UNI-T

MSO8000HD Series High-Resolution Oscilloscope

20GSa/s | 8GHz | 12-bit | 2Gpts | 1,000,000wfm/s



Data Sheet REV 2.2

May 2026

Table Content

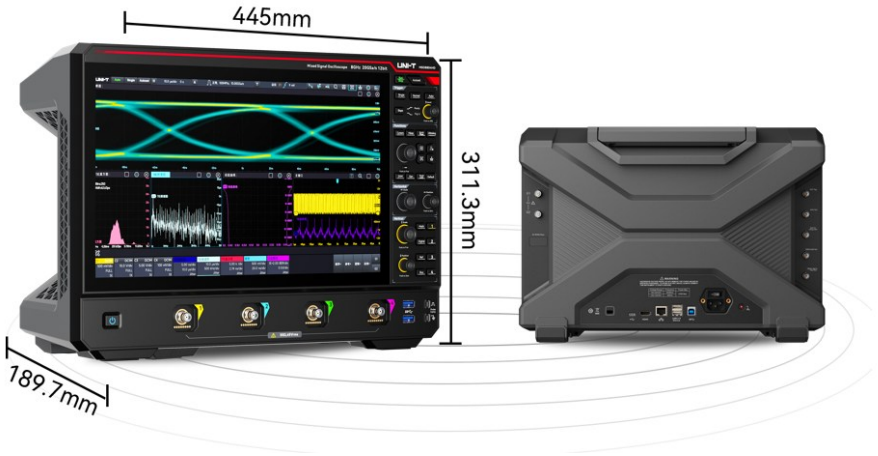
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MSO8000HD Series Overview

Introducing the MSO8000HD series of high-resolution oscilloscopes. This series includes 3 models with bandwidths of 8GHz, 6GHz and 5GHz, each featuring a standard 20GSa/s sampling rate, 12-bit vertical resolution, 4 analog channels, and 16 digital channels. Depending on application requirements, users can select memory depths of either 1Gpts or 2Gpts.

MSO8000HD series also offers a comprehensive suite of hardware-accelerated and software-based analysis tools, enabling flexible configuration to meet evolving test needs. Whether you're verifying high-speed digital signal integrity, analyzing semiconductor performance, testing 5G communication systems, monitoring new energy platforms, or designing and validating power supplies, the MSO8000HD delivers the performance, precision, and versatility required for advanced industrial and research applications.

X-shaped sleek design. Compact, Portable, and Refined



MSO8000HD Series Key Features	
Bandwidth	8GHz/6GHz/5GHz
Sample rate	20GSa/s
Input channels	4+16
Vertical resolution	12-bit (ERES 16bit)
ENOB	7-bit full-system bandwidth (50Ω, 50mV/div, -3dBFS)
Inherent jitter	≤150fs RMS
SFDR (Typ.)	≥50dBc
Noise floor (Typ.)	≤800μV (at 50mV/div and 8GHz bandwidth)
Memory depth	1Gpts (Standard), 2Gpts (Option)
Waveform capture rate	Up to 1,000,000wfms/s
Triggering types	Advanced triggering, protocol triggering, zone triggering
Cross-platform access	Web server, mobile devices
Advanced analysis tools	Power analysis kit, jitter analysis and eye diagram kit, limit template test kit, protocol analysis kit, and compliance tests kit
Display	15.6-inch HD touch screen
Connectivity	USB Host 3.0×4, USB Device 3.0 × 1, TYPE-C×1, 10M Ref IN/Out, HDMI, AUX In/Out, 10/100/1000LAN

Integrated Tools	Std.
Spectrum analyzer	Standard
Digital voltmeter	Standard
Frequency counter	Standard
Limit template testing kit	Standard
Protocol analysis kit	Standard: RS232/422/485/UART, I²C, SPI, CAN, LIN
Integrated Tools	**Opt.**
Protocol analysis kit	Option: CAN-FD, FlexRay, SENT, I3C, PSI5, USB2.0, PCIe2.0, 10/100Mb/s Ethernet, NRZ, Manchester, 8b/10b, SMBUS, SPMI, AudioBus (I2S, LJ, RJ, TDM), MIL-STD-1553, ARINC429
Function/Arbitrary Waveform Generator	MSO8000HD-AWG
Logic analyzer	MSO8000HD-LA
Jitter analysis and eye diagram kit	MSO8000HD-JITTER
100Base-Tx compliance tests	MSO8000HD-CTS100
1000Base-T compliance tests	MSO8000HD-CTS1000
100Base-T1 compliance tests	MSO8000HD-CTS100T1
1000Base-T1 compliance tests	MSO8000HD-CTS1000T1
USB2.0 compliance tests	MSO8000HD-CTSUSB20
MIPI D-PHY v1.2 compliance tests	MSO8000HD-CTSDPHY12
Power analysis kit	MSO8000HD-PWR
Upgrade kit	MSO8000HD-BND

High-Performance, High-Fidelity Signal Acquisition

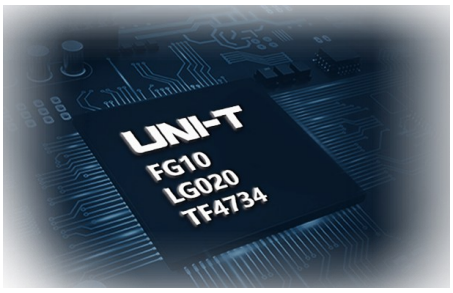
The new high-resolution mixed-signal oscilloscope, MSO8000HD offers up to 8GHz bandwidth and a 20GSa/s sampling rate. It features a 12-bit ADC, with resolution enhanced to 16 bits in ERES mode. With ultra-low intrinsic noise and high effective number of bits (ENOB), it delivers superior measurement fidelity.

Powered by UNI-T's self-developed AFE ASIC analog front-end chipset and its seventh-generation oscilloscope platform, the MSO8000HD achieves a new level of accuracy and capability in handling complex signals.

UNI-T Proprietary AFE Chipset for Lower Noise and Higher ENOB

The MSO8000HD leverages multiple low-noise conditioning chips independently developed by UNI-T, greatly enhancing performance and delivering precise, reliable measurements for advanced applications.

- Noise floor: 50mV/div, as low as 800μV at full bandwidth (Typ.)
- ENOB (Effective Number of Bits): >7bits (at full system bandwidth, 50Ω, 50 mV/div, -3dBFS).
- SFDR (Spurious-Free Dynamic Range): ≥ 50dBc (Typ.)
- Low intrinsic jitter: ≤150fs RMS
- High bandwidth precision BNC connector: > 10GHz

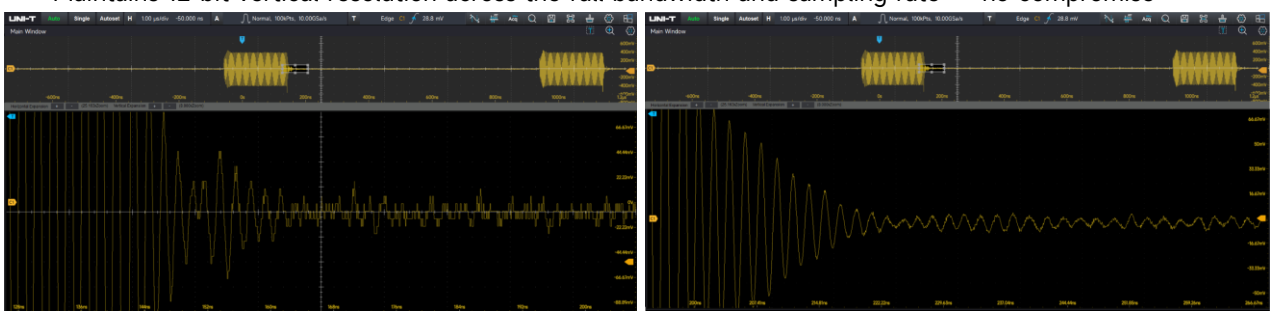




12-bit ADC Reveals Finer Details and Resolves Smaller Signals

All models in the MSO8000HD series are equipped with a built-in 12-bit analog-to-digital converter (ADC), supporting up to 16-bit resolution in high-resolution mode. This ensures outstanding signal fidelity, with a maximum sampling rate of 20GSa/s in half-channel mode. Compared to traditional 8-bit oscilloscopes, the high-resolution ADC provides 16 times more vertical quantization levels, offering significant advantages for high dynamic range measurements. This higher resolution is particularly valuable in applications such as: Accurately measuring small voltage fluctuations overlaid on large DC levels in power analysis. Differentiating true jitter from noise components in jitter analysis.

- 16× vertical resolution improvement over standard 8-bit oscilloscopes
- Up to 16-bit resolution in high-resolution mode
- 20GSa/s sampling rate (half-channel), 10GSa/s (full-channel)
- 8GHz bandwidth (half-channel), 4GHz (full-channel)
- Maintains 12-bit vertical resolution across the full bandwidth and sampling rate — no compromise



When vertically amplified 25 times within a 1V dynamic range, the 8-bit system (left) exhibits significant distortion, while the 12-bit system (right) still clearly resolves fine signal details during high dynamic range testing.

All-in-One High-Performance Solution for Versatile Measurements

MSO8000HD series is more than just an oscilloscope — it integrates the capabilities of several commonly used test instruments into a single platform. Even if you don't currently need every function, the MSO8000HD equips you for future measurement demands. It also supports online upgrades and offers optional feature licenses that can be activated at any time, depending on your evolving requirements.

Digital Oscilloscope

- Bandwidth: 8GHz, 6GHz, 5GHz
- Sample rate: 20GSa/s (whole series)
- Maximum memory depth: 2Gpts
- Maximum capture rate: 1,000,000wfms/s
- Channels: 4 analog channels + 1 external trigger channel

Function Arbitrary Waveform Generator (Option)

- Dual channels with equivalent performance
- Maximum output frequency: 60MHz
- Sample rate: 625MSa/s
- Built-in multiple standard waveforms: Sine wave, square wave, pulse wave, ramp wave, noise, DC, and over 200 built-in arbitrary waveforms
- Supports modulation and frequency sweep for various signals

Spectrum Analyzer

- Enhanced FFT, capable of up to 1Mpts signal analysis
- Frequency analysis range: Oscilloscope analog bandwidth
- Supports multiple spectrum view displays: Amplitude spectrum, power spectrum, power spectral density, real part, imaginary part, phase spectrum
- Two spectrum analysis windows can be added simultaneously to meet visual displays under different window functions

Digital Voltmeter (Standard)

- 4-digit DC/AC RMS/DC+AC RMS voltage measurement

Digital Frequency Meter (Standard)

- 8-digit high-precision frequency meter

Logic Analyzer (Option)

- 16-channel logic analysis
- Provides 16-channel logic analysis probe
- Digital channel sample rate: 1.25GSa/s
- Digital channel memory depth: 125Mpts
- Minimum detectable pulse width: as low as 3.2ns
- The digital probe features separate input connectors for upper and lower 8-bit channels, simplifying connection with the device under test. When interfacing with square pins, the UT-M15 can be directly connected to a 2×8 pin header with a 2.54 mm pitch.
- UT-M15 probe offers excellent electrical characteristics, with an input impedance of 101kΩ±1%

Protocol Analyzer (Option)

MSO8000HD provides various serial bus analyses and multiple protocol triggering modes. It can trigger specific packet contents, identify polarities, chip selections, etc. Trigger events are displayed in a list. Protocol searches can be carried out to precisely locate protocol frames.

- Embedded: RS232/422/485/UART, SPI, I^2C, SMBUS, SPMI, AudioBus (I2S, LJ, RJ, TDM)
- Automotive: CAN, CAN-FD, SENT, FlexRay, LIN, I3C, PSI5
- Computers & Communications: USB2.0, PCIe2.0, Ethernet, NRZ, Manchester, 8b/10b

- Aerospace: MIL-STD-1553, ARINC429

The protocol analyzer supports packet-level triggering, packet decoding views, event lists, protocol search, and automated protocol analysis reporting.

