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 - › FNIRSI 2C53T Upgraded Handheld Oscilloscope, Multimeter, DDS Generator User Manual

FNIRSI FNIRSI-2C53T

**FNIRSI 2C53T Upgraded Handheld Oscilloscope, Multimeter, and
DDS Signal Generator User Manual**

Model: FNIRSI-2C53T | Brand: FNIRSI

1. INTRODUCTION AND OVERVIEW

The FNIRSI 2C53T is a highly integrated, multi-functional handheld instrument combining a dual-channel oscilloscope, a 4.5-digit multimeter, and a DDS signal generator. This upgraded version of the 2C23T offers enhanced measurement capabilities including math operations, cursor measurement, persistence mode, and XY mode, making it an indispensable tool for professionals, students, and hobbyists in electronics.

3 IN 1 DUAL CHANNEL DIGITAL OSCILLOSCOPE

OSCILLOSCOPE+MULTIMETER+SIGNAL GENERATOR



50MHZ BANDWIDTH



± 400 Voltage



4.5 Digits



Figure 1.1: The FNIRSI 2C53T, showcasing its integrated oscilloscope, multimeter, and signal generator functions.

Key features include a 50 MHz bandwidth oscilloscope with a 250 MSa/s sampling rate, a multimeter with 19999 counts for precise measurements, and a signal generator capable of outputting 13 different waveforms up to 50 kHz. Its compact design, 2.8-inch LCD display, and built-in 3000 mAh Li-ion battery ensure portability and long operational hours.



FEATURE

FNIRSI-2C53T

FNIRSI-2C23T

Sample Rate (Oscilloscope)

250MSa/s

50MSa/s

Analog Bandwidth

50MHz

10MHz

Storage Depth

1Kpts

32kb

Display Mode

YT/Scroll/XY

YT/Scroll

Waveform Analysis

8 Basic Operations + FFT

/

Cursor Measurement

Available

/

Multimeter Digits

4.5 Digits (19,999 Counts)

4 Digits (10,000 Counts)

Signal Generator
Frequency

0-50kHz

1Hz-2MHz

Signal Types (Generator)

13

7

Figure 1.2: A comparison highlighting the upgraded features of the FNIRSI 2C53T over its predecessor, the 2C23T.

2. WHAT'S IN THE BOX

Upon opening your FNIRSI 2C53T package, please verify that all the following items are included:

- FNIRSI 2C53T Main Unit
- 10X Oscilloscope Probe (Quantity: 1)
- Crocodile Clip Probe (Quantity: 1)
- Multimeter Probe (Quantity: 1 pair)
- Type-C Charging Cable (Quantity: 1)
- Storage Case (Quantity: 1)
- User Manual (This document)



Figure 2.1: Illustration of the FNIRSI 2C53T and its included accessories.

3. SETUP

Before first use, ensure the device is fully charged. Connect the provided Type-C cable to the device and a 5V/1A power adapter. The charging indicator will show the charging status.

3.1 Connecting Probes

The FNIRSI 2C53T supports various probes for its different functions:

- **Oscilloscope Probes (10X):** Connect these to the CH1 and CH2 BNC connectors on the top of the device for waveform observation. Ensure the probe's attenuation setting matches the device's setting.
- **Multimeter Probes:** Insert the red probe into the VΩHz+ or 10A/mA jack (depending on measurement type) and the black probe into the COM jack for multimeter functions.
- **Crocodile Clip Probe:** This can be used with the signal generator output (DDS) or for specific multimeter measurements requiring a secure connection.

4. OPERATING INSTRUCTIONS

The FNIRSI 2C53T features an intuitive interface with dedicated buttons for mode selection, navigation, and function control. Press the power button to turn the device on or off.

4.1 Oscilloscope Mode

The oscilloscope function allows for detailed waveform analysis. It features a 50 MHz analog bandwidth and a 250 MSa/s real-time sampling rate across two independent channels (CH1, CH2).

