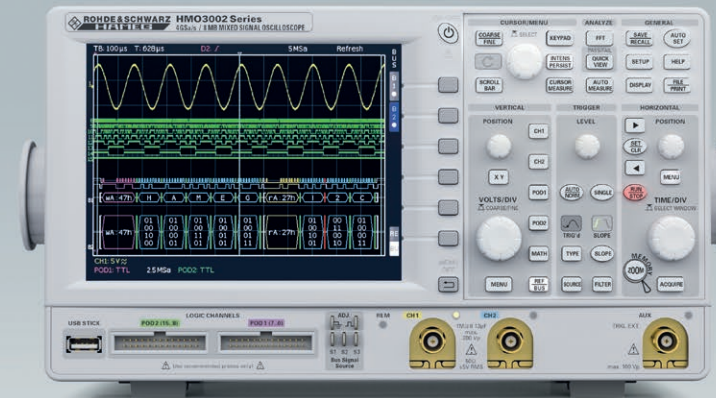
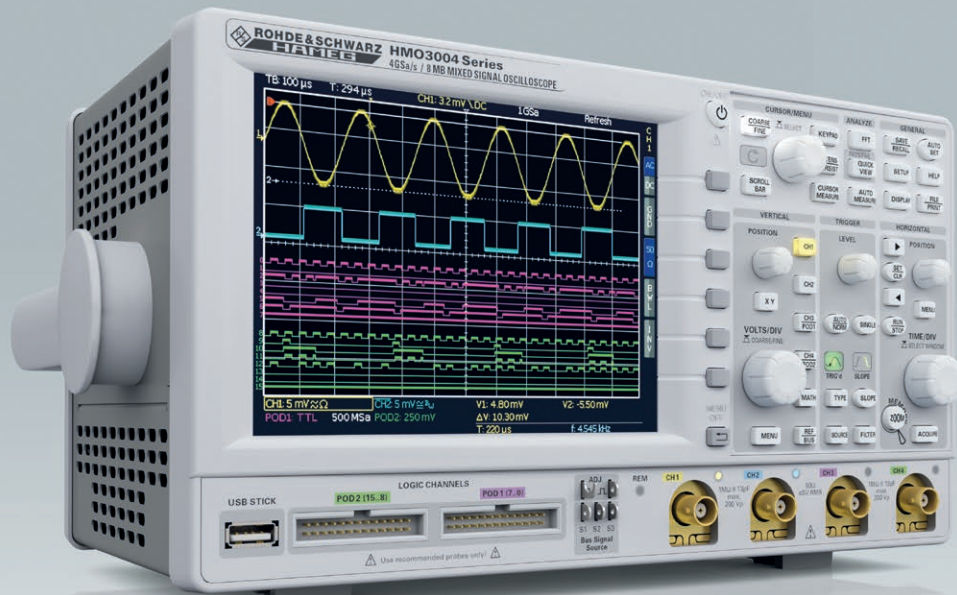


# Mixed Signal Oscilloscopes

## 300 MHz | 400 MHz | 500 MHz

### HMO3000 Series

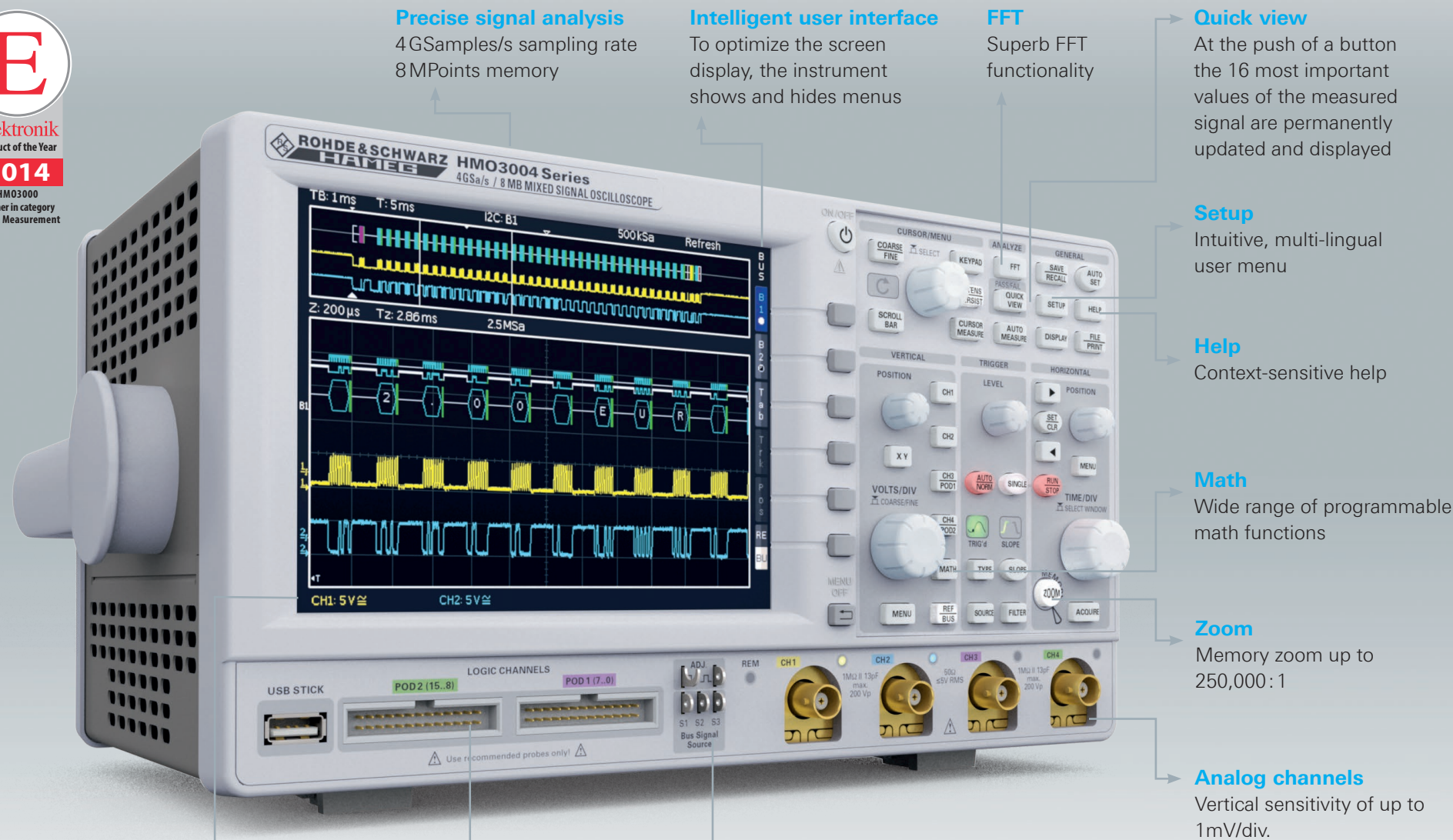
**HAMEG®**  
Instruments  
A Rohde & Schwarz Company





Elektronik  
Product of the Year  
**2014**  
HMO3000  
Winner in category  
Test & Measurement

HMO3004 Series, 500 MHz with 4 Channels



**Precise signal analysis**  
4GSa/s sampling rate  
8MPoints 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 250,000:1

