

Data Sheet

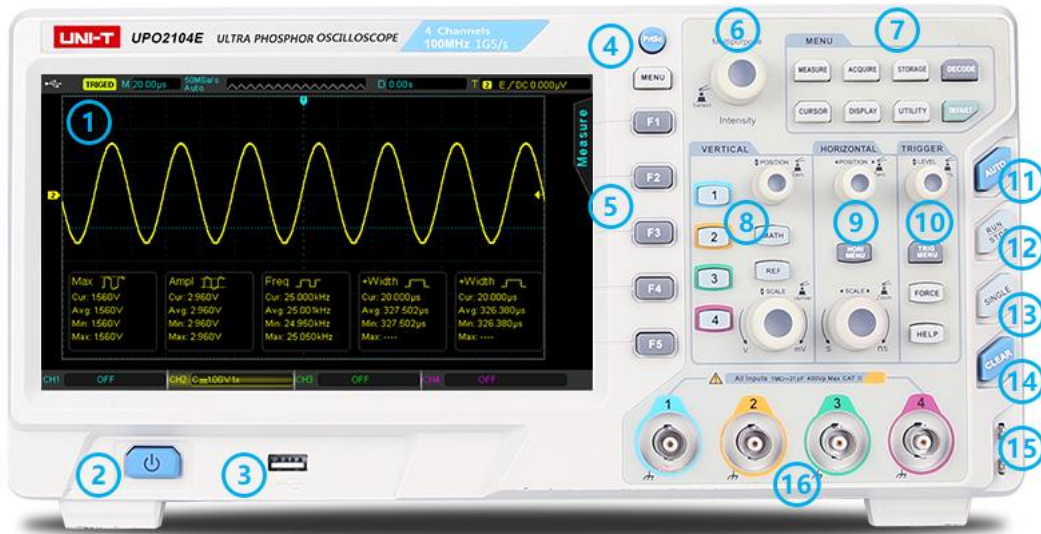
UPO2000E Series Digital Oscilloscopes



Main Features

- ✧ **Bandwidth:** 70MHz/100MHz
- ✧ **Measurement channel:** 2/4 analog channel
- ✧ **Real-time sampling rate:** 1GS/s
- ✧ **Storage depth:** 56Mpts per channel
- ✧ **Waveform capture rate:** 80,000wfms/s
- ✧ **Gray level:** 256
- ✧ **Auto measurement:** 34 waveform types
- ✧ **Waveform record:** record original data 65,000 frame at the same time
- ✧ **Abundant trigger:** including a variety of advanced trigger options
- ✧ **Bus encoding:** RS232, IIC, SPI
- ✧ **Independent time base:** each channel can adjust independently
- ✧ **Display:** 8inch WVGA (800×480) TFT LCD, super-widescreen, vivid color, clean display
- ✧ **Peripheral interface:** USB Host, USB Device, LAN, EXT Trig, AUX OUT(Trig out, Pass/Fail) output

Oscilloscope Panel



- ① Screen display area
- ② Power switch
- ③ USB host interface
- ④ Copy/print screen
- ⑤ Control menu
- ⑥ Multipurpose knob
- ⑦ Function menu
- ⑧ Vertical control area
- ⑨ Horizontal control area
- ⑩ Trigger control area
- ⑪ Automatic setting
- ⑫ Run/stop
- ⑬ Single trigger control
- ⑭ All clear
- ⑮ Probe compensation signal connector and ground terminal
- ⑯ Analog channel inputs



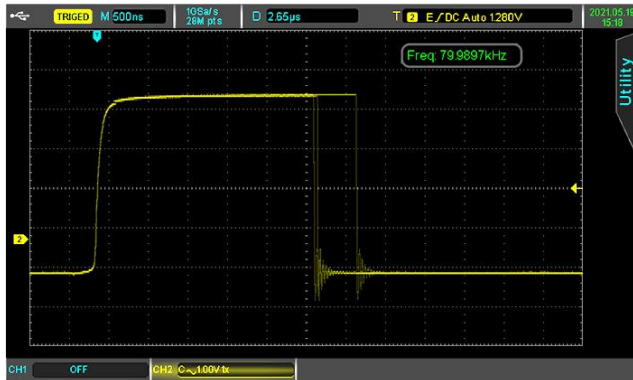
- ① EXT Trig
- ② AUX
- ③ USB Device
- ④ LAN
- ⑤ Power Switch
- ⑥ AC Power Socket
- ⑦ Safety Lock

Product Introduction

UPO2000E series digital oscilloscope is based on UNI-T's unique Ultra Phosphor technology. A multi-functional, high performance oscilloscope that is easy to use, with excellent technical specifications, a perfect combination of multi functionalities that can help users to quickly complete testings. UPO2000E series is aimed at satisfying the most extensive oscilloscope markets, including communications, semiconductors, computers, aerospace defense, instrumentation, industrial electronics, consumer electronics, automotive electronics, field maintenance, R&D, education, etc.

