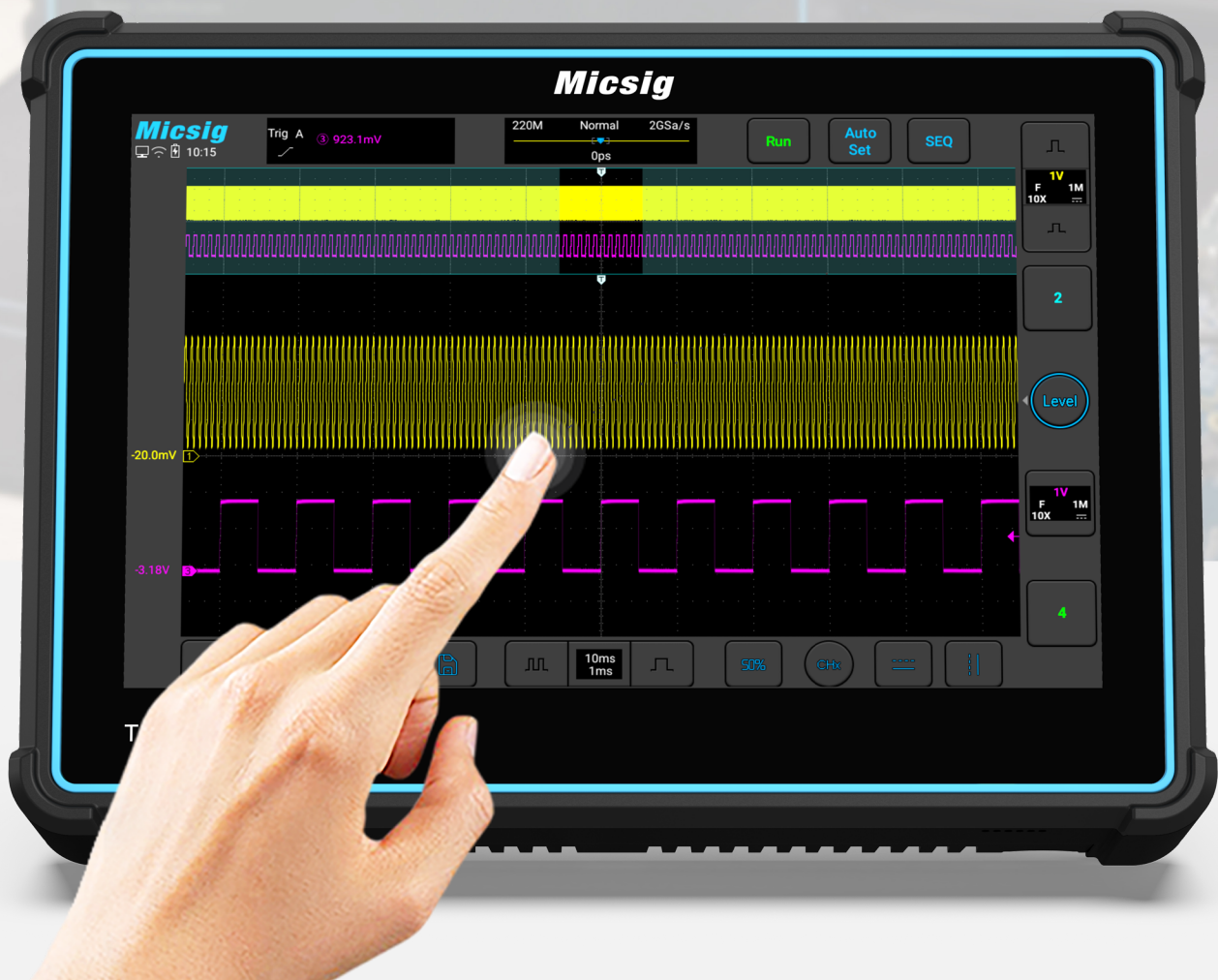# Micsig

Tablet Oscilloscope TO series

- 4 Analog Channels
- Max. 300MHz Bandwidth
- Max. 220Mpts Memory Depth
- Max. 2GSa/s Sampling Rate
- 7500mAh Li-ion Battery
- 10.1" Integrated Touchscreen

Intuitive, Superior, Intelligent, Professional

Product Overview

The TO series Tablet Oscilloscope features 4 analog channels, up to 300MHz bandwidth, 2GSa/s sampling rate and max. 220Mpts memory depth, running with Micsig latest SigtestUI^{TM} multitasking system, make sure long-time stable and smooth performance. 10.1-inch integrated full touch screen with 1280 x 800 high resolution, combined with Micsig's over 10 years of experience in touch control algorithms, the TO series brings touch experience to another level.

