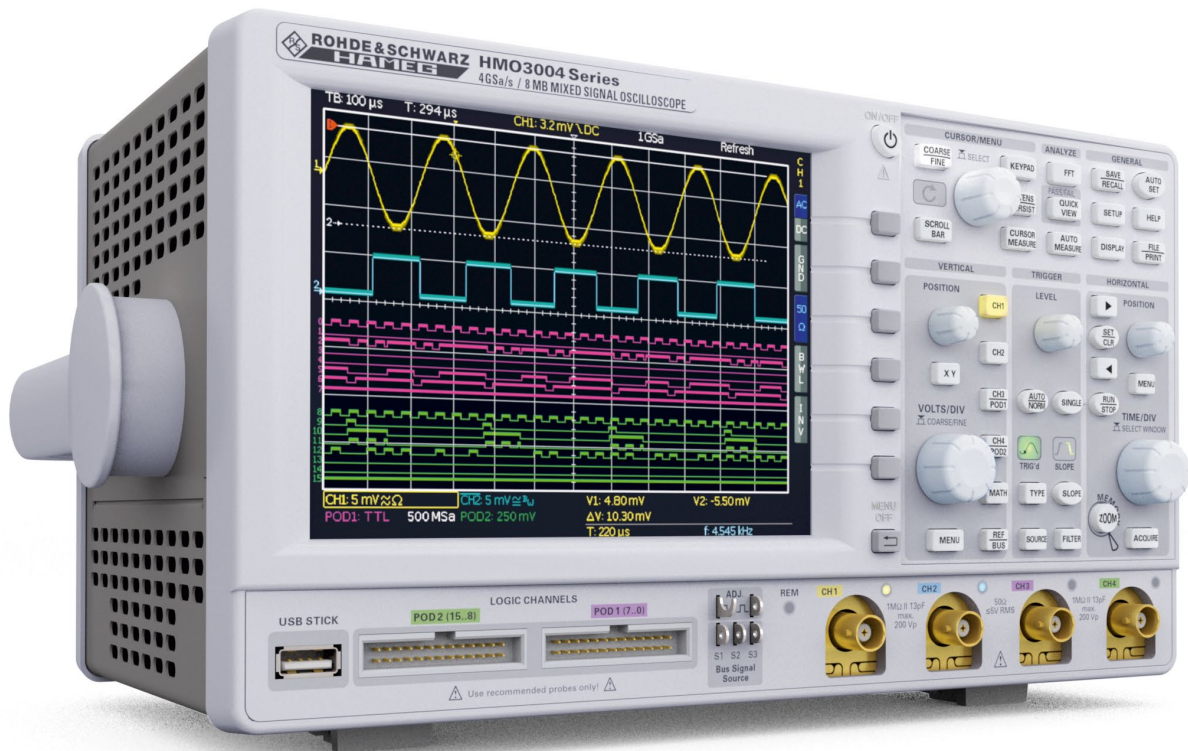


300/400/500MHz 2[4] channel mixed signal oscilloscope HMO3002 [HMO3004]



HMO3004



8 channel logic probe
H03508




Active probe HZ030



Future-proof due to
bandwidth upgrade option
H00352/354 - H00452/454

300/400 MHz
>>>
500 MHz

- ✓ 4GSa/s real time, low noise flash A/D converter
- ✓ 8MPts memory,  Zoom up to 200,000:1
- ✓ MSO functionality included as standard
(H03508/H03516 logic probe with 8/16 logic channels required)
- ✓ Automatically or manually adjustable memory depth
- ✓ Vertical sensitivity up to 1 mV/div.
- ✓ Trigger modes: slope (A/B), pulse width, video, logic, serial buses (optional), hold-off
- ✓ Serial bus trigger and hardware accelerated decode incl. list view.
Options: I²C + SPI + UART/RS-232 (H0010/H0011), CAN + LIN (H0012)
- ✓ 28 auto-measurement parameters plus statistics, formula editor, ratio cursor
- ✓ 6-digit hardware counter
- ✓ Real-time FFT (dBm, dBV, V_{rms}), up to 64 kPts
- ✓ Pass/fail test based on masks
- ✓ Automatic search for user-defined events
- ✓ Display: 12 div. x-axis, 20 div. y-axis (VirtualScreen)
- ✓ 2 x USB for mass storage, ethernet/USB dual-interface for remote control

HMO3004 Series 4 channel mixed signal oscilloscope
HMO3002 Series 2 channel mixed signal oscilloscope
HMO3032 [HMO3034] 300MHz
HMO3042 [HMO3044] 400MHz
HMO3052 [HMO3054] 500MHz
 Firmware: ≥5.0
 All data valid at 23°C after 30 minute warm-up.

