JHM5000HD Series

High-Resolution Oscilloscope

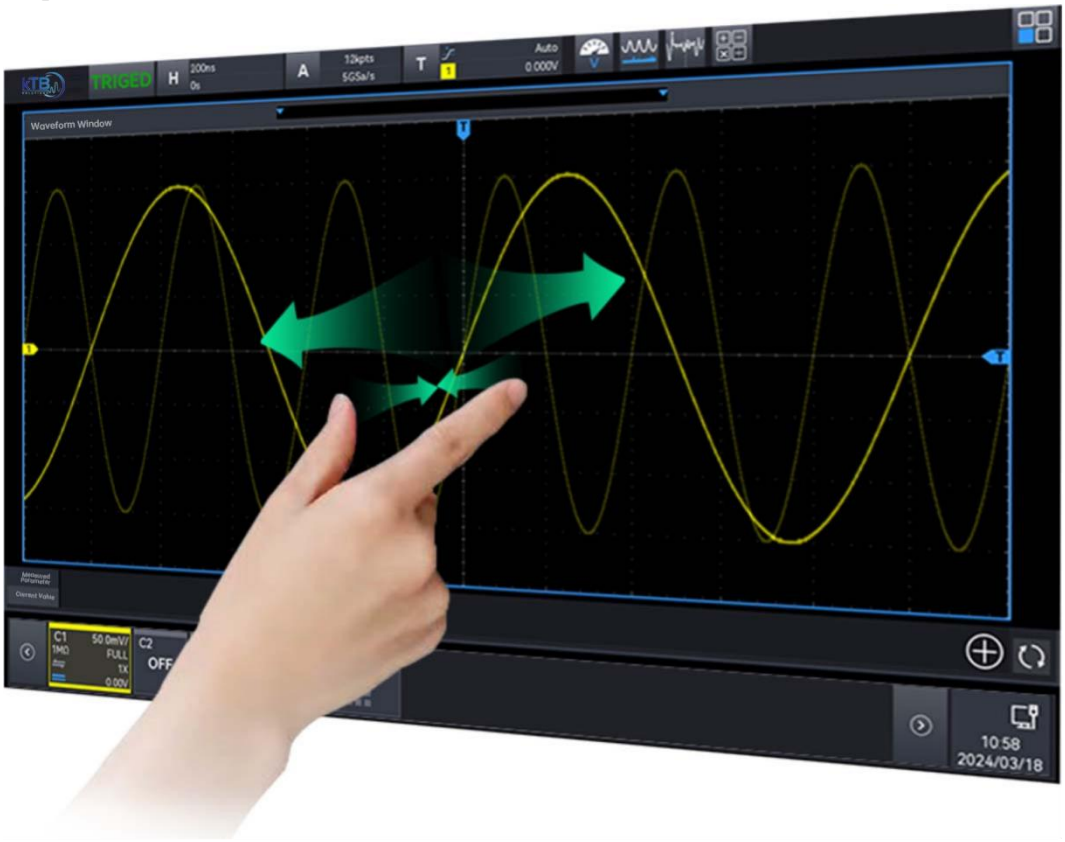
Data Sheet

Product Introduction

JHM5000HD series high-resolution oscilloscope features a maximum bandwidth of 1 GHz and a sampling rate of up to 5 GSa/s. It offers 4 analog channels and 16 digital channels, with a maximum storage depth of up to 500 Mpts. Utilizing proprietary ultra-fast acquisition technology, it achieves a waveform capture rate of up to 1,500,000 wfms/s. The display supports 256-level brightness and color temperature gradation and features an innovative digital trigger system with high trigger sensitivity and minimal trigger jitter. It supports abundant advanced triggering, serial bus triggering, and decoding functions. It also supports advanced acquisition and analysis modes including spectrum analysis, power analysis, histogram generation, waveform recording, Enhanced Resolution (ERES), hardware-accelerated template testing, Search, and Navigate. Equipped with abundant measurement and mathematical operation functions, the instrument is equipped with a 10.1-inch capacitive touchscreen that supports multiple gestures for common waveform operations, complemented by multiple one-touch buttons on the front panel to significantly optimize the efficiency of operating the oscilloscope and improve user experience.

Mainstream Touchscreen Design: Creating an Intelligent Interaction Experience

The 10.1-inch multi-touch HD capacitive screen supports a variety of gesture operations, including touching, dragging, zooming, and rectangle drawing. This enables more intuitive and smooth operation, allowing users to master the device with greater ease. While retaining traditional button and knob controls, the system also supports mouse and keyboard inputs, which diversifies the operation modes of the instrument and maximizes the interactive experience.



A Brand-New Exterior Design

The instrument features an innovative look with a slimmed-down profile on both sides; the display panel is perfectly flush with the main body, which enhances the tactile experience and viewing range of touch operations. In addition, the black bezel framing the display, paired with the metallic gray-black chassis, elevates the overall premium feel of the device.

Characteristics and Advantages

- Analog Channel Bandwidth: 1 GHz/500 MHz/350 MHz
- The analog channels feature a maximum real-time sampling rate of 5 GSa/s, while the digital channels offer a maximum sampling rate of 1.25 GSa/s.
- 12-bit Vertical Resolution (equivalent to 4,096 discrete levels), delivering clear visualization of waveform details.
- 4 analog channels + 16 digital channels, with a maximum memory depth of 500 Mpts.
- Maximum Waveform Capture Rate: 800,000 wfms/s (sequential mode: 1,500,000 wfms/s)
- 9-in-1 Instrument Integration: Digital Oscilloscope, Logic Analyzer, Function/Arbitrary Waveform Generator, Spectrum Analyzer, Digital Voltmeter, Frequency Counter, Protocol Analyzer, Bode Plot Analyzer, Power Analyzer.
- Built-in dual-channel 50 MHz function/arbitrary waveform generator; supports real-time loading of oscilloscope screen data to the Gen arbitrary waveform output, with a variety of preloaded arbitrary waveforms.
- Supports Bode plot loop test and analysis function for evaluating system stability.
- Supports timing analysis for bus protocols: I2C, SPI, CAN.
- Adds histogram and line chart displays for parameter measurement statistics.
- Supports hardware-based uninterrupted recording and analysis of up to 400,000 waveform frames, with data export capability to USB storage devices.
- Enhanced FFT Functionality: Up to 4 M-point FFT, supporting frequency setting, waterfall display, detection configuration, and marker placement (full spectrum analyzer functionality).
- Supports enhanced resolution, up to 4 bits.
- Offers up to 54 parameter measurement options.
- Multi-Window Display Support for simultaneous waveform viewing.
- Multi-channel independent 7-digit hardware frequency counter, with adjustable refresh time and effective digit count.
- DVM Function: Multi-channel independent true RMS measurement, supporting DC, AC RMS, and DC+AC RMS measurement modes.
- Comprehensive Trigger Types: Edge, Pulse Width, Video, Slope, Runt Pulse, Overrange Pulse, Delay, Timeout, Duration, Setup & Hold, Nth Edge, and Pattern Trigger.
- Protocol Trigger & Decoding: RS232/UART, I2C, SPI, CAN, CAN-FD, LIN, FlexRay, Audio, MIL-STD-1553B, Manchester, SENT, ARINC429, 1-WIRE, CAN-XL, I3C.
- Practical Zone Trigger Function: Ideal for capturing sporadic signals and observing complex signal characteristics.
- Ultra-fast acquisition technology, with up to 256-level grayscale display for waveform intensity grading.
- 10.1-inch 1280 × 800 HD capacitive touchscreen, supporting diverse gesture operations: Tap, Swipe, Zoom, Edit, and Drag.
- Rich Peripheral Interfaces: USB Host, USB Device, LAN, EXT Trig, AUX Out (Trig Out, Pass/Fail, DVM), Signal Source Output (Gen), HDMI.
- Supports Standard Commands for Programmable Instruments (SCPI).
- Built-in WebServer enables browser-based access and control of the instrument, supporting both PC and mobile device operation for seamless cross-platform access.
- Supports online firmware upgrade.

