TOTAL POWER SOLUTIONS

# Automotive Tablet Oscilloscope

## ATO Series


TPS Company Video on Youtube
https://youtu.be/DTcA-IU2NWA

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## ATO Series


### Key Features

- 2 or 4 analog channels
- Max. 300MHz bandwidth
- Max. 2GSa/s sampling rate
- Up to 220Mpts memory depth
- 7500mAh large Li-ion battery
- Support electronic measurements for all vehicles
- Professional automotive diagnostic tests
- Compact portable design, best for field work
- Large battery support continual field work
- Android-based OS, 32GB internal storage
- Switchable 1MΩ/50Ω input impedance
- Deep memory to display all signal details
- Comprehensive serial bus trigger & decoding
- Support Wi-Fi, USB, PC and SCPI control
- Hardware-based filter to eliminates interferences
- Support segmented storage acquisition

## Product Overview

ATO series oscilloscope is an oscilloscope dedicated to automotive maintenance and diagnostics. Equipped with professional automotive diagnostic functions, it comes with 2 and 4 channels, max. 300MHz bandwidth, up to 2GSa/s sampling rate and 220Mpts memory depth, delivers most powerful signal capture and analysis capability.

With 10.1-inch high-resolution full touch screen, large built-in battery, and Micsig's dedicated SigtestUI™ multi-tasking system, the ATO automotive oscilloscope making modern automotive diagnostics much easier than ever before.

## Key Specifications

| Model | ATO3004 | ATO2004 | ATO2002 | ATO1004 |
|---|---|---|---|---|
| Bandwidth | 300MHz | 200MHz | 200MHz | 100MHz |
| Analog Channels | 4 | 4 | 2 | 4 |
| Rise Time | ⩽1.16ns | ⩽1.75ns | ⩽1.75ns | ⩽3.5ns |
| Sampling Rate (Max.) | 2GSa/S | 2GSa/S | 1GSa/S | 1GSa/S |
| Memory Depth | 220Mpts | 220Mpts | 110Mpts | 110Mpts |
| Input impedance | 1MΩ / 50Ω | | 1MΩ | |
| Support Tests | Charging/Start Circuits, Sensors, Actuators, Ignition, Networks (CAN, CAN FD, LIN, Flexray, K line), Combination Tests, Pressure test | | | |
| Bandwidth Filter | Full bandwidth, Low pass | | | |
| Interfaces | Wi-Fi, USB 3.0/2.0 Host, USB Type-C, Grounding, HDMI, Trigger out | | | |
| Display | Industrial 10.1" TFT-LCD (1280*800) | | | |
| Dimension / Net weight | 265*192*50mm / 1.9kg (with battery) | | | |
| Battery | 7.4V, 7500mAh, Li-ion battery | | | |

## Characteristics & Features

### Wi-Fi
Online system update

### Protocol Decoding
Standard RS-232/422/485/UART, CAN, CAN FD, LIN, SPI, I²C

### Portable Design
ABS+TPU protector, pre-installed handstrap, only 1.9kg, one hand to hold.


### Smooth Touch
10.1" integrated seamless touch screen, ultra-high 1280*800 resolution.

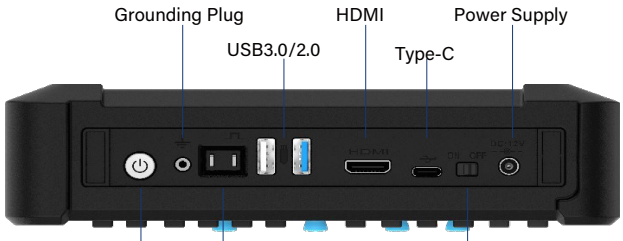
### Robust Hardware
Upgraded core hardware, fast CPU, 32G internal storage, support video recording

### Friendly UI
Fast Android OS experience, updated UI design, easy to use

### Auto-diagnostic Presets
Dedicated software for auto repair engineers, covering most of the auto repair tests.

- **Auto-diagnostic Presets**
- Charging/Start Circuit: 12V&24V charging, Alternator AC Ripple, Ford smart Alternator, 12V&24V Start, Cranking Current
- Sensor: ABS, Accelerator Pedal, Air Flow Meter, Camshaft, Coolant Temperature, Crankshaft, Distributor, Fuel pressure, Knock, Lamda, MAP, Road Speed, Throttle Position
- Actuators: Carbon Canister Solenoid Valve, Diesel Glow Plugs, EGR Solenoid Valve, Fuel Pump, Idle Speed Control Valve (IAC), Injector (Petrol), Injector (Diesel), Pressure Regulator, Quantity Control Valve, Throttle Servomotor, Variable-speed cooling fan, Variable Valve Timing
- Ignition: Primary, Secondary, Primary + Secondary
- Networks: CAN High & CAN Low, CAN FD, FlexRay, K line
- Combination Tests: Crankshaft + Camshaft, Camshaft + Primary Ignition, Primary ignition + Injector Vol, Crankshaft + Camshaft + Injector Vol. + Secondary Ignition
- Pressure Tests: Intake Manifold, Exhaust Tailpipe, In-Cylinder, In-Crankcase


