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OWON TA03102

OWON TAO3102 Portable Digital Oscilloscope User Manual

Model: TA03102

1. Introduction

The OWON TAO3102 is a high-performance portable digital oscilloscope designed for precise electronic measurements. It features a 2-channel input, 100 MHz bandwidth, and a 1 GS/s sample rate, making it suitable for a wide range of applications from hobbyist projects to professional diagnostics. Its low background noise and high waveform refresh rate of 45,000 wfms/s enable the capture of subtle signal details and transient events. The device also integrates advanced mathematical operations and multiple trigger modes for comprehensive signal analysis.



Figure 1: OWON TAO3102 Portable Digital Oscilloscope, front view.

2. Product Overview: Controls and Connectors

Familiarize yourself with the various controls and connectors on your TAO3102 oscilloscope for efficient operation.



Figure 2: Detailed view of the OWON TAO3102 oscilloscope, highlighting its controls and connectors.

- **8-inch (800x600) Multi-point Touchscreen:** The primary interface for waveform display and menu navigation.
- **Knobs:** Used to adjust vertical position, horizontal position, and trigger level.
- **Channel Selection and Horizontal/Vertical Control Areas:** Dedicated buttons and knobs for adjusting specific parameters.
- **Common Function Shortcut Keys:** Includes buttons for Copy, Default settings, Auto set, Run/Stop, etc.
- **Multimeter Connectors:** Input terminals for multimeter functions.
- **BNC Connectors:** Input channels for oscilloscope probes.
- **Probe Compensation Calibration Signal:** Output for probe calibration.
- **Pass/Fail Output Connector:** For automated testing.
- **USB Device Port:** For connecting to a computer.
- **USB Host Port:** For connecting USB storage devices.
- **LAN Port:** For network connectivity.
- **Power Adapter Connector:** For external power supply and charging.

3. Setup

3.1 Unpacking and Inspection

1. Carefully remove the oscilloscope and all accessories from the packaging.
2. Inspect the device for any signs of damage during transit. If damage is found, contact your dealer immediately.
3. Verify that all items listed in the packing list are present.

3.2 Powering On and Charging

- The TAO3102 is equipped with a 7.4V, 8000 mAh battery, providing approximately 5 hours of operation on a full charge.
- To charge the device or operate it using external power, connect the provided power adapter to the Power Adapter Connector on the side of the oscilloscope and plug it into a suitable power outlet.
- Press the power button located on the top right of the device to turn it on.

3.3 Physical Configuration

The TAO3102 offers versatile usage options:



Figure 3: The TAO3102 can be used in handheld, knapsack, or bracket configurations.

- **Handheld Type:** For maximum portability, the device can be held directly. An elastic anti-drop strap is provided on the back for secure handling.
- **Bracket Type:** Utilize the integrated stand to position the oscilloscope on a flat surface for stable viewing and operation.
- **Knapsack Type:** For field testing, the device can be carried in a knapsack or case (sold separately) for convenient transport.

4. Operating Instructions

4.1 Basic Oscilloscope Measurements

The TAO3102 is a 2-channel oscilloscope with a 100 MHz bandwidth and 1 GS/s sample rate. Connect your probes to the BNC connectors and the circuit under test.



Figure 4: The 8-inch high-resolution LCD multi-touch screen displaying waveform data.

- **Adjusting Vertical Scale and Position:** Use the dedicated vertical control knobs for each channel to adjust the voltage scale (V/div) and vertical position of the waveform.
- **Adjusting Horizontal Scale and Position:** Use the horizontal control knob to adjust the time base (s/div) and horizontal position of the waveform.
- **Auto Set:** Press the 'Auto' button for automatic adjustment of vertical, horizontal, and trigger settings to display a stable waveform.

4.2 Trigger Modes

The TAO3102 supports various trigger modes to capture specific events:

- **Edge Trigger:** Triggers on the rising or falling edge of a signal.
- **Video Trigger:** Triggers on standard video signals.
- **Pulse Trigger:** Triggers on pulses of specific width.
- **Slope Trigger:** Triggers on signals with a specific rise or fall time.

- **Runt Trigger:** Triggers on pulses that fail to cross a threshold.
- **Windows Trigger:** Triggers when a signal enters or exits a defined voltage window.
- **Timeout Trigger:** Triggers if a signal remains high or low for a specified duration.
- **PC Trigger:** Triggers based on specific patterns.
- **Serial Bus Triggers (SPI, RS232/UART, CAN, Nth Edge):** Specialized triggers for serial communication protocols.

