**FNIRSI 2C53T**

# FNIRSI 2C53T 3-in-1 Handheld Digital Oscilloscope, Multimeter, and Signal Generator User Manual

Model: 2C53T

## 1. INTRODUCTION

The FNIRSI 2C53T is a versatile 3-in-1 handheld device designed for electronic testing and measurement. It integrates the functionalities of a digital oscilloscope, a true RMS multimeter, and a signal generator into a single, portable unit. This manual provides detailed instructions for the safe and effective use of your device.

**Figure 1.1:** The FNIRSI 2C53T handheld device, showcasing its compact design and integrated display.

## 2. PRODUCT OVERVIEW

The FNIRSI 2C53T combines three essential tools for electrical and electronic work:

- **Digital Oscilloscope:** 2 channels, 50MHz bandwidth, 250MS/s real-time sample rate.
- **True RMS Multimeter:** 4.5 digits, 19999 counts, capable of measuring voltage, current, resistance, capacitance, diode, continuity, and temperature.
- **Signal Generator:** Outputs 13 types of waveforms with adjustable frequency (0-50KHz), amplitude (0-3V), and duty cycle (0-100%).

The device features a robust hardware architecture (ARM + FPGA + ADC) for enhanced performance and flexibility. It also includes a 2.8-inch wide-angle display for clear readability.

**Figure 2.1:** Front view of the FNIRSI 2C53T, showing the display, control buttons, and input terminals.

## Included Components:

- FNIRSI 2C53T Main Unit
- P6100 High Voltage Probe (x2)
- Alligator Clip (x1)
- Test Probe (x1)
- Type-C Charging Cable (x1)
- Storage Bag (x1)
- Instruction Manual (x1)
- Packing Box (x1)

## 3. Setup

### 3.1 Charging the Device

The 2C53T has a built-in rechargeable lithium polymer battery. Before first use, fully charge the device using the provided

Type-C charging cable and a compatible USB power adapter (not included). The charging port is located on the side of the device.

- Connect the Type-C cable to the device's charging port.
- Connect the other end of the cable to a USB power source.
- The battery indicator on the screen will show charging status.
- A full charge provides approximately 6 hours of standby time.

## 3.2 Powering On/Off

Press and hold the power button (usually marked with a power symbol) to turn the device on or off.

## 3.3 Connecting Probes

Depending on the function you intend to use (oscilloscope or multimeter), connect the appropriate probes to the designated input terminals on the device. Ensure connections are secure.



**Figure 3.1:** Illustrations of the Type-C charging port, internal battery, and the integrated stand for convenient placement.

## 4. Operating Instructions

The FNIRSI 2C53T offers three primary operating modes: Oscilloscope, Multimeter, and Signal Generator. Please note that these three functions cannot be used simultaneously.

## 4.1 Oscilloscope Function

The oscilloscope mode allows for the visualization and analysis of electrical signals.

- **Channels:** The device features 2 input channels.
- **Bandwidth:** 50MHz.
- **Sample Rate:** 250MS/s real-time.
- **Trigger Modes:** Select from Auto, Normal, or Single trigger modes to stabilize waveforms.
- **Vertical Sensitivity:** Adjustable from 200mv/div to 10v/div.
- **Maximum Input Voltage:** 400V.
- **Display Modes:** Choose between Y-T (standard time-domain display), Roll (for slow-changing signals), and X-Y (for Lissajous figures).
- **Advanced Features:** Includes mathematical operations, cursor measurement, FFT spectrum analysis, and persistence display for detailed waveform analysis.

**Figure 4.1:** Examples of oscilloscope display features, including mathematical operations, cursor measurements, persistence display, and X-Y mode for Lissajous figures.

## 4.2 Multimeter Function

The multimeter mode provides precise digital measurements of various electrical parameters.

- **Display:** 4.5 digits with 19999 counts.
- **True RMS:** Provides accurate readings for non-sinusoidal waveforms.
- **Measurement Capabilities:** DC/AC Voltage, DC/AC Current, Resistance, Capacitance, Diode, Continuity Check, and Temperature.
- **Maximum Measurements:** AC 750V, DC 1000V.
- **Auto-Ranging:** Automatically selects the appropriate measurement range; simply press the AUTO button.

**Figure 4.2:** The multimeter interface displaying various measurement options such as voltage, current, resistance, and capacitance.

## 4.3 Signal Generator Function

The signal generator mode allows you to output various waveforms for testing circuits.

