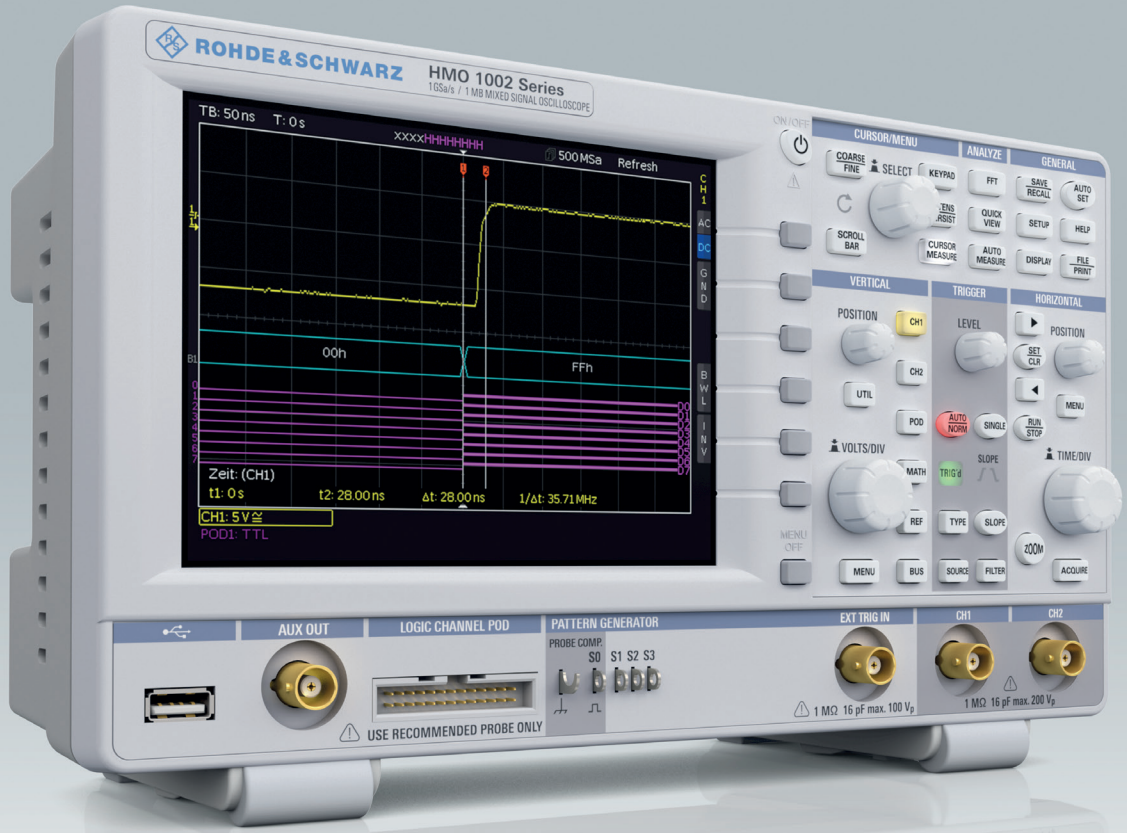
R&S®HMO1002

Digital Oscilloscope
50/70/100 MHz Bandwidth



ROHDE&SCHWARZ

Test & Measurement

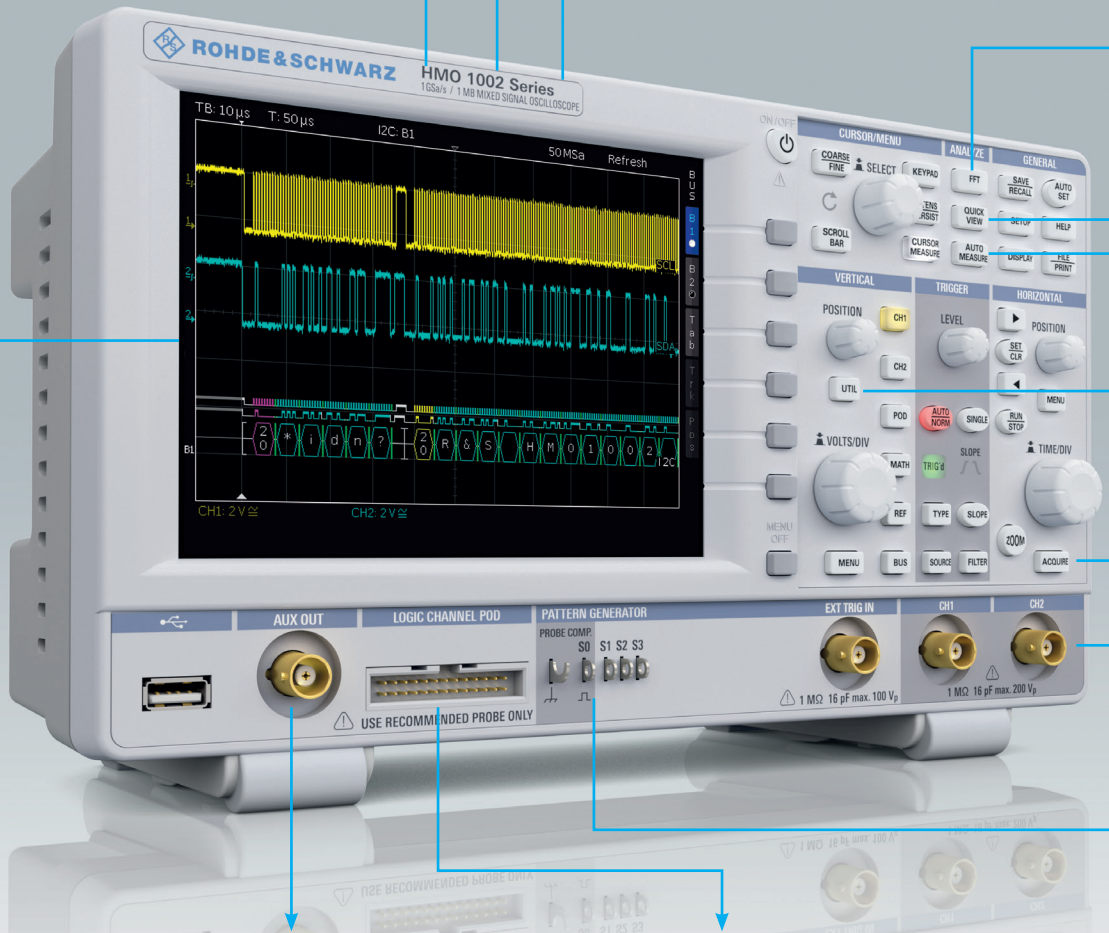
Product Brochure | 01.00

Bandwidth
50 MHz, 70 MHz
or 100 MHz

Sampling Rate
1 Gsample,
512 Msample per channel

Memory Depth
1 Msample,
512 Ksample per channel

FFT
The easy way to analyze
the signal spectrum



QuickView
Key results
at the push of a button

Auto Measurement
Versatile measurement
functions and fast results

Voltmeter
Voltmeter measurements
on both analog channel
simultaneously

Acquire
High acquisition rate
to identify signal faults

Channels
High vertical sensitivity
down to 1 mV/div

Serial Bus Analysis
Hardware-based triggering
and decoding

Function Generator
Common waveforms up to 50 kHz

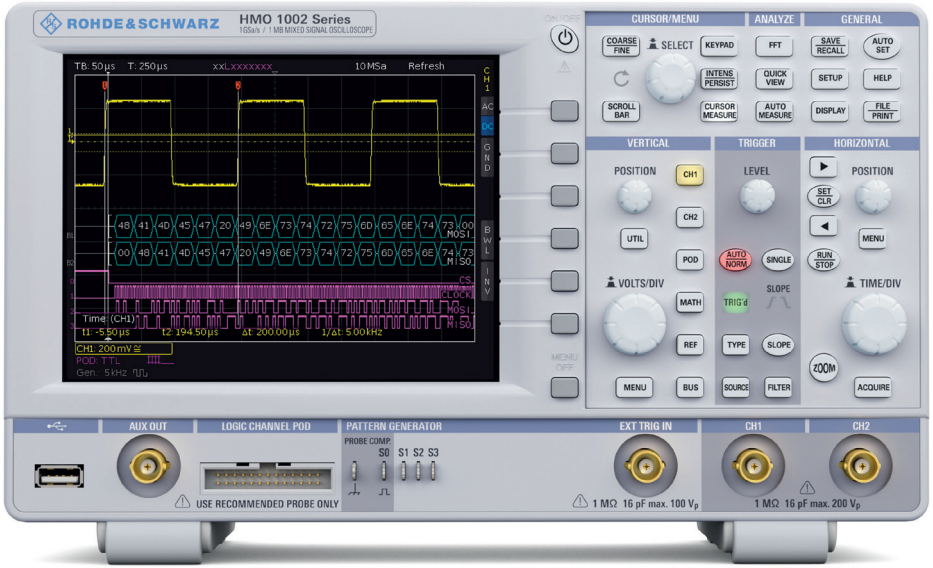
MSO
Mixed signal function as standard

Pattern Generator
4 bit wide patterns with up to
2 KBit length and 50 Mbit/s

USB | TCP/IP | 6.5" VGA 16.5 cm | Lab-VIEW | Software | Printed Manual

At a glance

High sensitivity, multifunctionality and a great price – that is what makes the R&S®HMO1002 digital oscilloscope so special. From embedded developers to service technicians to educators – with its wide range of functions, the R&S®HMO1002 addresses a broad group of users. Advanced, powerful technology in a fanless design meets the high requirements of today's customers. The R&S®HMO1002 digital oscilloscope includes a wide range of upgrade options, providing true investment protection for the future.



The R&S®HMO1002 digital oscilloscope from the Rohde & Schwarz Value Instruments product range features a high waveform update rate and high vertical sensitivity, and is available with bandwidths of 50 MHz, 70 MHz and 100 MHz. The fanless instrument offers a sampling rate of 1 Gsample/s and a memory depth of 1 Msample.