Display	
Display:	16.5 cm [6.5"] VGA Color TFT
Resolution:	640 x 480 Pixel
Backlight:	LED 500 cd/m ²
Display area for traces:	50 Pts/div.
without menu	400 x 600 Pixel (8 x 12 div.)
with menu	400 x 500 Pixel (8 x 10 div.)
Color depth:	256 colors
Intensity steps per channel:	0...31
Channel display:	False color, inverse brightness
Bus display:	up to 2 busses, parallel busses, serial busses (option), decoding of the bus values in ASCII, binary, decimal or hexadecimal format; Table view of the decoded data
Virtual Screen	20 div. vertical for all Math-, Logic-, Bus- and Reference Signals
LED brightness:	2 steps

Vertical System	
Channels:	
DSO mode	CH 1, CH 2 [CH 1...CH 4]
MSO mode	CH 1, CH 2, LCH 0...15 (logic channels) with 2 x Option H03508
Auxiliary input:	
Function	Front side [Rear side]
Impedance	External Trigger
Coupling	1 MΩ 14 pF ±2 pF
Max. input voltage	DC, AC
XYZ-mode:	100V [DC + peak AC]
Invert:	All analog channels on individual choice
Y-bandwidth [-3 dB]:	CH 1, CH 2 [CH 1...CH 4]
300/400/500 MHz [5 mV...5V]/div.	
300 MHz: 180 MHz [1mV, 2mV]/div.	
400/500 MHz: 200 MHz [1mV, 2mV]/div.	
Lower AC bandwidth:	2 Hz
Bandwidth limiter (switchable):	approx. 20 MHz
Rise time (calculated):	300 MHz: < 1.166 ns
	400 MHz: < 0.875 ns
	500 MHz: < 0.7 ns
DC gain accuracy:	2% of full scale
Input sensitivity:	12 calibrated steps
CH 1, CH 2 [CH 1...CH 4]	1 mV/div...5V/div. [1-2-5 Stepping]
Variable	Between calibrated steps
Inputs CH 1, CH 2 [CH 1...CH 4]:	
Impedance	1 MΩ 13 pF ±2 pF [50 Ω switchable]
Coupling	DC, AC, GND
Max. input voltage	1 MΩ: 200V _p , derates at 20 dB/Decade to 5V _{rms} above 100 kHz
	50 Ω: < 5V _{rms} , max. 30V _p
Measuring circuits:	Measuring Category 0
Position range:	±8 divs
Offset control:	
1 mV, 2 mV	±0.2V - 8 div. * sensitivity
5...20 mV	±1V - 8 div. * sensitivity
50 mV	±2.5V - 8 div. * sensitivity
100mV, 200mV	±20V - 8 div. * sensitivity
500 mV...5V	±50V - 8 div. * sensitivity
Logic channels:	With Option H03508/H03516
Select. switching thresholds	TTL, CMOS, ECL, 2 x User -2V...+8V
Impedance	100 kΩ < 4 pF
Coupling	DC
Max. input voltage	40V [DC + peak AC]

Triggering	
Trigger modes:	
Auto	Triggers automatically even when no trigger event occurs for a certain time
Norm	Always triggers when a trigger event occurs
Single	Triggers once on a trigger event
Trigger display:	LED
Trigger sensitivity:	
Intern	≥5 mV/div.: 0.8 div.
	≥2 mV/div. ... <5 mV/div.: 1 div.
	<2 mV/div.: 1.5 div.
Ext. trigger via	Auxiliary Input [Aux. Input rear side]
Ext. Sensitivity	0.5V...10V _{pp}

