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SainSmart SATO1004

Micsig SATO1004 Portable Handheld Automotive Oscilloscope User Manual

Brand: SainSmart | Model: SATO1004

1. INTRODUCTION

The Micsig SATO1004 is a portable, handheld automotive oscilloscope designed for comprehensive vehicle diagnostics. Featuring a 4-channel, 100MHz bandwidth, and 1GSa/s sampling rate, this device integrates advanced signal testing capabilities within an 8-inch touch screen tablet form factor. It operates on an Android system, offering a user-friendly interface and enhanced diagnostic software. The SATO1004 is engineered to assist technicians in analyzing various automotive signals, ensuring efficient and accurate troubleshooting.



Figure 1.1: Micsig SATO1004 Automotive Oscilloscope displaying a waveform and a car graphic.

2. SETUP

2.1 Unboxing and Initial Inspection

Upon receiving your Micsig SATO1004, carefully open the packaging and inspect all components for any signs of damage. Ensure all listed accessories are present. The standard package includes the oscilloscope unit, power adapter, USB Type-C cable, and various test leads and probes.



Figure 2.1: Contents of the Micsig SATO1004 package, including the oscilloscope, power adapter, and various test leads.

2.2 Charging the Device

Before first use, fully charge the oscilloscope's internal Lithium Polymer battery. Connect the provided power adapter to the Type-C port on the device and plug it into a standard electrical outlet. The charging indicator will provide status updates. A full charge ensures optimal portable operation.

2.3 Powering On/Off

To power on the device, press and hold the power button located on the side until the screen illuminates. To power off, press and hold the power button again, then follow the on-screen prompts to shut down the Android system safely.

2.4 Connecting Probes and Accessories

The SATO1004 features standard BNC interfaces for connecting probes. As of July 5, 2023, all manufactured units utilize standard BNC interfaces, replacing the previous UPI interface. Ensure probes are securely connected to the appropriate channels (CH1, CH2, CH3, CH4) for accurate signal acquisition.



▲ UPI channel interface, manufactured date before July 5, 2023



▲ No UPI channel interface, manufactured date as of July 5, 2023

Figure 2.2: Illustration showing the transition from UPI channel interfaces to standard BNC interfaces on Micsig oscilloscopes manufactured after July 5, 2023.

2.5 Wi-Fi Connectivity

The SATO1004 supports Wi-Fi connectivity for remote operation via a smartphone application and for software updates. To connect, navigate to the Wi-Fi settings within the Android operating system. Please note that the device primarily supports 2.4GHz Wi-Fi networks and may not connect to 5GHz networks or those using WPA3 encryption exclusively. Ensure your network is configured for WPA/WPA2 for optimal compatibility.

3. OPERATING INSTRUCTIONS

3.1 User Interface and Controls

The SATO1004 features an 8-inch touch screen for intuitive operation, complemented by physical buttons for common functions. The physical control panel provides dedicated knobs for Trigger, Position, and Scale adjustments, allowing for precise waveform manipulation.

