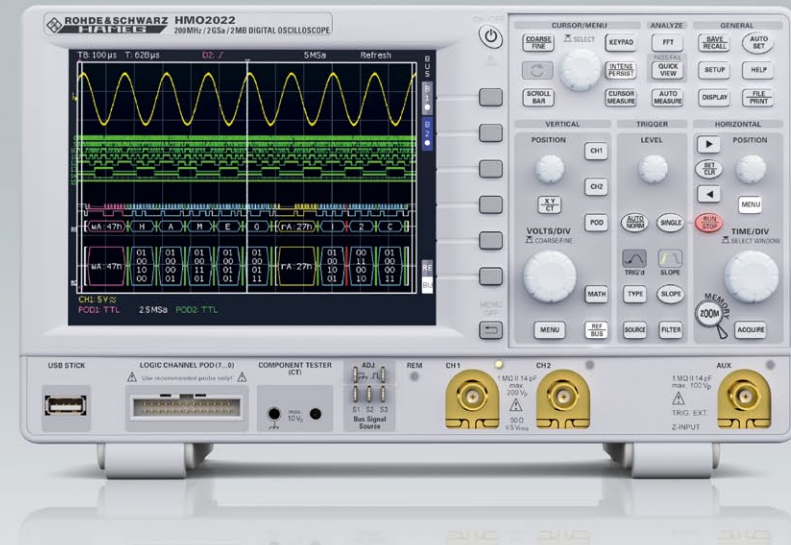
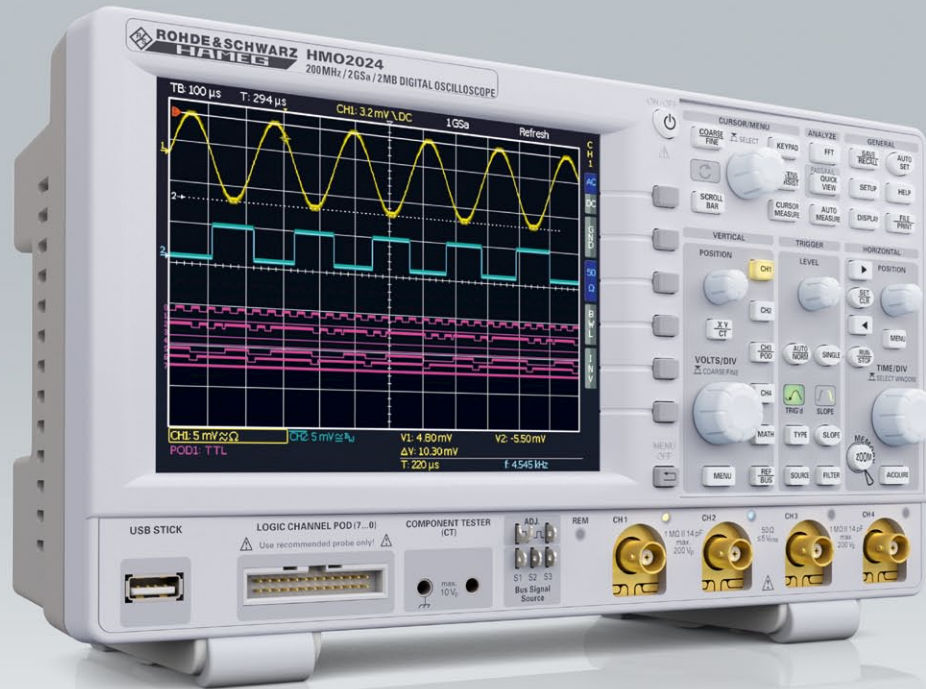


Mixed Signal Oscilloscopes

70 MHz - 200 MHz

HMO Compact Series

HAMEG®
Instruments
A Rohde & Schwarz Company



Display

Superb 16.5 cm (6.5") LED-backlit TFT display

Precise signal analysis

2 GSamples/s sampling rate
2 MPoints memory

Intelligent user interface

To optimize the screen display, the instrument shows and hides menus

FFT

Superb FFT functionality

Quick view

At the push of a button the 16 most important values of the measured signal are permanently updated and displayed

Setup

Intuitive, multi-lingual user menu

Help

Context-sensitive help

Math

Wide range of programmable math functions

Zoom

Memory zoom up to 50,000:1

Analog channels

Vertical sensitivity of up to 1mV/div.

Standard MSO functionality

Analyze analog channels plus up to an additional 8 digital channels

Component tester

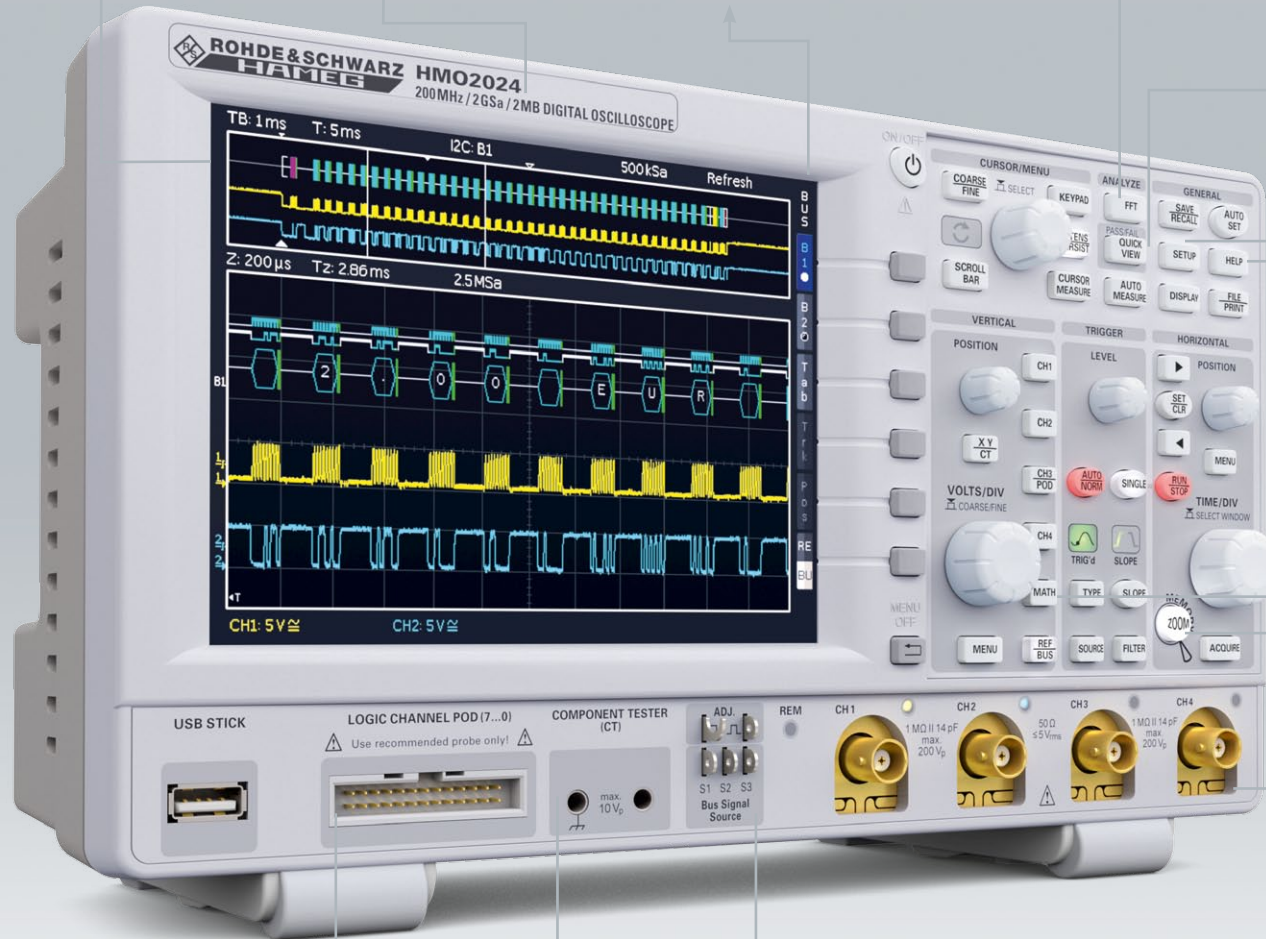
Display of characteristic curves for testing of components