**Analog channels**  
Vertical sensitivity of up to 1mV/div.

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

**Standard MSO functionality**  
Analyze analog channels plus up to an additional 16 digital channels

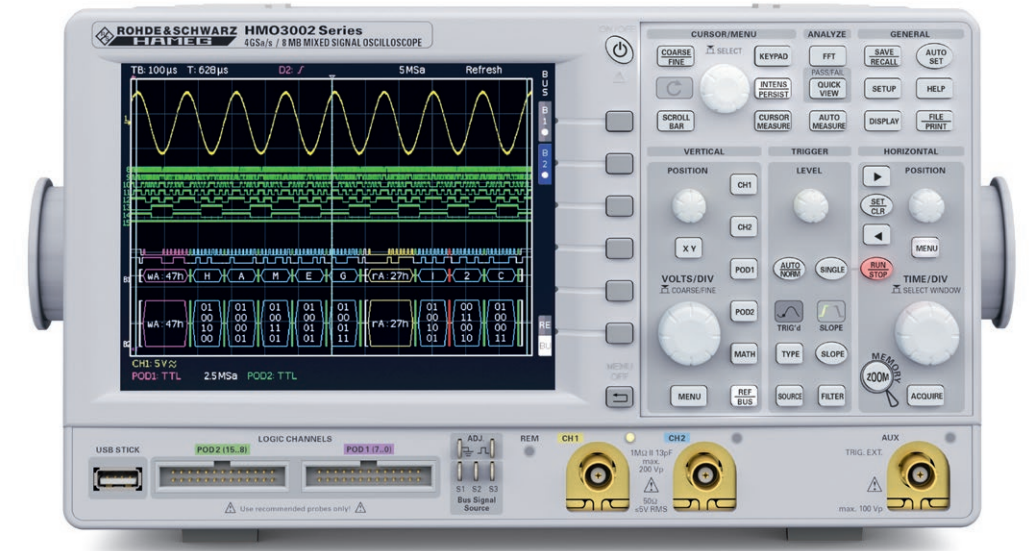
**Bus signal source**  
To create SPI, I<sup>2</sup>C, UART and counter test-signals

**Fan**  
Maximum noise reduction by temperature-controlled fan



# up to 500 MHz...

High sensitivity, multi-functionality and a great price – that's what distinguishes the HAMEG HMO3000 oscilloscope series.

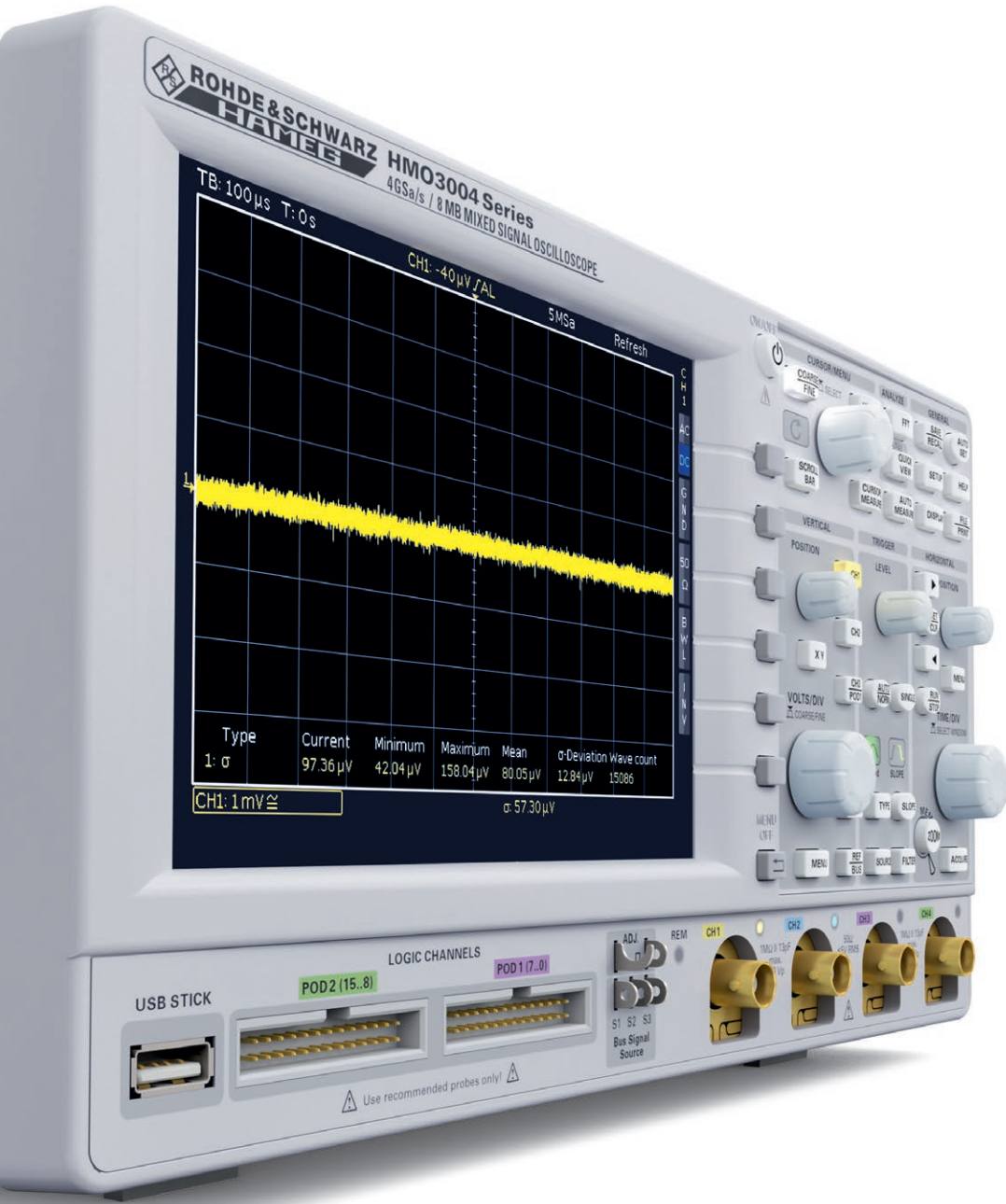


## Key facts

- 4GSa/s real time, 8MPts memory
- Automatically or manually adjustable memory depth, segmented memory option (H0014)
- MSO functionality included as standard (H03508/H03516 logic probe with 8/16 channels required)
- Trigger modes: slope (A/B), pulse width, video, logic, risetime, runt, serial buses (optional), hold-off
- Serial bus trigger and hardware accelerated decode incl. list view. Options: I<sup>2</sup>C + SPI + UART/RS-232 (H0010/H0011), CAN + LIN (H0012)
- 28 auto-measurement parameters plus statistics, formula editor, ratio cursor
- 6-digit hardware counter
- FFT up to 64 kPts (dBm, dBV, V<sub>rms</sub>)
- 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

Application	How the HAMEG HMO3000 meets your needs
Engineering lab	<ul style="list-style-type: none"> <li>Adjustable memory depth</li> <li>Advanced math functions available as standard, math on math possible</li> <li>Automeasurement for 28 user-defined parameters</li> <li>Segmented memory option</li> </ul>
Analog circuit design	<ul style="list-style-type: none"> <li>Low-noise amplifier and A/D converter</li> <li>1 mV/div. sensitivity</li> <li>50Ω/1 MΩ input impedance, switchable</li> <li>Bandwidth upgrades via software options</li> </ul>
Embedded debugging	<ul style="list-style-type: none"> <li>Mixed signal option (MSO) with 16 logic channels</li> <li>Serial bus trigger and hardware-accelerated decode</li> <li>6-digit hardware counter</li> <li>Superb FFT functionality</li> </ul>
Production environment	<ul style="list-style-type: none"> <li>Remote control for automated data acquisition</li> <li>Pass/fail tests based on user-defined masks with error signal output</li> <li>Automatic signal measurement at the push of a button</li> <li>USB/RS-232, Ethernet or GPIB (IEEE 488) interfaces</li> </ul>
General purpose and education	<ul style="list-style-type: none"> <li>Fast boot time</li> <li>Low-noise, intelligent temperature management</li> <li>Extended display size through Virtual Screen technology</li> <li>DVI-D output for external display</li> </ul>





# Precise Signal Analysis

An excellent sampling rate in combination with a large memory depth is the key for precise signal analysis. The highly resolved measurement data and the powerful zoom function expose even minor signal details.

