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Cloudpower DSO510

Cloudpower DSO510 Handheld Digital Oscilloscope and Multimeter User Manual

Model: DSO510

1. Introduction

The Cloudpower DSO510 is a versatile handheld digital oscilloscope and multimeter designed for various electrical testing and measurement applications. It features a real-time sampling rate of 48MS/s, a 10MHz bandwidth, and comprehensive trigger functions. This device also integrates a multi-function signal generator, making it a powerful tool for both periodic analog and non-periodic digital signal analysis. This manual provides detailed instructions for the safe and effective use of your DSO510.

2. Safety Information

Please read and understand all safety instructions before operating the device. Failure to follow these instructions may result in electric shock, fire, or damage to the device.

- Do not use the device if it appears damaged.
- Ensure proper probe connection and selection (1X/10X) to avoid exceeding voltage limits.
- Do not attempt to open or modify the device. Refer all servicing to qualified personnel.
- Keep the device away from water, moisture, and extreme temperatures.
- Use only the provided charging cable and adapter.
- Observe all local safety regulations when performing measurements.

3. Package Contents

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

- DSO510 Host Unit
- P6100 High Voltage Probe
- Adapter
- Alligator Clip Probe

- Charging Cable
- Lanyard
- User Manual (this document)



Image 3.1: DSO510 unit and its accessories, including the P6100 probe, alligator clip probe, charging cable, adapter, and lanyard.

4. Product Overview

4.1. Device Features

- **2.8-inch High-Definition LCD Screen:** 320x240 resolution for clear waveform display.
- **Integrated Signal Generator:** Outputs various waveforms up to 50KHz.
- **One-Button AUTO Function:** Quickly displays measured waveforms without manual adjustments.
- **Foldable Stand:** For convenient desktop use.
- **Rechargeable Battery:** Built-in 1000mAh lithium battery for portable operation.



Image 4.1: Front view of the DSO510 oscilloscope displaying a waveform on its screen.



Image 4.2: Side view of the DSO510 highlighting the foldable stand and the gear toggle button for adjustments.

4.2. Display Indicators

The 2.8-inch LCD screen provides critical information about the current measurement and device status:

- ① **Vertical Unit:** Indicates the voltage represented by each large grid in the vertical direction.
- ② **Trigger Mode Indicator:** Displays the current trigger mode (Auto, Single, Normal).
- ③ **Probe Ratio:** Shows the probe attenuation setting (e.g., 1X, 10X). This must match the physical switch on the probe.
- ④ **Input Coupling Mode Indicator:** Displays AC or DC coupling.
- ⑤ **Trigger Voltage Indicator:** Shows the voltage level at which the trigger is set.
- ⑥ **Trigger Position Indicator:** Indicates the horizontal position of the trigger point.

- ⑦ **Baseline Indicator:** Represents the 0V reference point on the waveform.
- ⑧ **Run/Pause Indicator:** Shows if the oscilloscope is actively acquiring data (RUN) or paused (STOP).
- ⑨ **Trigger Edge Indicator:** Displays whether the trigger is set for a rising or falling edge.

4.3. Control Buttons and Functions

The DSO510 features intuitive controls for navigation and adjustment:

- **V H (Wheel Button):** In normal operation, left/right controls the time base, and up/down controls the channel vertical sensitivity.
- **Arrow Buttons (Left/Right):** Control horizontal trigger movement.
- **Arrow Buttons (Up/Down):** Control channel waveform up/down movement.
- **MODE Button:** Switches between different control modes or functions.
- **AUTO Button:** Automatically adjusts settings for optimal waveform display.
- **RUN Button:** Starts or stops waveform acquisition.

5. Setup

5.1. Charging the Device

Before first use, fully charge the DSO510. Connect the provided USB charging cable to the device's USB port and to a 5V/1A USB power adapter. The charging indicator will show the charging status. A full charge provides approximately 4 hours of continuous use.

