R&S®HMO Compact Series
Mixed Signal Oscilloscopes
70/100/150/200 MHz Bandwidth

ROHDE&SCHWARZ
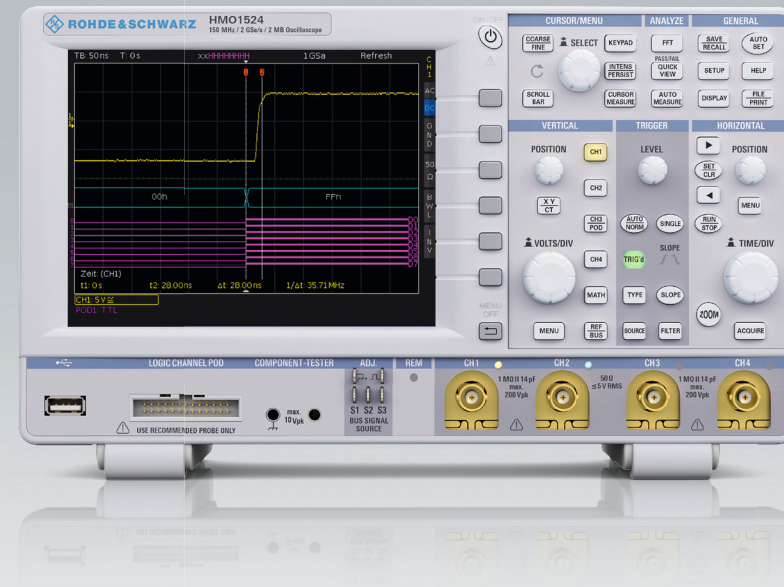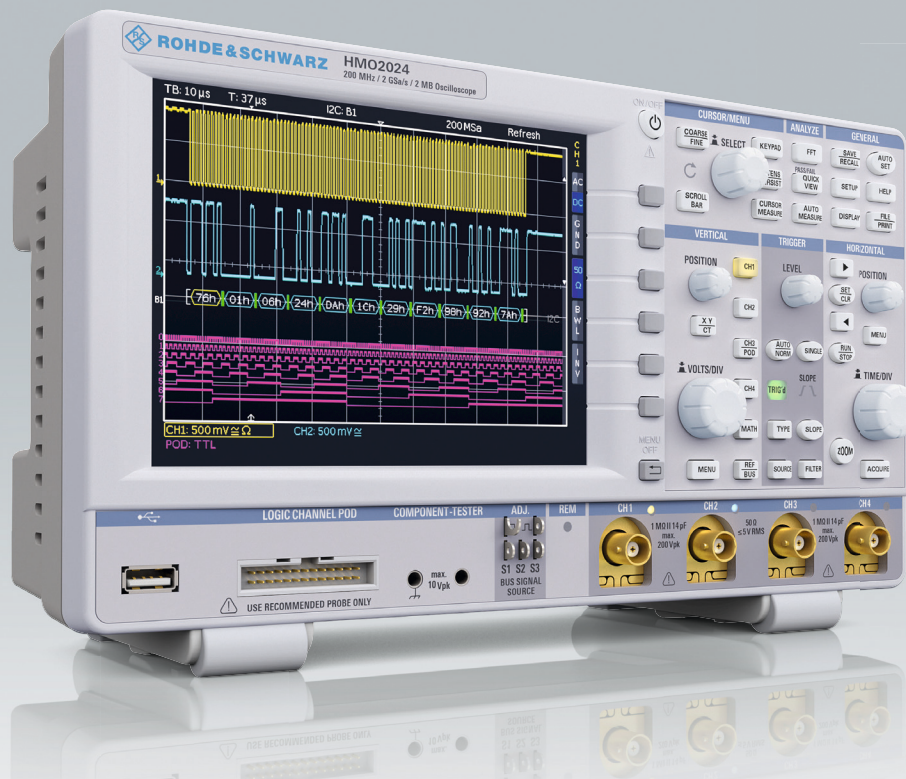
Serial bus analysis
Hardware-based triggering and decoding (optional)

Precise signal analysis
2 Gsamples/s sampling rate
2 Msamples 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

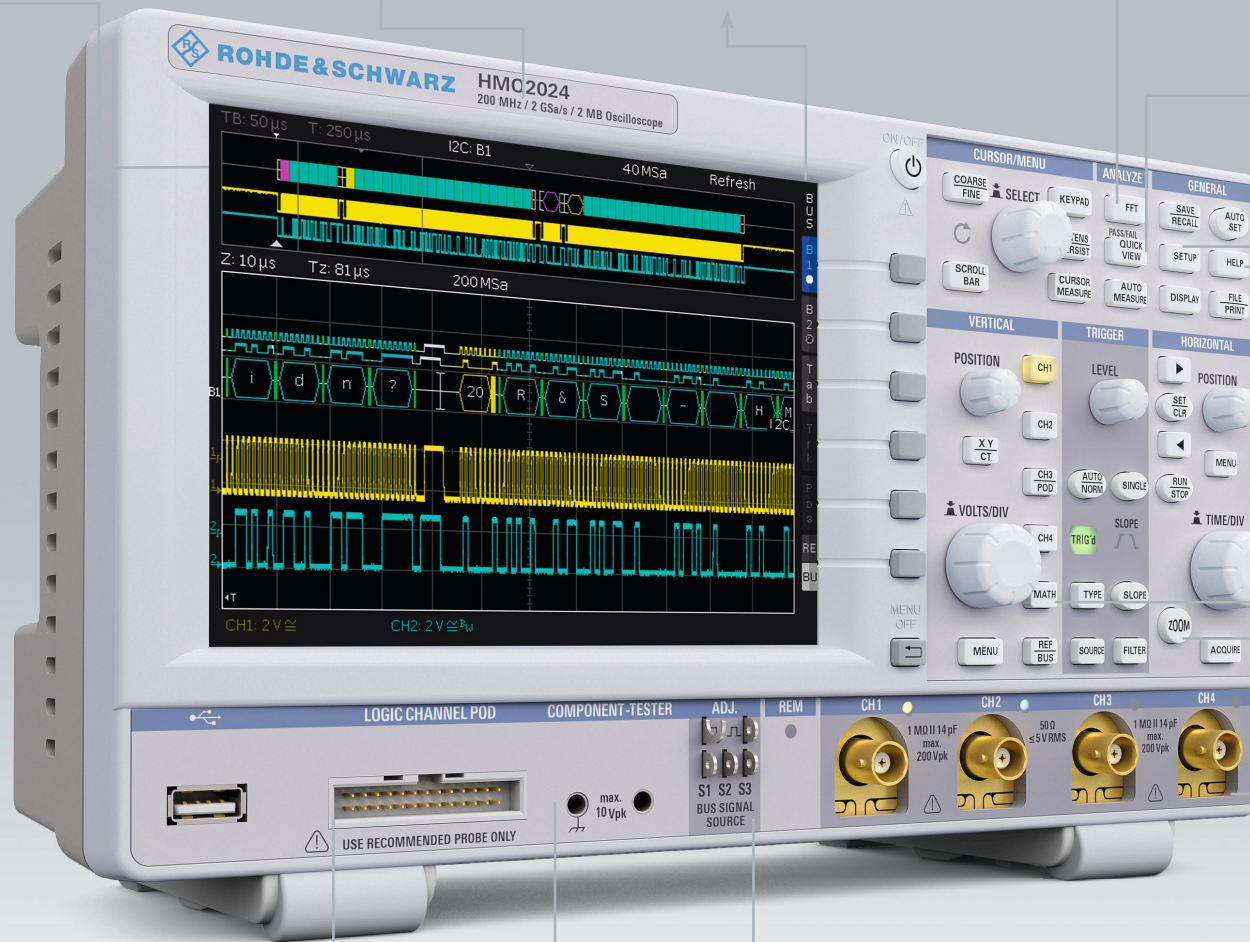**Math**
Wide range of programmable math functions

