JHM7000X Series Mixed-Signal Oscilloscope

10GSa/s | 2GHz | 1Gpts | 2,000,000wfms/s

Product Introduction

The JHM7000X Series, a flagship mixed-signal oscilloscope newly launched by KTB, excels in high-speed signal analysis with a bandwidth of up to 2.5 GHz and a sampling rate of up to 10 GSa/s.Equipped with proprietary UltraAcq® technology, it achieves a waveform capture rate of up to 800,000 wfms/s and an enhanced 2,000,000 wfms/s in sequential mode. Combined with an ultra-long memory depth of 1 Gpts, this technology significantly boosts the capability of capturing abnormal signals, as well as the precision of waveform detail measurement and analysis. The oscilloscope supports a rich portfolio of trigger and decoding types, along with advanced measurement and analysis functions including sequential mode, histogram, power analysis, jitter analysis, eye diagram analysis and mask testing. It also features up to 48 automatic measurement parameters, which fully caters to the diverse testing requirements of engineers. Powered by the 64-bit Windows 10 operating system, the JHM7000X provides a stable and scalable system platform. It is fitted with a 15.6-inch high-definition capacitive touchscreen that supports multi-window split-screen display and various gesture controls. This versatile instrument is widely applicable to telecommunications, aerospace, education and many other industries and fields.

Details

Characteristics and Advantages

- Analog channel bandwidth: up to 2G (1G/2GHz)
- Maximum sampling rate: 10 GSa/s
- Maximum Memory Depth: 1 Gpts (Standard Configuration)
- Waveform capture rate: ≥800,000wfms/s (UltraAcq® mode); 2,000,000wfms/s (sequential mode)
- Rich Trigger Types: Edge, Pulse Width, Slope, Video, Pattern, Timeout, Undershoot, Setup & Hold, Delay, Duration, Nth Edge
- Supports up to 11 serial protocols: RS232/422/485/UART, I2C, SPI, CAN, CAN-FD, LIN, FlexRay, SENT, MIL-STD-1553, ARINC 429, and AudioBus (I2S\\LJ\\RJ\\TDM).
- 7-in-1 Integrated Instrument: Digital Oscilloscope, Logic Analyzer, Spectrum Analyzer, Function/Arbitrary Waveform Generator, Digital Voltmeter, Frequency Counter, Protocol Analyzer
- 48 Parameter Measurements: Supports Histogram, Tracking, and Trend Plot
- Advanced Measurement & Analysis Functions: Power Analysis (Optional), Jitter & Eye Diagram Analysis (Optional), Mask Testing, Histogram, etc.
- System & Display: Windows 10 64-bit OS; 15.6-inch HD Capacitive Touchscreen; Supports Multi-Gesture Operations (Tap, Swipe, Zoom, Edit, Drag, etc.)
- WebServer Function: Browser-based Remote Access & Control; Supports PC/Mobile UI Layouts; Enables Seamless Cross-platform Operation
- SCPI Compliance: Supports Standard SCPI Command Set
- Versatile Interfaces: USB Host & Device, LAN, HDMI, AUX In/Out, 10 MHz Ref In/Out
- Waveform Processing & Analysis: Up to 8-channel Waveform Math; Built-in Spectrum Analysis & Peak Search; Supports MATLAB Embedded Programming & Data Visualization; Enhanced Resolution up to 3-bit
- Built-in Dual-channel Function/Arbitrary Waveform Generator: 60 MHz Output
- Built-in 16-channel Logic Analyzer: 1.25 GSa/s Sampling Rate; 125 Mpts Memory Depth

Design Features

7-in-1 Integrated Signal Measurement Platform

The JHM7000X is more than just an oscilloscope—it is a comprehensive signal test instrument that integrates the independent functions of seven major measurement instruments, enabling it to easily cope with complex testing environments.
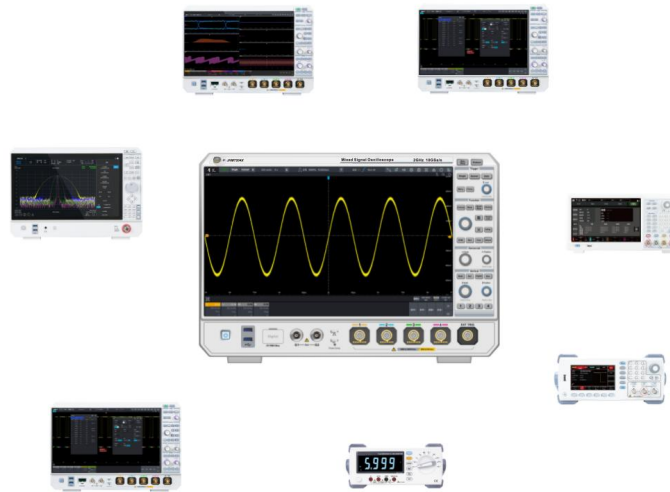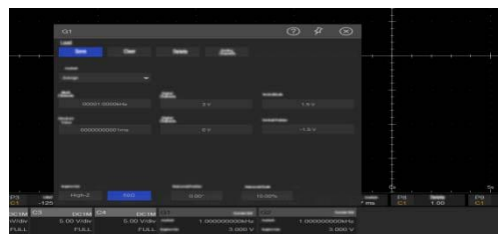

Digital Oscilloscope

- 1 GHz/2 GHz/2.5 GHz Bandwidth Options
- 4 analog channels + 1 external trigger channel
- 10 GSa/s Sampling Rate (Standard for All Models)
- By leveraging KTB proprietary UltraAcq® technology, the waveform capture rate is enhanced to 800,000wfms/s, with sequential mode reaching 2,000,000wfms/s
- The entire series comes standard with single-channel 1Gbps and full-channel 250Mbps storage depth. More easily detect details in waveforms
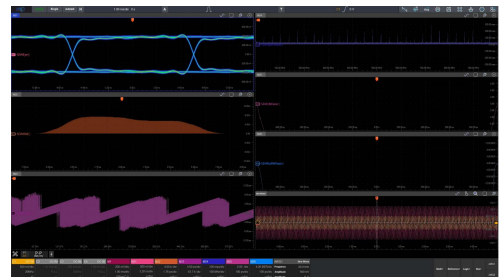
### Function/Arbitrary Waveform Generator (Optional)

- Dual-Channel Function/Arbitrary Waveform Generator with Equivalent Performance
- Maximum Output Frequency: 60 MHz (Dual Channels); Sampling Rate: 625 MSa/s.
- 16-bit vertical resolution
- Built-in Standard Waveforms: Sine, Square, Pulse, Ramp, Noise, DC
- Built-in Arbitrary Waveforms: Over 200 Types
- Supports modulation and frequency sweep of multiple signals

Spectrum Analyzer

■ Standard Enhanced FFT with Signal Analysis Capability up to 1Mpts

■ Frequency analysis range: oscilloscope analog bandwidth

■ Supports multiple spectrum views: amplitude spectrum, power spectrum, power spectral density, real part, imaginary part, and phase spectrum

■ Up to 2 Spectrum Analysis Windows Can Be Displayed Simultaneously, Enabling Visual Comparison Under Different Window Functions
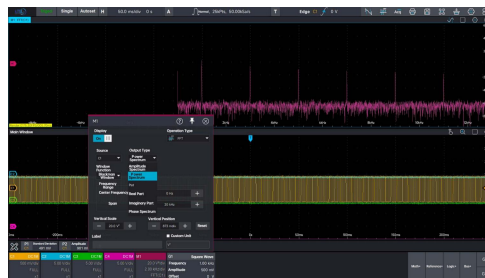
Digital Voltmeter

■ 4-bit DC/AC RMS/DC+AC RMS voltage measurement

Logic Analyzer (Optional)

■ The hardware comes with a standard 16-channel logic analyzer, and you can access the JHM7000X-LA software to enhance its functionality.