Sequential Mode: Efficient Storage and Precise Waveform Traceability

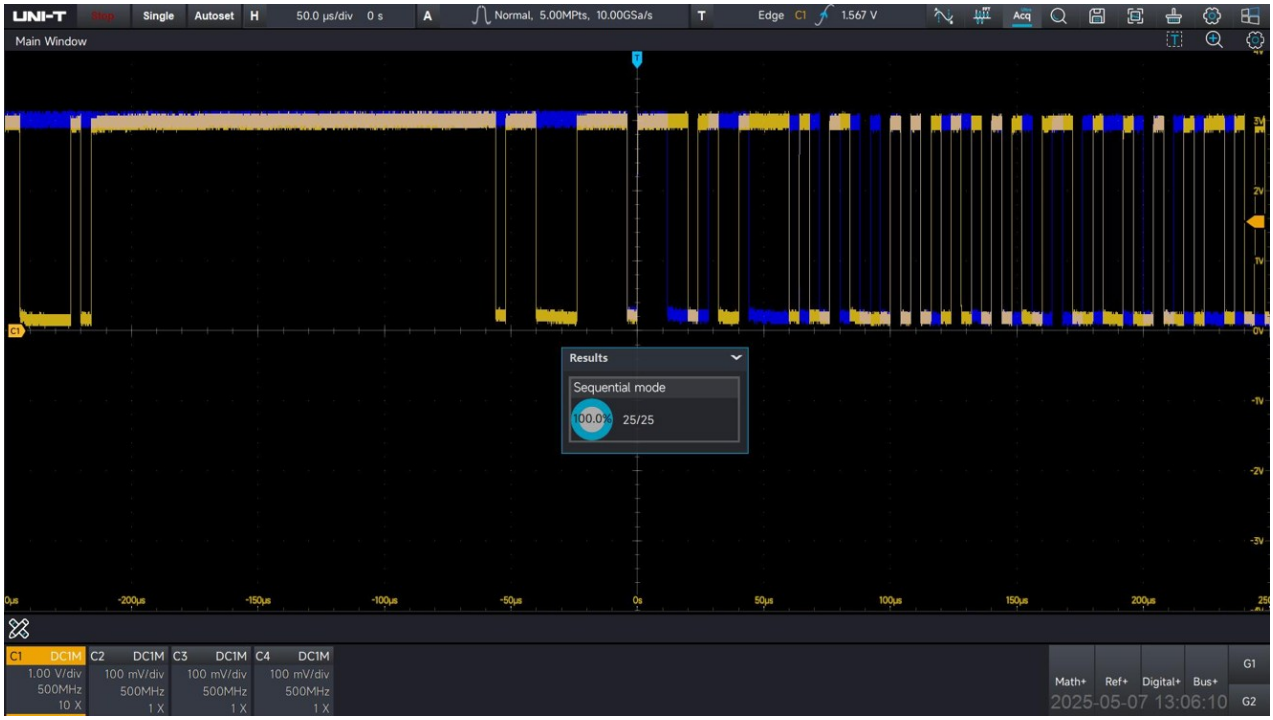
MSO8000HD series features a standard memory depth of 500Mpts per channel and 1Gpts when using half the channels. Users can upgrade to 1Gpts per channel or 2Gpts on half of the channels, depending on their application requirements.

In Sequential mode, the oscilloscope optimizes deep memory utilization for fast acquisition and high responsiveness. This mode enables users to precisely capture both historical and future waveform events. By segmenting memory (ranging from 500Mpts to 2Gpts), it efficiently stores multiple triggered events while minimizing dead time between segments.

After data acquisition, users can:

- Review individual captured frames
- Play back waveform sequences
- Display up to 40 waveform segments simultaneously in a variety of viewing modes: 45° view, overlap, superimpose, or stitch

Under optimal conditions, Sequential mode supports the acquisition and playback of up to 520,000 frames, providing powerful visibility into transient or infrequent signal events — ensuring critical waveforms are never missed.



By leveraging the high capture efficiency of Sequential mode, 25 complete CAN protocol frames were successfully captured for comparison. Analysis revealed timing errors in the transmitted bits. In the figure, the blue waveform represents the reference frame. Dark yellow segments indicate matching portions, while yellow segments highlight deviations.

An Intuitive User Experience Redefining the New Oscilloscope

Building on the widely acclaimed UI design of the previous 7000X series, the MSO8000HD adopts the same intuitive software interface while offering a ***Slimmer***, ***Lighter***, and ***Modern*** form factor.

Dynamic Multi-Window & Flexible Interaction

MSO8000HD features a 15.6-inch HD touchscreen that delivers a smooth, tablet-like user experience. In parallel, it retains dedicated knobs and shortcut keys to ensure the precise, tactile control professionals expect from high-performance test instruments. Additionally, it supports external Bluetooth mice and keyboards, offering a third mode of interaction for added convenience. The user interface (UI) is purpose-built for engineers, aligning with typical workflows and operational logic. Multi-window expandability further enhances efficiency by allowing users to view and manage multiple measurement tasks simultaneously, streamlining complex test scenarios.

Waveform Touch Control

- Move and zoom waveforms directly within a single window
- Drag waveforms up, down, left, or right to adjust horizontal and vertical positioning
- Use pinch-to-zoom gestures to scale waveforms along the horizontal or vertical axis

Dynamic Multi-Window

- Drag and rearrange windows freely; resize by dragging window edges
- Pin pop-up windows in place, and configure event lists to float or dock as needed
- Extend windows beyond screen edges to enable multi-monitor display
- Maximize waveform visibility with full-screen or split-screen window modes
- Independently adjust waveform brightness and contrast within each window
- Perform cursor-based waveform measurements in separate windows
- Control the brightness of front-panel key backlighting



Quick-Function Key Area



Frequently used keys are positioned at the top of the interface for fast, intuitive access.

Quick Trigger Control Area

Instantly switch trigger modes
Instantly switch trigger polarity

Quick-Function Control Area

Enable cursors
Open parameter measurements
Open parameter snapshot
Switch to UltraAcq mode
Access the start menu
Customize frequently used functions
Capture screenshots
Clear measurement results
Toggle between coarse and fine tuning
Open the digital voltmeter (DVM)
Launch the signal source
Lock the touchscreen
Restore factory settings

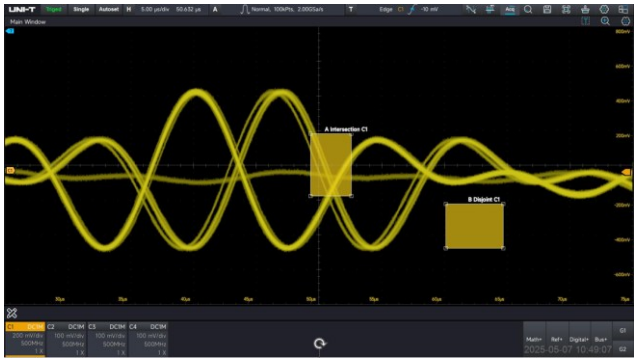
Vertical/Horizontal Control Area

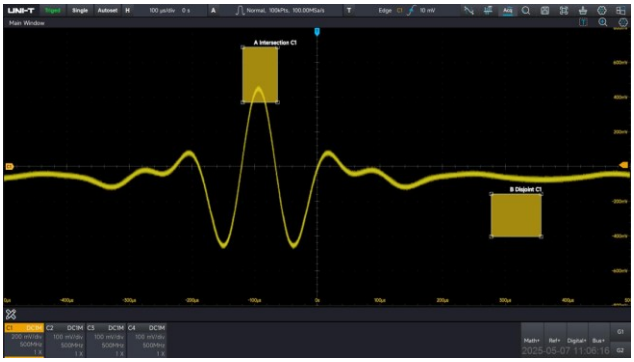
Activate math functions
Open digital channels
Recall reference waveforms
Launch protocol analysis
Adjust horizontal position (knob)
Adjust vertical position (knob)
Select active channels (button)

Flexible Zone Triggering and Advanced Triggering

MSO8000HD series supports over 22 advanced trigger types, empowering users to detect anomalies even within extremely long data records—ideal for debugging complex systems. Its serial triggering capability is tightly integrated with standard protocol decoding, enabling efficient bus analysis and deep insight into signal behavior.

The flexible, user-definable zone triggering function allows waveforms to interact with designated screen regions. This helps isolate unwanted signals and reduces the need for long-duration acquisitions or manual waveform searches. Zone triggering accelerates the identification of key events, significantly improving debugging efficiency and analysis precision.





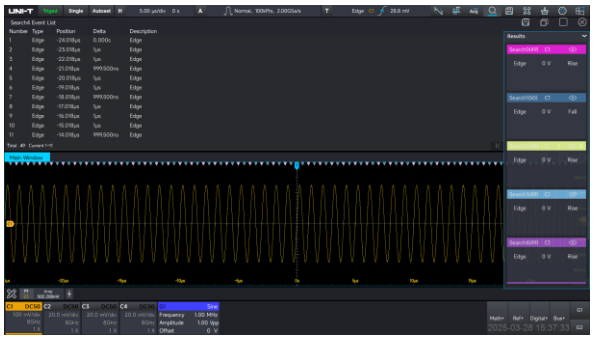
Use zone triggering to quickly isolate unconcerned signals and find key information rapidly, without the need to spend time mastering complex advanced trigger logic.

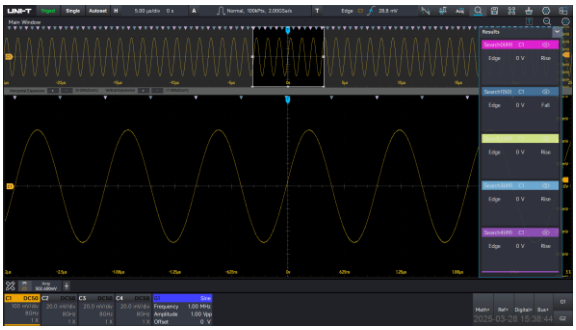
Search and Navigation

Locating specific events within a 2G-point waveform record can be time-consuming without efficient search tools. The MSO8000HD series features powerful search and navigation capabilities to streamline this process.

All detected events are highlighted with color-coded search markers. When acquisition is paused, users can navigate between events using the Previous (←) and Next (→) buttons in the search panel or by tapping on-screen navigation icons.

The system supports multiple, independently defined search conditions, enabling simultaneous detection of different event types. Search results are displayed in an event table, which includes timestamps and key measurement parameters for each matched event. Up to 10 unique search configurations can be active concurrently, greatly improving waveform analysis speed and efficiency.





Search is performed based on user-defined conditions. For example, when using pulse width search, the oscilloscope automatically identifies all pulses that meet the specified criteria. Each matched pulse is marked with a colored triangle, and its corresponding pulse width is displayed directly on the waveform. If you're analyzing pulses with significant width deviations, you can pause the acquisition and navigate directly to the marked locations for in-depth inspection and measurement.

Advanced Mathematical Waveform Operations for Precise Signal Processing

Digital and User-Defined Filters

Any signal processing system can be modeled as a filter. For example, an oscilloscope's 20MHz bandwidth limit functions as a low-pass filter, attenuating high-frequency noise in measured signals. Compared with analog oscilloscopes, digital oscilloscopes offer clear advantages: high-order filters are complex and costly to implement in analog circuitry, whereas digital filters enable precise and cost-effective filtering.

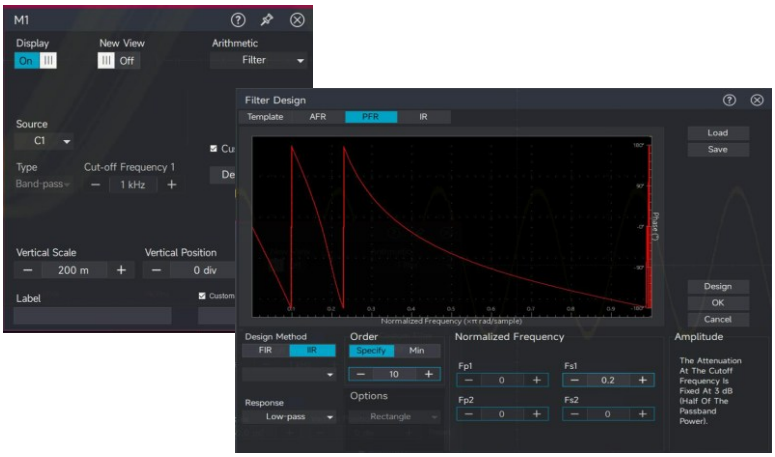
The MSO8000HD supports both Infinite Impulse Response (IIR) and Finite Impulse Response (FIR) filters, allowing users to choose the appropriate filter type based on application requirements. Filters can be applied through the Math function, supporting both standard and user-defined implementations. This enables advanced signal conditioning and tailored waveform analysis to meet specific testing needs.

MSO8000HD supports filter response types:

- High-pass
- Low-pass
- Band-pass
- Band-stop

MSO8000HD supports filter types:

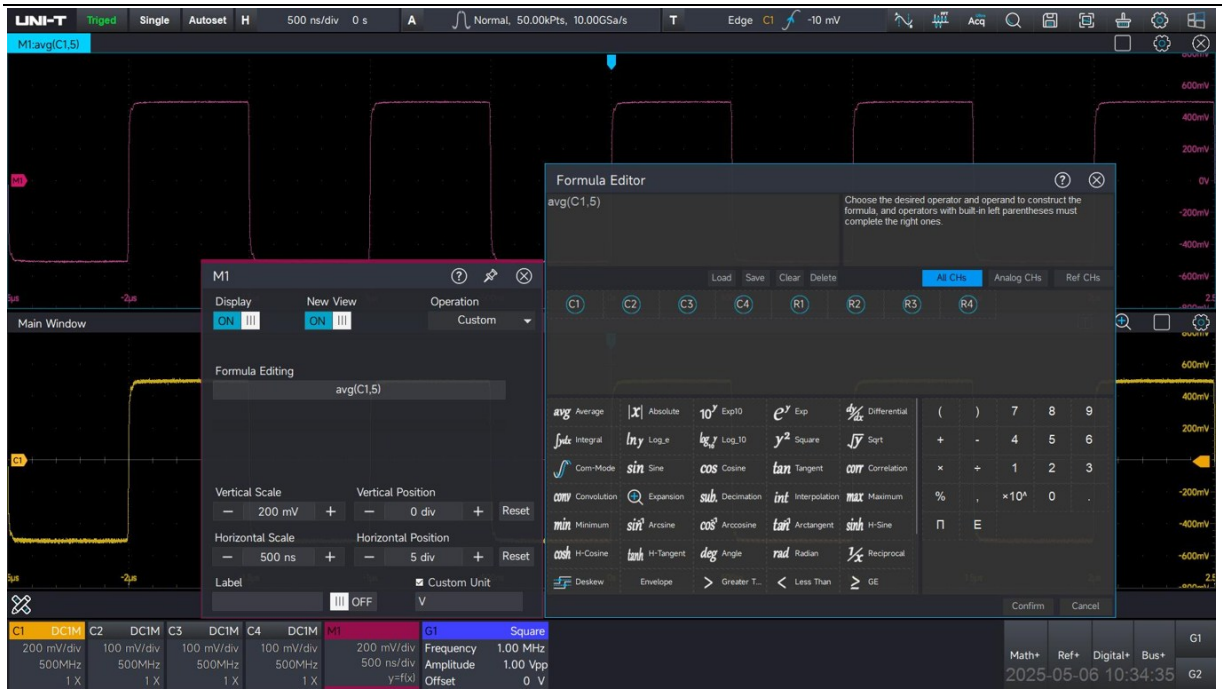
- Butterworth
- Chebyshev Type I
- Chebyshev Type II
- Elliptic
- Sampling method
- Remez
- Window function



Use the User-Defined Filter creation dialog to graphically configure filter parameters such as type, frequency response, and order. Custom filters can be saved for future recall and reuse, enabling consistent application across multiple measurement sessions.