- **Waveform Types:** Outputs 13 types of parameter-variable waveforms, including Sine, Square, Pulse, Ramp, Noise, and DC.
- **Output Frequency:** Adjustable from 0 to 50KHz.
- **Output Amplitude:** Adjustable from 0 to 3V.
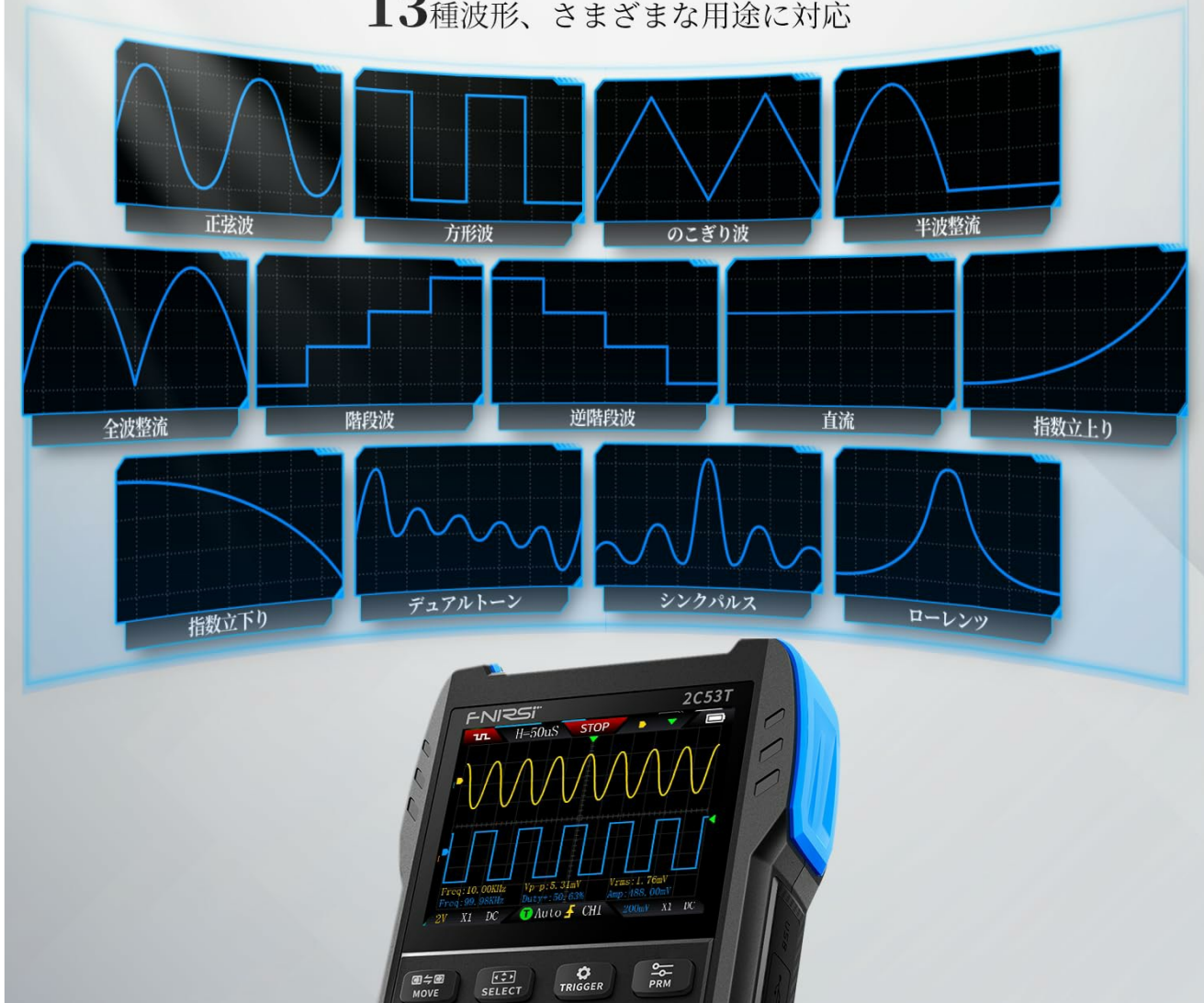- **Output Duty Cycle:** Adjustable from 0% to 100%.

**Figure 4.3:** The signal generator interface showing examples of different output waveforms such as sine, square, and pulse waves.

# 5. MAINTENANCE

Proper maintenance ensures the longevity and accuracy of your FNIRSI 2C53T.

