R&S®RTA4000 Oscilloscope

Power of ten

- 200 MHz to 1 GHz
- 10-bit ADC
- 1 Gsample standard memory

3 year warranty

ROHDE&SCHWARZ

Product Brochure | Version 03.02

R&S®RTA4000 Oscilloscope

At a glance

Designed with class-leading signal integrity and responsive ultra-deep memory, the R&S®RTA4000 brings the power of 10 to a new level.
A Rohde&Schwarz designed 10-bit ADC combined with class-leading low noise, memory depth and timebase accuracy gives you sharp waveforms, more accurate measurements and confidence when facing unexpected measurement challenges.

Rohde&Schwarz stands for quality, precision and innovation in all fields of wireless communications. As an independent, family-owned company, Rohde&Schwarz finances its growth from its own funds. The company plans for the long term to the benefit of its customers. Purchasing Rohde&Schwarz products is an investment for the future.

Traditionally, excellent signal integrity has been overlooked in the benchtop class of instruments because it is hard to accomplish and also expensive for instrument manufacturers. Users have had to compromise on measurement accuracy to get an affordable instrument that they could use for everyday debugging and troubleshooting tasks. With the R&S®RTA4000, signal integrity was at the forefront when we designed it.

The 10-bit A/D converter yields up to a fourfold improvement over conventional 8-bit A/D converters. The class-leading low noise allows users to take advantage of this extra vertical resolution. You get sharper waveforms with signal details that would have been hidden on other scopes in this class.

Oscilloscopes in the R&S®RTA4000 class have traditionally made users choose between deep memory and fast update rates. Each of these has its place, and having to choose one or the other means you may have the wrong tool for the problem you are addressing. The R&S®RTA4000 doesn't make you choose; it provides a fast update rate and ultra-deep memory to tackle any challenge that may come up.

The R&S®RTA4000 is more than just an oscilloscope. It includes a logic analyzer, protocol analyzer, spectrum analyzer, waveform and pattern generator and digital voltmeter. A large, high-resolution capacitive touchscreen with a widely acclaimed user interface makes it easy to take advantage of all these tools.

Benefits and key features

Unrivaled signal integrity

- 10-bit ADC with up to 16-bit resolution
- 500 µV/div: full measurement bandwidth
- Class-leading low noise

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Capture more time at full bandwidth

- Deep memory: standard 100 Msample per channel and 200 Msample interleaved
- Class-leading timebase accuracy
- Standard segmented memory: 1 Gsample
- Standard history function

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Large high-resolution display in a compact form factor

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Spectrum analysis: identify interactions between time and frequency

- Fast and precise analysis
- Parallel operation: correlation between frequency and time
- Spectrogram: display of frequency over time
- Markers: find peaks automatically

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Protocol analysis: efficiently debug serial buses

- Protocol aware triggering and decoding for serial buses
- Segmented memory for long time captures
- Table view of packets/frames

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The right probe for the best measurement

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Capabilities to meet your needs today with insurance for the future

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Choose your Rohde&Schwarz embedded oscilloscope

	R&S®RTC1000	R&S®RTB2000	R&S®RTM3000	R&S®RTA4000
Number of scope channels	2	2/4	2/4	4
Bandwidth in MHz	50, 70, 100, 200, 300	70, 100, 200, 300	100, 200, 350, 500, 1000	200, 350, 500, 1000
Max. sampling rate in Gsample/s	1/channel, 2 interleaved	1.25/channel, 2.5 interleaved	2.5/channel, 5 interleaved	2.5/channel, 5 interleaved
Max. memory depth in Msample	1/channel, 2 interleaved	10/channel, 20 interleaved; 160 Msample (optional) segmented memory	40/channel, 80 interleaved; 400 Msample (optional) segmented memory	100/channel, 200 interleaved; 1 Gsample (standard) segmented memory
Timebase accuracy in ppm	50	2.5	2.5	0.5
Vertical bits (ADC)	8	10	10	10
Min. input sensitivity	1 mV/div	1 mV/div	500 µV/div	500 µV/div
Display	6.5", 640 × 480 pixel	10" capacitive touch, 1280 × 800 pixel	10" capacitive touch, 1280 × 800 pixel	10" capacitive touch, 1280 × 800 pixel
Update rate	10000 waveforms/s	50000 waveforms/s	64000 waveforms/s	64000 waveforms/s
MSO	8 channels, 1 Gsample/s	16 channels, 2.5 Gsample/s	16 channels, 5 Gsample/s	16 channels, 5 Gsample/s
Protocol (optional)	I²C, SPI, UART/RS-232/ RS-422/RS-485, CAN, LIN	I²C, SPI, UART/RS-232/ RS-422/RS-485, CAN, LIN	I²C, SPI, UART/RS-232/RS-422/ RS-485, CAN, LIN, audio (I²S/ LJ/RJ/TDM), ARINC, MIL	I²C, SPI, UART/RS-232/ RS-422/RS-485, CAN, LIN, audio (I²S), ARINC, MIL
Generator(s)	1 generator, 4-bit pattern generator	1 ARB, 4-bit pattern generator	1 ARB, 4-bit pattern generator	1 ARB, 4-bit pattern generator
Math	+, –, *, /, FFT (128k points)	+, –, *, /, FFT (128k points)	+, –, *, /, FFT (128k points), 21 advanced functions	+, –, *, /, FFT (128k points), 21 advanced functions
Rohde&Schwarz probe interface	–	–	standard	standard
RF capability	FFT	FFT	spectrum analysis	spectrum analysis

Unrivaled signal integrity

10-bit ADC: 1024 levels, 4 times more than 8-bit ADC

0.6 % noise: at 1 mV/div, 200 MHz, 50 Ω; full scale %

500 µV/div: full bandwidth, no software magnification

10-bit ADC with up to 16-bit resolution

Rohde&Schwarz engineered a proprietary 10-bit A/D converter that delivers a fourfold improvement over conventional 8-bit A/D converters.

The increased resolution results in sharper waveforms with more signal details that would otherwise be missed. One example is the characterization of switched-mode power supplies. The voltages across the switching device must be determined during the on/off times within the same acquisition. For precise measurements of small voltage components, a high resolution of more than 8-bit is essential. With high resolution decimation, the R&S®RTA4000 even provides up to 16-bit vertical resolution, a resolution previously unseen in this class of instrument.