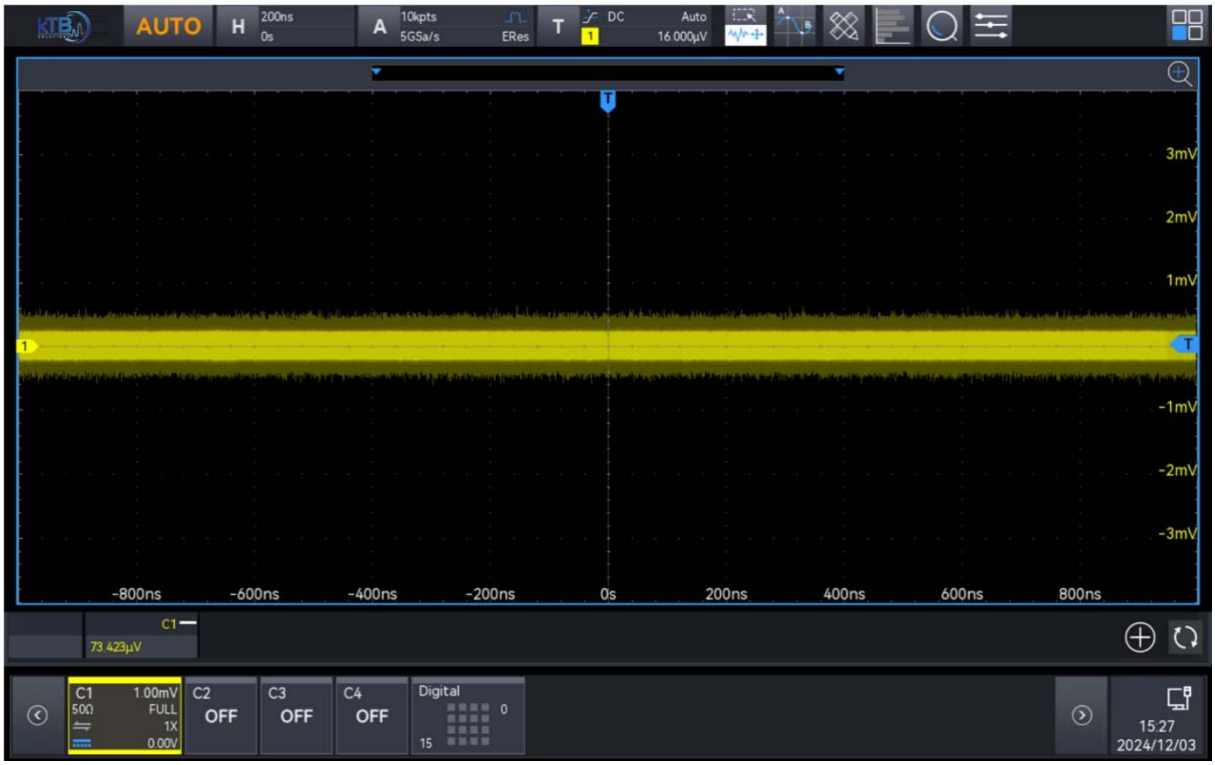
Design Features

high resolution

Equipped with 12-bit high-resolution ADC sampling, it achieves up to 4096 quantization levels — 16 times that of conventional 8-bit ADCs — thus enabling more accurate reproduction of waveform details.

8-bit

12-bit



Exceptional background noise performance, with only 90 μVrms under the full 1 GHz bandwidth, allows the 12-bit ADC to fully exert its performance.

Application Range

Cost-Effective 9-in-1 Integrated Oscilloscope

The JHM5000HD series high-resolution oscilloscope integrates nine independent instruments in one, including a digital oscilloscope, logic analyzer, function/arbitrary waveform generator, spectrum analyzer, digital voltmeter, high-precision frequency counter, protocol analyzer, Bode plot analyzer, and power analyzer. This all-in-one solution provides users with the most flexible and cost-effective options tailored to their practical requirements.

Digital Oscilloscope

- Available Bandwidth Options: 1 GHz, 500 MHz, or 350 MHz
- Maximum Real-Time Sampling Rate: 5 GSa/s
- Maximum Memory Depth: 500 Mpts
- 4 analog channels + 1 external trigger channel

Logic analyzer (optional)

- The hardware comes standard with a 16-channel logic analyzer; full functionality is available simply by purchasing the optional logic analyzer probe.
- Maximum Sampling Rate: 1.25 GSa/s
- Maximum Memory Depth: 500 Mpts
- Minimum Detectable Pulse Width: 800 ps
- The digital probe is equipped with separate signal input ports for the upper 8-bit and lower 8-bit channels, simplifying connection to the device under test (DUT). When interfacing with square pins, it can be directly connected to an 8×2 square pin header with a 2.54 mm pitch.
- The logic analyzer probe offers excellent electrical characteristics, with an input impedance of 101 kΩ±1% and a capacitive load of only 9.0 pF.

Function/Arbitrary Waveform Generator (Optional)

- Dual-Channel Output with 50 MHz Bandwidth and Other Performance Grades
- Sampling Rate: 250 MSa/s; Vertical Resolution: 16-bit
- Built-in Standard Waveforms: Sine wave, square wave, pulse wave, ramp wave, arbitrary wave, noise, and DC
- Supports AM, FM, ASK, FSK, and Frequency Sweep Output

Spectrum Analyzer

- Standard Enhanced FFT Function: Supports signal analysis for up to 4 Mpts × 4 channels
- Frequency Measurement Range: 0 to 2.5 GHz
- Waterfall Display Support
- 4 Trace Types + 4 Detection Modes
- Marker Modes: Automatic, Manual, and Threshold
- Marker Point List Display

Digital Voltmeter

- 4-digit Voltmeter Display
- Independent Measurement for Three Modes: DC, AC RMS, and DC+AC RMS
- Alarm Function for Out-of-limit Conditions

High-Precision Frequency Counter

- 7-Digit Hardware Frequency Counter
- Adjustable Refresh Time and Effective Digit Count for the Frequency Counter
- Accumulation Counter

Bode Plot Analyzer (Optional)

- Built-in Function/Arbitrary Waveform Generator
- Frequency Response Analysis
- Loop Stability Analysis
- Filter Analysis
- Amplifier Analysis, etc.

Protocol Analyzer

- Supports Triggering and Decoding for 15 Protocols, covering fields including computing, embedded systems, automotive electronics, avionics, and audio.
- Supports Decoding in Pause and Recording Modes
- Supports Event List Display and Search Functions

Option name	description	Option model	Is it standard?
Computer Serial Bus Trigger & Decode	RS-232/422/485/UART	-	Yes
Computer Serial Bus Trigger & Decode	I2C, SPI	-	Yes
Automotive Serial Bus Trigger & Decode	CAN	JHM5000HD-CAN	Optional
Automotive Serial Bus Trigger & Decode	LIN	JHM5000HD-LIN	Optional
Automotive Serial Bus Trigger & Decode	CAN-FD	JHM5000HD-CANFD	Optional
Automotive Serial Bus Trigger & Decode	CAN-XL	JHM5000HD-CANXL	Optional
Automotive Serial Bus Trigger & Decode	FlexRay	JHM5000HD-FLEX	Optional
Automotive Sensor Bus Trigger & Decode	SENT	JHM5000HD-SENT	Optional
Audio Serial Bus Trigger & Decode	Audio	JHM5000HD-AUDIO	Optional
Aerospace Serial Bus Trigger & Decode	MIL-STD-1553，ARINC 429	JHM5000HD-AREO	Optional
Wireless Communication Serial Bus Trigger & Decode	Manchester	JHM5000HD-MANCH	Optional
Sensor Bus Trigger & Decode	1-WIRE	JHM5000HD-1WIRE	Optional
Mobile Phone Smart Serial Bus Trigger & Decode	I3C	JHM5000HD-I3C	Optional

Power Analyzer (Optional)

With the advancement of chip technology, requirements for power supply systems have become increasingly stringent. Currently, the "low-voltage, high-current" trend is prevalent in power distribution networks. Especially for power networks composed of chips or precision components, reliable power supply and effective noise suppression for each circuit section are required, while ensuring complete signal transmission between chips. This has posed greater challenges to power supply testing; designers are more concerned about the energy efficiency and response speed of power supplies to ensure stable and clean power delivery. Against this backdrop, power integrity testing becomes particularly crucial—power integrity directly affects signal integrity, and conversely, signal quality also reflects power quality. Even poor power quality can trigger a series of electromagnetic interference (EMI) issues, which are undoubtedly troublesome for designers. Therefore, owning an oscilloscope with power analysis capabilities is undoubtedly your optimal choice.

