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› HANMATEK HO51 3-in-1 Digital Oscilloscope, Multimeter, and Signal Generator User Manual

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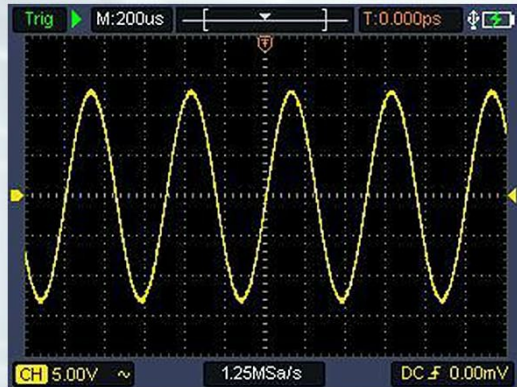
Model: HO51

1. INTRODUCTION

The HANMATEK HO51 is a versatile 3-in-1 handheld device combining the functionalities of a digital oscilloscope, a multimeter, and a signal generator. Designed for electronic troubleshooting, testing, and educational purposes, it offers a compact and lightweight solution for various measurement needs. This manual provides detailed instructions for setting up, operating, and maintaining your HO51 device.

3 IN 1 OSCILLOSCOPE & MULTIMETER & WAVEFORM GENERATOR

Oscilloscope



Multimeter



Waveform Generator

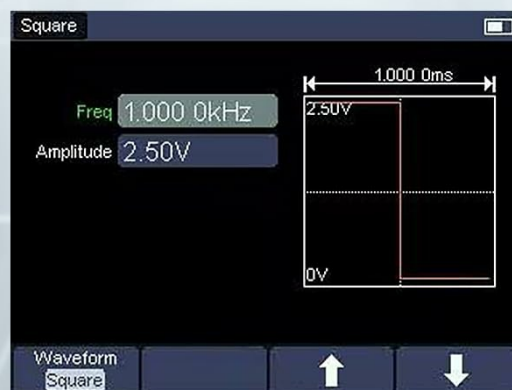


Figure 1: The HO51's integrated Oscilloscope, Multimeter, and Waveform Generator functions.

Key features include a 50 MHz bandwidth oscilloscope with a 200 MS/s sampling rate, advanced multimeter functions for precise measurements, and an integrated signal generator capable of emitting various waveforms up to 1 MHz. Its portable design, 3.5-inch color display, and PC software compatibility enhance usability and data analysis.

2. PRODUCT OVERVIEW AND CONTROLS

Familiarize yourself with the device's layout and controls before operation. The HO51 features a clear 3.5-inch HD LED display and intuitive button arrangement.

PRODUCT PARAMETERS



Figure 2: Front and side view of the HO51 with labeled components.

2.1 Front Panel Controls

- **Display Area:** Shows waveform, measurement data, and menu options.
- **Multi-Function Keys (F1-F4):** Context-sensitive keys for menu navigation and settings.
- **Mode Key:** Switches between Oscilloscope, Multimeter, and Signal Generator modes.
- **CH Key:** Selects the channel (if applicable) or related settings.
- **System Key:** Accesses system settings and configurations.
- **Save Key:** Saves current settings or waveform data.
- **Power Switch Key:** Turns the device on/off.
- **Trig/Δ Key:** Accesses the trigger menu (Oscilloscope) or relative value function (Multimeter).
- **HOR Key:** Adjusts horizontal scale/time base.
- **Return Key:** Navigates back in menus.
- **Measure Menu Key:** Opens measurement options (Oscilloscope) or range key (Multimeter).
- **Function of Direction Keys:** Used for navigation and adjusting parameters.
- **Auto Key:** Automatic setting key (Oscilloscope) or automatic range key (Multimeter).

- **Play/Pause (▶/||) Key:** Starts/stops waveform acquisition (Oscilloscope) or holds value (Multimeter).

2.2 Input/Output Ports

- **Multimeter Input Port (A, mA, COM, Ω V C-):** For connecting multimeter test leads.
- **The Measured Signal Input Connector (BNC):** For connecting oscilloscope probes.
- **Probe Compensation (2.5V/1KHz Square Wave Signal Output or Signal Generator Output Connector):** Used for probe calibration and signal generator output.
- **Charging or USB Communication Interface (Type-C):** For charging the device and connecting to a PC.

2.3 Physical Features

- **Bracket:** An expandable stand for convenient viewing.
- **Silicone Material:** Provides durability and grip.
- **ABS Material Silicone Jacket:** Offers protection against impacts.