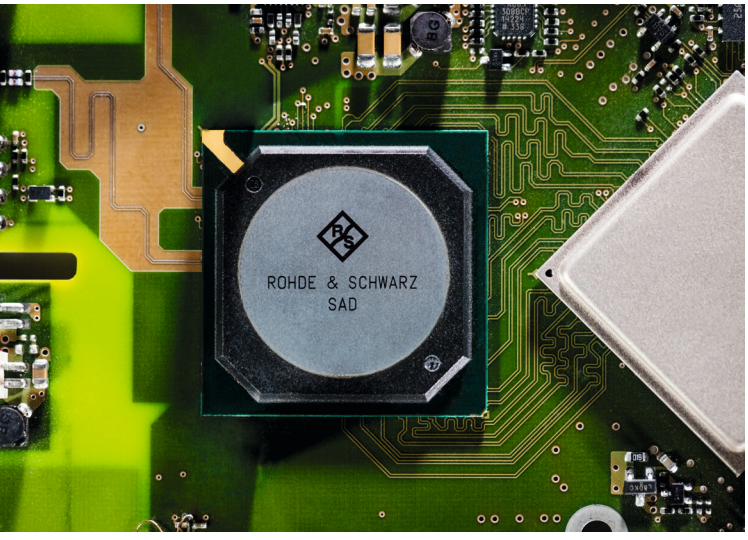
500 µV/div: full measurement bandwidth

The R&S®RTA4000 oscilloscope offers outstanding sensitivity down to 500 µV/div. Traditional oscilloscopes can only reach this level of input sensitivity by employing software-based magnification of larger settings or by limiting the bandwidth. The R&S®RTA4000 oscilloscope shows the signal's real sampling points over the full measurement bandwidth – even at 500 µV/div.

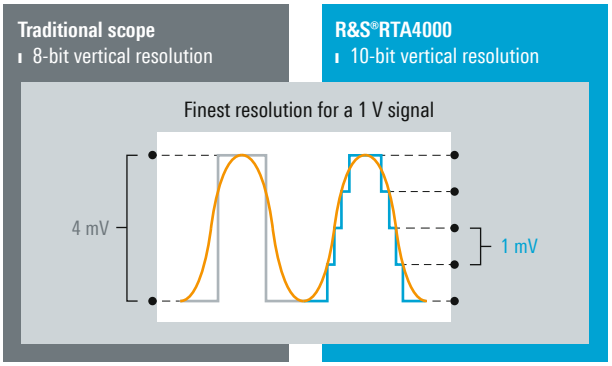
Class-leading low noise

Higher resolution is only beneficial if the extra bits are not consumed by the noise of the oscilloscope. The R&S®RTA4000 has class-leading low noise that allows you to take advantage of the extra bits of resolution and see signals that are hidden in the noise of other scopes.

The Rohde&Schwarz designed 10-bit A/D converter ensures highest signal fidelity at the highest resolution.



10-bit A/D converter: uncovers even small signal details



Capture more time at full bandwidth

200 Msample: standard acquisition memory

1 Gsample: standard history and segmented mode

±0.5 ppm: timebase accuracy

Deep memory: standard 100 Msample per channel and 200 Msample interleaved

The R&S®RTA4000 offers class-leading memory depth: 100 Msample per channel, 200 Msample in interleaved mode. This is up to 10 times more than similar oscilloscopes in the same instrument class. Maintaining a fast sample rate is directly tied to acquisition memory. With its deep memory, the R&S®RTA4000 captures longer periods of time at high sample rates, giving you extra insurance for unexpected project requirements.

Class-leading timebase accuracy

With a timebase accuracy of ±0.5 ppm, the R&S®RTA4000 is 5 to 20 times better than other instruments in its class. An excellent timebase is important to ensure accurate measurements over long time captures.

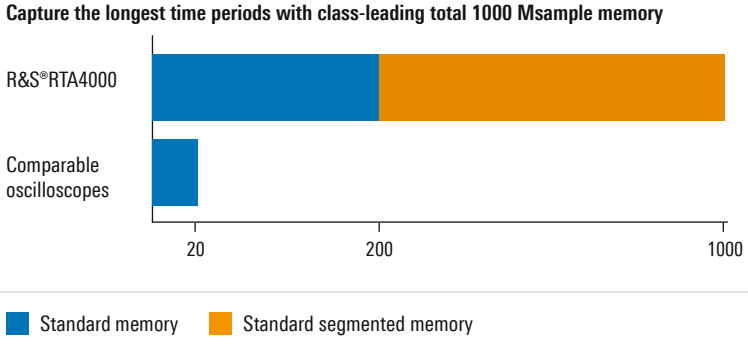
Standard segmented memory: 1 Gsample

The standard segmented memory analyzes signal sequences over a long observation period. For example, protocol-based signals with communications gaps, such as I²C or SPI, can be captured over extended periods of time without wasting storage on idle time. Thanks to the variable segment size from 10 ksample to 200 Msample, the deep memory is optimally utilized; more than 87 000 cohesive individual segments are possible.

Standard history function

History mode is an always-on capability to view previous acquisitions up to the maximum segmented memory depth of 1 Gsample. For further analysis, the complete toolset can be applied to recorded segments. This includes, for example, mask tests, QuickMeas function and FFT.

10 to 50 times more memory depth than traditional oscilloscopes in the same instrument class



Large high-resolution display...

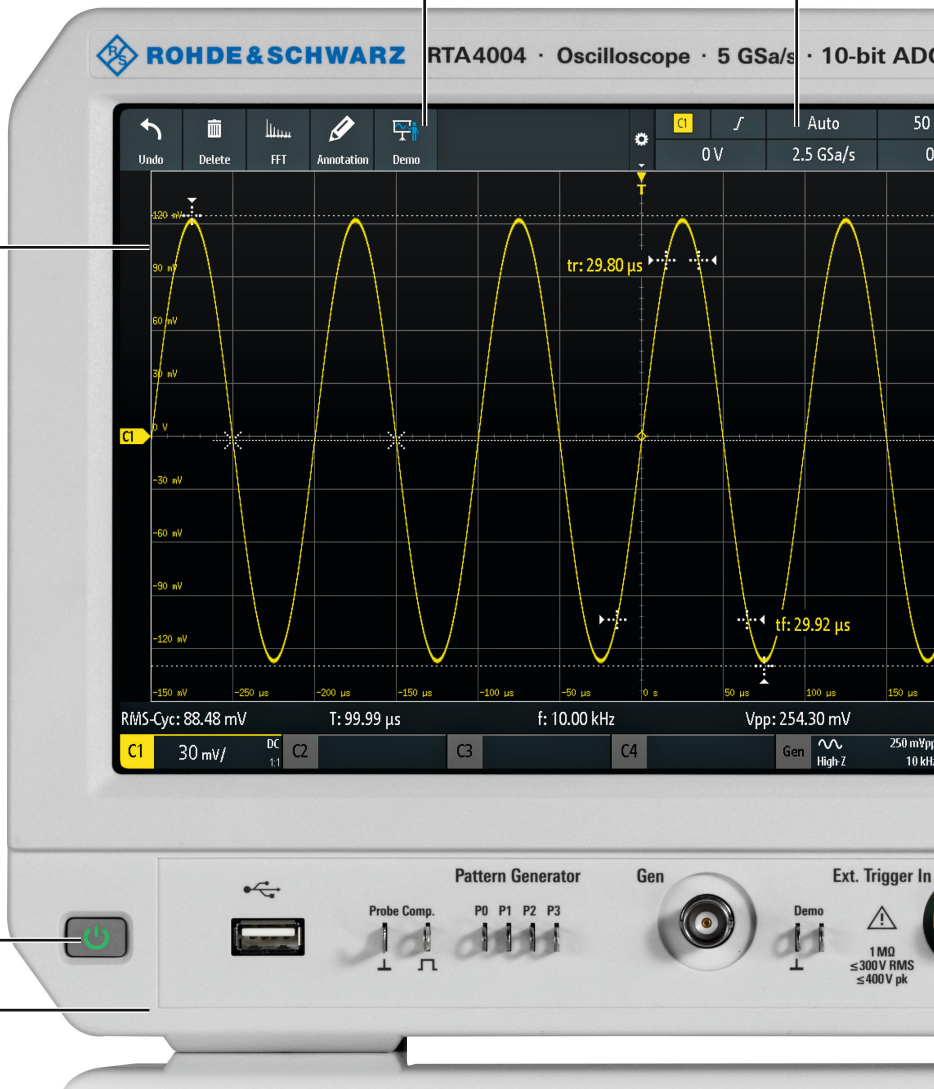
Quick access to important tools
- Drag & drop to use analysis tools
- Toolbar to access functions
- User-defined shortcuts allow fast adjustment of functions