Bus signal source

To create SPI, I²C, UART and counter test-signals

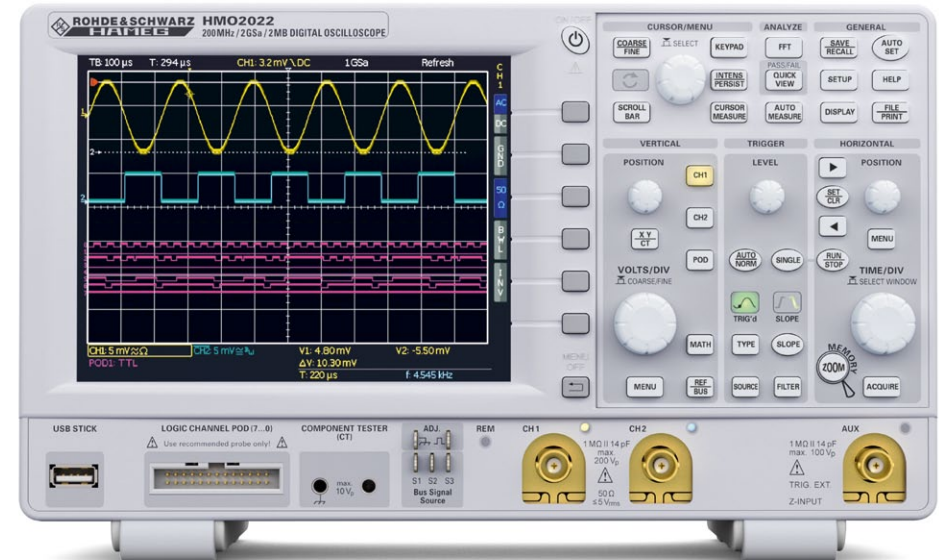
Fan

Maximum noise reduction by temperature-controlled fan



up to 200 MHz...

8 different models in a compact design with bandwidths from 70 to 200 MHz available with 2 or 4 channels. The mixed signal functionality is always included in the HMO compact series with no software option being necessary to unlock it.

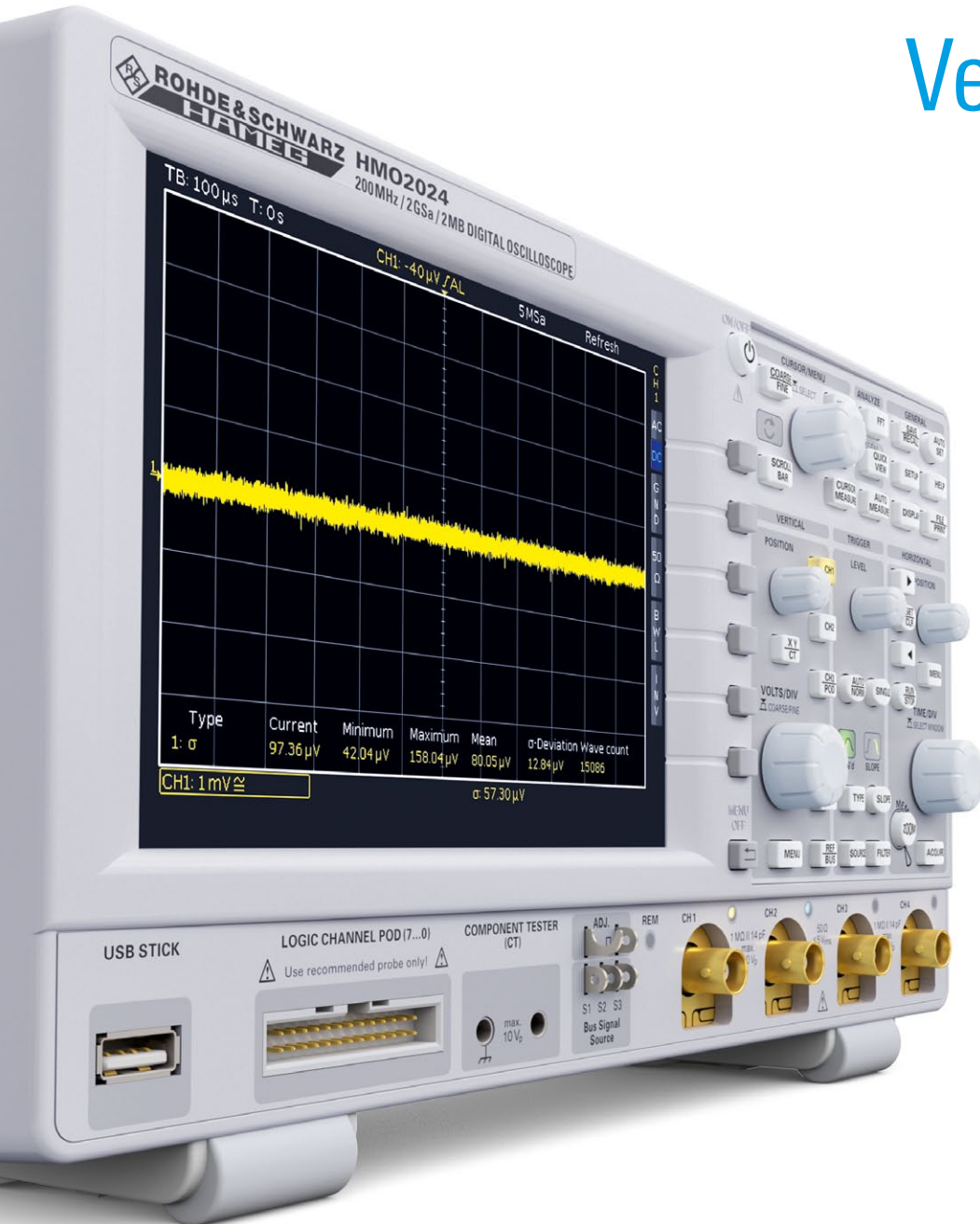


Key facts

- ▮ 2 GSa/s real time, low noise flash A/D converter
- ▮ 2 MPts memory, zoom up to 50,000:1
- ▮ MSO functionality included as standard (HO3508 logic probe with 8 channels required)
- ▮ Component tester for capacitors, inductors and semiconductors
- ▮ Vertical sensitivity up to 1 mV/div.
- ▮ Trigger modes: slope (A/B), pulse width, video, logic, serial buses (optional)
- ▮ Serial bus trigger and hardware accelerated decode incl. list view.
Options: I²C + SPI + UART/RS-232 (HOO10/HOO11), CAN + LIN (HOO12)
- ▮ 28 auto-measurement parameters plus statistics, formula editor, ratio cursor
- ▮ 6-digit hardware counter
- ▮ FFT up to 64 kPts (dBm, dBV, V_{rms})
- ▮ Pass/fail test based on masks
- ▮ Automatic search for user-defined events
- ▮ Display: 12 div. x-axis, 20 div. y-axis (Virtual Screen)
- ▮ 2x USB for mass storage, RS-232/USB dual interface for remote control

Application	How the HAMEG HMO meets your needs
Engineering lab	<ul style="list-style-type: none"> ▮ Advanced math functions available as standard, math on math possible ▮ Automeasurement for six user-defined parameters ▮ Memory zoom function up to 50 000:1
Analog circuit design	<ul style="list-style-type: none"> ▮ Low-noise amplifier and A/D converter ▮ 1 mV/div sensitivity ▮ 50 Ω/1 MΩ input impedance, switchable (HMO1502x, HMO202x) ▮ Component tester
Embedded debugging	<ul style="list-style-type: none"> ▮ Mixed signal option (MSO) with 8 logic channels ▮ Serial bus trigger and hardware-accelerated decode ▮ 6-digit hardware counter ▮ FFT with 64kPoints
Production environment	<ul style="list-style-type: none"> ▮ Remote control for automated data acquisition ▮ Pass/fail tests based on user-defined masks with error signal output ▮ Automatic signal measurement at the push of a button ▮ USB/RS-232, Ethernet or GPIB (IEEE 488) interfaces
General purpose and education	<ul style="list-style-type: none"> ▮ Fast boot time; slim and lightweight design ▮ Low-noise, intelligent temperature management ▮ Extended display size through VirtualScreen technology

Vertical Sensitivity: 1mV/div



The vertical sensitivity of the analog channels is outstanding in this instrument class. Gain settings of 1 mV/div. allows even the smallest voltages to be precisely examined.

