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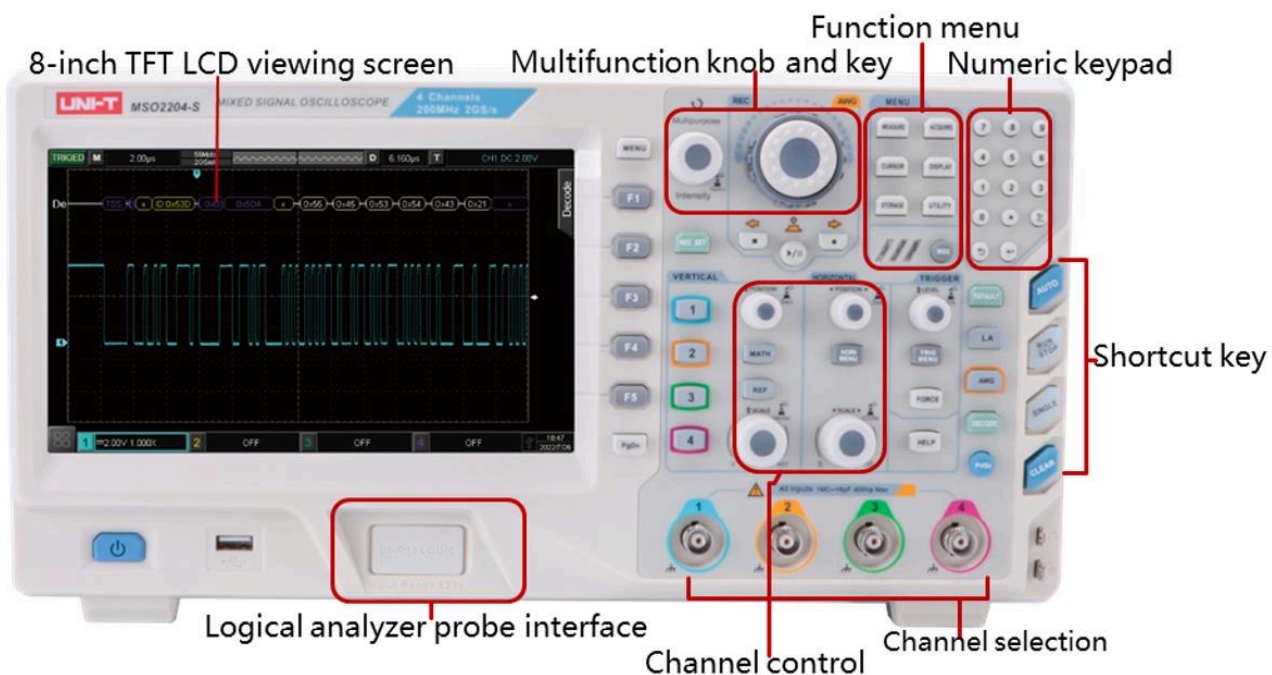
Datasheet

MSO/UP02000 Series Digital Oscilloscope

Main Features

- Analog channel bandwidth: 200MHz, 100MHz
- Real time sampling rate of analog channel 2GSa/s
- Real time sampling rate of digital channel 1GSa/s (only MSO)
- Number of analog channels: 2 or 4
- Storage depth of each channel: 56Mpts
- 16 digital channels, storage depth 56Mpts (only MSO)
- Waveform capture rate up to 1,000,000 wfms/s
- Built in 50MHz dual channel function / arbitrary waveform generator (only MSO-S). It supports real-time loading of oscilloscope screen data to AWG arbitrary wave output.
- Support Bode Plot loop test and analysis function
- Hardware real-time waveform uninterrupted recording and analysis up to 120,000 frames
- Waveform operation functions (+, -, ×, ÷, digital filtering, logic operation and advanced operation)
- 4M points enhanced FFT, supporting frequency setting, waterfall diagram, detection setting and mark measurement, etc.
- Auto measurement of 36 waveform parameters
- Multi-Scopes supports multi-channel independent trigger and fluorescent display
- Multi-channel independent 7-bit hardware frequency counter
- DVM supports multi-channel independent AC / DC true RMS measurement
- Rich trigger functions: edge, pulse, video, slope, runt, over amplitude pulse, delay, timeout, duration, setup/hold, Nth edge and pattern trigger
- Area trigger function, which can be used to capture accidental signals and observe complex signals
- Protocol trigger and decoding function (optional): RS232, I2C, SPI, CAN, CAN-FD, LIN, FlexRay
- Ultra Phosphor super fluorescent display effect, up to 256 levels of gray display
- 8-inch 800×480 capacitive touch, supporting various gesture operations: click, slide, zoom, edit, drag, etc.
- Rich interfaces: USB Host, USB Device, LAN, EXT Trig, AUX Out (Trig Out、Pass/Fail), AWG, VGA
- Support SCPI programmable instrument standard commands
- Support web access and control

Panel Structure

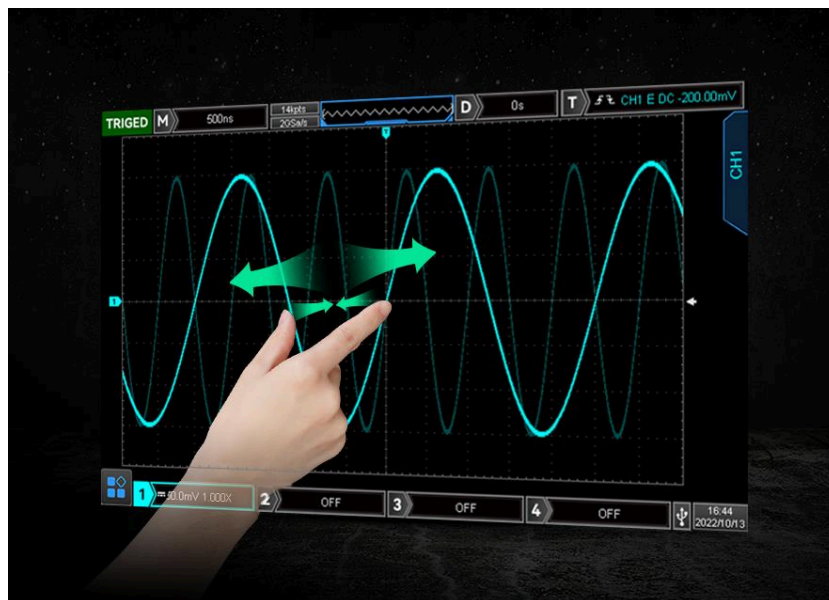


Product Introduction

The MSO/UPO2000 series digital phosphor oscilloscope is a multifunctional and high-performance oscilloscope based on UNI-T's original Ultra Phosphor technology. It realizes the combination of ease of use, excellent technical indicators and many functional features. It can help users complete the measurement work faster. It is an oscilloscope designed for general design / debugging / testing needs in many fields, such as communication, semiconductor, computer, instrumentation, industrial electronics, consumer electronics, automotive electronics, on-site maintenance, R & D / education, etc. Fast Acquire technology can accurately capture abnormal events such as video, jitter, noise and low wave signals.