The TO series Tablet Oscilloscope comes in a compact form factor about 5cm thick making it the go-to oscilloscope for electronic debug and test, it integrates comprehensive measurement and mathematical operation functions, supports serial bus triggering and decoding, also equipped with hardware digital filtering modules and other functions.

Powered by built-in battery, it helps engineers work where they work.
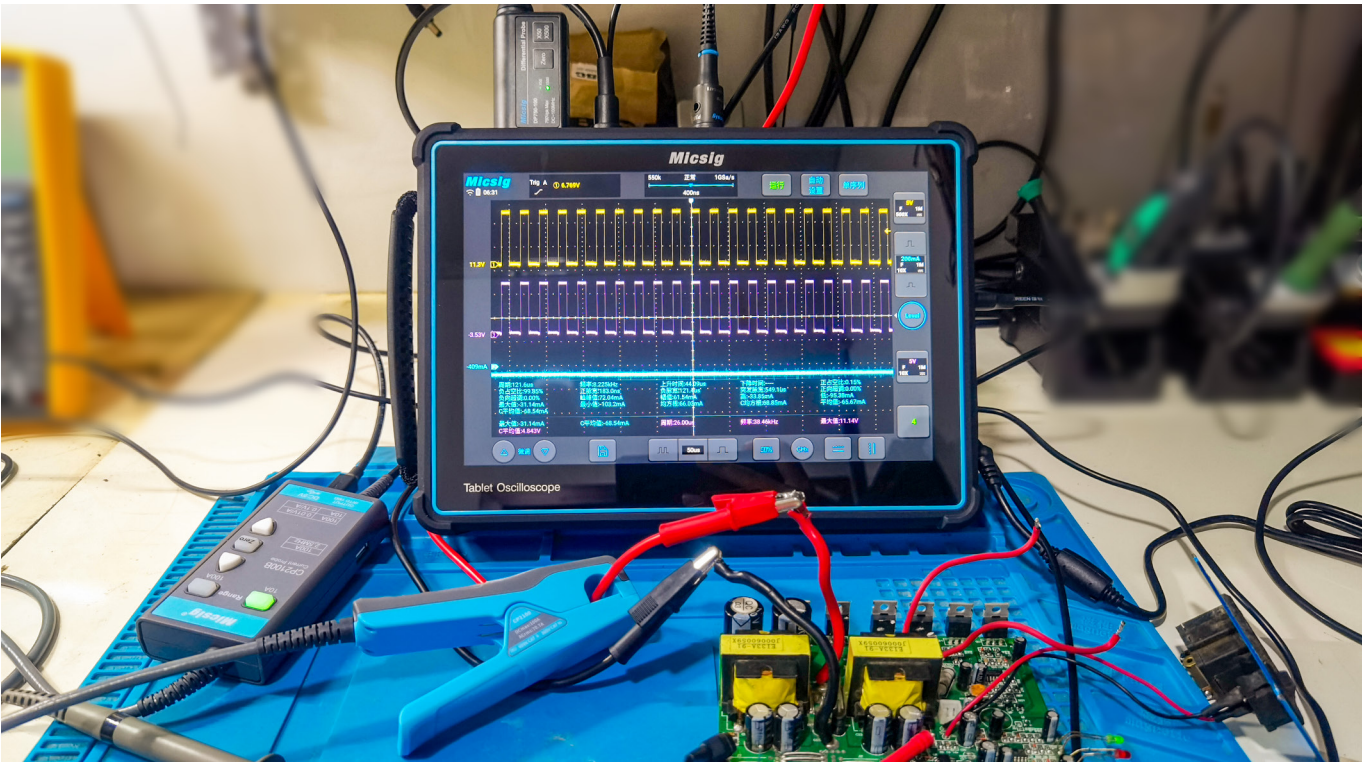
Key Specifications

Model	TO3004	TO2004	TO1004
Analog Channels	4	4	4
Bandwidth	300MHz	200MHz	100MHz
Rise Time	≤ 1.16ns	≤ 1.75ns	≤ 3.5ns
Max. Sampling Rate	2GSa/S		1GSa/S
Max. Memory Depth	220Mpts		110Mpts
Bandwidth Filter	20M, High Pass / Low Pass (to 30Hz)		20M, High Pass / Low Pass (to 30KHz)
Input Impedance	1MΩ / 50Ω		1MΩ
I/O Ports	Wi-Fi, USB 3.0/2.0 Host, USB Type-C, Grounding, HDMI, Trigger out		
Display	Industrial 10.1" TFT-LCD (1280*800), 11*10 grids		
Size / Net Weight	265*192*50mm / 1.9kg (with battery)		
Battery	7.4V, 7500mAh, Li-ion battery		