■ Digital channels feature a standard sampling rate of up to 1.25 GSa/s.

■ Digital Channel Memory Depth: Up to 125 Mpts

■ The minimum detectable pulse width is as low as 3.2 ns.

■ The digital probe features separate input connectors for the upper 8 bits and lower 8 bits, simplifying connection to the Device Under Test (DUT). When using square pins, the UT-M15 can directly mate with 2.54 mm pitch 8×2 square pin headers.

■ The UT-M15 offers excellent electrical characteristics with an input impedance of $100 \ k\Omega \ \pm 2\%$

Protocol Analyzer (Optional)

During debugging, engineers often need to monitor signals on one or more serial buses to track and identify events in system operations, which goes far beyond simple triggering functions. The JHM7000X provides comprehensive serial bus analysis capabilities with multiple protocol triggering modes, which can trigger on specific packet content, polarity identification, chip select and other events. Triggered events are displayed in a list to enable precise measurement. The instrument features rich scalability, basically covering all the most commonly used protocol analysis tasks in embedded design.

Software Suite	Description	Option Model	Standard Configuration
Computer Serial Bus Trigger Analysis	RS-232/422/485/UART	-	Standard
Embedded Serial Bus Trigger Analysis	I²C, SPI	-	Standard
Automotive Serial Bus Trigger Analysis	CAN, LIN	-	Standard
Automotive Serial Bus Trigger Analysis	CAN-FD	JHM7000X-CANFD	Optional
Automotive Serial Bus Trigger Analysis	FlexRay	JHM7000X-FLEX	Optional
Automotive Sensor Bus Trigger Analysis	SENT	JHM7000X-SENT	Optional
Audio Serial Bus Trigger Analysis	I2S, LJ, RJ, TDM	JHM7000X-AUDIO	Optional
Aerospace Serial Bus Trigger Analysis	MIL-STD-1553, ARINC 429	JHM7000X-AREO	Optional

-Supports data trigger and packet type trigger
-Supports event list and search functions

Digital Frequency Counter
■ 8-bit High-precision Hardware Frequency Counter (Standard for All Models)


KTB Proprietary UltraAcq® Technology

Waveform capture rate is critical when identifying and troubleshooting sporadic or intermittent signal anomalies. As is widely recognized, all oscilloscopes have a dead time parameter, which represents the time interval between two consecutive acquisitions. This parameter is one of the key indicators for evaluating an oscilloscope′s capability to capture abnormal signals, which is why improving waveform capture rate is often the top priority for oscilloscope manufacturers.

The JHM7000X adopts KTB′s proprietary UltraAcq® technology, leveraging multi-body cross-mapping technology and a segmented collaborative matrix processing architecture to boost the waveform capture rate up to 800,000 wfms/s—and up to 2,000,000 wfms/s in sequential mode. Compared with traditional oscilloscopes with a capture rate of 200,000 wfms/s, the JHM7000X achieves a dead time of < 1 μs, enabling it to capture nearly 1 million fast-edge signals (200 ps) per second.

Combined with intelligent anomaly signal detection technology based on information entropy, the instrument can easily handle sporadic or intermittent probabilistic events encountered by engineers during testing, realizing seamless acquisition of abnormal signals. Paired with the brand-new Ultra Phosphor 2.0 Super Phosphor Display Technology, it ensures that no elusive signals can escape detection.
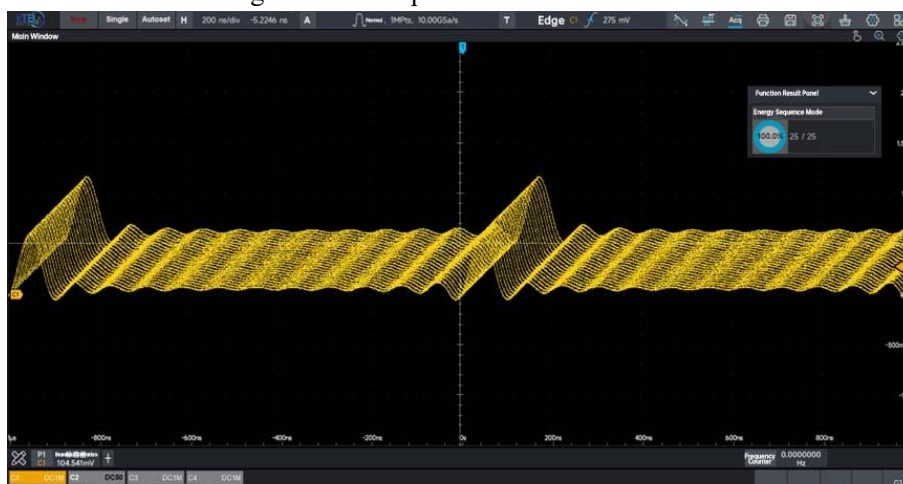
New Fast Autoset Strategy

Fuzzy control is an intelligent control method based on fuzzy set theory, fuzzy linguistic variables, and fuzzy logic reasoning. The algorithm features minimal iterations, high speed, and strong anti-interference capability.

Traditional oscilloscopes utilize Autoset functionality to automatically identify appropriate signal amplitude and frequency for optimal display. However, inconsistent implementation schemes across different manufacturers often lead to significant discrepancies in oscilloscope response speed, which even impairs user experience.

KTBhas redefined the Autoset execution mechanism by adopting an analog signal-based fast fuzzy algorithm combined with multi-channel parallel processing technology, and integrating it with an 8-bit high-precision hardware frequency counter. This enables the oscilloscope to quickly identify, process, and display the amplitude and frequency of unknown signals during Autoset operation. The full-channel Autoset completes in less than 1.5 seconds, while single-channel operation takes no more than 1.4 seconds.

For users who need to frequently switch test objects or conduct rapid testing, this strategy greatly improves work efficiency and reduces the risk of user misoperation.

15.6-inch FHD High-Definition Capacitive Touchscreen

The optimized interface layout delivers an exceptional interactive experience.

It provides a touch experience consistent with that of smartphones and tablets, enabling seamless touch interaction.