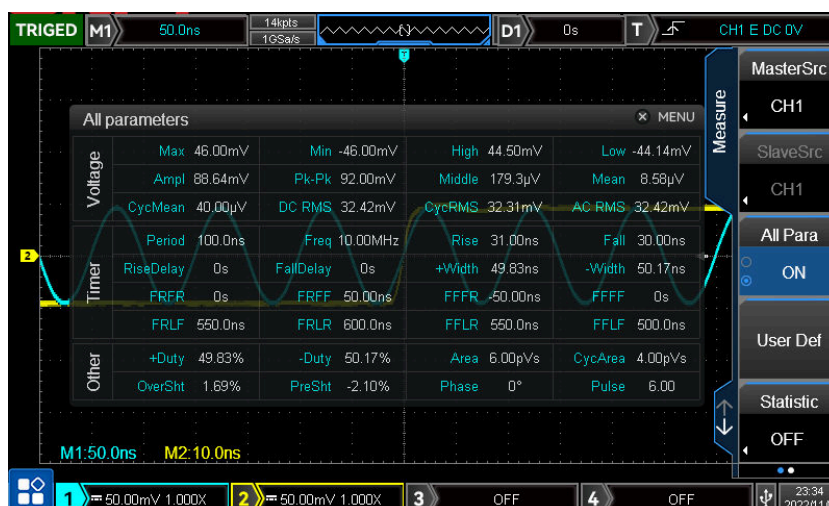
Brand new interactive experience

The 8-inch touch screen design supports a variety of gesture operations, such as click, slide, zoom, edit, drag, etc. Make the measurement action smoother and more convenient, and users can master it more quickly. At the same time, the traditional button and knob operation is still retained, and the interactive experience is optimized to the greatest extent.



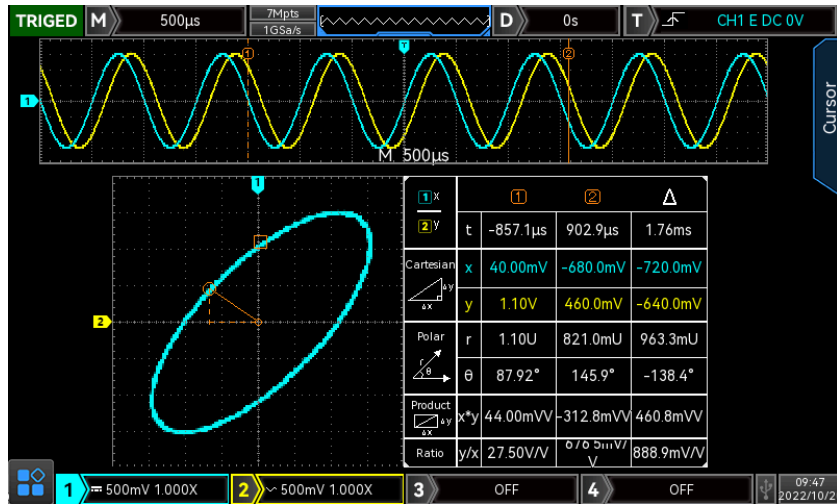
Rich measurement functions

Automatic parameter measurement up to 36 kinds. Provides a variety of automatic measurement parameters while you measure waveforms, greatly improving your measurement efficiency.



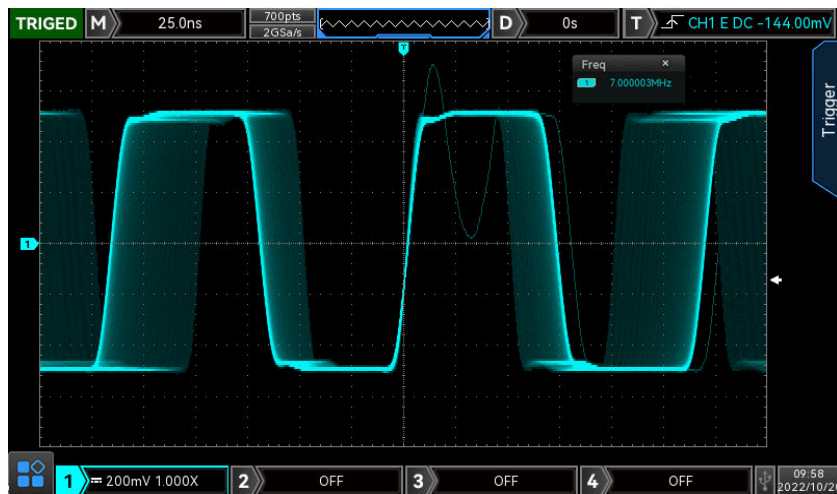
XY mode

XY mode cursor measurement can quickly measure the phase difference between two signals.



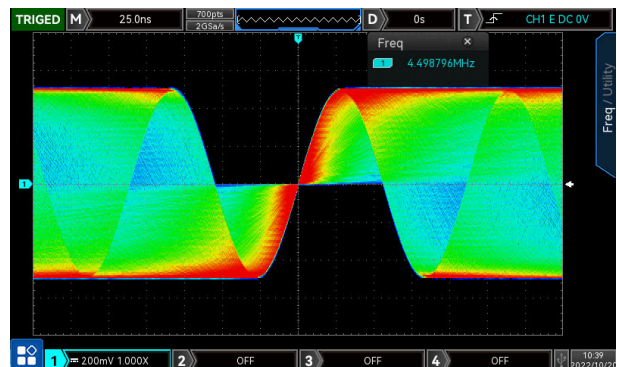
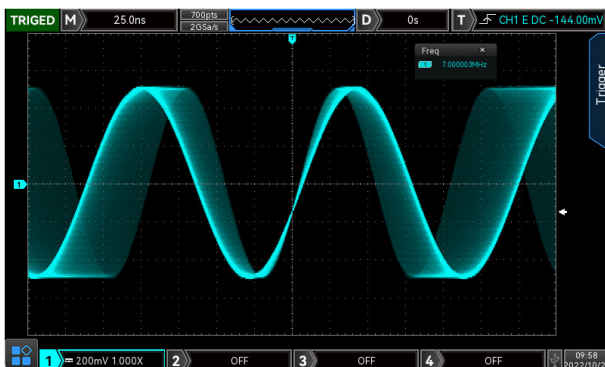
Ultra high capture rate

Using innovative digital signal parallel processing technology, it can reach an ultra-high capture rate of 200,000wfms/s in normal sampling and 1,000,000 wfms/s in Fast Acquire mode. Efficient capture of occasional signals.



256-level grayscale display

Using the original Ultra Phosphor display technology, you can observe the accumulated effect for a long time, which is convenient for displaying waveform details and occasional abnormalities.



