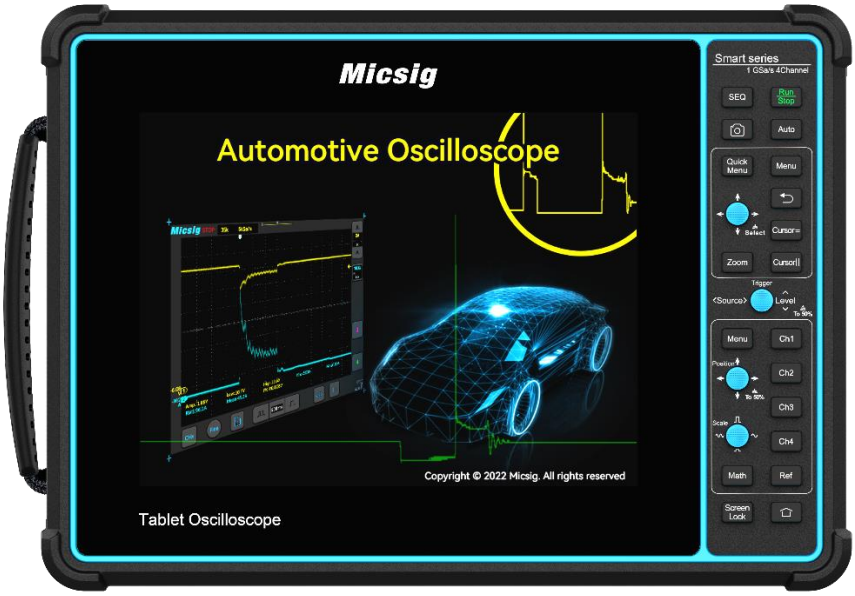
Micsig®

Automotive Tablet Oscilloscope
SATO1000 Series
DATASHEET

PRODUCT OVERVIEW

SATO1000 is Micsig's New Generation of Automotive Tablet Oscilloscope, compared with previous ATO1000 series, the SATO1000 adopts integrated touch screen technology and upgraded the hardware and software system, featuring 4 channels, 100MHz bandwidth, has maximum 1G Sa/s sampling rate and up to 70Mpts of memory depth.

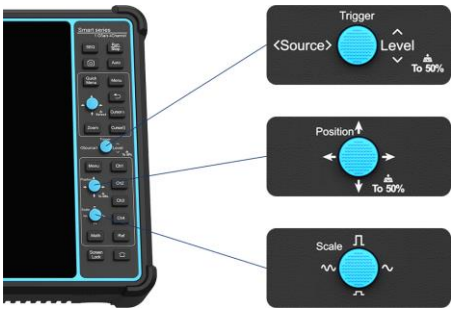
The SATO1000 equipped with highly sensitive digital trigger system, and a comprehensive Automotive Diagnostic software preset, able to help mechanics quickly and easily find out all kinds of problem on vehicles, including circuits on Charging/Start up, various Sensors and Actuators, Ignition system, and Networks (CAN, CAN FD, LIN, Flexray, K line) etc. Combined with Micsig's unique touch algorithm patented technology, the SATO1000 presents unparalleled operating experience to users.



Key Specifications

Model / Ordering Number	SATO1004
Analog Channels	4
Bandwidth	100MHz
Sampling Rate (Max.)	1GSa/S (single channel)
Memory Depth	70Mpts (single channel)
Waveform Capture Rate (Max.)	130,000 wfms/s
Support Tests	Charging/Start Circuits, Sensors, Actuators, Ignition, Networks (CAN, CAN FD, LIN, Flexray, K line), Combination Tests
Bandwidth Filter	Full bandwidth, Low pass
Interfaces	Wi-Fi, USB 3.0/2.0 Host, USB Type-C, Grounding, HDMI, Trigger out
Display	Industrial 8" TFT-LCD (800*600), 14*10 grids
Dimension / Net Weight	265*192*50mm / 1.9kg (with battery)
Battery	7.4V, 7500mAh, Li-ion battery

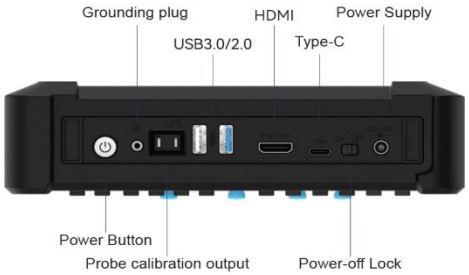
CHARACTERISTICS & FEATURES



▸ Highly integrated multifunction shortcut keys, deliver quick & accurate control.