Meanwhile, it retains the knobs and shortcut keys unique to test instruments, preserving the device′s dedicated operational attributes. When paired with a mouse and keyboard, it allows for more efficient handling of test tasks..

- Supports waveform panning and zooming
- Supports window drag-and-drop for layout customization;
- Supports pop-up pinning to reduce frequent switching between multiple windows
- Supports screen extension to improve multitasking efficiency
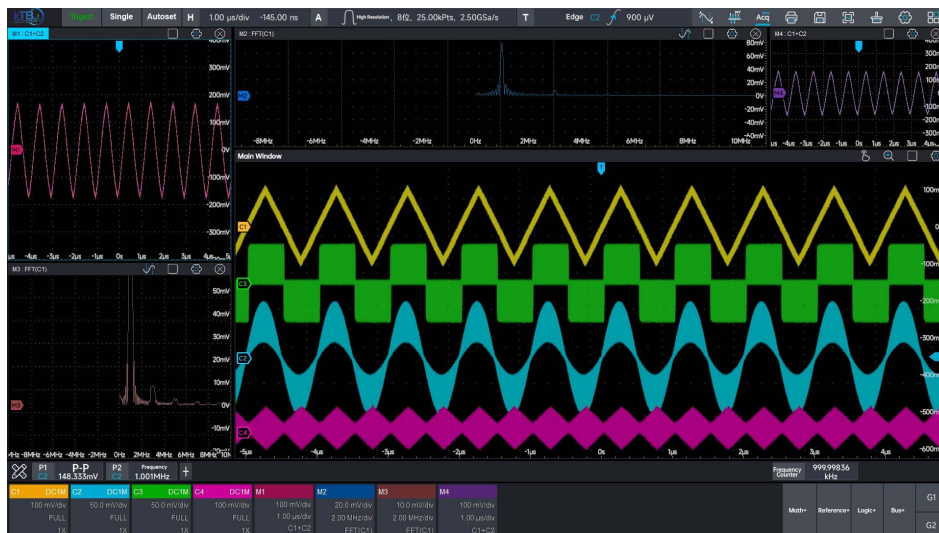
User-Defined Channel Layout

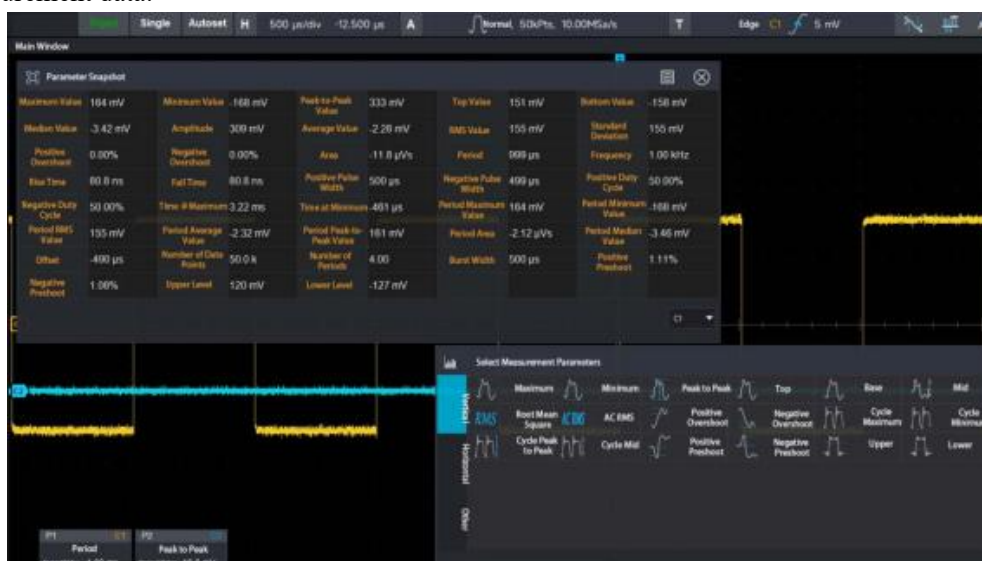The JHM7000X is equipped with an open oscilloscope user interface. You can select the created channel menus and drag them to any position as needed, with automatic layout adjustment available in four directions (up, down, left, right). You don't need to worry about cluttering the oscilloscope desktop with your operations—the instrument will automatically adjust the size and width of channel menus based on the number of channels you have enabled.

The 15.6-inch ultra-large display not only provides sufficient viewing space for signal channels, but also offers ample room for reference waveforms, bus decoding, math operations, FFT analysis, and logic channels.

Parameter Measurement

The JHM7000X provides up to 48 measurement parameters, supporting histogram, tracking, and trend chart statistics for these parameters. Its parameter snapshot function can display 35 measurement items for the current measurement channel, with measurement results updated in real time. Users can switch between measurement channels, and parameter snapshots can also be used as independent channel menus to facilitate observation of desired measurement data.

Math Operations

The JHM7000X is equipped with a comprehensive algorithm suite for complex waveform math operations, enabling you to further process your waveforms and render the results directly on the oscilloscope display.

- Enhanced FFT: Provides Spectral View in Time Domain, Frequency Domain and Modulation Domain
- Use filters (high-pass, low-pass, band-pass, band-stop)
- Enhance resolution mode, using filters to provide higher resolution. Each channel can be set independently, with a maximum enhancement of 3 bits. If the resolution and bandwidth trade-off is acceptable, filtering is the best method.
- Custom Math Operations: Includes digital channels, analog channels, all channels, and reference channels
- Supports Matlab embedded programming. You can run the code directly and render it on the oscilloscope.

Comprehensive Power Integrity Analysis — Power Analysis (Optional)

With the advancement of chip manufacturing processes, power supply systems are subject to increasingly stringent requirements. The industry is currently trending toward power delivery networks featuring low voltage and high current, especially for power networks that power chips or precision components. These systems demand reliable power supply, effective noise suppression, and uncompromised signal transmission between chips. This shift has introduced greater challenges for power testing. Designers now focus more on power efficiency and response speed to ensure stable and clean power delivery.