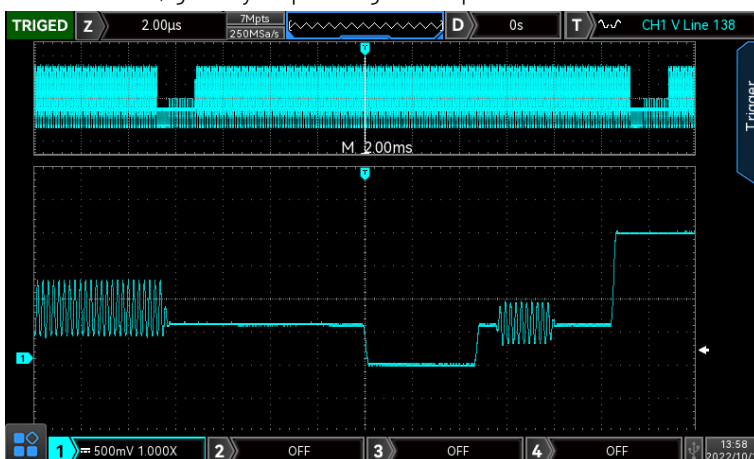
Channel split screen function

Using the original Multi-Scopes technology, the waveform display is more user-friendly, which is convenient for users to experience and analyze waveform details.



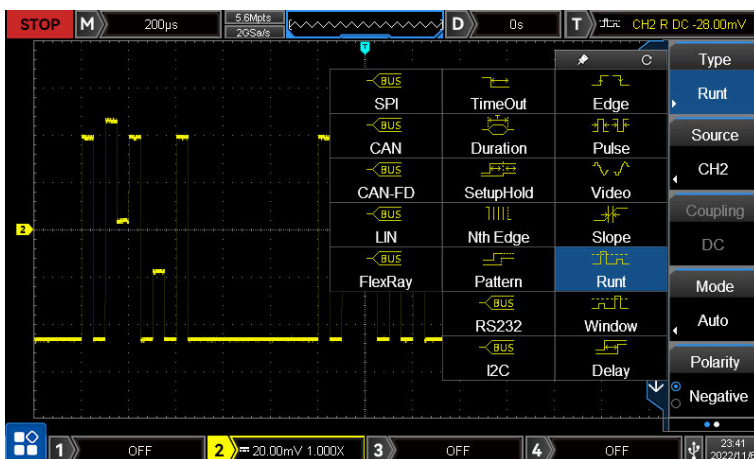
Memory depth 56Mpts per channel

The oscilloscope can maintain a high sampling rate in a wider time base range, while taking into account the overall and details of the waveform, greatly improving the capture rate of abnormal waveforms.



Rich trigger function

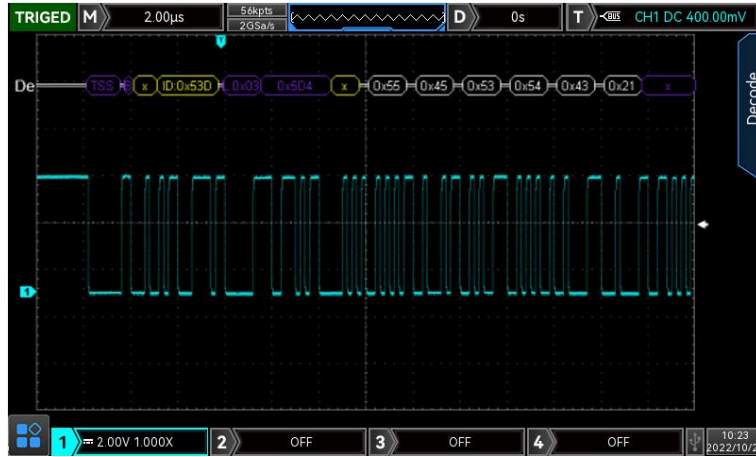
With a wealth of advanced trigger and bus trigger functions, it can help users accurately and quickly capture and display the signal of interest.



Full memory hardware decoding

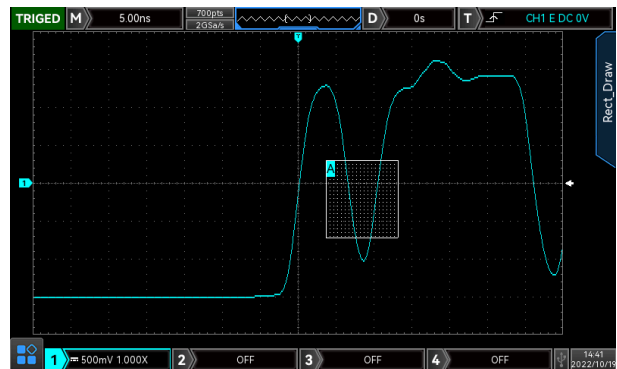
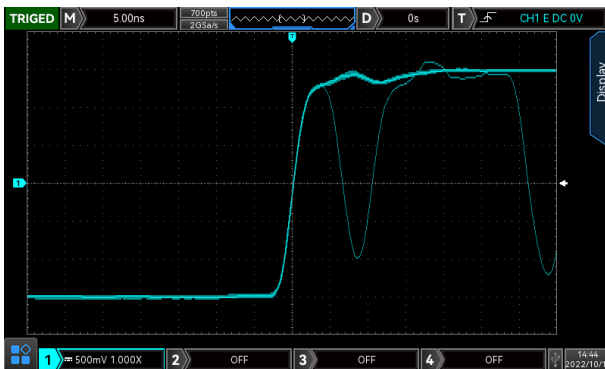
The decoding speed is greatly improved. The full-memory hardware decoding under the deep storage of 56Mpts, the decoding time is increased from more than ten seconds to milliseconds, which realizes real-time decoding and greatly improves the user's problem diagnosis efficiency.

The recorded waveform also supports full-memory hardware real-time decoding.



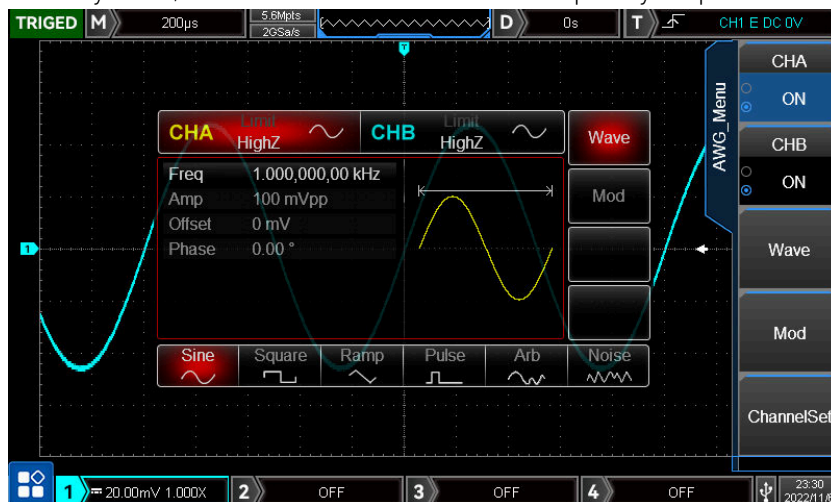
Area trigger

The area trigger can be used in combination with the existing basic trigger, advanced trigger and protocol trigger to complete the capture of various occasional and complex characteristic signals.