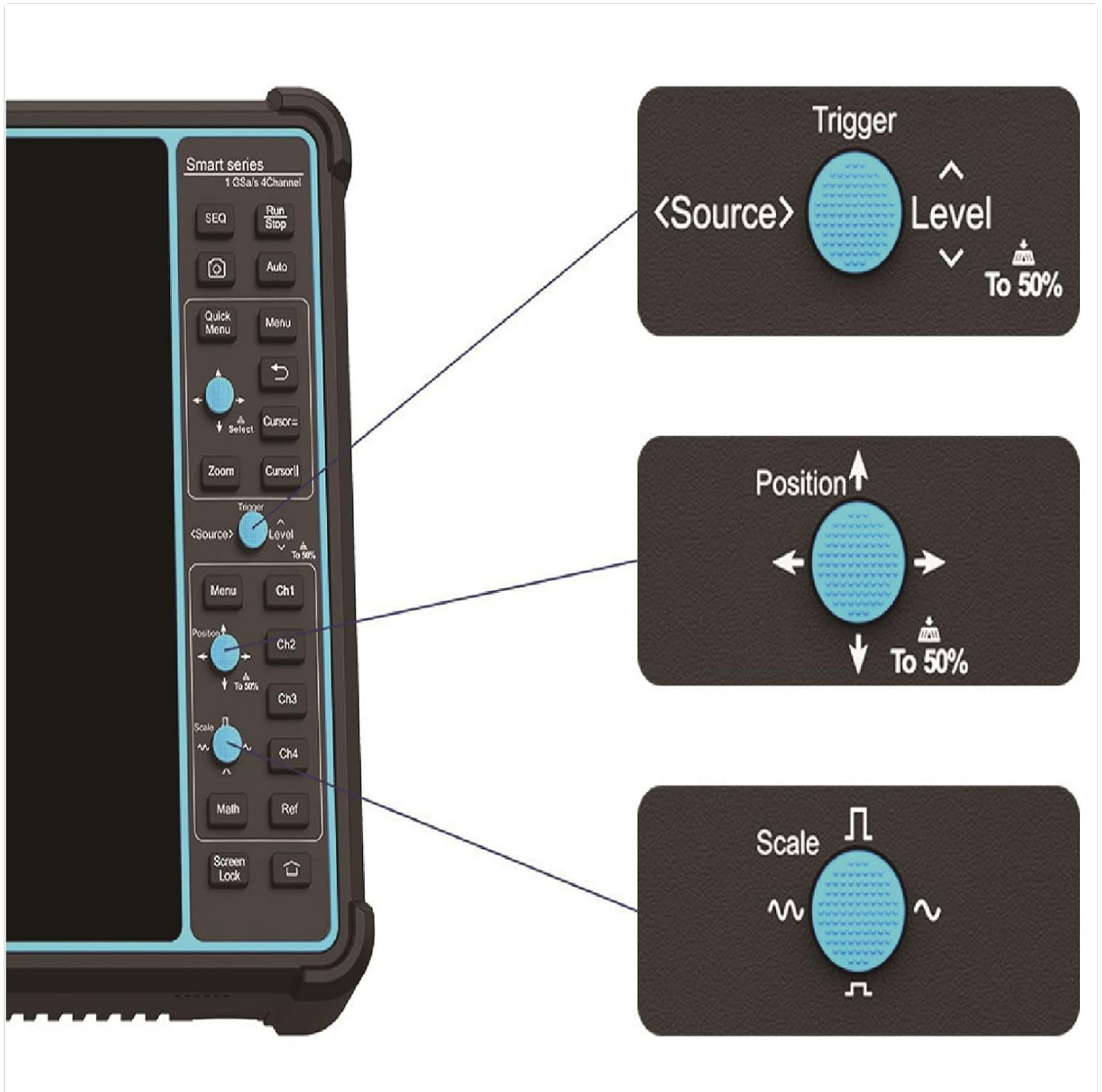


Figure 3.1: Detailed view of the physical control panel, highlighting the Trigger, Position, and Scale adjustment knobs.

3.2 Automotive Diagnostic Functions

The SATO1004 is equipped with optimized automotive diagnostic software, offering a wide range of preset tests for various vehicle systems. These include:

- **Ignition:** Primary and secondary ignition tests.
- **Sensors:** ABS, Accelerator Pedal, Air Flow Meter, Camshaft, Coolant Temperature, Crankshaft, Distributor, Fuel Pressure, Knock, O2 Sensor, Throttle Position, Wheel Speed, etc.
- **Actuators:** Carbon Canister Solenoid Valve, Diesel Glow Plugs, EGR Solenoid Valve, Fuel Pump, Idle Speed Control Valve (IAC), Injector (Petrol/Diesel), Pressure Regulator, Quantity Control, etc.
- **Networks:** CAN H/L, CAN FD, LIN, FlexRay, K-line communication tests.

- **Charging Circuit:** 12V/24V Charging, Alternator AC Ripple, 12V/24V Start, Cranking Current.
- **Starter Circuit:** Comprehensive analysis of starter motor operation.
- **Pressure Test:** Cylinder pressure, intake and exhaust pressure, fuel pressure, etc. (requires appropriate pressure transducers, not included).



Figure 3.2: Touch screen interface showing automotive diagnostic menu options, with a hand selecting a test.