- **Cleaning:** Use a soft, dry cloth to clean the device. Do not use abrasive cleaners or solvents. Ensure no liquids enter the device.
- **Battery Care:** To prolong battery life, avoid fully discharging the device frequently. If storing for extended periods, charge the battery to approximately 50% and recharge every few months.
- **Storage:** Store the device in a cool, dry place away from direct sunlight, extreme temperatures, and high humidity. Use the provided storage bag to protect it from dust and physical damage.
- **Probe Care:** Inspect probes and cables regularly for any signs of wear or damage. Replace damaged components immediately to ensure safety and accurate measurements.
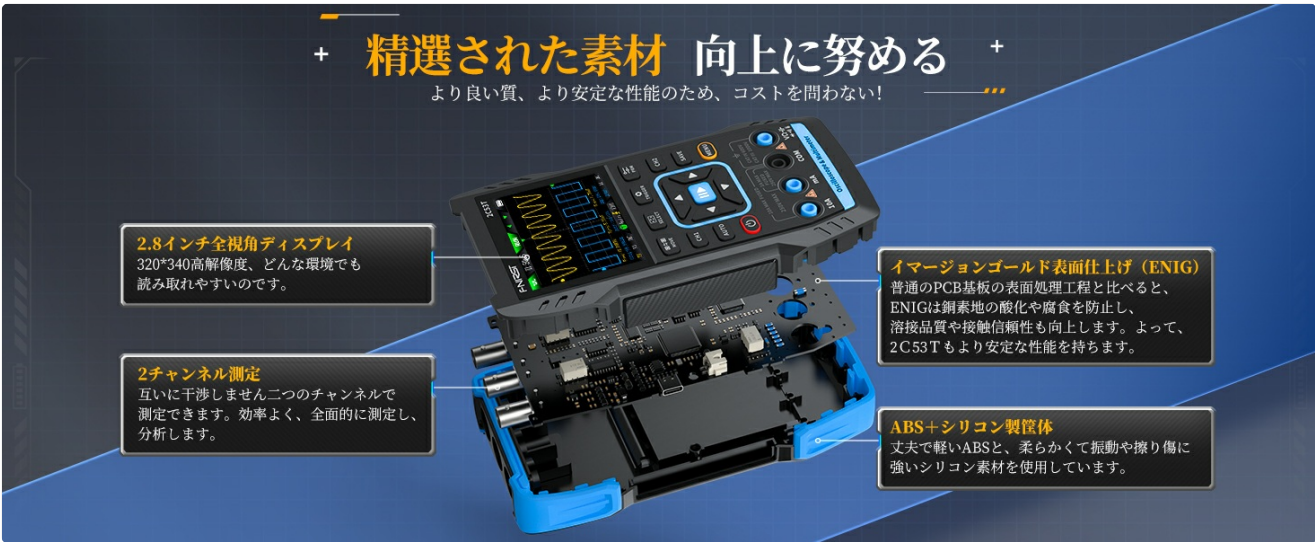
**Figure 5.1:** An exploded view illustrating the internal components and the durable ABS+silicon construction of the FNIRSI 2C53T, designed for stable performance and protection.

## 6. TROUBLESHOOTING

If you encounter issues with your FNIRSI 2C53T, refer to the following common troubleshooting steps:

- **Device Not Powering On:** Ensure the battery is sufficiently charged. Connect the device to a power source using the Type-C cable and try again.
- **Incorrect Readings:** Verify that probes are correctly connected and not damaged. Ensure the correct measurement mode is selected for the task. Check probe compensation for oscilloscope measurements.
- **Unstable Waveform:** Adjust the trigger settings (level, mode) in oscilloscope mode. Ensure the input signal is within the device's specifications.
- **Functions Not Working Simultaneously:** Remember that the oscilloscope, multimeter, and signal generator functions cannot be used at the same time. Switch between modes as needed.
- **PC Connection Issues:** Ensure the Type-C cable is properly connected. Check your computer's device manager to see if the device is recognized.

For persistent issues or problems not covered here, please contact customer support.

## 7. SPECIFICATIONS

| Feature | Specification |
| --- | --- |
| Manufacturer | FNIRSI |
| Model Number | 2C53T |
| Item Weight | 300 g |
| Product Dimensions (L x W x H) | 8.9 x 3.5 x 16.7 cm |
| Battery Type | 1 Lithium Polymer battery (included) |
| Measurement Accuracy | +/-5% |
| Oscilloscope Bandwidth | 50MHz |
| Oscilloscope Sample Rate | 250MS/s |

| Feature | Specification |
| --- | --- |
| Multimeter Counts | 19999 |
| Signal Generator Frequency Range | 0-50KHz |
| Date First Available | 2024/11/28 |

## 8. WARRANTY AND SUPPORT

FNIRSI Technology Co., Ltd. is committed to providing high-quality measuring instruments. For any inquiries, technical assistance, or warranty claims, please contact our support team.

- **Customer Support Email:** support@fnirsi.com
- **Online Resources:** A PDF user manual may be available for download on the product's detail page or the official FNIRSI website.
- **Brand Store:** Visit the official FNIRSI store for more products and information:FNIRSI Amazon Store