User-Defined Advanced Function Operations

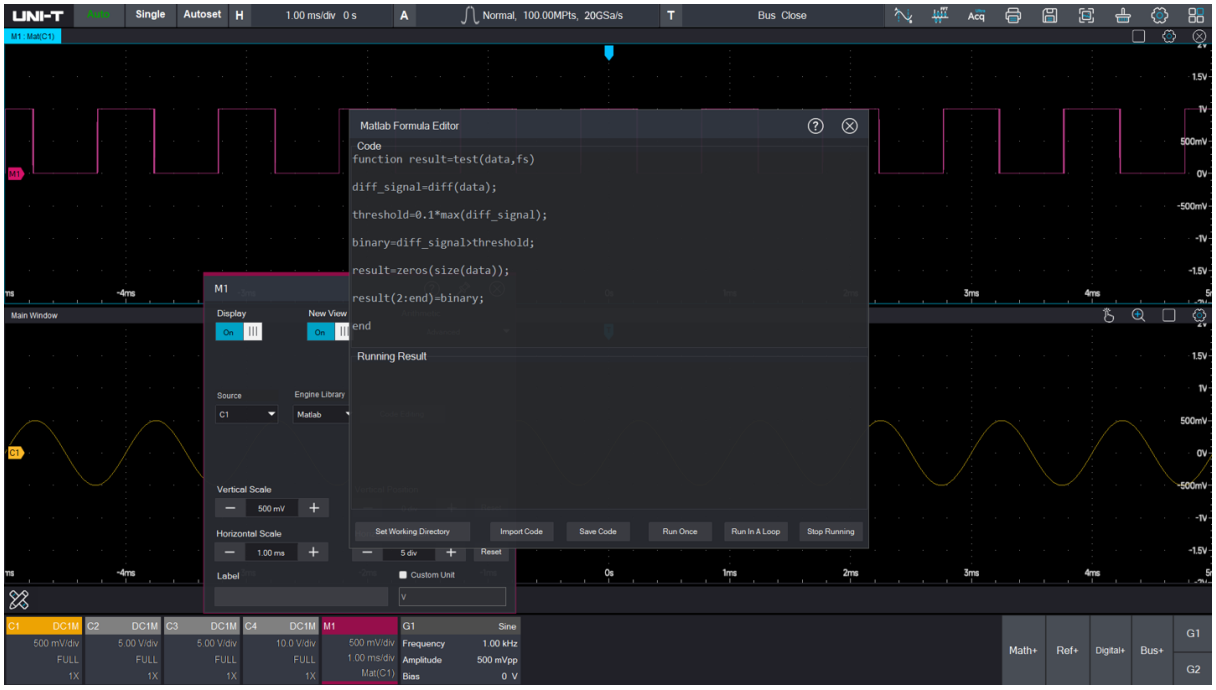
MSO8000HD supports dozens of advanced mathematical functions for flexible and in-depth signal analysis. Users can define custom operations by entering parameters as prompted through the interface. These functions are executed directly on the acquired waveform data in real time, eliminating the need for external post-processing tools and accelerating analysis workflows.



The above figure shows the use of the AVG function to average the waveform of channel 1, with an average count of 5.

Matlab Embedded Programming

MSO8000HD features an embedded Matlab code compiler that allows users to write and execute Matlab scripts directly within the oscilloscope. Script results are rendered as mathematical waveforms in the display window. When built-in functions and standard formulas are insufficient for complex analysis tasks, users can create custom Matlab scripts to perform advanced mathematical operations. These scripts can be saved, recalled, and reused as needed—enhancing flexibility, efficiency, and repeatability in waveform analysis.



The above figure shows a Matlab script to perform differential processing on the sine waveform of channel 1, and then converts it into a square wave.

Comprehensive Test Software Accelerates Development

A fully featured power analysis suite enables thorough evaluation and verification of power products.

A broad selection of high-speed and low-speed protocol decoding kits simplifies debugging of complex digital designs.

Hardware-accelerated jitter analysis and eye-diagram kits deliver faster eye-diagram acquisition and support a wide range of signal analysis types.

The hardware-optimized extreme mask test kit achieves the 6σ standard more rapidly and reliably.

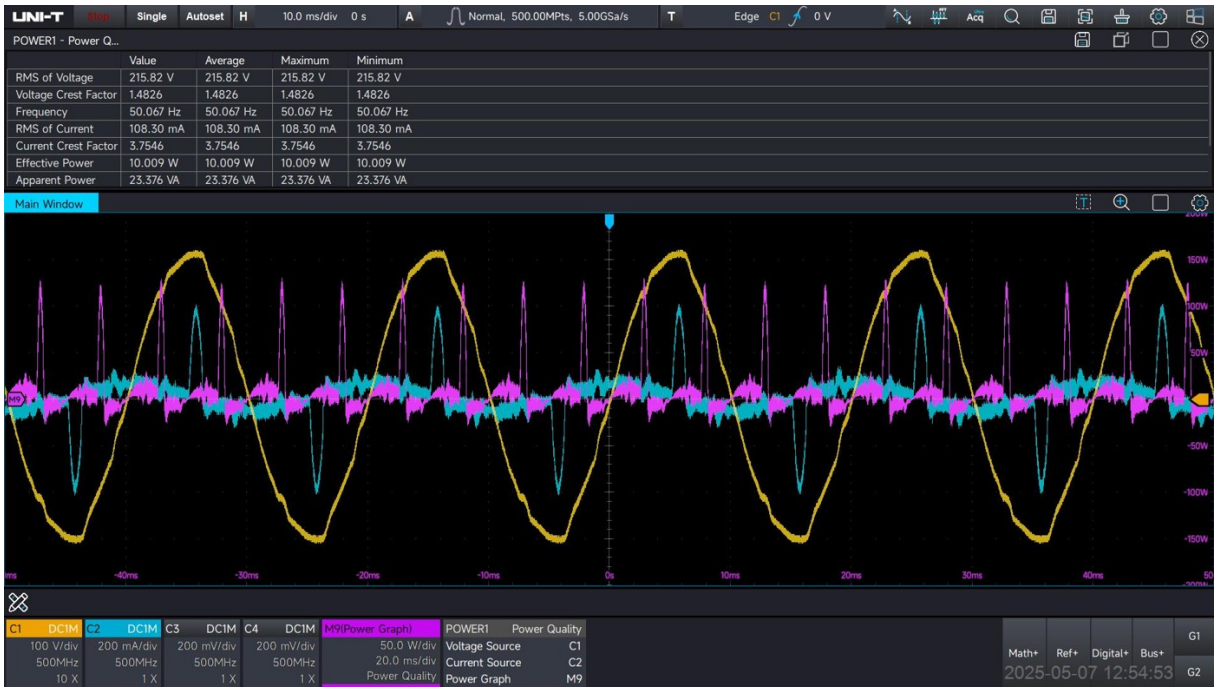
The compliant conformance analysis suite supports standard protocols, including USB 2.0, 100/1000 Mbps Ethernet, MIPI D-PHY, PCIe, and more.

Advanced Power Analysis

With the advancement of chip technology, requirements for power delivery systems have become increasingly stringent. Modern power supply networks, especially those composed of chips or precision components, tend to operate at low voltages and high currents. Ensuring reliable power delivery, effective noise suppression, and seamless signal transmission across each circuit segment is critical. These demands pose greater challenges for power supply testing. Designers prioritize energy efficiency and fast transient response to maintain power stability and cleanliness.

The comprehensive advanced power analysis option available on the MSO8000HD enables fast, repeatable evaluation of key power parameters, including power quality, inrush current, harmonics, switching losses, safe operating area (SOA), start-up and shut-down times, modulation, ripple, efficiency, Rds_{on}, power supply sequencing, slew rate (dv/dt and di/dt), control loop response (Bode plot), and power supply rejection ratio (PSRR).

Note: MSO8804HD does not have a high impedance channel, so please do not input voltages exceeding 5V RMS. If you need to use the power analysis function on the MSO8804HD, please use it with a high impedance adapter [Model: UT-OA-1M].



Serial Protocol Analysis

MSO8000HD provides a comprehensive suite for decoding and triggering industry-standard serial data buses. It supports more than 21 protocols, covering both low-speed and high-speed interfaces, including RS232/422/485/UART, I^2C, SPI, CAN, CAN-FD, LIN, AudioBus (I2S, LJ, RJ, TDM), MIL-STD-1553, ARINC 429, USB, Ethernet, and others.

The protocol search function enables users to scan extensive recorded serial packet data to identify packets matching specific criteria. The built-in serial triggering capability allows rapid event identification, with convenient navigation through the event list. Upon completion of testing, users can export detailed test reports for documentation and further analysis.

Embedded	RS232/422/485/UART, I^2C, SPI, SMBUS, SPMI, AudioBus (I^2S, LJ, RJ, TDM)
Automotive	CAN, CAN-FD, SENT, FlexRay, LIN, I^3C, PSI5
Computers & Communications	USB2.0, PCIe2.0, Ethernet, NRZ, Manchester, 8b/10b
Aerospace	MIL-STD-1553, ARINC429

-Supports packet parameter triggering

-Supports protocol packet view

-Supports event list

-Supports protocol search

-Supports protocol analysis reports



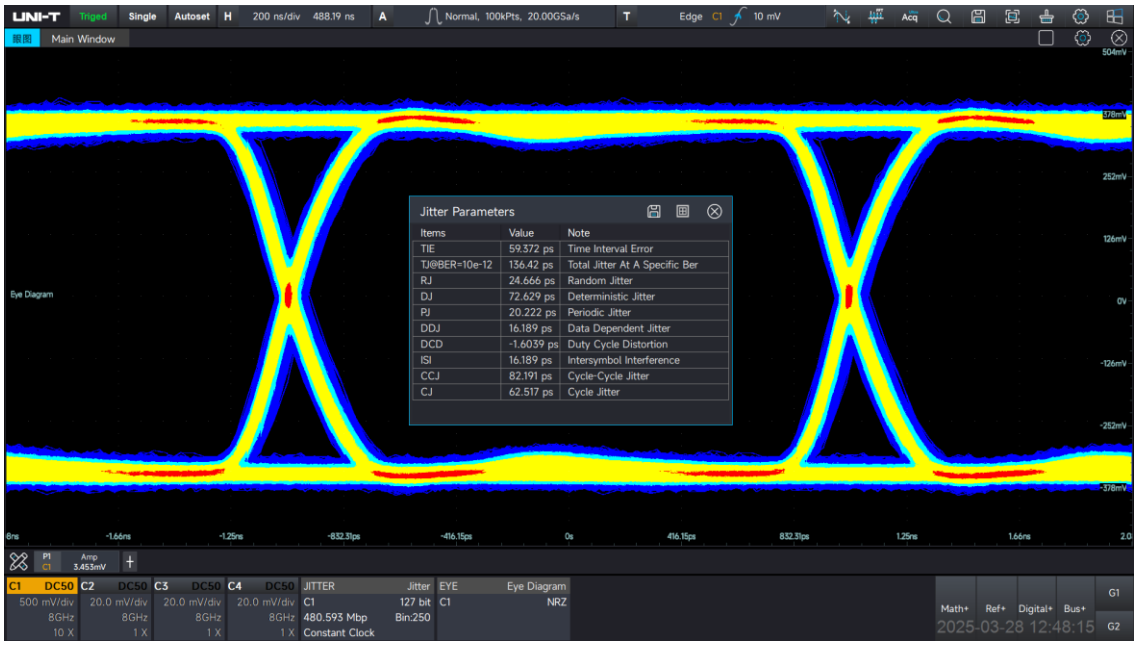
Analyze the 100M Ethernet bus. The bus waveform provides time-related decoded packet content, including preamble data, start frame delimiter, destination media access control address, source address, etc. The event list displays all the collected packet content.

