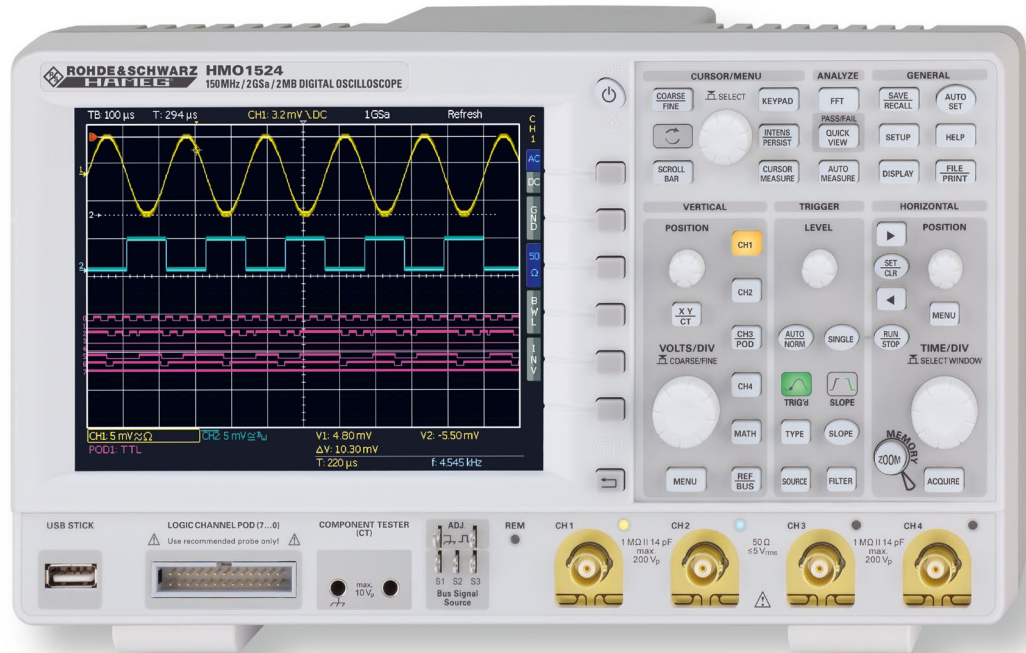


# 150MHz 2[4] Channel Digital Oscilloscope HMO1522 [HMO1524]

HMO1524



2 Channel Version  
HMO2022



Side view



8 Channel Logic Probe  
H03508



- ✓ 2GSa/s Real Time, Low Noise Flash A/D Converter (Reference Class)
- ✓ 2MPts Memory, Memory **Z**oom up to 50,000:1
- ✓ MSO (Mixed Signal Opt. H03508) with 8 Logic Channels
- ✓ Serial Bus Trigger and Hardware accelerated Decode incl. List View. Options: I<sup>2</sup>C + SPI + UART/RS-232, CAN/LIN
- ✓ Automatic Search for User defined Events
- ✓ Pass/Fail Test based on Masks
- ✓ Vertical Sensitivity 1mV/div., Offset Control ±0.2...±20V
- ✓ 12div. x-Axis Display Range, 20div. y-Axis Display Range (VirtualScreen)
- ✓ Trigger Modes: Slope, Video, Pulswidth, Logic, Delayed, Event
- ✓ Component Tester, 6 Digit Counter, Automeasurement: max. 6 Parameters incl. Statistic, Formula Editor, Ratiocursor, FFT: 64kPts
- ✓ Fan: Silence redefined
- ✓ 3 x USB for Mass Storage, Printer and Remote Control

# 150 MHz 2 [4] Channel Digital Oscilloscope HMO1522 [HMO1524]

All data valid at 23 °C after 30 minutes warm-up.