▸ Built-in 7500mAh Li-ion battery, up to 5 hours battery life, support Power-off lock, more secure to travel with.

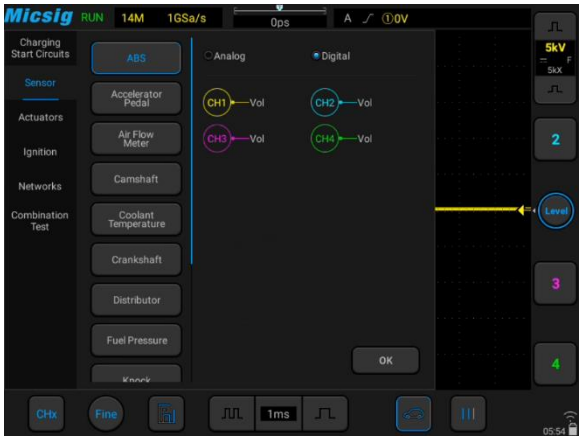
▸ Micsig Universal Probe Interface (UPI), intelligent bi-directional oscilloscope to probe communication, easy to set up attenuation and calibration.



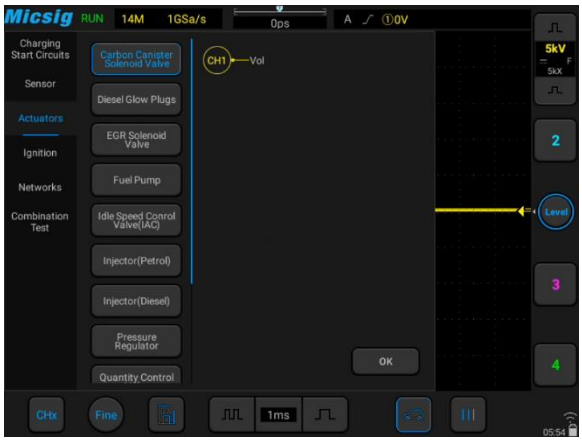
▸ Complete Connectivity: USB3.0/2.0, Type-C HDMI, Wi-Fi, Power-off lock, Grounding port

AUTOMOTIVE DIAGNOSTIC PRESETS

▲ SATO able to test the charging circuit and starting circuit to check whether the car charging /start-up circuit is working normally.



▲ SATO can directly measure the waveform of the sensors, by comparing with standard waveform, it helps user easily find out possible problem.

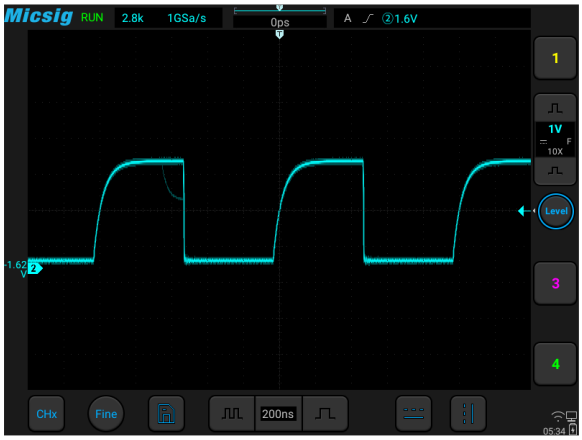


▲ SATO support multiple Actuator tests, including Carbon Canister and EGR solenoid valve, Fuel Pump Injectors, Cooling fan, Pressure Regulator, etc.

▲ The ignition system of a car is usually composed of primary and secondary coils and spark plugs. SATO can test both Primary and Secondary ignition signals, to find out possible malfunction.

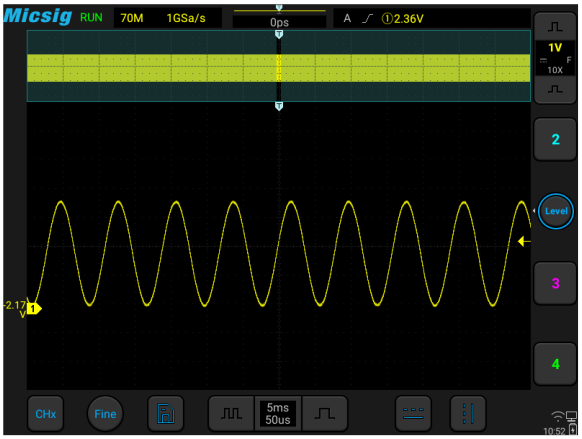
▲ SATO is capable of acquiring and decoding CAN High /CAN Low, CAN FD, LIN, FlexRay, and K line signals, delivers professional Network communication tests on vehicles.