Product Features

Micsig UPI probe interface can power the Micsig active probe and automatically configure the attenuation ratio

Wi-Fi

Rugged & Compact Design
ABS+TPU rubber protector, TPE side handle, weighs only 1.9KG

Superior Touch Experience
10.1 inch, 1280 x 800 pixels, upgraded seamless TFT LCD screen

Robust Hardware
Upgraded core hardware, faster CPU, 32GB ROM support video recording and large file storage

Intuitive User Interfaces
Android-based OS, impressive UI interactions

Standard Protocol Decoding
UART, CAN, LIN, SPI, I²C

Grouding

USB3.0/2.0

HDMI

Type-C

DC Charger

Power Button

Probe calibration output
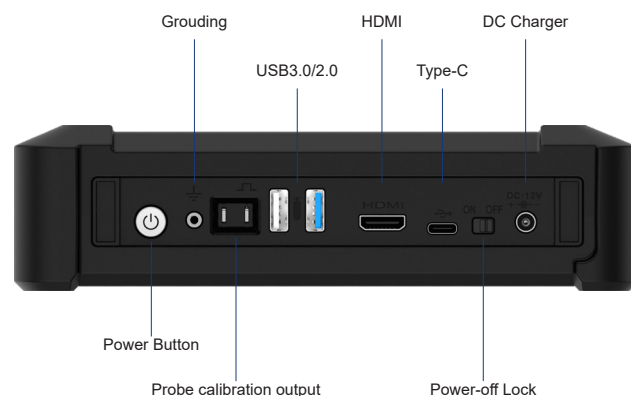
Power-off Lock

▶ Built-in 7500mAh Li-ion battery, Support Power-off lock, more secure to travel with.

▶ Power button, Grounding plug, Probe Calibration Output, USB3.0/2.0, HDMI, Type-C, Power Supply, Power-off Lock (Note: switch to ON for first-time use)
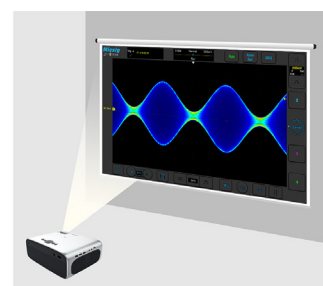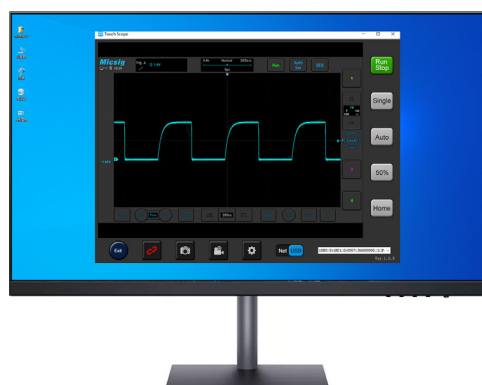
▶ The TO series supports PC software + Mobile App (Android / iOS) remote control via Wi-Fi, USB, able to access internet for online upgrade, it also can be projected through HDMI port for demonstrations for training and education purpose.
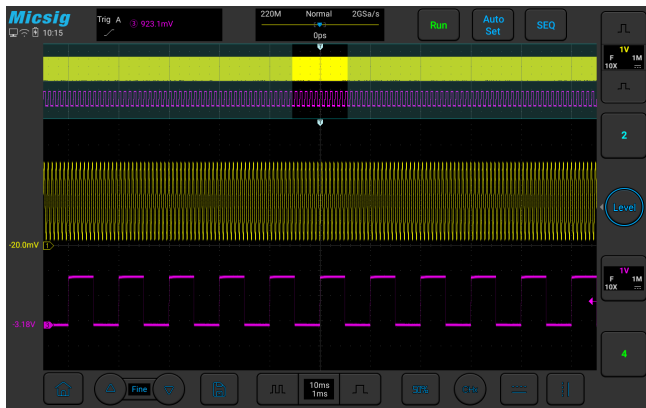
Up to 220Mpts Memory Depth (TO1004 has 110Mpts)