Signal Capture

UPO2000E series has 80,000 wfms/s waveform capture function to acquire glitch and abnormal signal of waveform more quickly and effectively. It is convenient to detect product's flaw and improve it immediately.



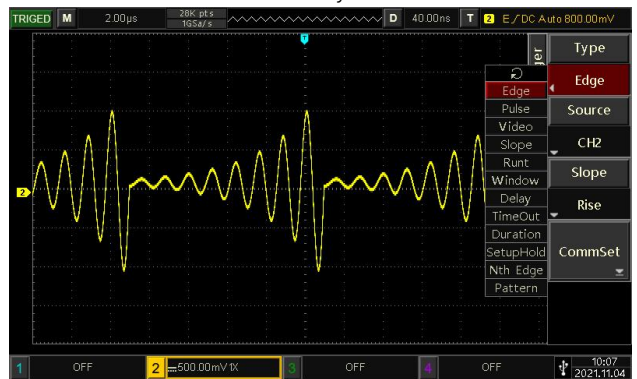
Storage Depth

The maximum storage depth of UPO2000E series can reach 56Mpts. That is, user can get more data points and events with high resolution in one-time trigger sampling. It provides a large number of sources for analysis work.



Multi-mode Trigger

UPO2000E series has a complete set of trigger system. It has edge trigger to acquire edge hopping change. Based on waveform feature to select trigger mode, there are pulse width, runt, exceed-amplitude, N-edge, delay, timeout, duration, setup hold, slope, video and code pattern. It helps to trigger target waveform fast and accurately. Abundant bus encoding function make interface more flexible and effectively.



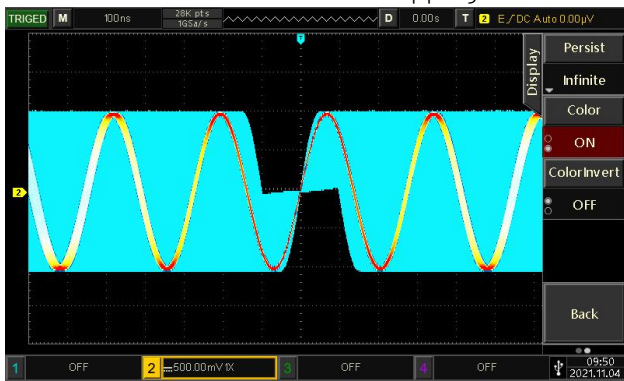
Auto Measurement

UPO2000E series has a complete set of analytical tools. Menu can open 34 auto measurement items to provide a large number of testing source, directly to display signal measurement. It is perfectly meet the requirements of signal quality measurement.



Steady Persistence Display

UPO2000E series has 256 level gray display, which can effectively show the cumulative effect over a long time. The dense accumulation of waveform in frequent signal areas is highlighted, which can record the historical trajectory of active signal. 80,000 wfms/s waveform capture rate to presents waveform whether is abnormal hopping.



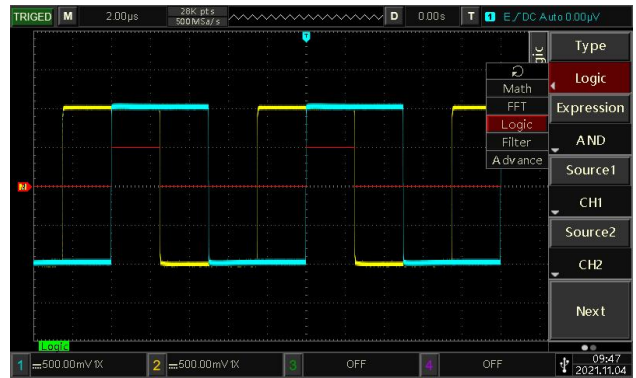
Independent Time Base

If measured four signal frequencies has great difference, turn on independent time base function to presents signal waveform details in different time base. It can also viewed by split screen.



Mathematical Operation

UPO2000E series can execute multiple mathematical operation, such as Math, FFT, logical operation and advanced operation. Enter mathematical operation menu, rotate knob to select operation mode, result waveform will be lighted by red M mark after operation.