Trigger level range:	
With auto level	Adjustability of the level between the peak values of the signal
Without auto level	-8 div...+8 div.
External	-5V...+5V
Trigger types:	
Slope:	
Slope direction	Rising, falling, both
Sources	CH 1, CH 2, Line, Ext [CH 1...CH 4, Line, Ext.]
Coupling	
Auto level	Adjustability of the level between the peak values of the signal, 5 Hz...300/400/400 MHz
AC	5 Hz...300/400/400 MHz
DC	0...300/400/400 MHz
HF	30 kHz...300/400/400 MHz
LF	0...5 kHz, selectable for DC, Auto level
Noise rejection [low-pass]	100 MHz, selectable for DC, AC, Auto level
Pulse width:	
Polarity	Positive, negative
Functions	ti>t, ti<t, ti=t, ti/=t, t1<ti<t2, not [t1<ti<t2]
Pulse duration	16 ns...8.589 s, resolution 4 ns/1 μs
Video	
Standards	Pos./neg. sync. impulse
Fields	PAL, SECAM, NTSC, PAL-M, SDTV 576i, HDTV 720p, HDTV 1080i, HDTV 1080p
Line	Upper, lower, both
Source	All, line number selectable
Source	CH 1, CH 2, Ext. [CH 1...CH 4]
Logic:	
Logic functions	AND, OR, TRUE, FALSE, with or without evaluation of the duration of the logic operation
Duration functions	ti>t, ti<t, ti=t, ti/=t, t1<ti<t2, not [t1<ti<t2], Timeout
Duration	4 ns...1 s
Source	LC0...15
State	LC0...15 X, H, L
Serial Busses: (Options)	
I ² C	Start, Stop, ACK, NACK, Address/Data
SPI	Start, End, Serial Pattern (32Bit)
UART/RS-232	Startbit, Frame Start, Symbol, Pattern
LIN	Frame Start, Wake Up, Identifier, Data, Error
CAN	Frame Start, Frame End, Identifier, Data, Error
Trigger Holdoff:	50 ns...>10 s
2nd Trigger (B):	
Type	Slope trigger
Slope direction	Rising or falling
Min. signal height	0.8 div.
Source	CH 1, CH 2, Ext. [CH 1...CH 4]
Coupling (source B=A):	DC, HF, NR
Coupling (source B=A):	see trigger A
Level (source B=A):	-8 div...+8 div. (adjustable separately by A)
Level (source B=A):	see level A
Frequency range	0...300/400/500 MHz
Operating modes:	
Time based	16 ns...8.589 s, resolution 4 ns/1 μs
Event based	1...216

Horizontal System	
Domain representation:	Time, Frequency (FFT), Voltage (XY)
Representation Time Base:	Main-window, main- and zoom-window
Memory Zoom:	Up to 200,000:1
Time Base:	
Accuracy	15 ppm
Aging	±5 ppm/year
Refresh operating modes	1 ns/div...20 ms/div.
Roll operating modes	50 ms/div...50 s/div.
Deskew:	-62,5 ns...+61,5 ns
Step size	500 ps
Search functions:	Slope, Pulse, Peak, Rise-/Falltime, Runt up to 8 user definable marker for easy navigation; automatic marker function based on search criteria
Marker:	

Digital Storage	
Sampling rate:	2 x 2 GSa/s, 1 x 4 GSa/s [4 x 2 GSa/s, 2 x 4 GSa/s] Logic channels: 16 x 1 GSa/s
Resolution (vertical):	8 Bit, HiRes 10 Bit
Memory:	2 x 4 MPts [4 x 4 MPts], 1x 8 MPts [2 x 8 MPts]
Operation modes:	Refresh, Average [1024], Envelope, Peak-Detect (500ps), Filter, Rol (free run/triggered from time base 50 ms/div. and slower), HiRes
Interpolation:	CH 1...CH 4: Sinx/x, Pulse, Linear; LC0...15: Pulse

Persistence:	Off, 50 ms...∞
Delay pretrigger:	0...4 Million x (1/samplerate), Interlaced x2
posttrigger	0...8,59 Billion x (1/samplerate)
Display refresh rate:	Up to 4,800 waveforms/s
Display:	Dots, vectors (interpolation), 'persistence'

Operation/Measuring/Interfaces

Operation:	Menu-driven (multilingual), Autoset, help functions (multilingual)
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Frequency counter:	0.5 Hz...300/400/500 MHz
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6 Digit resolution