Using hardware-based Zoom technique and memory depth of up to 220Mpts, allow users to move and browse waveforms much easier and quickly zoom in/out to interested events.
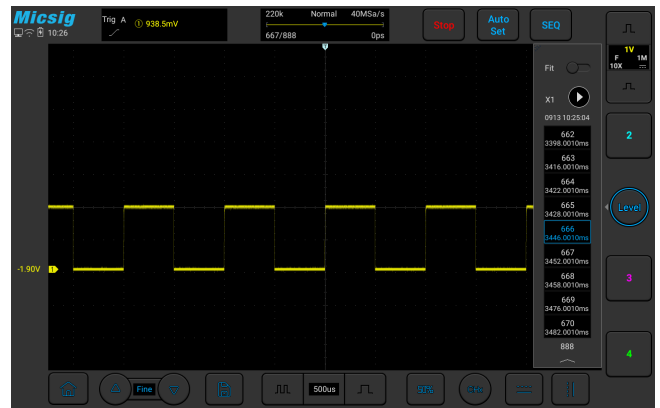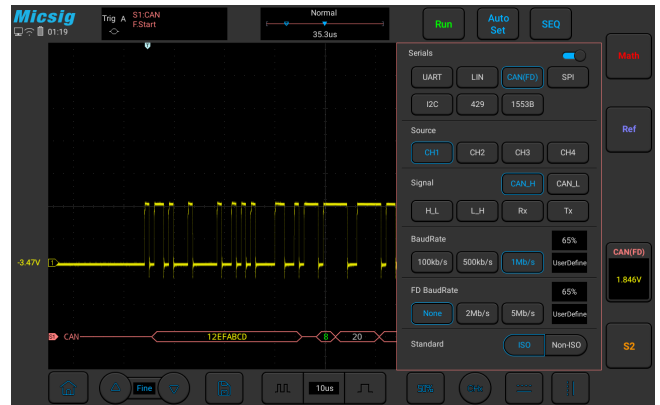

Segmented Storage Acquisition (TO1004 not available)

Up to 10,000 waveform events can be captured for efficient analysis, helping users to capture occasional signals and more optimally save the data required.
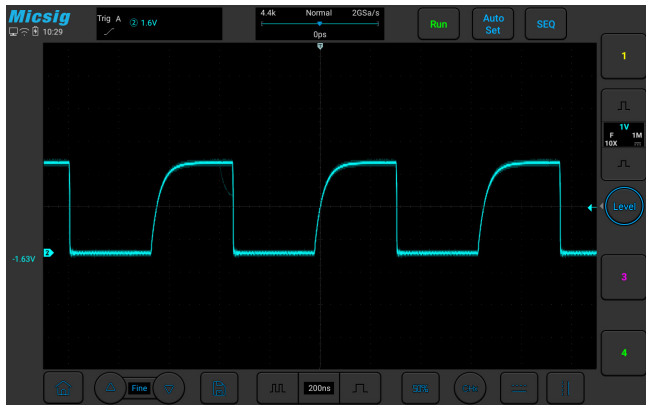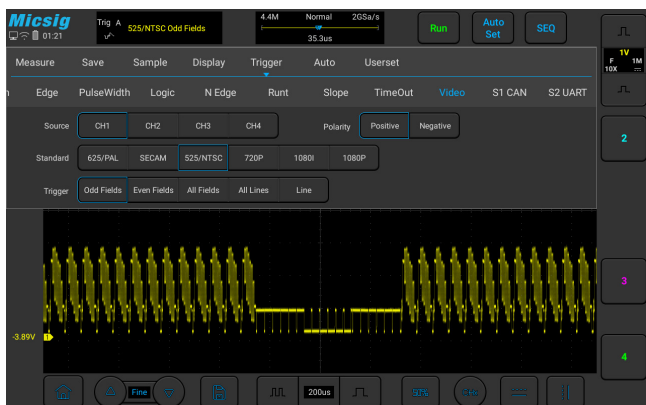

High Waveform Update Rate

Up to 300,000 wfms/s update rate, the TO series can easily capture unusual or low probability events.

Serial Bus Decoding and Analysis

Support UART, LIN, CAN, I²C, SPI and other hardware-based serial bus decoding and triggering, display waveform and data at the same time.

Powerful Trigger Functions

Support Edge, Pulse, Logic, N Edge, Runt, Slope, Timeout, Video and Serial trigger, most intuitive trigger settings, fast and easy trigger source switching.
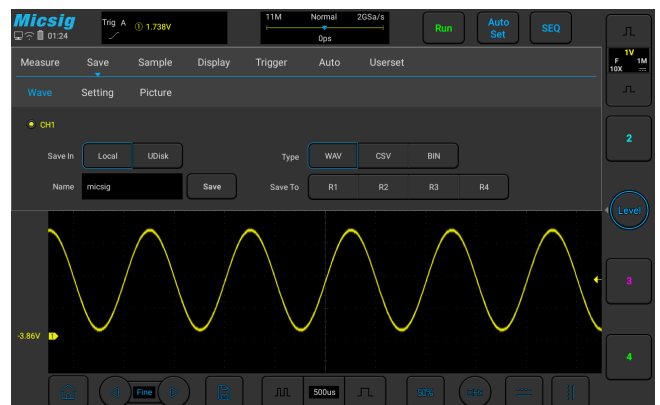
Fast Storage Function

Micsig's unique fast storage function allow users quickly save waveforms with one press, a full screen of 220M waveform data can be completely saved in BIN format. More than 70% faster than traditional oscilloscopes.