Depending on their requirements users can choose between four 2-channel-versions and four 4-channel-versions with bandwidths between 70 and 200 MHz.

	200 MHz	150 MHz	100 MHz	70 MHz
4 channel	HMO2024	HMO1524	HMO1024	HMO724
2 channel	HMO2022	HMO1522	HMO1022	HMO722

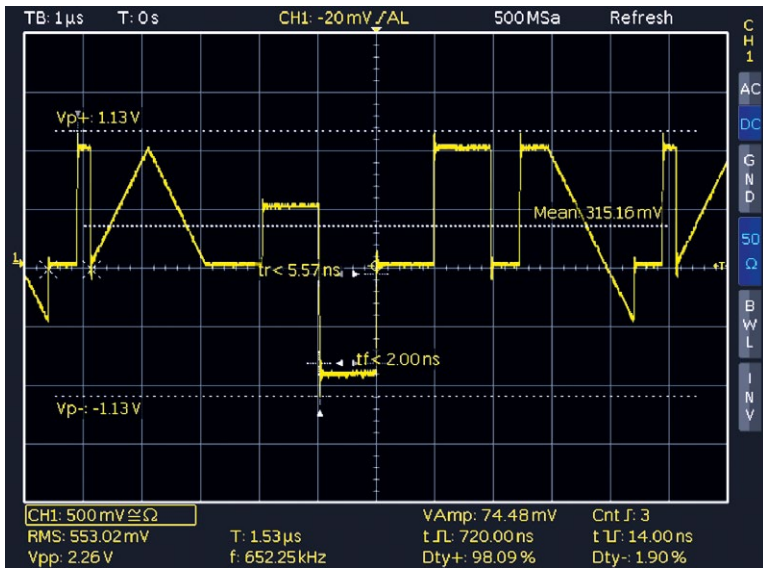
Key facts

Sampling rate (per analog channel)	1 GSa/s
Maximum sampling rate	2 GSa/s
Memory depth per channel	1 MPts.
Maximum memory	2 MPts.
Maximum number of logic channels	8
Input impedance	1 MΩ/50 Ω* switchable
V/div. @1 MΩ/50 Ω*	1 mV/div. to 10V/div.

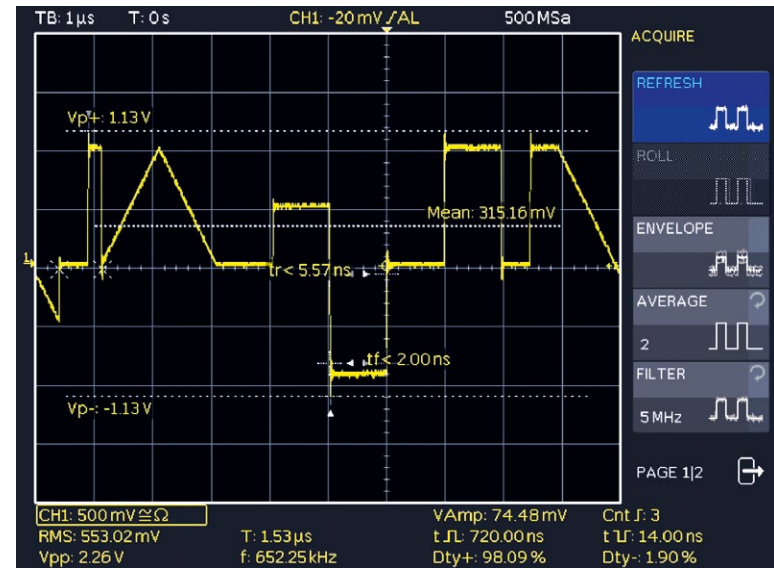
* 50Ω: HMO152x, HMO202x only

Superb TFT Display

The brilliant VGA TFT display with LED backlighting and very wide viewing angles makes working with the HMO oscilloscope a pleasure. The intelligent screen design hides menus when these are not in use. This allows a maximum display area for measurement data, despite the extremely compact instrument dimensions - all this without the otherwise required wider display.



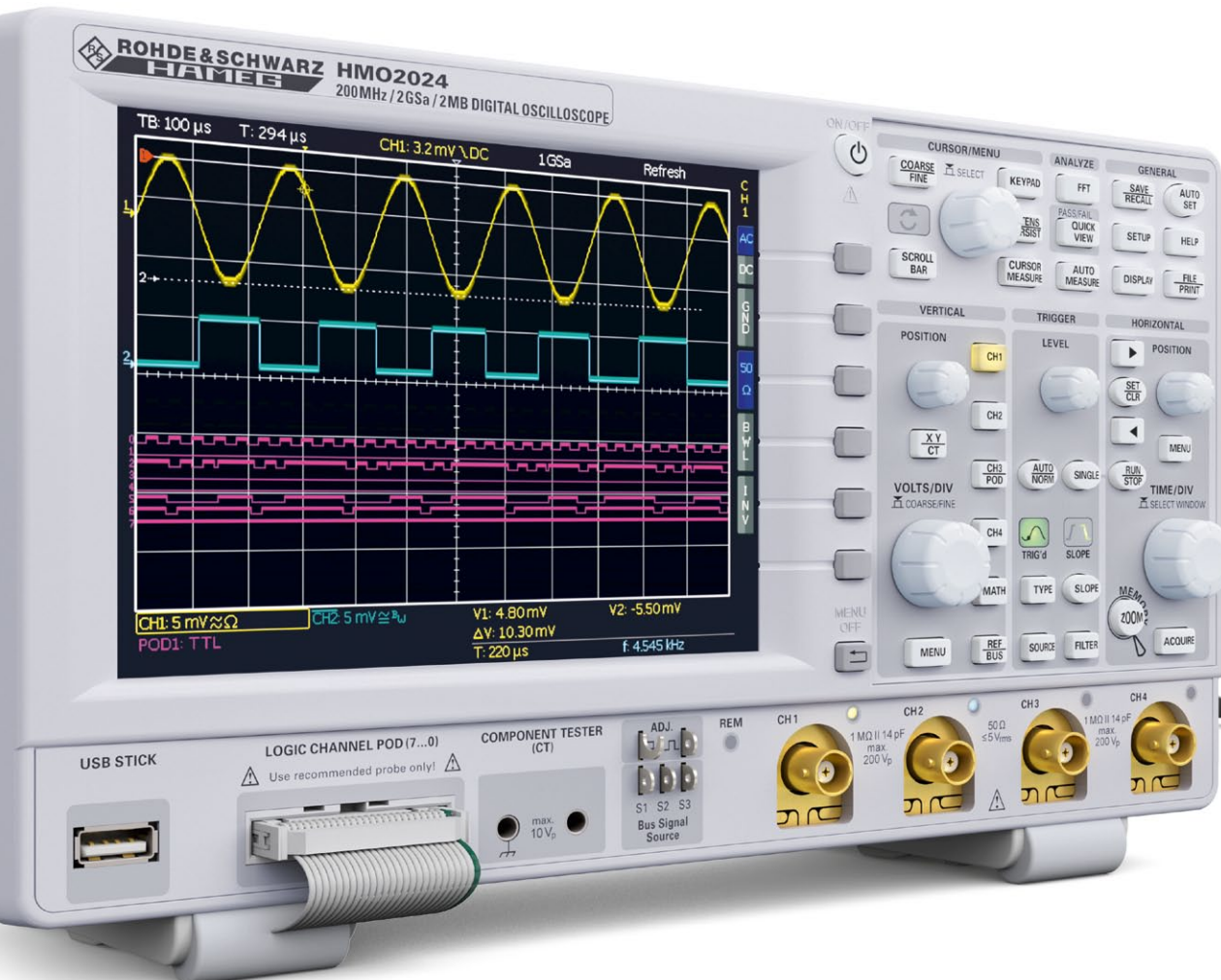
Maximum measurement area through hidden menus