Depending on their requirements users can choose between three 2-channel-versions and three 4-channel-versions with bandwidths between 300 and 500 MHz.

	500 MHz	400 MHz	300 MHz
4 channel	<b>HMO3054</b>	<b>HMO3044</b>	<b>HMO3034</b>
2 channel	<b>HMO3052</b>	<b>HMO3042</b>	<b>HMO3032</b>

Key facts	
Sampling rate (per analog channel)	2 GSa/s
Maximum sampling rate	4 GSa/s
Memory depth per channel	4 MPts.
Maximum memory	8 MPts.
Maximum number of logic channels	16
Input impedance	1 MΩ/50Ω, switchable
V/div. @1 MΩ/50Ω	1 mV/div. to 5V/div.

# Bandwidth Upgrade

Should your requirements change, then so does the HMO3000, as the 300 and 400 MHz models can be extended to 500 MHz bandwidth via software upgrades whenever required. This is done with option upgrade vouchers available at your dealer.

- For 300 MHz models with options HV352 (2 channel) and HV354 (4 channel).
- For 400 MHz models with options HV452 (2 channel) and HV454 (4 channel).

The voucher number and the serial number of your instrument enable you to generate the respective licence key directly on our dedicated web page <http://voucher.hameg.com>.

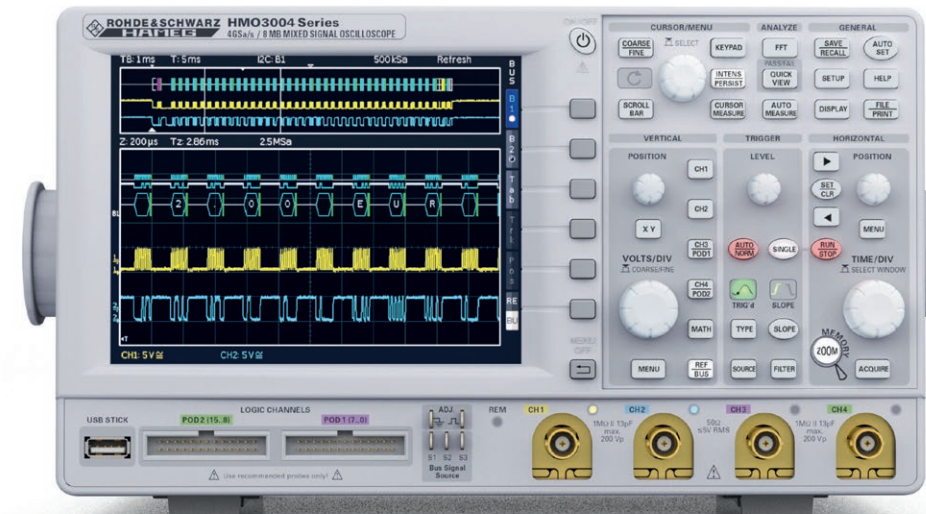
### Options

HV352 / HV354

HV452 / HV454

300 MHz  
>>>  