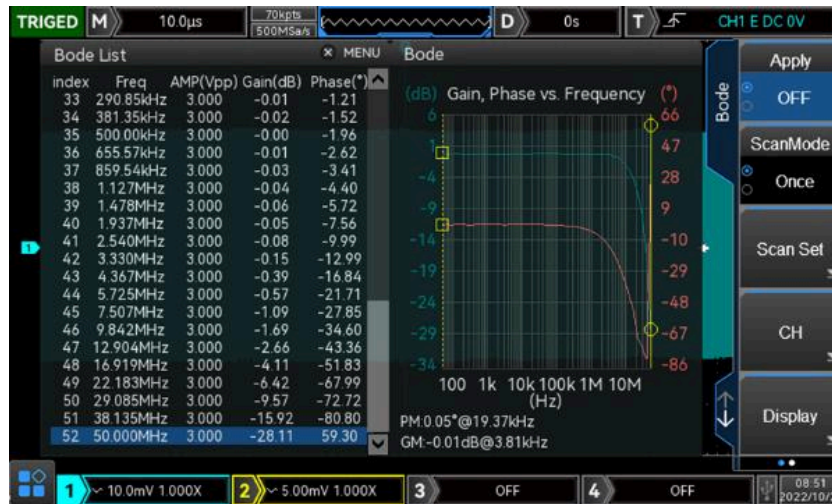
AWG Function Arbitrary Waveform Generator

The built-in dual-channel function arbitrary waveform generator can output sine wave, square wave, ramp wave, pulse wave, arbitrary wave, noise and DC. The maximum frequency output of sine wave is 50MHz.



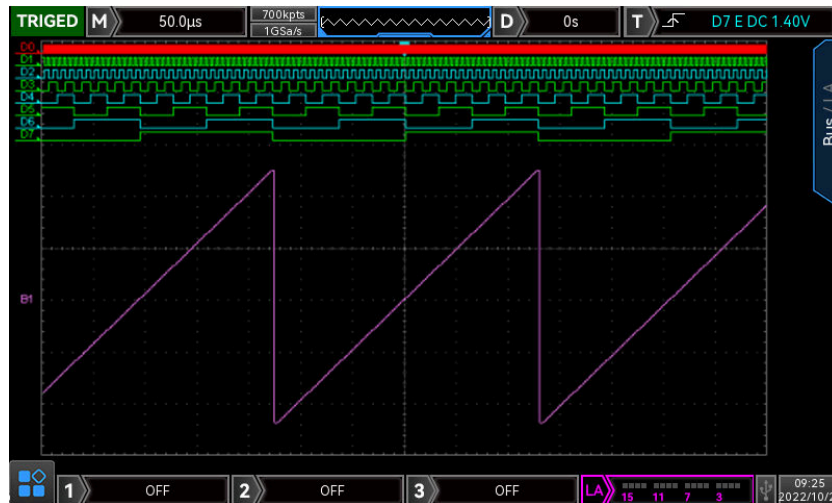
Bode plot

Can be used for loop analysis. It is a critical measurement often used to characterize the frequency response (gain, phase, and frequency) of today's various electronic designs, including passive filters, amplifier circuits, and negative feedback networks for switch-mode power supplies.



LA Logic Analyzer

Can be used for parallel bus, protocol decoding and timing measurements.



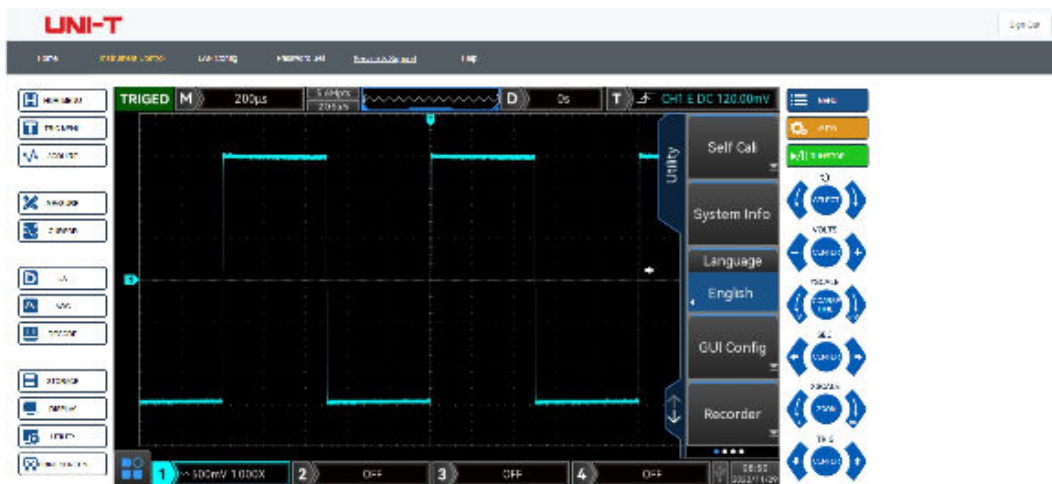
Logic Analysis Probe

Provides two 8-channel splitters and simplifies connection to the device under test. When connecting with square pins, UT-M15 can be directly connected with 8X2 square pin headers with pins of 2.54mm. The UT-M15 offers excellent electrical characteristics with an input impedance of 101kΩ and a capacitive load of only 9.0pF.



Web Control

The oscilloscope can be accessed through the web page, saving the trouble of installing the upper computer software. Support PC and mobile phone dual platform control. Remote operation is more flexible and comfortable.



Technical Parameter

All specifications are warranted except those marked "Typical".

Unless otherwise stated, all specifications are for probes with the attenuation switch set to 10× and the MSO/UPO2000 series digital phosphor oscilloscope. To meet these specifications, an oscilloscope must first meet the following two conditions:

- The instrument must run continuously for more than 30 minutes at the specified operating temperature.
- If the operating temperature variation range reaches or exceeds 5 degrees Celsius, you must open the system function menu and execute the self-calibration function.

| | | |
|--|---|--|
| Model | UPO2102 UPO2104 MSO2102 MSO2104 MSO2102-S MSO2104-S | UPO2202 UPO2204 MSO2202 MSO2204 MSO2202-S MSO2204-S |
| Analog Bandwidth(-3dB) | 100MHz | 200MHz |
| Rise time (Typical value) | ≤3.5ns | ≤1.8ns* |
| Channels | UPO 2XX2:2 analog channel, UPO 2XX4:4 analog channel MSO2xx2:2 analog channel +16 digital channel, MSO2XX4:4 analog channel +16 digital channel 16 digital channels (UPO2000-16LA is optional for UPO series) 2-channel arbitrary wave generator output (MSO-S series AWG optional activation software function is required) | |
| Sampling methods | real-time sampling | |
| Acquisition Mode | Sampling, peak detection, envelope, high resolution, averaging | |
| Real time sampling rate | Analog channel: 2GS/s(half channel interleaved), 1GS/s(all channel) Digital channel(MSO model only): 1GS/s; | |
| Average | After all channels are sampled for N times at the same time, the N times can be selected from 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, and 8192 | |
| Memory Depth | Analog channel: Automatic, 7kpts, 70kpts, 700kpts, 7Mpts, 28Mpts,56Mpts are optional Digital channel (MSO model only) : Automatic, 7kpts, 70kpts, 700kpts, 7Mpts, 14Mpts,28Mpts,56Mpts are optional | |
| Waveform capture rate | 200,000wfms/s 1,000,000wfms/s (Fast Acquire) | |
| Hardware real-time waveform recording and playback | 120,000 frames | |
| display | 8 inch 800x480 HD capacitive touch display | |

