FNIRSI 1014D

FNIRSI 1014D Oscilloscope

DIGITAL OSCILLOSCOPE & DDS SIGNAL GENERATOR USER MANUAL

1. Product Overview

The FNIRSI 1014D is a versatile 2-in-1 digital oscilloscope and DDS signal generator designed for a wide range of electronic testing and measurement applications. It features a real-time sampling rate of up to 1GSa/s and an analog bandwidth of 100MHz x 2, making it suitable for both periodic analog and aperiodic digital signals.

Key Features:

- **High Performance Oscilloscope:** Real-time sampling rate up to 1GSa/s, 100MHz x 2 analog bandwidth, supporting single/normal/automatic trigger modes.
- **Integrated DDS Function Signal Generator:** Outputs 2.5VPP, signal frequency steps of 1Hz, supports 14 types of function signals and customizable chopping signals with storage for up to 1000 customized signals.
- **Easy Measurement:** Cursor measurement function for direct peak-to-peak value and frequency readings without manual calculation.
- **Clear Display:** Equipped with a 7-inch 800x480 resolution high-definition LCD screen for improved readability.
- **User-Friendly Operation:** High-efficiency one-button AUTO function with adaptive 25%, 50%, 75% trigger for quick waveform display.
- **Advanced Analysis:** Lissajous Graphic Display for comparing amplitude, frequency, and phase of two signals, and FFT viewing for harmonic content estimation.

2. Package Contents

Verify that all items listed below are included in your package:

- FNIRSI 1014D Digital Oscilloscope Unit

- 100X High Voltage Probe (x1)
- Standard Probes (x2)
- Power Adapter
- USB Cable
- Alligator Clip Test Leads
- User Manual (this document)

Figure 2.1: FNIRSI 1014D Oscilloscope and its accessories.

3. Initial Setup

Follow these steps to set up your FNIRSI 1014D Oscilloscope for the first time:

1. **Power Connection:** Connect the provided power adapter to the DC input port on the rear of the oscilloscope and plug it into a suitable power outlet.
2. **Probe Connection:** Connect the oscilloscope probes to the BNC input connectors (CH1, CH2) on the front panel. Ensure a secure connection by twisting the BNC connector until it locks.
3. **Probe Calibration:** For accurate measurements, it is recommended to calibrate your probes. Connect the

probe to the calibration output (usually a square wave signal) and adjust the probe's compensation trimmer until a flat-top square wave is displayed on the screen.