4.3 Mathematical Operations and Digital Filtering

Perform advanced analysis on waveforms using built-in mathematical functions:

- **Basic Operations:** Add (+), Subtract (-), Multiply (*), Divide (/).
- **FFT (Fast Fourier Transform):** Analyze the frequency components of a signal.
- **FFT RMS:** Root Mean Square of the FFT.
- **Calculus:** Integration (Intg), Differentiation (Diff).
- **Square Root (Sqrt):** Calculates the square root of a waveform.
- **Custom Function:** User-defined mathematical operations.
- **Digital Filters:** Apply low-pass, high-pass, band-pass, or band-stop filters to waveforms.

4.4 Serial Bus Decoding

The TAO3102 supports decoding for common serial communication protocols:

- I2C
- SPI
- RS232
- CAN

Access these functions through the menu to configure and display decoded data.

4.5 Communication Functions

The oscilloscope offers various communication interfaces:

- **USB HOST:** Connect a USB flash drive to save waveform data, screenshots, or settings.
- **USB DEVICE:** Connect the oscilloscope to a computer for remote control, data transfer, and firmware updates using compatible software.
- **LAN:** Connect to a local area network for remote access and control.
- **Pass/Fail:** Configure automated tests where the oscilloscope compares input signals against defined masks and provides a pass/fail output.

MM+OSC=OWON TAO3102



Bandwidth: 100MHz
Channel: 2
Sample Rate: 1GS/s
Input Coupling: DC, AC, GND
Waveform Storage: 100 waveforms
Max Input Voltage: 1MΩ ⩽ 300Vrms;
Vertical Resolution (A/D)): 8 bits
Waveform Refresh Rate: 45,000 wfms/s