Like all R&S®HMO oscilloscopes, the R&S®HMO1002 includes the mixed signal function as standard. The separately available R&S®HO3508 logic probe is not coupled to a specific instrument and can be used with all R&S®HMO oscilloscopes.

For communications between embedded systems and the environment, the R&S®HMO1002 includes hardware-based signal triggering and decoding for all common protocols (I^2C, SPI, UART, CAN and LIN). This option can be activated with an upgrade voucher at any time.

The integrated pattern generator for generating protocol messages at up to 50 Mbit/s is ideal for embedded users. In addition to using predefined messages, developers can program their own signal patterns for supported serial protocols. The integrated three-digit digital voltmeter enables service technicians to simultaneously perform voltage measurements on both analog channels with two values each.

The function generator that generates different types of signals with frequencies up to 50 kHz is useful in educational settings. Trainees and students can use the R&S®HMO1002 to learn basic measurement tasks. In education mode, the convenience functions can be switched off.

Thanks to 128K test points and analysis functions in the frequency domain, the R&S®HMO1002 keeps pace with significantly larger oscilloscopes. The time domain signal, measurement window, FFT analysis range and measurement result are displayed on a single screen, which makes it easier to measure the spectra.

The R&S®HMO1002 offers time domain, logic, protocol and frequency analysis in a single instrument and is a member of the Rohde & Schwarz family of scope-of-the-art oscilloscopes.