* The typical rise time of 200MHz oscilloscope is 2.0ns for 1mV/div and 2mV/div.

| Vertical system (analog channel) | |
|----------------------------------|--|
| Coupling | DC, AC, GND |
| Impedance | (1MΩ±2%) (16 pF±3 pF) |
| Probe attenuation | 0.001×, 0.01×, 0.1×, 1×, 10×, 100×, 1000×, Custom |
| Max. Input voltage (1MΩ) | 400V Max (DC+Vpeak) |
| Vertical Resolution | 8-bit |
| Vertical Scale | 500uV/div ~20V/div (1MΩ) |
| Offset Range | 500uV/div~50mV/div: ±2V (1MΩ) 100mV/div~500mV/div: ±20V (1MΩ) 1V/div~5V/div: ±200V (1MΩ) 10V/div~20V/div: ±400V (1MΩ) With DC offset, shows vertical shift reading V |
| Bandwidth Limit | 20 MHz |
| Low frequency response | (AC coupling, -3dB); ≤5 Hz (on BNC) |
| DC Gain Accuracy | <5mV: ±3%, ≥5mV: ±2% |
| DC Offset Accuracy | ± (2%+0.1div+2mV) |
| Unit | W, A, V, and U. The default value is V |
| Degree of channel isolation | Dc to maximum bandwidth: >40 dB |
| (Digital channel, MSO only) | |
| Threshold | Adjustable threshold for 8 channels 1 group |
| Threshold selection | TTL (1.4 V) 5.0 V CMOS (+2.5 V), 3.3 V CMOS (+1.65 V) 2.5 V CMOS (+1.25 V), 1.8 V CMOS (+0.9 V) ECL (-1.3 V) PECL (+3.7 V) LVDS (+1.2 V) 0 V Custom |
| Threshold value range | ±20.0V, 20 mV step |
| Threshold accuracy | ±(100 mV + 3% threshold setting) |
| Dynamic range | ±10 V + threshold |
| Maximum input voltage | CAT I 40Vrms |
| Input impedance | (101 kΩ±1%) (9 pF ± 1 pF) |
| Minimum voltage swing | 500 mVpp |
| Minimum detectable pulse width | 2ns |
| Vertical resolution | 1bit |
| Inter-channel delay | ±100ns |

| Horizontal system (analog channel) | |
|------------------------------------|--|
| Timebase Scale | 1 ns/div to 1000 s/div (Display current sampling rate and storage depth) |
| Timebase Accuracy | $\leq \pm (50 + 2 \times \text{Use fixed number of year})$ ppm |
| Scope of delay | Pre-trigger (negative delay): ≥ 1 screen width Post-trigger (positive delay): 1 s to 10 s |
| Display Format | Y-T, default |
| | X-Y, CH1-CH2, CH1-CH3, CH1-CH4, CH2-CH3, CH2-CH4, CH3-CH4 |
| | Roll, Time base ≥ 50 ms/div. Roll mode can be automatically entered or exited by adjusting the horizontal time base knob |
| Multi-Scopes | Number: 2/4 Support each channel independent display, and independently adjustable time base |
| Trigger | |
| Trigger Level | Internal: ± 5 div from the center of the screen EXT: ± 1.8 V EXT/5: ± 9 V |
| Trigger Mode | Auto, Normal, Single |
| Holdoff Range | 80 ns -10 s |
| Coupling Frequency Response | DC: Passes all components of the signal |
| | AC: The direct current component that blocks the input signal |
| | HFRJ: Attenuates the high-frequency components above 40kHz |
| | LFRJ: Blocks the DC component and attenuates the low-frequency components below 40kHz |
| | Noise suppression: The high frequency noise in the signal is suppressed to reduce the probability of oscilloscope being triggered by mistake |
| Edge Trigger | |
| Slope | Rise, Fall, Any |
| Source | CH1~CH4/AC Line /EXT/D0~D15 |
| Runt Trigger | |
| Pulse width conditions | $>$ 、 $<$ 、 \leq , none |
| Polarity | Positive, Negative |
| Time Range | 8 ns -10 s |
| Source | CH1~CH4 |
| Window trigger | |
| Type | Rise, Fall, Any |
| Trigger position | Enter, Exit, Time |
| Time | 8 ns to 10 s |
| Source | CH1~CH4 |
| Nth Edge trigger | |
| Slope | Rise, Fall |
| Free time | 8 ns to 10 s |
| Edge number | 1 to 65535 |
| Source | CH1~CH4 or D0~D15 |

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|-----------------------------|--|
| Delay trigger | |
| Slope | Rise、Fall |
| Delayed type | >、<、 \leq 、>< |
| Delayed time | 8 ns to 10 s |
| Source | CH1~CH4 or D0~D15 |
| Time out trigger | |
| Slope | Rise、Fall、 Any |
| Time out | 8 ns to 10 s |
| Source | CH1~CH4 or D0~D15 |
| Duration trigger | |
| Type set | H、L、X |
| Trigger condition | >、<、 \leq |
| Duration | 8 ns to 10 s |
| Source | CH1~CH4 or D0~D15 |
| Setup Hold trigger | |
| Edge type | Rise、Fall |
| Data type | H、L |
| Setup time | 4 ns to 10 s |
| Hold time | 4 ns to 10 s |
| Source | CH1~CH4 or D0~D15 |
| Pulse Trigger | |
| Pulse conditions | +wid (>、<、 \leq) -wid (>、<、 \leq) |
| Pulse width | 1 ns to 4 s |
| Source | CH1~CH4、AC Line、EXT or D0~D15 |
| Slope Trigger | |
| Conditions of the slope | Positive slope (greater than, less than, within the specified interval) Negative slope (greater than, less than, within a specified interval) |
| Time set | 8 ns to 1 s |
| Source | CH1~CH4 |
| Video Trigger | |
| Signal Standard | Support standard NTSC, PAL, and SECAM broadcast systems with lines ranging from 1 to 525(NTSC) and 1 to 625(PAL/SECAM) |
| Source | CH1~CH4 |
| Pattern Trigger | |
| Pattern Setting | H、L、X、Rising edge, falling edge |
| Source | CH1~CH4/D0~D15 |
| RS232 / UART trigger | |
| trigger condition | Frame start, error frame, check error, data |
| Baud rate | 2400bps、4800bps、9600bps、19200bps、38400bps、57600bps、115200bps、Custom |
| Data bits wide | 5 bit、6 bit、7 bit、8 bit |
| Source | CH1~CH4 or D0~D15 |
| I2C Trigger | |