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

USB | RS-232 | optional TCP/IP | optional IEEE-488 | 6.5" VGA 16.5 cm | DVI-D Output | 50 Ω 1MΩ *1) | Lab-VIEW | Software | Printed Manual

*1) R&S®HMO2024, R&S®HMO1524 only

At a glance

The increasing complexity of systems brings with it an increase in the challenges facing T&M systems. The digital mixed signal oscilloscopes in the R&S®HMO compact series unify high sensitivity and multifunctionality with an attractive price. The wide range of applications and measurement functions address a broad group of users – from embedded developers to service technicians to educators. Advanced, powerful technology in a compact design meets the high requirements of today's customers.

The 2- and 4-channel instruments offer bandwidths of 70 MHz, 100 MHz, 150 MHz and 200 MHz, a sampling rate of 2 Gsample/s and a memory depth of 2 Msample. Featuring MSO functionality as standard and a variety of options for serial bus analysis, the instruments meet the demands of modern design development.

Rohde & Schwarz offers the R&S®HMO compact series exclusively as mixed signal oscilloscopes. Unlike other manufacturers' instruments, the mixed signal functions are not activated via software options. The only optional extra is the R&S®HO3508 low-capacitance logic probe that analyzes signals with a sampling rate of 1 Gsample/s on up to 8 logic channels. The probe is not tied to the instrument serial number and can be used with any of the R&S®HMO oscilloscopes.

For communications between embedded systems and the environment, hardware-based signal triggering and decoding for all common protocols (I2C, SPI, UART, CAN and LIN) has been integrated. It can be activated with an upgrade voucher at any time.
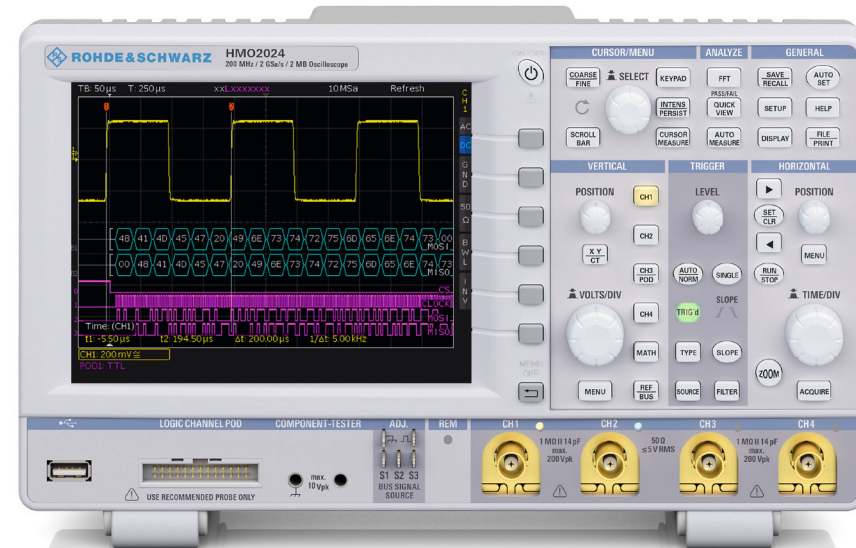
Thanks to the integrated 64k point FFT analysis function, the R&S®HMO compact series competes with significantly larger oscilloscopes in the frequency domain. The time domain signal, measurement window and FFT results are displayed on a single screen, which makes it easier to analyze the input signal waveform.

The R&S®HMO compact series offers time domain, logic, protocol and frequency analysis plus an advanced component tester in a single, compact instrument. It is a member of the Rohde & Schwarz scope-of-the-art family.

Key facts

Superior hardware-based acquisition for precise measurement results
❚ 2 Gsa/s sampling rate, 2 Msa memory depth
❚ High vertical sensitivity down to 1 mV/div
❚ Low-noise measurement due to state-of-the-art A/D converter
❚ High acquisition rate to identify signal faults

Versatile measurement functions and fast results
❚ Wide selection of automatic measurement functions
❚ QuickView: key results at the push of a button
❚ Advanced math functions with realtime calculations
❚ Mask test: a new mask can be easily created with just a few keystrokes
❚ FFT: the easy way to analyze the signal spectrum

Logic analysis with the MSO option
❚ Mixed signal function as standard
❚ Precise triggering on signal events
❚ Straightforward display of digital signals
❚ Low test point loading due to active probe solution

Serial bus analysis: hardware-based triggering and decoding
❚ Versatile trigger options for isolating specific data packets
❚ Color-coded display of decoded bus signals
❚ Direct export of analyzed data to USB memory drive
❚ Simultaneous decoding of two buses in realtime

Future-ready investment and scalability
❚ Free firmware updates
❚ Serial bus analysis via optional software licenses

Application	How the R&S®HMO meets your needs
Engineering lab	❚ Advanced math functions available as standard, chained calculations possible ❚ Automeasurement for six user-defined parameters ❚ Memory zoom function up to 50 000:1 ❚ Digital bus signal source
Analog circuit design	❚ Low-noise amplifier and A/D converter ❚ 1 mV/div sensitivity ❚ 50 Ω/1 MΩ input impedance, switchable (R&S®HMO15024, R&S®HMO2024) ❚ Component tester
Embedded debugging	❚ Mixed signal function with 8 logic channels ❚ Serial bus trigger and hardware-accelerated decode (R&S®HOO10/11/12, R&S®HV110/111/112) ❚ 6-digit hardware counter ❚ FFT with 64kPoints
Production environment	❚ 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/USB or GPIB (IEEE 488) interfaces
General purpose and education	❚ Fast boot time and lightweight design ❚ Low-noise, intelligent temperature management ❚ Extended display size through VirtualScreen technology ❚ DVI-D output for external display

| Model overview				
	200 MHz	**150 MHz**	**100 MHz**	**70 MHz**
4 channel	**R&S®HMO2024**	**R&S®HMO1524**	**R&S®HMO1024**	**R&S®HMO724**

Functions for everyday use

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.