Menus are only visible when needed

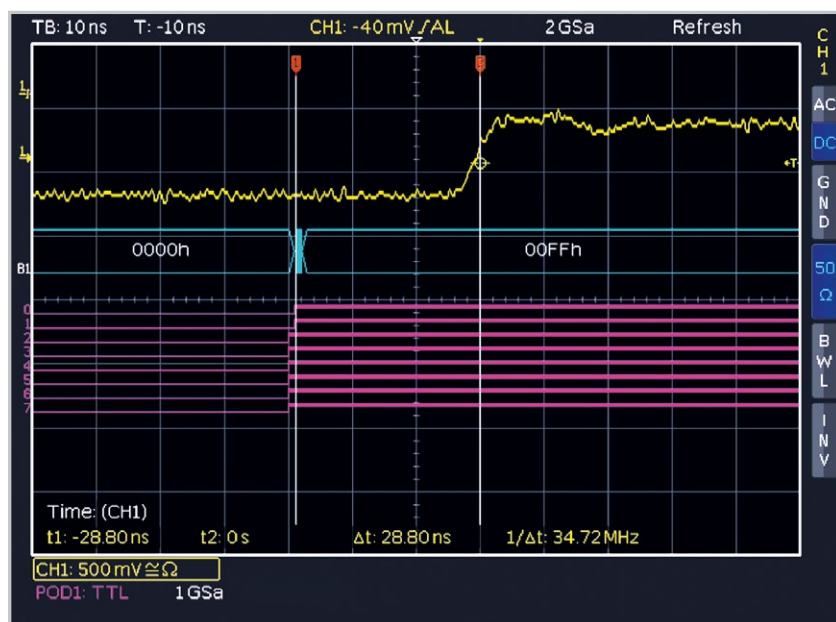
Always a MSO

The mixed signal functionality is always included in the HMO compact series with no software option being necessary to unlock it.



HAMEG logic probes are not linked to a specific instrument serial number. This allows their use with all digital HAMEG oscilloscopes in the HMO series.

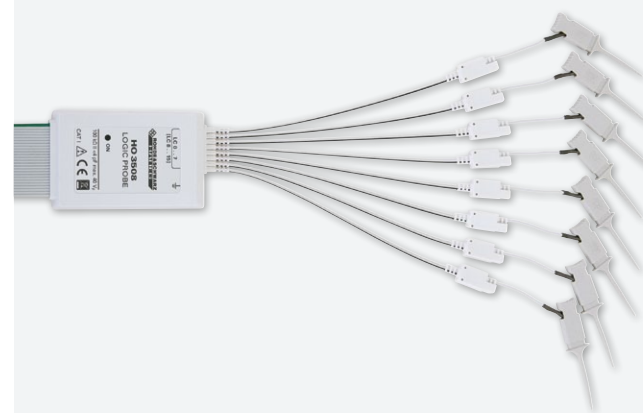
HAMEG is offering the HMO compact series exclusively as a mixed-signal oscilloscope. The great advantages of these instruments are best illustrated by taking a look at how ADCs (Analog Digital Converter) or DACs (Digital Analog Converter) are integrated. These transformer modules include an analog signal on the one side and a digital signal on the other side. As with HAMEG's HMO compact series, MSOs allow developers the assessment of the time component for both signal types on one monitor. As shown in the image below the latency time of a DAC can be determined with one simple cursor measurement. Therefore a MSO allows developers to devote their full attention to the circuit without having to waste energy on the measurement setup.



8bit DAC signal change

HAMEG is focusing resolutely on the increasing significance of the mixed-signal oscilloscopes. Consequently, all HAMEG HMO oscilloscopes are full-scale MSOs. As a result, HAMEG customers will not need to speculate if they should purchase an instrument with or without logic connectors. As the MSO functionality is invariably included, all instruments correspondingly offer a secure future. It is also unnecessary to initially activate the mixed-signal functions via software options, as is the case with other suppliers.

Optional: Logic probe HO3508



- ▮ Logic probe HO3508 fits to all HMO series oscilloscopes
- ▮ No hardware lock to a specific device
- ▮ 8 logic channels available on each logic probe
- ▮ Signal threshold adjustable for each logic pod

Specifications HO3508

Channels	8
Memory depth per channel	4 MPts. (HMO3000 series) 1 MPts. (HMO compact series)
Input impedance	100 kΩ <4 pF
Max. input frequency	350 MHz
Max. input voltage	40 V (DC + peak AC)
Measuring category	CAT I
Cable length	approx. 1 m

Frequency Analysis

Due to the outstanding FFT functionality of the HMO series oscilloscopes signals can also be analysed in the frequency domain with up to 65,536 points. Additional practical tools such as cursor measurement as well as peak-detect-functions are also available. They allow engineers to complete their analysis significantly faster, also in the frequency domain.

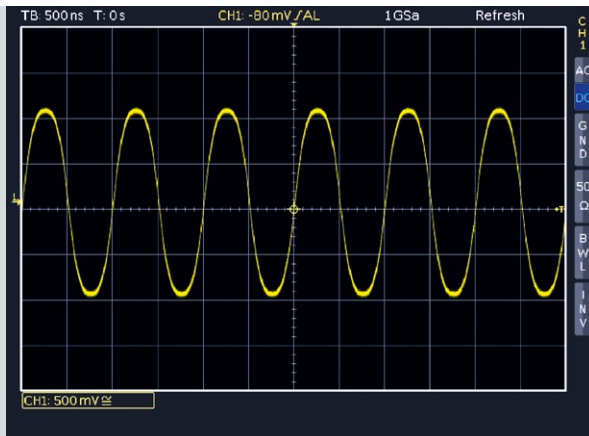


Figure 1: A sinusoid signal that at first sight appears undistorted

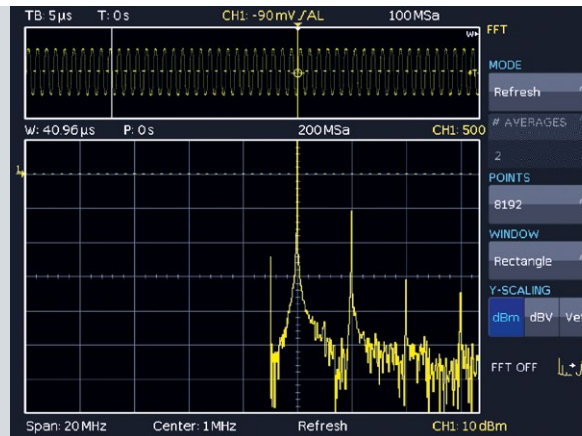


Figure 2: The frequency spectrum exposes the signal distortion

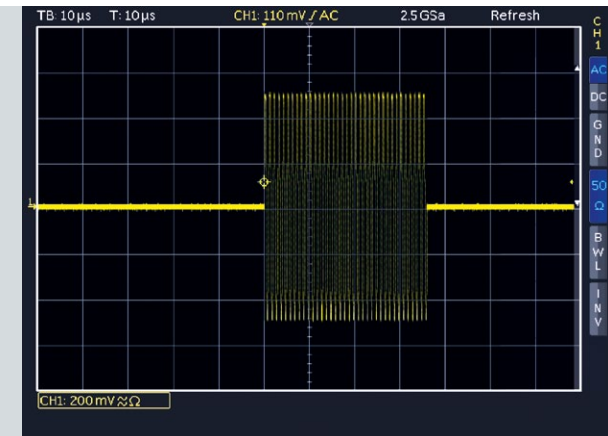


Figure 3

Easy analysis in frequency domain

Quite often the distortion of input signals cannot be detected with the naked eye. For instance, the sine wave signal displayed in figure 1 appears to be undistorted. Only the frequency spectrum (figure 2) - available with just one touch of a button - clearly displays additional harmonics that occur as harmonic oscillations for multiples of the basic frequency.