Built-in large Li-ion battery, work where you work

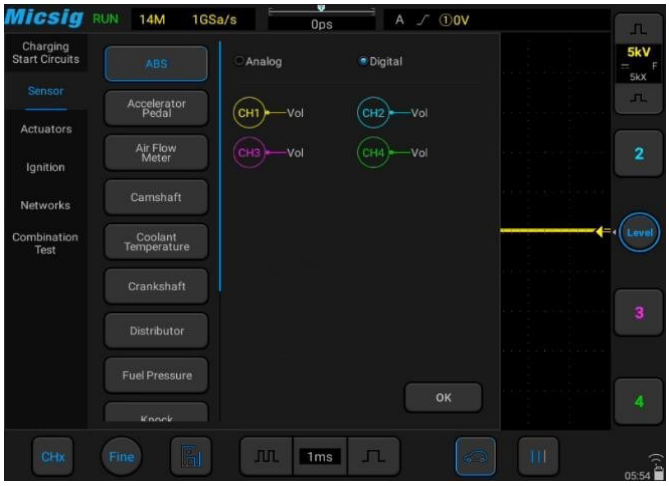



Complete connectivity (*switch Power-off lock to ON for first-time use)

The ATO series supports PC software + Mobile App (Android / iOS) remote control via Wi-Fi, USB to access internet for online upgrade, it also can be projected through HDMI port for demonstrations for training and education purpose.

## Automotive Diagnostic Presets


Support 12/24V Charging & Start circuit, AC Ripple, Cranking Current tests




Directly measure the waveform of various Sensors,by comparing with standard waveform, helps user easily find out possible problem.

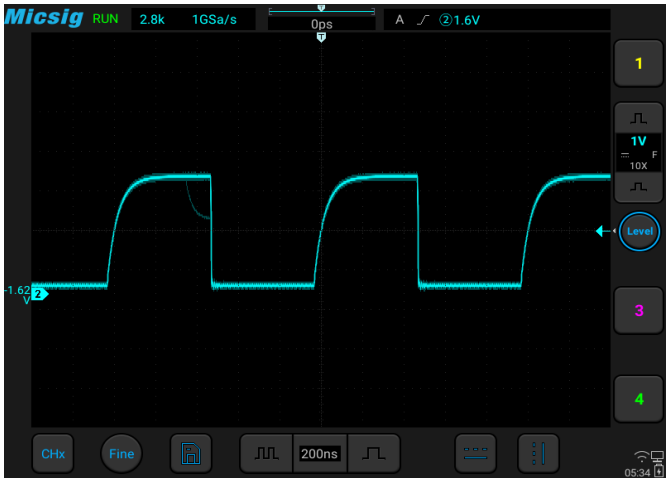

Support multiple Actuator tests, including Carbon Canister & EGR solenoid valve, Fuel PumpInjectors, Cooling fan, Pressure Regulator, etc.


The ignition system of a car is usually composed ofprimary and secondary coils and spark plugs. 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.

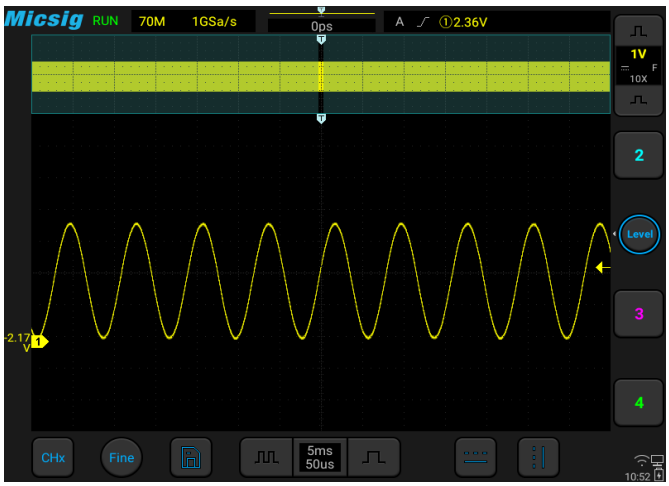

The electronic faults can be complicated, by comparing the collected various waveforms, users judgefaults by analyzing the timing and quantitative relationships between waveforms.