Vertical zoom
- Zoom both horizontally and vertically on waveforms without overdriving the frontend

Easily customizable waveform display with R&S®SmartGrid technology
- Configurable display
- Resizable waveform areas
- Scales labeled on all axes

10 second boot time

Compact form factor
- Small footprint
- Less than 3.3 kg
- Only 28.3 dB(A) audible noise



... in a compact form factor

10.1" high-resolution capacitive touchscreen with gesture support

- Gesture support for scaling and zooming
- High resolution: 1280 × 800 pixel
- 12 horizontal grid lines for more signal details

Documentation of results at the push of a button

- Documentation as a screenshot or of instrument settings

Integrated logic analyzer (MSO)

- 16 additional digital channels
- Synchronous and time-correlated analysis of analog and digital components of embedded designs
- User upgradable

Color-coded controls indicate the selected channel

Standard history function

- Always-on capability to view previous acquisitions
- Over 1 Gsample
- More than 87 000 segments

Active probe interface

- Automatically detects and powers probes
- Rohde & Schwarz probes with probe interface
- More than 30 available probes

Spectrum analysis: identify interactions between time and frequency

Spectrogram:
evolution over time

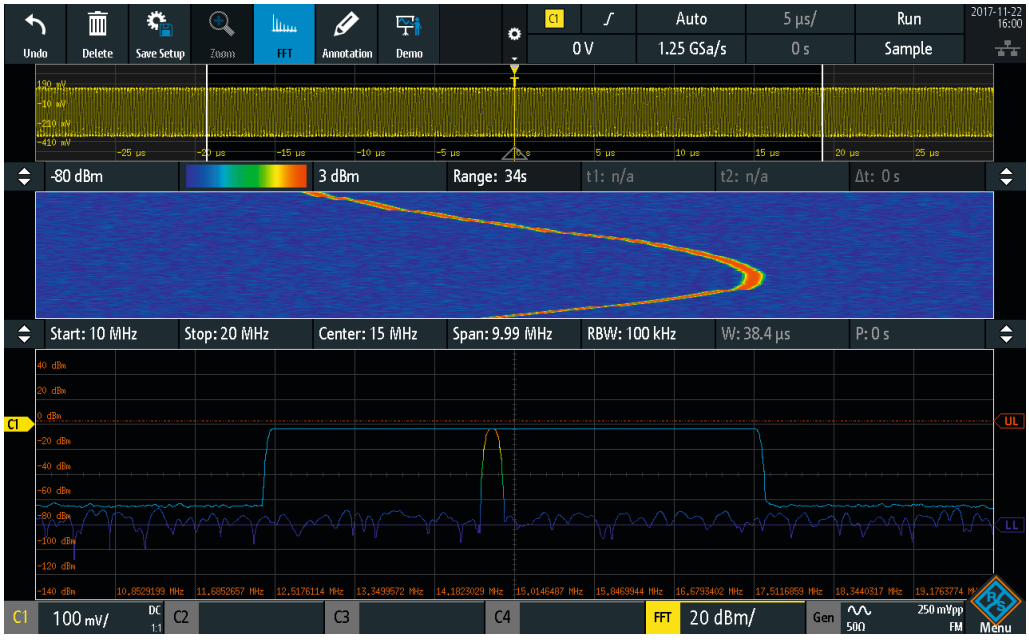
Peak markers:
automatic positioning

Fast and precise analysis
Difficult-to-find faults often result from the interaction between time and frequency signals. The R&S®RTA-K18 spectrum analysis and spectrogram option quickly finds such errors. Like on a spectrum analyzer, parameters such as center frequency and resolution bandwidth can be adapted to the specific measurement task. The oscilloscope automatically selects the relevant time domain settings. Optimum performance ensures the fastest multi-domain analysis in this oscilloscope class.

Parallel operation: correlation between frequency and time
Advanced electronics is based on the seamless interaction between protocol-based interfaces, digital, analog and frequency components. Simultaneous analysis of all components is a must. Time, frequency and protocol information is correlated, and time references can be quickly recognized. Measurement windows help you select specific areas of the recording, which can simplify, for example, the acquisition of frequency switching operations.

Spectrogram: display of frequency over time
A spectrogram displays the spectrum of frequencies as they vary over time. For easy interpretation, the magnitude can be color-coded. Thanks to the high FFT rate, even fast frequency changes can be displayed. When used in combination with the history and segmented memory, the spectrogram marker shows the time of the acquisition and makes it possible to load the corresponding time and frequency waveforms onto the screen. All R&S®RTA4000 tools can be used to analyze the loaded waveforms.

Markers: find peaks automatically
Markers can be automatically positioned on the frequency peaks for fast analysis. An adaptable threshold defines the peaks. Parameters such as excursion and maximum peak width can be adjusted for in-depth analysis. Results can be compiled in a table (absolute or relative to a specific reference marker). Selectable delta measurements make it easy to adjust the distances between signal peaks.



Test signal from three different perspectives: time domain (top), spectrogram (center) and frequency domain (bottom).

Protocol analysis: efficiently debug serial buses

Protocol aware triggering and decoding for serial buses

Counting 1s and 0s to decode a serial bus is tedious and error-prone. The R&S®RTA4000 automates this process by decoding the waveforms into a specific protocol. In addition, protocol aware triggering directly triggers on specific parts of a packet or frame.