Accuracy 15 ppm

Aging ±5 ppm/year

Auto measurements:	V_{pp} , V_{p+} , V_{p-} , V_{rms} , V_{avg} , V_{top} , V_{base} , amplitude, phase, frequency, period, risetime 80/90%, falltime 80/90%, pos./neg. pulse width, pos./neg. duty cycle, standard deviation, delay, pos./neg. edge count, pos./neg. pulse count, trigger period, trigger frequency
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Statistic Min., max., mean, standard deviation, number of measurements for up to 6 Functions simultaneously

Cursor measurements:	ΔV , Δt , $1/\Delta t$ (f), V to GND, Vt related to Trigger point, ratio X and Y, pulse count, edge count, peak to peak, peak+, peak-, mean value, RMS value, standard deviation, rise time, duty cycle
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Application memory:	8 MByte for references, device settings and formulars
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Interface:	Internal
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2x USB-Host (type A) (1x front side, 1x rear side), mass storage (FAT16/32)

Exchangeable H0730 Dual-Interface Ethernet/USB-Device (type B)

Video OUT:	DVI-D (480p, 60 Hz) for external display, HDMI compatible
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Trigger OUT:	BNC (rear side), Modes: Trigger, Mask
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Optional:	USB-Device/RS-232 Dual-Interface (H0720), IEEE-488 (GPIB) (H0740)
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Mathematic functions

Quickmath:	ADD, SUB, MUL, DIV
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Editor for formula sets:	Max. 5 formulas per formula set
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Label for:	Math. memories and formula set
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Sources:	All channels and math. Memories, constants
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Targets:	Math. memories
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Functions:	ADD, SUB, 1/X, ABS, MUL, DIV, SQ, POS, NEG, INV, SQR, MIN, MAX, LOG_{10} , LN, Integral, Differential, High-pass filter, Low-pass filter
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Display:	Up to 4 math. memories with label
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Mask test:	Signal test (pass/fail) based on previously defined mask
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Quickview:	Display of V_{p+} , V_{p-} , RMS value, rise time, fall time
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General Information

Probe ADJ Output:	1 kHz/1MHz square wave signal
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approx. $0,2V_{pp}$ ($t_a < 4$ ns)

Bus Signal Source (4Bit):	SPI, I ² C, UART, retangle, 4Bit counter, 4 Bit random pattern
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Internal RTC (Realtime clock):	Date and time for stored data
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Line voltage:	100...240V, AC 50...60Hz, CAT II
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Power consumption:	Max. 70 [90] W
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Protective system:	Safety class I (EN61010-1), CSA (pending)
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Operating temperature:	+5...+40 °C
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Storage temperature:	-20...+70 °C
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Rel. humidity:	5...80% (non condensing)
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Theft protection:	Kensington Lock
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Dimensions (W x H x D):	285 x 175 x 220 mm
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Weight:	3.6 kg
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Accessories supplied: H0730 Dual-Interface Ethernet/USB-Device, Line cord, printed operating manual, 2 [4] Probes, 10:1 with attenuation ID (HZ350 400/300MHz, HZ355 500MHz), Software-CD

Recommended accessories:

H0010	Serial bus trigger and hardware accelerated decode, I ² C, SPI, UART/RS-232 on Analog channels and Logic channel
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H0011	Serial bus trigger and hardware accelerated decode, I ² C, SPI, UART/RS-232 on Analog channels
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H0012	Serial bus trigger and hardware accelerated decode, CAN, LIN on Logic channels and Analog channels
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H03508	Active 8 Channel Logic Probe
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H03516	2 x H03508, active 8 Channel Logic Probes
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H0720	Dual-Interface USB-Device/RS-232
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H0740	Interface IEEE-488 (GPIB), galvanically isolated
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HZ46	4RU 19" Rackmount Kit
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HZ99	Carrying Case for protection and transport
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HZ355	Slimline Probe 10:1 with automatic identification
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HZ355DU	Upgrade from 2 x HZ350 to 2 x HZ355
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HZ020	High voltage probe 1000:1 (400MHz, 1000V _{rms})
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HZ030	Active probe 1GHz (0.9pF, 1MΩ, including many accessories)
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HZ040	Active differential Probe 200MHz (10:1, 3,5pF, 1MΩ)
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HZ041	Active differential Probe 800MHz (10:1, 1pF, 200kΩ)
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HZ050	AC/DC Current probe 30A, DC...100kHz
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HZ051	AC/DC Current probe 100/1000A, DC...20kHz
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