Jitter Analysis and Eye Diagram

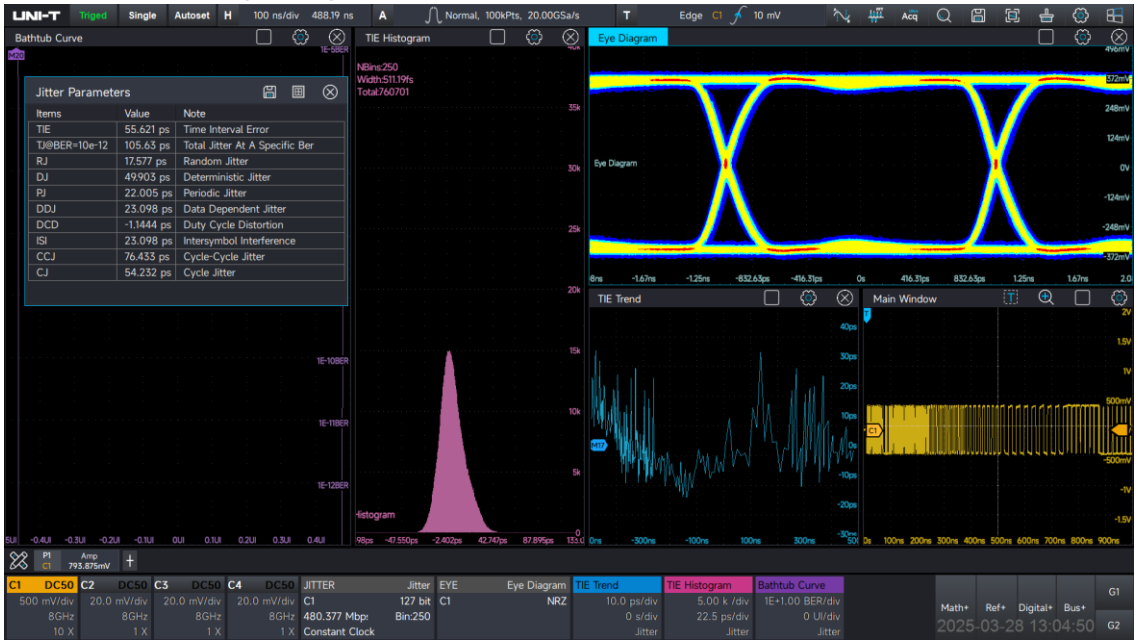
Jitter analysis and eye diagram testing are essential for electronic devices and communication systems, playing a crucial role in ensuring signal integrity and reliable performance across diverse applications.

The MSO8000HD-JITTER option enables users to efficiently perform the following evaluations:

- Measure clock jitter, data jitter, and eye opening in serial data communication systems
- Assess signal integrity, clock synchronization, and interference immunity in high-speed digital transmissions
- Evaluate clock and data recovery performance, including clock extraction, data demodulation, and clock reconstruction
- Analyze transmission quality, timing stability, and signal integrity of high-speed interfaces
- Identify clock jitter, signal distortion, and frequency interference sources



MSO8000HD performs eye diagram analysis on USB 2.0 standard protocol signals, measuring key eye diagram parameters to ensure signal integrity.



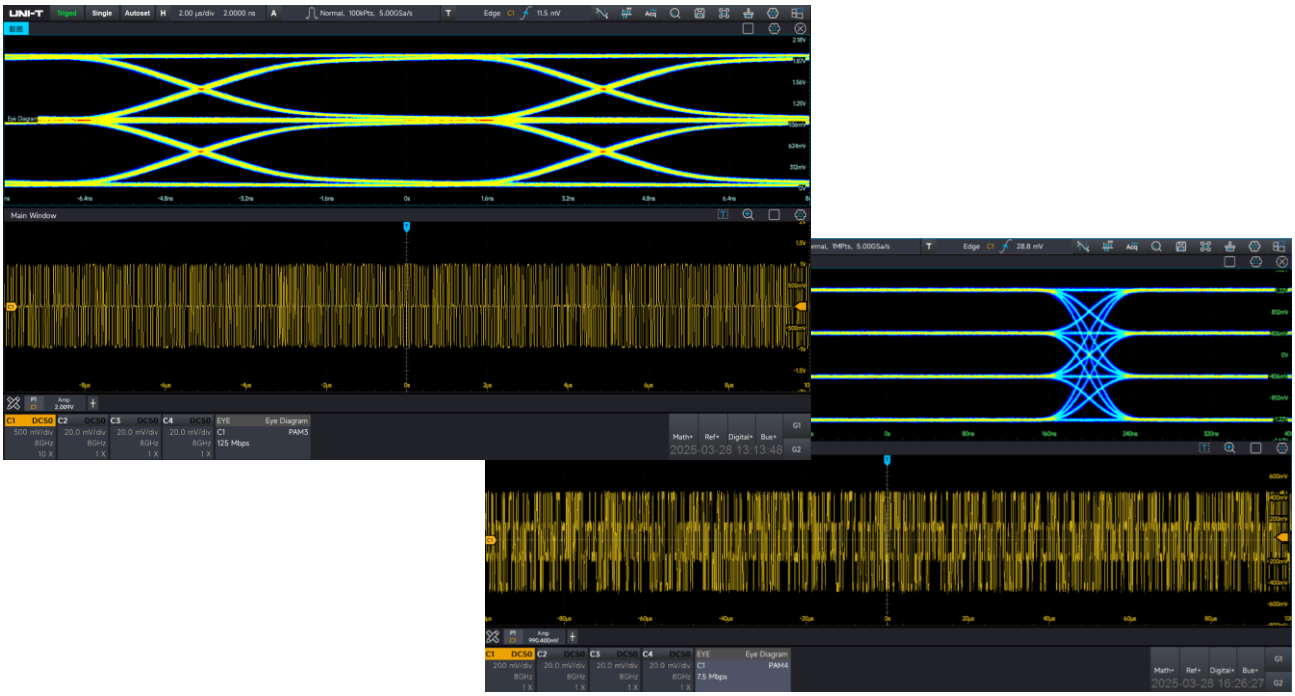
MSO8000HD-JITTER option includes a comprehensive suite of jitter measurement algorithms and offers a variety of jitter analysis views to support detailed signal evaluation.

PAM-N Analysis

Pulse Amplitude Modulation (PAM) is a modulation scheme widely used in digital communications. PAM signals utilize multiple amplitude levels compared to Non-Return-to-Zero (NRZ) signals, enabling higher data throughput at the same baud rate. For instance, PAM-4 uses four discrete levels (Level 0 to Level 3), each representing 2 bits of data (00, 01, 10, 11). Due to their increased data rates, PAM-N signals are extensively applied in Ethernet, optical communications, and emerging digital interfaces.

As the number of amplitude levels increases, PAM-N signals become more vulnerable to noise and crosstalk. Consequently, oscilloscopes must accurately verify PAM levels and separation thresholds under challenging signal conditions. This includes recovering the clock from the PAM signal and measuring jitter and noise for each individual level.

MSO8000HD, leveraging its user-friendly design, extends support to PAM-3, PAM-4, PAM-5, PAM-6, PAM-7 and PAM-8 signal analysis. Equipped with a 12-bit ADC and delivering over 7 bits of Effective Number of Bits (ENOB) at full bandwidth, it can recover clocks from PAM-N signals with small amplitude differences and perform real-time eye diagram measurements.

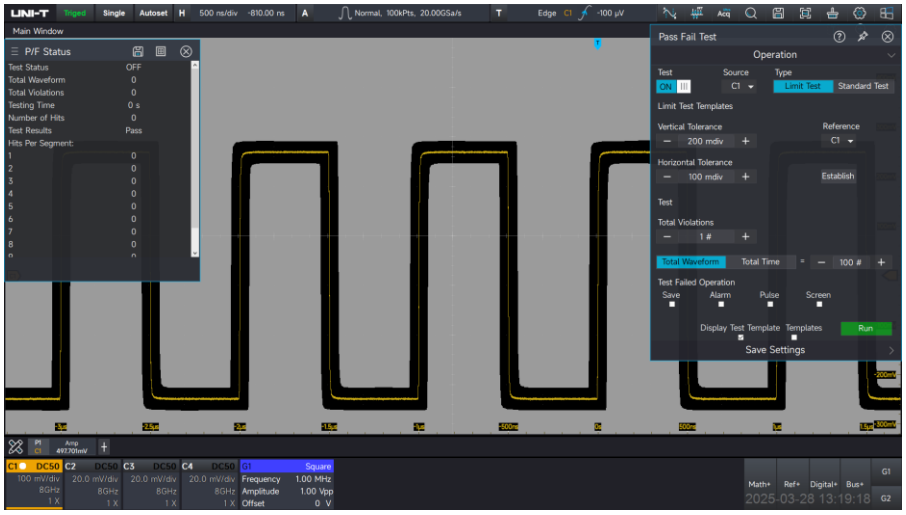


PAM3/4 Analysis

Limit Template Testing

MSO8000HD allows users to create limit templates based on standard waveforms, supporting applications such as material screening and quality control on production lines. This capability improves the compliance and reliability of product design and manufacturing. For example, noise limit tests can evaluate the sensitivity and interference immunity of receivers, the signal-to-noise ratio (SNR) of sensors, the clarity and quality of audio signals, and the safety of medical devices.

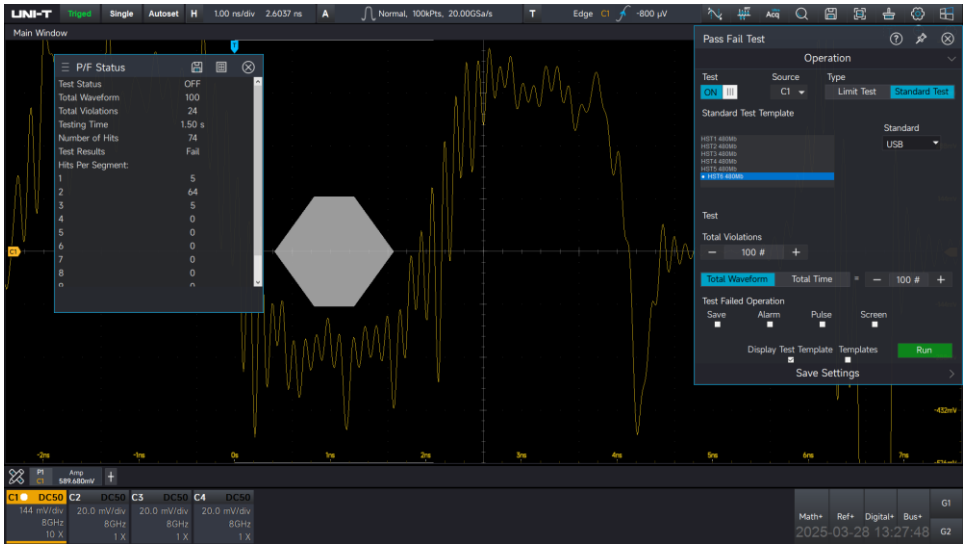
Users can customize the vertical and horizontal limit boundaries of the template test, set the maximum allowed number of violations, define the number of waveforms or total test duration, and configure the oscilloscope to automatically save waveforms, trigger alarms or pulses, or capture screenshots when a violation occurs.



Create a test template using the worst-case noise limit, and waveform screening that meets the standard can be completed within seconds.

Standard Template Test

For signal integrity testing, MSO8000HD also provides industry-standard templates as evaluation criteria. These standard templates can be used to judge the eye opening of an eye diagram or conduct a standard evaluation of time-domain signals.



Using the standard USB 2.0 transmission rate of 480 Mbps to test signal edges ensures that the bit rate complies with protocol specifications.

