Hantek DSO4084B

Hantek DSO4084B 4-Channel Digital Storage Oscilloscope User Manual

Model: DSO4084B

1. Product Overview

The Hantek DSO4084B is a versatile 4-channel digital storage oscilloscope designed for precise electrical testing and measurement. It offers a bandwidth of 80MHz, a minimum range of 500µV/div, and a 1GS/s sample rate, making it suitable for a wide array of applications.
Key features include:

- 4 channels with EXT and DVM auto-range function.
- Over 32 types of automatic measurement functions.
- Advanced digital trigger system with high sensitivity.
- More than 14 types of trigger functions, including edge, overtime, pulse, pattern, and interval.
- Serial bus triggering and decoding for intuitive protocol information display.
- Integrated USB Host/Device for PC communication and U-stick storage/system updates.
- Support for SCPI remote control commands.
- Optional RS232 and LAN ports for enhanced connectivity.

Figure 1: Hantek DSO4084B 4-Channel Digital Storage Oscilloscope with its display and control panel.

2. Setup Guide

Follow these steps to set up your Hantek DSO4084B oscilloscope:

1. **Unpacking:** Carefully remove the oscilloscope and all accessories from the packaging. Verify all components are present against the packing list.
2. **Power Connection:** Connect the power adapter to the oscilloscope's power input and then to a suitable power outlet.
3. **Probe Connection:** Connect the oscilloscope probes to the BNC input channels (CH1, CH2, CH3, CH4) as needed for your measurements. Ensure a secure connection.
4. **Power On:** Press the power button located on the front panel to turn on the oscilloscope. The device will perform a self-test and display the Hantek logo.
5. **Initial Display:** Upon startup, Channel 1 (CH1) will typically be active, displaying a horizontal line.

Figure 2: The Hantek DSO4084B oscilloscope shown with its packaging and various accessories, including probes and cables.

Figure 3: A comprehensive view of the Hantek DSO4084B oscilloscope and its complete set of accessories, including multiple probes and power cables.

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Video 1: This video demonstrates the initial setup and basic operation of a Hantek DSO4000B series oscilloscope, including connecting power, turning on the device, adjusting channel settings, using auto-setup, performing automatic measurements, and adjusting coupling and time base.

3. Operating Instructions

The Hantek DSO4084B offers intuitive controls for various measurement tasks.

3.1. Basic Waveform Adjustment

1. **Adjusting Voltage:** Use the vertical scale knobs (labeled "Vertical") for each channel to adjust the voltage per division (V/div). The button next to the knob allows for fine-tuning the voltage.
2. **Adjusting Waveform Position:** Use the position knobs for each channel to move the waveform vertically on the screen.
3. **Enabling Multiple Channels:** All four channels can be activated simultaneously. Use the dedicated buttons for each channel (CH1, CH2, CH3, CH4) to toggle them on or off. Adjust voltage and position for each active channel independently.

4. **Auto Setup:** Press the **AUTO** button to automatically adjust the oscilloscope settings for a stable waveform display. For example, when measuring a DC 5V signal, the auto function might set the display to 2V per division.

3.2. Measurement Functions

The oscilloscope provides extensive measurement capabilities:

- **Automatic Measurements:** Access over 32 types of automatic measurements by pressing the**MEAS** button. This displays parameters like Vpp (peak-to-peak voltage), Vmax, Vmin, frequency, period, and more. Pressing **MEAS** again will hide the measurement results.
- **Trigger System:** Utilize the advanced digital trigger system with over 14 types of trigger functions (edge, overtime, pulse, pattern, interval, etc.) to capture specific events.
- **Serial Bus Decoding:** For serial bus protocols, the device can quickly and intuitively display bus protocol information in table form.

3.3. Coupling Settings (DC/AC)

To accurately measure different signal types, adjust the coupling setting:

1. **DC Coupling:** Select DC coupling (usually via a menu accessed by a function button like F1) to measure both AC and DC components of a signal.
2. **AC Coupling:** Select AC coupling to block the DC component and only display the AC component of a signal. This is useful for observing small AC signals superimposed on a large DC offset.
3. **Bandwidth Limit:** The oscilloscope features a 20MHz bandwidth limit option (e.g., BW 20M). Activating this can help remove high-frequency noise or unwanted signals above 20MHz, providing a cleaner waveform for analysis.
4. **Adjusting Time Base:** Use the horizontal scale knob (labeled "Horizontal") to adjust the time per division (s/div) to view more or less of the waveform horizontally.

Figure 4: The oscilloscope display showing multiple active channels with distinct waveforms, demonstrating its multi-channel capability.

4. Maintenance

Proper maintenance ensures the longevity and accuracy of your Hantek DSO4084B oscilloscope:

- **Cleaning:** Regularly clean the exterior of the oscilloscope with a soft, dry cloth. For stubborn dirt, use a slightly damp cloth with mild detergent. Avoid abrasive cleaners or solvents.
- **Screen Care:** Use a soft, lint-free cloth specifically designed for electronics screens to clean the display. Do not press hard or use harsh chemicals.
- **Ventilation:** Ensure the ventilation openings are clear of dust and obstructions to prevent overheating.
- **Storage:** When not in use, store the oscilloscope in a clean, dry environment away from direct sunlight, extreme temperatures, and excessive humidity.
- **Probe Care:** Handle probes carefully. Avoid bending or stressing the cables. Store them properly to prevent damage to the tips and connectors.

- **Calibration:** For critical measurements, periodic calibration by a qualified service center is recommended to maintain accuracy.

