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ZT1428VXI Specifications

Digital Storage Oscilloscope

Drop-in Replacement for Agilent E1428A



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Input Channel Specifications

Channels	2
Bandwidth	DC to 250 MHz
Maximum Input	±250 VDC (1 MΩ) 5 Vrms (50 Ω)
Full Scale Input Range	8 mV_{pp} to 50 V_{pp} in 8 mV steps

DC Gain Accuracy

Full-Scale Range	DC gain accuracy
64 mV to 50V	±1.5%
8 mV to 56 mV	±(1.5% + 1 mV)

Impedance	1 MΩ || 12 pF or 50Ω
Input VSWR (50Ω)	≤ 1.3:1 DC to 250 MHz
Connector	BNC Female
Coupling	DC, DC–50, AC, AC–LFR DC: 1 MΩ || 12 pF DC–50: 50 Ω AC: 1 MΩ || 12 pF, 10 Hz High-Pass Filter AC-LFR: 1 MΩ || 12 pF, 450 Hz High-Pass Filter
Probe Attenuation	0.9 to 1000 : 1

Offset Adjust

Full-Scale Range	Offset Adjust Range
8mV to 400mV	±2V
408mV to 2V	±10V
2.008V to 10V	±50V
10.008V to 50V	±250V

Offset accuracy

Full-Scale Range	Offset Adjust Range
64mV to 50V	±(1% offset + 2% full-scale)
8mV to 56mV	±(1% offset + 1.12mV)

Noise

Bandwidth	Maximum RMS Noise
DC–250 MHz	0.5% full scale + 1 mV
DC–30 MHz	0.25% full scale + 0.5 mV
DC–1 MHz	0.2% full scale + 0.5 mV

Input Filtering	HF Reject, Low-pass or Bypass HF Reject: 30 MHz Low-Pass Filter Low-pass: 1 MHz Low-Pass Filter

Analog-to-Digital Converter Specifications

Resolution	8 bit resolution
Real-Time Sample Rate	1 S/s to 1 GS/s (1, 2.5, 5 steps)
Interpolated Sample Rate	2 GS/s to 50 GS/s
Acquisition Time Range	2 ns to 125,000s
Channel-to-Channel Skew	<100 ps @ same input settings
Delay Null Compensation	0 to 10 ns in 10 ps steps
Record Lengths	100 to 1,000,000 Samples (≥100 kS/s) 100 to 125,000 Samples (<100 kS/s)

Trigger Specifications

Trigger Source	Channels 1–2, External, ECLTRG0-1
Trigger Slope/Polarity	Positive or Negative
Trigger Holdoff	40 ns to 320 ms or 2 to 65536 events
Trigger Position	0%, 50% or 100% of record time + trigger delay
Trigger Delay	–1,000,000 sample intervals to +500s
Trigger Position Accuracy	±1 sample interval
Trigger Modes	Edge, Pattern, Time-Qualified Pattern, Event-Delayed, Time-Delayed, State
Trigger Sensitivity	6.25% of full scale (DC to 100 MHz) 15.625% of full scale (> 100 MHz)
Trigger Bandwidth (Ch 1–2)	> 200 MHz
Internal Trigger Filtering	Off, Noise Reject, Low-Pass (<50 kHz) or High-Pass (>50 kHz)
Post-Trigger Delay Range	0 to 500 seconds
Pre-Trigger Delay Range	0 to (Record Size – 1,000,000) sample intervals