▲ The electronic faults can be complicated, use SATO to perform combination tests, by comparing the collected various waveforms, it helps users judge faults by analyzing the timing and quantitative relationships between waveforms.



▲ High Waveform Update Rate

With a waveform update rate of up to 130,000 wfm/s, the SATO series can easily capture unusual or low probability events.

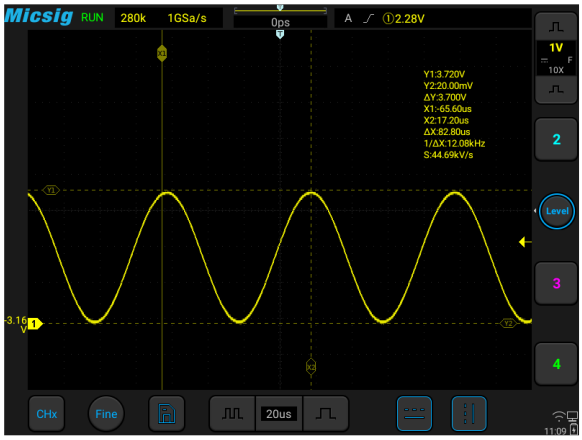


▲ Ultra-deep Memory

Using hardware-based Zoom technique and memory depth of up to 70Mpts, users to move and browse waveforms much easier and quickly zoom in to focus on the area of interest.

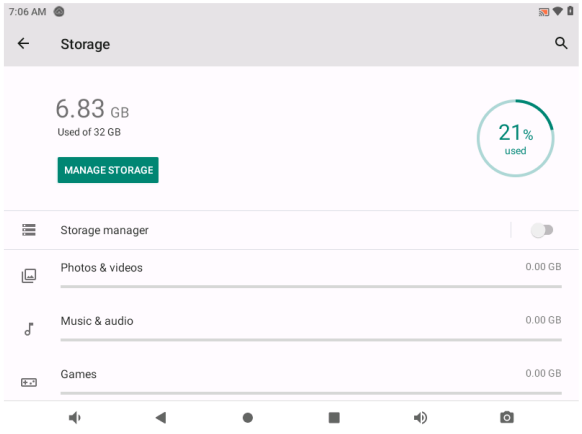
▲ Powerful Trigger Functions

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



▲ Convenient Cursor Measurement

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



▲ Large 32GB Internal Storage

user can wirelessly access/view mass files like pictures, videos of the oscilloscope via PC or mobile phone.

▲ Remote Control and Demonstration

Support PC software + Mobile App (Android / iOS) remote control, able to access internet for online upgrade, it also can be connected to HDMI port for training and education demonstrations.

Specifications

Vertical System	
Input Coupling	DC, AC, GND
Rise Time	≤ 3.5ns
Input Impedance	1MΩ±1%||14.5pF±3pF
Vertical Resolution	8 bits
DC Gain Accuracy (Amplitude Accuracy)	<±2% (1MΩ Input)
Input Sensitivity Range	1mV/div~10V/div (1MΩ Input)
Ch-to-Ch Isolation DC to Maximum Bandwidth	≥40dB (100:1)
Offset Range	±2.5V (Probe attenuation X1, <500mV/div), ±120V (Probe attenuation X1, ≥500mV/div)
Maximum Input Voltage	CAT I 300Vrms (1MΩ Input)
Horizontal System	
Time Base	2ns/div~1ks/div
Time Base Delay Time Range	14 divisions ~ 14ks
Clock Drift	≤±5ppm / year
Time Base Accuracy	±20ppm
Sampling System	
Sampling Method	Real-Time
Peak Detect	Capture narrow glitches at all sweep speeds: CH – 1ns, dual CH – 2ns, four CH – 4ns
Maximum duration at highest sampling rate	70ms
Average	Selectable from 2, 4, 8, 16, 32, 64, 128, 256
Envelope	Selectable from 2, 4, 8, 16, 32, 64, 128, 256, ∞
Trigger System	
Trigger Mode	Auto, Normal, Single
Trigger Coupling	DC, AC, high frequency reject, low frequency reject, noise reject
Trigger Holdoff Range	200ns~10s
Trigger Types	
Edge	Positive or negative slope on any channel. Coupling includes DC, HF reject, LF reject, and noise reject.
Pulse Width	Trigger on width of positive or negative pulses that are >, <, =, ≠ or within a period of time of 8ns ~ 10s.
Logic	Trigger on any logic pattern of the channel changes to >, <, =, ≠, true value, false value within the set time range. Any input can be used as a clock to find patterns on clock edges. Defines the assigned mode (AND, OR, NAND, NOR) of all input channels as high, low or irrelevant
Video	Trigger on video signals varies according to different video formats, generally PAL/625, SECAM, NTSC/525, 720P, 1080I, 1080P, etc.
Time Out	Starting from the intersection of the signal and the trigger level, the trigger is generated when the duration above (or below) the trigger level reaches the set time
Slope	Trigger on the time of the waveform from one level to another level meets the set time condition
Runt Pulse (Runt)	Trigger on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again.
N Edge	Trigger on the Nth rising/falling edge of the waveform