Quick Model Selection

Model Parameter	UPO2104E	UPO2102E	UPO2074E	UPO2072E
Bandwidth	100MHz	100MHz	70MHz	70MHz
Analog channel	4	2	4	2
Sampling rate	1GS/s	1GS/s	1GS/s	1GS/s
Storage depth	56Mpts	56Mpts	56Mpts	56Mpts
Capture rate	80,000wfms/s	80,000wfms/s	80,000wfms/s	80,000wfms/s
Rise Time(Typical)	≤3.5ns	≤3.5ns	≤5ns	≤5ns
Independent time base	support	support	support	support
Waveform record	65,000 frames	65,000 frames	65,000 frames	65,000 frames

Technical Specification

Vertical system	
Bandwidth	100MHZ/70MHZ
Input channel	2/4
Input coupling	DC, AC, Ground
Input impedance	1MΩ±2%/21pF±3pF
Probe attenuation coefficient	0.001x, 0.01x, 0.1x, 1x, 10x, 100x, 1000x
Vertical Scale	1mV/div~20V/div(1-2-5 base)
Vertical resolution	8bit
Maximum input voltage	CATI 300Vrms, CATII 100Vrms, transient Overvoltage 1000Vpk
DC gain accuracy	≤±4% (Sampling or average sampling method)
DC offset accuracy	≤±4% (Sampling or average sampling method)
Channel Isolation	DC to maximum bandwidth: >40dB
Vertical Displacement Range	1mV/div~200mV/div: ±2V
	500mV/div~2V/div: ±40V
	5V/div~20V/div: ±400V
Bandwidth limit (typical value)	20MHZ
Horizontal system	
Timing Scale	5ns/div~50s/div(1-2-5 system)

Delay range	Pre-trigger (negative delay) ≥ 1 screen width, late-trigger (positive delay) : 1s~50s
Time base mode	YT, XY, ROLL
Timing Accuracy	$\leq \pm (50+2x \text{ service life})$ ppm
Waveform capture rate	80,000wfms/s(single channel, horizontal time base 50ns/div, point diasplay, auto memory depth)
Sampling system	
Sampling mode	Real-time sampling
Real-time Sampling Rate	1GS/s(single channel), 500MS/s(dual channel), 250MS/s(quad channel)
Acquisition Mode	Sampling, peak detection, high resolution, envelope, and average
Average value	After all channels have reached N samples at the same time the number of N can be selected between 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096 and 8192.
Waveform interpolation	$\sin(x)/x$
Storage depth	Auto, 28kpts, 280kpts, 2.8Mpts, 28Mpts, 56Mpts
Trigger system	
Trigger mode	Auto, normal, single
Trigger level range	Internal: Center of the screen ± 8 grids External: $\pm 0.9V$ External/5: $\pm 4.5V$
Trigger hold-off range	80ns~10s
Trigger sensitivity	$\leq 1\text{div}$
HF rejection	80kHz
LF rejection	8kHz
Noise Suppression	Reduces waveform noise(10 mV/div ~ 20 V/div, the sensitivity of DC coupling trigger is reduced 2 times)
Trigger mode	
Edge	Rising, falling, any
Pulse width	Pulse width term: >、<、=
	Polarity: positive pulse width, negative pulse width
	Pulse width range: 4ns~10s
Runt pulse	Pulse width term: >、<、=
	Polarity: positive pulse width, negative pulse width
	Pulse width range: 8ns~10s
Window trigger	Window Type: Rising edge, falling edge, any edge
	Trigger Position: Window enter, exit, time
	Window time: 8ns~10s
N edge trigger	Edge mode: rise, fall
	Idle time: 8ns~10s
	Edge count: 1~65535

Delay trigger	Edge mode: rise, fall
	Delay mode: greater than, less than, within range, out of range
	Delay time: normal 8ns~10s; Lower time limit: 8ns ~ 10s; Upper time limit: 32ns ~ 10s
Timeout trigger	Edge Type: rise, fall, any edge
	Timeout: 8ns~10s
Duration trigger	Code pattern: H, L, X
	Trigger term: greater than, less than, within range
	Normal: 8ns ~ 10s
	Lower time limit: 8ns ~ 10s Upper time limit: 32ns ~ 10s
Setup time and hold time	Edge mode: rise, fall
	Data type: H, L
	Setup time: 8ns~10s
	Hold time: 8ns~10s
Slope trigger	Slope Condition: Positive slope (greater than, less than, specified range) Negative slope (greater than, less than, specified range)
	Time Setting: 8ns~10s
Video trigger	Signal System Horizontal Scanning Frequency Range: Supports standard NTSC, PAL and SECAM broadcast system with line numbers ranging from 1 ~ 525 (NTSC) and 1 ~ 625 (PAL/SECAM).
Code pattern trigger	H, L, X, rise edge, fall edge
I2C encoding	Trigger Condition: Start, restart, stop, lost acknowledgment, address, data, address/data
	Address bit width: 7bits, 10bits
	Address range: 0~119, 0~1023
	Byte size: 1~5bits
SPI encoding	Data qualifier: Equal to, greater than, less than
	Trigger Condition: Chip select, timeout
	Idle time: 80ns~1s
	Data bit: 4 ~32bits
RS-232 encoding	Data setup: H, L, X
	Clock edge: rise, fall
	Trigger Condition: Start of frame, error frame, parity error, data
	Baud rate: 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, user-defined
	Data bit width: 5-bit, 6-bit, 7-bit, 8-bit

