Hantek DSO2D10

Hantek DSO2D10 Digital Storage Oscilloscope User Manual

Model: DSO2D10

1. INTRODUCTION

The Hantek DSO2D10 is a 2-channel digital storage oscilloscope featuring a 100MHz bandwidth, 1GSa/s real-time sample rate, and 8M memory depth. This model also integrates a 1-channel, 25MHz arbitrary waveform generator, making it a versatile tool for electronic testing and development. This manual provides essential information for the safe and effective operation of your device, covering setup, basic operation, advanced features, maintenance, and troubleshooting.

2. SAFETY INFORMATION

Please read the following safety precautions carefully to avoid personal injury and prevent damage to this product or any products connected to it. This oscilloscope is designed for use by qualified personnel only.

- **Power Source:** Connect the oscilloscope only to a power source that provides the specified voltage range.
- **Grounding:** Ensure the oscilloscope is properly grounded to prevent electric shock.
- **Probe Safety:** Use only probes supplied with the instrument or recommended by Hantek. Observe the voltage ratings of the probes.
- **Environmental Conditions:** Do not operate the oscilloscope in wet or damp conditions. Avoid operating in explosive atmospheres.
- **Ventilation:** Ensure proper ventilation to prevent overheating. Do not block ventilation openings.
- **Servicing:** Do not attempt to service the instrument unless you are qualified to do so. Refer all servicing to qualified service personnel.

> **Warning:** Hazardous voltage inside. Do not remove the cover unless by specified personnel.

3. PACKAGE CONTENTS

Verify that all items listed below are included in your package. If any items are missing or damaged, please contact your dealer.

- Hantek DSO2D10 Digital Storage Oscilloscope Unit

- 100MHz Oscilloscope Probes (2 units, typically 10X/100X switchable)
- BNC to Alligator Clip Cables (2 units)
- USB Cable
- Power Cord
- User Manual (Digital version often available online)

Figure 3.1: Hantek DSO2D10 Oscilloscope with all standard accessories.

Figure 3.2: Close-up of the included 100X and 10X probes, BNC cables, USB cable, and power cord.

4. PRODUCT OVERVIEW

4.1 Front Panel

The front panel features the display, control knobs, function buttons, and input connectors for channels 1 and 2, as well as the external trigger/waveform generator output.

Figure 4.1: Front view of the Hantek DSO2D10 Oscilloscope.

Figure 4.2: Detailed view of the front panel controls, including vertical, horizontal, and trigger sections.

- **Display:** High-resolution TFT LCD for waveform visualization.
- **Function Buttons (F1-F6):** Context-sensitive menu options.
- **Vertical Controls:** VOLTS/DIV knobs and POSITION knobs for each channel (CH1, CH2).
- **Horizontal Controls:** SEC/DIV knob and POSITION knob for time base adjustment.
- **Trigger Controls:** LEVEL knob, MODE button, and related settings for stable waveform capture.
- **Measurement/Utility Buttons:** Access to automatic measurements, cursors, save/recall, and other utilities.
- **Channel Inputs (CH1, CH2):** BNC connectors for probe connection.
- **EXT TRIG/GEN OUT:** BNC connector for external trigger input or waveform generator output.

4.2 Rear Panel

The rear panel includes the power input, USB host port, and ventilation.

Figure 4.3: Rear view of the Hantek DSO2D10 Oscilloscope, showing power input and USB port.

- **Power Input:** AC power connector.
- **USB Host Port:** For connecting USB storage devices to save waveforms or settings.
- **Ventilation Grilles:** Essential for heat dissipation.

5. SETUP

5.1 Power Connection

1. Ensure the oscilloscope's power switch is in the OFF position.

2. Connect the provided power cord to the AC power input on the rear panel of the oscilloscope.

3. Plug the other end of the power cord into a grounded AC power outlet.

5.2 Probe Connection and Compensation

Oscilloscope probes are crucial for accurate measurements. Proper connection and compensation are necessary.

1. Connect the BNC end of the probe to either the CH1 or CH2 input connector on the front panel.

2. Attach the probe ground clip to the oscilloscope's ground terminal or a known ground point in your circuit.

3. **Probe Compensation:** Most probes have a compensation adjustment. To compensate a probe:
   - Connect the probe tip to the probe compensation test point (usually a square wave output on the front panel).
   - Adjust the compensation trimmer on the probe until the square wave displayed on the screen has flat tops and bottoms, without overshoot or undershoot.

6. OPERATING INSTRUCTIONS

6.1 Power On/Off

Press the power button on the front panel to turn the oscilloscope ON or OFF.

6.2 Basic Waveform Display

1. Connect a compensated probe to CH1.

2. Connect the probe tip to the signal you wish to measure.

3. Press the **AUTO SET** button. The oscilloscope will automatically adjust vertical, horizontal, and trigger settings to display a stable waveform.

4. Alternatively, manually adjust the **VOLTS/DIV** knob for vertical scaling, **SEC/DIV** knob for horizontal scaling, and the **TRIGGER LEVEL** knob for trigger point adjustment.

Figure 6.1: Example of a sine wave displayed with automatic measurements.

6.3 Vertical Controls

- **VOLTS/DIV:** Adjusts the vertical scale (voltage per division) for the selected channel.
- **POSITION:** Moves the waveform vertically on the screen.
- **CH1/CH2 MENU:** Accesses channel-specific settings like coupling (AC/DC/GND), bandwidth limit, and probe attenuation.

6.4 Horizontal Controls

- **SEC/DIV:** Adjusts the horizontal scale (time per division).
- **POSITION:** Moves the waveform horizontally on the screen.
- **HORIZ MENU:** Accesses horizontal settings, including zoom and main/window time base.