In this context, power integrity testing becomes particularly critical. Power integrity directly impacts signal integrity; conversely, signal quality also reflects power quality. What is more, substandard power quality can even trigger a series of electromagnetic interference (EMI) issues, which are particularly troublesome for designers. Therefore, an oscilloscope equipped with power analysis capabilities is undoubtedly the ideal choice for your testing needs.
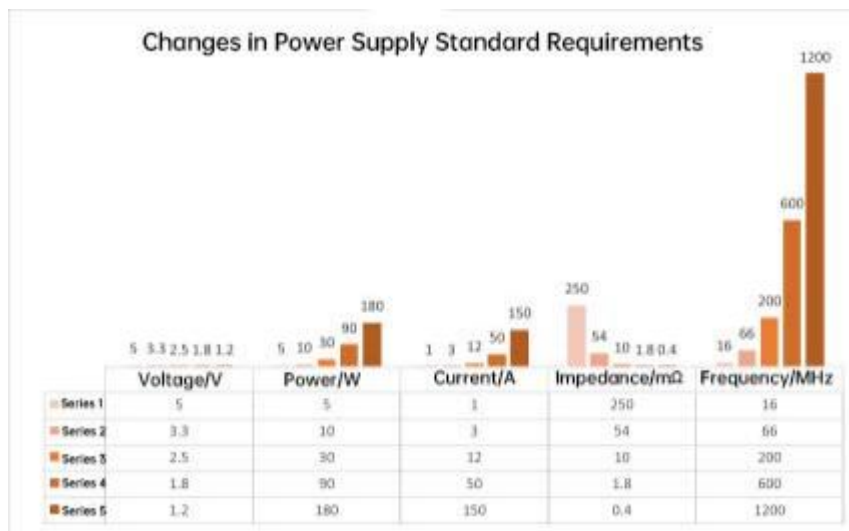
The JHM7000X is equipped with a full suite of power analysis tools and generates detailed evaluation results. Simply select the appropriate analysis type, connect the voltage and current probes to the power system test points or dedicated test fixtures as illustrated, connect the probe terminals to the desired oscilloscope channels, and perform minor adjustments to obtain your intended results.

- Power quality
- harmonic analysis
- switching loss

- ripple analysis
- loop analysis
- area of safe operation
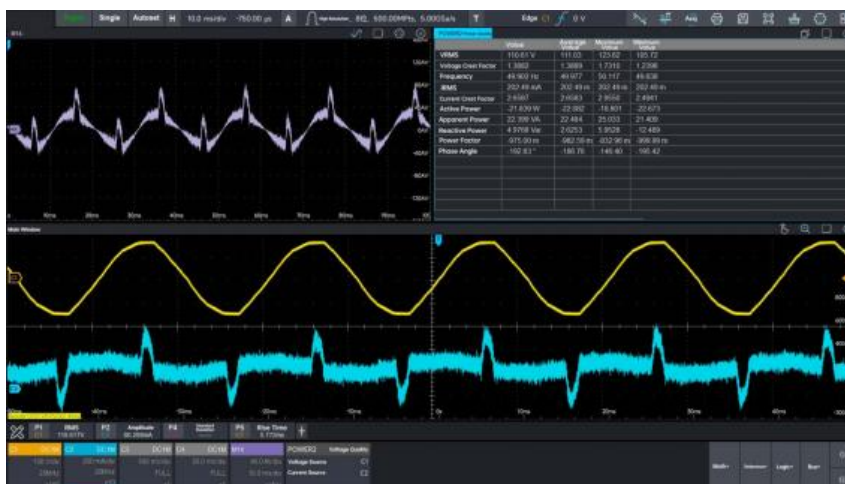
Visualized Signal Integrity Analysis ▬ Jitter and Eye Diagram Analysis (Optional)
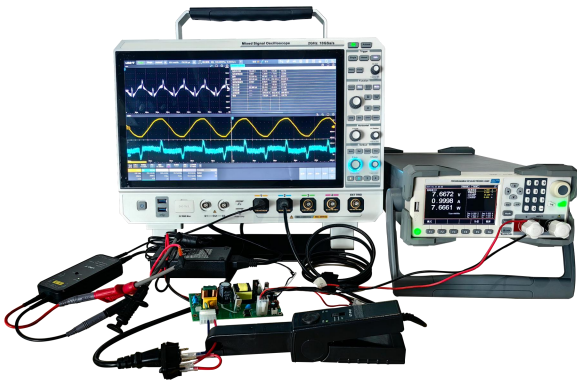
As signal rates increase, data transmission becomes increasingly susceptible to interference factors and more sensitive to link losses. Designers must accurately identify the root causes of signal discrepancies, since most signal jitter issues ultimately result from system faults induced by clock jitter. These transmission link faults include clock jitter caused by power supplies, PLL discontinuities, thermal and mechanical noise generated by crystal oscillators, and inter-symbol interference, among other issues.

How can these faults be accurately pinpointed? The JHM7000X series oscilloscope provides the ideal solution.

The JHM7000X is equipped with eye diagram generation and measurement functions integrated with clock recovery, supporting multiple clock recovery modes including fixed frequency, first-order PLL, second-order PLL, and external clock. It enables rapid generation of eye diagrams for serial signals without additional configuration. Anomalies can be identified using either standard eye diagram templates or user-defined templates, with test results displayed directly in the parameter list.

TIE jitter is the most common jitter metric. The JHM7000X is equipped with a dedicated jitter analysis software suite for visual measurement, which includes TIE trend charts, TIE spectrum charts, histograms, and bathtub curves. This suite enables jitter distribution analysis across the time domain, frequency domain, and statistical domain—for instance, RJ follows a Gaussian distribution, while DJ is bounded.

Eye Diagram Measurement Parameters: Eye amplitude, eye height, eye width, logic 1 level, logic 0 level, Q factorJitter Measurement Parameters: TIE, TJ@BER, RJ, DJ, PJ, DDJ, DCD

WebServer

- SCPI Remote Control
- Remote Viewing and Control
- Waveform File Export
- Online User Manual Browsing
- Mobile Access Support
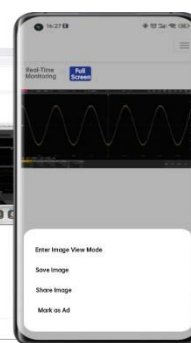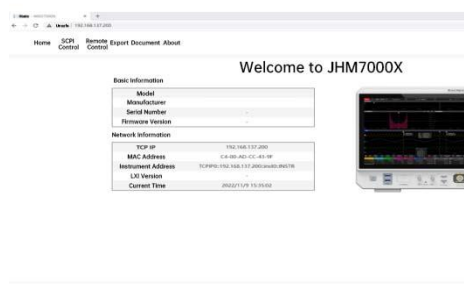
Comprehensive External Interfaces

The JHM7000X series oscilloscope is equipped with a comprehensive array of external interfaces, including USB Host, USB Device, LAN (LXI), HDMI, AUX In/Out, and 10M Ref In/Out

AUX In: 1. Trigger synchronization input; 2. External trigger input for AWG;

AUX Out: 1. Trigger synchronous output; 2. Based on test results; 3.AWG trigger output

10MHz Reference In/Out: The In/Out channels can be operated independently or simultaneously.

In: Provides the oscilloscope with a sampling reference clock.

Out: Can output its own 10MHz reference clock for external instruments to achieve inter-instrument clock synchronization.

Digital: A digital signal input used to connect digital signal sources or other digital devices.

G1 Out: Output from channel 1 of the signal source, used to transmit channel 1 signals to other devices.

G2 Out: Output from channel 2 of the signal source, used to transmit channel 2 signals to other devices.

Probe Comp: Probe compensation, used to calibrate the oscilloscope probe.

EXT TRIG: External Trigger, used to connect an external trigger signal source for the oscilloscope to trigger based on the signal.