500 MHz

400 MHz  
>>>  
500 MHz



# 500 MHz



300 MHz | 400 MHz



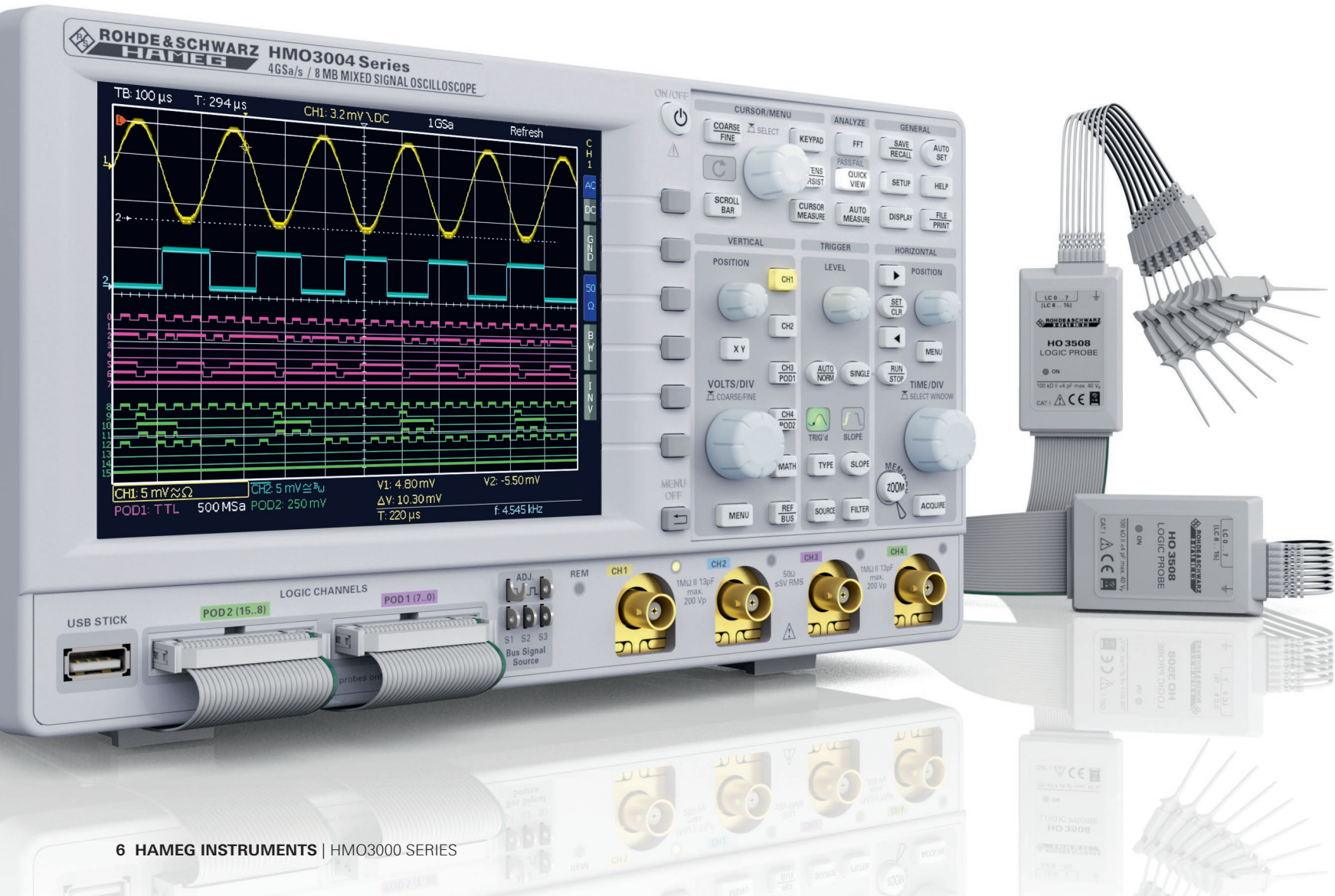
Video



HMO3000 product video:  
Scan, click or go to  
<http://youtube.com/HAMEGcom>

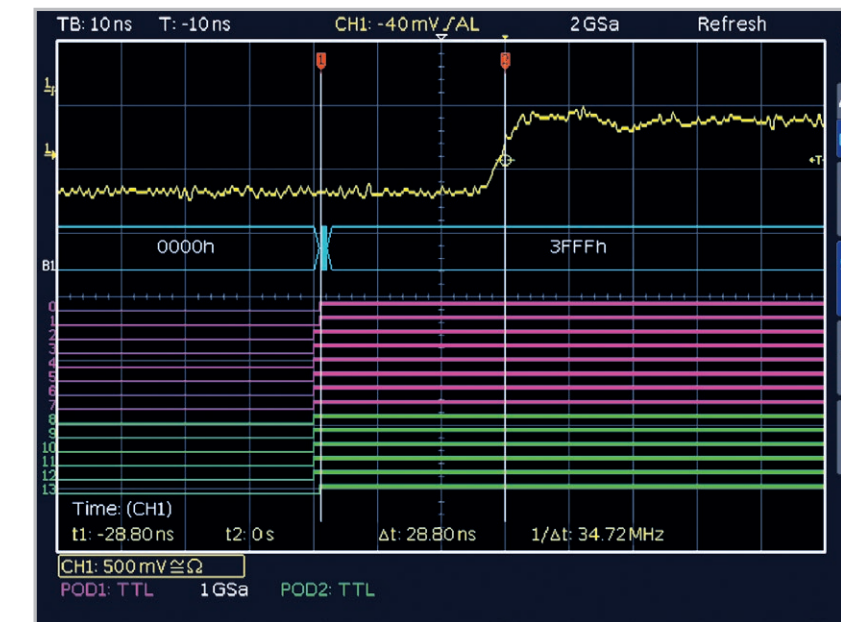
# Always a MSO

The mixed signal functionality is always included in the HMO3000 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 new HMO3000 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 new HMO3000 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.



14 bit 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, even the smaller models with a bandwidth as low as 70 MHz. 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 (also available as double pack HO3516)
- 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.

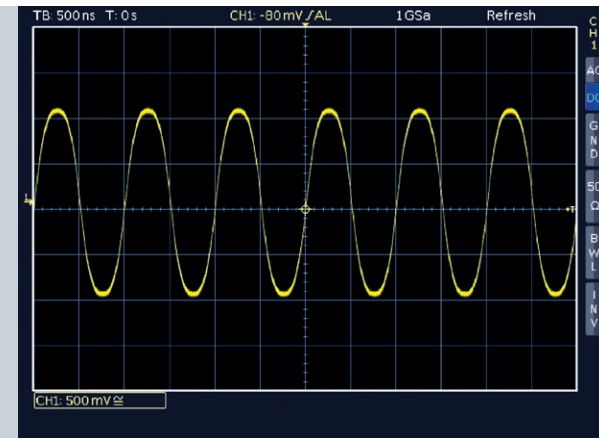


Figure 1: A sinusoid signal that at first sight appears undistorted

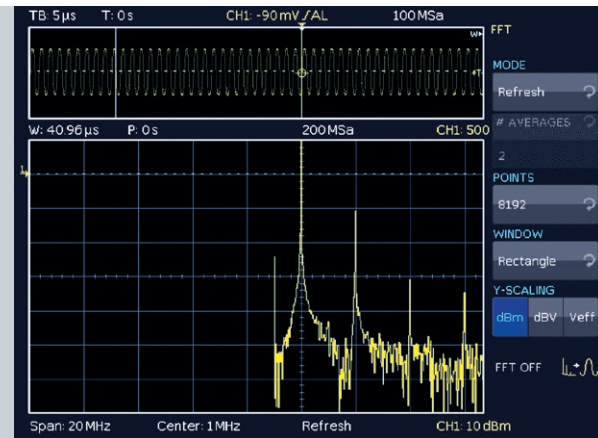


Figure 2: The frequency spectrum exposes the signal distortion

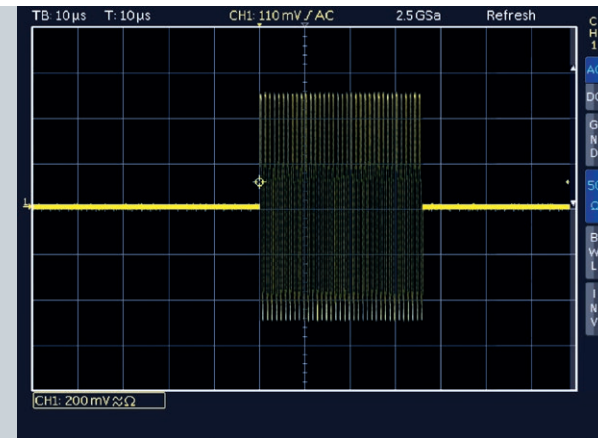


Figure 3

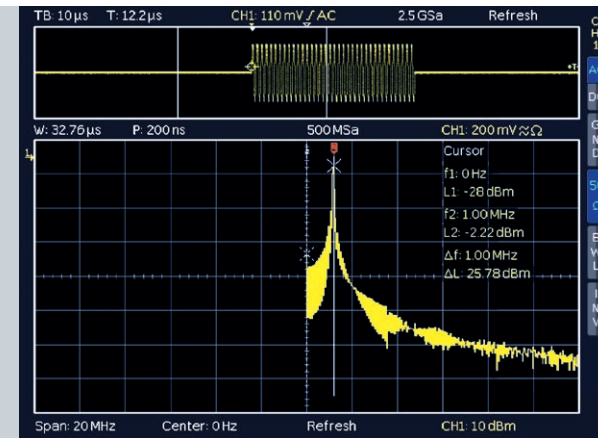


Figure 4

## 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

„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).