Automotive Oscilloscope SATO1004
 100MHz | 4CH | 1GSa/s | 70Mpts

- ★ Portable tablet design with all-in-one functions
- ★ Comprehensive auto diagnostic presets package
- ★ Powerful signal capture and analysis capabilities
- ★ Support PC & Smartphone App remote control
- ★ HDMI function for training & demonstration
- ★ Life-long free firmware online upgrade

Charging/Starter Circuits	Combination Tests
Actuators	Ignition
Networks	Sensors

Auto Diagnosis | iOS | Android | Touch Screen | PC software | Video Record | HDMI | Wi-Fi | USB

Figure 3.3: Visual summary of the SATO1004's automotive diagnostic capabilities, including Charging/Starter Circuits, Actuators, Ignition, Networks, Sensors, and Combination Tests.

3.3 Waveform Display and Analysis

The 8-inch display provides a clear view of waveforms. Users can zoom, pan, and adjust trigger levels and positions using both touch gestures and physical knobs. The device supports various measurement functions for detailed signal analysis.



Figure 3.4: A hand adjusting a waveform on the SATO1004's touch screen, demonstrating interactive control.

3.4 Data Storage and Export

The SATO1004 comes with an upgraded 32GB internal storage, allowing users to save waveforms, screenshots, and recorded videos directly on the device. Files can be managed through the internal storage manager. For external transfer, the device supports USB Host functionality, enabling connection to external flash drives.