Convenient Cursor Measurements

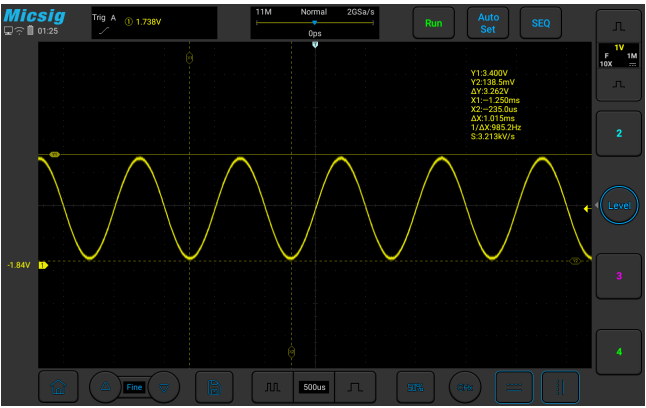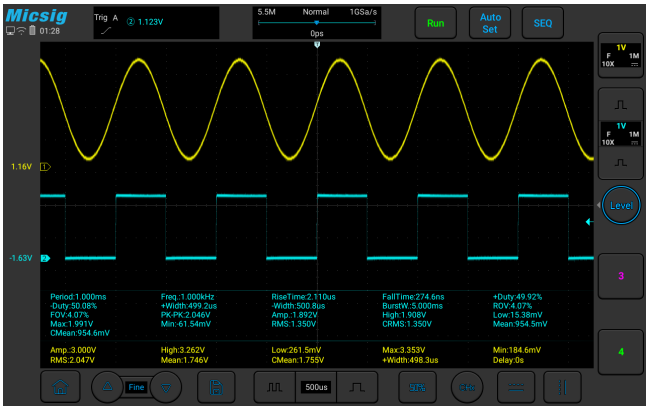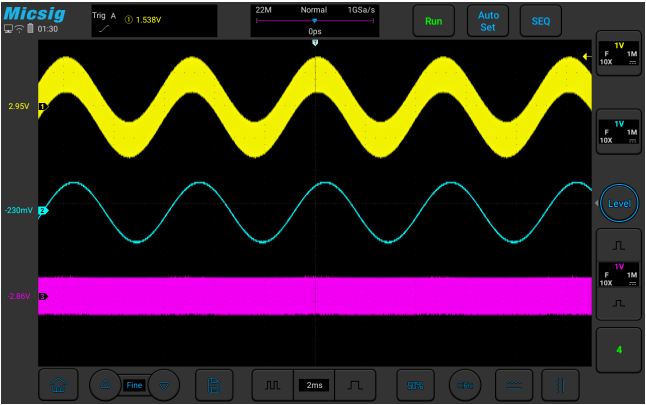One touch to open horizontal and vertical cursors, each cursor can be moved separately or simultaneously, brings unmatched user experience.

31 Auto Measurements

All 31 types of automatic measurements can be displayed on one screen, one touch to clear, the best auto measurement on the market.

Hardware Digital Filtering

The TO series high pass / low pass filter function helps engineers rule out insignificant frequency so to eliminate interference, and observe the true state of the signal.
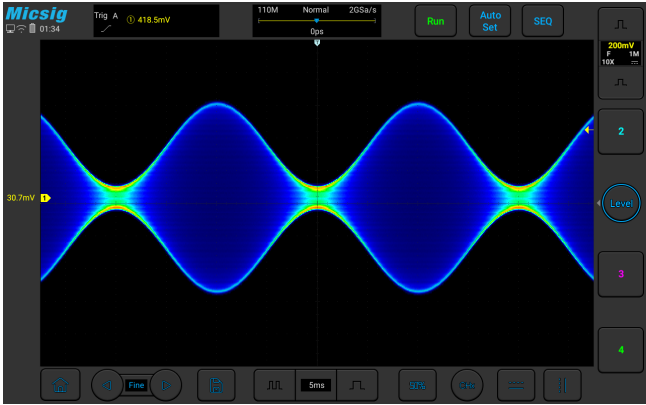
Color Temperature Display