Compliance Tests

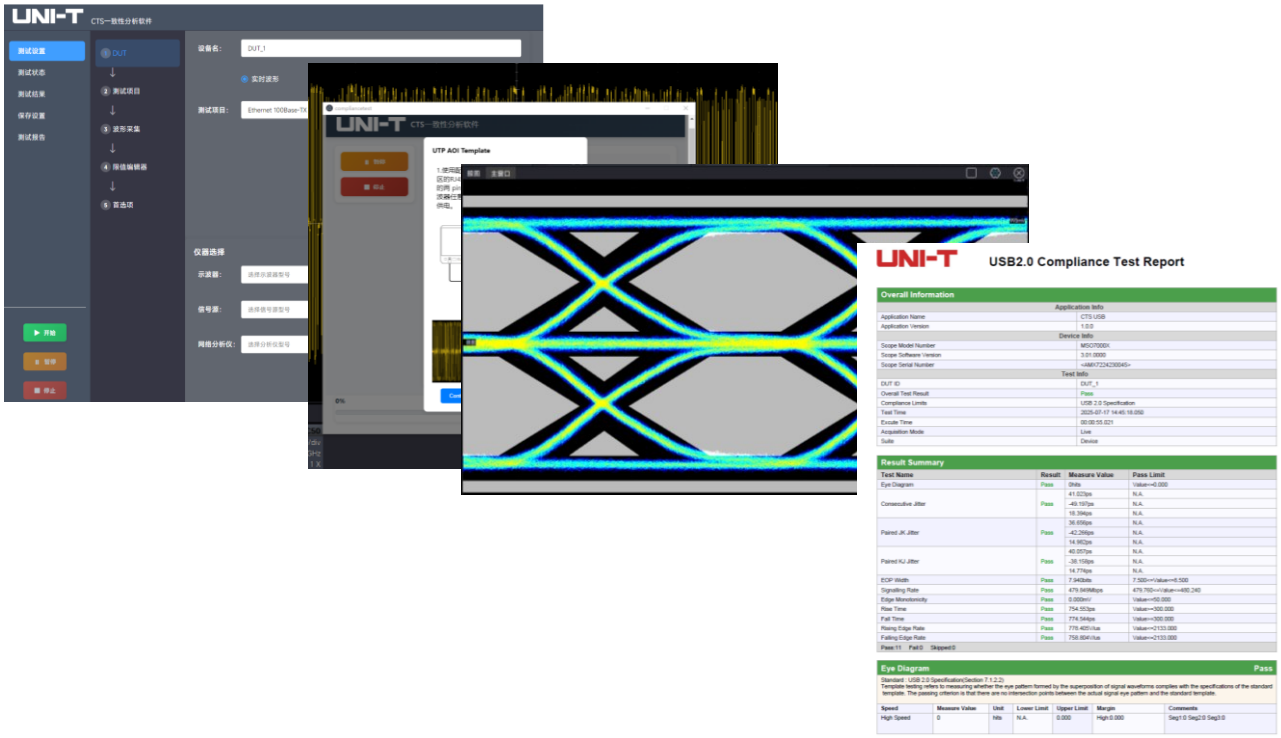
High-speed serial interface conformance testing ensures technical compliance of interfaces and protocols across different manufacturers, facilitating successful interoperability between devices using the same interface standard. Each interface protocol is governed by a specific standards organization—for example, USB by USB-IF, Ethernet by IEEE 802.3, HDMI by HDMI Forum, PCIe by PCI-SIG, and MIPI by the MIPI Alliance.

Manual execution of conformance tests can be time-consuming, prone to human error, and may lack compliance in applying test tolerances. To address these challenges, UNI-T offers a high-speed protocol conformance testing solution based on oscilloscopes, active probes, and test fixtures. This solution is designed to align with the latest industry specifications and is continuously updated to ensure compatibility with evolving standards.

Currently, the system supports USB 2.0 and 100/1000 Mbps Ethernet protocol conformance testing, with future updates planned to include additional mainstream protocols such as automotive Ethernet, MIPI, PCIe, and more.

Key Features of UNI-T's Conformance Analysis Software:

- Single or batch test execution: Run individual or multiple test items efficiently.
- Intuitive UI: Provides guided oscilloscope connection and test configuration through visualized workflows, simplifying setup.
- Full automation: Automatically configures the oscilloscope for each test, reducing setup time and ensuring repeatability.
- Detailed reporting: Generates comprehensive test reports with pass/fail status, test margins, parameter results, and waveform snapshots.
- Customizable test standards: Supports both association-defined and user-defined test criteria.
- Multi-round validation: Enables iterative testing to analyze trends and validate modifications.



The conformance testing software automatically executes test procedures and generates comprehensive reports by utilizing standardized signals and instrument connections, significantly reducing user operation time and minimizing the risk of human error.

Probe

UT-PA2000/1000 Active Single-Ended Probe

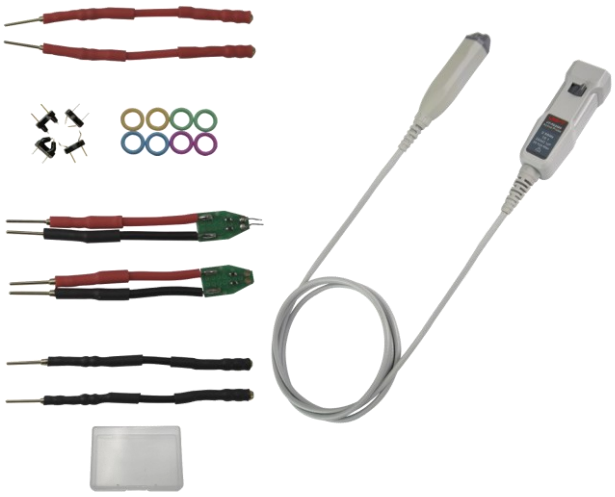
UT-PA2000 is an active single-ended probe designed for high-frequency measurements, integrating many features required by today's general-purpose high-speed probes. Active single-ended probes are widely used in high-speed digital circuits, bus analysis, signal integrity analysis, and many other high-speed fields. The UT-PA2000 can acquire signal information in circuits more accurately and quickly, helping to improve the work efficiency and accuracy of engineers.



Model	UT-PA2000	UT-PA1000
Bandwidth	2GHz	1GHz
Rise time	≤175ps	≤350ps
Attenuation ratio	10:1±5%	
Dynamic range	±4V	
Offset range	±4V	
Input capacitance	≤1.3pF	
Input resistance	1MΩ±2%	
Output impedance	50Ω	
Probe noise	＜7mV ACRMS	

UT-PD2500/1500 Active Differential Probe

UT-PD2500 is an active differential probe designed for high-frequency measurements. Active differential probes are widely used in numerous high-speed fields such as high-speed digital circuits, bus analysis, and signal integrity analysis, and are commonly employed in the design, verification, and debugging of high-speed buses.



Model	UT-PD2500	UT-PD1500
Bandwidth	2.5GHz	1.5GHz
Rise time	≤150ps	≤245ps
Attenuation ratio	10:1±5%	
Dynamic range	±4V	
Offset range	±4V	
Input capacitance	≤1pF	
Input resistance	200kΩ±2% (Differential)	
Output impedance	50 Ω	
Probe noise	＜7mV ACRMS	

UT-PD6000/4000 Active Differential Probe

UT-PD6000/4000 is an active differential probe designed for high-frequency measurements. Active differential probes are widely used in numerous high-speed fields such as high-speed digital circuits, bus analysis, and signal integrity analysis, and are commonly employed in the design, verification, and debugging of high-speed buses.



Model	UT-PD6000	UT-PD4000
Bandwidth	6GHz	4GHz
Rise time	≤73ps	≤110ps
Attenuation ratio	5:1±2%	
Dynamic range	7Vpp(±3.5V DC or peak AC)	
Offset range	±4V	
Input capacitance	0.75pF	
Input resistance	200kΩ±2% (Differential)	
Probe noise	7.5mV ACRMS	

Passive Probe

Model	Model	Description
UT-P07	High impedance probe	1X: DC-8 MHz 10X: DC-500MHz Oscilloscope compatibility: All **UNI-T** series
		
UT-P20	High impedance probe	DC-100MHz Probe coefficient: 100:1 Maximum operating voltage: 1500Vrms Oscilloscope compatibility: All **UNI-T** series
		
UT-V23	High voltage probe	DC-100MHz Probe coefficient: 100:1 Input resistance: 100MΩ ± 2% Maximum operating voltage: 2000Vpp Oscilloscope compatibility: All **UNI-T** series
		

UT-P21 	High voltage probe	DC-50 MHz Probe coefficient: 1000:1 Maximum operating voltage: DC 15kVrms, AC 10kV (sine wave) Oscilloscope compatibility: All **UNI-T** series
UT-P6150 	Low impedance probe	DC-1.5GHz Probe coefficient: 10:1 Maximum operating voltage: DC 7Vrms Oscilloscope compatibility: All **UNI-T** series

Current Probe

Model	Type	Description
UT-P40 	Current probe	DC-100kHz Range: 50mV/A, 5mV/A Current Range: 0.4A-60A Maximum operating voltage: 600Vrms Oscilloscope compatibility: **All UNI-T series**
UT-P41 	Current probe	DC-100kHz Range: 100mV/A, 10mV/A Current Range: 0.4A-100A Maximum operating voltage: 600Vrms Oscilloscope compatibility: **All UNI-T series**
UT-P42 	Current probe	DC-150kHz Range: 100mV/A, 10mV/A Current Range: 0.4A-200A Maximum operating voltage: 600Vrms Oscilloscope compatibility: **All UNI-T series**
UT-P43 	Current probe	DC-25MHz Range: 100mV/A Maximum measuring current: 20A Rise time: 14ns Oscilloscope compatibility: **All UNI-T series**

UT-P44 	Current probe	DC-50 MHz Range: 50mV/A Maximum measuring current: 40A Rise time: 7ns Oscilloscope compatibility: **All UNI-T series**
UT-P4030D 	Current probe	Bandwidth: DC-100MHz Range: 1X:5A, 10X:30A Rise time: ≤3.5ns Maximum continuous current: 30Arms Resolution: 5A:1mA, 30 A:10mA Oscilloscope compatibility: **All UNI-T series**
UT-P4150 	Current probe	Bandwidth: DC-12MHz Range: 10X:30A, 100X: 150A Rise time: ≤29ns Maximum continuous current: 150Arms Resolution: 30A:10mA, 150A:100mA Oscilloscope compatibility: **All UNI-T series**
UT-P4500 	Current probe	Bandwidth: DC-5MHz Range: 10X:75A, 100X:500A Rising time: ≤70ns Maximum continuous current: 500Arms Resolution: 75A: 10mA, 500A:100mA Oscilloscope compatibility: **All UNI-T series**
UT-P4100A 	Current probe	Bandwidth: DC-600kHz Current range: low-scale 50mA-10A, high-scale 1A-100A Range sensitivity: low-scale 0.1V/A, high-scale 0.01V/A Oscilloscope compatibility: **All UNI-T series**

UT-P4100B 	Current probe	Bandwidth: DC-2MHz Current range: low-scale 50mA-10A, high-scale 1A-100A Range sensitivity: low-scale 0.1V/A, high-scale 0.01V/A Oscilloscope compatibility: **All UNI-T series**

High Voltage Differential Probe

Model	Type	Description
UT-P30 	High voltage differential probe	DC-100MHz Probe coefficient: 100:1, 10:1 Differential input voltage: ±800Vpp Oscilloscope compatibility: **All UNI-T series**
UT-P31 	High voltage differential probe	DC-100MHz Probe coefficient: 1000:1, 100:1 Differential input voltage: ±1.5kVpp Oscilloscope compatibility: **All UNI-T series**
UT-P32 	High voltage differential probe	DC-50MHz Probe coefficient: 1000:1, 100:1 Differential input voltage: ±3kVpp Oscilloscope compatibility: **All UNI-T series**
UT-P33 	High voltage differential probe	DC-120MHz Probe coefficient: 100:1, 10:1 Differential input voltage: ±14kVpp Oscilloscope compatibility: **All UNI-T series**

UT-P35		DC-50MHz Probe coefficient: 500:1, 50:1 Rise time: 7ns Accuracy: 2% Differential input voltage: 1/50: 130 (DC+peak AC) 1/500: 1300 (DC+peak AC) Common input voltage: 100Vrms, CATI; 600Vrms, CATII Oscilloscope compatibility: **All UNI-T series**
	High voltage differential probe	
UT-P36		DC-50MHz Probe coefficient: 2000:1, 200:1 Rising time 3.5ns Accuracy: 2% Differential input voltage: 1/200:560 (DC+peak AC) 1/2000:5600 (DC+peak AC) Common input voltage: 2800Vrms, CATI; 1400Vrms, CATII Oscilloscope compatibility: **All UNI-T series**
	High voltage differential probe	

Power rail Probe

Model	Type	Description
UT-PR2060 	Power rail probe	DC-1GHz Rise time: 350ps Offset range: ±60V AC/DC coupling Oscilloscope compatibility: **All UNI-T series**

Technical Specifications

All specifications are guaranteed, except those marked "Typical (Typ.)". The instrument must be operated continuously for at least thirty minutes at the specified operating temperature.