Technical Specifications

All specifications are guaranteed except those marked as "Typical". The instrument must be operated continuously for a minimum of 30 minutes at the specified operating temperature prior to use.

Core Specifications	JHM7204X	JHM7204X
Bandwidth (-3dB) @ 50Ω ★1	2GHz	1GHz
Bandwidth (-3dB) @1MΩ	500MHz	
Rise Time @ 50Ω (Typical Value)	175ps	350ps
number of analog channels	4+EXT	
Digital channels (optional)	16 (requires JHM7000X-LA option)	
Analog channel sampling rate ★2	Dual-channel: 10 GSa/s; Full channel: 5G Sa/s	10 GSa/s (single channel); 5 GSa/s (dual channel); 2.5 GSa/s (full channel)
vertical resolution	8-bit (HD 12-bit)	
Maximum Memory Depth	1Gbps (single channel), 500Mbps (dual channel), 250Mbps (quadruple channel)	
Highest waveform capture rate ★3	≥2,000,000 wfms/s	
Function/Arbitrary Waveform Generator (Optional)	Waveform max frequency: 60MHz\nSampling rate: up to 625 MSa/s\nSupports arbitrary waveforms & editor; modulation & frequency sweep	
digital voltmeter	4-digit; DC, AC RMS, DC+AC RMS	
Frequency Counter	8-bit	
serial protocol analysis	Standard features: RS-232/422/485/UART, SPI, I2C, CAN, and LIN.\nOptional: CAN-FD, SENT, FlexRay, AudioBus (I2S\\LJ\\RJ\\TDM), MIL-STD-1553, ARINC429	
Measurement Functions	Supports over 48 types of automatic parameter measurements and snapshots, as well as statistical analysis, histograms, trend charts, and tracking charts.	
Math Operations	Supports 8 mathematical waveforms\nEnhanced FFT, basic operations, filtering, advanced formula editing, Matlab embedded programming for rendering, and resolution enhancement.	
Analysis Tools	Histogram, area histogram, trend chart, tracking chart	
Advanced Analysis Functions	Power analysis (optional), jitter and eye diagram analysis (optional), limit template test, sequential mode	
Interfaces	USB Device, USB Host×4, LAN (10/100/1000 Mb/s), HDMI, Aux In (Trigger Sync Input, AWG External Trigger Input), Aux Out (Trigger Sync Output, Test Result Output, AWG Trigger Output), 10MHz REF In/Out	
display screen	15.6-inch FHD High-Definition Capacitive Touchscreen (1920×1080) + Gesture Control Keys	

Analog Channels	JHM7204X	JHM7204X
number of channels	4+EXT	
Bandwidth Limit @ 50 Ω (Typical Value)	1GHz，500MHz，20MHz	500MHz，20MHz
Bandwidth Limit @ 1MΩ (Typical Value)	20MHz	
Vertical Input Sensitivity Range ★4	1MΩ：1mV/div ～ 10V/div	
	50Ω：1mV/div ～ 1V/div	
input coupling	AC，DC，GND	
Input Impedance	1MΩ ± 1% (15±3 pF), 50Ω ± 2%	
DC gain accuracy ★4	50Ω: ±1.5% (±2.0% when ≤5mV/div) ±1% of full scale (≤5mV/div: ±1.5% of full scale) 1MΩ: ±1.2% (±1.5% when ≤5mV/div); ±1% of full scale (±1.2% of full scale when ≤5mV/div)	
Offset Range	1MΩ：1mV/div-50mV/div:±2V；100mV/div-500 mV/div:±20V；1V/div:±40V；2V/div-10V/div:±100V	
	50Ω：1mV/div-100mV/div:±2V；200mV/div-1V/div:±5V	
DC Offset Accuracy	≤200mV/div(±0.1div±2 mV±1.5% offset) >200mV/div(±0.1div±2mV±1.0% offset)	
probe attenuation coefficient	1X,10X,100X, Custom: 0.001X~1000X	
maximum input voltage	1MΩ：≤300Vrms，CAT I；50Ω：≤5Vrms	
channel isolation	≥500:1 （DC～1GHz)	

1:2.5G,2G bandwidth is only applicable to single channel mode

★2: Dual-channel mode: Only C1 and C2 are enabled; or C3 and C4

★3: The highest waveform capture rate applies to the open sequence mode and single-channel mode settings

★4: 1mV/div is a digital amplification of 2mV/div. For vertical accuracy calculation, the vertical sensitivity of 1mV/div should be calculated using 16mV at the full scale of 2mV/div.

Digital Channel (Optional)

number of channels	16
sampling rate	1.25GSa/s

Memory Depth	125Mpts
maximum input switching rate	500MHz
Minimum Detectable Pulse Width	3.2ns
Threshold Groups	4 adjustable groups, 4 channels per group
threshold selection	TTL （1.4 V）\5.0V CMOS （+2.5 V），3.3V CMOS （+1.65 V）\2.5V CMOS （+1.25 V），1.8V CMOS （+0.9 V） ECL (-1.3 V) / PECL (+3.7 V) / LVDS (+1.2 V) / 0 V / User-defined (4 channels per group, adjustable threshold)
range of threshold *	±20.0V,20mV step
Threshold resolution*	20mV
Threshold accuracy*	±(100 mV + 3% of calibrated threshold setting)
maximum input voltage *	±40Vpeak
Maximum input dynamic range*	±10V+ threshold
Minimum voltage swing*	500mVpp
Input Impedance*	100kΩ±2%
vertical resolution	1bit
Inter-channel Skew*	1.6ns (typical value)

Note: * Indicates specifications measured with the digital probe connected to the oscilloscope

Horizontal System	
Time base range	100ps/div-1000s/div
time base accuracy	±(1.6 + 0.5 × calibrated years) ppm
time base delay range	Pre-trigger: ≥0.5 screen width; Post-trigger: ≤5000 seconds
Inter-channel Skew Adjustment Range	±100ns, minimum step 40ps
Inter-channel Synchronization Accuracy	≤100ps
Horizontal mode	Y-T\X-Y\ROLL

Acquisition System

Peak Detect Mode	Captures narrowest glitches down to 400 ps
High Resolution Mode	8–12 bits
Averaging Range	2 ~ 65536
UltraAcq® Technology	Waveform capture rate up to 800,000 wfms/s in ultra-fast acquisition mode

Trigger System

trigger mode	Automatic, Normal, Single	
trigger coupling	high frequency suppression	suppression of high frequency signal above 1MHz
	low-frequency suppression	suppression of low frequency signal below 1MHz
	Noise Rejection	Trigger hysteresis to turn on or off
	DC	DC coupled trigger
	AC	AC coupling trigger
Holdoff Range	6.4ns ~ 10s	
Trigger Sensitivity	Internal Trigger: C1 ~ C4	≤5mV：1div； ＞5mV：0.5div
	external trigger	EXT:100mVpp DC ~ 100MHz, 150mVpp 100MHz ~ 200MHz EXT/5:500mVpp DC ~ 100MHz, 750mVpp 100MHz~200MHz
trigger level range	Internal	±4 grid units from the screen center
	external trigger	EXT：±1V； EXT/5：±5V
	AC Line	The line voltage is fixed at approximately 50%.