6.5 Trigger System

The trigger system stabilizes repetitive waveforms and captures single-shot events.

- **LEVEL:** Adjusts the voltage level at which the trigger occurs.
- **MODE:** Selects trigger modes (Auto, Normal, Single).
- **TRIGGER MENU:** Provides access to advanced trigger settings, including edge, pulse, video, slope, and

serial protocol triggers.

Figure 6.2: Displaying two synchronized sine waves on CH1 and CH2.

7. ADVANCED FEATURES

7.1 Waveform Generator (AWG)

The DSO2D10 includes a 1-channel, 25MHz arbitrary waveform generator. This allows you to output various standard waveforms (sine, square, ramp, pulse) and custom arbitrary waveforms.

1. Connect a BNC cable from the **EXT TRIG/GEN OUT** port to your circuit.
2. Press the **WAVE GEN** button to access the waveform generator menu.
3. Select the desired waveform type, frequency, amplitude, and offset.
4. Enable the output to generate the waveform.

Figure 7.1: Example of a generated sine wave displayed on the oscilloscope.

7.2 Automatic Measurements

The oscilloscope supports 32 types of automatic measurements, providing quick and accurate analysis of waveform parameters.

- Press the **MEASURE** button to open the measurement menu.
- Select the desired measurement parameters (e.g., Vpp, Vmax, Freq, Period, Rise Time, Fall Time).
- The results will be displayed on the screen.

Figure 7.2: Multiple automatic measurements displayed on the screen.

7.3 Digital Voltmeter (DVM) and Frequency Counter

The DSO2D10 includes a 3-digit digital voltmeter and a 6-digit hardware frequency counter for precise voltage and frequency readings.

- Access these functions through the **UTILITY** menu.
- Select the desired measurement type (e.g., DC RMS, AC RMS, Peak-to-Peak).

7.4 Serial Protocol Decoding

The oscilloscope supports decoding of various serial protocols, which is useful for debugging embedded systems.

- Press the **DECODE** button to access the serial decoding menu.
- Select the protocol (e.g., RS232, I2C, SPI) and configure the relevant parameters.

7.5 Save/Recall Settings and Waveforms

You can save instrument settings and captured waveforms to internal memory or a USB flash drive.

- Press **SAVE/RECALL** to manage saved data.
- Use **SAVE TO USB** to store data on an external USB device.

8. MAINTENANCE

8.1 Cleaning

- Disconnect the oscilloscope from all power sources and test circuits before cleaning.
- Use a soft cloth dampened with a mild detergent solution to clean the exterior surfaces. Do not use abrasive cleaners or solvents.
- Avoid spraying liquids directly onto the instrument.

8.2 Storage

When not in use, store the oscilloscope in a clean, dry environment, away from direct sunlight and extreme temperatures.

9. TROUBLESHOOTING

This section provides solutions to common issues you might encounter. If the problem persists, contact Hantek support.

Problem	Possible Cause	Solution
No display after power on	Power cord not connected; Power switch off; Faulty power outlet.	Check power cord connection; Ensure power switch is ON; Test power outlet.
No waveform displayed	Probe not connected; Incorrect vertical/horizontal settings; Trigger not set correctly; No input signal.	Connect probe; Press AUTO SET; Adjust VOLTS/DIV, SEC/DIV, and TRIGGER LEVEL; Verify signal source.
Unstable waveform	Incorrect trigger level or mode; Noisy signal.	Adjust TRIGGER LEVEL; Change TRIGGER MODE (e.g., to Normal for single-shot); Check signal integrity.
Waveform generator output not working	Output disabled; Incorrect settings; Cable issue.	Ensure output is enabled in WAVE GEN menu; Verify frequency/amplitude settings; Check BNC cable connection.

10. SPECIFICATIONS

10.1 General Specifications

- **Manufacturer:** Hantek
- **Model Number:** TXD-a221
- **Item Weight:** 1.91 Kilograms
- **Product Dimensions:** 11 x 32 x 15 cm
- **Style:** 100MHz 2CH+1CH (Oscilloscope + Waveform Generator)
- **Batteries Included:** No
- **Batteries Required:** No

10.2 Oscilloscope Specifications

- **Bandwidth:** 100MHz

- **Channels:** 2 (Dual Channel)
- **Real-time Sample Rate:** 1GSa/s
- **Memory Depth:** 8M points
- **Vertical Resolution:** 8-bit
- **Automatic Measurements:** 32 types
- **Trigger Modes:** 14 types (Edge, Pulse, Video, Slope, etc.)
- **Digital Voltmeter (DVM):** 3-digit
- **Hardware Frequency Counter:** 6-digit

10.3 Waveform Generator Specifications

- **Channels:** 1
- **Bandwidth:** 25MHz
- **Arbitrary Waveform Length:** 4K points
- **Output Types:** Sine, Square, Ramp, Pulse, Arbitrary

10.4 Probe Specifications (P4100 Example)

Figure 10.1: Example specifications for a P4100 oscilloscope probe.

Parameter	Value	Parameter	Value
Attenuation Ratio	X100	Input Resistance (MΩ)	100
Input Capacitance (pF)	6	Compensation Range (pF)	10-35
Bandwidth (MHz)	100	Response Time (ns)	3.5
Working Voltage (Vp.p)	2000	Net Weight (g)	60
Cable Length (cm)	110	Operating Temperature (°C)	-10 ~ +50
Non-operating Temperature (°C)	-20 ~ +60	Humidity	85% Relative Humidity

11. WARRANTY AND SUPPORT

Hantek products are designed for reliability and performance. For warranty information, technical support, or service inquiries, please refer to the official Hantek website or contact your local distributor. Keep your purchase receipt as proof of purchase for warranty claims.