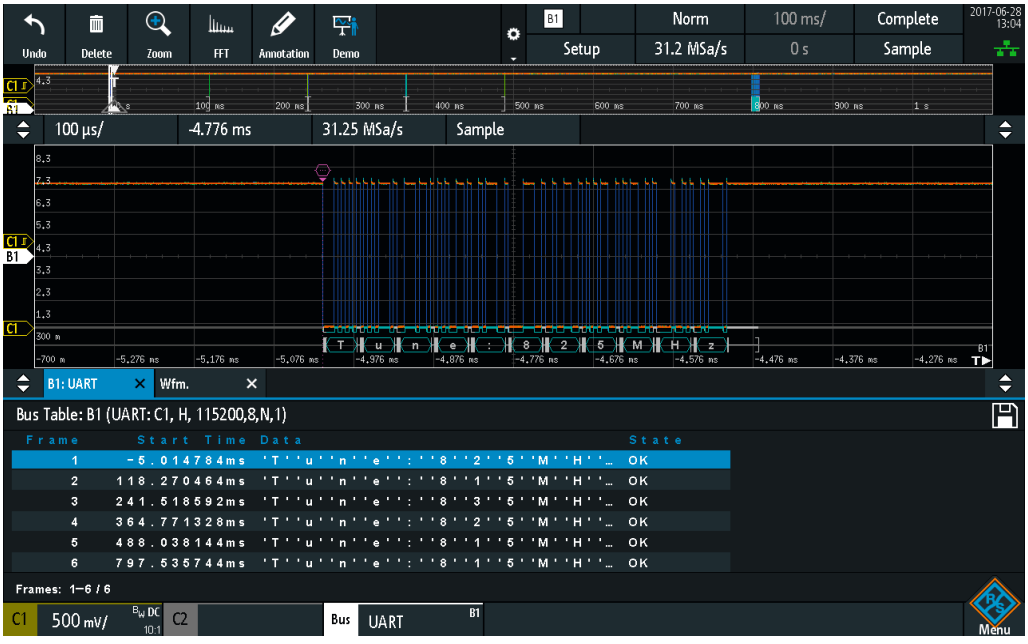
Segmented memory for long time captures

Standard segmented memory is ideal for serial protocols. It allows you to capture only relevant packets/frames and ignore the long idle time in between packets. With 1 Gsample of segmented memory available, you can capture more than 87 000 timestamped packets/frames.

Table view of packets/frames

A table view allows you to see a high-level representation of all captured packets. You can also export the table.

Supported buses	
Embedded	I²C UART/RS-232/RS-422/RS-485 SPI (2/3/4-wire)
Aerospace	MIL-STD-1553 ARINC 429
Automotive, industrial	CAN LIN
Audio	I²S/LJ/RJ/TDM



Decoded hexadecimal I²C message shown in honeycomb format and in table.

The right probe for the best measurement

More than 30: dedicated probes

Micro button: for convenient instrument control

0.01 % accuracy: with R&S®ProbeMeter

Extensive probe range for all measurement tasks

A complete portfolio of high-quality passive and active probes covers all measurement tasks. With an input impedance of 1 MΩ, the active probes put only a minimum load on a signal source's operating point. The very large dynamic range, even at high frequencies, prevents signal distortion – for example: 60 V (V_{pp}) at 1 GHz for the active single-ended probes.

Complete portfolio for power measurements

The portfolio of dedicated probes for power measurements includes active and passive probes for the different voltage and current ranges – from µA to kA and from µV to kV. Dedicated power rail probes detect even small and sporadic distortions on DC power rails.

Micro button for convenient instrument control

The situation is all too familiar. You've carefully positioned the probe on the device under test and want to start the measurements – but you don't have a free hand. The micro button on Rohde&Schwarz active probes solves this problem. It is conveniently situated on the probe tip, and you can assign it different functions, such as run/stop, autoset and adjust offset.

R&S®ProbeMeter: integrated voltmeter for precise DC measurements

One connection lets you see the scope waveform and gives you access to a highly accurate voltmeter that shows the DC value regardless of other instrument settings.

▷ For more information, see the product brochure: Probes and accessories for Rohde&Schwarz oscilloscopes (PD 3606.8866.12).

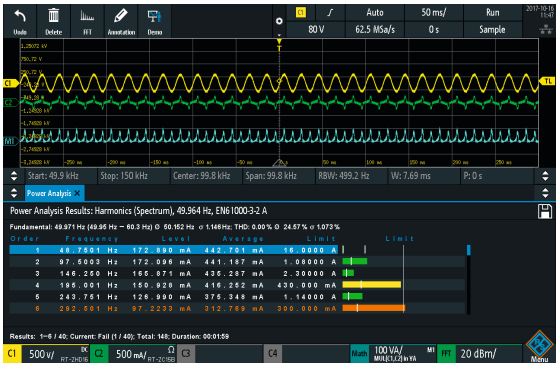
Practical design: micro button for convenient instrument control. Diverse probe tips and ground cables are included as standard accessories.

Probe type	Ideal for measuring	Recommended probes
Standard passive probe	Single-ended voltages, max. bandwidth 500 MHz	R&S®RT-ZP10 comes as standard with the R&S®RTA4000
Active broadband probe	Singled-ended voltages, up to 8 GHz bandwidth	R&S®RT-ZS10E, R&S®RT-ZS10, R&S®RT-ZS20
Power integrity probe	Disturbances on power rails with high offsets, greater than 2 GHz bandwidth	R&S®RT-ZPR20
High voltage probe	High single-ended and differential voltages, up to 6 kV	R&S®RT-ZHD007, R&S®RT-ZHD15, R&S®RT-ZHD16, R&S®RT-ZHD60
Current probe	Currents from µAs to kAs	R&S®RT-ZC05B, R&S®RT-ZC10B, R&S®RT-ZC15B, R&S®RT-ZC20B, R&S®RT-ZC30
EMC near-field probe	EMI debugging up to 3 GHz	R&S®HZ-15

Common applications

Power integrity

- Measure large DC offsets with the ability to zoom in on small ripples
- Accurately measure ripple and periodic and random disturbances (PARD)
- Spectrum analysis view makes finding coupled sources easier



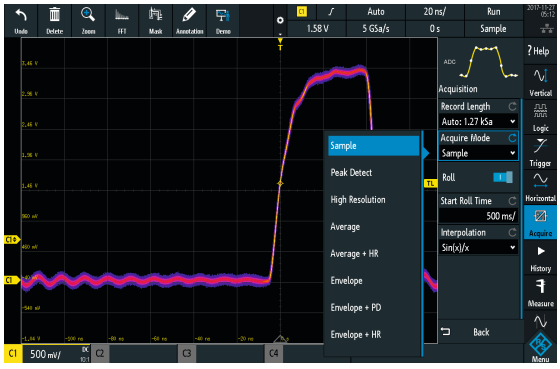
Power analysis

- See power signal details with up to 16-bit resolution
- Capture long periods of time, e.g. a turn-on sequence, with high sample rate
- Complete probe portfolio for measuring from µA to kA and µV to kV

EMI debugging

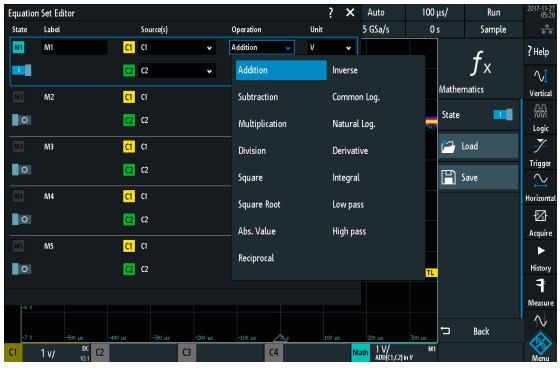
- Near-field probes allow you to sniff out interfering signals
- Time and frequency domain correlation for powerful debugging of emitters
- Hardware-based digital downconversion and FFT provides a vivid and fast view in the frequency domain

Capabilities to meet your needs today...