The Color temperature display is similar to the intensity-graded trace function, but the trace occurrence is represented by different colors as opposed to changes in the intensity of one color. Red colors represent more frequently occurred events, while the bule represents less frequently ones.
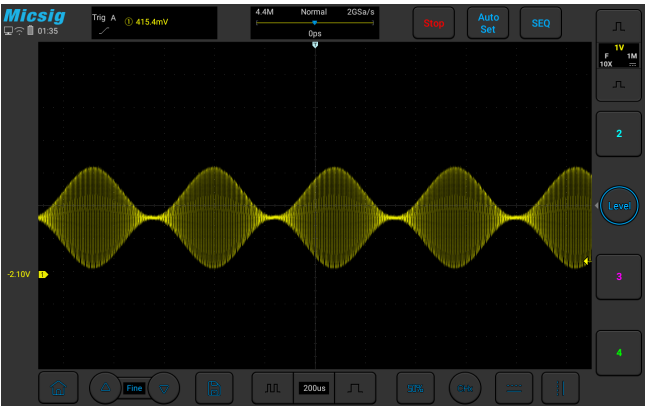
256-Level Intensity Grading

The TO series has digital fluorescent display, the resulting intensity-graded trace is brighter for events that occur with more frequency and dims when the events occur with less frequency.
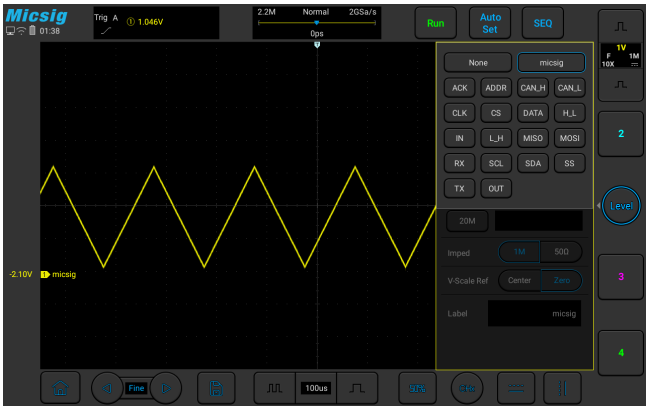
User Defined Channel Label

Users can set different labels for different sources to facilitate observation and readout.

Soft Keyboard Input

When entering names, IPs, and characters, the TO series can easily use the soft keyboard to input like a tablet PC.

Quick Printing

Connect to the network, user can print screenshots with one step.

Large 32GB Internal Storage

With 32G large storage, user can wirelessly access/view mass files like pictures, videos via PC or mobile phone.

Android Operation System

With industry-first Android based OS, the TO series provides excellent user experience and promising applications.