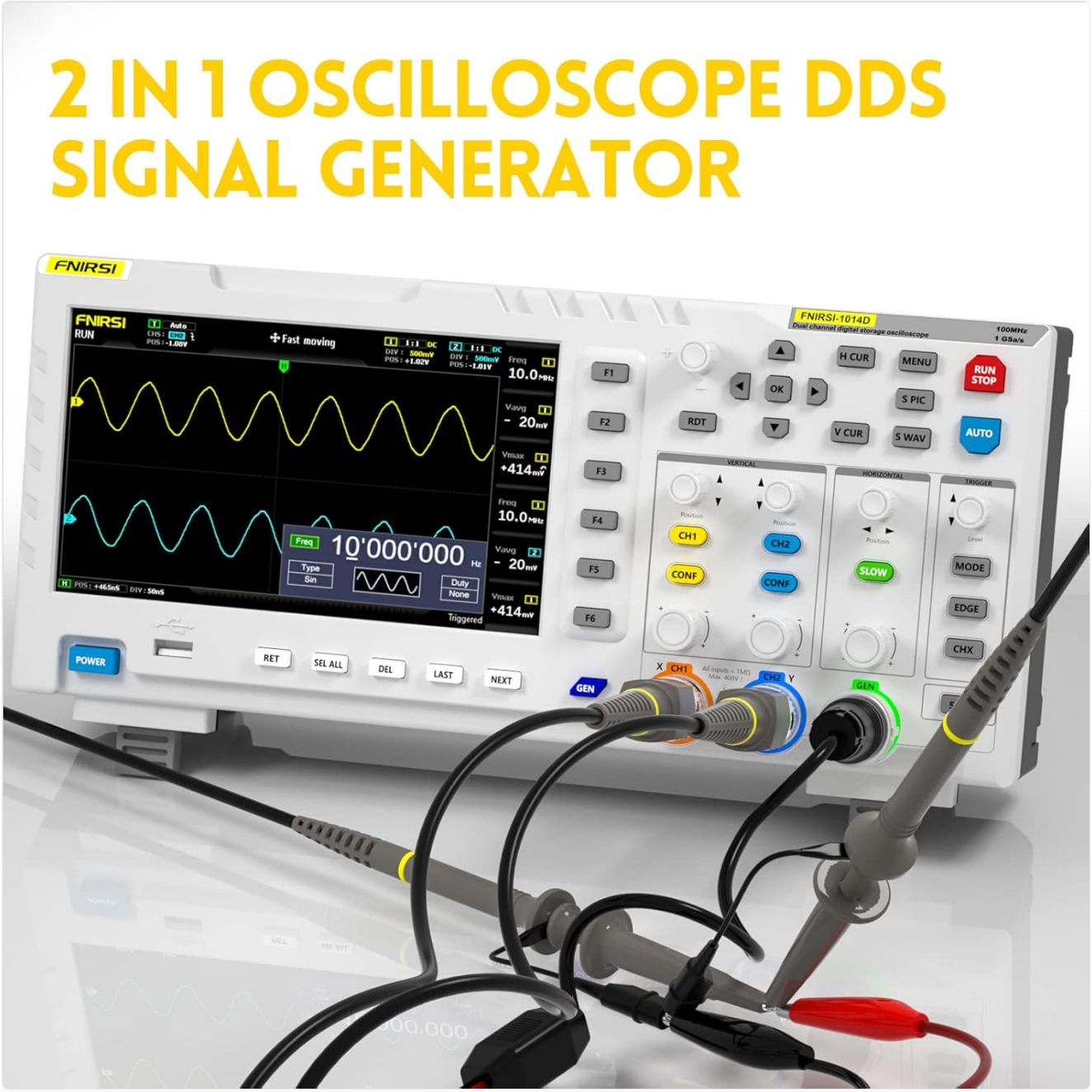

Figure 3.1: Oscilloscope with probes connected and ready for use.

4. Operating Instructions

4.1 Basic Operation

- **Power On/Off:** Press the **POWER** button located on the front panel to turn the device on or off.
- **Navigation:** Use the rotary encoders and function buttons (F1-F6, OK, MENU, etc.) to navigate through menus and adjust settings.
- **AUTO Button:** Press the **AUTO** button for automatic waveform adjustment, which quickly optimizes the display for the input signal.

4.2 Oscilloscope Function

The FNIRSI 1014D operates as a dual-channel digital storage oscilloscope with a 100MHz bandwidth and 1GSa/s

sampling rate. It supports various trigger modes (Single, Normal, Auto) for capturing different types of signals.

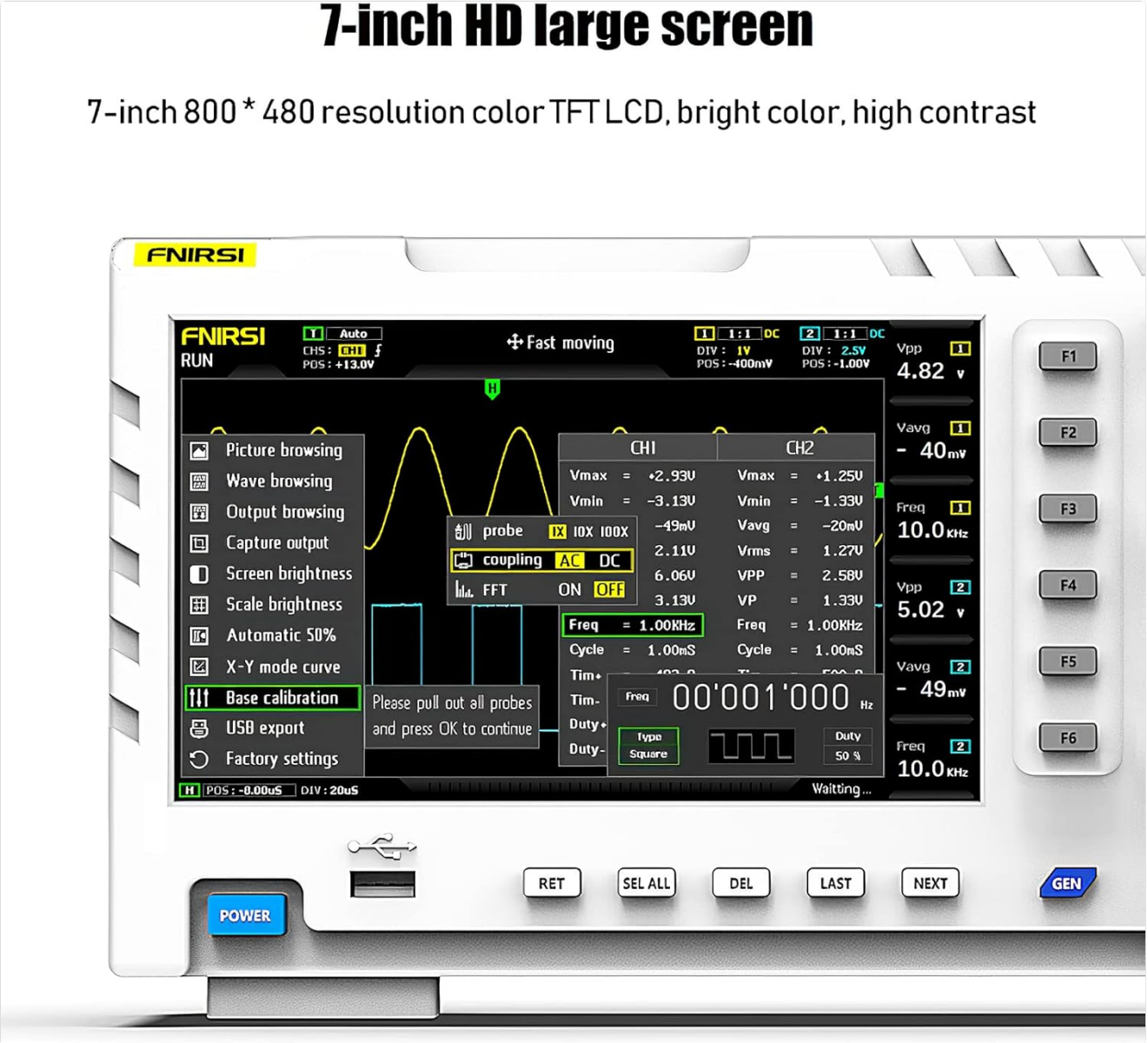

Figure 4.1: The 7-inch HD screen provides a clear view of waveforms.