APPEARANCE DESIGN TO MEET USER NEEDS

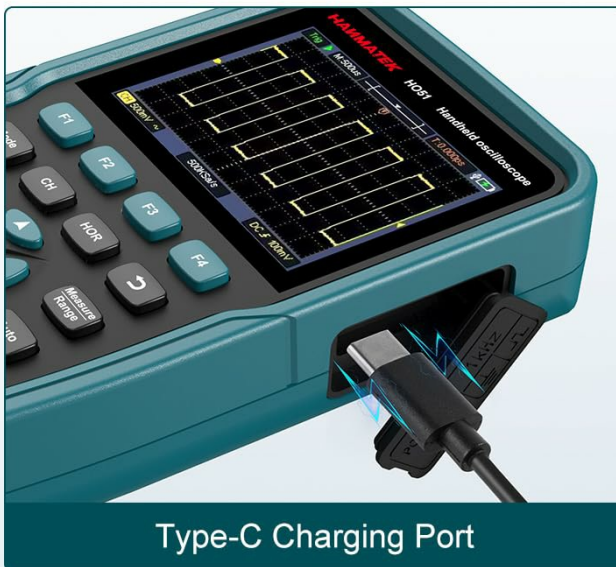


Figure 3: Detailed views of the HO51's design features.

3. SETUP

3.1 Package Contents

Verify that all items are present in the package:

- 1x HANMATEK HO51 Oscilloscope
- 1x Oscilloscope Probe
- 1x Pair of Multimeter Test Leads (Red and Black)
- 1x USB Type-C Charging Cable
- 1x Power Adapter
- 1x User Manual (on CD or printed)
- Small accessories (e.g., probe adjustment tool, color rings)



Figure 4: Included accessories with the HANMATEK HO51.

3.2 Initial Charging

Before first use, fully charge the device. Connect the USB Type-C cable to the HO51's charging port and the other end to the provided power adapter or a compatible USB power source. The device has a built-in 2000mAh rechargeable battery.

3.3 Language Selection

Upon initial power-on, the device may default to Chinese. To change the language:

1. Press the **System** key.
2. Navigate to the language option (often labeled with characters resembling 'Language' or 'Langue').
3. Select your desired language (e.g., English) using the direction keys and confirm.

Caractéristiques	Descriptions
Canal:	1
Largeur de bande:	50 MHz
Résolution verticale:	8 bits
Méthode d'échantillonnage:	Échantillonnage, détection de crête
Taux d'échantillonnage en temps réel:	250 MSa/s
Taux de rafraîchissement de la forme d'onde:	10 000 wfms/s
Précision de la base de temps:	±100ppm
Couplage d'entrée:	DC, AC, GND
Atténuation de la sonde:	1X, 10X, 100X, 1000X,10000X
Tension d'entrée maximale:	400V (DC+AC, PK-PK)
Mode de déclenchement:	Auto, Normal, Simple
Type de déclenchement:	Bord ascendant, bord descendant
Méthode de couplage:	AC / DC



Figure 5: The HO51 display showing language options and battery status.

3.4 Probe Calibration

For accurate oscilloscope measurements, calibrate the probe:

1. Connect the oscilloscope probe to the BNC input connector.
2. Connect the probe tip to the **Probe Compensation** terminal (2.5V/1KHz square wave output) located on the side of the device.
3. Adjust the compensation screw on the probe connector until a clear, stable square wave is displayed on the screen.

4. OPERATING INSTRUCTIONS

4.1 General Navigation

Use the **Mode** key to switch between the three main functions: Oscilloscope, Multimeter, and Signal Generator. The direction keys are used to navigate menus and adjust parameters. The **F1-F4** keys provide context-sensitive options relevant to the current mode and menu.

4.2 Oscilloscope Mode

In Oscilloscope mode, the device displays real-time waveforms. Connect the oscilloscope probe to the signal source.

- **Auto Setup:** Press the **Auto** key for automatic scaling and triggering.

- **Vertical Scale (VOLTS/DIV):** Adjust using the direction keys after selecting the vertical parameter.
- **Horizontal Scale (TIME/DIV):** Use the **HOR** key and direction keys to adjust the time base.
- **Trigger Settings:** Press **Trig/Δ** to access trigger options (Edge, Slope, Level).
- **Measurements:** Use the **Measure Menu** key to display automatic measurements like frequency, period, Vpp, Vrms, etc.
- **Waveform Capture:** Press the **Play/Pause** key to freeze or resume the waveform display.

4.3 Multimeter Mode

In Multimeter mode, the device performs various electrical measurements. Connect the multimeter test leads to the appropriate input ports (A, mA, COM, Ω VC→).

- **Function Selection:** Use the **F1-F4** keys or direction keys to select measurement types (Voltage, Current, Resistance, Capacitance, Diode Test, Continuity).
- **Auto Range:** The device supports automatic ranging. Manual range selection may be available via the **Measure Range** key.
- **Reading Hold:** Press the **Play/Pause** key to hold the current measurement on the display.

4.4 Signal Generator Mode

In Signal Generator mode, the device outputs various waveforms. Connect the output to the circuit under test via the Probe Compensation terminal.