Waveform Measurements	
Cursors	Horizontal, Vertical, Cross
Automated Measurements	31 types, of which up to 10 types can be displayed on-screen at any time. Including: 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
Hardware Frequency Meter	6 digits
Waveform Math	
Dual Waveform	Add, Subtract, Multiply, Divide
FFT	Spectral magnitude. Set FFT vertical scale to linear RMS or decibel dBV RMS, set FFT window to Rectangular, Hamming, Hanning or Blackman-Harris

Display System	
Display Type	8-inch TFT LCD multi-point capacitive touch screen
Display Resolution	800*600 pixels
Operation Method	Touch, Button, Touch + Button
Persistence Duration	Auto, 10ms~10s, ∞
Time Base Mode	YT, XY, Zoom, Roll (scroll waveforms right to left across the screen at sweep speeds slower than or equal to 200 ms/div)
Expand Benchmark	Center, Trigger position
Waveform Display	Vectors, Line, brightness adjustable
Graticules	14 x 10, brightness adjustable
Waveform Update Rate	130,000 wfms/s
Clock	Real time, user adjustable
Language	English, Chinese, German, French, Czech, Korean, Spanish, Italian, etc.

Storage	
Storage Medium	Local, USB drive
Internal Storage	32G
Waveform Storage Format	csv, wav, bin
Store Waveform Quantity	Unlimited
Stored Waveform Rename	Support
Reference Waveform Display	4 internal waveforms
Quick Screenshot	Support
User Setting Storage	10 internal setups
User Settings Rename	Support
USB Flash Drive	Support industry standard flash drives

Input / Output Ports	
USB3.0 Port	Support one USB mass storage device, read and edit
USB2.0 Port	One, read and edit
USB Type-C	One, read and edit
DC Port	One
Probe Compensator	1KHz, 2Vpk-pk
HDMI	HDMI 1.4
Wi-Fi	Support
Android/iOS Remote Control Application	Support

Power Source	
Power Voltage Range	100~240VAC, 50/60Hz
Power Consumption	< 60W
Adapter Output	12V DC, 4A
Battery	7.4V, 7500mAh Li-ion battery

Environment	
Temperature	
Operating	0℃ ~ 45℃
Non-operating	-40℃ ~ 60℃
Humidity	
Operating	5% ~ 85%, 25℃
Non-operating	5% ~ 90%, 25℃
Altitude	
Operating	< 3000m
Non-operating	< 12000m

Physical Characteristics	
Dimensions (W x H x D)	265*192*50mm
Weight	Net: 1.9kg (with battery), Shipping: 4.5kg

Standard Accessories	
Passive Probe	Measuring voltage: 10X: < 600V AC pk, one per channel
Power Adapter	One (Localized)
Power Cord	One
Warranty	Three-year warranty for Base Unit only, probes, battery and related accessories are valid for 180 days

Instrument Options	
Customized Battery (Standard)	7.4V, 7500mAh Li-ion battery
Bus Decoding	**Standard**: UART, LIN, CAN, SPI, I²C; **Optional**: ARINC-429, MIL-STD-1553B
Recommended Accessory	Customized nylon handbag, hard shell suitcase, screen protective mask

Micsig

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