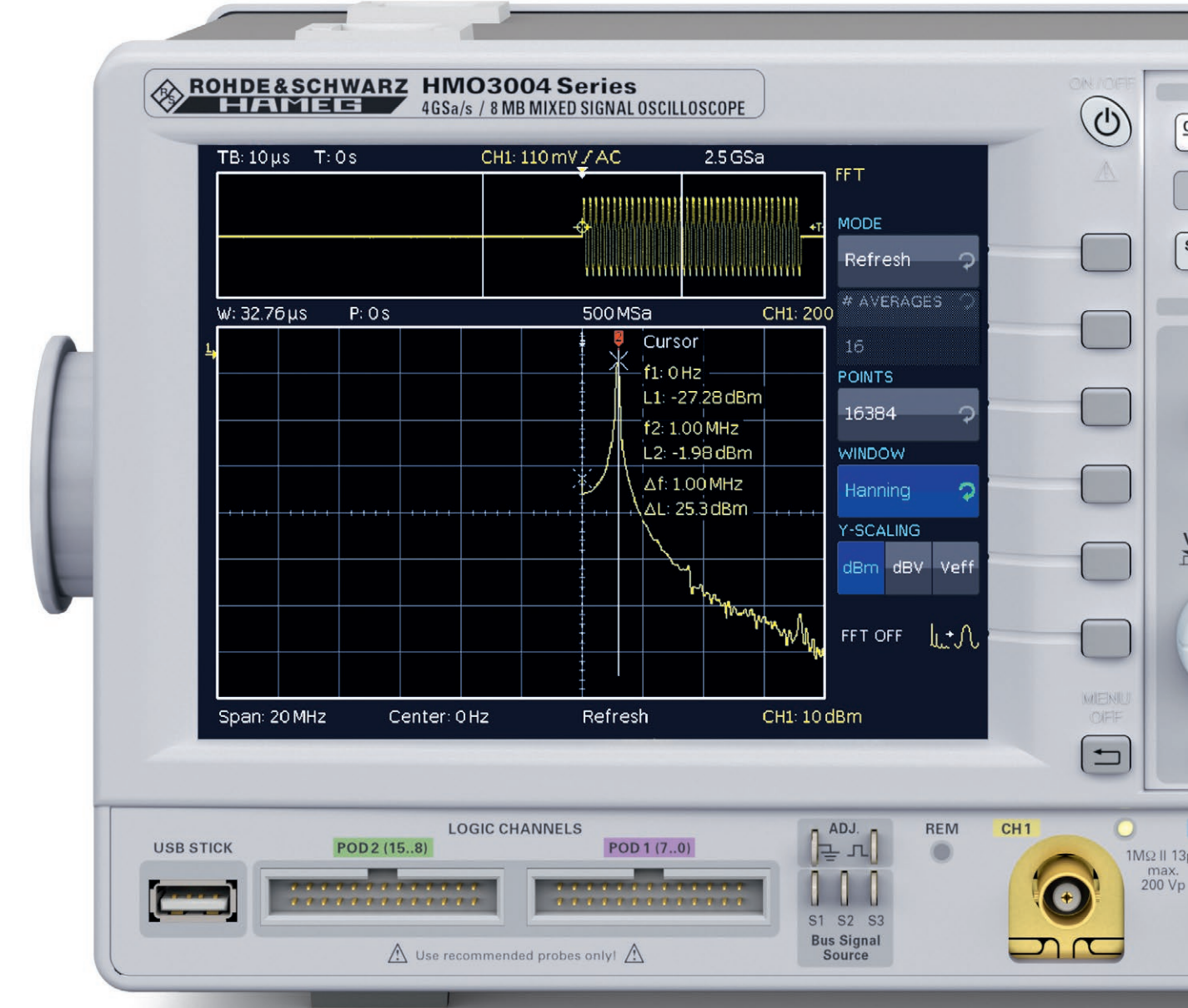


Figure 5



# Serial Bus Analysis

I<sup>2</sup>C, 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 new HMO3000 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:

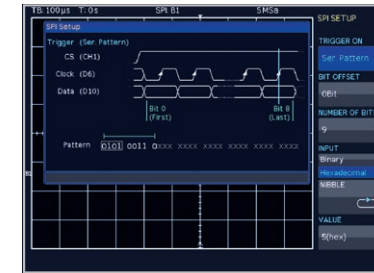
- HOO10: Analysis of I<sup>2</sup>C, SPI and UART/RS-232 signals on analog and logic channels
- HOO11: Analysis of I<sup>2</sup>C, SPI and UART/RS-232 signals on all analog channels
- HOO12: Analysis of CAN and LIN signals on analog and logic channels

### Serial bus trigger types:

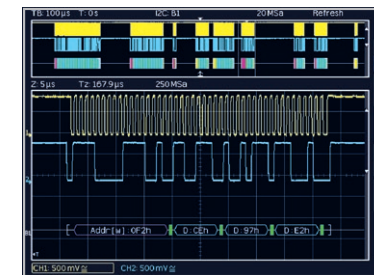
- I<sup>2</sup>C: Start, Stop, ACK, nACK, Address/Data
- SPI: Start, End, Serial Pattern (32Bit)
- UART/RS-232: Startbit, Frame Start, Symbol, Pattern
- LIN: Frame Start, Wake Up, Identifier, Data, Error
- CAN: Frame Start, Frame End, Identifier, Data, Error

### HOO10/HOO11

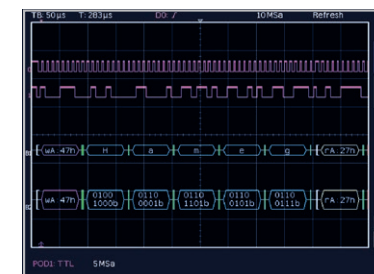
SPI/I<sup>2</sup>C/UART/RS-232 bus analysis for all oscilloscopes of the HMO series



SPI bus trigger setup



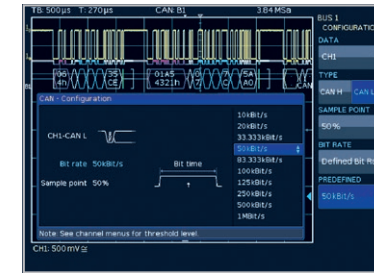
I<sup>2</sup>C bus hex decoding on the analog channel



I<sup>2</sup>C bus ASCII und binary

### HOO12

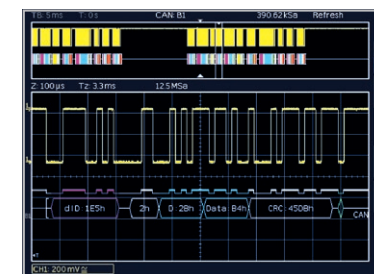
CAN/LIN bus analysis for all oscilloscopes of the HMO series



CAN bus configuration



CAN bus list display



HEX decoded CAN bus signal

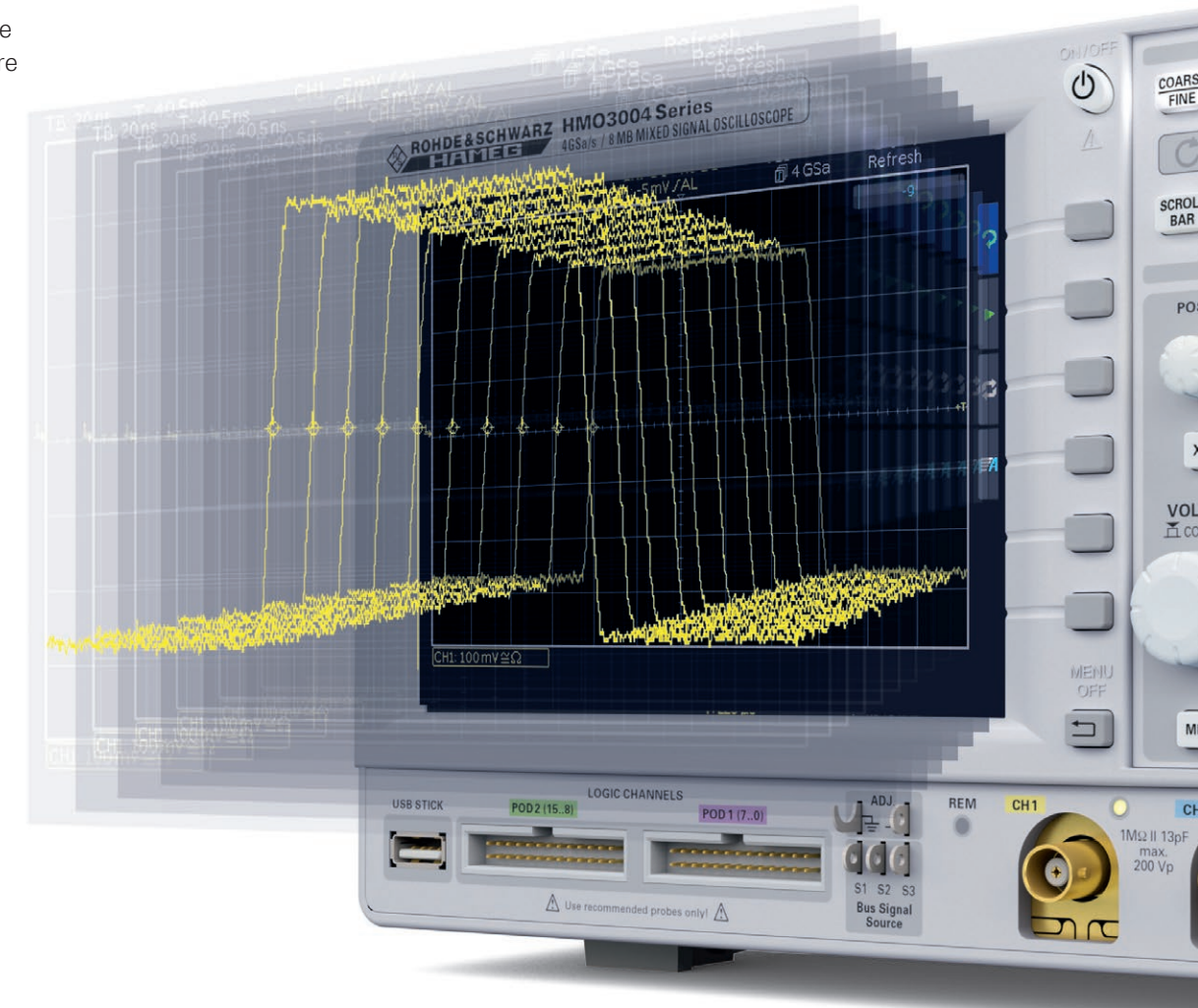
# Segmented Memory

The segmented memory option HOO14 enables you to divide the available memory of your HMO3000 into up to 1000 segments. This procedure allows sampling rates of 200,000 Wfm/s, which makes it possible to capture rare anomalies occurring during many short events in quick succession. For the analysis of the recorded signals, all measurement functions of the HMO are available, including the Pass/Fail function.