| | |
|-------------------------|--|
| Condition | Start, Restart, Stop, loss confirmation, address, data, address data |
| Address bits wide | 7 bit、10 bit |
| Address range | 0 to 119、0 to 1023 |
| bytes | 1 to 5 |
| Data qualifier | =、>、< |
| Source | CH1~CH4 or D0~D15 |
| SPI Trigger | |
| Condition | Film selection, free time |
| timeout | 100 ns to 1 s |
| Data bits | 4 bit to 32 bit |
| The data set | H、L、X |
| The edge of the clock | Rise、Fall |
| Source | CH1~CH4 or D0~D15 |
| CAN trigger | |
| Signal types | CAN_H、CAN_L |
| Condition | Frame beginning, DATA frame, REMOTE frame, ERROR frame, OVERLOAD frame, Identifier, Data, ID and Data, Frame end, loss acknowledgement, for padding error |
| Signal rate | 10kbps、20kbps、31.25 kbps、33.3kbps、37kbps、50kbps、62.5kbps、68.266kbps、83.3kbps、92.238kbps、100kbps、125kbps、153kbps、250kbps、400kbps、500kbps、800kbps、1Mbps、Custom |
| Source | CH1~CH4 or D0~D15 |
| CAN - FD trigger | |
| Signal types | CAN_H、CAN_L |
| Condition | Frame beginning, DATA frame, REMOTE frame, ERROR frame, OVERLOAD frame, Identifier, Data, ID and Data, Frame end, loss acknowledgement, for padding error |
| Baud Rate | 10kbps、20kbps、31.25 kbps、33.3kbps、37kbps、50kbps、62.5kbps、68.266kbps、83.3kbps、92.238kbps、100kbps、125kbps、153kbps、250kbps、400kbps、500kbps、800kbps、1Mbps、Custom |
| FD bit rate | 250kbps、500kbps、800kbps、1Mbps、1.5Mbps、2Mbps、4Mbps、6Mbps、8Mbps、Custom |
| Source | CH1~CH4 or D0~D15 |
| LIN trigger | |
| Condition | Synchronization, identifiers, Data, ID and data, wake frame, sleep frame, Error |
| speed signal | V1、V2、Both |
| Baud Rate | 2.4kbps、4.8kbps、9.6kbps、19.2kbps、Custom |
| Data Length | 1~8 |
| Source | CH1~CH4 or D0~D15 |
| FlexRay trigger | |
| trigger condition | Frame beginning, indicator, identifier, loop number, Header field, Data, ID and data, frame end, Error |
| polarity | BM、BDiff or BP |

| | |
|--------------------------------|--|
| Bit rate | 2.5Mbps、5Mbps、10Mbps |
| Source | CH1~CH4 or D0~D15 |
| Decode | |
| Decoding the number | One serial, two parallel |
| Decoding type | RS232/UART、I ² C、SPI、CAN、CAN-FD、LIN、FlexRay |
| parallel | Up to 18-bit parallel bus decoding, support analog channel and digital channel combination. Supports custom clock Settings. |
| Source | CH1~CH4 or D0~D15 |
| Measure | |
| cursor | Voltage difference between cursors (ΔV) |
| | Time difference between cursors (ΔT) |
| | Inverse of ΔT (Hz) ($1/\Delta T$) |
| | The voltage value and time value of the waveform point |
| | Allows the cursor to be displayed during automatic measurements |
| Automatic measurement | Analog channel: Max,Min,High,Low,Ampl,Pk-Pk,Middle,Mean,Cycmean,RMS,CycRMS,AC RMS,Period,Freq,Rise,Fall,RiseDelay,FallDelay,+Width,-Width,FRFR,FRFF,FFFR,FFFF,FRLF,FRLR,FFLR,FFLF,+Duty,-Duty,Area,CycArea,Oversht,Presht,Phase,Pulse, a total of 36 measurement parameters; Digital channel: Freq,period,+Width,-Width,+Duty,-Duty,RiseDelay A→B,FallDelay A→B,phase A→B,phase B→A |
| Number of measurements | 5 measurements are displayed simultaneously |
| Measuring range | Screen or cursor |
| XY measurement | Support time, Cartesian coordinates, polar coordinates, product and proportion display |
| Measurement statistics | Mean, maximum, minimum, standard deviation and number of measurements |
| Frequency meter | 7-bit hardware frequency meter |
| Mathematical operations | |
| Waveform calculation | A+B、A-B、A×B、A/B、FFT、Can edit advanced operation, logic operation |
| FFT window type | Rectangle、Hanning、Blackman、Hamming |
| FFT display | Split screen,Full screen;The time base is independently adjustable |
| FFT vertical scale | Vrms、dBVrms |
| FFT | Display mode: full screen, split screen and waterfall |
| | Spectrum range Settings: start frequency, end frequency, center frequency, sweep width |
| | Detection mode: Normal, average, maximum hold, minimum hold |
| | Tags: Tag type, tag trace, tag maximum number of points, event list |
| Digital filtering | Low pass, high pass, band pass, band stop |
| Logical operations | and, or, not, xor |
| Advanced computing | 0,1,2,3,4,5,6,7,8,9,(,+, -, *, /, ^, >, <, &&, , ==, !=,) |

| | |
|---|--|
| Mathematical function | Sin, Cos, Sinc, Tan, Sqrt, Exp, Lg, In, Floor, ABS, Acos, Asin, Atan, Sinh, Tanh, Ceil, Cosh, Fabs |
| Storage | |
| Setting | Internal (256 groups), external USB memory |
| Waveform | Internal (256 groups), external USB memory |
| Bitmap | External USB memory, and can store related parameter information. |
| Signal source (MSOXXXX-S model only) | |
| Channel | 2 |
| Sampling Rate | 250MS/s |
| Vertical Resolution | 16 bits |
| Max. Output Frequency | 50 MHz |
| Waveforms | Sine wave, square wave, ramp wave, pulse wave, noise, DC, arbitrary wave |
| Built-in waveform | Sinc, exponential rise, exponential fall, electrocardiogram, Gauss, Lorentz, semi-orthogonality |
| Sine | Frequency: 1 μ Hz to 50 MHz |
| | Amplitude Flatness: ± 0.5 dB (Relative to 1 kHz) |
| | Harmonic Distortion(typical): -40 dBc |
| | Spurious (non-harmonic)(typical): -40 dBc |
| | Total Harmonic Distortion (typical): 1% (DC~20kHz, 1Vpp) |
| Square/pulse | Spurious (non-harmonic): 40 dB |
| | Frequency range: Square wave: 1 μ Hz to 15 MHz; Pulse: 1 μ Hz to 15 MHz |
| | Rise and fall time: <13 ns (Typical values 1kHz, 1Vpp, 50 Ω) |
| | overshoot: Typical values 2% (1kHz, 1Vpp, 50 Ω) |
| | Duty ratio: Square wave: 1% to 99%, adjustable; Pulse: 1% to 99%, adjustable |
| | Duty cycle resolution: 1% or 10 ns (whichever is larger) |
| | The minimum pulse width: 20 ns |
| Pulse width resolution: 10 ns | |
| ramp wave | jitter: 2ns |
| | Frequency range: 1 μ Hz to 400 kHz |
| | linearity: 1% |
| noise | bandwidth: 50 MHz (Typical values) |
| | symmetry: 0.1%-99.9% |
| Built-in wave | Frequency range: 1 μ Hz to 5MHz |
| Arbitrary wave | Frequency range: 1 μ Hz to 5MHz |
| | wave length: 8 to 512K points (Play mode) |
| | Internal storage location: 10 |
| Frequency | Accuracy: 100 ppm (less than 10 kHz); 50 ppm (greater than 10 kHz) |
| | Resolution : 1 μ Hz |
| Amplitude | Output range: 20 mVpp to 6 Vpp (high resistance); 10 mVpp to 3 Vpp (50 Ω) |
| | Resolution: 1mV |
| | Accuracy: $\pm 5\%$ |
| DC offset | Accuracy: 2% (1 kHz) |
| | Range: ± 3 V (high resistance); ± 1.5 V (50 Ω) |
| | Resolution: 1mV |