DUAL CHANNEL
50MHZ ANALOG BANDWIDTH
250MS/S SAMPLING RATE

CH1

CH2

DDS

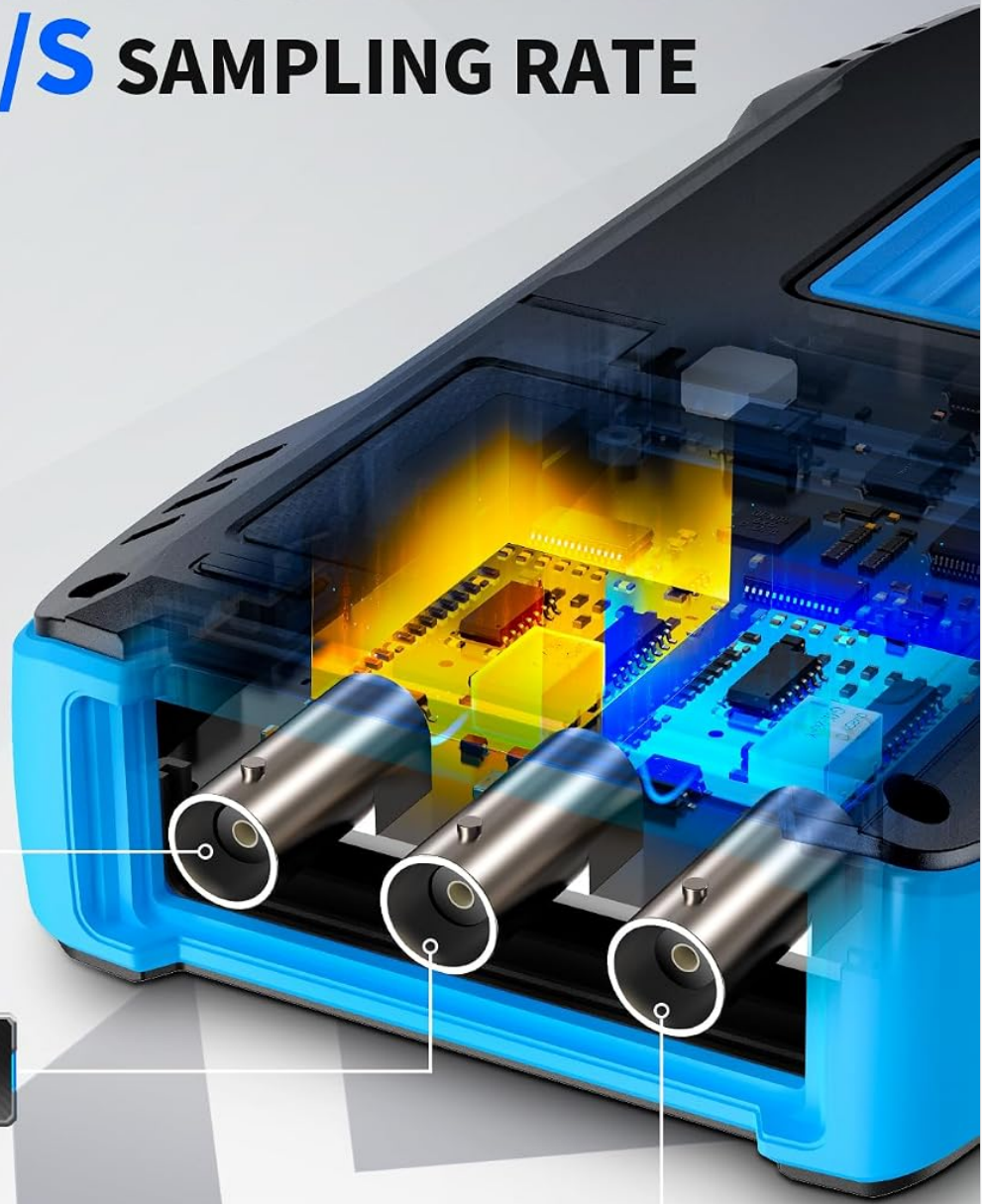


Figure 4.1.1: The FNIRSI 2C53T's dual-channel oscilloscope capabilities, highlighting its bandwidth and sampling rate.