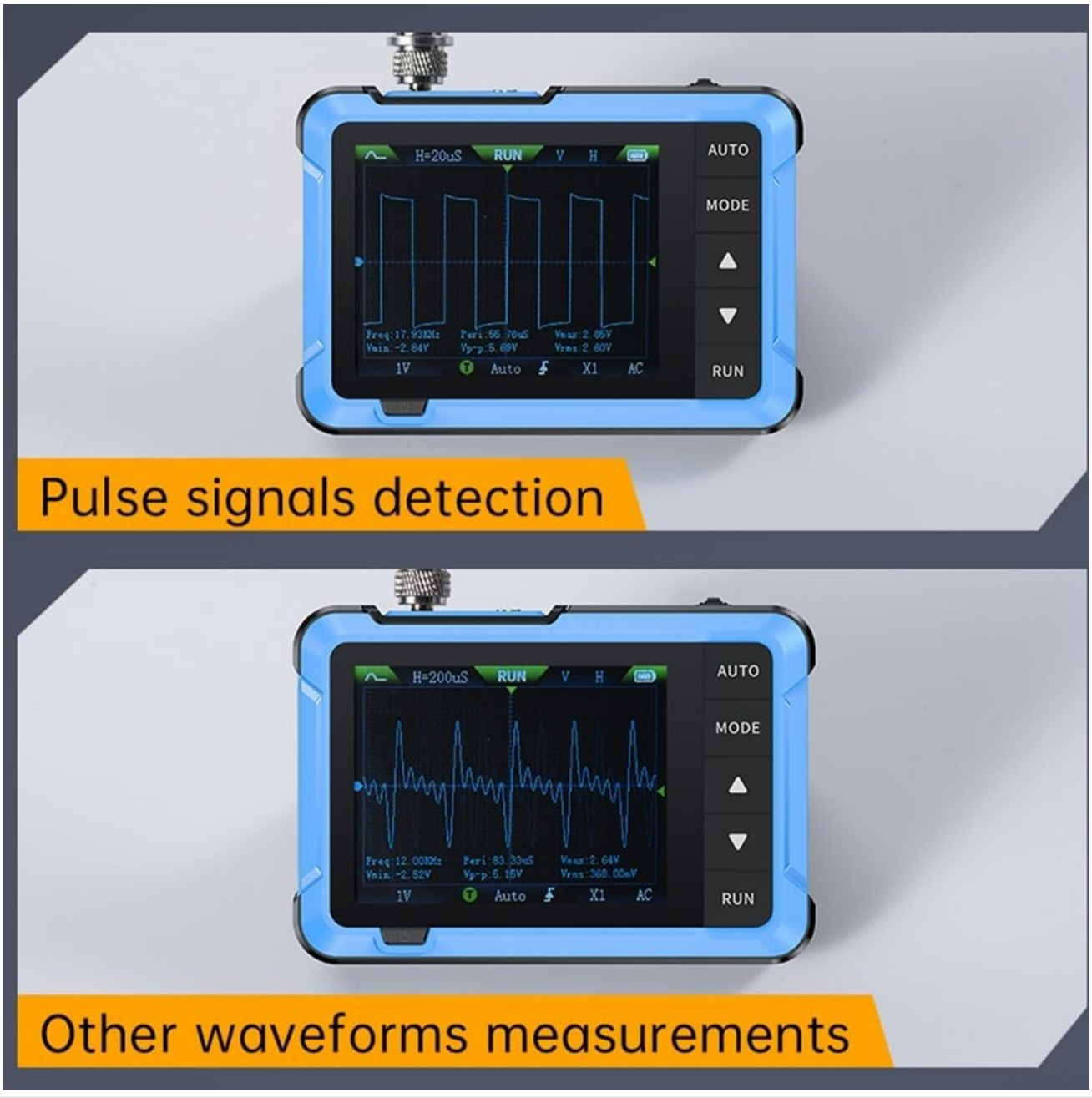


Image 5.1: Close-up of the DSO510's USB charging port.

5.2. Attaching Probes

Connect the desired probe (P6100 high voltage probe or alligator clip probe) to the input BNC connector on the DSO510. Ensure the connection is secure.

Important:

- For the P6100 probe, set the 1X/10X switch on the probe handle to match the probe ratio setting on the oscilloscope display (Indicator ③).
- Using a 1X probe setting allows measurement of up to ±40V. A 10X probe setting allows measurement of up to ±400V. Mismatching these settings can lead to incorrect readings or damage.

6. Operating Instructions

6.1. Power On/Off

Press and hold the power button (usually located near the bottom of the device) to turn the DSO510 on or off.