- **Waveform Type:** Select Sine, Square, Ramp, or Pulse waveforms using the menu options.
- **Frequency Adjustment:** Adjust the output frequency (up to 1 MHz for some waveforms) using the direction keys.
- **Amplitude Adjustment:** Set the peak-to-peak voltage (Vpp) or peak voltage (Vp) of the output signal.

4.5 PC Connectivity

The HO51 can connect to a PC via its USB Type-C port for data transfer and advanced control using compatible software.

- **Data Export:** Save waveform data or measurement results to the device's internal memory and then transfer them to a PC for further analysis.
- **Remote Control:** Use the PC software to control the device's functions and view measurements on a larger screen.



Figure 6: PC connectivity for waveform saving and data export.

5. MAINTENANCE

5.1 Cleaning

To clean the device, use a soft, damp cloth. Do not use abrasive cleaners or solvents, as these can damage the casing or screen. Ensure the device is powered off and disconnected from any power source before cleaning.

5.2 Battery Care

The HO51 uses a rechargeable 2000mAh battery. To prolong battery life:

- Avoid fully discharging the battery frequently.
- Charge the device regularly, even if not in use for extended periods.
- Store the device in a cool, dry place when not in use.

5.3 Storage

When storing the HO51, ensure it is powered off. Keep it in a dry environment, away from extreme temperatures and direct sunlight. Use the provided carrying case to protect it from dust and physical damage.

6. TROUBLESHOOTING

If you encounter issues with your HANMATEK HO51, refer to the following common problems and solutions:

- **Device does not power on:**
Ensure the battery is charged. Connect the device to a power source using the USB Type-C cable and adapter. If the issue persists, contact support.
- **No waveform displayed in Oscilloscope mode:**
Check probe connections. Ensure the trigger settings are appropriate for the input signal. Try pressing the **Auto** key for automatic setup. Verify the input signal source is active.
- **Inaccurate multimeter readings:**
Ensure test leads are correctly connected to the appropriate input ports for the measurement type. Check the test leads for damage. Perform a self-calibration if available in the system settings.
- **Screen is frozen or unresponsive:**
Try pressing the **Play/Pause** key to unfreeze the display. If unresponsive, power off the device and restart it.
- **Cannot connect to PC:**
Ensure the USB Type-C cable is securely connected to both the device and the PC. Verify that the necessary PC software and drivers are installed.

7. SPECIFICATIONS

7.1 Oscilloscope Specifications

Characteristic	Description
Channel	1
Bandwidth	50 MHz
Vertical Resolution	8 bits
Sampling Method	Sampling, Peak Detection
Real-time Sampling Rate	250 MS/s
Waveform Refresh Rate	10,000 wfms/s
Time Base Accuracy	±100ppm
Input Coupling	DC, AC, GND
Probe Attenuation	1X, 10X, 100X, 1000X, 10000X
Maximum Input Voltage	400V (DC+AC, PK-PK)
Trigger Mode	Auto, Normal, Single
Trigger Type	Rising Edge, Falling Edge
Coupling Method	AC / DC



Figure 7: Oscilloscope specifications.

7.2 Multimeter Specifications

Characteristic	Description
Digital Display	24,000 counts
Measurement Type	Voltage, Current, Resistance, Capacitance, Continuity, Diode
Maximum Input Voltage (AC)	750V
Maximum Input Voltage (DC)	1000V
Maximum Input Current (AC)	10A
Maximum Input Current (DC)	10A
Continuity Test	√ (<50Ω)
Diode Test	√ (0-2V)
Auto Range	√
TRMS	√



Figure 8: Multimeter specifications.

7.3 Signal Generator Specifications

Characteristic	Description
Waveform Type: Sine Frequency	10Hz~100KHz (Step-by-step according to 1-2-5 method)
Waveform Type: Square Frequency	10Hz~100KHz (Step-by-step according to 1-2-5 method)
Waveform Type: Ramp Frequency	10Hz~100KHz (Step-by-step according to 1-2-5 method)
Waveform Type: Pulse Frequency	10Hz~10KHz (Step-by-step according to 1-2-5 method)
Amplitude	1Vpp or 2.5Vpp

Caractéristiques	Descriptions	
Forme d'onde Fréquence	Sinus:	10Hz~100KHz
		Pas à pas selon la méthode 1-2-5
	Carré:	10Hz~100KHz
		Pas à la manière de 1-2-5
	Rampe:	10Hz~100KHz
		Pas à la manière de 1-2-5
	Impulsion:	10Hz~10KHz
		Marche dans le sens 1-2-5
Amplitude:	1Vpp ou 2.5Vpp	



Figure 9: Signal Generator specifications.

8. WARRANTY AND SUPPORT

HANMATEK products are designed for reliability and performance. For warranty information, please refer to the documentation included with your purchase or visit the official HANMATEK website. If you require technical assistance or have questions not covered in this manual, please contact HANMATEK customer support through their official channels.