QuickView you will also receive a comfort feature that allows to get a quick overview of the measured waveform. By pressing a single button to activate the automatic analysis the results are displayed directly at the signal and on the bottom of the screen.
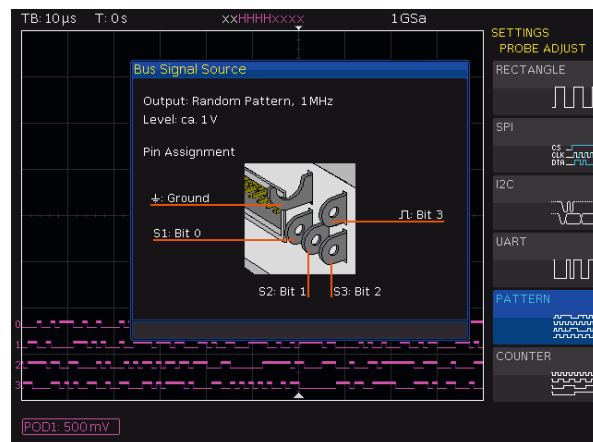

Pattern Generator
The HMO Compact Series includes a 4 bit wide bus signal source. Thereby predefined I²C, SPI, UART signal patterns as well as pseudo random patterns and counter signals are provided.
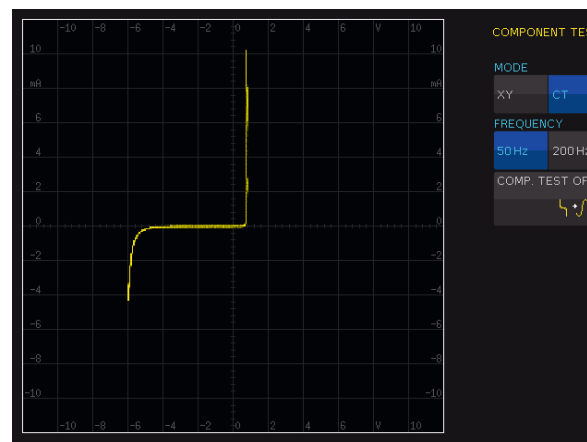
Component Tester
Our time proven component tester will also be at your side. Two measuring frequencies with 50 Hz or 200 Hz are provided to support your potentially tedious search for faulty components. And since a picture truly does say more than a thousand words, you will be able to tell at a glance if your error analysis is on track.
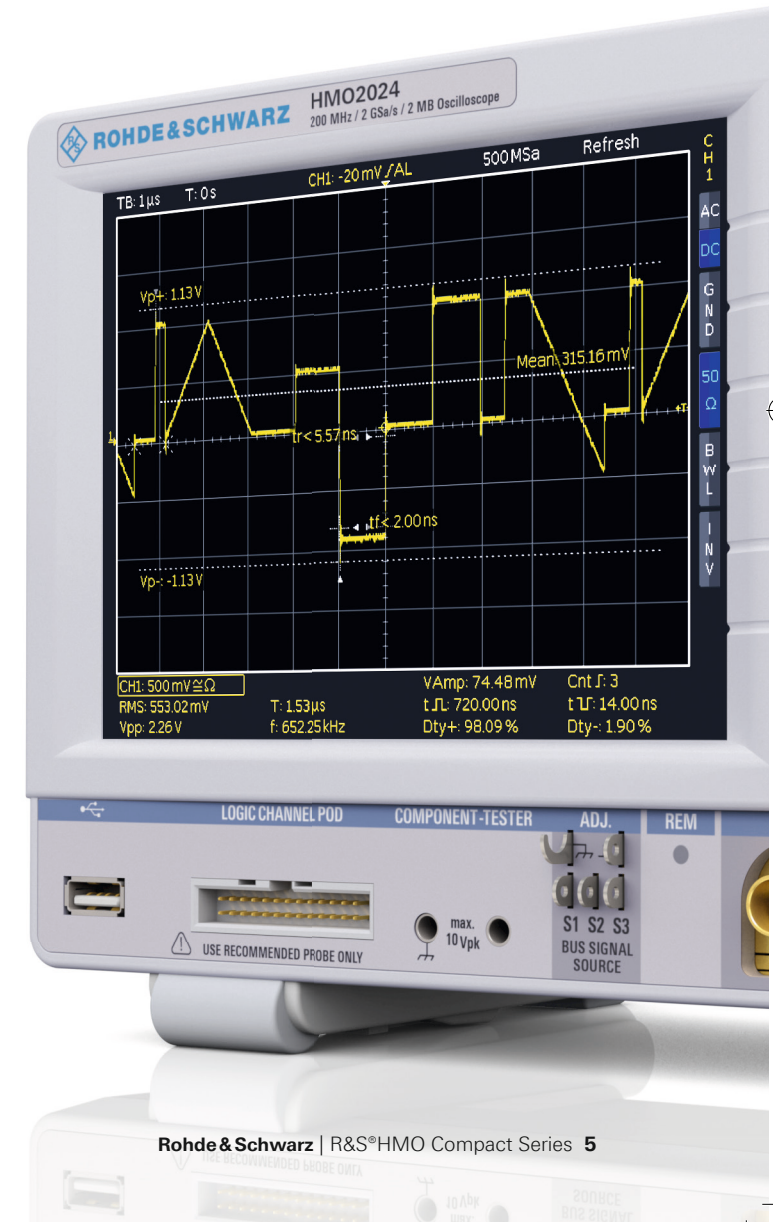
Always a MSO

The mixed signal functionality is always included in the R&S®HMO Compact Series with no software option being necessary to unlock it.
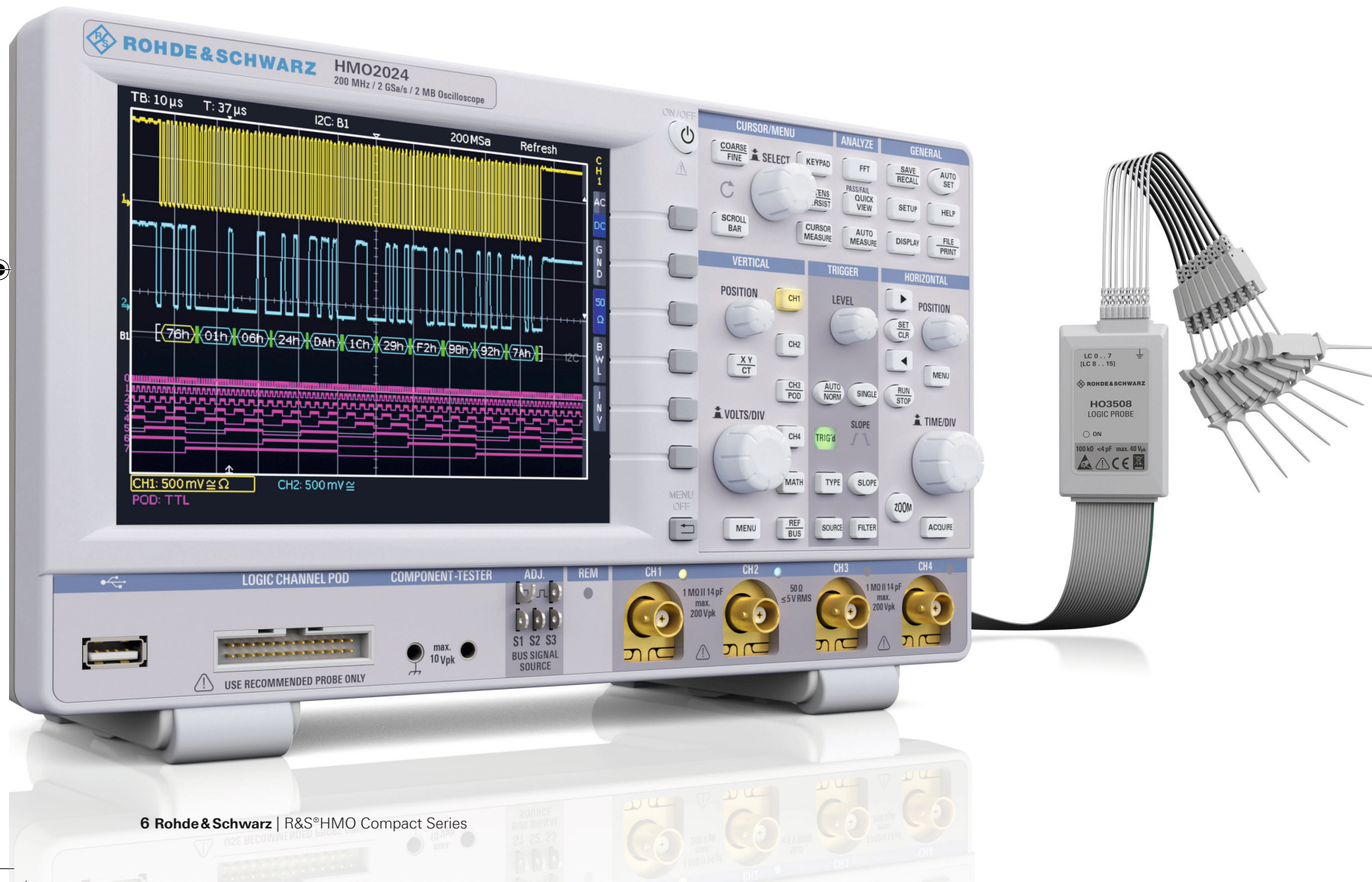
Rohde & Schwarz is offering the R&S®HMO Compact Series exclusively as mixed-signal oscilloscopes. The great advantages of these instruments are best illustrated by taking a look at how ADCs (Analog Digital Converter) or DACs (Digital Analog Converter) are integrated.