Key facts

Superior hardware-based acquisition for precise measurement results

- 1 Gsample/s sampling rate, 1 Msample 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
- 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 flash drive
- Simultaneous decoding of two buses in realtime

The right waveform for each application

- The right signal at hand: pattern generator up to 50 Mbit/s and function generator up to 50 kHz
- Pattern generator with standard bus signals, arb editor and counter
- Function generator with all common waveforms

Voltmeter measurements using an oscilloscope

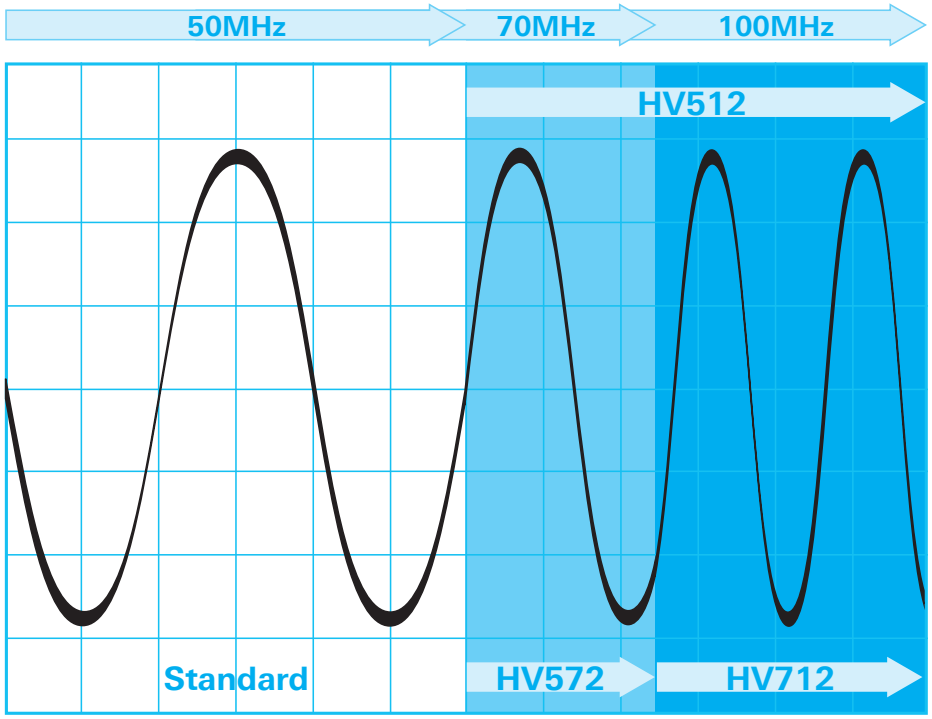
- Three-digit display for precise voltage measurements
- Simultaneous measurement of primary and secondary voltage value per channel

Future-ready investment and scalability

- Free firmware updates
- Bandwidth upgrades as required
- Serial bus analysis options via software licenses

Application	How the R&S®HMO1002 meets your needs
Engineering lab	▪ Digital pattern generator with standard bus signals and arb editor ▪ Automeasurement function for 28 different parameters ▪ Powerful zoom function ▪ Fanless design
Analog circuit design	▪ Sensitivity down to 1 mV/div ▪ Simultaneous voltmeter measurements on both analog channels ▪ Component tester ▪ FFT with 128 kpoints
Embedded Debugging	▪ Mixed signal function with 8 logic channels ▪ Hardware-accelerated triggering and decoding of serial buses ▪ Pass/fail tests based on user-defined masks with error signal output ▪ 5-digit hardware counter
Education	▪ Function generator with all common waveforms ▪ Education mode

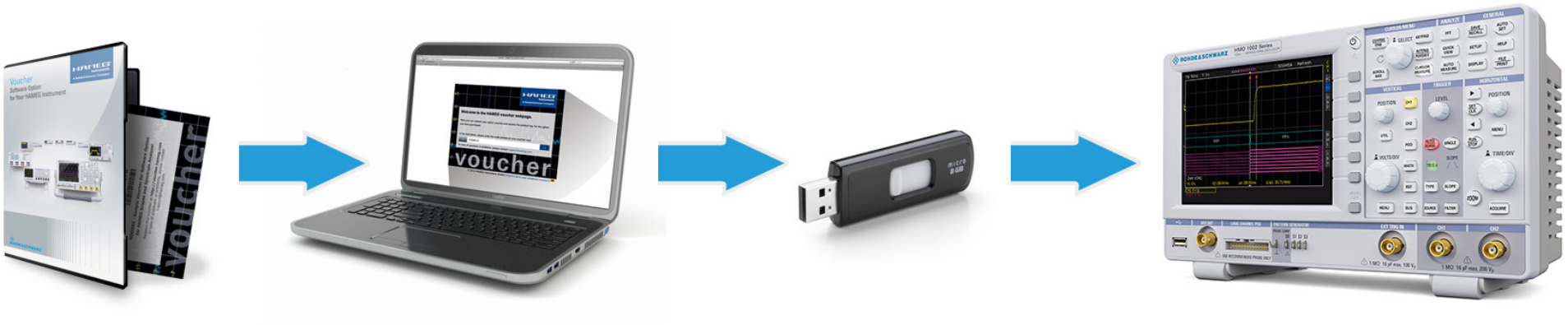
50 MHz, 70 MHz or 100 MHz



Depending on your requirements, the standard R&S®HMO1002 bandwidth can be upgraded from 50 MHz to 70 MHz or 100 MHz. This is done with upgrade vouchers which can be purchased at the dealer either together with the instrument or anytime thereafter.

- The upgrade voucher HV572 allows the basic 50 MHz instrument to be upgraded to a bandwidth of 70 MHz.
- Voucher HV512 increases the bandwidth from 50 MHz to 100 MHz.
- If an instrument has initially been upgraded to 70 MHz, the voucher HV712 enables you to upgrade it at any time to 100 MHz.

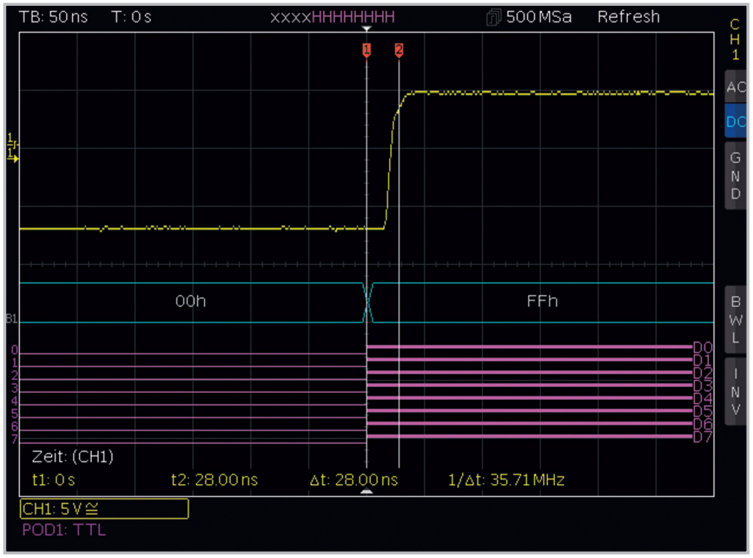
Voucher for bandwidth upgrades or serial bus analysis options are available at the dealer. The individual voucher number and the serial number of the instrument to be upgraded is entered at . The customer immediately receives the respective licence key. By loading this key via USB interface on the instrument, a 50 MHz oscilloscope is upgraded to a bandwidth of 70 MHz or 100 MHz in no time.