Key Features:

- **Automatic Measurement:** Use the 'AUTO' button for quick waveform display and automatic parameter measurement.
- **Waveform Analysis:** Supports 8 basic operations and FFT (Fast Fourier Transform) for in-depth signal analysis.
- **Cursor Measurement:** Precisely measure voltage and time differences on the waveform using movable cursors.

- **Persistence Mode:** Observe signal changes over time, useful for identifying glitches or infrequent events.
- **XY Mode:** Display the relationship between two signals, often used for phase analysis or Lissajous figures.
- **Waveform Storage:** Save waveform images for later review or export to a PC via the Type-C interface.

WAVEFORM ANALYSIS

8 BASIC OPERATIONS + FFT OPERATIONS

Support waveform screenshot saving,
viewing, convenient for secondary analysis

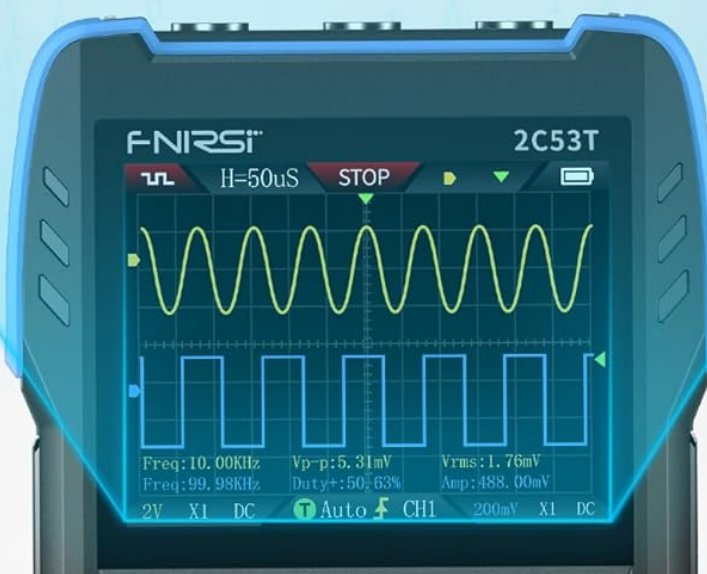
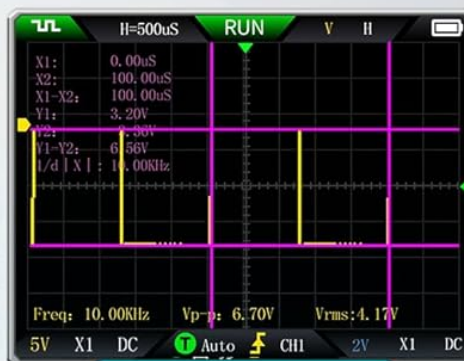


Figure 4.1.2: Detailed view of the waveform analysis capabilities, including various display and measurement modes.

Video 4.1.1: An official demonstration of the FNIRSI 2C53T's oscilloscope functions and features.