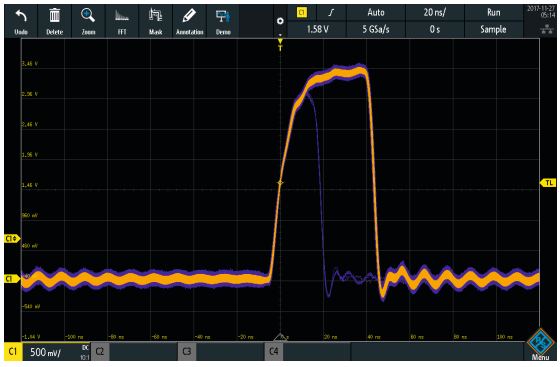
Acquisition modes

- High-resolution: up to 16-bit vertical resolution
- Averaging: up to 100 000 waveforms
- Peak detect
- Envelope
- Averaging plus high resolution
- Envelope plus peak detect
- Envelope plus high resolution



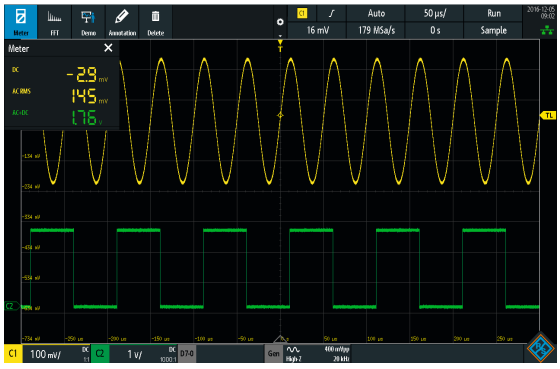
Math and measurements

- Up to five basic or advanced math waveforms
- Advanced math includes equation editor with 30 options
- Up to eight measurements at once
- Over 40 automated measurement options available for each measurement
- Gated measurements and statistics



Annotation, R&S®SmartGrid and documentation

- Simplified documentation at the push of a button
- On-screen annotation using the touch display for specific notes
- R&S®SmartGrid to easily resize/layout/ configure the display as needed
- Graticule annotation makes it easy to quickly see the V/div and timebase setting



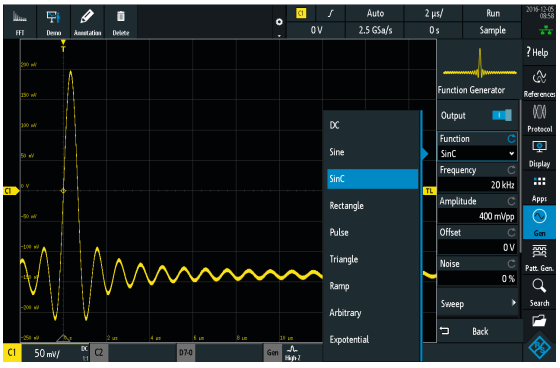
Digital voltmeter

- Integrated 3-digit voltmeter (DVM)
- Integrated 6-digit frequency counter
- Always on, even when the oscilloscope is stopped
- Measurement functions include DC, AC + DC (RMS) and AC (RMS)

... with insurance for the future

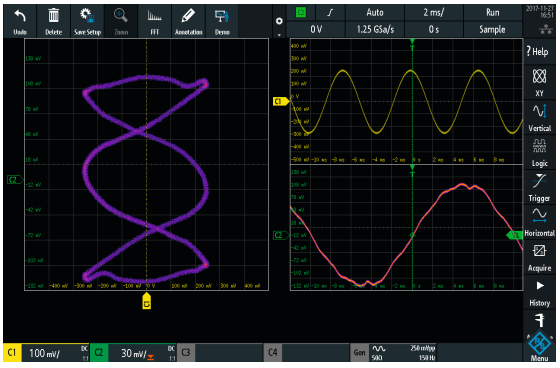
Mixed signal

- Integrated digital channels (16 channels) allows correlated measurements between analog and digital signals
- Up to 5 Gsample/s sample rate for high timing resolution
- Up to 200 Msample of memory allows long time captures
- Ideal for low-speed serial bus analysis



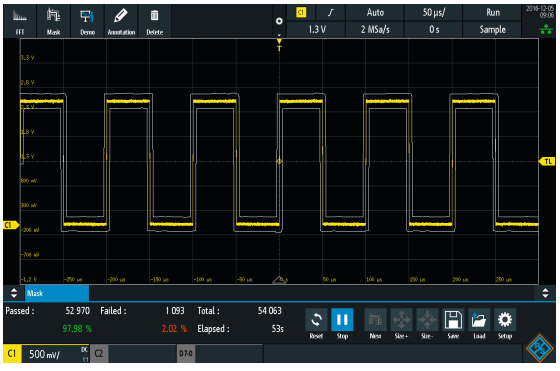
Waveform and pattern generator

- Integrated arbitrary waveform generator to produce signals for device stimulus
- High sample rate (250 Msample/s) and resolution (14-bit) allows accurate signal reproduction
- Modulation and swept mode capabilities
- 50 Ω (2.5 V (V_{pp})) and 1 MΩ (10 V (V_{pp})) output
- 4-bit pattern generator with predefined patterns and the ability to import user-defined patterns



XY mode

- Plot the voltage levels of two channels against each other
- Measure phase shift



Mask test mode

- Fast limit testing to see if a waveform violates a configured set of conditions
- Import user-defined masks or create a mask of a known good waveform on the oscilloscope
- Save screenshots, waveforms; output a beep or pulse on violations

And there is so much more ...

- Efficient reporting capabilities
- Localized GUI and online help
- Fully upgradable via software licenses
- Web server functionality for instrument access
- Extensive range of probes and accessories

Grows with your needs

The R&S®RTA4000 oscilloscopes flexibly adapt to needed project updates. You simply install the necessary software licenses, e.g. triggering and decoding of serial protocols. The waveform and pattern generator and MSO capabilities [1] are built-in and just need to be activated. The bandwidth can be upgraded up to 1 GHz via keycode. All this makes retrofitting really easy.

Multilingual support: choose among thirteen languages

The R&S®RTA4000 oscilloscope's user interface and online help support thirteen languages (English, German, French, Spanish, Italian, Portuguese, Czech, Polish, Russian, simplified and traditional Chinese, Korean and Japanese). You can change the language in just a few seconds while the instrument is running.