| | |
|---|---|
| | Accuracy: Offset setting value $\pm 5\%$ |
| AM modulation | |
| Carrier | Sine, square wave, oblique wave, arbitrary wave |
| Source | internal |
| Modulation wave | Sine, square wave, ascending oblique wave, ascending oblique wave, noise, arbitrary wave |
| Modulation frequency | 2mHz~50kHz |
| Modulation depth | 0%~120% |
| FM modulation | |
| carrier | Sine, square wave, oblique wave, arbitrary wave |
| Source | internal |
| modulation wave | Sine, square wave, ascending oblique wave, ascending oblique wave, noise, arbitrary wave |
| Modulation frequency | 2mHz~50kHz |
| deviation | 12.5MHz(max) |
| Display | |
| Display type | 8-inch TFT LCD |
| Resolution of display | 800 horizontal \times RGB \times 480 vertical pixels |
| display color | 24 - bit true colors |
| persistence | Minimum value, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s, 20s, infinite |
| Menu Hold | Hold time: 5S, 10s, 20S, infinite |
| Display type | Point, vector |
| Real time clock | Time and date (user adjustable) |
| Bode | |
| Start frequency | 50 Hz~50 MHz |
| Stop frequency | 60 Hz~50 MHz |
| Points | 1~1000 |
| Output amplitude | High resistance: 20 mVpp to 6 Vpp 50 Ω : 10 mVpp to 3 Vpp |
| interface | |
| Standard or optional | USB-host, USB-Device, LAN, EXT Trig, AUX Out(Trig Out\Pass/Fail) output, signal source output interface (only MSO-S model), VGA |
| General technical specifications | |
| Probe compensator output | |
| output voltage | About 3Vp-p |
| frequency | 10Hz, 100Hz, 1kHz(default), 10kHz |
| Power supply | |
| power supply voltage | 100V~240VACrms (Fluctuations $\pm 10\%$), 50Hz/60Hz |
| power | 100VA |
| Fuse | 2.5A, F class, 250V |
| Environment | |
| Temperature range | Operation: 0°C~+40°C |

| | | | |
|---|---|------------------------------|---|
| | Not operation: -20°C ~ +70°C | | |
| Cooling method | Forced fan cooling | | |
| Humidity range | Operation: +35°C ≤ 90% relative humidity; No operation: +35 °C to +40 °C ≤ 60% relative humidity | | |
| altitude | Operation: below 3000 meters; Non-operational: up to 15,000 m | | |
| Pollution degree | 2 | | |
| Operating environment | Indoor use | | |
| Mechanical specifications | | | |
| size(W×H×D) | 370mm×185mm×115mm | | |
| weight | 4.5 kg | | |
| Adjust the interval | | | |
| The calibration interval is recommended | 1 year | | |
| Standard | | | |
| Electromagnetic compatibility | Comply with EMC Directive (2014/30/EU), comply with or better than IEC 61326-1:2021/EN61326-1:2021, IEC 61326-2-1:2021/EN61326-2-1:2021 | | |
| | Conduction disturbance | CISPR 11/EN 55011 | CLASS B group 1, 150kHz-30MHz |
| | Radiated disturbance | CISPR 11/EN 55011 | CLASS B group 1, 30MHz-1GHz |
| | Electrostatic discharge(ESD) | IEC 61000-4-2/EN 61000-4-2 | 4.0 kV (contact) , 8.0 kV (air) |
| | Radio-frequency electromagnetic field Immunity | IEC 61000-4-3/EN 61000-4-3 | 0V/m (80 MHz to 1 GHz) ; 3V/m (1.4 GHz to 2 GHz) ; 1V/m (2.0 GHz to 2.7GHz) |
| | Electrical fast transients(EFT) | IEC 61000-4-4/EN 61000-4-4 | 2kV(Input AC Power Ports) |
| | Surges | IEC 61000-4-5/EN 61000-4-5 | 1kV(Line to line) 2kV(Line to ground) |
| | Radio-frequency continuous conducted Immunity | IEC 61000-4-6/EN 61000-4-6 | 3V,0.15-80MHz |
| | Voltage dips and interruptions | 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 | 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 | | |



*The MSO/UPO2000 series have been certified by CE, UKCA, cETLus.

Order information







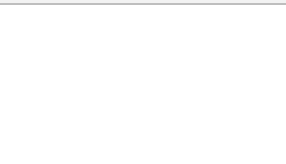
| | Description | Standard Quantity per Carton | Order No. |
|----------------------|---|------------------------------|-----------|
| Model | MSO2204-S (200MHz,2GSa/s,4CH+16 digital, AWG) | 1 | MSO2204-S |
| | MSO2104-S (100MHz,2GSa/s,4CH+16 digital, AWG) | 1 | MSO2104-S |
| | MSO2202-S (200MHz,2GSa/s,2CH+16 digital, AWG) | 1 | MSO2202-S |
| | MSO2102-S (200MHz,2GSa/s,2CH+16 digital, AWG) | 1 | MSO2102-S |
| | MSO2204 (200MHz,2GSa/s,4CH+16 digital) | 1 | MSO2204 |
| | MSO2104 (100MHz,2GSa/s,4CH+16 digital) | 1 | MSO2104 |
| | MSO2202 (200MHz,2GSa/s,2CH+16 digital) | 1 | MSO2202 |
| | MSO2102 (100MHz,2GSa/s,2CH+16 digital) | 1 | MSO2102 |
| | UPO2204 (200MHz,2GSa/s,4CH) | 1 | UPO2204 |
| | UPO2104 (100MHz,2GSa/s,4CH) | 1 | UPO2104 |
| | UPO2202 (200MHz,2GSa/s,2CH) | 1 | UPO2202 |
| | UPO2102 (100MHz,2GSa/s,2CH) | 1 | UPO2102 |
| Standard accessories | Power cord that conforms to the standard of the destination country | 1 | -- |
| | USB data cable | 1 | -- |