For non-periodic input signals most instruments offer the option to trigger the spectrum at just the right moment to then check it in "STOP" mode at a later time. However, at that point, many oscilloscopes with FFT functionality calculate the spectrum only once and store the result in the memory. The base time signal will no longer be used for the calculation. Consequently, an investigation of all parts of the signal will no longer be possible.

HMO series oscilloscopes work differently: Since FFT is also active for previously stored signals, it is possible to subsequently analyze any sections of those signals captured in single shot mode or stop mode with an adjustable window width. Figure 3 shows a sine burst signal in the time domain. Pushing the FFT button will switch the oscilloscope into the frequency domain. Users can choose between various measurement windows like the

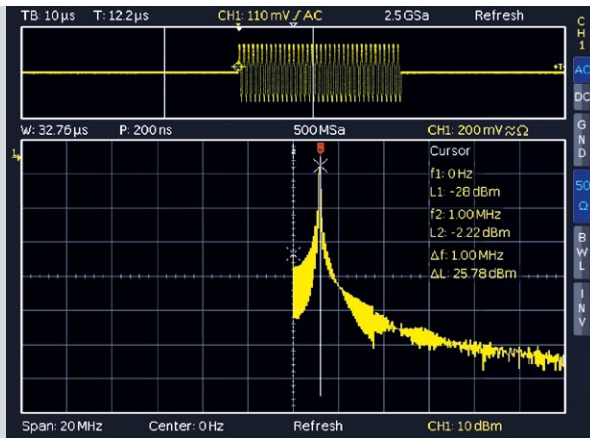


Figure 4

„rectangular“ type that has been used in figure 4. Although this window type captures frequencies at a high degree of accuracy, it is also accompanied by more noise. In order to suppress this disturbing interference users can for instance choose the Hanning window. The impact on the spectrum is visible in figure 5 (see device screen).

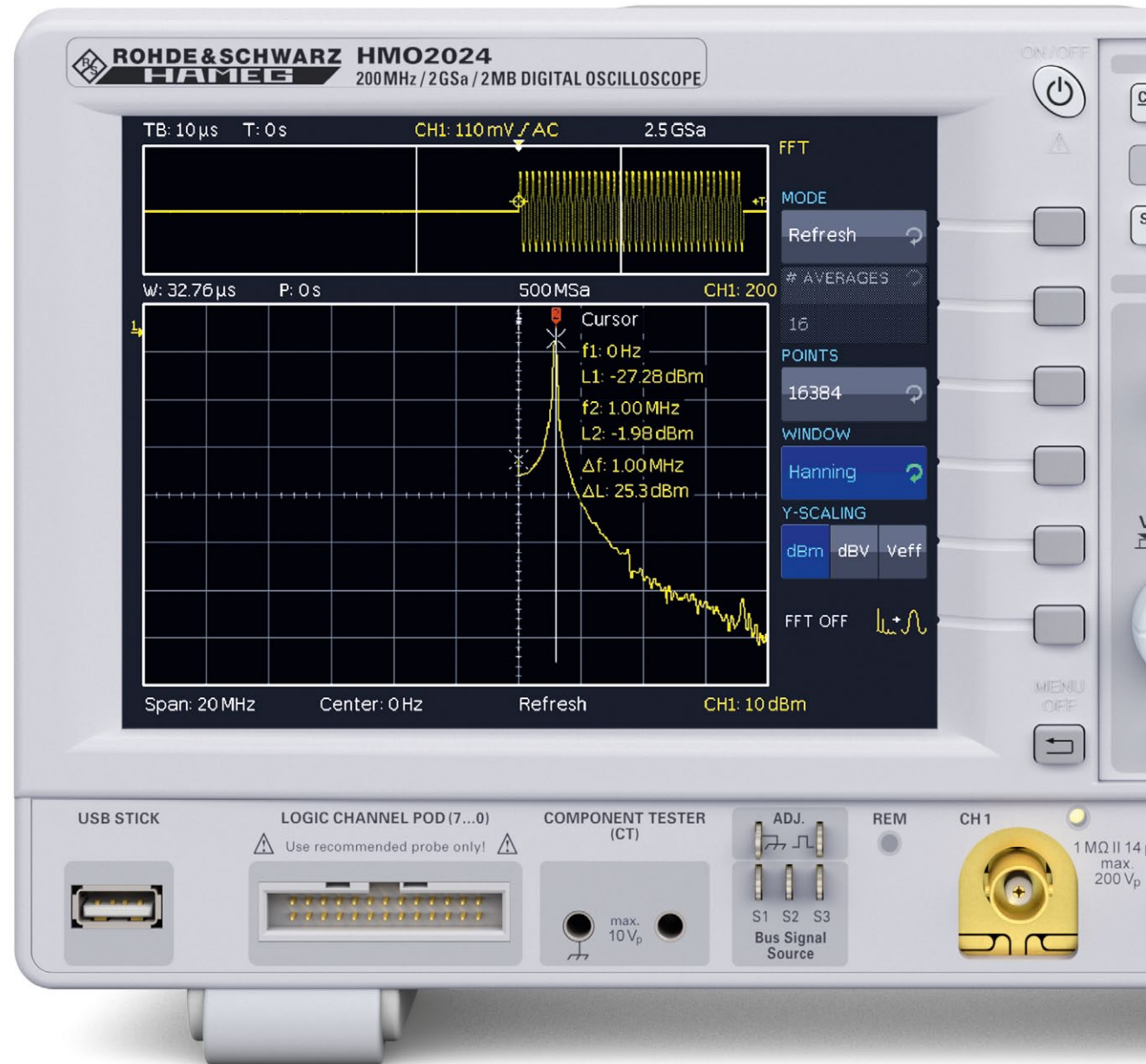
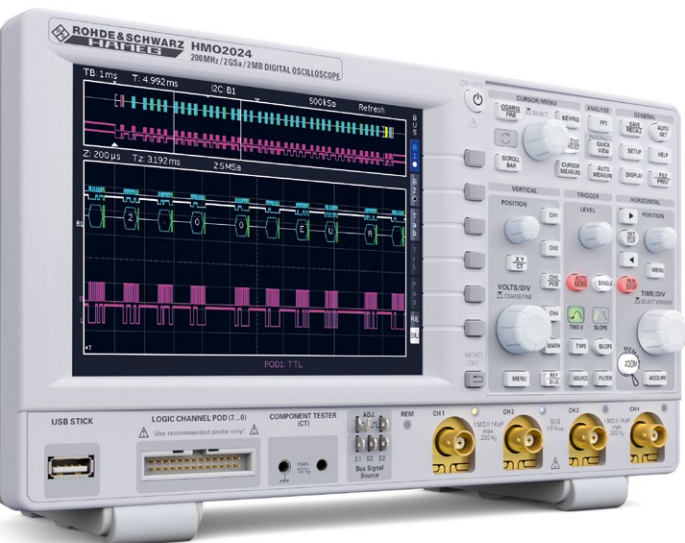