Protection of data

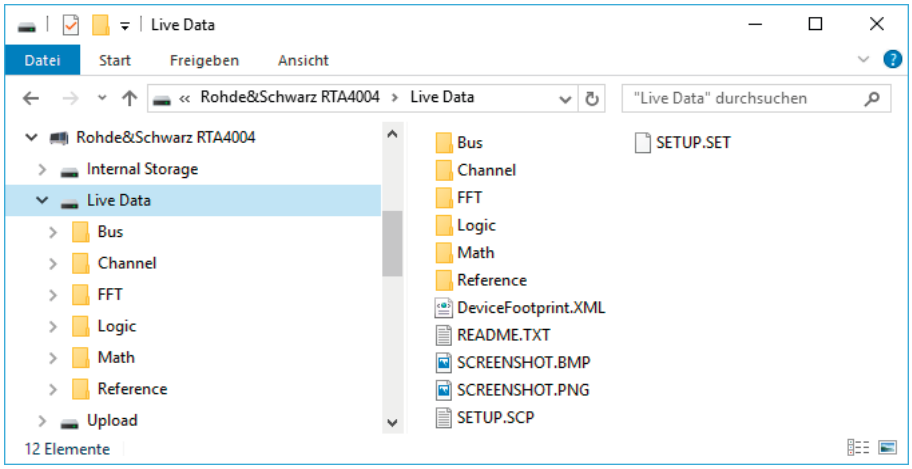
The secure erase function protects sensitive data. This function removes all user data and settings, including device setups and reference waveforms.

Connectivity

The R&S®RTA4000 can be directly connected to a PC via the built-in USB host and USB device ports. The USB host transfers screenshots and instrument settings to a USB stick. Media transfer protocol (MTP) implementation ensures seamless integration. The USB device port and the LAN interface enable remote control. The built-in web server functionality allows you to control the oscilloscope and display your screen content to an audience. Data and programming interfaces are included, e.g. for seamless MATLAB® integration.

[1] The R&S®RTA-B1 MSO option additionally contains two logic probes with 16 digital channels.

With the USB MTP implementation, you can easily access live channel data and screenshots and integrate the oscilloscope into your computing environment.



Specifications in brief

Specifications in brief		
Vertical system		
Number of channels	R&S®RTA4004	4
Bandwidth (–3 dB)	R&S®RTA4004 (with R&S®RTA-B24x options)	200 MHz, 350 MHz, 500 MHz, 1 GHz
Rise time (calculated)	R&S®RTA4004 (with R&S®RTA-B24x options)	5 ns, 3.5 ns, 1.75 ns, 1.15 ns
Input sensitivity	max. bandwidth in all ranges	
	at 1 MΩ	500 µV/div to 10 V/div
	at 50 Ω	500 µV/div to 1 V/div
DC gain accuracy	offset and position = 0, maximum operating temperature change of ±5 °C after self-alignment	
	input sensitivity > 5 mV/div	±1 % of full scale
	input sensitivity ≤ 5 mV/div to ≥ 1 mV/div	±1.5 % of full scale
	input sensitivity < 1 mV/div	±2.5 % of full scale
ADC resolution		10-bit, up to 16-bit with high resolution decimation
Acquisition system		
Maximum realtime sampling rate		2.5 Gsample/s; 5 Gsample/s, interleaved
Acquisition memory		100 Msample (200 Msample, interleaved); 1 Gsample segmented memory
Horizontal system		
Timebase range		selectable between 0.5 ns/div and 500 s/div
Trigger system		
Trigger types	standard	edge, width, video (PAL, NTSC, SECAM, PAL-M, SDTV 576i, HDTV 720p, HDTV 1080i, HDTV 1080p), pattern, line, serial bus
	option	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN/LIN, audio (I²S), ARINC 429, MIL-STD-1553
MSO option		
Digital channels		16 (2 logic probes)
Sampling rate		2.5 Gsample/s; 5 Gsample/s, interleaved
Acquisition memory		10 Msample
Waveform generator		
Resolution, sample rate		14-bit, 250 Msample/s
Amplitude	high Z; 50 Ω	20 mV to 10 V (V_{pp}); 10 mV to 5 V (V_{pp})
DC offset	high Z; 50 Ω	±5 V; ±2.5 V
General data		
Screen		10.1" WXGA TFT color display (1280 × 800 pixel)
Interfaces		USB host with MTP, USB device, LAN, powerful web server for remote display and operation
Audible noise	maximum sound pressure level at a distance of 1.0 m	28.3 dB(A)
Dimensions	W × H × D	390 mm × 220 mm × 152 mm (15.4 in × 8.66 in × 5.98 in)
Weight		3.3 kg (7.3 lb)

RMS noise floor at 50 Ω (meas.)				
Input sensitivity	**R&S®RTA4004**	**R&S®RTA4004 + R&S®RTA-B243**	**R&S®RTA4004 + R&S®RTA-B245**	**R&S®RTA4004 + R&S®RTA-B2410**
1 V/div	22.7 mV	22.8 mV	25.1 mV	31.4 mV
500 mV/div	12.6 mV	13.7 mV	15.4 mV	19.8 mV
200 mV/div	5.5 mV	6.2 mV	7.0 mV	9.1 mV
100 mV/div	2.7 mV	3.0 mV	3.4 mV	4.6 mV
50 mV/div	1.4 mV	1.6 mV	1.8 mV	2.4 mV
20 mV/div	0.53 mV	0.58 mV	0.65 mV	0.86 mV
10 mV/div	0.26 mV	0.28 mV	0.32 mV	0.41 mV
5 mV/div	0.15 mV	0.18 mV	0.20 mV	0.27 mV
2 mV/div	0.07 mV	0.09 mV	0.10 mV	0.13 mV
1 mV/div	0.06 mV	0.07 mV	0.08 mV	0.11 mV
0.5 mV/div	0.05 mV	0.07 mV	0.08 mV	0.11 mV