## Display

Display:	16.5 cm (6.5") VGA Color TFT
Resolution:	640 x 480 Pixel
Backlight:	LED 400 cd/m <sup>2</sup>
Display area for traces:	
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 trace:	0...31

## Vertical System

<b>Channels:</b>	
DSO mode	CH 1, CH 2 [CH 1...CH 4]
MSO mode	CH 1, CH 2, LCH 0...7 (Logic Channels) [CH 1, CH 2, LCH 0...7, CH4] with Option HO3508
<b>Auxiliary input:</b> Frontside (Rear side)	
Function	Ext. Trigger
Impedance	1 M $\Omega$    14 pF $\pm$ 2 pF
Coupling	DC, AC
Max. input voltage	100V (DC + peak AC)
XYZ-mode:	All Analog Channels on individual choice
Invert:	CH 1, CH 2 [CH 1...CH 4]
Y-bandwidth (-3 dB):	150 MHz (5 mV...10V)/div. 100 MHz (1 mV, 2 mV)/div.
Lower AC bandwidth:	2 Hz
<b>Bandwidth limiter</b> (switchable): approx. 20 MHz	
Rise time (calculated):	<2.4 ns
DC gain accuracy:	2%
Input sensitivity:	13 calibrated steps
CH 1, CH 2 [CH 1...CH 4]	1 mV/div...10V/div. (1-2-5 Sequence)
Variable	Between calibrated steps
<b>Inputs CH 1, CH 2 [CH 1...CH 4]:</b>	
Impedance	1 M $\Omega$    14 pF $\pm$ 2 pF (50 $\Omega$ switchable)
Coupling	DC, AC, GND
Max. input voltage	200V (DC + peak AC), 50 $\Omega$ <5V <sub>rms</sub>
Measuring circuits:	Measuring Category I (CAT I)
Position range:	$\pm$ 10 Divs
<b>Offset control:</b>	
1 mV, 2 mV	$\pm$ 0.2V - 10 div. x Sensitivity
5...50 mV	$\pm$ 1V - 10 div. x Sensitivity
100 mV	$\pm$ 2.5V - 10 div. x Sensitivity
200 mV...2V	$\pm$ 40V - 10 div. x Sensitivity
5V...10V	$\pm$ 100V - 10 div. x Sensitivity
<b>Logic Channels:</b> With Option HO3508	
<b>Select. switching thresholds</b> TTL, CMOS, ECL, User -2...+8V	
Impedance	100 k $\Omega$    <4 pF
Coupling	DC
Max. input voltage:	40V (DC + peak AC)

## Triggering

<b>Analog Channels:</b>	
Automatic:	Linking of peak detection and trigger level
Min. signal height	0.8 div.; 0.5 div. typ. (1.5 div. at $\leq$ 2 mV/div.)
Frequency range	5 Hz...200 MHz (5 Hz...120 MHz at $\leq$ 2 mV/div.)
Level control range	From peak- to peak+
<b>Normal (without peak):</b>	
Min. signal height	0.8 div.; 0.5 div. typ. (1.5 div. at $\leq$ 2 mV/div.)
Frequency range	0 Hz...200 MHz (0 Hz...120 MHz at $\leq$ 2 mV/div.)
Level control range	-10...+10 div from center of the screen
<b>Operating modes:</b> Slope/Video/Logic/Pulses/Buses optional	
<b>Slope:</b>	
Sources	Rising, falling, both CH 1, CH 2, Line, Ext., LCH 0...7 [CH 1...CH 4, Line, Ext., LCH 0...7]
<b>Coupling (Analog Channel)</b>	
AC:	5 Hz...200 MHz
DC:	0...200 MHz
HF:	30 kHz...200 MHz
LF:	0...5 kHz
Noise rejection:	selectable
<b>Video:</b>	
Standards	PAL, NTSC, SECAM, PAL-M, SDTV 576i, HDTV 720p, HDTV 1080i, HDTV 1080p
Fields	Field 1, field 2, both
Line	All, selectable line number
Sync. Impulse	Positive, negative
Sources	CH 1, CH 2, Ext. [CH 1...CH 4]