| | | | |
|-----------------------------|---|--|--|
| | BNC-BNC straight-through cable (only MSO-S) | 1 | UT-L45 |
| | BNC-red and black alligator clip cable (only MSO-S) | 1 | UT-L02A |
| | Passive probe (200MHz/100MHz) | 2/4 | UT-P05/UT-P04 |
| | Logic analyzer probe (only MSO) | 1 | UT-M15 |
| Optional accessories | Serial bus trigger and decode options (MSO/UPO2000-EMBD&MSO/UPO2000-AUTO) | -- | MSO/UPO2000-BND |
| | Serial bus trigger and decode options (includes RS232, UART, I2C, SPI) | -- | MSO/UPO2000-EMBD |
| | RS232/UART trigger and decode options | -- | MSO/UPO2000 -COM |
| | I2C trigger and decode options | -- | MSO/UPO2000 -I2C |
| | SPI trigger and decode options | -- | MSO/UPO2000 -SPI |
| | Automotive serial bus triggering and decoding options (CAN, CAN-FD, LIN, FlexRay) | -- | MSO/UPO2000-AUTO |
| | CAN trigger/decode option | -- | MSO/UPO2000-CAN |
| | CAN-FD trigger/decode option | -- | MSO/UPO2000-CAN-FD |
| | LIN trigger/decode option | -- | MSO/UPO2000-LIN |
| | FlexRay trigger/decode option | -- | MSO/UPO2000-FlexRay |
| | Bode plot loop test analysis (software) | -- | MSO-BODE |
| | Isolation transformer | | UT-ISOT |
| | 16 digital channels option (software) | -- | UPO2000-16LA |
| | High voltage probe | -- | UT-V23, UT-P21 |
| | High-Voltage Differential Probes | -- | UT-P30, UT-P31, UT-P32, UT-P33, UT-P35, UT-P36 |
| Current Probe | -- | UT-P40, UT-P41, UT-P42, UT-P43, UT-P44 | |
| 16-way logic analyzer probe | -- | UT-M15 | |




Note: All mainframes, accessories and options can be ordered from your local UNI-T dealer.

UNI-T oscilloscope probes and accessories supported by MSO/UPO2000 series




Passive probe




| Model | Type | Description |
|---|----------------------|---|
| UT-P01  | High impedance probe | 1X:DC ~ 8MHz 10X:DC ~ 25MHz Oscilloscope compatibility: UNI-T all series |
| UT-P03  | | |
| UT-P04  | High impedance probe | 1X:DC ~ 8MHz 10X:DC ~ 100MHz Oscilloscope compatibility: UNI-T all series |
| UT-P05  | | |
| UT-P06  | High impedance probe | 1X:DC ~ 8MHz 10X:DC ~ 300MHz Oscilloscope compatibility: UNI-T all series |
| UT-P07  | | |
| UT-P08  | High | 1X:DC ~ 8MHz |

| | | |
|---|-----------------------------|---|
|  | <p>impedance probe</p> | <p>10X:DC ~ 350MHz Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P20</p> | <p>High impedance probe</p> | <p>DC ~ 100MHz Probe coefficient 100:1 Maximum operating voltage 1500Vrms Oscilloscope compatibility: UNI-T all series</p> |
|  | <p>High voltage probe</p> | <p>DC ~ 100MHz Probe coefficient 100:1 Input resistance 100MΩ±2% Maximum operating voltage 2000Vpp Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-V23</p> | <p>High voltage probe</p> | <p>DC ~ 50MHz Probe coefficient 1000:1 Maximum operating voltage DC 15kVrms, AC 10kV(sine wave) Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P21</p> | <p>Current probe</p> | <p>DC ~ 100kHz Range 50mV/A, 5mV/A Current range 0.4A ~ 60A Maximum operating voltage 600Vrms Oscilloscope compatibility: UNI-T all series</p> |
|  | <p>Current probe</p> | <p>DC ~ 100kHz Range 100mV/A, 10mV/A Current range 0.4A ~ 100A Maximum operating voltage 600Vrms Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P40</p> | <p>Current probe</p> | <p>DC ~ 150kHz</p> |
|  | <p>Current probe</p> | <p>DC ~ 150kHz</p> |
| <p>UT-P41</p> | <p>Current probe</p> | <p>DC ~ 150kHz</p> |
|  | <p>Current probe</p> | <p>DC ~ 150kHz</p> |
| <p>UT-P42</p> | <p>Current probe</p> | <p>DC ~ 150kHz</p> |

| | | |
|---|----------------------|---|
|  | | <p>Range 100mV/A, 10mV/A Current range 0.4A ~ 200A Maximum operating voltage 600Vrms Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P43</p>  | <p>Current probe</p> | <p>DC ~ 25MHz Range 100mV/A Maximum measurement current 20A Rise time 14ns Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P44</p>  | <p>Current probe</p> | <p>DC ~ 50MHz Range 50mV/A Maximum measurement current 40A Rise time 7ns Oscilloscope compatibility: UNI-T all series</p> |

Active probe

| Model | Type | Description |
|---|---|---|
| <p>UT-P30</p>  | <p>High-Voltage Differential Probes</p> | <p>DC ~ 100MHz Attenuation ratio 100:1,10:1 Input differential voltage ±800Vpp Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P31</p>  | <p>High-Voltage Differential Probes</p> | <p>DC ~ 100MHz Attenuation ratio 1000:1,100:1 Input differential voltage ±1.5kVpp Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P32</p>  | <p>High-Voltage Differential Probes</p> | <p>DC ~ 50MHz Attenuation ratio 1000:1,100:1 Input differential voltage ±3kVpp Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P33</p> | <p>High-Voltage</p> | <p>DC ~ 120MHz</p> |

| | | |
|--|---|--|
|  | <p>Differential Probes</p> | <p>Attenuation ratio 100:1,10:1 Input differential voltage $\pm 14\text{kVpp}$ Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P35</p>  | <p>High-Voltage Differential Probes</p> | <p>DC ~ 50MHz Attenuation ratio 500:1,50:1 Rise time 7ns Accuracy 2% Input differential mode voltage 1/50:130(DC+peakAC) 1/500:1300(DC+peakAC) Input common mode voltage 100Vrms, CATI 600Vrms, CATII Oscilloscope compatibility: UNI-T all series</p> |
| <p>UT-P36</p>  | <p>High-Voltage Differential Probes</p> | <p>DC ~ 50MHz Attenuation ratio 2000:1,200:1 Rise time 3.5ns Accuracy 2% Input differential mode voltage 1/200:560(DC+peakAC) 1/2000:5600(DC+peakAC) Input common mode voltage 2800Vrms, CATI 1400Vrms, CATII Oscilloscope compatibility: UNI-T all series</p> |

| Accessory | Standard |
|----------------------|-------------------------------------|
| National power cable | 1 |
| USB line | 1 |
| Passive probe | 1 set (2, apply to 2 channel model) |

Warranty

Three-years warranty, excluding probes and accessories. Please visit https://instruments.uni-trend.com/list_190/65.html to learn more information. To protect your investment, please purchase from UNI-T official authorized global distributors.

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