The JHM5000HD series oscilloscope provides comprehensive power analysis tools and evaluation results. You only need to select the appropriate analysis type, connect the voltage probe and current probe to the test points of the power supply system or specific test fixtures as shown in the diagram, connect to the channel you want to observe, and make appropriate fine adjustments to obtain the desired test results.

- Power Quality
- Harmonic Analysis
- Switching Loss
- Surge Current
- Rds(on)
- Slew Rate
- SafeOperating Area (SOA)
- Modulation Analysis
- Ripple Analysis

*Under continuous update. Power analysis support is subject to the latest firmware version on the official website.

Timing Analyzer

Smart devices such as mobile phones, smart wearables, home appliances, multimedia audio-visual systems, and automotive electronic components have strict requirements for the timing consistency of internal bus communication. The JHM5000HD features an innovative timing analysis function that can analyze parameters (e.g., pulse width, amplitude, edge, setup time, and hold time) of signals such as I2C, SPI, and CAN, and supports the export of consistency test reports. reports.

Ultrafast Acquisition Technology

Waveform capture rate is crucial when identifying and troubleshooting sporadic or intermittent anomalies in signals. The capture rate of an oscilloscope refers to the number of waveforms it can capture per unit time, a parameter that directly reflects the speed at which the oscilloscope processes and analyzes signals.

The JHM5000HD series adopts an advanced hardware and software architecture, achieving 5 to 10 times higher data processing performance than its predecessor. Equipped with upgraded ultrafast acquisition technology, it supports 8-channel parallel graphics mapping with a processing rate of 20 Gbps and a waveform capture rate of up to 800,000 wfms/s. In sequential mode, it can capture 1.5 million fast-edge signals at 750 ps, ensuring no sporadic signals escape detection.

New Fast Autoset Strategy

Fuzzy control is an intelligent control method based on fuzzy set theory, fuzzy linguistic variables, and fuzzy logic reasoning. The advantages of this algorithm include fewer iterations, fast response speed, and strong anti-interference capability.

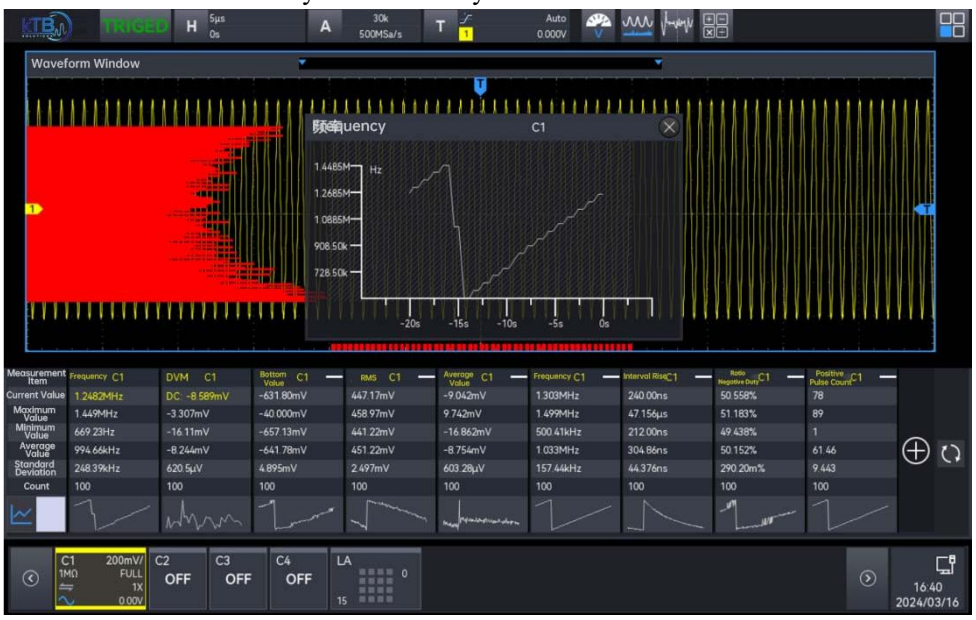
Traditional oscilloscopes rely on the Autoset function to automatically find the appropriate signal amplitude and frequency for display. However, due to the different implementation schemes adopted by various oscilloscope manufacturers, the response speed of oscilloscopes often varies significantly, which seriously affects the user experience. KTB redefines the execution method of Autoset, innovatively adopting analog signal-based fast fuzzy algorithm + multi-channel parallel processing technology, and integrating a 7-bit high-precision hardware frequency counter. This enables the oscilloscope to quickly identify and process the amplitude and frequency parameters of unknown signals when executing the Autoset strategy. The execution time does not exceed 1.5 seconds with all channels turned on, and no more than 1 second for a single channel. For users who need to frequently switch test objects and complete tests quickly, this innovation will greatly improve work efficiency and reduce the risk of misoperation.

Rich Parameter Measurement

Parameter measurement functionality is particularly important for engineers using oscilloscopes. The JHM5000HD series offers up to 54 measurement parameters, supporting the simultaneous addition and display of 27 parameters. Each page of the measurement statistics displays 9 parameters, and each parameter supports statistical display of measurement values in three forms: the measurement value itself, histogram, and trend graph. Among them, the histogram can intuitively present the probability distribution of parameters, while the trend graph can reflect the variation trend of parameters over time. The parameter snapshot function can display 39

measurement items for a single channel, covering voltage-related and time-related measurement parameters, with the measurement results updated in real time during device operation.

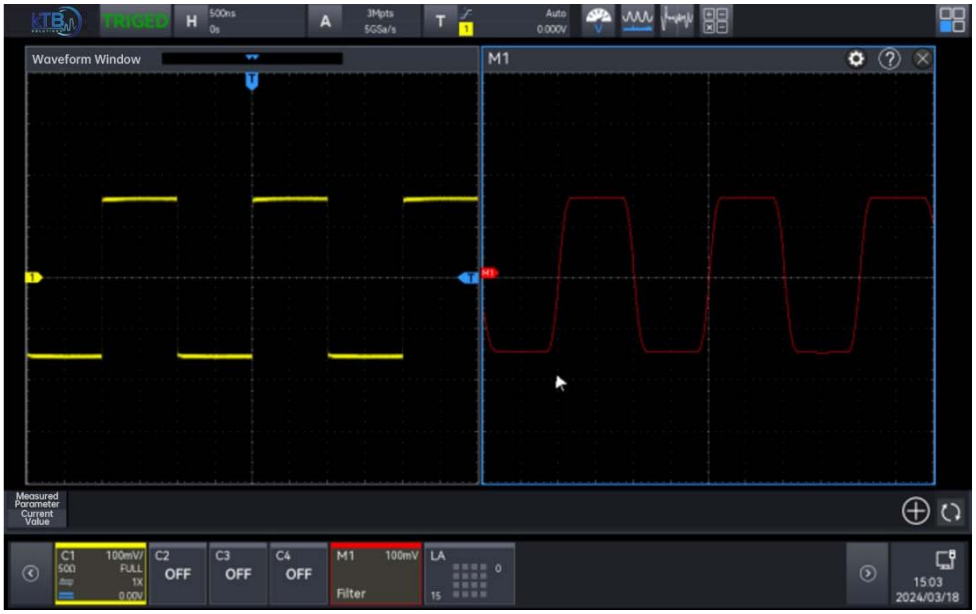
The JHM5000HD series adds new amplitude calculation strategies, including top value strategy and bottom value strategy functions, providing engineers with greater flexibility in using the parameter measurement function. Additionally, it introduces a burst setting function that can display burst-related parameters, facilitating engineers to grasp channel measurement data timely and accurately.