Trigger type

Edge Trigger	source	C1 ~ C4/EXT/EXT/5/D0 ~ D15/ mains power trigger
	Trigger Edge	Rising edge, falling edge, or any edge

Pulse Width Trigger	source	C1 ~ C4/D0~D15
	polarity	Positive pulse width, negative pulse width
	Condition	Less than, greater than, within the range
	pulse length	3.2ns ~ 10s
slope trigger	source	C1 ~ C4
	Slope	Up, down
	Condition	Less than, greater than, within the range
	Time setting	3.2ns ~ 10s
Video trigger	source	C1 ~ C4，Ext
	standard	NTSC、PAL
	Trigger condition	All rows, specified rows, odd fields, or even fields
Pattern Trigger	source	C1 ~ C4
	Pattern Setting	High, Low, Any, Rising Edge, Falling Edge
Timeout Trigger	source	C1 ~ C4/D0~D15
	Edge type	Rising edge, falling edge, or any edge
	Time setting	3.2ns ~ 10s
Runt Trigger	source	C1 ~ C4
	polarity	Positive pulse width, negative pulse width
	Condition	Less than, greater than, within range, outside range
	Time setting	3.2ns ~ 10s
Setup/Hold Trigger	clock source	C1 ~ C4
	Clock edge	Rising edge, falling edge
	data source	C1 ~ C4
	condition	Setup, Hold, Setup & Hold
	Time setting	3.2ns ~ 10s
Delay Trigger	source	C1 ~ C4

	Edge type	rising edge, falling edge
	Delay type	Greater than, less than, within range, outside range
	delay time	3.2 ns to 10s
Duration Trigger	source	C1 ~ C4
	Pattern Setting	H、L、X
	Trigger condition	Greater than, less than, within the range
	duration	3.2 ns to 10s
N-Edge Trigger	source	C1 ~ C4/D0~D15
	Edge type	rising edge, falling edge
	Idle Time	3.2ns to 10s
	edge count	1 to 65535
RS-232/422/485/UART trigger	Trigger method	Start bit, parity bit, data bit, stop bit
I²C trigger	Trigger method	Start position, restart, stop, response failed, address, data, address and data
SPI detonate by contact	Trigger method	Chip Select Active, Data
CAN detonate by contact	Trigger method	Frame start, frame type, ID, data, ID and data, frame end, error
LIN detonate by contact	Trigger method	Frame start, ID, data, ID check error, checksum error
CAN-FD trigger (optional)	Trigger method	Frame start, frame type, ID, data, ID and data, frame end, error
SENT Trigger (Optional)	Trigger method	Synchronization bit, frame start, data, and CRC error
AudioBus Trigger (Optional)	Trigger method	Data, sync bit
FlexRay Trigger (Optional)	Trigger method	Frame header, indicator bit, ID, period count, data, ID and data, frame end, error
MIL-STD-1553 Trigger (Optional)	Trigger method	Command frame, data frame, status frame, and CRC error
ARINC 429 trigger (optional)	Trigger method	Frame start, tag, source or destination identifier, data, flags and status bits, and checksum

waveform measurement

cursor measurement

Source	C1 ~ C4, Math, Ref, Histogram
Measurement Type	Vertical cursor measures time and voltage (X, Y), the reciprocal of ΔX (Hz) (1/ΔX), and ΔY/ΔX (V/s). Horizontal cursor measurement voltage (Y) and ΔY; Supports auto-cursor tracking;

automatic measurement

Vertical Parameters	Maximum, minimum, peak-to-peak, top value, bottom value, median, amplitude, average, valid value, standard deviation, positive overshoot, negative overshoot, period maximum, period minimum, period valid value, period average, period peak-to-peak, period median, positive pre-charge, negative pre-charge
Horizontal Parameters	Period, Frequency, Rise Time, Fall Time, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Time@Max, Time@Min, Rise Time@Lv, Fall Time@Lv, Period@Lv, Frequency@Lv, Pulse Width@Lv, Duty Cycle@Lv, Phase Difference@Lv, RRD@Lv, FFD@Lv, RFD@Lv, FRD@Lv, Offset, Data Points, Set Time, Hold Time, Period Count
Other Parameters	Area, Cycle Area
Histogram parameters	μ±1σ, μ±2σ, μ±3σ, mode, mean, standard deviation, maximum, minimum, median, peak-to-peak, number of peaks, total sample size
Measurement Source	C1 ~ C4
Measurement Capacity	48 automatic measurements, displaying up to 10 measurements simultaneously
measuring range	Screen or cursor
Parameter snapshot	Display 35 measurement items for the current channel, with switchable signal sources
Measurement statistics	Current Value, Average Value, Maximum Value, Minimum Value, Standard Deviation, Measurement Count, Histogram, Trend Chart, Tracking Chart

Waveform Math	
Waveform Math	Supports 8 math channels, displayable simultaneously
source	C1 ~ C4，P1 ~ P10，R1 ~ R4
Advanced Operations	Supports MATLAB embedded programming and data visualization

Basic Operations		Addition, subtraction, multiplication, division, AND, OR, NOT, XOR, average, absolute value, Exp10, Exp, differentiation, integration, Ln, Lg, square, square root, common mode, sine, cosine, tangent, correlation, convolution, expansion, extraction, interpolation, maximum, minimum, custom expression (can edit and execute compound formula operations)
Enhanced FFT	functions	Amplitude spectrum, power spectrum, PSD, real part, imaginary part, and phase spectrum
	Window types	Rectangular window, Hanning window, Blackman window, Hamming window, Flat-top window
	Display Modes	Full Screen (Spectrum View), Multi-Window
	Vertical units	Vrms/dBrms
digital filtering		Low-pass, High-pass, Band-pass, Band-stop
Enhanced Resolution		Enhancement Bits: 0.5, 1, 1.5, 2, 2.5, 3 bits

measurement analysis		
digital voltmeter	source	C1 ~ C4
	Modes	DC、AC RMS、DC+AC RMS
	voltage resolution	4-bit
Frequency Counter	frequency resolution	8-bit
Pass/Fail Test	source	C1 ~ C4
	Test Templates	User-customizable or standard template importable
	Fail Actions	Stop, Save, Alarm, Generate Test Report
histogram	source	P1 ~ P10
	types	Horizontal, Vertical, Measurement-based
	Metrics	$\mu \pm 1\sigma$, $\mu \pm 2\sigma$, $\mu \pm 3\sigma$, mode, mean, standard deviation, maximum, minimum, median, peak-to-peak, number of peaks, total sample size
Jitter Analysis (Optional)	source	C1 ~ C4
	clock recovery	Fixed frequency: automatic or user-specified PLL: first-order phase-locked loop; second-order phase-locked loop; Display clock: external clock
	Views	TIE histogram, TIE trend chart, TIE spectrum, and bathtub curve