These transformer modules include an analog signal on the one side and a digital signal on the other side. As 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.

The active logic probe R&S®HO3508 is available separately and is not linked to a specific serial number of an instrument. It can be used with any R&S®HMO oscilloscope.
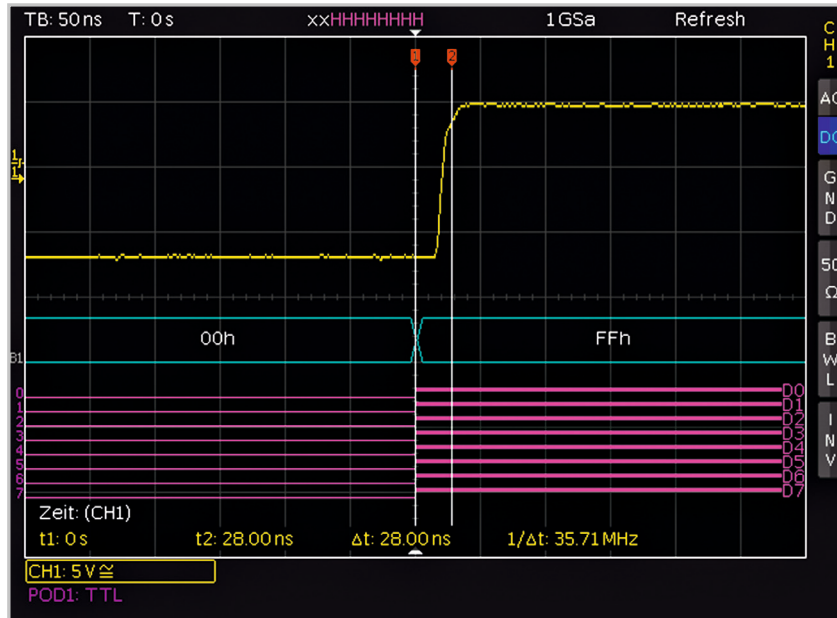
8 bit DAC signal change
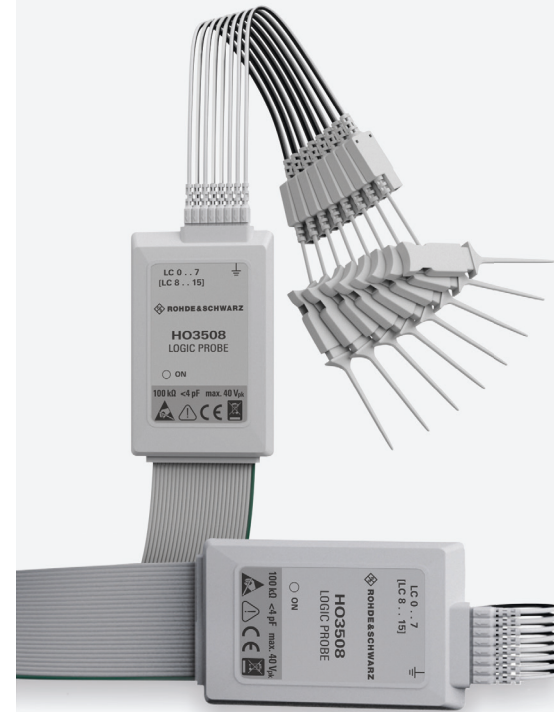
ı Logic probe R&S®HO3508 fits to all R&S®HMO series oscilloscopes
ı No hardware lock to a specific device
ı 8 logic channels available on each logic probe
ı Signal threshold adjustable for each logic pod

Specifications R&S®HO3508	
Channels	8
Memory depth per channel	1 MPts (R&S®HMO Compact Series)
Input impedance	100 kΩ || <4 pF
Max. input frequency	350 MHz
Max. input voltage	40 V (DC + AC)
Thresholds	TTL, CMOS, ECL, user-defined (-2 V to +8 V)
Measuring category	CAT I
Cable length	approx. 1 m

Frequency Analysis

Due to the outstanding FFT functionality of the R&S®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.
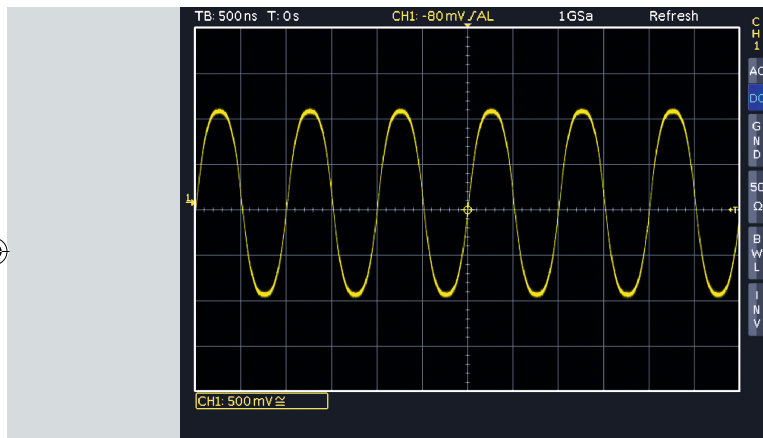