Mathematical Operations

The JHM5000HD is equipped with a series of algorithm systems for complex waveform operations. You can use these algorithms to conduct in-depth analysis of your waveforms and display the results directly on the oscilloscope.

- Basic Operations: +, -, ×, ÷
- Digital Filters: High-pass, Low-pass, Band-pass, Band-stop
- Custom Function Operations: Including analog channel operations

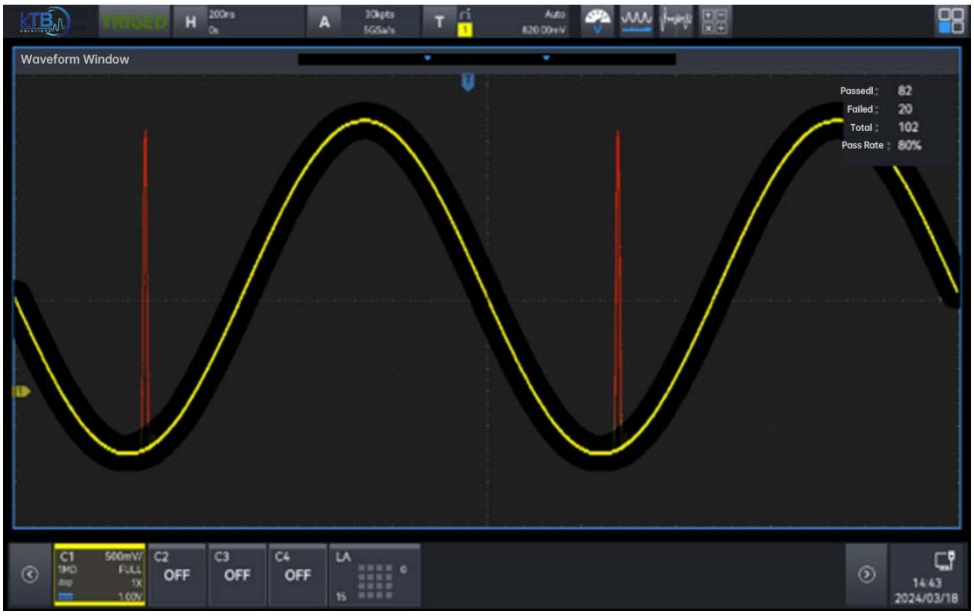


Navigation and Search

The maximum storage depth of the JHM5000HD oscilloscope has been upgraded to 500 Mpts. With this high storage depth, the oscilloscope can capture tens of thousands of waveform cycles in a single acquisition. Previously, engineers had to spend a great deal of time manually searching for the required waveforms. However, using the oscilloscope's search function, it can automatically search the collected signals according to the search criteria set by the user, and quickly locate the waveforms of interest through navigation. Meanwhile, the oscilloscope's analysis function can be used to conduct detailed analysis of events, eliminating the time consumption and inconvenience of manual searching. The navigation function can not only navigate search events but also navigate time and markers.

Hardware-Accelerated Template Testing

Hardware-accelerated template testing enables waveform testing that meets specific standards to be completed within seconds.



Region Trigger

The region trigger serves two primary purposes: first, isolating sporadic abnormal signals; second, stabilizing waveform display—only stable triggering ensures stable display. Therefore, when engineers debug complex and variable signals, they can use the oscilloscope's region trigger function to capture and stabilize these sporadic signals. This function is easy to operate: there is no need to spend time learning complex advanced triggering functions. By drawing a rectangle on the screen with a gesture, engineers can quickly isolate the signals they want to observe. Even if the waveform is not fully stably triggered, the region trigger function can still capture the waveforms that meet the conditions and achieve stable display.

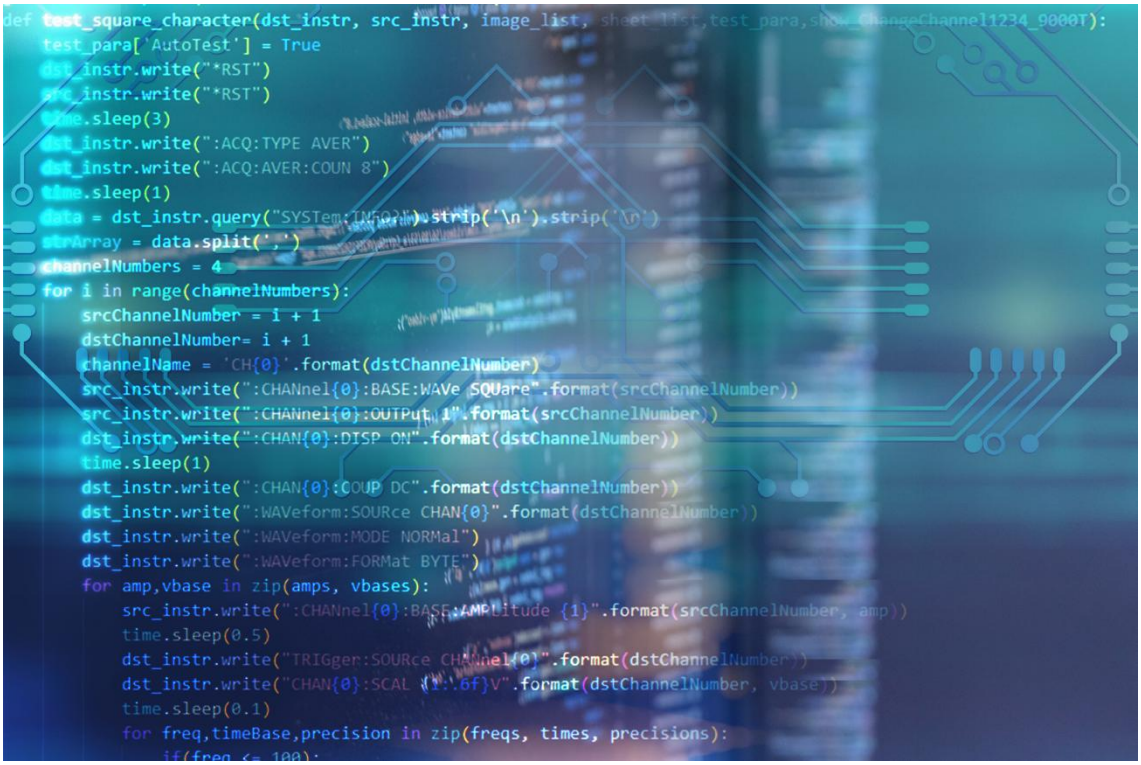
Multiple Interfaces

The JHM5000HD series offers versatile connectivity options, delivering unprecedented flexibility and convenience.

WIFI Connection: Eliminates the need for cable connections, enabling more flexible and simple instrument connectivity with wide coverage and a neater work surface.

Rich Control Methods

Supports control or secondary development via an instruction set compliant with SCPI standards.



Control via the Free Instrument Manager

The device can be controlled by installing the instrument management software on a PC via LAN, WIFI, or USB Device interfaces.The system supports high-speed data transmission with a 100-channel integrated architecture. It synchronously collects 1M sample points per channel, transmits the data via Ethernet ports, and stores it as CSV-format data files in the master control system, with the entire process completed in less than 1 minute.