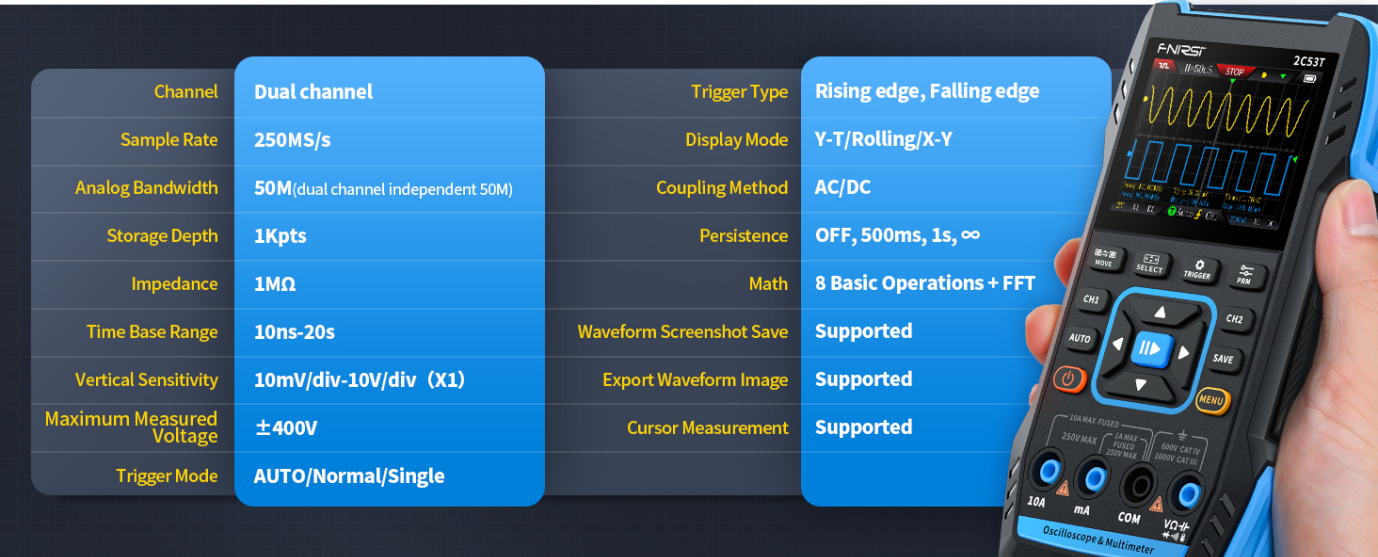


Figure 4.1.3: Detailed specifications for the oscilloscope function, including channel type, sampling rate, bandwidth, and more.

4.2 Multimeter Mode

The integrated 4.5-digit multimeter provides precise measurements with 19999 counts, suitable for a wide range of electrical testing applications.

MULTIMETER MODE

4.5 DIGITS

19,999 COUNTS

UP TO
AC750V,DC1000V

INTELLIGENT ANTI
BURNING



Figure 4.2.1: The FNIRSI 2C53T in Multimeter Mode, showing its high-resolution display.

Measurement Capabilities:

- AC Voltage: 0-750 V
- DC Voltage: 0-999.9 V
- DC/AC Current: 0-9.999 A

- **Resistance:** 0-19.99 MΩ
- **Capacitance:** 0-99.99 mF
- **Continuity Measurement:** For checking circuit continuity.
- **Diode Test:** For testing diode functionality.



Figure 4.2.2: An overview of the diverse measurement functions available in multimeter mode.

Video 4.2.1: A detailed tutorial demonstrating the various multimeter functions of the FNIRSI 2C53T.

Function	Range	Accuracy
DC Voltage	1.9999V/19.999V/199.99V/1000V	±(0.5%+3)
AC Voltage	1.9999V/19.999V/199.99V/750.0V	±(1%+3)
DC Current	19.999mA/199.99mA/1.9999A/9.999A	±(1.2%+3)
AC Current	19.999mA/199.99mA/1.9999A/9.999A	±(1.5%+3)
Temperature	19.999MΩ/1.9999MΩ/199.99KΩ/19.999KΩ	±(0.5%+3)
Diode	1.9999KΩ/199.99Ω	±(2.0%+3)
Resistance	999.9uF/99.99uF/9.999uF/999.9nF/99.99nF/9.999nF	±(2.0%+5)
Capacitance	9.999mF/99.99mF	±(5.0%+20)
Continuity test	(-55~1300°C)/(-67~2372°F)	±(2.5%+5)
Diode	✓	
Continuity test	✓	

Figure 4.2.3: Detailed specifications for the multimeter function, including ranges and accuracy for various measurements.

4.3 Signal Generator Mode (DDS)

The built-in DDS (Direct Digital Synthesis) signal generator can output 13 different waveforms with a maximum frequency of 50 kHz and a step of 1 Hz.