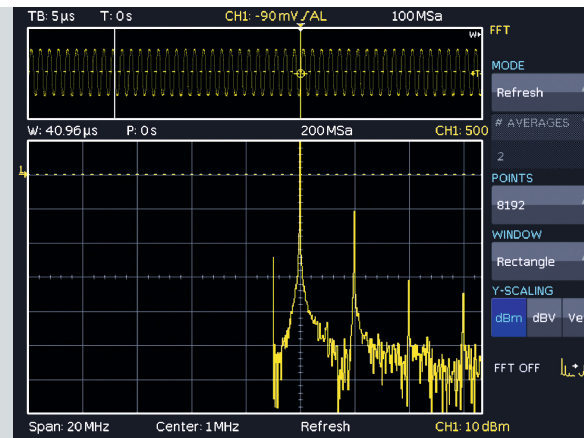Figure 1: A sinusoid signal that at first sight appears undistorted

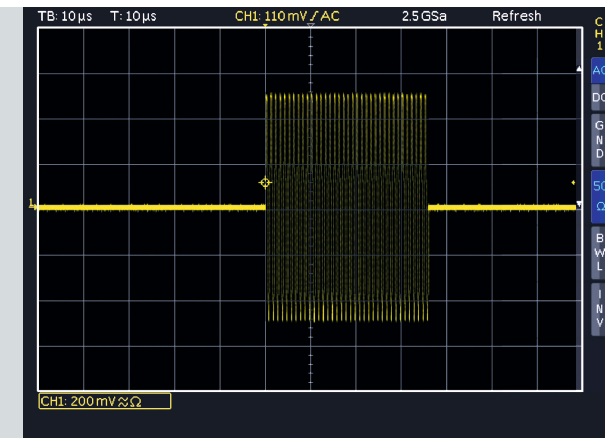Figure 2: The frequency spectrum exposes the signal distortion

Figure 3: Sine burst signal in time domain

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.

R&S®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
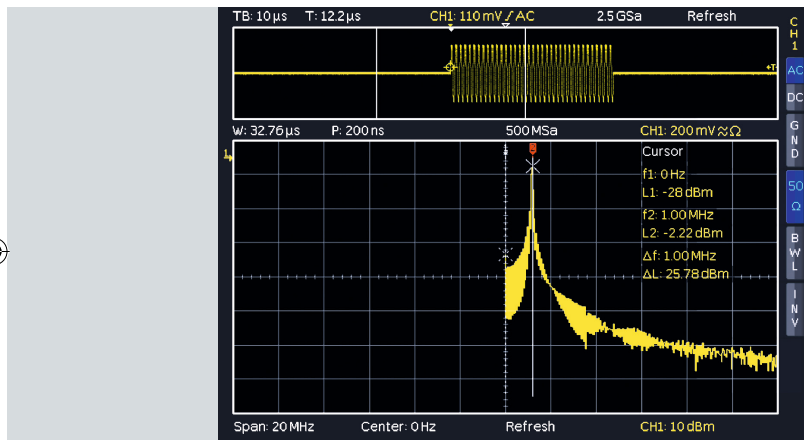
Figure 4: FFT analysis of a sine burst signal with rectangular window function

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).
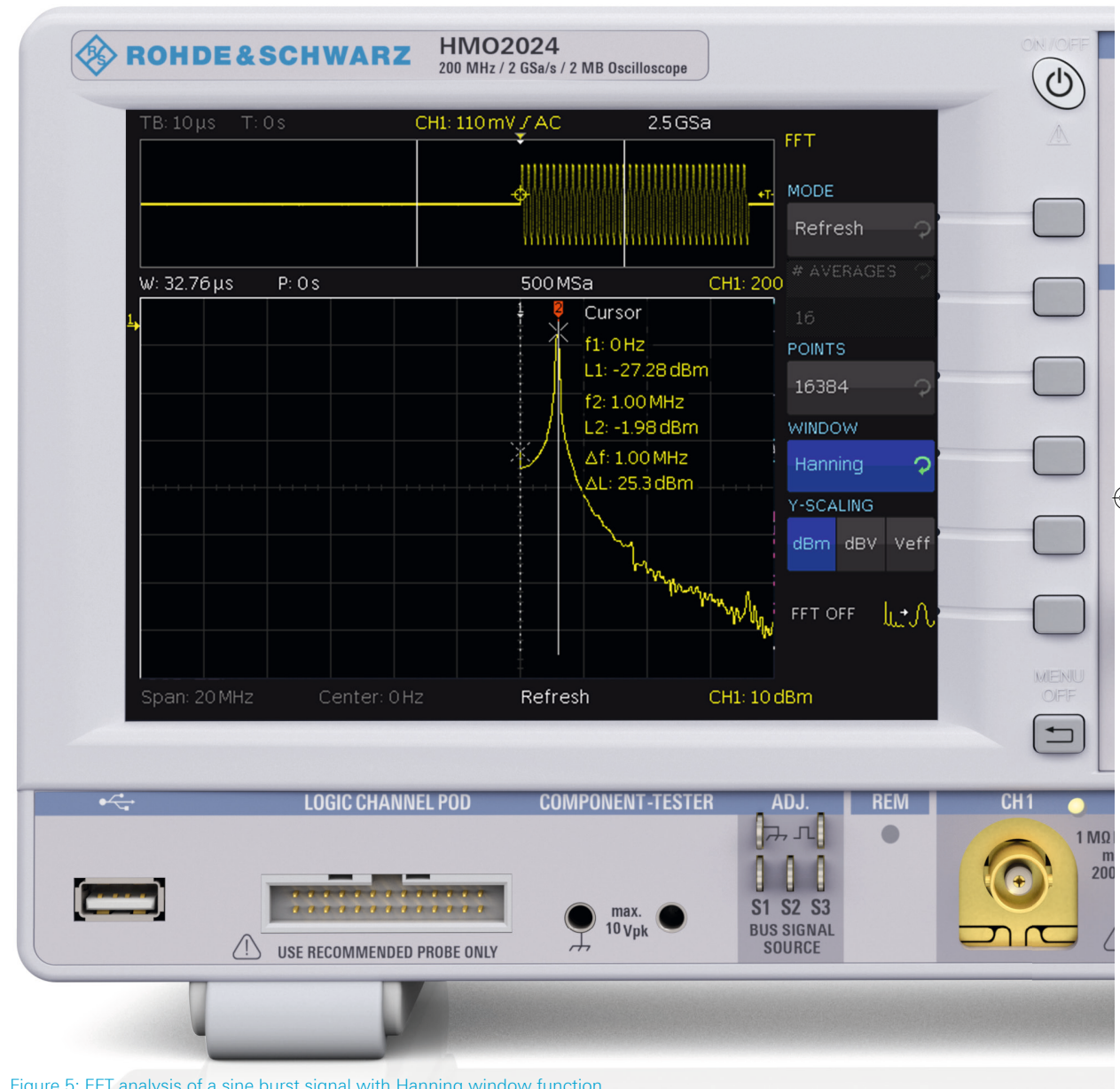