Ordering information

Designation	Type	Order No.
Choose your R&S®RTA4000 base model		
Oscilloscope, 200 MHz, 4 channels	R&S®RTA4004	1335.7700.04
Base unit (including standard accessories: 500 MHz passive probe per channel, power cord)		
Choose your bandwidth upgrade		
Upgrade of R&S®RTA4004 oscilloscopes to 350 MHz bandwidth	R&S®RTA-B243	1335.7846.02
Upgrade of R&S®RTA4004 oscilloscopes to 500 MHz bandwidth	R&S®RTA-B245	1335.7852.02
Upgrade of R&S®RTA4004 oscilloscopes to 1 GHz bandwidth	R&S®RTA-B2410	1335.7869.02
Choose your options		
Mixed Signal Upgrade for non-MSO models, 400 MHz	R&S®RTA-B1	1335.7823.02
Arbitrary Waveform and 4-bit Pattern Generator	R&S®RTA-B6	1335.7830.02
I²C/SPI Serial Triggering and Decoding	R&S®RTA-K1	1335.7681.02
UART/RS-232/RS-422/RS-485 Serial Triggering and Decoding	R&S®RTA-K2	1335.7698.02
CAN/LIN Serial Triggering and Decoding	R&S®RTA-K3	1335.7717.02
Audio (I²S, LJ, RJ, TDM) Triggering and Decoding	R&S®RTA-K5	1335.7723.02
MIL-STD-1553 Serial Triggering and Decoding	R&S®RTA-K6	1335.7730.02
ARINC 429 Serial Triggering and Decoding	R&S®RTA-K7	1335.7746.02
Spectrum Analysis and Spectrogram	R&S®RTA-K18	1335.7752.02
Power Analysis	R&S®RTA-K31	1335.7769.02
Application Bundle, consists of the following options: R&S®RTA-K1, R&S®RTA-K2, R&S®RTA-K3, R&S®RTA-K5, R&S®RTA-K6, R&S®RTA-K7, R&S®RTA-K18, R&S®RTA-K31, R&S®RTA-B6	R&S®RTA-PK1	1335.7775.02
Choose your additional probes		
Single-ended passive probes		
500 MHz, 10 MΩ, 10:1, 300 V, 10 pF, 5 mm	R&S®RT-ZP05S	1333.2401.02
500 MHz, 10 MΩ, 10:1, 400 V, 9.5 pF, 2.5 mm	R&S®RT-ZP10	1409.7550.00
38 MHz, 1 MΩ, 1:1, 55 V, 39 pF, 2.5 mm	R&S®RT-ZP1X	1333.1370.02
Active broadband probes: single-ended		
1.0 GHz, 10:1, 1 MΩ, BNC interface	R&S®RT-ZS10L	1333.0815.02
1.0 GHz, active, 1 MΩ, Rohde&Schwarz probe interface	R&S®RT-ZS10E	1418.7007.02
1.0 GHz, active, 1 MΩ, R&S®ProbeMeter, micro button, Rohde&Schwarz probe interface	R&S®RT-ZS10	1410.4080.02
1.5 GHz, active, 1 MΩ, R&S®ProbeMeter, micro button, Rohde&Schwarz probe interface	R&S®RT-ZS20	1410.3502.02
Active broadband probes: differential		
1.0 GHz, active, differential, 1 MΩ, R&S®ProbeMeter, micro button, incl. 10:1 external attenuator, 1 MΩ, 70 V DC, 46 V AC (peak), Rohde&Schwarz probe interface	R&S®RT-ZD10	1410.4715.02
1.5 GHz, active, differential, 1 MΩ, R&S®ProbeMeter, micro button, Rohde&Schwarz probe interface	R&S®RT-ZD20	1410.4409.02
Power rail probe		
2.0 GHz, 1:1, 50 kΩ, ±0.85 V, ±60 V offset, Rohde&Schwarz probe interface	R&S®RT-ZPR20	1800.5006.02
High voltage single-ended passive probes		
250 MHz, 100:1, 100 MΩ, 850 V, 6.5 pF	R&S®RT-ZH03	1333.0873.02
400 MHz, 100:1, 50 MΩ, 1000 V, 7.5 pF	R&S®RT-ZH10	1409.7720.02
400 MHz, 1000:1, 50 MΩ, 1000 V, 7.5 pF	R&S®RT-ZH11	1409.7737.02
High voltage probes: differential		
25 MHz, 20:1/200:1, 4 MΩ, 1.4 kV (CAT III), BNC interface	R&S®RT-ZD002	1337.9700.02
25 MHz, 10:1/100:1, 4 MΩ, 700 V (CAT II), BNC interface	R&S®RT-ZD003	1337.9800.02
100 MHz, 8 MΩ, 1 kV (RMS) (CAT III), BNC interface	R&S®RT-ZD01	1422.0703.02
200 MHz, 10:1, ±20 V, BNC interface	R&S®RT-ZD02	1333.0821.02
800 MHz, 10:1, 200 kΩ, ±15 V, BNC interface	R&S®RT-ZD08	1333.0838.02
200 MHz, 250:1/25:1, 5 MΩ, 750 V (peak), 300 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD07	1800.2307.02
100 MHz, 500:1/50:1, 10 MΩ, 1500 V (peak), 1000 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD15	1800.2107.02
200 MHz, 500:1/50:1, 10 MΩ, 1500 V (peak), 1000 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD16	1800.2207.02
100 MHz, 1000:1/100:1, 40 MΩ, 6000 V (peak), 1000 V CAT III, Rohde&Schwarz probe interface	R&S®RT-ZHD60	1800.2007.02

Designation	Type	Order No.
Current probes		
20 kHz, AC/DC, 0.01 V/A and 0.001 V/A, ±200 A and ±2000 A, BNC interface	R&S®RT-ZC02	1333.0850.02
100 kHz, AC/DC, 0.1 V/A, 30 A, BNC interface	R&S®RT-ZC03	1333.0844.02
2 MHz, AC/DC, 0.01 V/A, 500 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC05B	1409.8204.02
10 MHz, AC/DC, 0.01 V/A, 150 A (RMS), BNC interface	R&S®RT-ZC10	1409.7750K02
10 MHz, AC/DC, 0.01 V/A, 150 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC10B	1409.8210.02
50 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC15B	1409.8227.02
100 MHz, AC/DC, 0.1 V/A, 30 A (RMS), BNC interface	R&S®RT-ZC20	1409.7766K02
100 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde&Schwarz probe interface	R&S®RT-ZC20B	1409.8233.02
120 MHz, AC/DC, 1 V/A, 5 A (RMS), BNC interface	R&S®RT-ZC30	1409.7772K02
EMC near-field probes		
Probe Set for E and H Near-Field Measurements, 30 MHz to 3 GHz	R&S®HZ-15	1147.2736.02
Logic probes		
400 MHz Logic Probe, 8 channels	R&S®RT-ZL04	1333.0721.02
Probe accessories		
Probe Power Supply for R&S®RT-ZC10/20/30	R&S®RT-ZA13	1409.7789.02
External Attenuator 10:1, 2.0 GHz, 1.3 pF, 60 V DC, 42.4 V AC (peak) for R&S®RT-ZD20/30 probes	R&S®RT-ZA15	1410.4744.02
Probe Pouch	R&S®RT-ZA19	1335.7875.02
Power Deskew and Calibration Test Fixture	R&S®RT-ZF20	1800.0004.02
3D Positioner with central tensioning knob for easy clamping and positioning of probes (span width: 200 mm, clamping range: 15 mm)	R&S®RT-ZA1P	1326.3641.02
Choose your accessories		
Front Cover	R&S®RTB-Z1	1333.1728.02
Soft Bag	R&S®RTB-Z3	1333.1734.02
Rackmount Kit	R&S®ZZA-RTB2K	1333.1728.02

Application package

Designation	Consists of	Type	Order No.
Power integrity package			
R&S®RTA4004	R&S®RTA4004 R&S®RTA-K18 R&S®RT-ZPR20	R&S®RTA4K-PI	1335.7917P02