「DDS SIGNAL GENERATOR」

13 SIGNAL WAVEFORMS

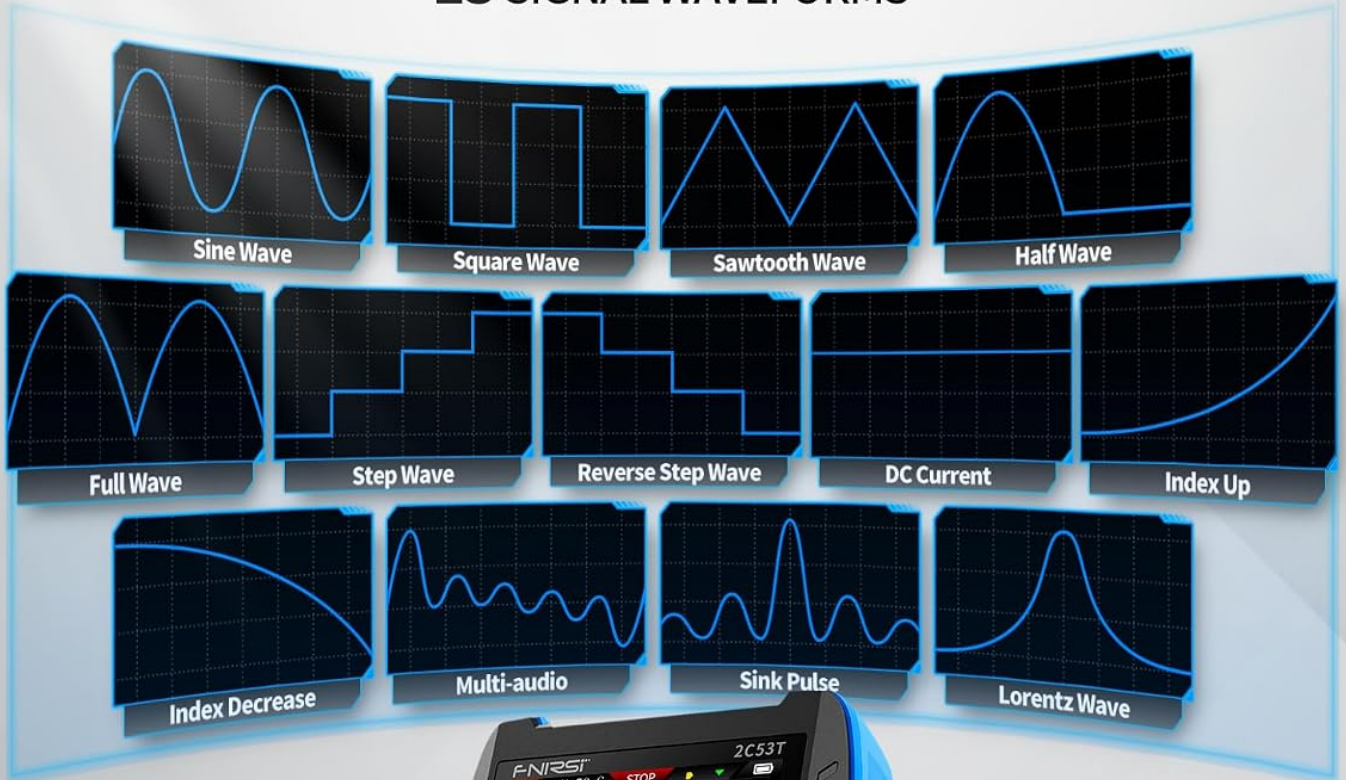


Figure 4.3.1: The FNIRSI 2C53T's DDS Signal Generator, illustrating the variety of waveforms it can produce.

Available Waveforms: Sine Wave, Square Wave, Sawtooth Wave, Half Wave, Full Wave, Step Wave, Reverse Step Wave, DC Current, Index Up, Index Decrease, Multi-audio, Sink Pulse, Lorentz Wave.