<b>Logic:</b>	AND, OR, TRUE, FALSE
Sources	LCH 0...7, CH 1, CH 2 [CH 1...CH 4]
State	LCH 0...7 X, H, L
Duration	8 ns...8.38 ms
<b>Pulses:</b> Positive, negative	
<b>Modes</b> equal, unequal, less than, greater than, within/without a range	
<b>Range</b>	min. 32 ns, max. 10 s, resolution min. 8 ns
Sources	CH 1, CH 2, Ext. [CH 1...CH 4]
<b>Indicator for trigger action:</b> LED	
Ext. Trigger via:	Auxiliary input 0.3V...10V <sub>pp</sub>
<b>2<sup>nd</sup> Trigger:</b>	
Slope	Rising, falling, both
Min. signal height	0.8 div.; 0.5 div. typ. (1.5 div. at $\leq$ 2 mV/div.)
Frequency range	0 Hz...200 MHz (0 Hz...120 MHz at $\leq$ 2 mV/div.)
Level control range	-10...+10 div.
<b>Operating modes</b>	
after time	32 ns...10 s
after incidence	1...2 <sup>16</sup>
<b>Serial Buses:</b>	
Option H0010	I <sup>2</sup> C/SPI/UART/RS-232 on Logic Channels and Analog Channels
Option H0011	I <sup>2</sup> C/SPI/UART/RS-232 on Analog Channels
Option H0012	CAN/LIN on Logic Channels and Analog Channels

## Horizontal System

<b>Domain representation:</b>	Time, Frequency (FFT), Voltage (XY)
<b>Representation Time Base:</b>	Main-window, main- and zoom-window
<b>Memory Zoom:</b>	Up to 50,000:1
<b>Accuracy:</b>	50 ppm
<b>Time Base:</b>	2 ns/div...50 s/div.
<b>Roll Mode</b>	50 ms/div...50 s/div.

## Digital Storage

<b>Sampling rate (real time):</b>	2 x 1 GSa/s, 1 x 2 GSa/s [4 x 1 GSa/s, 2 x 2 GSa/s] Logic Channels: 8 x 1 GSa/s
<b>Memory:</b>	2 x 1 MPts, 1 x 2 MPts [4 x 1 MPts, 2 x 2 MPts]
<b>Operation modes:</b> Refresh, Average, Envelope, Peak-Detect Roll: free run/triggered, Filter, HiRes	
<b>Resolution (vertical):</b>	8 Bit, (HiRes up to 10 Bit)
<b>Resolution (horizontal):</b>	40 ps
<b>Interpolation:</b>	Sin $\pi$ x, linear, Sample-hold
<b>Persistence:</b>	Off, 50 ms... $\infty$
<b>Delay pretrigger:</b>	0...8 Million x (1/samplerate)
<b>    posttrigger</b>	0...2 Million x (1/samplerate)
<b>Display refresh rate:</b>	Up to 2,000 waveforms/s
<b>Display:</b>	Dots, vectors, 'persistence'
<b>Reference memories:</b>	typ. 10 Traces

## Operation/Measuring/Interfaces

<b>Operation:</b>	Menu-driven (multilingual), Autoset, help functions (multilingual)
<b>Save/Recall memories:</b>	typ. 10 complete instrument parameter settings
<b>Frequency counter:</b>	
0.5 Hz...200 MHz	6 Digit resolution
Accuracy	50 ppm
<b>Auto measurements:</b> Amplitude, standard deviation, V <sub>pp</sub> , V <sub>p+</sub> , V <sub>p-</sub> , V <sub>rms</sub> , V <sub>avg</sub> , V <sub>top</sub> , V <sub>base</sub> , frequency, period, pulse count, t <sub>width+</sub> , t <sub>width-</sub> , t <sub>duty</sub> , t <sub>cycle+</sub> , t <sub>cycle-</sub> , t <sub>Rise10_90</sub> , t <sub>Fall10_90</sub> , t <sub>Rise20_80</sub> , t <sub>Fall20_80</sub> , pos. edge count, neg. edge count, pos. pulse count, neg. pulse count, trigger frequency, trigger period, phase, delay	
<b>Measurement statistic:</b>	Min., max., mean, standard deviation, number of measurements for up to 6 Functions
<b>Cursor measurements:</b>	$\Delta$ V, $\Delta$ t, 1/ $\Delta$ t (f), V to Gnd, Vt related to Trigger point, ratio X and Y, pulse count, peak to peak, peak+, peak-, mean value, RMS value, standard deviation
<b>Search functions:</b>	Search- and Navigation functions for specific signal parameter
<b>Interface:</b>	Dual-Interface USB type B/RS-232 (HO720), 2 x USB type A (front- and rear side each 1 x) max. 100 mA, DVI-D for ext. Monitor
<b>Optional:</b>	IEEE-488 (GPIB) (HO740), Dual-Interface Ethernet/USB (HO730)

