliant

### Emissions

EN 55011	Radiated Emissions, ISM Group 1, Class A, distance 10 m, emissions < 1 GHz
EN 55011	Conducted Emissions, Class A, emissions < 30 MHz Immunity
EN 61000-4-2	Electrostatic Discharge (ESD), 4 kV by Contact, 8 kV by Air
EN 61000-4-3	RF Radiated Susceptibility, 10 V/m
EN 61000-4-4	Electrical Fast Transient Burst (EFTB), 2 kV AC Power Lines
EN 61000-4-5	Surge
EN 61000-4-6	Conducted Immunity
EN 61000-4-8	Power Frequency Magnetic Field, 30 A/m
EN 61000-4-11	Voltage Dips and Interrupts

## CE Compliance

This product meets the necessary requirements of applicable European Directives for CE Marking as follows:

73/23/EEC	Low Voltage Directive (Safety)
89/336/EEC	Electromagnetic Compatibility Directive (EMC)

See Declaration of Conformity for this product for additional regulatory compliance information.