Specifications	MSO8804HD	MSO8604HD	MSO8504HD
Bandwidth (-3dB) @50Ω★1	8GHz	6GHz	5GHz
Bandwidth (-3dB) @1MΩ	-	500MHz	500MHz
Rise time @50 Ω (Typ.)	55ps	73ps	88ps
Analog channels	4+EXT		
Digital channels (Option)	16 (requires purchase of the MS8000HD-LA option)		
Sample rate★2	20GSa/s (Half channels); 10GSa/s (Full channel)		
Vertical resolution	12-bit		
Eres Mode	Maximum resolution: 16-bit		
Memory depth	Standard: 500Mpts/CH (Full channel), 1Gpts/CH(Half channels) Option: 1Gpts/CH (Full channel), 2Gpts/CH (Half channels)		
Waveform capture rate★3	≥1,000,000wfms/s		
Function/Arbitrary waveform generator (Option)	Maximum frequency output of waveform: 60MHz; Sample rate: 625MSa/s; Supports arbitrary waveform and provides arbitrary waveform editor; Supports modulation and sweep		
Digital voltmeter	4-digit, DC, AC RMS, DC+AC RMS		
Frequency counter	8-digit		
Serial protocol analysis	Standard: RS-232/422/485/UART, SPI, I²C, CAN, LIN Option: CAN-FD, SENT, FlexRay, AudioBus (I2S/LJ/RJ/TDM), MIL-STD-1553, ARINC429, SMBUS, SPMI, I3C, PSI5, USB1.0/2.0, PCIe1.0/2.0, Ethernet, NRZ, Manchester, 8b/10b		
Measurement	Supports 74 kinds of automatic parameter measurement, quick Meas, statistical analysis, histogram, trend chart, trace analysis		
Mathematical operation	Supports up to 8 math waveforms simultaneously; Enhanced FFT, basic mathematical operation, filter, advanced function editor; Matlab embedded programming (Option), advanced filter designer (Option)		

Analysis tool	Histogram, zone histogram, trend chart, trace
Advanced analysis function	Power analysis (Option), jitter analysis and eye diagram (Option), limit template test, sequence mode, search and navigation
Compliance Tests	MIPI D-PHY v1.2、USB2.0、100Base-Tx、1000Base-T、100Base T1、1000Base-T1
Interface	USB Device, USB Host*5 (TYPE-C*1, TYPE-A*4), LAN (10\100\1000Mb/s), HDMI, AuxIn (Trigger Sync input, AWG external trigger input), AuxOut (Trigger Syn output, pass test result, AWG trigger output), 10MHz Ref In/Out
Display screen	15.6-inch FHD touch screen (1920*1080) + Gesture touch

Analog Channel	**MSO8804HD**	**MSO8604HD MSO8504HD**
Channels	4+EXT	
Bandwidth limit @50 Ω(Typ.)	4GHz, 2GHz, 1GHz，500MHz, 20MHz	
Bandwidth limit @1M Ω(Typ.)	-	500MHz, 20MHz
Vertical input sensitivity range★4	50Ω: 1mV/div-1V/div	50Ω: 1mV/div-1V/div
	-	1 MΩ: 1mV/div-10V/div
Input coupling	50Ω: DC, GND	50Ω: DC, GND
	-	1MΩ: AC, DC, GND
Input impedance	50Ω ±2%	50Ω ±2% 1MΩ ±1% (15 ±3pF)
DC gain accuracy★4	**50Ω:** ±1.5% (±2.0% when ≤5mV/div) ±1% of full scale division (≤5mV/div: ±1.5% of full scale division)	**50Ω:** ±1.5% (±2.0% when ≤5mV/div) ±1% of full scale division (≤5mV/div: ±1.5% of full scale division)
	-	**1MΩ**: ±1.2% (±1.5% when ≤5 mV/div) ±1% of full scale division (≤5mV/div: ±1.2% of full scale division)

Offset range	**50Ω:** 1mV/div-50mV/div: ±500mV 100mV/div-200mV/div: ±1V 500mV/div-1V/div: ±4V	**50 Ω:** 1mV/div-50mV/div: ±500mV 100mV/div-200 mV/div: ±1V 500mV/div-1 V/div: ±4V
	-	**1MΩ:** 1mV/div-100mV/div: ±2V 200mV/div-500mV/div: ±10V 1V/div-2V/div: ±40V 5V/div-10V/div: ±100V
DC offset accuracy★4	＞200mV/div: ±0.1div±2mV±1.5% of offset ≤ 200mV/div: ±0.1div±2mV±2.0% of offset	
SFDR (Typ.)	≥50dBc	
Probe attenuation ratio	1X, 5X，10X, 100X, User-defined: 0.001X~2000X	
Maximum input voltage	50Ω: ≤5Vrms –	50Ω: ≤5Vrms 1MΩ: ≤300Vrms, CAT I
Channel-to-channel isolation★5	≥600:1 (DC-4GHz) ≥500:1 (＞4GHz)	

The RMS value of the noise floor when the input is 8GHz, 50Ω ($V_{AC\ RMS}$) ★6	
1, 2, 5, 10mV/div	390μV
20mV/div	430μV
50mV/div	790μV
100mV/div	1.05mV
200mV/div	3.91mV
500mV/div	5.89mV
1V/div	12.5mV

★1. The 8GHz, 6GHzand 5GHz bandwidths are available only in half-channel mode. In full-channel mode, the maximum bandwidth is 4GHz.

★2. Half-channel mode: Only turn on C1 or C3, or turn on C1 and C3 simultaneously.

★3. The maximum waveform capture rate is achieved when sequential mode is enabled.

★4. MSO8804HD: 1mV/div, 2mV/div and 5mV/div are digital magnifications of 10mV/div. When calculating the vertical accuracy, the vertical sensitivities of 1mV/div, 2mV/div and 5mV/div should be calculated based on 80 mV corresponding to 10 mV/div. MSO8604HD/MSO8504HD: 1mV/div, 2mV/div are digital magnifications of 5mV/div. When calculating vertical accuracy, the vertical sensitivities of 1mV/div and 2mV/div should be

calculated based on 40mV corresponding to 5mV/div.

★5. Channel-to-channel isolation (DC-4GH) applies to any combination of channels. Channel-to-channel isolation (4GHz-8GHz) is valid only when C1 and C3 are enabled.

★ 6. Time base: With a time base setting of 1ms/div and memory depth of 100kpts, measurements of oscilloscope parameters are conducted with High Resolution (Hi-Res) / Enhanced Resolution (ERes) mode disabled. The measurement results are obtained by selecting "Standard Deviation" as the statistical method.

Digital Channel (Option)	
Digital input channels	16
Sample rate	1.25GSa/s
Memory depth	Standard: 62.5Mpts Option: 125Mpts (requires purchase of the MSO8000HD-MD2G memory depth upgrade option)
Maximum input toggle rate	500MHz
Minimum detectable pulse width	3.2ns
Threshold	A total of 4 groups are available, with each group supporting 4 adjustable channels.
Threshold selection	TTL (1.4V) /5.0V CMOS (+2.5V), 3.3V CMOS (+1.65V) /2.5V CMOS (+1.25V), 1.8V CMOS (+0.9V) ECL (-1.3V) /PECL (+3.7V) /LVDS (+1.2V) / 0V / User-defined (Each group contains 4 channels, with adjustable thresholds within each group.)
Threshold range *	±20.0V, 10 mV stepping
Threshold resolution *	20mV
Threshold accuracy*	± (100mV+3% of threshold setting after calibration)
Maximum input voltage *	±40Vpeak
Maximum input dynamic range *	±10V+ threshold
Minimum voltage swing*	500mVpp
Input impedance*	101kΩ±2%
Vertical resolution	1bit
Inter-channel delay*	1.6ns (Typ.)

Note: *indicates a specification or feature applicable only when the oscilloscope is connected to a digital probe.

Horizontal System	
Time base range	50ps/div-1000s/div
Time base accuracy	±0.5ppm ± 1ppm * number of years since last calibration
Time base delay time range	Pre-trigger: ≥0.5 screen width Post-trigger: ≤5000s
Inter-channel delay range	±100ns, minimum step: 1ps
Inter-channel Synchronization Accuracy (Typ.)	≤10ps
Horizontal mode	Y-T, X-Y, ROLL

Acquisition System								
Peak detect	Capture glitches as narrow as 100ps							
Average	2 to 65536							
UltraAcq®	Waveform capture rate: Up to 300,000wfms/s							
High Resolution (Typ.)								
Resolution bits	12-bit		13-bit	14-bit		15-bit	16-bit	
Bandwidth	8GHz		2.2GHz	444MHz		89MHz	23MHz	
Sample rate	20GSa/s		5GSa/s	1GSa/s		200MSa/s	50MSa/s	
ERes (Typ.) ★1								
Enhanced bits	0.5	1	1.5	2	2.5	3	3.5	4
Bandwidth	4GHz	1.9GHz	960MHz	460MHz	230MHz	120MHz	56MHz	28MHz

★1. ERes mode does not impact the sample rate; it only reduces the effective bandwidth.

Trigger System		
Trigger modes	Auto, normal, single	
Trigger coupling	HF rejection	Suppresses high-frequency signals above 100kHz
	LF rejection	Suppresses low-frequency signals smaller than 100kHz
	Noise rejection	Adds lag to the trigger circuit. Can be turned OFF or ON. When ON, the trigger sensitivity is reduced by two times
	DC	DC coupling triggering
	AC	AC coupling triggering
Trigger holdoff range	6.4ns to 10s	
Trigger sensitivity	Internal: C1-C4	≤5mV: 1div ＞5mV: 2.25div @ < 8GHz 1.50div @ < 5GHz 1.00div @ < 3GHz 0.75div @ < 1GHz
	External	EXT: 100mVpp DC to 100MHz 150mVpp 100 to 200MHz EXT/5: 500mVpp DC to 100MHz 750mVpp 100 to 200MHz
Trigger level range	Internal	± 4divs from the center of the screen
	External	EXT: ±1V; EXT/5: ±5V
	AC Line	Fixed at about 50% of line voltage
Trigger Type		
Zone triggering	Source	C1-C4
	Zone	Up to 2 zones
	Attribute	Intersect, non-intersect
Edge triggering	Source	C1-C4, EXT (EXT/5), D0-D15, AC

	Trigger edge	Rising edge, falling edge, any edge
Pulse width triggering	Source	C1-C4, D0-D15
	Polarity	Positive pulse width, negative pulse width
	Limit condition	Less than, greater than, within range
	Pulse width	100ps to 10s
Slope triggering	Source	C1-C4
	Slope	Rise, fall
	Limit condition	Less than, greater than, within range
	Time setting	3.2ns to 10s
Video triggering	Source	C1-C4
	Standard	NTSC, PAL, SECAM, 525p/60, 625p/50, 720p/24, 720p/25, 720p/30, 720p/50, 720p/60, 1080i/25, 1080i/30, 1080p/24, 1080p/25, 1080p/30, 1080Psf/24
	Trigger condition	All lines, specified line, odd field, or even field
Pattern triggering	Source	C1-C4
	Pattern	H, L, X, rising edge, falling edge
Timeout triggering	Source	C1-C4, D0-D15
	Edge type	Rising edge, falling edge, arbitrary edge
	Time setting	3.2ns to 10s
Runt triggering	Source	C1-C4
	Polarity	Positive pulse width, negative pulse width
	Limit condition	Less than, greater than, within range, outside the range
	Time setting	3.2ns to 10s
Setup/Hold triggering	Clock source	C1-C4
	Clock edge	Rising edge, falling edge
	Data source	C1-C4

	Condition	Setup, hold, setup & hold
	Time setting	3.2ns to 10s
Nth edge triggering	Source	C1-C4, D0-D15
	Edge type	Rising edge, falling edge
	Idle time	3.2ns to 10s
	Edge count	1 to 65535
RS-232/422/485/UART triggering	Trigger mode	Start bit, parity error, data bit, stop bit
I^2C triggering	Trigger mode	Start bit, restart bit, stop bit, missing acknowledgment, address, data, address and data
SPI triggering	Trigger mode	Start bit, data bit
CAN triggering	Trigger mode	Frame start, frame type, identifier ID, data, identifier ID & data, end of frame, error
LIN triggering	Trigger mode	Frame start, ID, data, ID and data, wake-up frame, sleep frame, synchronization error, ID check error, checksum error
CAN FD triggering (Option)	Trigger mode	Frame start, frame type, ID, data, ID and data, end of frame, error
SENT triggering (Option)	Trigger mode	Fast channel: Sync, status, data, CRC, status + data, status + data + CRC, error Slow channel: ID, data, CRC, ID+data, CRC error
AudioBus triggering (Option)	Trigger mode	Data, sync bit, channel + data
FlexRay triggering (Option)	Trigger mode	Frame head, indicating bit, ID, cycle count, header field, data, ID and data, end of frame, error
MIL-STD-1553 triggering (Option)	Trigger mode	Command word, status word, data, error, sync
ARINC 429 triggering (Option)	Trigger mode	Frame start, end of frame, label, SDI, data, SSM, label and data, error
Advanced protocol triggering (Option)	Trigger mode	Depending on protocol type

Waveform Measurement	
Cursor Measurement	
Source	C1-C4, Math, Ref
Type	Vertical cursor: Measures time and voltage (X, Y), reciprocal of △X (1/△X, measured in Hz), and △Y/△X (measured in V/s) Horizontal cursor: Measures voltage (Y) and ΔY Supports automatic trace cursor
Automatic Measurement	
Vertical measurement parameters	Maximum, Minimum, Peak-to-Peak, Top, Base, Middle, Amplitude, Average, RMS, AC RMS, Positive overshoot, Negative overshoot, Maximum cycle, Minimum cycle, Cycle RMS, Cycle average, Cycle Peak-to-Peak, Cycle middle, Positive pre-shoot, Negative pre-shoot
Horizontal measurement parameters	Period, Frequency, Rise time, Fall time, + pulse width, -pulse width, + duty cycle, -duty cycle, Time @Max, Time @Min, Rise time @Lv, Fall time @Lv, Period @Lv, Frequency @Lv, Pulse width @Lv, Duty cycle @Lv, Phase different @Lv, RRD @Lv, FFD @Lv, RFD @Lv, FRD @Lv, Skew, Data count, Setup time, Hold time, Cycle count, The number of rising edges, the number of falling edges, the number of positive pulses, the number of negative pulses
Other measurements	Area, Absolute area, Positive area, Negative area, Periodic area, Periodic absolute area, Periodic positive area, Periodic negative area
Histogram parameter	μ±1σ, μ±2σ, μ±3σ, mode, mean, standard deviation, maximum, minimum, median, peak-to-peak, peak count, total sample size
Measurement source	C1-C4、R1~R4
Number of measurements	74 kinds of automatic measurements, with up to 10 parameters displayed simultaneously
Measurement range	Screen, cursor
Parameter snapshot	Displays 53 measurement items of the current measurement source, the source can be switched
Measurement statistics	Current value, Average value, Maximum value, Minimum value, Standard deviation, Measure the count, Histogram, Trend chart, Trace