Figure 5

Serial Bus Analysis

I²C, SPI, CAN or LIN – in terms of interaction with the outside world for embedded systems, it is safe to say that these are the most commonly used communication protocols. The HMO compact series by HAMEG Instruments offers you hardware-accelerated signal triggering and decoding for all of these protocols. You can upgrade your instrument via software licence keys with those functions required to develop your application:

- HOO10: Analysis of I²C, SPI and UART/RS-232 signals on analog and logic channels
- HOO11: Analysis of I²C, SPI and UART/RS-232 signals on all analog channels
- HOO12: Analysis of CAN and LIN signals on analog and logic channels

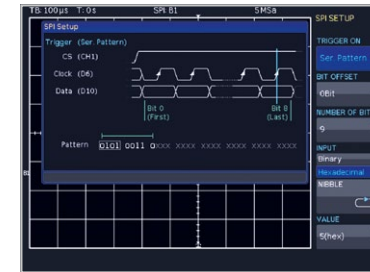


Serial bus trigger types:

- I²C: 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

HOO10/HOO11

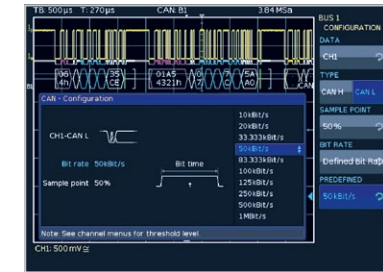
SPI/I²C/UART/RS-232 bus analysis for all oscilloscopes of the HMO series



SPI bus trigger setup

HOO12

CAN/LIN bus analysis for all oscilloscopes of the HMO series



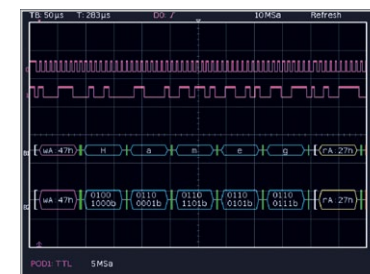
CAN bus configuration



I²C bus hex decoding on the analog channel



CAN bus list display



I²C bus ASCII und binary



HEX decoded CAN bus signal

2 [4] channel mixed signal oscilloscope
HMO722 [HMO724] 70MHz
HMO1022 [HMO1024] 100MHz
HMO1522 [HMO1524] 150MHz
HMO2022 [HMO2024] 200MHz
Firmware: ≥ 4.522

Display	
Display:	16.5 cm (6.5") VGA Color TFT
Resolution:	640 x 480 Pixel
Backlight:	LED 400 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 to 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 to CH 4]
MSO mode	CH 1, CH 2, LCH 0 to 7 (logic channels) [CH 1, CH 2, LCH 0 to 7, CH 4] with Option HO3508
Auxiliary input:	Front side [Rear side]
Function	External Trigger
Impedance	HMO72x/HMO102x: 1 MΩ 13 pF ±2 pF HMO152x/HMO202x: 1 MΩ 14 pF ±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 to CH 4]
Y-bandwidth (-3 dB):	HMO72x/HMO102x: 70/100 MHz (5 mV to 10V)/div. 20 MHz (1 mV, 2 mV)/div. HMO152x/HMO202x: 150/200 MHz (5 mV to 10V)/div. 100 MHz (1 mV, 2 mV)/div.
Lower AC bandwidth:	2 Hz
Bandwidth limiter (switchable):	approx. 20 MHz
Rise time (calculated):	HMO72x/HMO102x: < 5 ns HMO152x/HMO202x: < 2.4 ns

DC gain accuracy:	2%
Input sensitivity:	13 calibrated steps
CH 1, CH 2 [CH 1 to CH 4]	1 mV/div. to 10V/div. (1–5 Stepping)
Variable	Between calibrated steps
Inputs CH1, CH2 [CH1 to CH4]:	
Impedance	1 MΩ 14 pF ±2 pF (50Ω switchable, HMO152x/HMO202x only)
Coupling	DC, AC, GND
Max. input voltage	200V (DC + peak AC) (50Ω: < 10V _{rms} , HMO152x/HMO202x only)
Measuring circuits:	Measuring Category I (CAT I)
Position range:	± 10 divs
Offset control:	HMO152x/202x only
1 mV, 2 mV	± 0.2V - 10 div. * sensitivity
5 mV to 50 mV	± 1V - 10 div. * sensitivity
100 mV	± 2.5V - 10 div. * sensitivity
200 mV to 2V	± 40V - 10 div. * sensitivity
5V to 10V	± 100V - 10 div. * sensitivity
Logic channels:	With Option HO3508
Select. switching thresholds	TTL, CMOS, ECL, 2 * User -2V to +8V

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. to <5 mV/div.: 1 div. <2 mV/div.: 1.5 div.
Ext. trigger via	Auxiliary Input [Aux. Input rear side]
Ext. Sensitivity	0.3V to 10V _{pp}
Trigger level range:	
With auto level	Adjustability of the level between the peak values of the signal
Without auto level	-8 div. to +8 div.
External	-5V to +5V
Trigger types:	
Slope:	
Slope direction	Rising, falling, both
Sources	CH 1, CH 2, Line, Ext., LCH 0 to 7 [CH 1 to CH 4, Line, Ext., LCH 0 to 7]
Coupling	
Auto level	Adjustability of the level between the peak values of the signal, 5 Hz to 70/100/150/200 MHz
AC	HMO72x/HMO102x: 5 Hz to 100 MHz HMO152x/HMO202x: 5 Hz to 200 MHz

Technical Data	
DC	HMO72x/HMO102x: 0 to 100 MHz HMO152x/HMO202x: 0 to 200 MHz
HF	HMO72x/HMO102x: 30 kHz to 100 MHz HMO152x/HMO202x: 30 kHz to 200 MHz
LF	0 kHz to 5 kHz, selectable for DC, Auto level
Noise rejection (low-pass)	approx. 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	Min. 32 ns, max. 17.179 s, resolution min. 8 ns
Source	CH 1, CH 2 [CH 1 to CH 4]
Video	Pos./neg. sync. impulse
Standards	PAL, SECAM, NTSC, PAL-M, SDTV 576i, HDTV 720p, HDTV 1080i, HDTV 1080p
Fields	Upper, lower, both
Line	All, line number selectable
Source	CH 1, CH 2, Ext. [CH 1 to 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	8 ns to 2.147 s, resolution min. 1 ns
Source	LCH 0 to 7 [CH 1 to CH 4]
State	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
2 nd Trigger (B):	
Type	Slope trigger
Slope direction	Rising, falling, both
Min. signal height	0.8 div.; 0.5 div. typ. (1.5 div at ≤2 mV/div.)
Source	CH 1, CH 2 [CH 1 to CH 4]
Coupling (source B=A):	DC, HF, NR
Coupling (source B=A):	see trigger A
Level (source B=A):	-10 div to +10 div. (adjustable separately by A)
Level (source B=A):	see level A
Frequency range	HMO72x/HMO102x: 0 Hz to 100 MHz (0 Hz to 30 MHz at ≤2 mV/div.) HMO152x/HMO202x: 0 Hz to 200 MHz (0 Hz to 120 MHz at ≤2 mV/div.)
Operating modes:	
Time based	32 ns to 17.179 s, resolution 8 ns
Event based	1 to 2 ¹⁶

Technical Data

Horizontal System	
Domain representation:	Time, Frequency (FFT), Voltage (XY)
Representation Time Base:	Main-window, main- and zoom-window
Memory Zoom:	Up to 50,000:1
Time Base:	2 ns/div. to 50 s/div.
Accuracy	50 ppm
Aging	±5 ppm/year
Refresh operating modes	1 ns/div. to 20 ms/div.
Roll operating modes	50 ms/div. to 50 s/div.
Deskew:	-15 ns to +16 ns
Step size	1 ns
Search functions:	Slope, Pulse, Peak, Rise-/Falltime, Runt
Marker:	up to 8 user definable marker for easy navigation; automatic marker function based on search criteria