Recommended Options

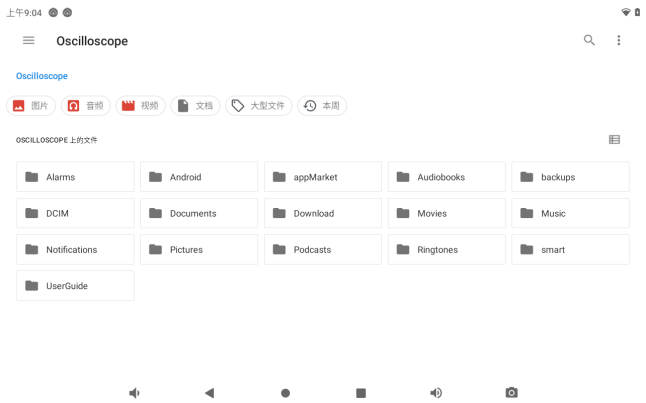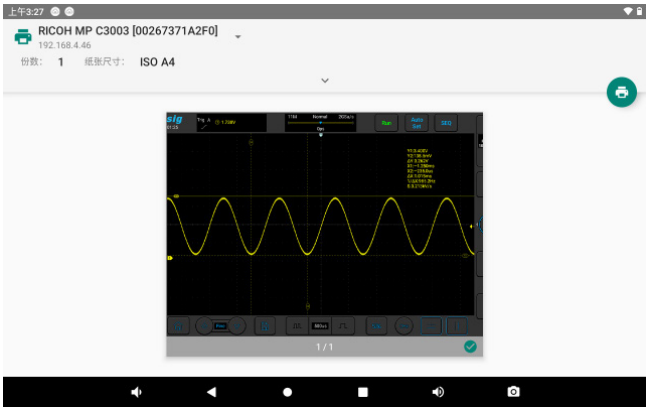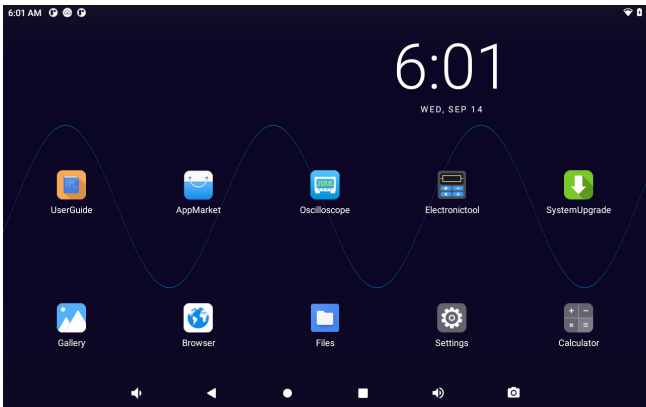| Handbag & Suitcase	
Micsig Special Handbag	Black nylon canvas, suitable for all Micsig oscilloscopes
Micsig Special Suitcase	PP hard-shell, EVA foam, optional for tablet scope and automotive scope
Current Probe	
High Frequency AC/DC Current Probe	Bandwidth: 50 / 100MHz, Range: 6A/30A, Accuracy: ±1%, BNC interface / Micsig UPI interface
Rogowski Coil AC Current Probe RCP500	Bandwidth: 15-300KHz, Range: 200mApk-500Apk, Accuracy: 1%, BNC interface / Micsig UPI interface
AC Current Probe ACP1000	Bandwidth: 10Hz-100KHz, Range: 0.1Apk-1000Apk, BNC interface
Low Frequency AC/DC Current Probe CP2100B	Bandwidth: DC~2.5MHz, Range: 10A/100A, BNC interface
Low Frequency AC/DC Current Probe CP2100A	Bandwidth: DC~800KHz, Range: 10A/100A, BNC interface
Low Frequency AC/DC Current Probe CP2100X	Bandwidth: DC~300KHz, Range: 10A/100A, BNC interface
Differential Probe	
High Voltage Differential Probe DP750-100	Bandwidth: 100MHz, Max. input differential voltage(DC+AC PK): 75V(50X), 750V(500X), Accuracy: ±2%, BNC interface / Micsig UPI interface
High Voltage Differential Probe DP10013	Bandwidth: 100MHz, Max. input differential voltage(DC+AC PK): 130V(50X), 1300V(500X), Accuracy: ±2%, BNC interface
High Voltage Differential Probe DP5013	Bandwidth: 50MHz, Max. input differential voltage(DC+AC PK): 130V(50X), 1300V(500X), Accuracy: ±2%, BNC interface
High Voltage Differential Probe DP10007	Bandwidth: 100MHz, Max. input differential voltage(DC+AC PK): 70V(10X), 700V(100X), Accuracy: ±1%, BNC interface
High Voltage Differential Probe DP20003	Bandwidth: 100MHz, Max. input differential voltage(DC+AC PK): 560V(200X), 5600V(2000X), Accuracy: ±2%, BNC interface

Technical Parameters

Vertical system	
Invert	Support
Bandwidth filter	TO3004 / TO2004: 20MHz, high pass / low pass (to 30Hz) TO1004: 20MHz, high pass / low pass (to 30KHz)
Coupling	DC, AC, GND
Input Impedance and Accuracy	TO3004 / TO2004: 1MΩ±1% || 50Ω±1% TO1004: 1MΩ±1%
Vertical divisions	10div
Vertical scale factor	TO3004 / TO2004: 1mV/div~10V/div 1MΩ; 1mV/div~1V/div 50Ω TO1004: 1mV/div~10V/div 1MΩ
DC Gain accuracy	5mV/div ~10V/div: ≤ ±2.0%≤ 2mV/div: ≤ ±3.0%
Vertical offset range(1MΩ/50Ω)	±2.5V(@probe 1X, <500mV/div), ±120V(@probe 1X, ≥500mV/div)
Noise floor	≤1.2mVpp(1mV/div, 1MΩ)
Probe type	Voltage / Current
Active probe apply	Support
Probe Auto Identification	Support
Probe Attenuation Ratio	1mX~10kX, 1-2-5 sequence
Max. input voltage	CAT I 300Vrms 400Vpk (1MΩ), 5Vrms (50Ω)
Channel isolation	>40dB (≤100MHz), >35dB (>100MHz)
Waveform expansion	Screen center, channel Zero
Channel selection	Support
Channel label	Support