Technical Specifications

All specifications except those marked "Typical" are guaranteed.Unless otherwise specified, all technical specifications apply to probes with attenuation switches set to 10× and the JHM5000HD series high-resolution oscilloscopes. To meet these specifications, the oscilloscope must first satisfy the following two conditions:

- The instrument must operate continuously for more than 30 minutes at the specified operating temperature.
- If the operating temperature variation reaches or exceeds 5 °C, the self-calibration function must be performed.

Model	JHM5104HD	JHM5054HD	JHM5034HD
Analog Bandwidth (50Ω)	1GHz	500MHz	350MHz
Analog Bandwidth (1MΩ)	500MHz	500MHz	350MHz
Rise Time (Typical)	≤0.35ns	≤0.70ns	≤1.00ns
Input/Output Channel Count	4 Analog Channels		
	16 Digital Channels (Optional)		
	2-Channel Signal Source Output		
Sampling Method	Real-time Sampling		
Acquisition Mode	Sampling, Peak Detection, High Resolution, Averaging, Enhanced Resolution		
Enhanced Resolution	Enhanced Bits: 1, 1.5, 2, 2.5, 3, 4 (12 to 16-bit)		
Real-time Sampling Rate	Analog Channels: 5GSa/s (Interleaved Mode, only 1/2 or 3/4 channels enabled); 2.5GSa/s (Non-interleaved Mode, all 4 channels enabled) Digital Channels: 1.25GSa/s		
Averaging	All channels complete N samplings simultaneously. N can be selected from 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192		
Memory Depth	500Mpts per channel (2-channel mode) 250Mpts per channel (4-channel mode)		
Waveform Capture Rate	800,000wfms/s		
	1,500,000wfms/s (Sequential Mode)		
Sequential Acquisition	Max. 400,000 frames, Min. Trigger Interval < 700 ns		
Hardware Real-time Waveform Recording & Playback	400,000 frames		
Display Screen	10.1-inch 1280×800 HD Capacitive Touch Full Lamination Display		
Vertical System (Analog Channels)			
Input Coupling	DC, AC, Ground		
Input Impedance	Analog Channels: (1MΩ±2%)‖ (16pF±2pF)‖ (50Ω±1%)		
Probe Attenuation Coefficient	Voltage Probe Ratio: 0.001X,0.01X,0.1X,1X,10X,100X,1000X, Customizable Current Probe Sensitivity: 5mV/A, 10mV/A, 50mV/A, 100mV/A, 200mV/A, 500mV/A, 1V/A, and customizable		
Maximum Input Voltage	1MΩ : 400V(DC+ACVpk) 135VRMS		

	50Ω: Max. 5VRMS
Vertical Resolution	12-bit
Vertical Range	1 MΩ: 500μV/div to 10V/div 50Ω: 500μV/div to 1V/div
Offset Range	500μV/div to 50mV/div: ±2V (50Ω or 1MΩ) 100mV/div ~ 1V/div：±5V（50Ω） 100mV/div ~ 1V/div：±20V（1MΩ） 2V/div ~ 10V/div：±200V（1MΩ） Supports display of vertical shift reading (Unit: V)
Bandwidth Limitation (Typical)	50Ω: 20 MHz, Full, Customizable 1MΩ: 20 MHz, Full, Customizable
Low-Frequency Response	AC Coupling (-3dB): ≤5 Hz (on BNC)
DC Gain Accuracy	<5mV: ±2% Full Scale; ≥5mV: ±1.5% Full Scale
DC Offset Accuracy	±（2%+0.1div+2mV）
Unit	Selectable: W, A, V, U; Default: V
Channel Isolation	DC to Maximum Bandwidth: >40 dB (100:1)
Digital Channels (Optional)	
Threshold	8 channels per group, threshold adjustable
Threshold Selection	TTL (1.4 V) 5.0 V CMOS (+2.5 V)，3.3 V CMOS (+1.65 V) 2.5 V CMOS (+1.25 V)，1.8 V CMOS (+0.9 V) ECL (-1.3 V) PECL (+3.7 V) LVDS (+1.2 V) 0 V Customize
Threshold Range	±20.0V,20 mV step
Threshold Accuracy	±(100 mV + 3% of the threshold setting)
Dynamic Range	±10 V + Threshold
Input Impedance	(101 kΩ±1%) || (9 pF ± 1 pF)
Maximum Input Voltage	±20V
Minimum Voltage Swing	500 mVpp
Minimum Detectable Pulse Width	800ps
Vertical Resolution	1bit
Inter-channel Delay	±100ns
Horizontal System (Analog Channels)	
Time Base Range	500 ps/div ~ 1 ks/div Supports time base fine-tuning

	(Displays current sampling rate and memory depth simultaneously)
Time Base Accuracy	Initial accuracy: ±1ppm; First-year aging rate: ±1ppm; Ten-year aging rate: ±3.5ppm
Delay Range	Pre-trigger (Negative Delay): ≥1 Screen Width Post-trigger (Positive Delay): 1 s ~ 5 ks
Time Base Mode	Y-T (Default)
	X-Y (CH1-CH2,CH1-CH3,CH1-CH4,CH2-CH3,CH2-CH4,CH3-CH4)
	Roll: Time base ≥50 ms/div; Automatic entry/exit via horizontal time base knob adjustment
	Scan: Time base ≥50 ms/div; User-selectable between Roll and Scan modes
Trigger	
Trigger Sensitivity	CH1 ~ CH4: ≤ 10mV/div: The larger value of 1 div or 5mVpp > 10mV/div: 0.5 div EXT: 400mVpp (DC ~ 10MHz) 800mVpp (10MHz ~ External Trigger Bandwidth Limit of 250 MHz)
	Trigger sensitivity is reduced by half when noise suppression is enabled
Trigger Level Range	Inside: ± 5 div from the screen center EXT: ± 9V
Trigger Mode	Automatic, Normal, Single
Trigger Jitter	<200ps
Holdoff Range	0.0 ps to 10s
Trigger Coupling (Typical)	DC: Pass all components of the signal
	AC: Blocks the DC component of the input signal
	High-Frequency Suppression: Suppresses high-frequency components above 40kHz in the signal
	Low-Frequency Suppression: Suppresses low-frequency components below 40kHz in the signal
Noise Suppression	Suppresses high-frequency noise in the signal and reduces the probability of false triggering of the oscilloscope
Region Trigger	
Region	Up to 2 regions supported; Trigger Source: CH1 ~ CH4; Region Attribute: Intersection, Non-Intersection
Edge Trigger	
Edge type	Rising Edge, Falling Edge, Any Edge
Trigger Source	CH1 ~ CH4, Mains, EXT, D0 ~ D15
Runt Pulse Trigger	
Pulse Width Condition	Greater Than, Less Than, Within Range, Irrelevant
Polarity	Positive Polarity, Negative Polarity
Pulse Width Range	3.2 ns to 10s

Trigger Source	CH1 ~ CH4
Overrange Pulse Trigger	
Overrange Type	Rising Edge, Falling Edge, Any Edge
Trigger Position	Overrange Entry, Overrange Exit, Overrange Duration
Overrange Duration	3.2 ns to 10s
Trigger Source	CH1 ~ CH4
Nth Edge Trigger	
Nth Edge Trigger	Rising Edge, Falling Edge
Idle Time	3.2 ns to 10s
Edge Count	1 to 65535
Trigger Source	CH1 ~ CH4、D0 ~ D15
Delay Trigger	
Edge type	Rising Edge, Falling Edge
Delay type	Greater Than, Less Than, Within Range, Outside Range
Delay Time	3.2 ns to 10s
Trigger Source	CH1 ~ CH4、D0 ~ D15
Timeout Trigger	
Edge Type	Falling Edge, Any Edge
Timeout Duration	3.2 ns to 10s
Trigger Source	CH1 ~ CH4、D0 ~ D15
Duration Trigger	
Pattern Setting	H、L、X
Trigger Condition	Greater Than, Less Than, Within Range
Duration	3.2 ns to 10s
Trigger Source	CH1 ~ CH4、D0 ~ D15
Setup and Hold Trigger	
Edge Type	Rising Edge, Falling Edge
Data Type	H、L
Setup Time	3.2 ns to 10s
Hold Time	3.2 ns to 10s
Trigger Source	CH1 ~ CH4、D0 ~ D15
Pulse Width Trigger	
Pulse Condition	Positive Polarity (Greater Than, Less Than, Within Specified Range) Negative Polarity (Greater Than, Less Than, Within Specified Range)
Pulse Width	0.8 ns to 4s
Trigger Source	CH1 ~ CH4, Mains, EXT, D0 ~ D15