## • High Waveform Update Rate




With a waveform update rate of up to 300,000 wfm/s,the ATO can easily capture unusual or low probability events.

## • Ultra-deep Memory

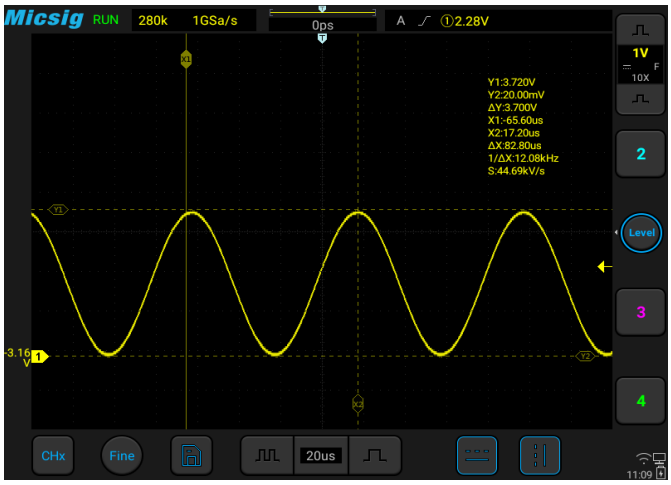



Using hardware-based Zoom technique and memorydepth of up to 220Mpts, users to move and browse waveforms much easier and quickly zoom in to focuson the area of interest

## • Powerful Trigger Functions

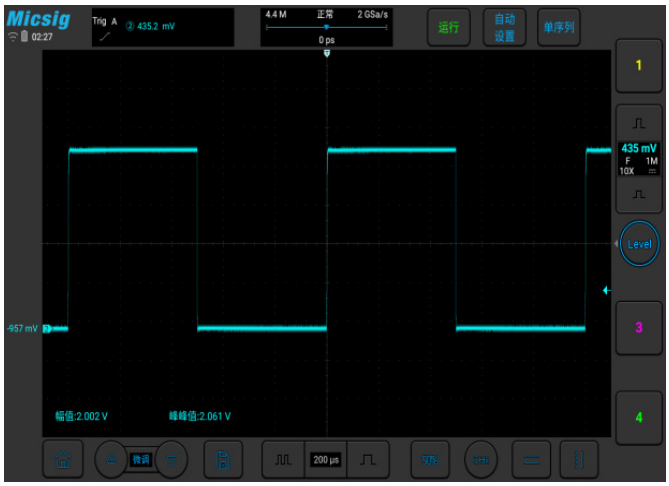

Support Edge, Pulse, Logic, N Edge, Runt, Slope, Timeout, Video and Serial trigger, most intuitive trigger settings.

## • Convenient Cursor Measurement




One touch to open horizontal and vertical cursors, eachcursor can be moved separately or simultaneously.

## • Vertical scale fining




By pinching two fingers apart on the screen, you can adjust the vertical scale as you like, no longer limited by the 1/2/5 step limit.

## • Serial Bus Decoding and Analysis


Support RS-232/422/485/UART, LIN, CAN, CAN FD, I²C, SPI serial bus decoding and triggering options, display waveform and data at the same time.

## Specifications

### Vertical System

| | |
|---|---|
| Input Coupling | DC, AC, GND |
| Bandwidth Filter | ATO3004 / ATO2004: Full bandwidth, Low pass (to 30Hz)<br>ATO2002 / ATO1004: Full bandwidth, Low pass (to 30KHz) |
| Input Impedance | ATO3004 / TO2004: 1MΩ±1% II 50Ω±1%<br>ATO2002 / ATO1004: 1MΩ±1% |
| Vertical Resolution | 8 bits |
| Vertical Divisions | 10 divisions |
| Input Sensitivity Range | ATO3004 / ATO2004: 1mV/div~10V/div (1MΩ) 1mV/div~1V/div (50Ω)<br>ATO2002 / ATO1004: 1mV/div~10V/div (1MΩ) |
| DC Gain Accuracy | 5mV/div~10V/div: ⩽±2.0%;<br>⩽2mV/div: ⩽±3.0% |
| Ch-to-Ch Isolation DC to Max. Bandwidth | ＞40dB (⩽100MHz), ＞35dB (＞100MHz) |
| Offset Range(1MΩ, 50Ω) | ±2.5V (Probe @ X1, ＜500mV/div), ±120V (Probe @ X1, ⩾500mV/div) |
| Maximum Input Voltage | CAT I 300Vrms 400Vpk (1MΩ), 5Vrms (50Ω) |

### Horizontal System

| | |
|---|---|
| Time Base | 1ns/div~1ks/div(ATO2002/AT01004:2ns/div-1ks/div) |
| Vertical Divisions | 11 divisions |
| Clock Drift | ⩽±5ppm / year |
| Time Base Accuracy | ±20ppm |