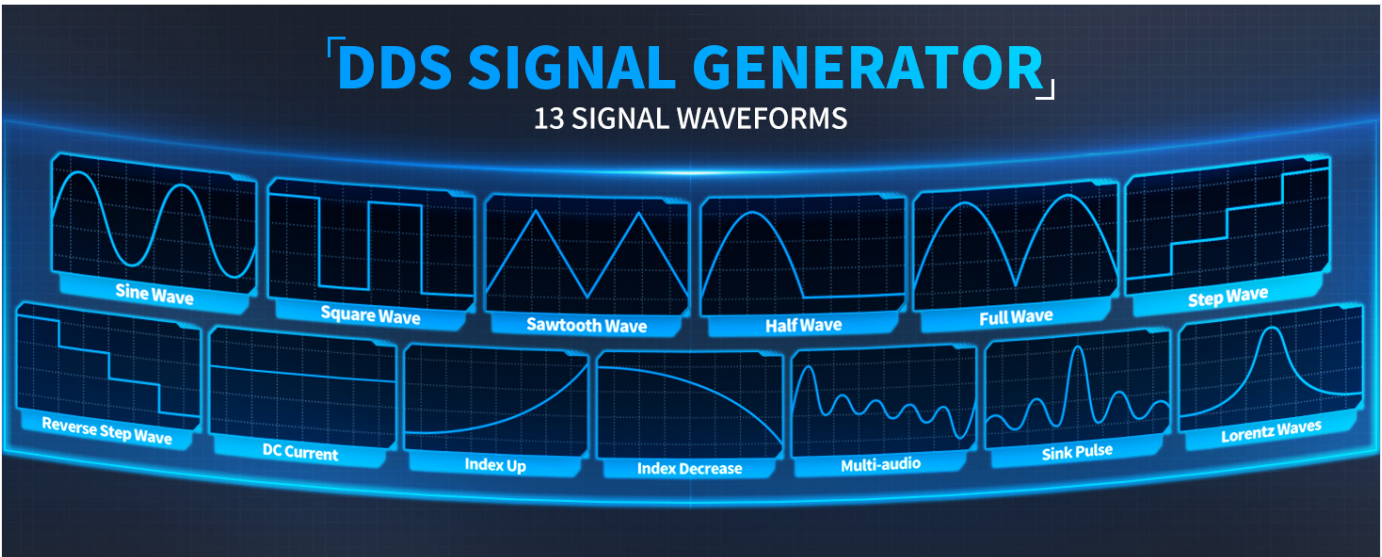


Figure 4.3.2: A visual guide to the 13 distinct signal waveforms generated by the device.