Figure 5: FFT analysis of a sine burst signal with Hanning window function
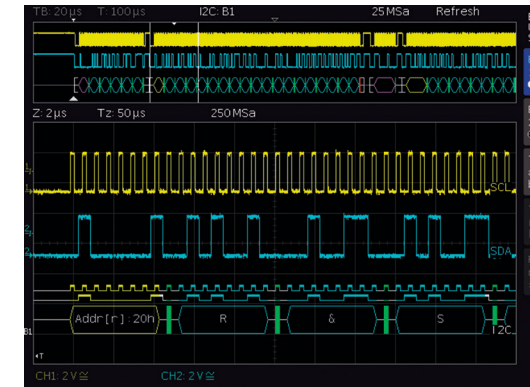
Serial Bus Analysis

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 R&S®HMO Compact Series by Rohde & Schwarz 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:

❙ R&S®HOO10 / R&S®HV110: Analysis of I²C, SPI and UART/RS-232 signals on analog and logic channels
❙ R&S®HOO11 / R&S®HV111: Analysis of I²C, SPI and UART/RS-232 signals on all analog channels
❙ R&S®HOO12 / R&S®HV112: Analysis of CAN and LIN signals on analog and logic channels
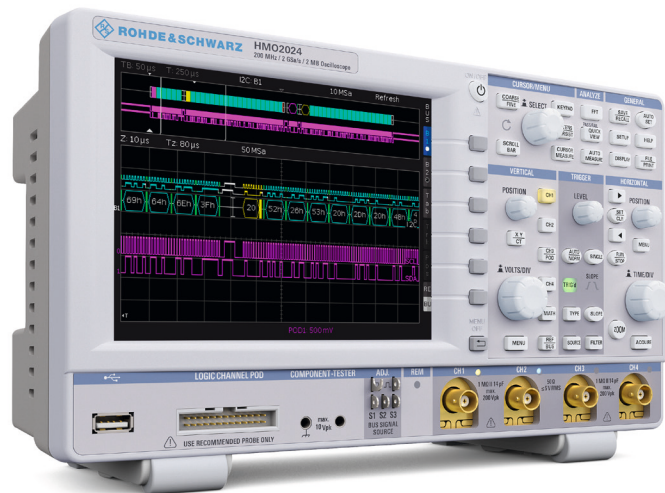
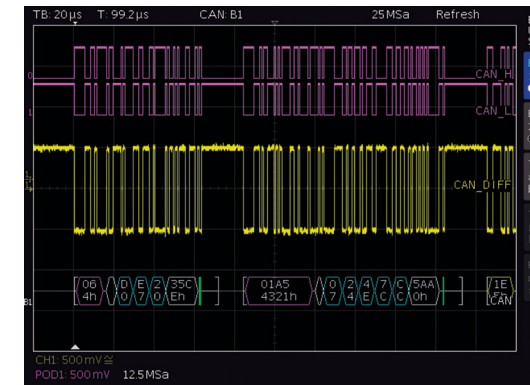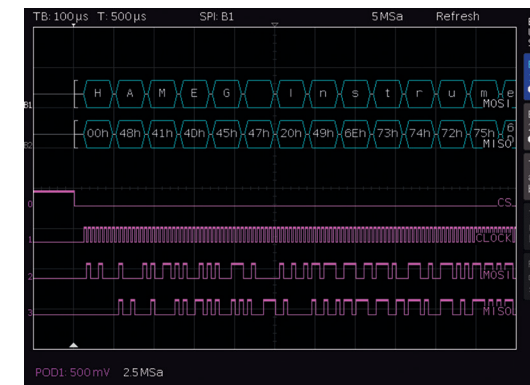**Serial bus trigger types:**
❙ I²C: Start, Stop, ACK, nACK, Address/Data
❙ SPI: Start, End, Serial Pattern (32Bit)
❙ UART/RS-232: Startbit, Frame Start, Symbol, Pattern
❙ LIN: Frame Start, Wake Up, Identifier, Data, Error
❙ CAN: Frame Start, Frame End, Identifier, Data, Error

SPI bus signal, MISO / MOSI decoded

HEX decoded CAN bus signal

I²C bus signal in zoom view

Vouchers and Options

You can easily upgrade all available serial bus analysis options for your R&S®HMO oscilloscope at any point in time. Should your requirements change, then so does the R&S®HMO Compact Series, as all models can be extended to serial bus analysis functionality via software upgrades whenever required. This is done with upgrade vouchers available at your dealer.

The individual voucher number and the serial number of the instrument to be upgraded is entered at http://voucher.rohde-schwarz.com

The customer immediately receives the respective licence key which can be loaded via USB memory drive into the instrument.

Options for all R&S®HMO oscilloscopes

Voucher-Code[1]	Option-Code[2]	Description
R&S®HV110	R&S®HOO10	I^2C, SPI, UART/RS-232 on analog and digital channels
R&S®HV111	R&S®HOO11	I^2C, SPI, UART/RS-232 on all analog channels
R&S®HV112	R&S®HOO12	CAN, LIN on analog and digital channels

1) Available at your dealer at any time
2) Only when purchasing an R&S®HMO oscilloscpe
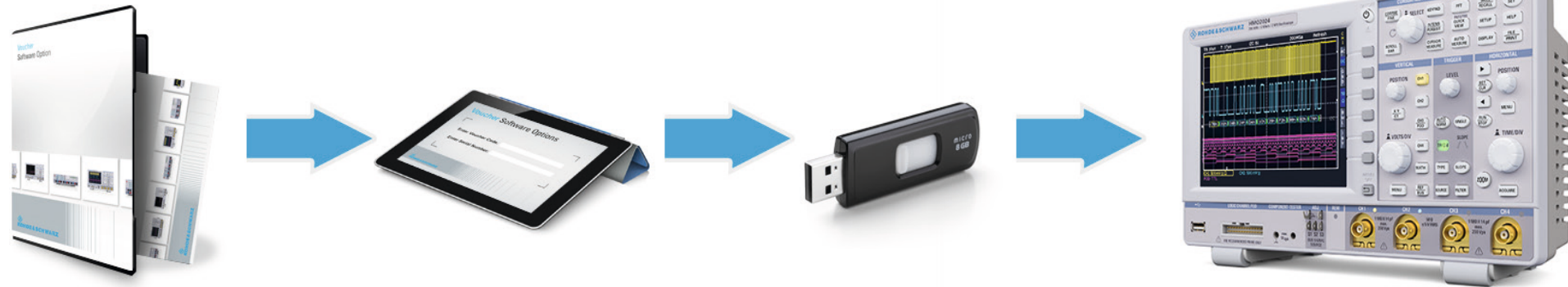
R&S®HMO Compact Series
(4-channel mixed signal oscilloscopes)

R&S®HMO724: 70 MHz
R&S®HMO1024: 100 MHz
R&S®HMO1524: 150 MHz
R&S®HMO2024: 200 MHz

from firmware version 4.527

Display

Screen size / type	16,5 cm (6,5") VGA Color Display
Resolution (L x W)	640 x 480 Pixel
Backlight	400 cd/m² (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
Trace display	pseudo-color, inverse brightness
Levels of trace brightness	32
Button brightness	light, dark