Digital Storage	
Sampling rate:	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
Resolution (vertical):	HiRes up to 10Bit
Memory:	3 x 1 MPts [4 x 1 MPts], 1 x 2 MPts [2 x 2 MPts]
Operation modes:	Refresh, Average (1024), Envelope, Peak-Detect (1 ns), Filter, Roll (free run/triggered from time base 50 ms/div. and slower), HiRes
Interpolation:	CH 1 to CH 4: Sinx/x, Pulse, Linear; LCH 0 to 7: Pulse
Persistence:	Off, 50 ms to ∞
Delay pretrigger:	0 to 8 Million x (1/samplerate)
posttrigger	0 to 2 Million x (1/samplerate)
Display refresh rate:	Up to 2,500 waveforms/s
Display:	Dots, vectors, 'persistence'

Operation/Measuring/Interfaces	
Operation:	Menu-driven (multilingual), Autiset, help functions (multilingual)
Frequency counter:	
HMO72x/HMO102x	0.5 Hz to 100 MHz: 6 Digit resolution
HMO152x/HMO202x	0.5 Hz to 200 MHz: 6 Digit resolution
Accuracy	50 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

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, Δt 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
Application memory:	4 MByte for references, device settings and formulars
Interface:	
Internal	2x USB-Host (type A) (1x front side, 1x rear side), mass storage (FAT16/32)
Exchangeable	HO720 Dual-Interface RS-232/USB-Device (type B)
Video OUT:	DVI-D (480p, 60 Hz) for external display, HDMI compatible
Trigger OUT:	BNC (rear side), Modes: Trigger, Mask
Optional:	Ethernet/USB-Device Dual-Interface (HO730), IEEE-488 (GPIB) (HO740)

Mathematic functions	
Quickmath:	ADD, SUB, MUL, DIV
Editor for formula sets:	Max. 5 formulas per formula set
Label for:	Math. memories and formula set
Sources:	All channels and math. Memories, constants
Targets:	Math. memories
Functions:	ADD, SUB, 1/X, ABS, MUL, DIV, SQ, POS, NEG, INV, SQ, MIN, MAX, LOG ₁₀ , LN, Integral, Differential, High-pass filter, Low-pass filter
Display:	Up to 4 math. memories with label
Mask test:	Signal test (pass/fail) based on previously defined mask
Quickview:	Display of V_{p+} , V_{p-} , RMS value, rise time, fall time, additional 6 configurable measurement parameters

General Information	
Component Tester	
Test voltage:	10V _e (open) typ.
Test current:	10 mA _e (short) typ.
Test frequency:	50 Hz/200 Hz typ.
Reference potential:	Ground (safety earth)
Probe ADJ Output:	1 kHz/1 MHz square wave signal approx. 1 V _{pp} (ta < 4 ns)
Bus Signal Source (4Bit):	SPI, I ² C, UART, retangle, 4Bit counter, 4Bit random pattern

Internal RTC (Realtime clock):	Date and time for stored data
Line voltage:	100 V to 240 V, AC 50 Hz to 60 Hz, CAT II
Power consumption:	Max. 45 W, typ. 25 W [max. 55 W, typ. 35 W]
Protective system:	Safety class I (EN61010-1)
Operating temperature:	+5 °C to +40 °C
Storage temperature:	-20 °C to +70 °C
Rel. humidity:	5% to 80% (non condensing)
Theft protection:	Kensington Lock
Dimensions (W x H x D):	285 x 175 x 140 mm
Weight:	< 2,5 kg
All data valid at 23 °C after 30 minute warm-up.	

Accessories included:

HO720 RS-232/USB dual-interface card, Line cord, printed operating manual, 2/4 probes (amount=number of channels), 10:1/1:1 switchable (HZ154, HMO72x/HMO102x only), 10:1 with attenuation ID (HZO10, HM152x/HMO202x only), software-CD

HO720

Built-in RS-232/USB dual-interface card

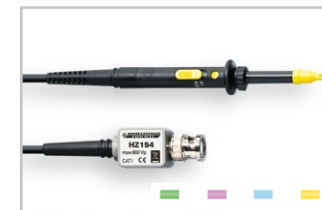


Printed operating manual and software-CD



HZ154

10/100 MHz passive probe (for HMO72x/HMO102x)



HZO10

250 MHz passive probe (for HMO152x/HMO202x)



Recommended Accessories

HO730

Ethernet/USB-device dual-interface card



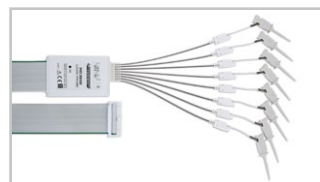
HO740

IEEE-488 (GPIB) interface card, galvanically isolated



HO3508

8 channel logic probe



HZO20

High voltage probe 1000:1 (400MHz, 1000V_{rms})



HZO30

1 GHz active probe (0.9pF, 1 MΩ)



HZO40

Active differential probe 200 MHz (10:1, 3.5pF, 1 MΩ)



HZO41

Active differential probe 800 MHz (10:1, 1 pF, 200 kΩ)



HZO50/HZO51

AC/DC current probes 30 A, DC to 100 kHz / 100/1000 A, DC to 20 kHz



HZ51

150 MHz passive probe 10:1 (12 pF, 10 MΩ)



HZ52

250 MHz passive probe 10:1 (10 pF, 10 MΩ)



HZ53

100 MHz passive probe 100:1 (4.5 pF, 100 MΩ)



HZO90

Carrying case for protection and transport



HZO91

4-RU 19" rackmount kit



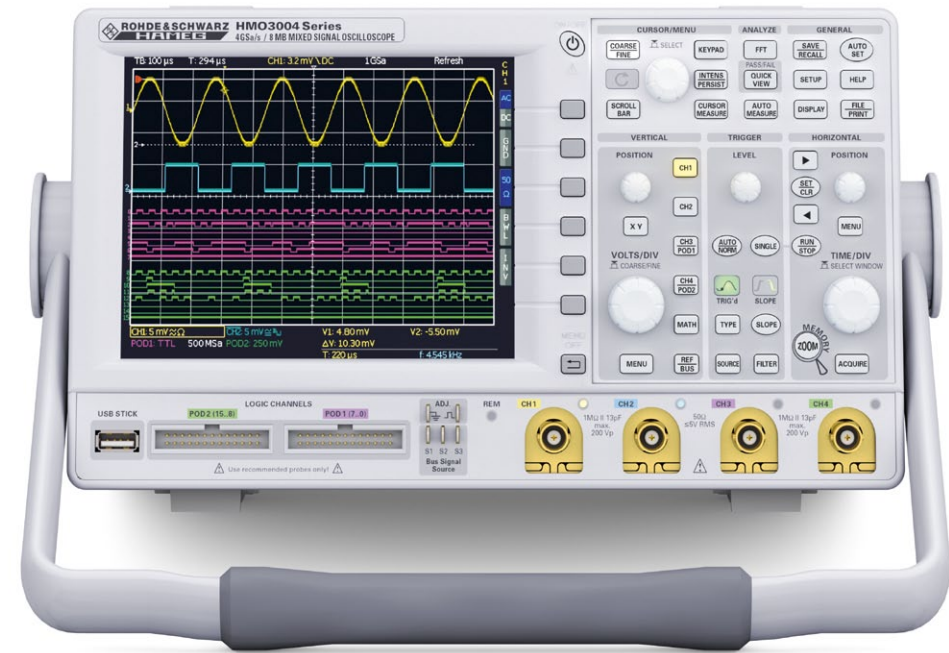
HMO3000 Series

500 MHz | 400 MHz | 300 MHz

High sensitivity, multi-functionality and a great price – that's what distinguishes the HAMEG HMO3000 oscilloscope series. 6 different models in a compact design with bandwidths from 300 to 500 MHz available with 2 or 4 channels. As usual for all digital HAMEG oscilloscopes the mixed signal functionality is always included in the HMO3000 series with no software option being necessary to unlock it.