Always a MSO

Although it is unusual for this instrument class, the standard R&S®HMO1002 model is equipped with a mixed signal functionality with no software option necessary to unlock it. Analog and digital signals can be measured and analyzed simultaneously. A real life example is the integration of ADCs (analog digital converter) or DACs (digital analog converter). In this case, the mixed signal technology allows users to determine latency periods by means of a 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 instrument. It can be used with all R&S®HMO oscilloscopes.



8 bit DAC signal change

Optional: Logic probe R&S®HO3508

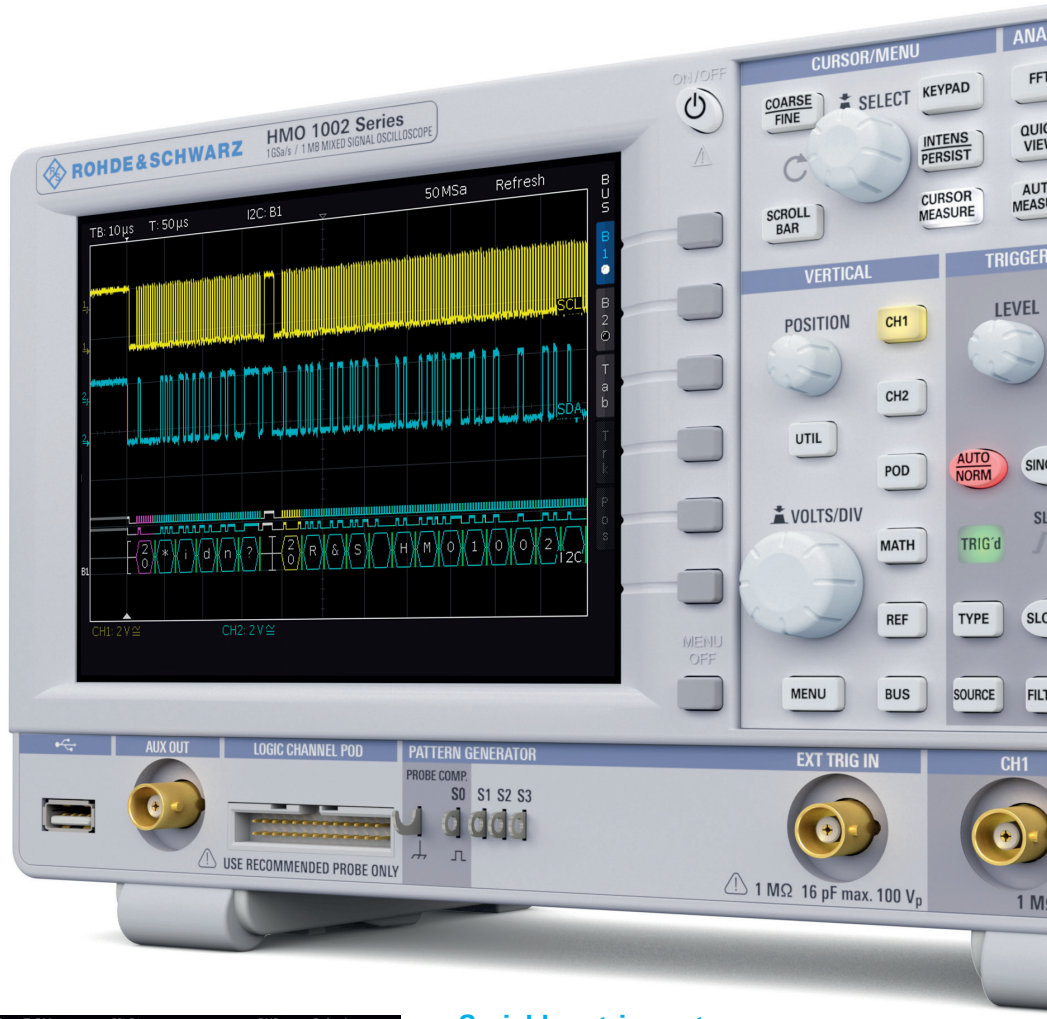
- **Logic probe R&S®HO3508 fits to all R&S®HMO series oscilloscopes**
- No hardware lock to a specific device
- 8 logic channels available on each logic probe
- Signal threshold adjustable for each logic pod

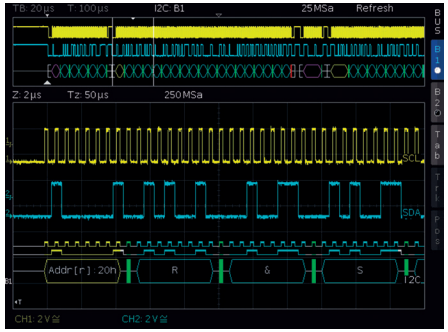
Specifications	
Channels	8
Memory depth per channel	512 Ksample. (HMO1002)
Input impedance	100 kΩ || <4 pF
Max. input frequency	350 MHz
Max. input voltage	40 V (DC + peak AC)
Measuring category	CAT I
Cable length	approx. 1 m

Serial Bus Analysis

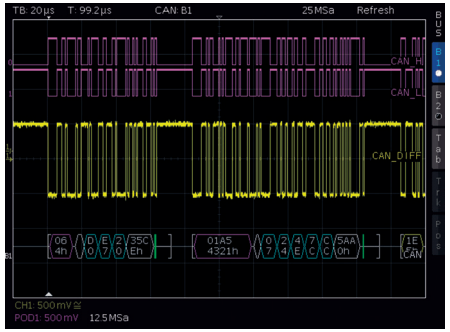
I²C, SPI, CAN or LIN – in terms of interaction with the outside world for embedded systems, it is safe to say that these are the most commonly used communication protocols. The R&S®HMO1002 oscilloscopes offer you hardware-accelerated signal triggering and decoding for all of these protocols. You can upgrade your instrument via software licence keys with those functions required to develop your application:

- HV110: Analysis of I²C, SPI and UART/RS-232 signals on analog and logic channels
- HV111: Analysis of I²C and UART/RS-232 signals on all analog channels
- HV112: Analysis of CAN and LIN signals on analog and logic channels

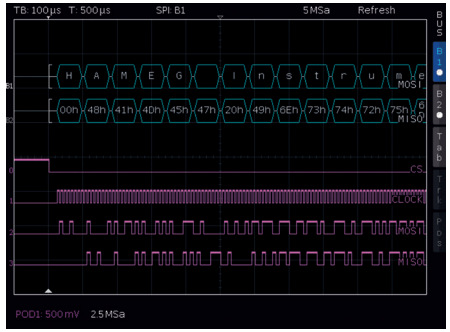




SPI bus signal, MISO / MOSI decoded



HEX decoded CAN bus signal



I²C bus signal in zoom view

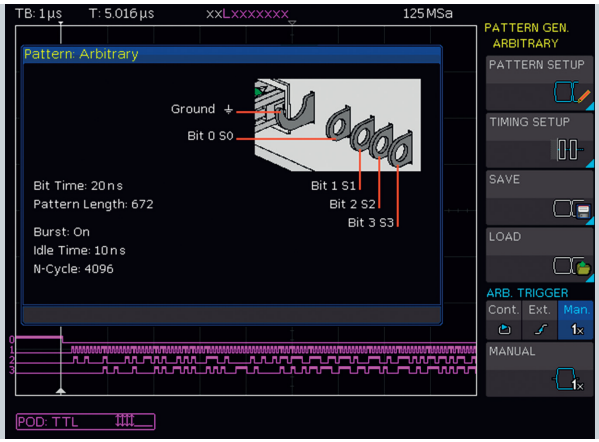
Serial bus trigger types:

- 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

Functions for everyday use

Pattern Generator

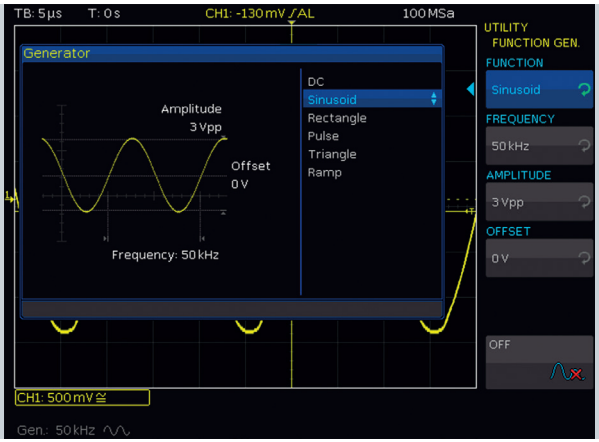
Are you working on a distributed project, the interface definition has been completed but the prototype hardware has yet to be implemented? The R&S®HMO1002 pattern generator includes a tool for freely programmable 4-bit wide bus signals which allows you to emulate a sensor signal, for instance, to continue your work.



- Generate protocol telegrams at speeds of up to 50 Mbit/s
- Use predefined signal patterns: I²C, SPI, UART, CAN, LIN
- Create your own patterns tailored to your needs
- Use the pattern generator as counter: a clock for your circuit with up to 25 MHz

Function Generator

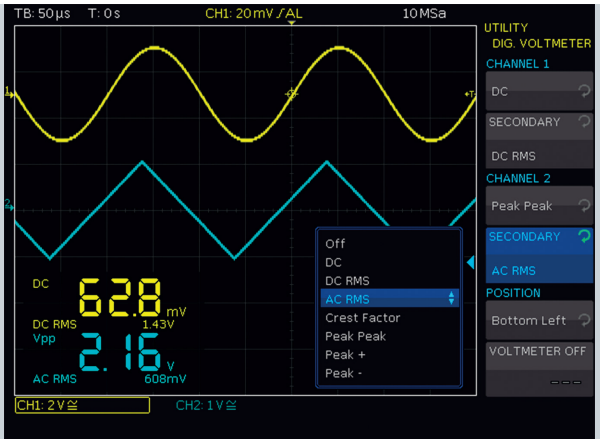
Select the signal type suitable for your scope of application. The various basic types with frequencies of up to 50 kHz not only assist trainees and students with their measuring tasks, they also support technicians in the audio field with their assessments of filters and passes.



- The function generator offers all common basic waveforms up to 50 kHz
- Available waveforms: Sine, square wave, pulse, triangle and ramp
- In tandem with the education mode which allows you to deactivate the automatic measuring functions for instruction and demonstration purposes, this will get you a powerful all-in-one instrument

Digital Voltmeter (DVM)

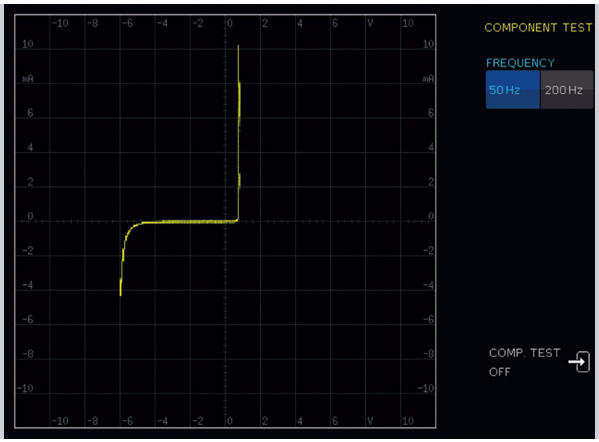
The three-digit digital voltmeter is also a standard feature which makes the work of service technicians in particular easier. Voltage measurements can be performed simultaneously for both analog channels. Integrated into a single compact device it allows you to keep your workplace tidy.



- Perform measurements simultaneously on both analog channels, with two freely definable parameters each
- These options are available: DC, DC_{rms}, AC_{rms}, Crest Factor, V_{pp}, V_{p+}, V_{p-}
- You decide about the position of the values on the screen

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, or rather individual values, you will be able to tell at a glance if your error analysis is on track.