Waveform measurement

Cursor	Manual mode	Voltage difference between cursors (ΔV)
		Time difference between cursors (ΔT)
		The reciprocal of ΔT (Hz) ($1/\Delta T$)
Track mode		Voltage and time at waveform point

	Indicator	Allows cursor display during automatic measurement
Automatic Measurement		Maximum, minimum, peak-to-peak, median, top, bottom, amplitude, period average, average, periodic RMS, RMS, overshoot, preshoot, frequency, period, rise time, fall time, positive pulse width, negative pulse width, rise delay, fall delay, FRR, FRF, FFR, FFF, LRF, LRR, LFR, LFF, positive duty ratio, negative duty ratio, phase, area, cycle area.
Number of Measurement		Displays 5 measurements at the same time
Measurement range		Screen or cursor
Measurement statistics		Average, maximum, minimum, standard deviation and the number of measurements
Frequency meter		6-bit hardware frequency meter
Mathematical operation		
Waveform Calculation		A+B, A-B, A×B, A/B, FFT, logic operation, digital filtering, advanced operation
FFT window type		Rectangle, Hanning, Blackman, Hamming
FFT display		Split screen; time base can be adjusted independently
FFT vertical scale		Vrms, dBVrms
Digital filter		Low-pass, high-pass, band-pass and band-stop
Logical operation		AND, OR, NOT, XOR
Advanced operation		Log, Exp, Sin, Cos, Tan, Sqrt, Inth, Diff
Storage		
Setting		Internal (256), external USB storage device
Waveform		Internal (256), external USB storage device
Bitmap		External USB storage device, it can also store the relevant parameter information.
Display		
Display type		8-inch TFT LCD
Display resolution		800 horizontal×RGB×480 vertical pixels
Display color		24bits true color
Duration		1s, 2s, 5s, 10s, 20s, manual
Menu hold		hold time: 1s, 2s, 5s, 10s, 20s, manual
Display Type		Point, vector
Interface		
Standard Interface		Standard: USB-Host, USB-Device, LAN, EXT Trig, AUX Out
Probe Compensation Signal Output		
Output Voltage		about 3Vp-p
Frequency		10Hz, 100Hz, 1kHz(default) , 10kHz

Power supply

Supply voltage	100V ~ 240VACrms
Frequency	45Hz ~ 440Hz
Fuse	2.5A, T, 250V

Environment

Temperature range	operating: 0°C ~ +40°C; non-operating: -20°C ~ +60°C
Cooling method	Fan forced cooling
Humidity range	Operational: below +35°C ≤ 90% relative humidity Non-Operational: +35°C ~ +40°C ≤ 60% relative humidity
Altitude	operating: below 3000m; Non-operational: below 15,000m

Mechanical Specifications

Size	336mm(W)×164mm(H)×108mm(D)
Weight	3.5kg

Calibration Interval

Recommend to perform calibration once a year



*The UPO2000E series have been certified by CE, cETLus.

Standard accessories

UT-P03(UPO207x)	Passive probe x 2: 1x,10x switchable, 60MHz
UT-P04(UPO210x)	Passive probe x 2: 1x,10x switchable, 100MHz
Power cable	Fits the standard of destination country
UT-D14 USB data cable	For UPO2072E, UPO2074E, UPO2102E, UPO2104E

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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UNI-T group maintains a wide products category includes Digital Test & Measurement instruments, Field Testing Meter, Infrared thermal imaging products. As early as 2008, we continue to introduce self-developed Digital Test and Measurement instruments to the market and have made remarkable achievements. At present, we have formed a variety of product lines of Oscilloscope, AWG, Spectrum Analyzer, Bench Multi-meter, Power Supply, DC Load, Power Meter, LCR Meter, Micro Ohm Meter and Data logger. We have separated instruments sub-sites, instruments.uni-trend.com, on the basis of the original website www.uni-trend.com, in order to be more targeted to provide customers with better service and value.

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