Vertical System

DSO Mode	CH1, CH2, CH3, CH4
MSO Mode	CH1, CH2, CH3|POD, CH4

Analog Channels

Y-bandwidth (-3 dB)	
(1 mV, 2 mV)/Div	20 MHz (R&S®HMO724, R&S®HMO1024) 100 MHz (R&S®HMO1524, R&S®HMO2024)
(5 mV to 10 V)/Div	70 MHz (R&S®HMO724) 100 MHz (R&S®HMO1024) 150 MHz (R&S®HMO1524) 200 MHz (R&S®HMO2024)
Lower AC bandwidth	2 Hz
Bandwidth limitation (switchable)	about 20 MHz
Rise time (computed)	
R&S®HMO724	<5 ns
R&S®HMO1024	<3.5 ns
R&S®HMO1524	<2.4 ns
R&S®HMO2024	<1.75 ns

DC gain accuracy	2% of full scale
Input sensitivity range	
all analog channels	1 mV/Div to 10 V/Div
coarse stepping	13 calibrated steps, 1-2-5 sequence
variable stepping	freely between calibrated steps
Impedance	1 MΩ II 14 pF ±2 pF (50Ω switchable: R&S®HMO1524, R&S®HMO2024)
Coupling	DC, AC, GND
Max. input voltage	
1 MΩ	200 V$_p$ (derates at 20 db/decade to 5 V$_{rms}$ above 100 kHz)
50Ω (R&S®HMO1524, R&S®HMO2024)	5 V$_{rms}$
Position range	±10 Div (from center of screen)
Offset control (R&S®HMO1524, R&S®HMO2024 only)	
1 mV/Div, 2 mV/Div	±0.2 V - 10 Div x sensitivity
5 mV/Div to 50 mV/Div	±1.0 V - 10 Div x sensitivity
100 mV/Div	±2.5 V - 10 Div x sensitivity
200 mV/Div to 2V/Div	±40 V - 10 Div x sensitivity
5 V/Div to 10 V/Div	±100 V - 10 Div x sensitivity
XY/XYZ mode	selectively all analog channels
Inversion	selectively all analog channels

Logic Channels (with logic probe R&S®HO3508)

Thresholds	TTL, CMOS, ECL, user-definied (-2 V to +8 V)
Impedance	100 kΩ || 4 pF
Coupling	DC
Max. input voltage	40 V$_p$

Trigger System

Trigger Mode

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 5mV/Div	1.5 Div
from 5mV/Div	0.8 Div

Trigger level setting	
with auto level	Linking peak value and trigger level, adjustable between peak values of a signal
without auto level	±10 Div (from center of screen)
Trigger coupling	
AC	5 Hz to 100 MHz (HMO724) 5 Hz to 150 MHz (HMO1024) 5 Hz to 200 MHz (HMO1524) 5 Hz to 250 MHz (HMO2024)
DC	DC to 100 MHz (HMO724) DC to 150 MHz (HMO1024) DC to 200 MHz (HMO1524) DC to 250 MHz (HMO2024)
HF	30 kHz to 100 MHz (HMO724) 30 kHz to 150 MHz (HMO1024) 30 kHz to 200 MHz (HMO1524) 30 kHz to 250 MHz (HMO2024)
selectable filters	
LF	DC to 5 kHz, selectable in DC and auto level mode
Low-pass (noise rejection)	min. level: 1.5 Div (> 5 mV/Div) selectable with AC, DC

External Trigger Input (BNC)

Impedance	1 MΩ || 14 pF ±2 pF
Trigger level	0.3 V$_{pp}$ to 10 V$_{pp}$
Max. input voltage	100 V$_p$
Coupling	DC, AC

Trigger Types

Edge

Direction	rising, falling, both
Switchable filters	LF, noise rejection
Sources	all analog and digital channels, AC line, external (AC, DC)

Edge A/B

Direction	rising, falling, both
Frequency range	DC to 70/100/150/200 MHz
Min. signal amplitude	0.8 Div
Trigger level range (seperately adjustable with different sources)	±10 Div (from center of screen)
Trigger settings for state B	
time based	32 ns to 17 s, resolution min. 8 ns
event based	1 to 2^{16} events

Pulse width

Polarity	positive, negative
Functions	equal, not equal, lower, higher, within/without a range
Pulse duration	32ns to 17s, resolution min. 8ns
Sources	all analog channels

Logic

Functions	
boolean operators	AND, OR, TRUE, FALSE
time based operators	equal, not equal, lower, higher, within/without a time range, timeout
Duration	8 ns to 2 s, resolution min. 1 ns
States	H, L, X
Sources	all logic and analog channels

Video

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)

Serial Busses (R&S®HOO10/11/12)

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 / Voucher code	
R&S®HOO10/R&S®HV110	Analysis of I²C, SPI, UART/RS-232 signals on analog and logic channels
R&S®HOO11/R&S®HV111	Analysis of I²C, SPI, UART/RS-232 signals on all analog channels
R&S®HOO12/R&S®HV112	Analysis of CAN and LIN signals on analog and logic channels
Trigger types by protocols	
I²C	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

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
Component tester	voltage (X), current (Y)
Reference signals	up to 4 references
Channel deskew	-15 ns to +16 ns, step size 1 ns
Memory Zoom	up to 50.000:1
Time base	
Accuracy	50.0×10^{-6}
Aging	10.0×10^{-6} per year
Operation Modes	
REFRESH	2 ns/Div to 50 s/Div
ROLL	50 ms/Div to 50 s/Div

Acquisition System

Realtime Sampling Rate

Analog channels	4 x 1 GSa/s or 2 x 2 GSa/s
Logic channels	8 x 1 GSa/s
Memory depth	4 x 1 MPts or 2 x 2 MPts
Resolution	8 Bit, (HiRes up to 10Bit)
Waveform arithmetics	refresh, roll (loose/triggered), average (up to 1024), envelope, peak detect (1 ns), filter (low-pass, adjustable), high resolution (up to 10 Bit)
Record modes	automatic, max. sampling rate, max. waveform rate

Interpolation

all analog channels	sin(x)/x, linear, sample-hold
logic channels	pulse

Delay

pre-trigger	0 to 8×10^6 Sa x (1/sample rate)
post-trigger	0 to 2×10^6 Sa x (1/sample rate)
Waveform update rate	up to 2,000 Wfm/s
Waveform display	dots, vectors, persistence afterglow
Persistence afterglow	min. 50 ms

Waveform measurements and Operation

Operation	menu-driven (multilingual), auto-set, help functions (multilingual)
Automatic measurements	voltage (V_{pp}, V_{p+}, V_{p-}, V_{rms}, V_{avg}, V_{min}, V_{max}), amplitude, phase, frequency, period, rise/fall time (80%, 90%), pulse width (pos/neg), 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_{pp}, V_{p+}, V_{p-}), mean/RMS/standard deviation, duty cycle (pos/neg), rise/fall time (80%, 90%), ratio marker
Quick measurements (QUICKVIEW)	voltage (V_{pp}, V_{p+}, V_{p-}, V_{rms}, V_{mean}), rise/fall time, frequency, period plus 6 additional measurement functions (see automatic measurement functions, freely selectable)
Marker	up to 8 freely positionable markers for easy navigation, automatic marker positioning based on search specification
Frequency counter (hardware based)	
Resolution	6 digit
Frequency range	0.5 Hz to 70/100/150/200 MHz
Accuracy	50.0×10^{-6}
Aging	$\pm10.0 \times 10^{-6}$ per year