Slope Trigger	
Slope Condition	Positive Slope (Greater Than, Less Than, Within Specified Range) Negative Slope (Greater Than, Less Than, Within Specified Range)
Time Setting	3.2 ns to 1s
Trigger Source	CH1 ~ CH4
Video trigger	
Signal Standard & Line Frequency Trigger Range	Triggers on all lines, specified lines, odd fields, or even fields that comply with video standards Supported video standards include PAL, NTSC, SECAM, 525p/60,625p/50,720p/24,720p/25,720p/30,720p/50,720p/60,1080i/25,1080i/30,1080p/24 ,1080p/25,1080p/30, and 1080pfs/24.
Trigger Source	CH1 ~ CH4
Pattern Trigger	
Pattern Setting	H, L, X, rising edge, falling edge
Trigger Source	CH1 ~ CH4、D0 ~ D15
RS232/UART trigger	
Trigger condition	Frame start, error frame, parity error, data
Baud rate	2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, Custom
data bit width	5-bit, 6-bit, 7-bit, 8-bit
Trigger Source	CH1 ~ CH4、D0 ~ D15
I2C trigger	
Trigger condition	Start, restart, stop, lost confirmation, address, data, address data
address bit width	7-bit, 10-bit
Address range	0 to 7F,0 to 3FF
Byte length	1 to 5
Trigger Source	CH1 ~ CH4、D0 ~ D15
SPI Trigger	
Trigger condition	Chip Select, Idle Time
Timeout Duration	100 ns to 1s
Data Bit Count	4-bit to 32-bit
Clock edge	rising edge, falling edge
Trigger Source	CH1 ~ CH4、D0 ~ D15
CAN Trigger	
Signal type	CAN_H、CAN_L
Trigger condition	Frame Header, Data Frame, Remote Frame, Error Frame, Overload Frame, Identifier, Data, ID & Data, Frame Footer, Acknowledge Lost, Bit Stuffing Error, CRC Error, All Errors
signal rate	10kbps, 19.2kbps, 20kbps, 33.3kbps, 38.4kbps, 50kbps, 57.6kbps, 62.5kbps, 83.3kbps, 100kbps, 115.2kbps, 125kbps, 230.4kbps, 250kbps, 490.8kbps, 500kbps, 800kbps, 921.6kbps, 1Mbps, 2Mbps, 3Mbps, 4Mbps, 5Mbps, Customizable
Trigger Source	CH1 ~ CH4、D0 ~ D15

CAN-FD Trigger	
Signal type	CAN_H、CAN_L
Trigger condition	Frame Header, Data Frame, Remote Frame, Error Frame, Overload Frame, Identifier, Data, ID & Data, Frame Footer, Acknowledge Lost, Bit Stuffing Error, CRC Error, All Errors
signal rate	10kbps, 19.2kbps, 20kbps, 33.3kbps, 38.4kbps, 50kbps, 57.6kbps, 62.5kbps, 83.3kbps, 100kbps, 115.2kbps, 125kbps, 230.4kbps, 250kbps, 490.8kbps, 500kbps, 800kbps, 921.6kbps, 1Mbps, 2Mbps, 3Mbps, 4Mbps, 5Mbps, Customizable
FD bit rate	250kbps, 500kbps, 800kbps, 1Mbps, 1.5Mbps, 2Mbps, 4Mbps, 6Mbps, 8Mbps, Customizable
Trigger Source	CH1 ~ CH4、D0 ~ D15
LIN Trigger	
Trigger condition	Sync, identifier, data, ID, and data, wake-up frame, sleep frame, error
signal speed	V1, V2, Any
bit rate	1.2kbps, 2.4kbps, 4.8kbps, 9.6kbps, 10.417kbps, 19.2kbps, 20kbps, Customizable
Data Length	1 ~ 8
Trigger Source	CH1 ~ CH4、D0 ~ D15
FlexRay trigger	
Trigger condition	Frame header, indicator, identifier, loop count, header fields, data, ID and data, frame footer, error
polarity	BM, BDiff, or BP
bit rate	2.5Mbps, 5Mbps, 10Mbps, Customizable
Trigger Source	CH1 ~ CH4、D0 ~ D15
Audio Trigger	
Trigger condition	Word Trigger, Left Channel, Right Channel or Any Channel Data
Format	Standard, Left-Aligned, Right-Aligned, TDM
Trigger Source	CH1~CH4、D0~D15
MIL-STD-1553B trigger	
Trigger condition	Sync, command, status, data, error
polarity	Normal Polarity, Polarity Inverted
response time	2μs~100μs
Trigger Source	CH1~CH4
SENT Trigger	
Trigger condition	Fast Mode — Sync, Status, Data, CRC, Status+Data, Status+Data+CRC, Fast CRC Error, Continuous Pulse Error Slow Mode — Sync, Short ID, Short Data, Short CRC, Short ID+Data, Enhanced ID, Enhanced Data, Enhanced CRC, Enhanced ID+Data, Slow Channel CRC Error
Trigger Source	CH1~CH4、D0~D15
Manchester Trigger	
Trigger condition	Frame Header, Header Segment Trigger, Data Segment Trigger, Tail Segment Trigger, Error Trigger

Baud rate	500bps ~ 10Mbps
Trigger Source	CH1~CH4、D0~D15
ARINC 429 trigger	
Trigger condition	Start Bit, End Bit, Label, SDI, Data, SSM, Label + Bit Count, Parity Bit Error, Bit Error, Gap Error, All Errors
Trigger Source	CH1~CH4
1-WIRE trigger	
Trigger condition	Start Segment, Command Segment, Configuration Command Segment, ID, Data, Customizable
Trigger Source	CH1~CH4、D0~D15
I3C trigger	
Trigger condition	II3C — SDR Start, SDR Restart, SDR Stop, SDR Global Broadcast Address, SDR Generic Command Code, SDR Address, SDR Data, SDR Address & Data, SDR Target End Read, SDR Target Reset, SDR Acknowledge Lost, SDR Parity Error, HDR Enter Mode, HDR Restart Mode, HDR Exit Mode, HDR_DDR Global Broadcast Address, HDR_DDR Generic Command Code, HDR_DDR Command Word, HDR_DDR Data Word, HDR_DDR Command Word & Data Word, HDR_DDR Acknowledge Lost，Interrupt, HDR_DDR Parity Error, HDR_DDR CRC Error I2C — SDR Start, SDR Restart, SDR Stop, SDR Address, SDR Data, SDR Address & Data, SDR Acknowledge Lost
Trigger Source	CH1~CH4、D0~D15
CAN-XL Trigger	
Trigger condition	Frame Header, Frame Format, Identifier, Data, ID & Data, SDT, VCID, AF, Frame Footer, Acknowledge Lost, Bit Stuffing Error, Format Error, CRC Error, All Errors
Trigger Source	CH1~CH4、D0~D15
decoding	
Decode Count	4
Decode Type	Standard — RS232/UART, I2C, SPI
	Optional — CAN, CAN-FD, LIN, FlexRay, Audio, MIL-STD-1553B, SENT, ARINC 429, Manchester, 1-WIRE, I3C, CAN-XL
Parallel Decoding	Supports up to 18-bit parallel bus decoding, compatible with combination of analog and digital channels. Custom clock settings are supported.
Decode Source	CH1 ~ CH4 or D0 ~ D15
Measurement	
Cursor Measurement	Voltage difference between cursors (△Y) Time difference between cursors (△X) The reciprocal of △X (Hz) (1/△X)
	Voltage and time values of waveform points
	Allow cursor display during automatic measurement
automatic measurement	**analog channel ：** 54 measurement parameters: maximum value, minimum value, peak-to-peak value, bottom-to-top value, midpoint value, peak-to-peak amplitude, average value, period average, root mean square (RMS), period RMS, AC RMS, area, period area, positive area, negative area, period positive area, period negative area, positive overshoot, negative