Waveform Math		
Number of math waveforms	Supports up to 8 simultaneous math waveforms	
Source	C1-C4, R1-R4	
Advanced operation	Supports Matlab embedded programming and data presentation	
Basic operation	Add, Subtract, Multiply, Divide, AND, OR, NOT, XOR, Average, Absolute value, Exp10, Exp, Differential, Integral, Ln, Lg, Square, Square root, common, Sine, cos, tan, Correlation, Convolution, extended-value, Extraction, Interpolation, maximum, minimum, User-defined function expression (editable and supports composite formula operations)	
Enhanced FFT	Function	Amplitude spectrum, power spectrum, Psd, real part, imaginary part, phase spectrum
	Window type	Rectangular, Hanning, Blackman-Harris, Hamming, Flat top
	Display	Full screen (spectrum view), multi-window
	Vertical units	Vrms, dBrms
Digital filter	Filter type	Low pass, high pass, band pass, band stop, user-defined filters
	User-defined filter design method	FIR, IIR
	User-defined filter type	Sampling, Window function, Lemmez, Butterworth, Chebyshev I, Chebyshev II, Elliptical
	Response type	Low pass, high pass, band pass, band stop
	Filter order	FIR order: 2-1000 IIR order: 2-50
	Filter characteristics	Amplitude-frequency, phase-frequency, impulse response

Measurement Analysis		
Digital voltmeter	Source	C1-C4
	Mode	DC, AC RMS, DC+AC RMS
	Voltage resolution	4-digit

Frequency counter	Frequency resolution	8-digit
Pass/Fail Test	Source	C1-C4
	Test template	User-defined test template or load standard test template
	Failure operation	Stop, save, alarm, pulse, screenshot
Histogram	Source	P1-P10
	Type	Horizontal, vertical, measurement
	Measurement item	μ±1σ, μ±2σ, μ±3σ, mode, mean, standard deviation, maximum, minimum, median, peak-to-peak, peak count, total sample size
Jitter Analysis and Eye Diagram (Option)	Source	C1-C4, Ref， Math
	Clock recovery	Constant frequency: Automatic/user-defined PLL: First-order phase locked loop, second-order phase-locked loop
	View	TIE histogram, TIE trend chart, TIE spectrum, Bath-Tub Curve
	Jitter measurement parameter	TIE, TJ@BER, RJ, DJ, PJ, DDJ, DCD, ISI, Cycle-Cycle Jitter, Period Jitter
	Eye diagram measurement parameter	Eye amplitude, eye height, eye width, level 1, level 0, Q factor, eye crossover ratio, extinction ratio
Power analysis (Option)	Analysis item	Input analysis: Power quality, harmonic analysis, inrush current Output analysis: Ripple analysis, modulation analysis, efficiency, startup/shutdown time Frequency response analysis: Control loop response (Bode plot), power supply rejection ratio (PSRR) Switching analysis: Switching Loss, safe operating area, di/dt, dv/dt, Rds(on)

Serial Bus Decode	
Decoding channel	2 channels

RS-232/422/485/ UART decode	Source	C1-C4, R1-R4
	Bit width	5-bit, 6-bit, 7-bit, 8-bit
	Parity check	Odd, even, or none
	Stop bit	1-bit, 2-bit
	Polarity	Positive, negative
	Bit sequence	LSB, MSB
	Baud rate	2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, user-defined
I^2C decode	Source	C1-C4, R1-R4
	Signal	SCL, SDA
	Address length	7-bit, 10-bit
SPI decode	Source	C1-C4, R1-R4
	Mode	TIMEOUT, CS
	Signal	Clock, word selection, data
	Clock edge	Rising edge, falling edge
	Word selection polarity	High level, low level
	Data polarity	Positive, negative
	Data bit width	4-32
	Bit sequence	LSB, MSB
CAN decode	Source	C1-C4, R1-R4
	Signal type	CAN_H, CAN_L, differential
	Sampling point	30%-90%
	Signal rate	User-defined, 10kbps, 19.2kbps, 20kbps, 33.3kbps, 38.4kbps, 50kbps, 57.6kbps, 62.5kbps, 83.3kbps, 100kbps, 115.2kbps, 125kbps, 230.4kbps, 250kbps, 490.8kbps 500kbps, 800kbps, 921.6kbps, 1Mbps 2Mbps, 3Mbps, 4Mbps, 5Mbps

LIN decode	LIN signal standard	1.0, 2.0, Both
	Source	C1-C4, R1-R4
	Baud rate	2400bps, 4800bps, 9600bps, 19200bps, user-defined
	polarity	Positive, negative
	Sampling point	50%-90%
	ID includes parity bit	Yes, no
CAN FD decode (Option)	Source	C1-C4, R1-R4
	Signal type	CAN-FD_H, CAN-FD_L, differential
	Arbitration field sample point	30-90%
	Data field sample point	30-90%
	SD signal rate	User-defined, 10kbps, 19.2kbps, 20kbps, 33.3kbps, 38.4kbps, 50kbps, 57.6kbps, 62.5kbps, 83.3bps, 100kbps, 115.2kbps, 125kbps, 230.4kbps, 250kbps, 490.8kbps, 500kbps, 800kbps, 921.6kbps, 1Mbps, 2Mbps, 3Mbps, 4Mbps, 5Mbps
	FD signal rate	User-defined, 250kbps, 500kbps, 800kbps, 1Mbps, 1.5Mbps, 2Mbps, 3Mbps, 4Mbps, 5Mbps, Mbps, 7 Mbps, 8Mbps
SENT decode (Option)	Source	C1-C4, R1-R4
	Polarity	Positive, negative
	Clock period	User-defined, 1μs, 3μs, 10μs, 30μs, 100μs, 300μs
	Clock tolerance	1%-30%
	Mode	Fast channel, slow channel
	Pause bit	No, yes
	Data field forma	Half-byte, fast channel
	Data length	1Nibbles, 2Nibbles, 3Nibbles, 4Nibbles, 5Nibbles, 6Nibbles

AudioBus decode (Option)	Source	C1-C4, R1-R4
	Protocol type	I2S, LJ, RJ, TDM
	Word selection polarity	Positive, negative
	Clock edge	Rising edge, falling edge
	Data polarity	Positive, negative
	Bit sequence	MSB, LSB
	Channel type	Left and right channel, left channel, right channel
	Number of data bits per channel	2-64bit
	Number of channels per frame	4-32
	Number of clock bits per channel	4-32bit
	Bit delay	0-31bit
FlexRay decode (Option)	Source	C1-C4, R1-R4
	Signal type	BP, BM
	Signal rate	User-defined, 1Mbps, 5Mbps, 10Mbps
	Channel type	A, B
MIL-STD-1553 decode (Option)	Source	C1-C4, R1-R4
	Baud rate	1Mbps, 10Mbps, user-defined
	Polarity	Positive, negative
ARINC 429 decode (Option)	Source	C1-C4, R1-R4
	Signal rate	12.5kbps, 100kbps, user-defined
	polarity	Positive, negative
	Data format	19-bit, 21-bit, 23-bit
SMBUS decode (Option)	Source	C1~C4,R1~R4
	Signal	Data channel, Clock channel
	PEC enabled	YES, NO

PSI5 decode (Option)	Source	C1~C4，R1~R4
	Mode	Standard(125kbps)，Fast(189kbps)
	Frame Control	0-4bit
	Serial Messaging	OFF，ON
	Status	0，1，2
	Data A	10-24bit
	Data B	0-10bit
USB2.0 decode (Option)	Source	C1-C4，R1-R4
	Signal Type	Differential
	Speed	USB 2.0(480Mb/s)
NRZ decode (Option)	Source	C1-C4，R1-R4
	Bit Order	MSB，LSB
	Bit Rate	Custom (1bps - 2Gbps)
	Idle Level	Low，High
Ethernet (100Base-TX) decode (Option)	Source	C1-C4，R1-R4
	Signal Type	Single Ended，Differential
	Speed	100Mbps
Manchester decode (Option)	Source	C1-C4，R1-R4
	Polarity	Rise edge，Fall edge
	Start Index	1-8edge
	Tolerance	1-50%
	Idle bit	1.2-32bit
	Packet View	ON/OFF
	Sync Bits	0-32bit
	Parity	None，Odd，Even
	Bit Order	MSB，LSB
	Word Count	1-255

	Word Size	1-32bit
	Header	0-128bit
	Trailer	0-128bit
SPMI decode (Option)	Source	C1-C4，R1-R4
	Signal	SCLK，SDATA
	Version	1.0，2.0
8b/10b decode (Option)	Source	C1-C4，R1-R4
	Bit Rate	Custom (1-1Gbps)

Function/Arbitrary Waveform Generator (Option)	
Channels	2
Sample rate	625MSa/s
Vertical resolution	16-bit
Maximum frequency	60MHz
Maximum frequency	Sine, square, pulse, ramp, noise, DC
Operation mode	Continuous, modulation, sweep
Built-in Wave	
Sine wave	Frequency range: 1μHz to 60MHz
	Flatness: Typical value (sine waveform, 0dBm) ≤30MHz:± 0.5dB, ≤60MHz: ±0.8dB
	Harmonic distortion: -40dBc
	Spurious (Non-harmonic): -40dBc
	Total harmonic distortion: 1% (DC-20kHz, 1Vpp)
	SNR (Signal to Noise Ratio): 40dB
Square wave/Pulse	Frequency range: Square wave: 1μHz to 25MHz Pulse: 1μHz to 25MHz
	Rise/Fall time: <7ns

	Overshoot: <2% (1kHz, 1Vpp, 50Ω)	
	Duty cycle: 0.01% to 99.99% (adjustale)	
	Minimum pulse width: 20ns	
	Jitter: 2ns	
Ramp wave	Frequency range: 1μHz to 1MHz	
	Symmetry: 0.01% to 99.99%	
	Linearity: <1% of peak output (typical value: 1kHz, 1Vpp, symmetry 100%)	
Noise	Bandwidth: 60MHz (Typ.)	
Arbitrary wave	Frequency range: 100mHz to 5MHz	
	Type: Supports over 200 kinds of arbitrary waveforms, such as Sinc/ Exponential Rise/Fall/Cardiac/Gaussian/Lorentz/Haversine	
Modulation		
AM (Amplitude Modulation)	Carrier waveform	Sine, square, ramp, arbitrary waveforms
	Source	Internal
	Modulation waveform	Sine, square, ramp, noise, arbitrary waveforms
	Modulation frequency	2mHz to 200kHz
	Modulation depth	0%-120%
FM (Frequency Modulation)	Carrier waveform	Sine, square, ramp, arbitrary waveforms
	Source	Internal
	Modulation waveform	Sine, square, ramp, noise, arbitrary waveforms
	Modulation frequency	2mHz to 200kHz
	Frequency offset	DC to 30MHz
PM (Phase Modulation)	Carrier waveform	Sine, square, ramp, arbitrary waveforms
	Source	Internal
	Modulation waveform	Sine, square, ramp, noise, arbitrary waveforms
	Modulation frequency	2mHz to 200kHz

	Phase offset	0° to 360°
Sweep		
Sweep	Carrier wave	Sine, square, ramp, arbitrary waveforms
	Type	Linear, logarithmic
	Sweep time	1ms to 500s
	Trigger source	Internal, external, manual
Frequency Characteristics		
Signal frequency	Accuracy: ±0.5 ppm, 25°C Annual aging rate ± 1ppm temperature coefficient < ±0.5 ppm/°C	
	Resolution: 1μHz	
Output Characteristics		
Signal amplitude	Amplitude (50Ω)	≤30MHz: 10mVpp-3Vpp
		≤60MHz: 10mVpp-1.5Vpp
	Amplitude (High resistance)	≤30MHz: 20mVpp-6Vpp
		≤60MHz: 20mVpp-3Vpp
	Resolution: 1mV	
	Accuracy: Typical value (sine waveform of 1kHz, 0V offset, > 20mVpp) ± (2% of setting value + 2mVpp)	
DC offset	Range (Peak AC + DC)	±1.5V (50Ω)
		±3V (High resistance)
	Resolution: 1mV	
	Offset accuracy: ±2% of offset setting value ± 2%±2mV of amplitude setting value	
Waveform output	Impedance: 50Ω (Typ.) Protection: Overvoltage protection. The waveform output will be disabled when an overvoltage condition is detected, and a warning message will appear on the screen.	
Display		
Display	15.6-inch FHD touch screen	