Sampling System (TO3004 / TO2004)	
Real-time sample rate (single channel)	2G Sa/s
Real-time sample rate (dual channels)	2G Sa/s (either one of CH1&2, and either one of CH3&4) 1G Sa/s (both CH1&2, or both CH3&4)
Real-time sample rate (all 4 channels)	1G Sa/s
Memory depth (single channel)	220Mpts/22M/2.2M/220K/22K/2.2K/Auto
Memory depth (dual channels)	220Mpts/22M/2.2M/220K/22K/2.2K/Auto (either one of CH1&2, and either one of CH3&4) 110Mpts/11M/1.1M/110K/11K/1.1K/Auto (both CH1&2, or both CH3&4)
Memory depth (all 4 channels)	110Mpts/11M/1.1M/110K/11K/1.1K/Auto
Segmented storage	Support
Average	2,4,8,16,32,64,128,256
Envelope	2,4,8,16,32,64,128,256,∞

Horizontal System	
Timebase Scale	1ns/div~1ks/div
Mode	YT, XY, Roll, Zoom
Zoom default multiple	Preview window show all
Roll Mode	200ms/div~1000s/div
Trigger timebase	1ns/div~1ks/div

Timebase accuracy	20ppm
Horizontal divisions	11div
Expand Timebase Reference	Center, trigger position
Timebase delay range	-11div ~ 11ks, resolution: 1 pixel

Trigger System	
Trigger mode	Auto, Normal, Single
Trigger level range (analog)	±5div from screen center, analog channel
Hold off range	200ns~10s
Trigger coupling and frequency (analog channel)	DC, AC(70Hz), low frequency (40KHz), high frequency (40KHz), noise (10MHz)
Trigger Types	Edge, Pulse Width, Logic, N Edge, Runt Pulse (Runt), Slope, Time Out, Video
Bus decoding	UART, CAN, LIN, SPI, I2C

Measurements	
Auto measurements	Period, Frequency, Rise Time, Fall Time, Delay, Positive Duty Cycle, Negative Duty Cycle, Positive Pulse Width, Negative Pulse Width, Burst Width, Positive Overshoot, Negative Overshoot, Phase, Peak-to-Peak, Amplitude, High, Low, Maximum, Minimum, RMS, Cycle RMS, Mean, Cycle Mean
Measurement object	Analog Channels, Math, Reference Channels
All measurements	Support
Hardware frequency meter and resolution	Support each analog channel, 6bit, 2Hz~max. bandwidth, peak-to-peak value>0.8div
Cursor	Horizontal, vertical, cross
Cursor resolution	1 pixel

Math	
Dual waveform	+, -, *, /, Analog channel
FFT	Points: 100; K, dBVrms; Source: Analog channel; Resolution: Max100Kpts Window: Rectangular window, Hamming window, Blackman window, Hanning window
AX+B	A: ±1k, Min. Resolution 1p or 4it B: ±1k, Resolution 1p or 5bit X: Analog channel
Advanced	Advanced input, including +, -, *, /, <, >, ≤, ≥, ==, !=, &&, ||, (,), !(, sqrt, abs, deg, rad, exp, diff, ln, sin, cos, tan, intg, lg, asin, acos, atan, E
Vertical expansion datum	Screen center, channel zero

Waveform store	
Source	Analog channel, math channel
Storage location	Local (32G), U disk
Waveform format	WAV, CSV, BIN
Store in Language	English
Storage quantity	Unlimited
Quick save	Support
Reference Waveform	Can open all 4

Auto	
Auto configuration	Channel switch (threshold level can be set), Trigger source (max. signal, current)
Auto range	Vertical scale, horizontal scale, trigger level

Display	
LCD screen and resolution	10.1 inches, 1280*800 resolution
Grids	11*10 Grids
Grid Type	Full, Line, None, Cross
Brightness	Adjustable
Waveform Display	Line, Dot
Persistence	Auto, None, Infinity, Normal
Persistence duration	100ms, 200ms, 300ms, 400ms, 500ms, 600ms, 700ms, 800ms, 900ms, 1s, 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s
Waveform gray scale	256 Level
Color temperature display	Support

Interfaces	
USB3.0 Port	Support one USB storage device
USB2.0 Port	1, readable & writable
USB Type-C	1, readable & writable
DC Port	1, Supply power to oscillsocope
Probe calibration signal	1KHz, 2Vpk-pk
HDMI	HDMI 1.4
Wi-Fi	Support
Android/iOS Remote control application	Support

Others	
Battery	7.4V, 7500mAh Li-Ion Battery
Screenshots, video recording	Support
Self-calibration	Support
Languages	English, Chinese, German, French, Czech, Korean, Spanish, Italian, etc
Factory information	Model, SN, Bandwidth, Serial Number, Version, Factory Date
Operating System	Android
Built-in app	App Store, Browser, Oscilloscope, Calendar, Clock, Gallery, Calculator, User Guide, Electronic Tools, File Manager

Micsig

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