You can upgrade to option HOO14 at any time with voucher HV114.

### Specifications HOO14

Segmented Memory:	Acquisition memory divided into segments
Maximum segments	1,000
Minimum segment size	5 kPts
Maximum segment size	2 MPts
Re-arm time	<3µs
Maximum Acquisition rate	200,000Wfm/s
Segment Player	Displays all recorded segments manually or automatically, all measurement functions including pass/fail can be used with recorded segments



## Technical Data

**HMO3002 series 2-channel mixed signal oscilloscope**  
**HMO3004 series 4-channel mixed signal oscilloscope**  
**HMO3032, HMO3034: 300 MHz**  
**HMO3042, HMO3044: 400 MHz**  
**HMO3052, HMO3054: 500 MHz**  
**from firmware version 5.405**

Display	
Display	16.5cm (6.5") VGA Color Display
Resolution	640 (H) x 480 (V) Pixel
Backlight	500cd/m <sup>2</sup> (LED)
Display range in horizontal direction	
without menu bar	12 Div (600 Pixel)
with menu bar	10 Div (500 Pixel)
Display range in vertical direction	
8 Div (400 Pixel)	
with Virtual Screen usage	20 Div
Color depth	256 colors
Levels of brightness	32
Trace display	pseudo-color, inverse intensity
Button brightness	light, dark

Vertical System	
DSO mode	
2-channel models	CH1, CH2
4-channel models	CH1, CH2, CH3, CH4
MSO mode	
2-channel models	CH1, CH2, POD1, POD2
4-channel models	CH1, CH2, CH3 POD1, CH4 POD2
<b>Analog channels</b>	
Y-bandwidth (-3dB)	
(1mV, 2mV)/Div	HMO303x: 180 MHz HMO304x, HMO305x: 200 MHz
(5mV bis 5V)/Div	HMO303x: 300 MHz HMO304x: 400 MHz HMO305x: 500 MHz
Lower AC bandwidth	2 Hz
Bandwidth limitation (switchable)	about 20 MHz
Rise time (computed)	
HMO303x	< 1.166 ns
HMO304x	< 0.875 ns
HMO305x	< 0.700 ns
DC gain accuracy	2% of full scale

Input sensitivity	
all analog channels	1 mV/Div to 5 V/Div (1 MΩ and 50 Ω)
coarse stepping	12 calibrated steps, 1-2-5
variable stepping	freely between calibrated steps
Impedance	1 MΩ    13 pF ±2 pF (50 Ω switchable)
Coupling	DC, AC, GND
Max. input voltage	(derates at 20 db/decade to 5V <sub>rms</sub> above 100 kHz)
1 MΩ	200V <sub>p</sub>
50 Ω	5V <sub>rms</sub> , max. 30V <sub>p</sub>
Position range	±8 Div (from center of screen)
Offset control	
1 mV, 2 mV	±0.2 V - 8 Div x sensitivity
5 mV to 20 mV	±1.0 V - 8 Div x sensitivity
50 mV	±2.5 V - 8 Div x sensitivity
100 mV, 200 mV	±20 V - 8 Div x sensitivity
500 mV to 5 V	±50 V - 8 Div x sensitivity
XY/XYZ mode	selectively all analog channels
Inversion	selectively all analog channels
<b>Logic channels</b>	with logic probe (HO3508/HO3516)
Thresholds	TTL, CMOS, ECL, user-defined (-2 V to +8 V)
Impedance	100 kΩ    4 pF
Coupling	DC
Max. input voltage	40V <sub>p</sub>

Trigger System	
<b>Trigger mode</b>	
Auto	Triggers automatically also without any specific trigger event
Normal	Triggers only on specific trigger events
Single	Triggers once on a trigger event
Trigger indicator	Screen and panel (LED)
Trigger sensitivity	
up to 2mV/Div	1.5 Div
2mV/Div to 5mV/Div	1.0 Div
from 5mV/Div	0.8 Div
external	0.5V <sub>pp</sub> to 10V <sub>pp</sub>
Trigger level setting	
with auto level	Linking peak value and trigger level, adjustable between peak values of a signal ±8 Div (from center of screen)
without auto level	±8 Div (from center of screen)
external	±5 V
Trigger coupling	
Auto level	5 Hz to 300/400/500 MHz
AC	5 Hz to 300/400/500 MHz
DC	DC to 300/400/500 MHz
HF	30 kHz to 300/400/500 MHz

selectable filters	
LF	DC to 5 kHz, selectable in DC and auto level mode
low-pass (noise rejection)	200 MHz, selectable in AC, DC, HF and auto level mode
Trigger hold-off	50 ns to 10 s
<b>External trigger input (BNC)</b>	
Impedance	1 MΩ    14 pF ±2 pF
Sensitivity	0.5V <sub>pp</sub> to 10V <sub>pp</sub>
Trigger level	±5 V
Max. input voltage	100V <sub>p</sub>
Coupling	DC, AC
<b>Trigger/Auxiliary output (BNC)</b>	
Functions	Pulse output for every acquisition trigger event, error output on mask violation
Output level	3.8 V
Pulse polarity	positive
Pulse width	> 150 ns (trigger event), > 0.5 μs (mask violation)

Trigger types	
<b>Edge</b>	
Direction	increasing, decreasing, both
Trigger coupling	auto level AC, DC, HF
Switchable filters	LF, noise rejection
Sources	all analog and digital channels, mains, external (AC, DC)

<b>Edge A/B</b>	
Direction	increasing, decreasing, both
Source: A, B	all analog channels, external (AC, DC)
Frequency range	DC to 300/400/500 MHz
min. signal amplitude	0.8 Div
Trigger level range (separately adjustable with different sources)	±8 Div (from center of screen)
external	±5.0 V
Trigger coupling	
State A	auto level, AC, DC, HF LF, low-pass
State B	
same sources	as state A
different sources	DC, HF low-pass
Trigger setting	
time based	16 ns to 8.589 s, resolution min. 4 ns
event based	1 to 2 <sup>16</sup> events
<b>Pulse width</b>	
Polarity	positive, negative