	overshoot, positive pre-charge, negative pre-charge, frequency, period, rise time, fall time, positive pulse width, negative pulse width, positive duty cycle, negative duty cycle, rise delay, fall delay, phase, proportion, period proportion, setup time, hold time, setup-to-hold ratio, FRFR, FRFF, FFFR, FFFF, FRLF, FRLR, FFLR, FFFL, positive pulse count, negative pulse count, rising edge count, falling edge count, burst width, burst interval, burst period, burst period count. digital channel ： Frequency, Period, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Rise Delay A→B, Fall Delay A→B, Phase A→B, Phase B→A
Measurement Mode	Standard measurement and precision measurement (full-memory hardware measurement)
Measurement Capacity	Display 27 measurements simultaneously
measuring range	Main Time Base, Extended Time Base, Cursor Area
Measurement statistics	Mean, maximum, minimum, standard deviation, number of measurements, line chart, and histogram
XY Measurement	Supports display of Time, Cartesian Coordinates, Polar Coordinates, Product and Ratio
Analysis Functions	Frequency Counter, Digital Voltmeter (DVM), Pass/Fail Test, Waveform Recording, Bode Plot, Power Analysis, Timing Analysis
Math Operations	
waveform calculation	A+B, A-B, A×B, A÷B, advanced operations, digital filtering
digital filtering	Low-pass, High-pass, Band-pass, Band-stop
Advanced Operations	0,1,2,3,4,5,6,7,8,9,(,+,-,*,/,^,>,<,&&,||,==,!=,)
Math Functions	Sin, Cos, Sinc, Tan, Sqrt, Exp, Lg, ln, Floor, ABS, Acos, Asin, Atan, Sinh, Tanh, Ceil, Cosh, Fabs, intg, diff
FFT	
Channel Count	4
FFT window type	Hanning, Hamming, Rectangular, Blackman
FFT Point Count	Maximum 4Mpts
FFT Vertical Scale	Vrms、dB
Function Expansion	Waterfall Plot: On, Off
	Spectrum Range Settings: Start Frequency, Stop Frequency, Center Frequency, Span
	Trace Display Modes: Normal, Average, Max Hold, Min Hold
	Marker Functions: Marker Type, Marker Point Count, Marker List
Storage	
Settings:	Instrument Configuration Status (.set)
Waveforms	Waveform data (*.dat), comma-separated values (*.csv), arbitrary waveform (*.bsv)
Images	Image save formats (*.bmp), (*.png), (*.jpg)
Reports	Decode event list formats (*.csv), (*.html), (*.pdf)
Signal source Gen (optional)	
Channel count	2
sampling rate	250MSa/s

vertical resolution	16-bit
maximal frequency	50 MHz
Standard Waveforms	Sine wave, square wave, pulse, ramp (triangular wave), noise, DC, and arbitrary wave
built-in waveforms	200 types including Sinc, Exponential Rise, Exponential Fall, ECG, Gaussian, Lorentz, and Hanning
sinusoidal wave	Frequency range: 1 μHz to 50 MHz
	Flatness: ±0.5 dB (relative to 1 kHz)
	Harmonic distortion: -40 dBc
	Spurious (Non-harmonic): -40 dBc
	Total harmonic distortion: 1% (DC to 20kHz, 1Vpp)
	Signal-to-noise ratio: 40 dB
Square wave/pulse	Frequency range: Square wave: 1 μHz to 15 MHz; Pulse: 1 μHz to 15 MHz
	Rise and fall time: <13 ns (typical value 1kHz, 1Vpp, 50Ω)
	Overdrive: Typical value 2% (1kHz, 1Vpp, 50Ω)
	Duty cycle: Square wave: 1% to 99%, adjustable; Pulse: 1% to 99%, adjustable
	Duty Cycle Resolution: 1% or 10 ns (whichever is greater)
	Minimum pulse width: 20 ns
	Pulse width resolution: 10 ns
	Jitter: 2ns
sawtooth wave	Frequency range: 1 μHz to 400 kHz
	Linearity: 1%
	Symmetry: 0.1% -99.9%
noise	Bandwidth: 50 MHz (typical)
Arbitrary Wave	Frequency range: 1 μHz to 5MHz
	Waveform length: 4 kpts
	Internal Storage Capacity: 200 Types
Frequency Parameters	Accuracy: ±1ppm initial accuracy; ±1ppm aging rate in the first year; ±3.5ppm aging rate after 10 years
	Resolution: 1μHz
Amplitude Parameters	Output range: 20 mVpp to 6 Vpp (high resistance); 10 mVpp to 3 Vpp (50 Ω)
	Resolution: 1mV
	Accuracy (Typical value: 1kHz sine wave, 0V offset): ±(5% of the set value + 2mVpp)
DC offset	Range: ±3 V (high resistance); ±1.5 V (50 Ω)
	Resolution: 1mV
	Accuracy: ±(5% of the offset setting value + 2mV)
AM Modulation	

Carrier Wave	Sine Wave, Square Wave, Ramp Wave, Arbitrary Wave
source	Internal
modulation wave	Sine Wave, Square Wave, Rising Ramp Wave, Falling Ramp Wave, Noise, Arbitrary Wave
modulating frequency	2mHz ~ 50kHz
Modulation Depth	0% to 120%
FM Modulation	
Carrier Wave	Sine Wave, Square Wave, Ramp Wave, Arbitrary Wave
source	Internal
modulation wave	Sine Wave, Square Wave, Rising Ramp Wave, Falling Ramp Wave, Noise, Arbitrary Wave
Modulation Frequency	2mHz ~ 50kHz
Modulation Depth	12.5 MHz (Max)
ASK Modulation	
Carrier Wave	Sine Wave, Square Wave, Ramp Wave, Arbitrary Wave
modulation waveform	50% duty cycle square wave
Modulation Frequency	2mHz ~ 50kHz
FSK Modulation	
Carrier Wave	Sine Wave, Square Wave, Ramp Wave, Arbitrary Wave
modulation waveform	50% duty cycle square wave
Modulation Frequency	2mHz ~ 50kHz
Modulation Frequency	Any frequency within the carrier signal range
sweep frequency	
Sweep Mode	Linear, logarithmic
Sweep Time	1ms ~ 500s
Start & Stop Frequencies	Any frequency within the waveform range
Display	
Screen Type	10.1-inch Multi-touch Full Lamination Capacitive Screen
display resolution	1280 horizontal × RGB × 800 vertical pixels
Display color	24-bit true color
Persistence Time	Auto, 50ms, 100ms, 200ms, 500ms, 1s,5s,10s,20s, Unlimited, Off
Waveform Display Type	Waveform Display Type
real-time clock	Time and Date (User-adjustable)
waveform brightness	1% to 100% (default 50%)
Grid brightness	0%~100% (default 50%)