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 128 Kpoints. 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.

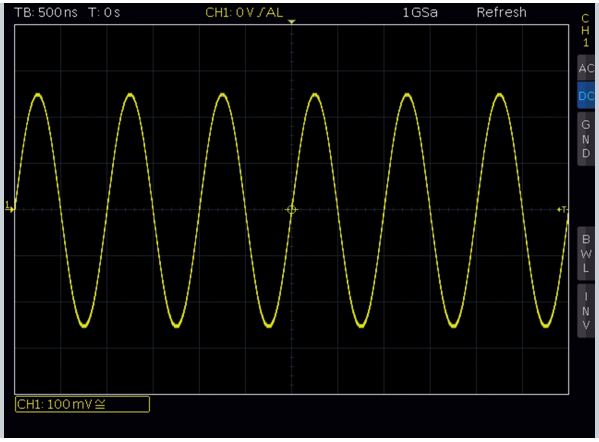


Figure 1: A sinusoid signal that appears undistorted at first sight

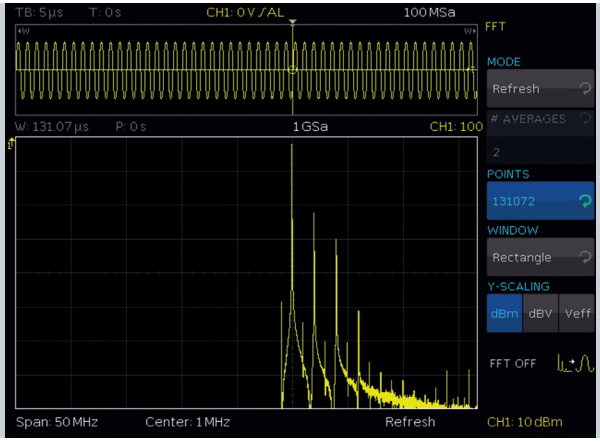


Figure 2: The frequency spectrum exposes the signal distortion

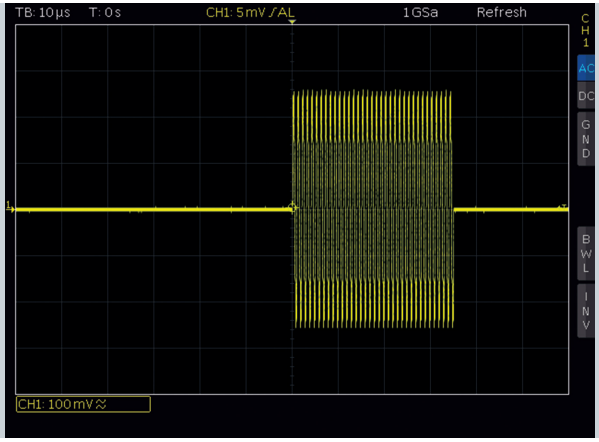


Figure 3: Sine burst signal in time domain

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

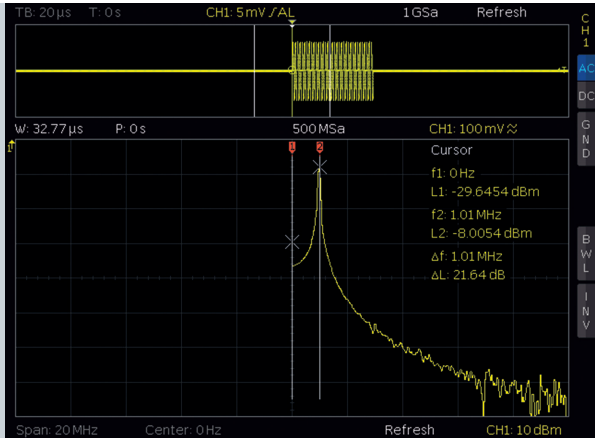


Figure 4: Rectangular measurement window

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).