Functions	equal, not equal, lower, higher, within/without a range
Pulse duration	4 ns to 8.5 s, resolution min. 0.5 ns
Sources	all analog and digital channels
<b>Logic</b>	
Functions	
Boolean operators	AND, OR, TRUE, FALSE
time based operators	equal, not equal, lower, higher, within/without a time range, timeout
Duration	4 ns to 8.5 s, resolution min. 0.5 ns
States	H, L, X
Sources	all logic channels
<b>Video</b>	
Sync. pulse polarity	positive, negative
supported standards	NTSC, SECAM, PAL, PAL-M, SDTV 576i, HDTV 720p, HDTV 1080i, HDTV 1080p
Field	even/odd, either
Line	line number selectable, all
Sources	all analog channels, external (AC, DC)
<b>Risetime</b>	
Functions	rise/fall time, both
Time range	4 ns to 8.5 s, resolution min. 0.5 ns
Time based operators	equal, not equal, lower, higher
Variance	±2 ns to ±33.5 ms, resolution 2 ns
Sources	all analog channels
<b>Runt</b>	
Polarity	positive, negative, both
Duration	n/a
Sources	all analog channels
<b>Serial Busses</b>	
Bus representation	Up to two busses can be analyzed at the same time. Color-coded display of decoded data in ASCII, binary, decimal and hexadecimal format.
Option code	
HOO10	Analysis of I <sup>2</sup> C, SPI, UART/RS-232 signals on analog and logic channels
HOO11	Analysis of I <sup>2</sup> C, SPI, UART/RS-232 signals on all analog channels
HOO12	Analysis of CAN and LIN signals on analog and logic channels
Trigger types by protocols	
I <sup>2</sup> C	Start, Stop, ACK, NACK, Address/Data
SPI	Start, End, Serial Pattern (32 Bit)
UART/RS-232	Startbit, Frame Start, Symbol, Pattern
LIN	Frame Start, Wake Up, Identifier, Data, Error
CAN	Frame Start, Frame End, Identifier, Data, Error

Horizontal System	
<b>Display</b>	
Time domain (Yt)	main screen, time domain and zoom window
Frequency domain (FFT)	time domain and frequency domain window (FFT)
XY/XYZ mode	Voltage (XY), Intensity (Z)
VirtualScreen	virtual display of 20 Div for all math, logic, bus, reference signals
Reference signals	up to 4 references
Channel deskew	-62.5 ns to +61.5 ns, step size 500 ps
Memory zoom	up to 250,000:1
Time basis	
Accuracy	15,0 x 10 <sup>-6</sup>
Aging	±5,0 x 10 <sup>-6</sup> per year
Operation modes	
REFRESH	1 ns/Div to 50 s/Div
ROLL	50 ms/Div to 50 s/Div

Acquisition System	
<b>Realtime sampling rate</b>	
2-channel models	2 x 2 GSa/s or 1 x 4 GSa/s
4-channel models	4 x 2 GSa/s or 2 x 4 GSa/s
Logic channels	16 x 1 GSa/s
<b>Memory depth</b>	
2-channel models	2 x 4 MPts or 1 x 8 MPts
4-channel models	4 x 4 MPts or 2 x 8 MPts
Resolution	8 Bit, (HiRes up to 10 Bit)
Waveform arithmetics	refresh, roll (loose/triggered), average (up to 1024), envelope, peak detect (500ps), filter (low-pass, adjustable), high resolution (up to 10 Bit)
Record modes	automatic, max. sampling rate, max. waveform update rate, specific record length (10 kPts to 2 MPts)
Interpolation	
all analog channels	sin(x)/x, linear, sample-hold
logic channels	pulse
Delay	
pre-trigger	0 to 4x10 <sup>6</sup> Sa x (1/sample rate), x2 in interlaced mode
post-trigger	0 to 8,59x10 <sup>9</sup> Sa x (1/sample rate)
Waveform update rate	up to 5000 Wfm/s
Waveform display	dots, vectors, persistence afterglow
Persistence afterglow	min. 50 ms
<b>Segmented Memory (HOO14 option)</b>	
Segment size	5 kPts to 2 MPts
max. number of segments	1,000

Technical Data	
re-arming time	less than 3 μs
sampling rate	200.000 Wfm/s
Segment player	Displays all recorded segments manually or automatically. All measurement functions including pass/fail testing can be applied on the recorded segments.

Waveform Measurements	
Operation	menu-driven (multilingual), auto-set, help functions (multilingual)
<b>Measurement functions</b>	
Automatic measurements	Voltage (V <sub>pp</sub> , V <sub>p+</sub> , V <sub>p-</sub> , V <sub>rms</sub> , V <sub>avg</sub> , V <sub>min</sub> , V <sub>max</sub> ), amplitude, phase, frequency, period, rise/fall time (80%, 90%), overshoot (pos/neg), pulse width (pos/neg), burst width, duty cycle (pos/neg), standard deviation, delay, crest factor, edge/pulse count (pos/neg), trigger period, trigger frequency
Automatic search functions	Edge, pulse, peak, rise/fall time, runt
Cursor measurements	Voltage (V1, V2, ΔV), time (t1, t2, Δt, 1/Δt), ratio X, ratio Y, pulse and edge count (pos/neg), peak values (V <sub>pp</sub> , V <sub>p+</sub> , V <sub>p-</sub> ), mean/RMS/standard deviation, duty cycle (pos/neg), burst width, rise/fall time (80%, 90%), ratio marker, crest factor
Quick measurements (QUICKVIEW)	Voltage (V <sub>pp</sub> , V <sub>p+</sub> , V <sub>p-</sub> , V <sub>rms</sub> ), frequency, period (predefined) 6 additional measurement functions (see automatic measurement functions) freely selectable plus statistics
Marker	up to 8 freely positionable markers for easy navigation, automatic marker positioning based on search specification
<b>Frequency counter (hardware based)</b>	
Resolution	6 digit
Frequency range	0.5 Hz to 300/400/500 MHz
Accuracy	15,0 x 10 <sup>-6</sup>
Aging	±5,0 x 10 <sup>-6</sup> per year

Mask Testing	
Functions	Pass/Fail comparison with an user-defined mask performed on waveforms
Sources	all analog channels
Mask definition	Mask enclosing acquired waveform with user-defined tolerance
Actions	
on mask violations	beep, acquisition stop, screenshot, trigger pulse, automatically saving trace data



during acquisition	Statistics: number of completed tests, number of passes / failed acquisition (absolute and in percent), test duration
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**Waveform Maths**

**Quickmath**

Functions	addition, subtraction, multiplication, division
Sources	2 analog channels

**Mathematics**

Functions	addition, subtraction, multiplication, division, minimum / maximum, square, square root, absolute value, pos/neg wave, reciprocal, inverse, log10/ln, derivation, integration, filter (lowpass/highpass)
Editing	formula editor, menu-driven
Sources	all analog channels, user-defined constants
Storage location	Math. Memory
Number of formula sets	5 formula sets
Number of equations	5 equations per formula set
Simultaneous display of math. Functions	1 formula set with max. 4 equations

**Frequency Analysis (FFT)**

Parameters	frequency span, center frequency, vertical scale, vertical position
FFT length	2 kpts, 4 kpts, 8 kpts, 16 kpts, 32 kpts, bis 64 kpts
Window	Hanning, Hamming, Rectangular, Blackman
Scale	dBm, dBV, V <sub>rms</sub>
Waveform arithmetics	refresh, envelope, average (up to 512)
Cursor measurement	2 horizontal cursors, previous/next peak search
Sources	all analog channels

**Pattern Generator**

Functions	probe adjust, bus signal source, counter, random pattern
Probe ADJ output	1 kHz, 1 MHz square wave: 1.0V <sub>pp</sub> (tr < 4ns)
Bus Signal Source (4Bit)	I <sup>2</sup> C (100 kBit/s, 400 kBit/s, 1 MBit/s), SPI (100 kBit/s, 250 kBit/s, 1 MBit/s), UART (9600 Bit/s, 115,2 kBit/s, 1 MBit/s)
Counter (4Bit)	frequency: 1 kHz, 1 MHz direction: incrementing
Random pattern (4Bit)	frequency: 1 kHz, 1 MHz

**Interfaces**

Connectors and ports	
for mass storage (FAT16/32)	2 x USB-Host (Typ A)
for remote control	HO730 dual interface: Ethernet (RJ-45) / USB-Device (Typ B)

optional interfaces	HO720 dual interface: USB-Device (Typ B) / RS-232 HO740 interface: IEEE-488 (GPIB)
external monitor interface	DVI-D (480p, 60Hz), HDMI compatible