Display resolution	1920*1080 (H*V)
Zoom	Supports horizontal and vertical zoom on all waveforms, with gesture control and interactive zooming functionality
Graticules	10 horizontal scale division × 8 vertical scale division
Brightness level	256
Display mode	Point, vector
Waveform color	User-defined
Persistence	Off, infinite

Host System	
CPU	Inter® core™ i5-8400H (2.5GHz, 64-bit)
Operating system	Windows 10 IoT Ent LTSC (64bit)
Memory	8GB
Hard disk (SSD)	128GB

Interface and Protocol	
High-definition audio/video output	One HDMI interface located on the rear panel
USB host	Five interfaces: two located on the front panel and three on the rear panel (TYPE-C×1, TYPE-A×2)
USB device	One USB device interface located on the rear panel
LAN port	One Ethernet interface (10/100/1000Mb/s) located on the rear panel
Probe compensator output	Square wave 1kHz, 3Vpp
10MHz reference clock Input/output	IN/OUT can be opened individually or simultaneously. IN: BNC connector on the rear panel. It provides a reference clock for the oscilloscope's sampling (3.3V CMOS, frequency 10MHz ±2ppm). OUT: BNC connector on the rear panel. It can output its own 10MHz reference clock, which is provided to other external instruments for inter-instrument clock synchronization (3.3V CMOS,

	square wave).
Aux output	BNC connector on the rear panel 3.3V CMOS 1. Trigger sync output 2. Pass the test result 3. AWG trigger output
Aux input	3.3V CMOS 1. Trigger synchronization input 2. External trigger input for AWG
EXT Trig	BNC connector located on the rear panel (Refer to the trigger section for relevant specifications)
Kensington Lock	Standard Kensington lock
Remote control	Built-in WebServer: Supports accessing the oscilloscope's web interface via IP address through a standard browser. Enables remote viewing of instrument status, network configuration, help and programming manuals, saving oscilloscope settings, exporting waveforms, capturing screenshots, and full remote control using keyboard and mouse
USBTMC	Standard USBTMC interface protocol
SCPI	Standard SCPI
Power Supply	
Power voltage	100V-240VAC (fluctuation ±10%) 50Hz, 60Hz 100V-120VAC (fluctuation ±10%) 400Hz
Power	Maximum 300W

Environmental Requirements	
Temperature range	Operating: 0°C to + 40°C Non-operating: -20°C to + 60°C
Humidity range	Operating: Below +35°C, relative humidity ≤90% Non-operating: +35°C to +40°C, relative humidity ≤60%
Altitude	Operating: Below 2000 meters Non-operating: Below 15000 meters
Specifications	

Dimension (W×H×D)	445mm×311.3mm×189.7mm	
Weight	＜12.5kg	
Installation	8U	
Safety Regulation		
Electromagnetic compatibility	Compliance with EMC directive (2014/30/EU), compliance with or better than IEC 61326-1:2021/ EN61326-1:2021, IEC 61326-2-1:2021/ EN61326-2-1:2021	
	CISPR11/EN 55011	Conducted disturbance CLASS B group1, 150 kHz-30 MHz
		Radiation disturbance CLASS B group 1, 30 MHz-1 GHz
	IEC 61000-4-2/EN 61000-4-2	Electrostatic discharge (ESD) 4.0 kV (contact), 8.0 kV (air)
	IEC 61000-4-3/EN 61000-4-3	Radio-frequency electromagnetic field immunity 0V/m (80 MHz to 1 GHz) 3V/m (1.4 GHz to 2 GHz) 1V/m (2.0 GHz to 2.7GHz)
	IEC 61000-4-4/EN 61000-4-4	Electrical fast transient (EFT) 2 kV (Input AC Power ports)
	IEC 61000-4-5/EN 61000-4-5	Surges 1 kV (live line to zero line) 2 kV (live/zero to ground)
	IEC 61000-4-6/EN 61000-4-6	Radio-frequency continuous conducted Immunity 3V, 0.15-80MHz
	IEC 61000-4-11/EN 61000-4-11	Voltage dips: 0% UT during 1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles Short interruption: 0% UT during 250/300 cycles
Safety specification	EN 61010-1:2010+A1:2019 EN IEC61010-2-030:2021+A11:2021 BS EN61010-1:2010+A1:2019 BS EN IEC61010-2-030:2021+A11:2021 UL 61010-1:2012 Ed.3+ R:19 Jul2019	

	UL 61010-2-030:2018 Ed.2 CSA C22.2#61010-1:2012 Ed.3+U1;U2;A1 CSA C22.2#61010-2-030:2018 Ed.2
Warranty and Calibration Service	
Calibration interval	1 year
Warranty period	1 year

Order Information

Product Model	
MSO8804HD	Bandwidth: 8GHz, maximum sample rate: 20GSa/s (half-channel: 20GSa/s, four-channel: 10GSa/s), 4-channel oscilloscope
MSO8604HD	Bandwidth: 6GHz, maximum sample rate: 20GSa/s (half-channel: 20GSa/s, four-channel: 10GSa/s), 4-channel oscilloscope
MSO8504HD	Bandwidth: 5GHz, maximum sample rate: 20GSa/s (half-channel: 20GSa/s, four-channel: 10GSa/s), 4-channel oscilloscope
Standard Accessories	
MSO8804HD/MSO8604HD/MSO8504HD	
UT-D30	USB3.0 data cable x 1
UT-L45	BNC-BNC straight-through cable x 2
UT-KJG12	SMA adapters BNC to SMA (50Ω) x 2
UT-JLC12	SMA cables, 12GHz, 1m x 2
UT-P6150	Passive low-impedance 1.5GHz probe x 2
--	Front-panel protective cover x 1
--	Region-specific power cord x 1
--	Calibration certificate
MSO8604HD/ MSO8504HD	
UT-P07	Passive high-impedance 500MHz probe x 4
Standard Software	
RS-232/422/485/UART	Embedded Serial Bus Triggering and Analysis (RS-232/422/485/UART)
SPI	Embedded Serial Bus Triggering and Analysis (SPI)
I2C	Embedded Serial Bus Triggering and Analysis (I2C)
CAN	Automotive Serial Bus Triggering and Analysis (CAN)
LIN	Automotive Serial Bus Triggering and Analysis (LIN)
Extreme-template testing	Extreme test, standard template test
Spectrum analyzer	Enhanced FFT

Digital voltmeter	4-digit, DC, AC RMS, DC AC RMS
Frequency meter	8-digit
Trigger software	Edge, Pulse Width, Slope, Video, Pattern, Timeout, Runout, Setup/Hold, N-Edge, Zone Triggers
WebServer	SCPI remote control, remote viewing and control, exporting waveform files, online browsing manuals
Advanced analysis	Statistical histograms, trend charts, tracking, zone histograms

Option

Option-Bandwidth Upgrade	
MSO8000HD-BW-5T6	MSO8000HD series upgrades from 5GHz to 6GHz bandwidth
Option-Memory Depth Upgrade	
MSO8000HD-MD2G	Expand the maximum memory depth of the oscilloscope to 1Gpts/CH (for all channels) and 2Gpts/CH (for half channels).
Option-Upgrade to 16-channel Logic Analyzer	
MSO8000HD-LA	16-channel logic analyzer
Option-Function/Arbitrary Waveform Generator	
MSO8000HD-AWG	Dual-channel 60MHz Arbitrary Waveform Generator
Option-Advanced Jitter Analysis and Eye Diagram	
MSO8000HD-JITTER	Advanced Jitter and Eye Diagram Analysis
Option-Advanced Power Analysis	
MSO8000HD-PWR	Advanced Power Analysis
Option-Protocol Trigger and Analysis	
MSO8000HD-CANFD	Automotive Serial Bus Trigger and Analysis Option (CAN-FD)
MSO8000HD-FLEX	Automotive Serial Bus Trigger and Analysis Option (FlexRay)
MSO8000HD-SENT	Automotive Sensor Bus Trigger and Analysis Option (SENT)
MSO8000HD-AUDIO	Audio Serial Bus Trigger and Analysis Option (I2S, LJ, RJ, TDM)
MSO8000HD-AERO	Aerospace Serial Bus Trigger and Analysis Option (MIL-STD-1553, ARINC 429)

MSO8000HD-SMBUS	Embedded Serial Bus Trigger and Analysis Option (SMBus)
MSO8000HD-SPMI	Power Management Serial Bus Trigger and Analysis Option (SPMI)
MSO8000HD-I3C	MIPI-I3C Bus Trigger and Analysis Option (I3C)
MSO8000HD-PSI5	Automotive Serial Bus Analysis Option (PSI5)
MSO8000HD-USB2	USB Bus Trigger and Analysis Option (USB 2.0)
MSO8000HD-PCIe2	PCIe Bus Trigger and Analysis Option (PCIe 1.0, 2.0)
MSO8000HD-NET	Ethernet Bus Analysis Option (10BASE-T, 100BASE-TX)
MSO8000HD-NRZ	NRZ Signal Analysis Option (NRZ)
MSO8000HD-MANCH	Manchester Signal Analysis Option
MSO8000HD-8B10B	8b/10b Signal Analysis Option (8B/10B)
Option-Advanced Filter Designer	
MSO8000HD-FILTER	Advanced Filter Designer
Option-Matlab Embedded Programming	
MSO8000HD-MAT	Matlab embedded programming Option allows users to create Matlab code to customize mathematical functions
Option- compliance tests	
MSO8000HD-CTS100	100BASE-Tx Ethernet compliance test Option
MSO8000HD-CTSUSB20	USB2.0 compliance test Option
MSO8000HD-CTS1000	1000BASE-T Ethernet compliance test Option
MSO8000HD-CTS100T1	100BASE-T1 compliance test Option
MSO8000HD-CTS1000T1	1000BASE-T1 compliance test Option
MSO8000HD-CTSDPHY12	MIPI D-PHY v1.2 compliance test Option
Upgrade Kit	
MSO8000HD-BND	Upgrade Kits (Advanced Jitter Analysis and Eye Diagram, Protocol Trigger and Analysis)
Probe	
UT-PA2000	Active single-end probe (2GHz; 10X)
UT-PA1000	Active single-end probe (1GHz; 10X)

UT-PD6000	Active differential probe (6GHz; 5X)
UT-PD4000	Active differential probe (4GHz; 5X)
UT-PD2500	Active differential probe (2.5GHz; 10X)
UT-PD1500	Active differential probe (1.5GHz; 10X)
UT-PR2060	Active power rail probe (1GHz; 1.25X)
UT-P6150	Passive low impedance probe (1.5GHz; 10X)
UT-P07A	Passive high impedance probe (1X: 8MHz; 10X: 500MHz)
UT-P20	Passive high voltage probe (100MHz; probe coefficient 100:1, 1.5kVrms)
UT-V23	Passive high voltage probe (100MHz; 2kVpp)
UT-P21	Passive high voltage probe (50MHz; maximum operating voltage DC 15kVrms)
UT-P40	Current probe (100kHz; 0.4A-60A)
UT-P41	Current probe (100kHz; 0.4A-100A)
UT-P42	Current probe (150kHz; 0.4A-200A)
UT-P43	Current probe (25MHz; maximum measurement current 20A)
UT-P44	Current probe (50MHz; maximum measurement current 40A)
UT-P4030D	Current probe (100MHz; maximum measurement current 30A)
UT-P4150	Current probe (12MHz; maximum measurement current 150A)
UT-P4500	Current probe (5MHz; maximum measurement current 500A)
UT-4100A	Current probe (600kHz; maximum measurement current 100A)
UT-4100B	Current probe (2MHz; maximum measurement current 100A)
UT-P30	High voltage differential probe (100MHz; ±800Vpp)
UT-P31	High voltage differential probe (100 MHz; ±800Vpp)
UT-P32	High voltage differential probe (100 MHz; ±1.5kVpp)
UT-P33	High voltage differential probe (50MHz; ±3kVpp)
UT-P35	High voltage differential probe (120MHz; ±14kVpp)
UT-P36	High voltage differential probe (50MHz; 5.6kV)

UT-M15	16-channel logic analyzer probe
Accessories	
UT-OA-1M	BNC type high impedance adapter 500MHz
UT-GBE-FT	100/1000M Industrial Ethernet Compliance test Fixture
UT-USB20-SQ-HD	USB2.0 Compliance test Fixture
Notes: Please order all hosts, accessories and Options from your local UNI-T distributor.	

Options Ordering and Installation

1. **Purchase options:** Based on your requirements, please purchase the specified function options from UNI-T Sales Personnel and provide the serial number of the instrument that needs the option installed.
2. **Receive certificate:** You will receive the license certificate based on the address provided in the order.
3. **Register and obtain license:** Visit the UNI-T official website license activation session for registration. Use the license key and instrument serial number provided in the certificate to obtain the option license code and license file.
4. **Install the option:** Download the option license file to the root directory of a USB storage device, and connect the USB storage device to the instrument. Once the USB storage device is recognized, the Option Install menu will be activated. Press this menu key to begin installing the option.

Limited Warranty and Liability

UNI-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination, or improper handling. If you need a warranty service within the warranty period, please contact your seller directly. UNI-T will not be responsible for any special, indirect, incidental, or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.

Learn more at: www.uni-trend.com

Register your product to confirmyour ownership. You will also get product notifications, update alerts, exclusive offers and all the latest information you need to know.

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