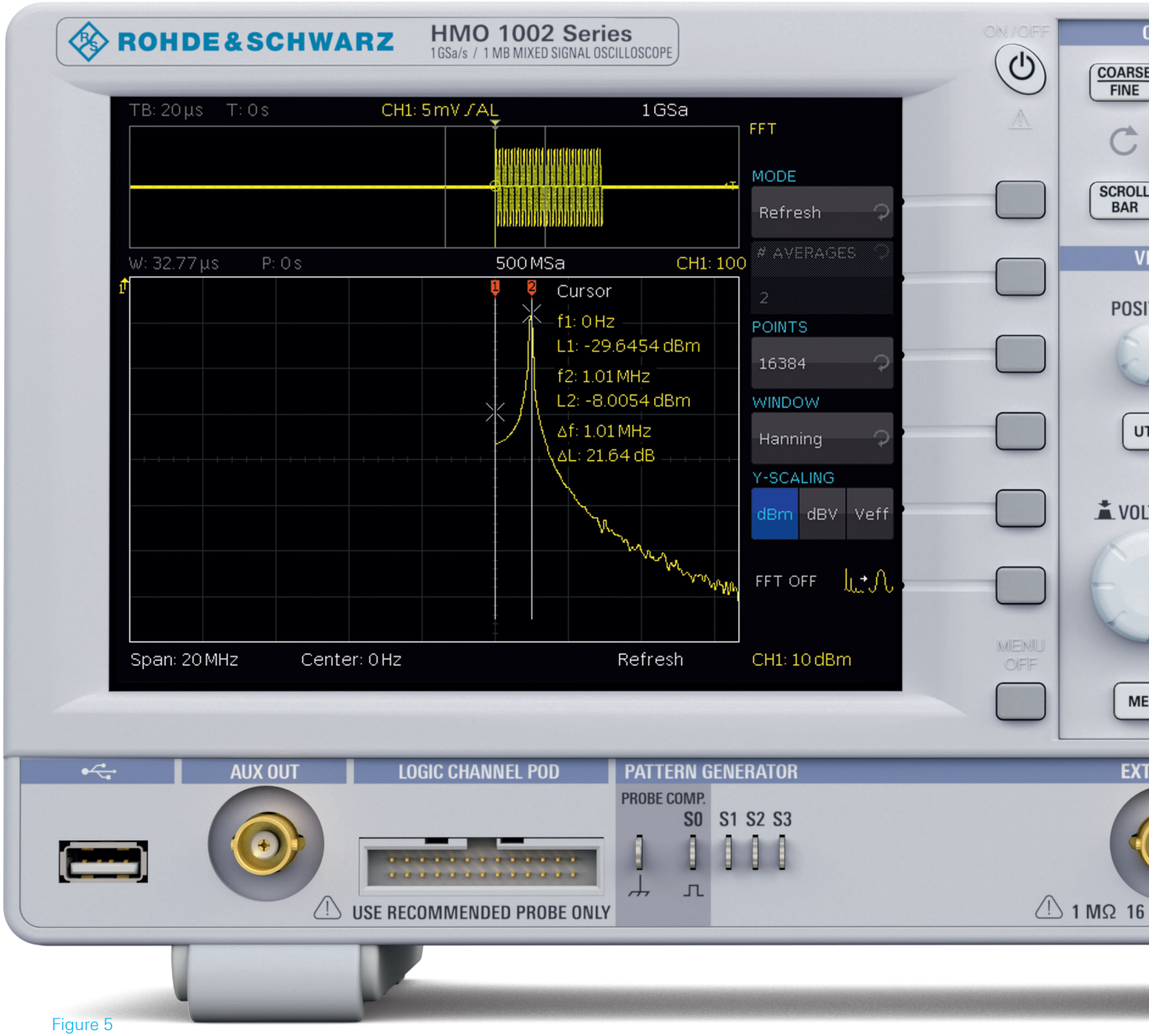


Figure 5

R&S®HMO1002
50/70/100MHz 2-channel mixed signal oscilloscopes

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

Display	
Display:	16,5 cm (6,5") VGA Color Display
Resolution:	640 (H) x 480 (V) 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
Levels of trace brightness:	32
Trace display:	pseudo-color, inverse brightnes
Vertical System	
DSO Mode:	CH1, CH2
MSO Mode:	CH1, POD (with Logic Probe HO3508)
Analog channels	
Y-bandwidth (-3dB)	
(1 mV, 2 mV)/Div:	50 MHz
(5 mV to 10 V)/Div:	50 MHz (basic unit) 70 MHz (with HOO572/HV572 option) 100 MHz (with HOO512/HV512 or HOO712/HV712 option)
Lower AC bandwidth:	2 Hz
Bandwidth limitation (switchable):	about 20 MHz
Rise time (calculated, 10%-90%)	
50 MHz (basic unit):	<7 ns
basic unit with 70 MHz option:	<5 ns
basic unit with 100 MHz option:	<3.5 ns
DC gain accuracy (all ranges):	3% 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 16 pF ±2 pF
Coupling:	DC, AC, GND
Max. input voltage:	200 V_p (derates at 20 db/decade to 5 V above 100 kHz)
Position range:	±5 Div (from center of screen)
Channel isolation:	35 dB from DC to specified bandwidth (same V/Div range)
XY mode:	CH1, CH2
Inversion:	selectively all analog channels
Logic channels (with logic probe HO3508)	
Thresholds:	TTL, CMOS, ECL, user-definied (-2 V to +8 V)
Impedance:	100 kΩ || 4 pF
Coupling:	DC
Max. input voltage:	40 Vp
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:	adjustable between peak values of a signal
without auto level:	±5 Div (from center of screen)
external	±5.0 V
Trigger coupling	
AC:	<5 mV/Div: 10 Hz to 65 MHz >5 mV/Div: 10 Hz to 65/90/130 MHz
DC:	<5 mV/Div: DC to 65 MHz >5 mV/Div: DC to 65/90/130 MHz
HF:	<5 mV/Div: 30 kHz to 65 MHz >5 mV/Div: 30 kHz to 65/90/130 MHz
selectable filters	
LF (low pass):	DC to 5 kHz (-3db), selectable in DC and auto level mode
Noise rejection:	min. level: 1.5 Div (> 5 mV/Div) selectable with AC, DC and HF coupling
Trigger hold-off:	auto, 50 ns to 10 s
External trigger input (BNC)	
Impedance:	1 MΩ || 16 pF ±2 pF
Trigger level:	0.3 V_{pp} to 10 V_{pp}
Max. input voltage:	100 V_p
Coupling:	DC, AC
Trigger output	via AUX OUT (BNC)
Functions:	Pulse output for every acquisition trigger event, error output on mask violation
Output level:	3 V
Pulse polarity:	positive
Pulse width:	>150 ns (trigger event), >0.5 µs (mask violation)
Trigger types	
Edge	
Direction	rising, falling, both
Trigger coupling	auto level AC, DC, HF
Switchable filters	LF, noise rejection
Sources	all analog and digital channels, AC line, external (AC, DC)
Pulse width	
Polarity	positive, negative
Functions	equal, not equal, lower, higher, within/ without a range
Pulse duration	16ns to 10s, resolution min. 2ns
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:	16 ns to 10 s, resolution min. 2 ns
States:	H, L, X
Sources:	all logic 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	
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^2C, SPI, UART/RS-232 signals on analog and logic channels
HOO11:	Analysis of I^2C, 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^2C:	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	
Display	
Time domain (Yt):	main screen, time domain and zoom window
Frequency domain (FFT):	time domain and frequency domain window (FFT)
XY mode:	voltage (XY)
VirtualScreen:	virtual display of ±10 Div for all math, logic, bus, reference signals
Component tester:	voltage (X), current (Y)
Reference signals:	up to 4 references
Channel deskew:	±32 ns, step size 2 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:	2 x 500 MSa/s or 1 x 1 GSa/s
Logic channels:	8 x 500 MSa/s
Memory depth:	2 x 500 kPts or 1 x 1 MPts
Resolution:	8 Bit, (HiRes up to 16Bit)
Waveform arithmetics:	refresh, roll (loose/triggered), average (up to 1024), envelope, peak detect (2 ns), filter (low-pass, adjustable), high resolution (up to 16 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 500.000 Sa x (1/sample rate), multiplied by 2 in interlaced mode
post-trigger:	0 to 8×10^6 Sa x (1/sample rate)
Waveform update rate:	up to 10,000 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), burst width, duty cycle (pos/neg), standard deviation, delay, crest factor, overshoot (pos/neg), edge/pulse count (pos/neg), trigger period, trigger frequency
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, crest factor
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
Frequency counter (hardware based)	
Resolution:	5 digit
Frequency range:	0.5 Hz to 100 MHz
Accuracy:	50.0×10^{-6}
Aging:	$\pm 10.0 \times 10^{-6}$ 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, number of passes / failed acquisitions (absolute and in percent), test duration
Waveform maths	
Quickmath	
Functions.	addition, substraction, multiplication, division
Sources:	CH1, CH2
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, 128 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, programmable pattern
Square wave (Probe ADJ output):	frequency range: 1mHz to 500kHz level: 2.5V_{pp} (ta < 4ns) polarity: normal, invert duty cycle: 1% to 99%
Bus Signal Source (4 Bit):	I^2C (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), CAN (up to 50 MBits/s), LIN (up to 50 MBits/s)
Counter (4 Bit):	frequency: 1 mHz to 25 MHz direction: incrementing, decrementing
Programmable pattern (4 Bit):	sampling time: 20 ns to 42 s memory depth: 2048 sa pattern idle time: 20 ns to 42 s
Function Generator	
Waveform modes:	DC, sine, square, triangle/ramp, pulse
Sine:	frequency range: 0.1 Hz to 50 kHz flatness: ±0.5 dB relative to 1kHz
Square:	frequency range: 0.1 Hz to 50 kHz rise time: <4 µs
Triangle/ramp:	frequency range: 0,1 Hz bis 10 kHz
Pulse:	frequency range: 0.1 Hz to 10 kHz duty cycle: 10% to 90%
Sampling rate:	978 kSa/s
Frequency accuracy:	50.0 x 10^{-6}
Aging:	±10.0 x 10^{-6} per year
Amplitude	
high impedance load:	60 mV_{pp} to 6 V_{pp}
50 Ω load:	30 mV_{pp} to 3 V_{pp}
Accuracy:	3%
DC offset:	±3 V