6.2. Basic Oscilloscope Measurement

1. **Connect the Probe:** Attach the appropriate probe to the circuit under test.
2. **Set Probe Ratio:** Ensure the probe's 1X/10X switch matches the setting displayed on the DSO510 screen.
3. **Use AUTO Function:** Press the **AUTO** button for quick, automatic waveform display and scaling. This is recommended for initial setup.
4. **Adjust Vertical Sensitivity (V/Div):** Use the V H wheel button (up/down) to adjust the vertical scale, changing the voltage represented by each grid division.
5. **Adjust Time Base (s/Div):** Use the V H wheel button (left/right) to adjust the horizontal scale, changing the time represented by each grid division.
6. **Select Coupling Mode (AC/DC):** Use the MODE button to cycle through options and select AC (for AC components only) or DC (for both AC and DC components).
7. **Trigger Settings:**
    - **Trigger Mode:** Use the MODE button to select Automatic, Normal, or Single trigger.
    - **Trigger Edge:** Select rising or falling edge for triggering.
    - **Trigger Level:** Use the arrow buttons (up/down) to adjust the trigger voltage level.
8. **Pause/Run:** Press the **RUN** button to pause or resume waveform acquisition.



Image 6.1: DSO510 screen showing a pulse signal detection.

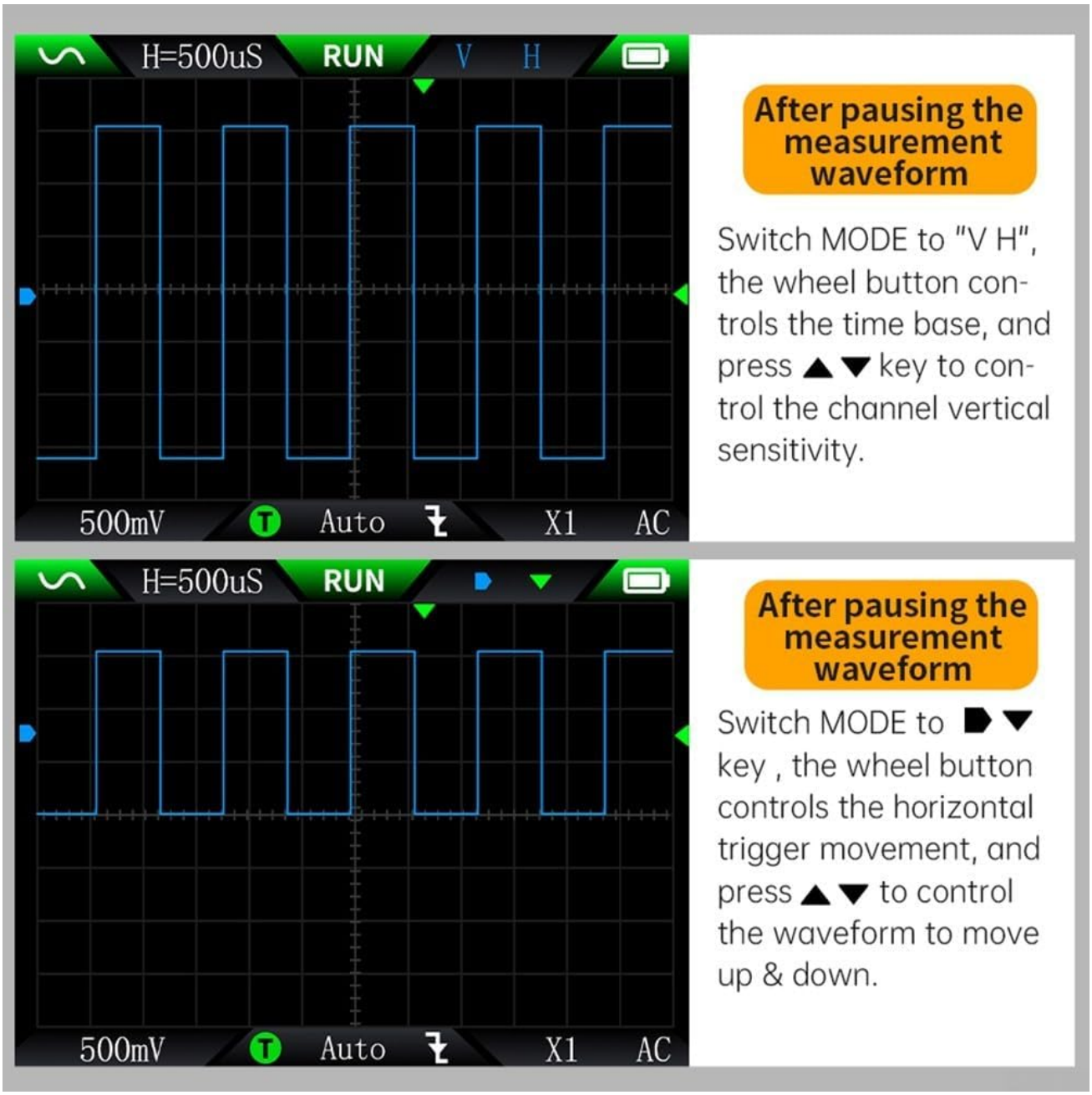


Image 6.2: DSO510 screen showing measurements of other complex waveforms.

6.3. Waveform Analysis (After Pausing)

Once the waveform is paused (STOP mode), you can perform detailed analysis:

- **Adjusting Time Base and Vertical Sensitivity:** Switch MODE to "V H". The wheel button (left/right) controls the time base, and (up/down) controls the channel vertical sensitivity.
- **Moving Waveform and Trigger:** Switch MODE to the arrow key icon. The wheel button (left/right) controls horizontal trigger movement, and (up/down) controls the waveform's vertical position.