### Sampling System

| Model | ATO3004 / ATO2004 | ATO2002 / ATO1004 |
|---|---|---|
| Real-time Sampling Rate | 2G Sa/s (One CH), 1G Sa/s (All CH) | 1G Sa/s (One CH), 250M Sa/s (All CH) |
| Max. Memory Depth | 220Mpts | 110Mpts |
| Segmented Storage | Support | Not Support |
| Average | Selectable within 2, 4, 8, 16, 32, 64, 128, 256 | |
| Envelope | Selectable within 2, 4, 8, 16, 32, 64, 128, 256, ∞ | |

### Trigger System

| | |
|---|---|
| Trigger Mode | Auto, Normal, Single |
| Trigger Coupling (frequency) | DC, AC (70Hz), high frequency (40KHz), low frequency (40KHz), noise (10MHz) |
| Trigger Holdoff Range | 200ns~10s |
| Trigger Types | Edge, Pulse Width, Logic, N Edge, Runt Pulse (Runt), Slope, Time Out, Video |
| Bus decoding | RS-232/422/485/UART, CAN, CAN FD, LIN, SPI, $I^2C$ |

| Waveform Measurements | |
|---|---|
| Cursor | Horizontal, Vertical, Cross |
| Automated Measurements | 31 types. 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 & Resolution | 6 digits, 2Hz~Max bandwidth， PK-PK＞0.8div |
| Waveform Math | |
| Dual Waveform | +,-,*,/, Analog channel |
| FFT | Points: max. 275KdBVrms; Source: Analog channel; Resolution: Max 100Kpts<br>Window: Rectangular, Hamming, Blackman, Hanning |
| AX+B | A: ±1k, Min. Resolution 1p or 4it<br>B: ±1k, Resolution 1p or 5bit<br>X: Analog channel |
| Advanced Math | Advanced input, including +, -, *, /, <, >, ≤, ≥, ==, !=, &&, ll, (,), !(, sqrt, abs, deg, rad, exp. diff, In, sin, cos, tan, intg, lg, asin, acos, atan, |

| Display System | |
|---|---|
| Display Type | 10.1-inch TFT LCD capacitive, 11*10 divsions |
| Display Resolutlon | 1280*800 pixels |
| Persistence Duratlon | 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 |
| Waveform Update Rate | ATO3004/2004/3002 is 300,000 wfms/s,<br>ATO2002 / ATO1004 is 78,000 wfms/s |
| Clock | Real time, user adjustable |
| Language | English, Chinese, German, French, Czech, Korean, Spanish, Italian, Russia, 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 wavefomms |
| Quick Screenshot | Support |
| User Setting Storage | 10 intemal 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 |
| Other supported | Wi-Fi (2.4G); HDMI 1.4; Android / IOS App, PC Remote Control |

| Power Source | |
|---|---|
| Power Voltage Range | 100-240VAC，50/60Hz |
| Power Consumption | < 60W |
| Adapter Output | 12V DC,5A (ATO2002/ATO1004 is 12V DC, 4A) |
| Battery | 7.4V,7500mAh Li-ion battery |

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

| Physical Characteristics | |
|---|---|
| Dimensions (W × H × D) | 265*192*50mm |
| Weight | Net: 1.9kg (with battery), Volume Weight: 4.5kg |

| Standard Accessories | |
|---|---|
| Accessories | Passive BNC probes *2 |
| | Power adaptor *1 pc |
| | Power plug (Local) *1 pc |
| | Battery (Built-in) *1 pc |
| | 8" Screen protector *1 pc |
| | Alligator clips *2 pairs |
| | BNC to banana cable *2 or 4 pcs |
| | Flexible needle *2 pairs |
| | Hard case *1 pc (Master Kit) |
| | Multimeter probe *1 / pair (Master kit) |
| | Secondary ignition pickup *1 pc (Master kit) |
| Warranty | Three years for Base Unit;<br>180 days for accessories. |

| Options | |
|---|---|
| Bus Decoding | Standard: UART, LIN, CAN, SPI, $I^2C$; Optional: ARINC-429, MIL-STD-1553B |
| Weight | Customized handbag, hard shell suitcase;<br>High-frequency AC/DC current probe: 50MHz-100MHz, 6A/30A;<br>Low-frequency AC/DC current probe: 800KHz-2.5MHz, 10A/100A;<br>High-voltage differential probe: 100MHz, 700Vpk-5600Vpk;<br>SigOFIT optical-fiber isolated probe: 100MHz - 1GHz, 85kVpk, CMRR: DC -180dB. |