Edge Trigger Mode	Rising or Falling Edge, all sources
Pattern Trigger Mode	Pattern match true or false
Pattern Sources	Channels 1–2, External, ECLTRG0-1
Time-Qualified Pattern	< limit1, > limit1, < limit1 & > limit2
Time-Qualified Range	N to 65536 * N sample intervals
Time-Qualified Resolution	N sample intervals
Time-Qualified Accuracy	N sample intervals N = 4 for 1 GS/s N = 2 for 500 MS/s N = 1 for <500 MS/s
Time-Qualified Accuracy	±(1 sample interval + 3 ns)
State Trigger Mode	Edge event while pattern match true or false Source, Pattern, Slope selectable
TV Trigger Mode	PAL (50 Hz) or NTSC (60 Hz) Video Standard, Field, Line selectable
Time-Delayed Trigger	30 ns to 160 ms
Event-Delayed Trigger	Event Counter: 1 to 65536
Channels 1–2 Trigger Level	±1.5X Full-Scale Range from Offset
Ch 1–2 Level Resolution	0.025% of full-scale
Ch 1–2 Level Accuracy	±(2% setting + 3% full-scale + offset accuracy)
Ch 1–2 Coupling/Impedance	Same as Input Signal
Ch 1–2 Noise Reject	Adds 3X Hysteresis for Noise Reject
External Trigger Connector	BNC Female
External Trigger Level	±2V programmable threshold, 5 Vrms maximum
External Level Resolution	0.025% of full-scale
External Trigger Bandwidth	> 100 MHz

External Coupling/Impedance	DC/50Ω or DC/1 MΩ
External Impedance Accuracy	±5%
External Level Accuracy	±(2% setting + 50 mV)

Timebase Reference

Timebase Source	Internal TCXO, VXIbus CLK10, or External
External Trigger/Clock Select	Shared Connector & Input Characteristics
External Clock	100 MHz ±0.005%, 50% Duty
VXIbus Clock	VXIbus CLK10, 10 MHz ±0.005%, ECL

Probe Comp / Cal / Trig Output

Modes	+5V voltage, ground, sample clock, probe compensation, trigger pulse, programmable voltage.
DC Calibrator	0.0V ± 1 mV or 5.0V ± 0.1%
Sample Clock	10 MHz output signal, -0.4V to 0V into 50Ω
Probe Comp	500Hz output signal, -0.4V to 0V into 50Ω
Trigger Pulse	-0.4V to 0V into 50Ω Rising edge at trigger event Falling edge at end of hold-off
Programmable Voltage	-1.5V to 4V into 50Ω -3.5V to 8.5V into 1 MΩ Rate: DC, 500 Hz, or 10 MHz (programmable)
Connector	BNC Female

LED Status Indicators

FAILED	Unit has failed power-up self-diagnostics
ACCESS	VXI access occurring or VXIbus MODID asserted
ERROR	Unit has an error pending in the error queue

TRIG'D	Trigger event was recognized

Signal Processing Specifications

Measurements	Min, Max, Low, High, Average, Amplitude, Peak-to-Peak, DC RMS, AC RMS, Rise Time, Fall Time, +Width, –Width, Period, Frequency, +Duty, –Duty, Overshoot, Pre-shoot, Delay, N^{th} Positive Crossing Time, N^{th} Negative Crossing Time, Time at Voltage, Voltage at Time, Cursor Functions
Reference Waveforms	Qty. 4 stored in non-volatile memory (32k maximum record size)
Waveforms Functions	Qty. 2: Add, Subtract, Differentiate, Integrate, Multiply, and Invert
Limit Testing	Measurement Limit Range Testing
Waveform Compare	Waveform Mask Testing
Auto-Scale	Automatic adjust of input signal conditioning

VXI Interface

Backplane Connection	standard P1 and P2 interface
Command Interface	A16 message based, SCPI & COMP
Interrupt Operation	programmable interrupter, level 1 to 7
Data Interface	32 Mbytes A32 register-based, or 1 Mbytes A24 register-based
ZTEC Manufacturer ID	3712 ($E80_{16}$)
ZT1428VXI Model ID	1428 (594_{16})

Other Specifications

Configuration Save	Non-volatile storage of 48 instrument setup configurations
Power Consumption	55W typical total power & cooling required

Voltage	DC Current	Dynamic Current
+24V	0.0A	0.0A
+12V	0.1A	0.1A

+5V	9.0A	0.5A
-24V	0.0A	0.0A
-12V	0.1A	0.1A
-5.2V	1.5A	0.1A
-2V	0.1A	0.1A

Temperature Range

Operating	0 °C to +40 °C Ambient
Storage	-40 °C to +75 °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 2,000 m
Storage	Up to 15,000 m

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