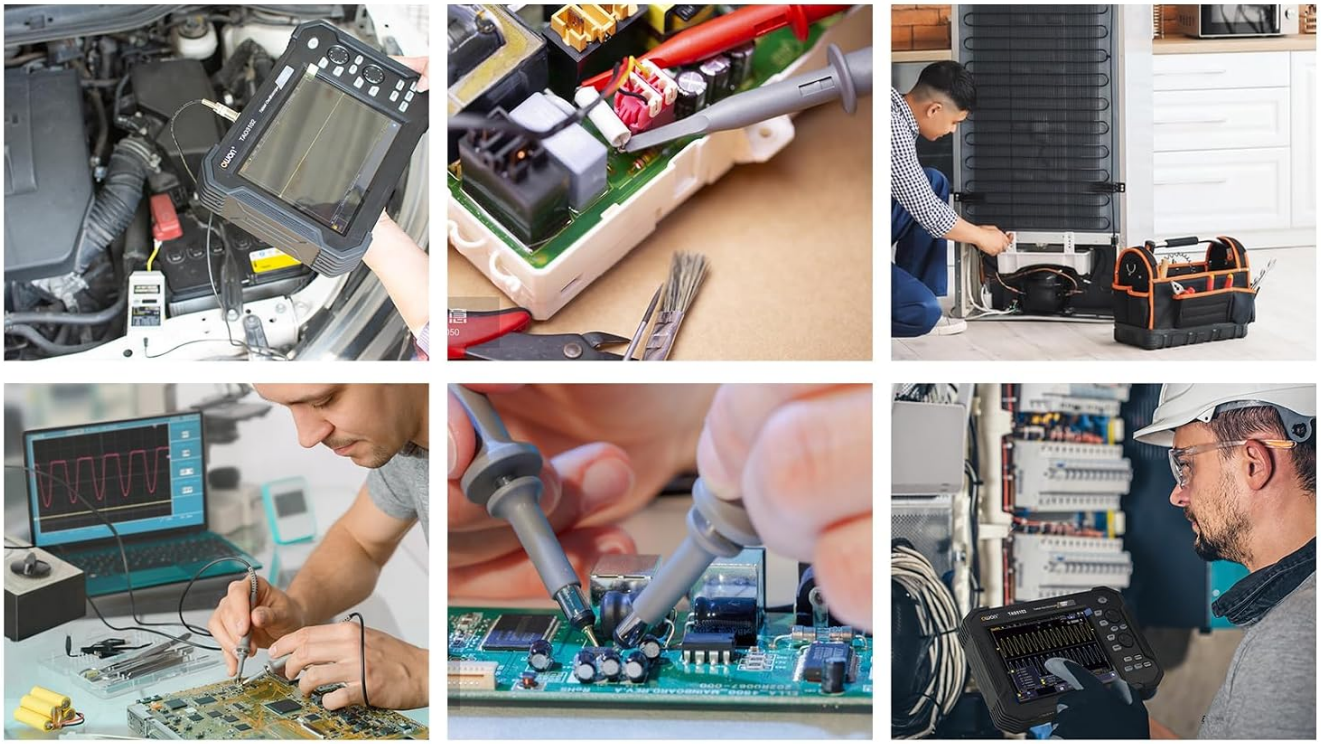


Figure 5: The TAO3102 being used in various electrical testing scenarios, including automotive diagnostics, appliance repair, and circuit board analysis.

5. Maintenance

5.1 Cleaning

- Clean the exterior of the oscilloscope with a soft, damp cloth. Do not use abrasive cleaners or solvents.
- For the screen, use a specialized screen cleaning solution and a microfiber cloth to avoid scratches.
- Ensure all ports and connectors are free from dust and debris.

5.2 Battery Care

- To prolong battery life, avoid fully discharging the battery frequently.
- If storing the device for an extended period, charge the battery to approximately 50% and store in a cool, dry place.
- Use only the original or an OWON-approved power adapter for charging.

5.3 Storage

- Store the oscilloscope in a dry environment, away from direct sunlight and extreme temperatures.
- Protect the screen from impact and scratches when not in use.

6. Troubleshooting

This section provides solutions to common issues you might encounter with your OWON TAO3102 oscilloscope.

Problem	Possible Cause	Solution
No display after powering on	Low battery; Power adapter not connected or faulty; Device malfunction.	Connect the power adapter and charge the device. Ensure the adapter is working. If the problem persists, contact support.
Unstable waveform display	Incorrect trigger settings; Probe compensation issues; Signal too noisy.	Adjust trigger level and mode. Perform probe compensation. Use averaging mode for noisy signals.
No signal detected	Probe not connected correctly; Faulty probe; Input coupling incorrect.	Check probe connections. Test with a known good probe. Verify input coupling (DC, AC, GND).
Touchscreen unresponsive	Temporary software glitch; Screen damage.	Restart the device. If unresponsive after restart, contact support.

For issues not covered here, please refer to the official OWON support resources.

7. Specifications

Key technical specifications for the OWON TAO3102 Portable Digital Oscilloscope:

Feature	Specification
Brand	OWON
Model	TA03102
Item Model Number	TA03102
Style	TA03102-UK
Product Dimensions (L x W x H)	19 x 27 x 4.8 cm (7.48 x 10.63 x 1.89 inches)
Item Weight	3.61 kilograms (7.96 lbs)
Color	Black
Channels	2
Bandwidth	100 MHz
Sample Rate	1 GS/s

Feature	Specification
Waveform Refresh Rate	45,000 wfms/s
Display	8-inch 800x600 High Resolution LCD Multi-touch Screen
Input Coupling	DC, AC, GND
Max Input Voltage	1MΩ ≤ 300Vrms
Vertical Resolution (A/D)	8 bits
Waveform Storage	100 waveforms
Power Source	Battery Powered (7.4V, 8000 mAh, approx. 5 hours operation)
Measurement Type	Multimeter functionality included
Connectivity	USB HOST, USB DEVICE, LAN
Country of Origin	China

8. Warranty and Support

OWON is committed to providing quality products and customer support.

- **Return Policy:** This product is subject to a 30-day return policy for refunds or replacements, as per the retailer's terms.
- **Spare Parts Availability:** Information regarding the availability of spare parts is currently not available. Please contact customer support for specific inquiries.
- **Software Updates:** Information regarding guaranteed software updates is not available. Please check the official OWON website or contact support for the latest firmware and software.
- **Manufacturer Support:** For technical assistance, warranty claims, or further inquiries, please contact OWON SmartTek Ltd. You can often find contact information on the retailer's product page or the official OWON website.

For direct support, please visit the Owon SmartTek Ltd seller page on Amazon.

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