Waveform Capture and Analysis:

- Adjust the **VERTICAL** controls (Position, CH1/CH2, CONF) to scale and position the waveform vertically.
- Use the **HORIZONTAL** controls (Position, ORIG) to adjust the time base and horizontal position of the waveform.
- The **TRIGGER** section allows you to set the trigger mode (MODE), trigger level (Level), and trigger edge (EDGE) to stabilize repetitive waveforms.

Video 4.1: Demonstrating oscilloscope measurement and serial port loopback data capture.

Video 4.2: An overview of the FNIRSI-1014D Dual-Channel Digital Oscilloscope's features and capabilities.

Video 4.3: A quick demonstration of the FNIRSI 1014D Oscilloscope in action.

4.3 DDS Signal Generator Function

The built-in DDS signal generator can output various waveforms at adjustable frequencies. Press the**GEN** button to access the signal generator settings.

- Select from 14 types of function signals, including sine, square, triangle, and more.
- Adjust the frequency using the dedicated controls.
- Custom chopping signals can be stored and recalled.

Figure 4.2: The 2-in-1 functionality of the oscilloscope and signal generator.

Video 4.4: Detailed operation of the FNIRSI 1014D Signal generator function.

4.4 Measurement Functions

The oscilloscope provides various measurement functions to analyze waveforms:

- **Cursor Measurement:** Use horizontal and vertical cursors to precisely measure amplitude, time, and frequency parameters directly on the screen.
- **FFT Viewing:** The Fast Fourier Transform (FFT) function allows for the estimation of the harmonic content of the signal, useful for spectral analysis.
- **Lissajous Graphic Display:** This function is used to compare the amplitude, frequency, and phase of two sets of signals, often used for phase shift analysis.

5. Care and Maintenance

- **Cleaning:** Use a soft, dry cloth to clean the exterior of the device. For stubborn dirt, a slightly damp cloth with mild detergent can be used, ensuring no liquid enters the device.
- **Storage:** Store the oscilloscope in a cool, dry place away from direct sunlight, extreme temperatures, and high humidity.
- **Handling:** Avoid dropping the device or subjecting it to strong impacts. Do not attempt to disassemble the unit, as this will void the warranty.
- **Power Off:** Always power off the device and disconnect it from the power source when not in use for extended periods or during cleaning.

6. Troubleshooting Guide

If you encounter issues with your FNIRSI 1014D, refer to the table below for common problems and their solutions:

Problem	Possible Cause	Solution
No display/Device won't power on	No power, faulty power adapter, loose connection.	Check power outlet, ensure power adapter is securely connected, try a different power adapter if available.
No waveform displayed	No input signal, incorrect probe connection, incorrect trigger settings, vertical/horizontal scale issues.	Ensure signal source is active, check probe connections, press AUTO button, adjust vertical (Volts/Div) and horizontal (Time/Div) scales.
Unstable waveform	Incorrect trigger level or mode.	Adjust trigger level (Level knob) to stabilize the waveform. Try different trigger modes (Auto, Normal, Single).
Inaccurate measurements	Uncalibrated probes, incorrect probe attenuation setting.	Perform probe calibration. Ensure the probe attenuation setting on the oscilloscope matches the physical probe (e.g., 1X, 10X, 100X).
Signal noise at low voltages	Inherent device characteristic for very weak signals.	This model may exhibit some internal interference for signals below 1Vpp. Consider external signal conditioning if precise low-voltage measurements are critical.

7. Technical Specifications

Feature	Specification
Model	1014D
Product Dimensions	9.84 x 2.76 x 5.51 inches
Item Weight	3.46 pounds
Analog Bandwidth	100MHz x 2 Channels
Real-time Sampling Rate	1GSa/s
Display	7-inch 800x480 LCD
DDS Signal Generator Output	2.5VPP, 1Hz step, 14 function signals
Storage Depth	240Kbit
Input Impedance	1MΩ
Sensitivity	50mV ~ 500V
Time Base	50S ~ 10nS
Trigger Mode	Single/Normal/Auto
Coupling	AC/DC
Max Input Voltage	40V (1X probe), 400V (10X probe)

8. Warranty and Support

FNIRSI Technology Co., Ltd. is committed to providing high-quality and cost-effective instrumentation. For specific warranty details and support inquiries, please refer to the official user manual or contact FNIRSI customer service directly.

Official User Manual (PDF): Download Here

For further assistance, visit the official FNIRSI website or contact their customer support channels.