	Metrics	TIE，TJ@BER，RJ，DJ，PJ，DDJ，DCD
Eye diagram analysis (optional)	source	C1 ~ C4
	clock recovery	Fixed frequency: automatic or user-specified PLL: Phase-locked loop
	Metrics	Eye amplitude, eye height, eye width, 1 level, 0 level, Q factor
Power Analysis (Optional)	Analysis item	Power Quality, Harmonic Analysis, Switching Loss, Safe Operating Area, Ripple Analysis, Loop Analysis
Loop Analysis (Optional, requires Power Analysis)	Start Frequency	50Hz~50MHz
	Stop frequency	60Hz~50MHz
	Point Count	1~1000
	output amplitude	High impedance: 20mVpp to 6Vpp
		50Ω:10mVpp to 3Vpp

serial bus decoding		
Decoded count	Route 2	
RS-232/422/485/ UART decoding	source	C1 ~ C4
	Data width	5bit，6bit，7bit，8bit
	Parity	Odd parity, even parity, or no parity
	stop bit	1bit，2bit
	polarity	Positive polarity, negative polarity
	Bit Order	Least Significant Bit (LSB), Most Significant Bit (MSB)
	Baud rate	2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, Custom
I²C Decoding	source	C1 ~ C4
	signals	SCL，SDA
	Data width	7bit，10bit

SPI decoding	source	C1 ~ C4
	signals	MISO，MOSI，MOMI
	clock edge	Rising edge, falling edge
	Chip Select Polarity	High level, low level
	Bit Order	Least Significant Bit (LSB), Most Significant Bit (MSB)
CAN decoding	source	C1 ~ C4
	signals	CAN_H, CAN_L, Send/Receive, Differential
LIN decoding	LIN protocol version	1.0，2.0
	source	C1 ~ C4
	Baud rate	2400bps, 4800bps, 9600bps, 19200bps, Custom
	polarity	Positive polarity, negative polarity
	Data Byte Count	1 ~ 8
CAN-FD decoding（optional）	source	C1 ~ C4
	SD signal rate	10kbps,20kbps,33.3kbps,50kbps,62.5kbps,83.3kbps, 100kbps, 125kbps, 1Mbps, custom
	FD signal rate	1Mbps, 2Mbps, 3Mbps, 4Mbps, 5Mbps, 6Mbps, 7Mbps, 8Mbps, Custom
SENT decoding（optional）	source	C1 ~ C4
	Baud rate	10kbps,20kbps,33.3kbps,50kbps,62.5kbps,83.3kbps, 100kbps, 125kbps, 1Mbps, custom
	Data Length (DL)	1Nibbles，2Nibbles，3Nibbles，4Nibbles，5Nibbles，6Nibbles
	CRC Standard	V2008，V2010
AudioBus decoding（optional）	source	C1 ~ C4
	protocol type	I2S、LJ、RJ、TDM
	Channel type	Left channel, right channel
FlexRay decoding（optional）	source	C1 ~ C4
	signals	BP, BM, RX/TX, differential
	Baud rate	1Mbps, 5Mbps, 10Mbps, Customizable

MIL-STD-1553 decoding (optional)	source	C1 ~ C4
	Baud rate	1Mbps, 10Mbps, Custom
ARINC429 decoding（optional）	source	C1 ~ C4
	Signal type	single-ended differential
	signal rate	12.5kbps, 100kbps, custom
	decoding mode	19bit、23bit

Function/Arbitrary Waveform Generator (Optional)

Number of Channels	2
sampling rate	625MSa/s
vertical resolution	16bits
Maximum Output Frequency	60MHz
standard waveforms	Sine, Square, Pulse, Ramp, Noise, DC
Operating Modes	continuous wave, modulation, sweep frequency

Built-in Waveform Performance

sinusoidal wave	Frequency range: 1 µHz to 60 MHz
	Flatness: Typical value (sine wave, 0dBm) ≤30MHz:±0.5dB ≤60MHz:±0.8dB
	Harmonic distortion: -40dBc
	Spurious (Non-harmonic): -40 dBc
	Total harmonic distortion: 1% (DC to 20kHz, 1Vpp)
	Signal-to-noise ratio: 40dB
Square wave/pulse	Frequency range: Square wave: 1µHz to 25 MHz; Pulse: 1µHz to 25 MHz
	Rise/Fall Time: < 7 ns
	Overshoot: < 2% (1 kHz, 1 Vpp, 50 Ω)
	Duty Cycle: 0.01% to 99.99%, Adjustable

	Minimum pulse width: 20ns	
	Jitter: 2ns	
Ramp Wave	Frequency range: 1μHz to 1MHz	
	Symmetry: 0.01% ~ 99.99%	
	Linearity: less than 1% of peak output (typical value, 1kHz, 1Vpp, symmetry 100%)	
noise	Bandwidth: 60MHz (typical value)	
Arbitrary Waveform	Frequency range: 100 MHz to 5MHz	
	Waveform length: 8 to 512k points (output point by point)	
	Waveform Library: Over 200 types including Sinc, Exponential Rise, Exponential Fall, ECG, Gaussian, Lorentz, Half-Sine, etc.	

Modulation Functions

AM Modulation	Carrier Wave	Sine, Square Wave, Sine Wave, Any Wave
	source	interior
	modulation wave	sinusoidal, square, ramp, noise, arbitrary wave
	Modulation Frequency	2mHz ~ 200kHz
	Modulation Depth	0% ~ 120%
FM Modulation	Carrier Wave	Sine, Square, Ramp, Arbitrary Wave
	source	Internal
	modulation wave	sinusoidal, square, ramp, noise, arbitrary wave
	Modulation Frequency	2mHz ~ 200kHz
	frequency deviation	DC ~ 30MHz
PM Modulation	Carrier Wave	Sine, Square, Ramp, Arbitrary Wave
	source	Internal
	modulation wave	sinusoidal, square, ramp, noise, arbitrary wave
	modulating frequency	2mHz ~ 200kHz
	Phase Deviation	0° ~ 360°

sweep frequency

Frequency Sweep	Carrier Wave	Sine, Square Wave, Sine Wave, Any Wave
	Sweep Type	Linear, logarithmic
	Sweep Time	1ms ~ 500s
	trigger source	Internal, external, manual

frequency characteristics

signal frequency	Accuracy: ±0.5 ppm; annual aging rate at 25℃: ±1 ppm; temperature coefficient: < ±0.5 ppm/℃
	Resolution: 1μHz

output characteristics

Signal Amplitude	Range (50Ω load):	≤30MHz:10mVpp ~ 3Vpp
		≤60MHz:10mVpp ~ 1.5Vpp
	Range (high-impedance load):	≤30MHz:20mVpp ~ 6Vpp
		≤60MHz:20mVpp ~ 3Vpp
	Resolution: 1mV	
	Accuracy: Typical value (1kHz sine wave, 0V offset,>20mVpp) ±(2% of set value + 2mVpp)	
DC offset	Range (Peak AC+DC):	±1.5V （50Ω)
		±3V (high impedance)
	Resolution: 1mV	
	Offset accuracy: ±2% of the offset setting value ± 2% of the amplitude setting value ± 2mV	
waveform output	Impedance: 50Ω (typical value) Protection: Overvoltage protection (waveform output is disabled during overvoltage, and the user is prompted on the main interface)	