Key facts

- ▮ 4GSa/s real time, low noise flash A/D converter
- ▮ 8MPts memory, zoom up to 200,000:1
- ▮ Automatically or manually adjustable memory depth, segmented memory option (HOO14)
- ▮ MSO functionality included as standard (HO3508/HO3516 logic probe with 8/16 channels required)
- ▮ 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 (HOO10/HOO11), CAN + LIN (HOO12)
- ▮ 28 auto-measurement parameters plus statistics, formula editor, ratio cursor
- ▮ 6-digit hardware counter
- ▮ FFT up to 64 kPts (dBm, dBV, V_{rms})
- ▮ Pass/fail test based on masks
- ▮ Automatic search for user-defined events
- ▮ Display: 12 div. x-axis, 20 div. y-axis (Virtual Screen)
- ▮ 2x USB for mass storage, Ethernet/USB dual interface for remote control



HMO3000 series	500 MHz	400 MHz	300 MHz
Bandwidth	500 MHz	400 MHz	300 MHz
Model: 4 channel	HMO3054	HMO4054	HMO3054
2 channel	HMO3052	HMO4052	HMO3052
Sampling rate (per analog channel)	2 GSa/s		
Maximum sampling rate	4 GSa/s		
Memory depth per channel	4 MPts.		
Maximum memory	8 MPts.		
Max number of logic channels	16		
Input impedance	1 M Ω / 50 Ω		
V/div. @ 1 M Ω /50 Ω	1 mV/div. to 5V/div.		

From entry level to high performance. Oscilloscopes from the T&M expert.

Fast operation, easy to use, precise measurements – that's Rohde & Schwarz oscilloscopes.

R&S®RTO: high performance (Bandwidths: 600 MHz to 4 GHz)

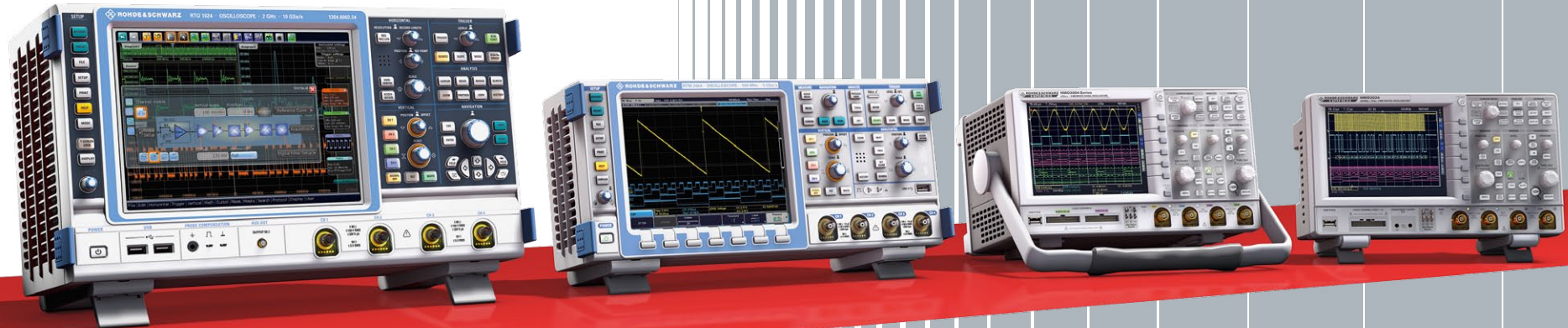
R&S®RTM: upper midrange (Bandwidths: 350 MHz and 500 MHz)

HMO3000: midrange (Bandwidths: 300 MHz to 500 MHz)

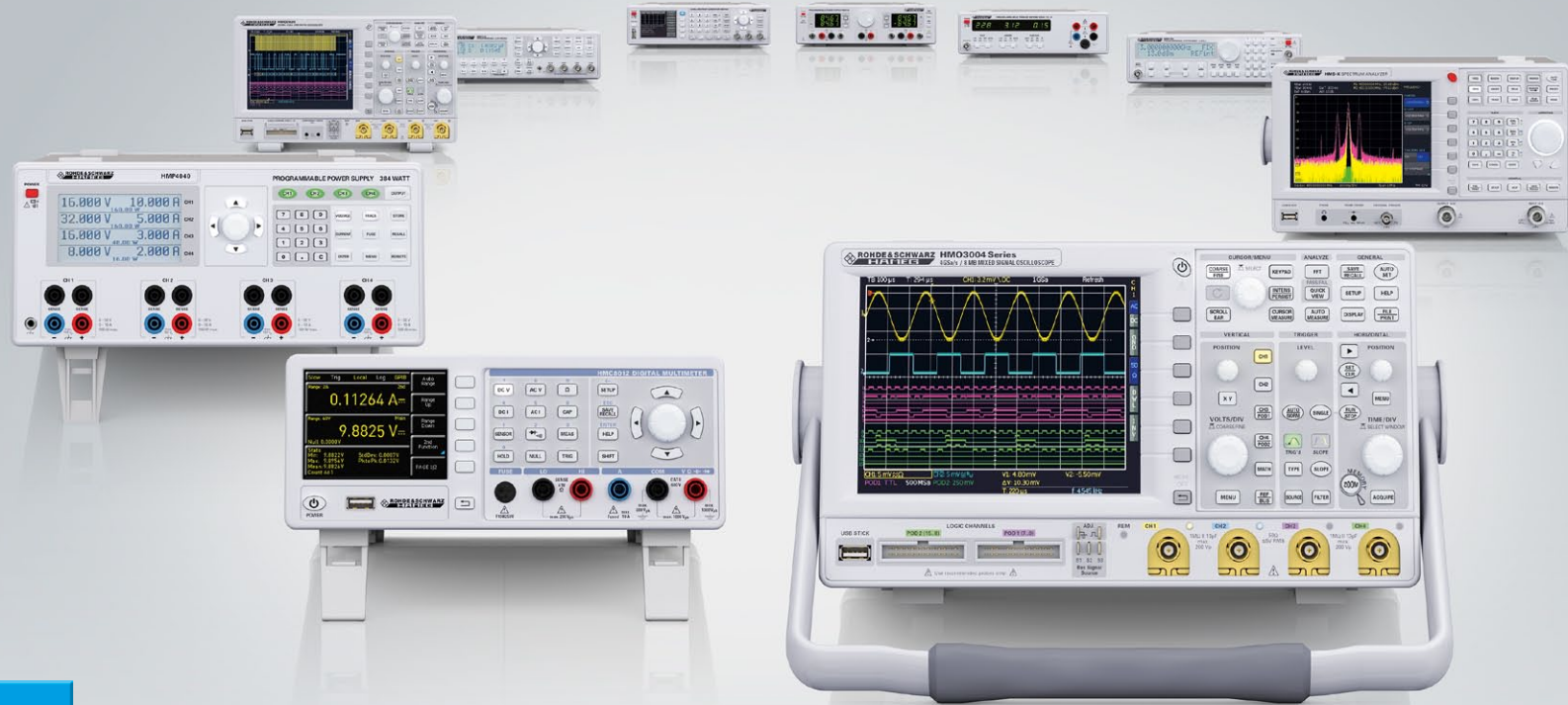
HMO Compact: value range (Bandwidths: 70 MHz to 200 MHz)

All Rohde & Schwarz oscilloscopes incorporate time domain, logic, protocol and frequency analysis in a single device.

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