5. Troubleshooting

This section provides solutions to common issues you might encounter:

Problem	Possible Cause	Solution
No power	Power cable not connected, power outlet faulty, power switch off.	Check power cable connection, try a different outlet, ensure power switch is on.
No waveform displayed	Input signal absent, probe not connected, channel off, incorrect vertical/horizontal settings.	Verify signal source, check probe connection, activate channel, use AUTO button or manually adjust V/div and s/div.
Unstable waveform	Incorrect trigger settings, noisy signal.	Adjust trigger level and mode. Consider using the 20MHz bandwidth limit to reduce noise.
Incorrect measurements	Improper probe attenuation setting, uncalibrated device.	Ensure probe attenuation (e.g., 1X, 10X) matches the oscilloscope setting. Consider professional calibration.

6. Specifications

Below are the detailed specifications for the Hantek DSO4084B oscilloscope:

- **Model:** DSO4084B
- **Channels:** 4
- **Bandwidth:** 80MHz
- **Sample Rate:** 1GS/s
- **Minimum Range:** 500µV/div
- **Auto Measurement Functions:** Over 32 types
- **Trigger Functions:** Over 14 types (edge, overtime, pulse, pattern, interval, etc.)
- **Connectivity:** Integrated USB Host/Device, optional RS232 port, LAN port
- **Display:** 7-inch 64K Color TFT
- **Product Dimensions:** 8.27 x 4.33 x 6.3 inches
- **Item Weight:** 3.3 pounds
- **Batteries:** 1 Lithium Metal battery required (included)
- **Manufacturer:** Hantek Qingdao
- **Date First Available:** February 26, 2024

Model	Channels	Bandwidth	Sample Rate	AFG
DSO4084B	4	80MHz	1GS/s	-
DSO4104B	4	100MHz	1GS/s	-
DSO4204B	4	200MHz	1GS/s	-
DSO4254B	4	250MHz	1GS/s	-
DSO4084C	4	80MHz	1GS/s	Yes
DSO4104C	4	100MHz	1GS/s	Yes
DSO4204C	4	200MHz	1GS/s	Yes
DSO4254C	4	250MHz	1GS/s	Yes

Figure 5: A table detailing the different models within the Hantek DOS4000B series, including their channels, bandwidth, sample rate, and AFG capabilities.

Model	DSO4254B	DSO4204B	DSO4104B	DSO4084B
Bandwidth	250MHz	200MHz	100MHz	80MHz
Horizontal				
Sample Rate Range	1GS/s			
Waveform Interpolation	(sin x)/x			
Record Length	Maximum 64K samples per single-channel;			
	Maximum 32K samples per dual-channel (4K, 32K optional)			
SEC/DIV Range	2ns/div~100s/div			
	1, 2, 5 sequence			
Sample Rate and Delay Time Accuracy	±50ppm			
Delta Time Measurement Accuracy (Full Bandwidth)	Single-shot, Normal mode ± (1 sample interval +100ppm × reading + 0.6ns)			
	>16 averages ± (1 sample interval + 100ppm × reading + 0.4ns)			
	Sample interval = s/div ÷ 200			
Vertical				
AD Converter	8-bit resolution, each channel sampled simultaneously			
VOLTS/DIV Range	500μV/div to 10V/div at input BNC			
Position Range	500μV/div~20mV/div, ±400mV			
	50mV/div~200mV/div, ±2V			
	500mV/div~2V/div, ±40V			
	5V/div~10V/div, ±50V			
Selectable Analog Bandwidth Limit, typical	20MHz			
Low Frequency Response (-3db)	≤10Hz at BNC			
Rise Time at BNC, typical	DSO4254B	DSO4204B	DSO4104B	DSO4084B
	<1.4ns	≤1.8ns	< 3.5ns	≤4.4ns
DC Gain Accuracy	±3% for Normal or Average acquisition mode, 10V/div to 10mV/div			
	±4% for Normal or Average acquisition mode, 5mV/div to 500μV/div			
	Note: Bandwidth reduced to 6MHz when using a 1X probe.			
Acquisition				
Acquisition Modes	Normal, Peak Detect, Average and HR			
Acquisition Rate, typical	Up to 2000 waveforms per second per channel (Normal acquisition mode, no measurement)			
Single Sequence	Acquisition Mode	Acquisition Stop Time		
	Normal, Peak Detect	Upon single acquisition on all channels simultaneously		
	Average	After N acquisitions on all channels simultaneously, N can be set to 4, 8, 16, 32, 64 or 128		
Trigger				
Mode	Auto, Normal			
Level	CH1~CH4	±4 divisions from center of screen		
	EXT	0~3.3V		
Holdoff Range	20ns ~ 10s			
Trigger Level Accuracy	CH1~CH4	0.2div × volts/div within ±4 divisions from center of screen		
	EXT	± (6% of setting + 40mV)		
Edge Trigger				
Slope	Rising, Falling, Rising&Falling			
Source	CH1~CH4/EXT			
Pulse Width				
Polarity	Positive, Negative			
Condition(When)	<, >, ≠, =			
Source	CH1~CH4			
Width Range	8ns ~ 10s			

Figure 6: A comprehensive table outlining the detailed technical specifications for various Hantek DOS4000B series oscilloscopes,

covering aspects like vertical, horizontal, and trigger settings.

7. Warranty and Support

For warranty information and technical support, please refer to the official Hantek website or contact your authorized dealer. Keep your purchase receipt as proof of purchase for warranty claims.
Additional protection plans may be available for extended coverage. Please check with your retailer for details.