Display

display type	15.6-inch FHD High-Definition Capacitive Touchscreen
display resolution	1920×1080 (H×V)
Zoom Function	All waveform views support horizontal and vertical zooming and gesture control zooming

Graticule	10 horizontal divisions × 8 vertical divisions
brightness levels	256
Waveform Display Mode	Point, Vector
Waveform color	Customize waveform colors
Persistence Time	Off afterglow, Auto afterglow, Infinite afterglow

host system

processor	Inter® core™ i5-6500 (3.2GHz, 64-bit)
operating system	Windows 10 IoT Ent LTSC (64bit)
Memory	8GB
Solid State Drive (SSD)	128GB

interfaces and protocols

HDMI Output	1 port, rear panel (supports HD audio & video output)
USB host ports	4 ports (2 front panel, 2 rear panel)
USB Device Port	1 port, rear panel
LAN Interface	One Ethernet interface (10/100/1000Mbps) on the rear panel
probe compensation source	1kHz, 3Vpp square wave
10MHz reference clock Input/Output	IN/OUT can be opened individually or simultaneously IN: Rear panel BNC connector for the oscilloscope's sampling reference clock OUT: The rear panel's BNC connector outputs a 10MHz reference clock, which can be used by external instruments for inter-instrument clock synchronization.
Aux output	BNC connector on the back panel 1. Trigger the synchronous output; 2. Based on the test results; 3.AWG trigger output
Aux import	1. Trigger synchronous input 2.AWG external trigger input
EXT Trig	front panel BNC connector
Security Slot	Standard Kensington lock slot
Remote Control	Built-in WebServer: Supports accessing the web interface via the oscilloscope IP address in a web browser. Features include: Check instrument status; view and modify network status; access help manuals and

	programming manuals; download drivers; save settings, export waveforms, and take screenshots; perform real-time remote control of the instrument through keyboard and mouse
USBTMC	Supports the USBTMC interface protocol
SCPI	Supports standard SCPI command set

source

Power Supply	100V to 240VAC (±10% fluctuation) at 50Hz or 60Hz
power	Maximum 200W
Fuse Rating	3A, T level, 250V

Environmental Requirements

temperature range	Working: 0℃ ~ +40℃; Non-working: -20℃ ~ +70℃
Cooling Method	forced cooling by fan
Operating Humidity	Working conditions: below +35℃ with relative humidity ≤90%; non-working conditions: +35℃ to +40℃ with relative humidity ≤60%
Operating Altitude	Work: below 2000 meters; non-work: below 15000 meters

Mechanical Specifications

Dimensions (W×H× D)	Excluding the foot pad and outer protective cover: 445mm×302mm×200mm Calculate the dimensions of the foot pad and outer protective cover: 452mm × 309mm × 216mm Dimensions after rack accessory installation: 485mm×356mm×209mm
Net Weight	< 10.5kg
Rack Mount Compatibility	7U (requires optional JHM7000X-RM rack-mount kit)

Regulatory standards

electromagnetic compatibility	Complies with the EMC Directive (2014/30/EU) and meets or exceeds the IEC 61326-1:2021/EN61326-1:2021 standard. IEC 61326-2-1:2021/EN61326-2-1:2021	
	CISPR11/EN 55011	Conducted Emission CLASS B group1，150kHz-30MHz
		Conducted Emission CLASS B group 1，30MHz-1GHz
	IEC 61000-4-2/EN 61000-4-2	electrostatic discharge 4.0 kV (contact), 8.0 kV (air)
	IEC 61000-4-3/EN 61000-4-3	Radio frequency electromagnetic field immunity: 0V/m（80 MHz to 1 GHz）； 3V/m（1.4 GHz to 2 GHz）； 1V/m（2.0 GHz to 2.7GHz）
	IEC 61000-4-4/EN 61000-4-4	Electrical Fast Transient (EFT) Immunity 2kV (AC input port)
	IEC 61000-4-5/EN 61000-4-5	Surge Immunity 1kV (phase to neutral); 2kV (phase/neutral to ground)
	IEC 61000-4-6/EN 61000-4-6	Radio Frequency Conducted Immunity 3V，0.15-80MHz
	IEC 61000-4-11/EN 61000-4-11	Voltage sag: 0% UT during 1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles. Short interruption: 0% UT during 250/300 cycles
Safety Standards	EN 61010-1:2010+A1:2019 EN IEC61010-2-030:2021+A11:2021 BS EN61010-1:2010+A1:2019 BS EN IEC61010-2-030:2021+A11:2021 UL 61010-1:2012 Ed.3+ R:19 Jul2019 UL 61010-2-030:2018 Ed.2 CSA C22.2#61010-1:2012 Ed.3+U1;U2;A1 CSA C22.2#61010-2-030:2018 Ed.2	

Warranty and calibration services

Recommended calibration interval	1 year
Warranty Period	1 year

Order Information

product models

JHM7204X	2GHz bandwidth with peak data rates of 10GSa/s (10GSa/s per channel, 5GSa/s for dual channels, and 2.5GSa/s for quad channels). 4-channel oscilloscope
JHM7204X	1GHz bandwidth with peak throughput of 10GSa/s (10GSa/s per channel, 5GSa/s for dual channels, and 2.5GSa/s for quad channels)

	4-channel oscilloscope

Standard Accessories

--	1 USB3.0 data cable
--	Four Sets of Passive High-impedance 500MHz Probes
--	2 BNC-BNC straight-through lines
--	1 front panel protective cover
--	1 power cord compliant with local standards
--	1 calibration certificate

Optional Accessories

JHM7000X-RM	Rack Mount Kit

Optional Function Modules

JHM7000X-AWG	Dual-channel 60 MHz Function/Arbitrary Waveform Generator
JHM7000X-LA	16-channel logic analyzer
JHM7000X-JITTER	Advanced jitter and eye diagram analysis
JHM7000X-PWR	Advanced Power Measurement & Analysis
JHM7000X-CANFD	Automotive Serial Bus Trigger & Analysis (CAN-FD)
JHM7000X-FLEX	Automotive Serial Bus Trigger & Analysis (FlexRay)
JHM7000X-SENT	Automotive Sensor Trigger & Analysis (SENT)
JHM7000X-AUDIO	Audio Serial Bus Trigger & Analysis (I2S, LJ, RJ, TDM)
JHM7000X-AREO	Aerospace Serial Bus Trigger and Analysis (MIL-STD-1553, ARINC 429)
JHM7000X-BND	Upgrade Bundle (JITTER, PWR, CANFD, FLEX, SENT, AUDIO, AERO)