**General Data**

Application memory	8MB for references, formulas, device settings, languages and help functions
Save/Recall	
device settings	on internal file system or external USB memory, available file formats: SCP, HDS
reference waveforms	on internal file system or external USB memory, available file formats: BIN (MSB/LSB), FLT (MSB/LSB), CSV, TXT, HRT
traces	on external USB memory, available file formats: BIN (MSB/LSB), FLT (MSB/LSB), CSV, TXT, HRT
data	display or acquisition data
sources	single or all analog channels
screenshots	on external USB memory, available file formats: BMP, GIF, PNG
math equation sets	on internal file system or external USB memory
Realtime Clock (RTC)	date and time
Power supply	
AC supply	100V to 240V, 50 Hz to 60 Hz, CAT-II
Power consumption	
2-channel models	max. 70W
4-channel models	max. 90W
Safety	in line with IEC 61010-1 (ed. 3), IEC 61010-2-30 (ed. 1), EN 61010-1, EN 61010-2-030, CAN/CSA-C22.2 No. 61010-1-12, CAN/CSA-C22.2 No. 61010-2-030-12, UL Std. No. 61010-1 (3rd Edition), UL61010-2-030
Temperature	
Operating temperature range	+5 °C to +40 °C
storage temperature range	-20 °C to +70 °C
rel. humidity	5% to 80% (without condensation)
Mechanical data	
Dimensions	285 mm (W) x 220 mm (H) x 175 mm (D)
Weight	3.6 kg
All specifications at 23°C after 30 minute warm-up.	

**Accessories included:**  
HO730 Ethernet/USB dual-interface card, Line cord, printed operating manual, 2/4 probes (amount=number of channels), 10:1 with attenuation ID (HZ350 400/300 MHz, HZ355 500 MHz), software-CD

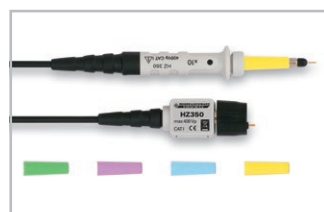
**HO730**

Dual interface card ethernet/USB (included in printed operating manual and software-CD)



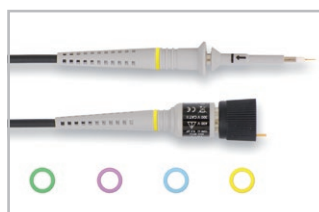
**HZ350**

400 MHz passive probe (for 400/300 MHz oscilloscopes)



**HZ355**

500 MHz passive probe (for 500 MHz oscilloscopes)



# Recommended Accessories

**HO720**

USB-device/RS-232 dual-interface card



**HO740**

IEEE-488 (GPIB) interface card, galvanically isolated



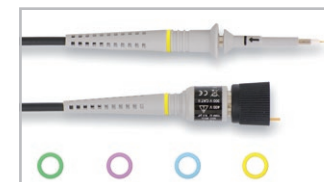
**HZO20**

High voltage probe 1000:1 (400 MHz, 1000V<sub>rms</sub>)



**HZ355**

500 MHz passive probe 10:1 with automatic identification



**HZ355DU**

Upgrade from 2 x HZ350 to 2 x HZ355, only available when purchasing a HMO3000 (300 MHz / 400 MHz models)

**HZO40**

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



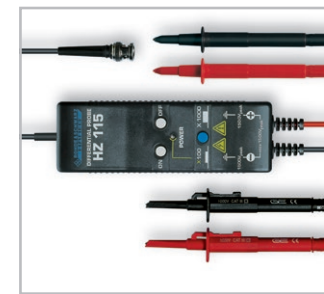
**HZO41**

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



**HZ115**

Active differential high voltage probe



**HZ99**

Carrying case for protection and transport



**HZ46**

4RU 19" rackmount kit



**HZO50**

AC/DC current probe 30 A, DC to 100 kHz



**HZO51**

AC/DC current probe 100/1000 A, DC to 20 kHz

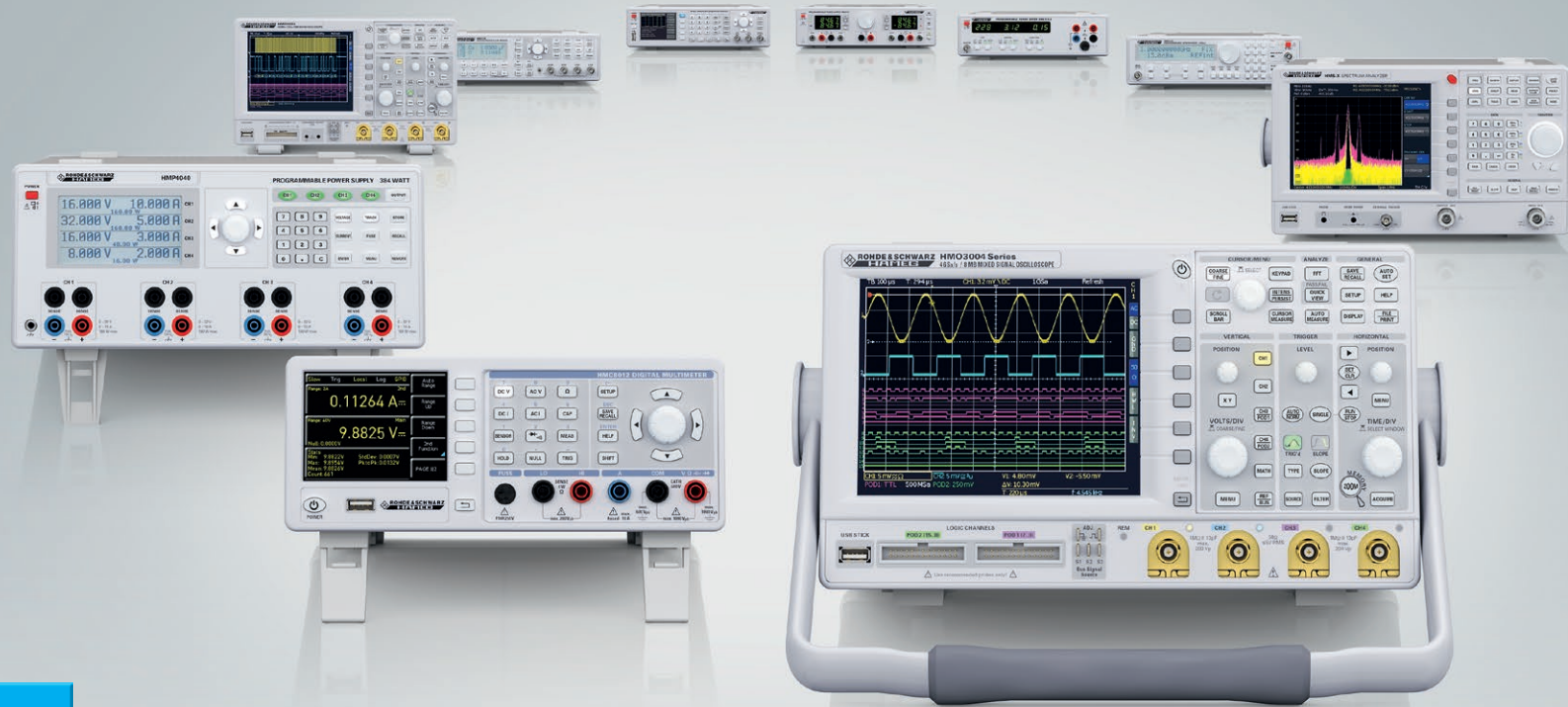


**HZO30**

1 GHz active probe (0.9 pF, 1 MΩ, including many accessories)







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