Digital Voltmeter	
Display (3-digit):	Primary and secondary measurement value per channel, simultaneous measuring on all channels
Functions:	DC, DC_{rms}, AC_{rms}, V_{pp}, V_{p+}, V_{p-}, crest factor
Sources	all analog channels
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	
for mass storage (FAT16/32):	1 x USB-Host (Typ A), max. 500 mA
for remote control:	Ethernet (RJ45), USB Device (Typ B)
General Data	
Application memory:	3 MB for references and device settings
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
data:	display or acquisition data
sources:	single or all analog channels
screenshots:	on external USB memory, available file formats: BMP, GIF, PNG
Realtime Clock (RTC):	date and time
Power supply:	
AC supply:	100 V to 240 V, 50 Hz to 60 Hz, CAT-II
Power consumption:	max. 25 W

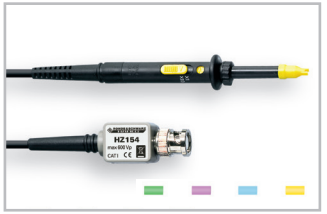
Safety:	in line with IEC 61010-1 (ed. 3), IEC 61010-2-30 (ed. 1), EN 61010-1, EN 61010-2-030 , CAN/CSA-C22.2 No. 61010-1-12 , CAN/CSA-C22.2 No. 61010-2-030-12 ,UL Std. No. 61010-1 (3rd Edition) , UL61010-2-030
Operating temperature range:	+5 °C to +40 °C
Storage temperature range:	-20 °C to +70 °C
Rel. humidity:	5% to 80% (without condensation)
Mechanical Data	
Dimensions (W x H x D):	285 mm x 175 mm x 140 mm
Net weight:	2.5 kg

Accessories included:
Line cord, printed operating manual, 2 probes : HZ154 (100MHz, 10:1/1:1 switchable), HZ20 adapter BNC plug /4 mm banana socket, software-CD

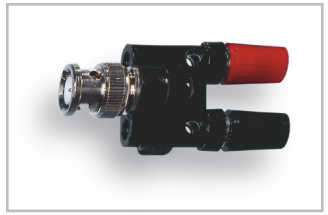
Printed operating manual

software-CD

HZ154
10/100 MHz
passive probe



HZ20
Adapter BNC plug /
4 mm banana socket

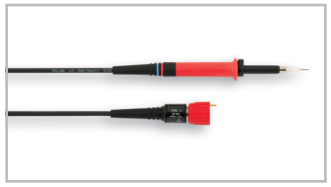


Recommended Accessories

HZO50
AC/DC Current Probe 30 A,
DC to 100kHz

HZO51
AC/DC Current Probe
100/1000 A, DC to 20kHz

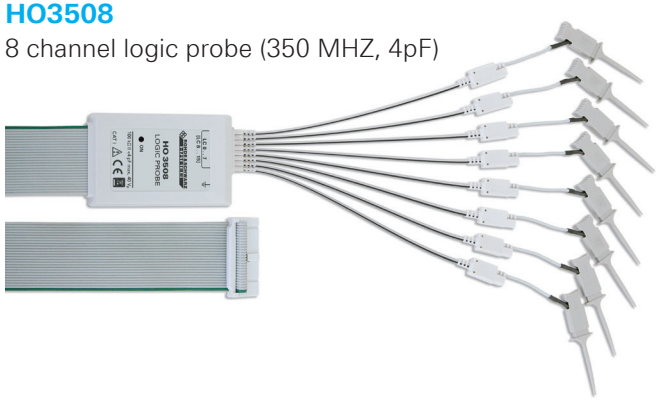
HZO20
High voltage probe 1000:1
(400 MHz, 1000 V_{rms})



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

HZ115
Differential Probe
100:1/1000:1

HO3508
8 channel logic probe (350 MHZ, 4pF)

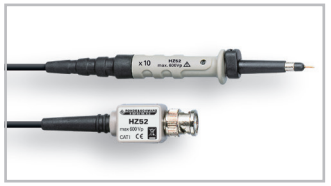


HZO40
Active differential probe
200 MHz (10:1, 3.5 pF, 1 MΩ)

HZO41
Active differential probe
800 MHz (10:1, 1 pF, 200 kΩ)

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