backlight brightness	1% to 100% (default 50%)
Window transparency	0%~100% (default 50%)
Bode Plot (Optional)	
Start Frequency	50 Hz ~ 50 MHz
Stop frequency	60 Hz ~ 50 MHz
Point Count	1 ~ 1000
output amplitude	20 mVpp to 6 Vpp (High Impedance); 10 mVpp to 3 Vpp (50 Ω)
Digital voltmeter (DVM) (all values are typical)	
Source	Any Analog Channel
functions	DC、AC+DC RMS、AC RMS
Resolution	4-bit
Limit Alarm	Issues an alarm when the value meets or exceeds the specified limit range
High-Precision Frequency Counter	
Source	any analog channel and digital channel
Measurement Functions	Frequency, Period, and Accumulation
counter	Maximum valid bits: 7. Refresh time and valid bits are adjustable.
maximum measurement frequency	maximum analog channel bandwidth
Time reference	Internal Reference — ±1 ppm Initial Accuracy; ±1 ppm 1st-year Aging Rate; ±3.5 ppm 10-year Aging Rate
Interfaces	
USB-Host 3.0	1 on Front Panel, 2 on Rear Panel
USB-Device 3.0	1 on Rear Panel
LAN	LAN(VXI11)，10/100/1000 Base-T，RJ-45
AUX Out	Trig Out，Pass/Fail，DVM
Gen output	2 on Front Panel
10MHz reference input	50 Ω, amplitude 400 mVpp to 4.5 Vpp(-3.979dBm,17.044dBm), frequency 10 MHz ± 10 ppm
10MHz reference output	50Ω,1.65 Vpp square wave
HDMI1	1 Port, Supports Connection to External Monitor or Projector
WIFI	802.11b/g/n Protocol, Supports WPA-PSK Encryption
General Specifications	
Probe compensator output	
output voltage	3 Vp-p
frequency	10Hz, 100Hz, 1kHz (default), 10kHz
Power Supply	

supply voltage	100V ~ 240VAC (fluctuation: ±10%), 50Hz/60Hz 100V ~ 120VAC (fluctuation: ±10%), 400Hz		
power	120W Max		
fuse	3 A, Class F, 250 V		
environment			
temperature range	Operation: 0℃ ~ +50℃		
	Non-operational: -30℃ to +70℃		
Cooling Method	Forced Air Cooling via Fan		
Humidity range	Operation——5%~90% RH Below +35℃; 5%~60% RH for +35℃ ~ +40℃ Non-operation: 5%~ 95% RH		
Altitude	Operational: below 3000 meters; Non-operational: below 15,000 meters		
Pollution Degree	2		
Operating Environment	Indoor Use Only		
Mechanical Specifications			
Dimensions (W × H×D)	361mm×209mm×106mm		
weight	3.97kg		
adjustment interval			
Recommended calibration interval	1 year		
Regulatory standards			
electromagnetic compatibility	Complies with EMC Directive (2014/30/EU), complies with IEC 61326-1:2021/EN61326-1:2021, IEC 61326-2-1:2021/EN61326-2-1:2021, GB/T 18268.1-2020		
	Conducted Emission	CISPR 11/EN 55011	CLASS B group 1，150kHz-30MHz
		GB4824	CLASS A group 1，150kHz-30MHz
	Radiated Emission	CISPR 11/EN 55011	CLASS B group 1，30MHz-1GHz
		GB4824	CLASS A group 1，30MHz-1GHz
	electrostatic discharge	IEC 61000-4-2/ EN 61000-4-2/ GB/T 17626.2	4.0 kV (contact), 8.0 kV (air)
	Radio frequency electromagnetic field immunity	IEC 61000-4-3/ EN 61000-4-3/ GB/T 17626.6	3V/m（80 MHz to 1 GHz）; 3V/m（1.4 GHz to 2 GHz）; 1V/m（2.0 GHz to 2.7GHz）
	Electrical Fast Transient (EFT) Burst	IEC 61000-4-4/ EN 61000-4-4/	2kV (AC input port)
		GB/T 17626.4	1kV (AC input port)
	Surge Immunity	IEC 61000-4-5/ EN 61000-4-5/ GB/T 17626.5	1kV (hot wire to neutral wire) 2kV (hot/neutral to ground)
	RF Conducted	IEC 61000-4-6/	3V, 0.15-80MHz

	Immunity	EN 61000-4-6/ GB/T 17626.6	
	Voltage Sag & Short Interruption	IEC 61000-4-11/ EN 61000-4-11/ GB/T 17626.11	Voltage sag: 0% UT during 1/2-1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles Short interruption: 0% UT during 250/300 cycles
Environmental Adaptability	Vibration	GB/T 6587	Class 2 random vibration
	Shock	GB/T 6587-2012	Class 2 random oscillation
		IEC 60068-2-27	Class 3 random oscillation
		(Non-working conditions: 30 g, half-sinusoidal wave, 11 ms duration, along 3 oscillations per spindle, total 18 oscillations	
	Hazardous Substance Requirements	The maximum concentration limits for restricted substances are as follows: lead (Pb): 0.1%; mercury (Hg): 0.1%; cadmium (Cd): 0.01%; hexavalent chromium (Cr6+): 0.1%; polybrominated biphenyls (PBBs): 0.1%; polybrominated diphenyl ethers (PBDEs): 0.1%; di(2-ethylhexyl) phthalate (DEHP): 0.1%; butylbenzyl phthalate (BBP): 0.1%; dibutyl phthalate (DBP): 0.1%; diisobutyl phthalate (DIBP): 0.1%.	
Safety Standards	EN 61010-1:2010+A1:2019 EN IEC61010-2-030:2021+A11:2021 UL61010-1:2012 Ed.3+ R:19 Jul2019 UL61010-2-030:2018 Ed.2 CSA C22.2#61010-1:2012 Ed.3+U1:U2:A1 CSA C22.2#61010-2-030:2018 Ed.2 GB 4793.1/GB/T 42125.1		

Notes ：

1: Only standard HDMI ports are supported; adapter connections of other types are not supported.

Order information and warranty period

Order Information

	description	Order Number
Models	High-resolution oscilloscope with 1GHz resolution and 4 analog channels	JHM5104HD
	High-resolution oscilloscope with 500MHz resolution and 4 analog channels	JHM5054HD
	High-resolution oscilloscope with 350MHz sampling rate and 4 analog channels	JHM5034HD
Standard Accessories	Power Cord Compliant with Local National Standards (1 pc)	——
	USB 3.0 cable	——
	BNC-BNC Straight Cable (1 pc)	——
	BNC-Red & Black Alligator Clip Cable (1 pc)	——
	Passive probe (500MHz) (4)	——
Optional Accessories	Upgrade from 350MHz to 1GHz bandwidth	JHM5000HD-BW3M5T1G
	Upgrade from 350MHz to 500MHz bandwidth	JHM5000HD-BW3M5T5M
	Upgrade from 500MHz to 1GHz bandwidth	JHM5000HD-BW5MT1G
	All Serial Bus Trigger & Decode Options	JHM5000HD-BND
	Automotive Serial Bus Trigger & Decode Option (Includes CAN, CAN-FD, LIN, FlexRay)	JHM5000HD-AUTO
	CAN Trigger/Decode Option	JHM5000HD-CAN
	CAN-FD Trigger/Decode Option	JHM5000HD-CANFD
	LIN Trigger/Decoder Option	JHM5000HD-LIN
	FlexRay Trigger/Decode Option	JHM5000HD-FLEX
	SENT Trigger/Decode Option	JHM5000HD-SENT
	Audio Trigger/Decode Option	JHM5000HD-AUDIO
	MIL-STD-1553 Trigger/Decode Option	JHM5000HD-MIL1553
	ARINC429 trigger/decoder option	JHM5000HD-ARINC429
	MANCHESTER Trigger/Decode Option	JHM5000HD-MANCH
	1-WIRE trigger/decoder option	JHM5000HD-1WIRE
	I3C trigger/decoder option	JHM5000HD-I3C
	CAN-XL trigger/decoder option	JHM5000HD-CANXL
	Dual-channel function/arbitrary waveform generator option (includes Gen and Port diagrams)	JHM5000HD-AWG
	Power Analysis Option	JHM5000HD-PWR
	Timing Analysis Option	JHM5000HD-TIME

Note: All main units, accessories and optional items shall be ordered from KTB.

Warranty Period

The main unit is covered by a 1-year warranty, excluding probes and accessories.