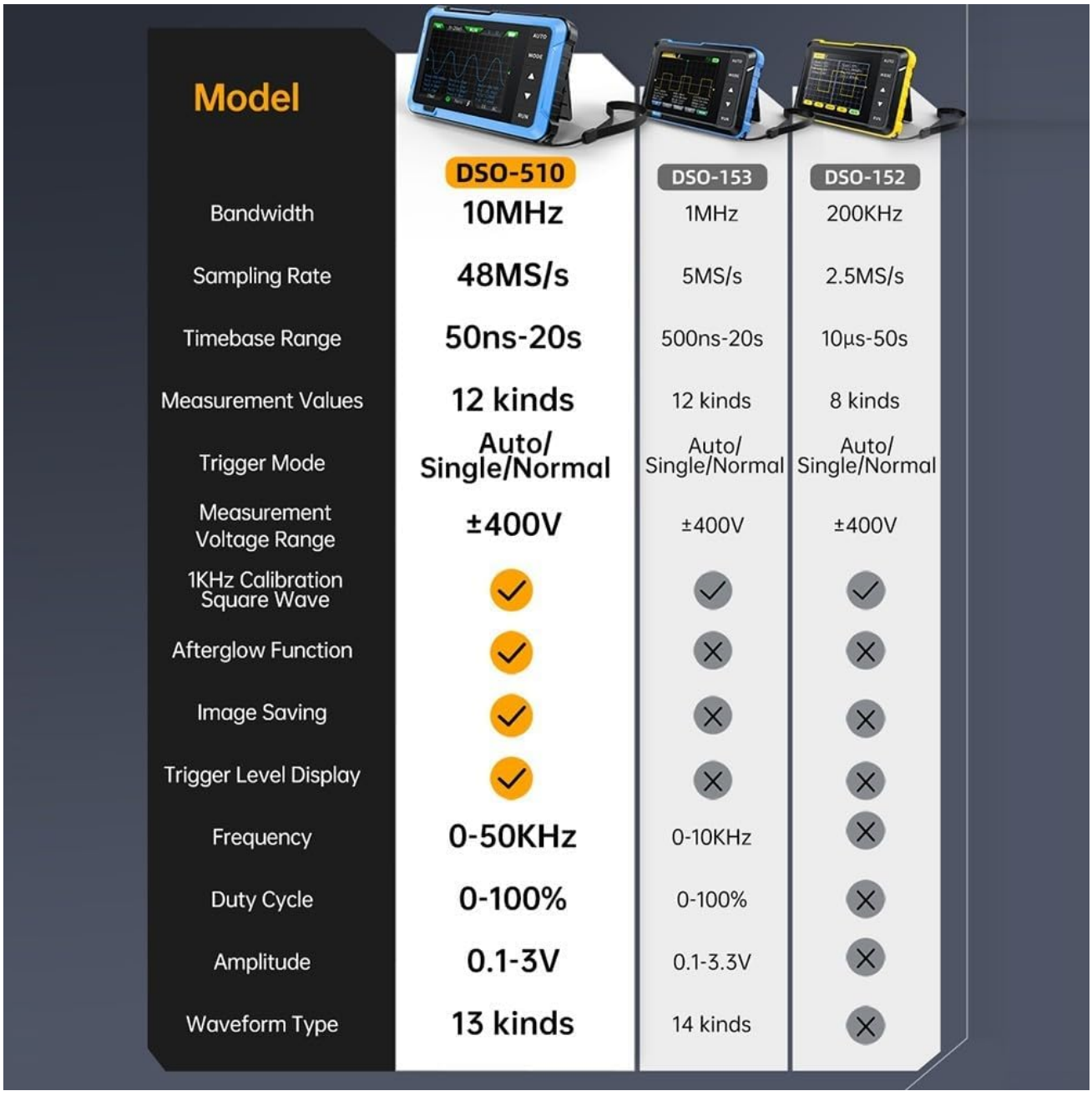


Image 6.3: Examples of adjusting time base, vertical sensitivity, and waveform position after pausing the measurement.

6.4. Signal Generator Function

The DSO510 includes a built-in signal generator:

1. **Access Signal Generator:** Use the MODE button to switch to the signal generator function.
2. **Select Waveform:** Choose from sine wave, rectangular wave, sawtooth wave, half wave, full wave, positive step wave, reverse step wave, exponential rise, exponential fall, DC signal, multi-audio, Sink pulse, Lorentz wave.
3. **Adjust Frequency:** Set the output frequency from 0 to 50KHz.
4. **Adjust Duty Cycle:** For rectangular and sawtooth waves, adjust the duty cycle from 0-100%.
5. **Adjust Amplitude:** Set the output amplitude from 0-3.0V.

7. Maintenance

- **Cleaning:** Use a soft, dry cloth to clean the device. Do not use abrasive cleaners or solvents.
- **Storage:** Store the DSO510 in a cool, dry place away from direct sunlight and extreme temperatures.

- **Battery Care:** For long-term storage, charge the battery to approximately 50% every few months to maintain battery health.

8. Troubleshooting

- **Device not powering on:** Ensure the battery is charged. Connect to a power source and try again.
- **No waveform displayed:**
  - Check probe connections.
  - Verify the probe is properly connected to the circuit under test.
  - Press the AUTO button.
  - Adjust vertical sensitivity (V/Div) and time base (s/Div).
  - Check trigger settings (level, mode, edge).
- **Incorrect voltage readings:** Verify the probe ratio setting (1X/10X) on both the probe and the oscilloscope matches.