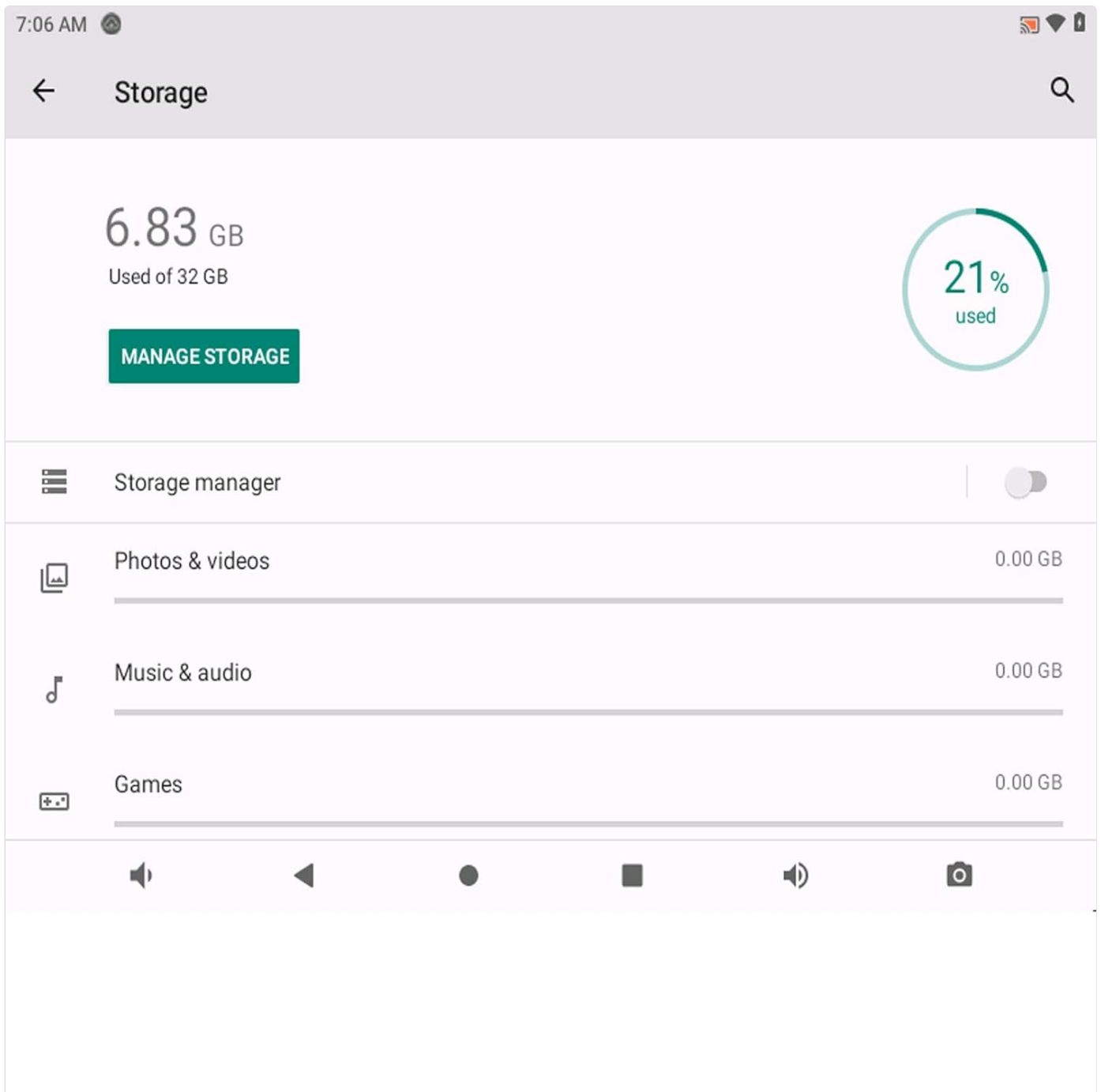


Figure 3.5: The storage management interface, indicating 6.83 GB used out of 32 GB total storage.

3.5 Remote Operation and HDMI Output

Under a stable Wi-Fi connection, the oscilloscope can be operated remotely via a smartphone application, allowing real-time waveform and data observation. The device also features an HDMI output, useful for training, demonstrations, or connecting to a larger display for enhanced viewing.

4. MAINTENANCE

4.1 Cleaning the Device

To maintain the device's performance and appearance, regularly clean the screen and casing with a soft, lint-free cloth. For stubborn marks, a slightly damp cloth with mild, non-abrasive cleaner can be used. Avoid excessive moisture and harsh chemicals.

4.2 Battery Care

The SATO1004 uses a Lithium Polymer battery. To prolong battery life, avoid fully discharging the battery frequently. Store the device in a cool, dry place when not in use for extended periods, ideally with the battery charged to around 50-70%.

4.3 Software Updates

Regular software updates are released to optimize performance, add new features, and address any known issues. Connect the device to a stable Wi-Fi network and check for updates periodically through the system settings. Keeping the software updated ensures access to the latest functionalities and improvements.

4.4 Storage Guidelines

When storing the oscilloscope, ensure it is placed in a protective environment, away from extreme temperatures, direct sunlight, and high humidity. Consider using a protective case to prevent physical damage during transport or storage.

5. TROUBLESHOOTING

5.1 Common Issues and Solutions

- **Device not powering on:** Ensure the battery is charged. Connect the power adapter and attempt to power on. If the issue persists, contact support.
- **Wi-Fi connection issues:** Verify that your Wi-Fi network is 2.4GHz and uses WPA/WPA2 encryption. Restart the device and your router.
- **Unable to save files to flash drive:** Ensure the flash drive is properly formatted and inserted into the USB Host port. Check the device's file management settings.
- **Screen unresponsive or displaying abnormalities:** Perform a soft reset by holding the power button until the device restarts. If the screen remains white or unresponsive, contact technical support.
- **Inaccurate readings:** Verify probe connections and calibration. Ensure the correct probe attenuation settings are selected on the oscilloscope.

For issues not covered here, refer to the official user manual PDF or contact SainSmart/Micsig customer support.

6. SPECIFICATIONS

Feature	Specification
Model Number	SATO1004
Channels	4
Bandwidth	100 MHz
Sampling Rate	1 GSa/s
Display	8-inch Touch Screen
Operating System	Android
Internal Storage	32 GB
I/O Ports	Wi-Fi, Type-C, LAN, HDMI, USB Host, USB Device, GND, DC Power
Power Source	Battery Powered (1 Lithium Polymer battery included)
Minimum Operating Voltage	7.5 Volts
Dimensions (Package)	12.6 x 10.91 x 6.77 inches
Weight (Package)	8.09 Pounds

7. WARRANTY AND SUPPORT

For warranty information, technical support, or service inquiries, please refer to the official SainSmart website or the Micsig product support page. A detailed user manual in PDF format is available for download, providing in-depth information on all features and operations.

Official User Manual (PDF): [Download PDF](#)