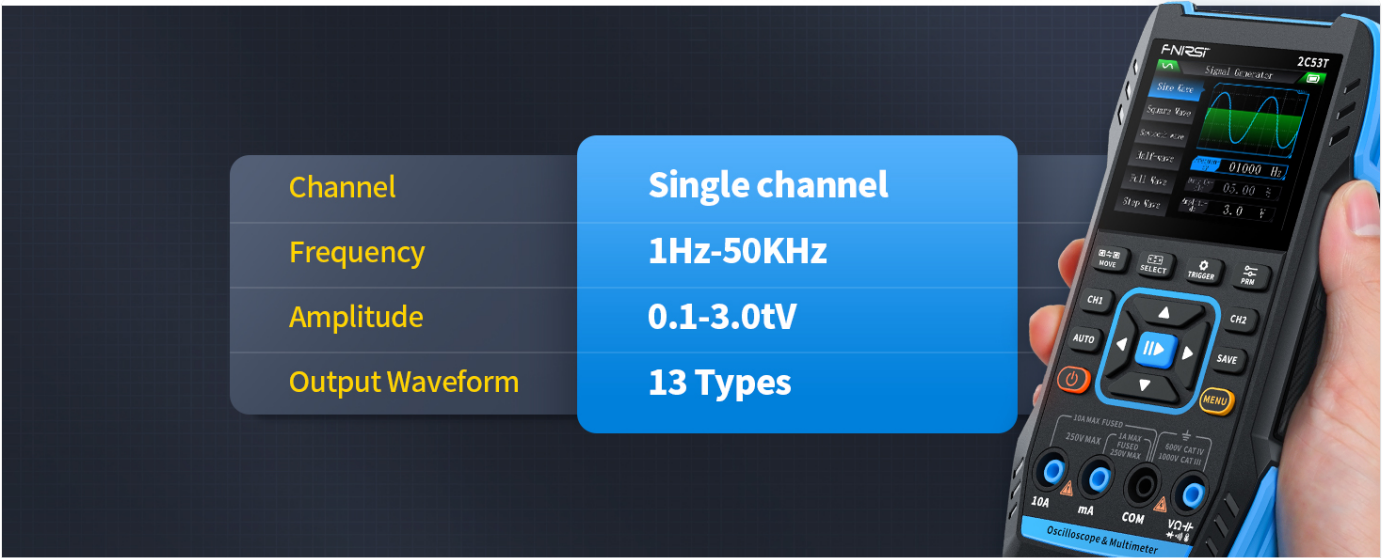


Figure 4.3.3: Detailed specifications for the signal generator function, including channel type, frequency, amplitude, and output waveforms.

5. MAINTENANCE

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

- **Cleaning:** Use a soft, dry cloth to clean the device. For stubborn dirt, a slightly damp cloth with mild detergent can be used, ensuring no liquid enters the device. Do not use abrasive cleaners or solvents.
- **Storage:** When not in use for extended periods, store the device in its provided storage case in a cool, dry place, away from direct sunlight and extreme temperatures.
- **Battery Care:** To maintain battery health, avoid fully discharging the battery frequently. If storing for a long time, charge the battery to approximately 50-70% every few months.
- **Probe Care:** Inspect probes regularly for damage to cables or connectors. Replace damaged probes immediately to ensure accurate and safe operation.

6. TROUBLESHOOTING

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

- **Device does not power on:** Ensure the battery is sufficiently charged. Connect the device to a power source using the Type-C cable and allow it to charge for at least 30 minutes before attempting to power on again.
- **Inaccurate readings:** Check that probes are correctly connected and not damaged. Ensure the correct measurement mode is selected for the task. For oscilloscope measurements, verify probe attenuation settings.
- **Screen freezes or device is unresponsive:** Try restarting the device by holding down the power button until it turns off, then power it back on. If the issue persists, ensure the firmware is up to date (check manufacturer's website for updates).
- **No waveform displayed in oscilloscope mode:** Verify that the input signal is within the device's voltage range. Check probe connections and ensure the trigger settings are appropriate for the signal being measured. Use the 'AUTO' button to attempt automatic setup.

For persistent issues not resolved by these steps, please contact FNIRSI customer support.

7. SPECIFICATIONS

Detailed technical specifications for the FNIRSI 2C53T:

Feature	Specification
Model Number	FNIRSI-2C53T
Product Dimensions	6.57 x 3.5 x 1.38 inches (16.7 x 8.9 x 3.5 cm)
Item Weight	14.11 ounces (400 Grams)
Display Screen	2.8 inch LCD
Battery	3000 mAh Li-ion battery
Standby Time	Up to 6 hours (theoretical maximum)
Charging Interface	Type-C (5V/1A)
Oscilloscope Bandwidth	50 MHz
Oscilloscope Sampling Rate	250 MSa/s
Oscilloscope Channels	2
Oscilloscope Record Depth	1 Kpts
Max Input Voltage (Oscilloscope)	400 V
Multimeter Counts	19999 Counts (4.5-Digit)
Signal Generator Frequency	Max 50 kHz
Signal Generator Waveforms	13 Types

Feature	Specification
Manufacturer	FNIRSI
Country of Origin	China

8. WARRANTY AND SUPPORT

FNIRSI products are designed and manufactured to high-quality standards. For warranty information, technical support, or service inquiries, please refer to the official FNIRSI website or contact your point of purchase. Keep your purchase receipt as proof of purchase for warranty claims.

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Details

Model number, symptoms, what you tried, or the section of the manual you are using.

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