- **Screen frozen:** Press the RUN button to ensure the device is not in pause mode. If unresponsive, perform a soft reset by holding the power button until it turns off, then restart.

9. Specifications

Feature	Specification
Model	DSO510
Real-time Sampling Rate	48MS/s
Bandwidth	10MHz
Vertical Sensitivity	10mV/Div - 10V/Div
Time Base Range	50ns/Div - 20s/Div
Voltage Range (X1)	±40V (Vpp: 80V)
Voltage Range (X10)	±400V (Vpp: 800V)
Trigger Modes	Automatic, Normal, Single
Trigger Edge	Rising edge / Falling edge
Coupling Modes	AC / DC
Calibration Square Wave	Frequency: 1KHz; Duty Cycle: 50%; Amplitude: 3.3V

Feature	Specification
Signal Generator Frequency	0-50KHz
Signal Generator Duty Cycle	0-100% (Rectangular & Sawtooth)
Signal Generator Amplitude	0-3.0V
Signal Generator Waveforms	Sine, Rectangular, Sawtooth, Half Wave, Full Wave, Positive Step, Reverse Step, Exponential Rise, Exponential Fall, DC, Multi-audio, Sink Pulse, Lorentz Wave
Display	2.8-inch LCD, 320x240 resolution
USB Charging	5V/1A
Lithium Battery Capacity	1000mAh
Continuous Use Time	Approx. 4 hours (fully charged)
Dimensions	99 x 68.3 x 19.5mm (3.9 x 2.69 x 0.77 inches)
Weight	10.3 ounces (approx. 292g)
Manufacturer	Cloudpower



Image 9.1: A comparison table highlighting the specifications of the DSO510 against other models.

10. Warranty and Support

Information regarding warranty coverage and customer support for the Cloudpower DSO510 is not provided in the available product data. Please refer to the product packaging or contact the seller directly for details on warranty terms and technical assistance.

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