### Display functions

<b>Marker:</b>	up to 8 user definable marker for easy navigation; automatic marker using search criteria
<b>VirtualScreen:</b>	virtual Display with 20 div. vertical for all Math-, Logic-, Bus- and Reference Signals
<b>Busdisplay:</b>	up to 2 busses, user definable, parallel or serial busses (option), decode of the bus value in ASCII, binary, decimal or hexadecimal, up to 4 lines; Table view of the decoded data

### Mathematic functions

<b>Number of formula sets:</b>	5 formula sets with up to 5 formulas each
<b>Sources:</b>	All Channels and math. memories
<b>Targets:</b>	Math. memories
<b>Functions:</b>	ADD, SUB, 1/X, ABS, MUL, DIV, SQ, POS, NEG, INV, INTG, DIFF, SQR, MIN, MAX, LOG, LN, Low-, High-pass filter
<b>Display:</b>	Up to 4 math. memories with label

### Pass/Fail functions

<b>Sources:</b>	Analog Channels
<b>Type of test:</b>	Mask around a signal, userdefined tolerance
<b>Functions:</b>	Stop, Beep, screen shot (screen print-out) and/or output to printer for pass or fail, event counting up to 4 billion, including the number and the percentage of pass and fail events

### General Information

<b>Component tester:</b>	
<b>Test voltage:</b>	10V <sub>p</sub> (open) typ.
<b>Test current:</b>	10 mA <sub>p</sub> (short) typ.
<b>Test frequency:</b>	50 Hz/200 Hz typ.
<b>Reference Potential:</b>	Ground (safety earth)
<b>Probe ADJ Output:</b>	1 kHz/1 MHz square wave signal ~1V <sub>pp</sub> (ta < 4 ns)
<b>Bus Signal Source:</b>	SPI, I <sup>2</sup> C, UART, Parallel (4 Bit)
<b>Internal RTC</b> [Realtime clock]:	Date and time for stored data
<b>Line voltage:</b>	100...240V, 50...60 Hz, CAT II
<b>Power consumption:</b>	Max. 45W, typ. 25W [max. 55W, typ. 35W]
<b>Protective system:</b>	Safety class I (EN61010-1)
<b>Operating temperature:</b>	+5...+40 °C
<b>Storage temperature:</b>	-20...+70 °C
<b>Rel. humidity:</b>	5...80% (non condensing)
<b>Dimensions (W x H x D):</b>	285 x 175 x 140 mm
<b>Weight:</b>	<2.5 kg

**Accessories supplied:** Line cord, Operating manual, 2 [4] Probes, 10:1 with attenuation ID (HZO10), CD, Software

#### Recommended accessories:

H0010	Serial bus trigger and hardware accelerated decode, I <sup>2</sup> C, SPI, UART/RS-232 on Logic Channels and Analog Channels
H0011	Serial bus trigger and hardware accelerated decode, I <sup>2</sup> C, SPI, UART/RS-232 on Analog Channels
H0012	Serial bus trigger and hardware accelerated decode, CAN, LIN on Logic Channels and Analog Channels
H03508	Active 8 Channel Logic Probe
H0730	Dual-Interface Ethernet/USB
H0740	Interface IEEE-488 (GPIB) galvanically isolated
HZ091	4RU 19" Rackmount Kit
HZ090	Carrying Case for protection and transport
HZ020	High voltage probe 1,000:1 (400 MHz, 1,000V <sub>rms</sub> )
HZ030	Active probe 1 GHz (0.9 pF, 1 MΩ, including many accessories)
HZ040	Active differential Probe 200 MHz (10:1, 3.5 pF, 1 MΩ)
HZ041	Active differential Probe 800 MHz (10:1, 1 pF, 200 kΩ)
HZ050	AC/DC Current probe 30 A, DC...100 kHz
HZ051	AC/DC Current probe 100/1,000 A, DC...20 kHz