Mask Testing

Functions	Pass/Fail comparison with an user-definied 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 acquisiton	Statistics: number of completed tests (max. 4x10^9 events), number of passes / failed acquisitions (absolute and in percent), test duration

Waveform maths

Quickmath

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

Mathematics

Functions	addition, substraction, 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, 64 Kpts
Window	Hanning, Hamming, Rectangular, Blackman
Scale	dBm, dBV, V_{rms}
Waveform arithmetics	refresh, envelope, average (up to 512)
Cursor measurement	2 horizontal cursors, previous/next peak search
Sources	all analog channels

Pattern Generator

Functions	square wave / probe adjust, bus signal source, counter, pseudo-random pattern
Square wave (Probe ADJ output)	frequencies: 1 kHz, 1 MHz level: 1 V_{pp} (t_a <4 ns)
Bus Signal Source (4 Bit)	I²C (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 (4 Bit)	frequencies: 1 kHz, 1 MHz direction: decrementing
Random pattern (4 Bit)	frequencies: 1 kHz, 1 MHz

Component Tester

Parameters	voltage (X), current (Y)
Testing frequency	50 Hz, 200 Hz
Voltage	10 V_p (open)
Current	10 mA (short)
Reference potential	Ground (PE)

Interfaces

Connectors and ports	
for mass storage (FAT16/32)	2 x USB-Host (Typ A), max. 500 mA
for remote control	HO720 dual interface: USB Device (Typ B), RS-232
Optional interfaces	HO730 dual interface: USB Device (Typ B), Ethernet (RJ45) HO740 interface: IEEE-488 (GPIB)
External monitor interface	DVI-D (480p, 60Hz) HDMI compatible
Y-OUT (BNC)	Trigger event on mask violation: pulse: > 0.5 µs

General Data

Application memory	4 MB for references, formulas, device settings, language and help functions
Save/Recall	
device settings	on internal file system or external USB memory, available file format: HDS
reference waveforms	on internal file system or external USB memory, available file formats: BIN, CSV, TXT, HRT
traces	on external USB memory, available file formats: BIN, 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 (color, inverted, grey-scale)
Math equation sets	on internal file system or external USB memory
Realtime Clock (RTC)	date and time
Power supply	
AC supply	100 V to 240 V, 50 Hz to 60 Hz, CAT-II
Power consumption	
2-channel models	max. 45W
4-channel models	max. 55W

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 (W x H x D)	285 x 175 x 140 mm
Net weight	2.5 kg

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

Accessories included:
HO720 RS-232/USB dual interface, line cord, printed operating manual, software-CD, 4 probes (model depending): RT-ZP03 (up to 100 MHz, 10:1/1:1 switchable) or HZO10 (up to 250 MHz, 10:1)

Options and Vouchers

| Description	Optionen-Code	Voucher-Code
I2C, SPI, UART/RS-232 on analog and digital channels	R&S®HOO10	R&S®HV110
I2C, SPI, UART/RS-232 on all analog channels	R&S®HOO11	R&S®HV111
CAN und LIN on analog and digital channels	R&S®HOO12	R&S®HV112

Service options

|		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty with Calibration Coverage, one year	R&S®CW1	
Extended Warranty with Calibration Coverage, two years	R&S®CW2	

Recommended Accessories

R&S®HO732
Ethernet/USB-device dual-
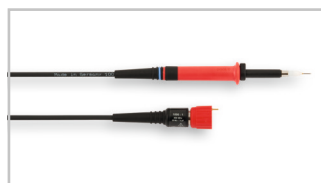interface card
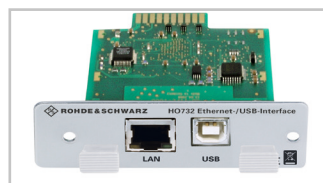
R&S®HO740
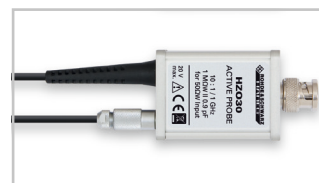IEEE-488 (GPIB) interface
card, galvanically isolated
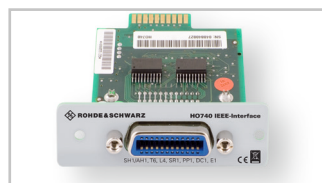
HZO20
High voltage probe 1000:1
(400 MHz, 1000 V$_{rms}$)
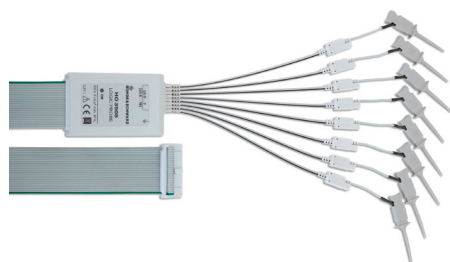

HZO30
1 GHz active probe
(0.9 pF, 1 MΩ)

HZ100
Differential Probe
20:1 / 200:1

R&S®HO3508
8 channel logic probe

HZO40
Active differential probe 200 MHz
(10:1, 3.5 pF, 1 MΩ)

HZO50 / HZO51
AC/DC current probes 30 A, DC to 100 kHz /
100/1000 A, DC to 20 kHz

R&S®RT-ZP03
Passive probe 1:1 (10MHz), 10:1 (300MHz)

R&S®RT-ZH10
Passive probe, 400 MHz, high-voltage, 100:1,
50 MΩ, 7.5 pF, 1 kV (RMS)
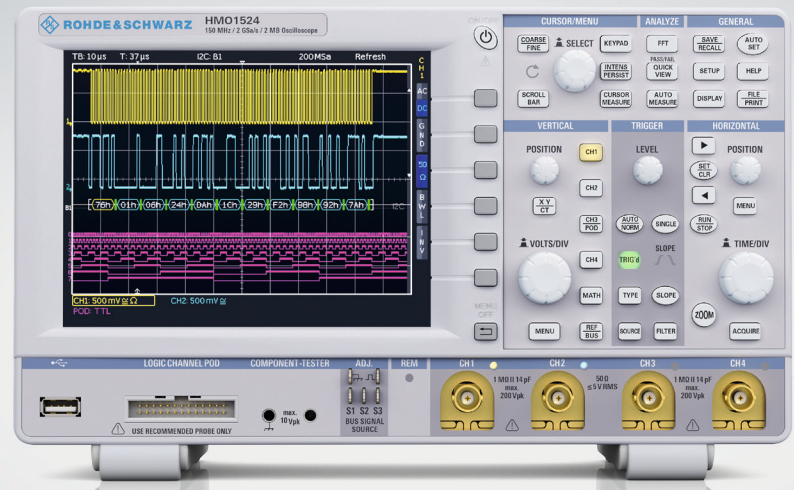

HZO90
Carrying case for
protection and transport

HZO91
4 RU 19" rackmount kit
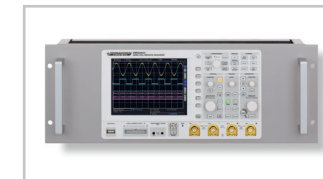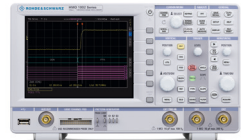
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