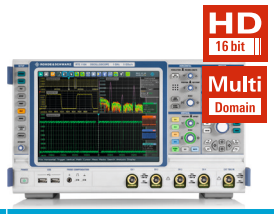
Warranty		
Base unit		3 years
All other items [1]		1 year
Options		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde&Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty with Calibration Coverage, one year	R&S®CW1	
Extended Warranty with Calibration Coverage, two years	R&S®CW2	
Extended Warranty with Accredited Calibration Coverage, one year	R&S®AW1	
Extended Warranty with Accredited Calibration Coverage, two years	R&S®AW2	

[1] For options that are installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

Oscilloscope portfolio

R&S® family	RTH1000	RTC1000	RTB2000	RTM3000
Vertical				
Bandwidth	60/100/200/350/500 MHz [1]	50/70/100/200/300 MHz [1]	70/100//200/300 MHz [1]	100/200/350/500 MHz/1 GHz [1]
Number of channels	2 plus DMM/4	2	2/4	2/4
V/div 1 MΩ	2 mV to 100 V	1 mV to 10 V	1 mV to 5 V	500 µV to 10 V
V/div 50 Ω	–			500 µV to 1 V
Horizontal				
Sampling rate	1.25 Gsample/s per channel (4-channel model); 2.5 Gsample/s per channel (2-channel model); 5 Gsample/s (all channels interleaved)	1 Gsample/s per channel 2 Gsample/s (2 channels interleaved)	1.25 Gsample/s per channel; 2.5 Gsample/s (2 channels interleaved)	2.5 Gsample/s per channel; 5 Gsample/s (2 channels interleaved)
Max. memory (per channel/1 channel active)	125 ksample (4-channel model); 250 ksample (2-channel model); 500 ksample (50 Msample in segmented memory mode [2])	1 Msample; 2 Msample	10 Msample; 20 Msample (160 Msample in segmented memory mode [2])	40 Msample; 80 Msample (400 Msample in segmented memory mode [2])
Segmented memory	option	–	option	option
Acquisition rate	50000 waveforms/s	10000 waveforms/s	50000 waveforms/s (300000 waveforms/s in fast segmented memory mode [2])	64000 waveforms/s (700000 waveforms/s in fast segmented memory mode [2])
Trigger				
Options	advanced, digital trigger (14 trigger types) [2]	elementary (5 trigger types)	basic (6 trigger types)	basic (7 trigger types)
Mixed signal option				
No. of digital channels [1]	8	8	16	16
Sampling rate of digital channels	1.25 Gsample/s	1 Gsample/s	1.25 Gsample/s	two logic probes: 2.5 Gsample/s on each channel; one logic probe: 5 Gsample/s on each channel
Memory of digital channels	125 ksample	1 Msample	10 Msample	40 Msample
Analysis				
Cursor meas. types	4	13	4	4
Stand. meas. functions	33	31	31	31
Mask test	elementary (tolerance mask around the signal)	elementary (tolerance mask around the signal)	elementary (tolerance mask around the signal)	elementary (tolerance mask around the signal)
Mathematics	elementary	elementary	elementary	basic (math on math)
Serial protocols triggering and decoding [1]	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN, CAN-FD, SENT (7)	I²C, SPI, UART/RS-232/RS-422/ RS-485, CAN, LIN (5)	I²C, SPI, UART/RS-232/RS-422/ RS-485, CAN, LIN (5)	I²C, SPI, UART/RS-232/ RS-422/RS-485, CAN, LIN, I²S, MIL-STD-1553, ARINC 429 (8)
Display functions	data logger	–	–	–
Applications [1]	high resolution frequency counter, advanced spectrum analysis, harmonics analysis	digital voltmeter (DVM), component tester, fast Fourier transform (FFT)	digital voltmeter (DVM), fast Fourier transform (FFT)	power, digital voltmeter (DVM), spectrum analysis and spectrogram
Compliance testing [1]	–	–	–	–
Display and operation				
Size and resolution	7", color, 800 × 480 pixel	6.5", color, 640 × 480 pixel	10.1", color, 1280 × 800 pixel	10.1", color, 1280 × 800 pixel
Operation	optimized for touchscreen operation, parallel button operation	optimized for fast button operation	optimized for touchscreen operation, parallel button operation	
General data				
Size in mm (W × H × D)	201 × 293 × 74	285 × 175 × 140	390 × 220 × 152	390 × 220 × 152
Weight in kg	2.4	1.7	2.5	3.3
Battery	lithium-ion, > 4 h	–	–	–

[1] Upgradeable. [2] Requires an option.



RTA4000	RTE1000	RTO2000
200/350/500 MHz/1 GHz [1]	200/350/500 MHz/1/1.5/2 GHz [1]	600 MHz/1/2/3/4/6 GHz [1]
4	2/4	2/4 (only 4 channels in 4 GHz and 6 GHz model)
500 µV to 10 V	500 µV to 10 V	1 mV to 10 V (500 µV to 10 V) [2]
500 µV to 1 V	500 µV to 5 V	1 mV to 1 V (500 µV to 1 V) [2]
2.5 Gsample/s per channel; 5 Gsample/s (2 channels interleaved)	5 Gsample/s per channel	10 Gsample/s per channel; 20 Gsample/s (2 channels interleaved in 4 GHz and 6 GHz model)
100 Msample; 200 Msample (1 Gsample in segmented memory mode)	50 Msample/200 Msample	standard: 50 Msample/200 Msample; max. upgrade: 1 Gsample/2 Gsample
standard	standard	standard
64 000 waveforms/s (700 000 waveforms/s in fast segmented memory mode)	1 000 000 waveforms/s (2 000 000 waveforms/s in ultra-segmented memory mode)	1 000 000 waveforms/s (3 000 000 waveforms/s in ultra-segmented memory mode)
basic (7 trigger types)	advanced, digital trigger (13 trigger types)	advanced (includes zone trigger), digital trigger (14 trigger types) [2]
16	16	16
two logic probes: 2.5 Gsample/s on each channel; one logic probe: 5 Gsample/s on each channel	5 Gsample/s	5 Gsample/s
100 Msample	100 Msample	200 Msample
4	3	3
31	47	47
elementary (tolerance mask around the signal)	advanced (freely configurable, hardware-based)	advanced (freely configurable, hardware-based)
basic (math on math)	advanced (formula editor)	advanced (formula editor)
I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN, I²S, MIL-STD-1553, ARINC 429 (8)	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN, I²S, MIL-STD-1553, ARINC 429, FlexRay™, CAN-FD, USB 2.0/HSIC, Ethernet, Manchester, NRZ, SENT, SpaceWire, CXPI, USB Power Delivery, automotive Ethernet 100BASE-T1 (19)	I²C, SPI, UART/RS-232/RS-422/RS-485, CAN, LIN, I²S, MIL-STD-1553, ARINC 429, FlexRay™, CAN-FD, MIPI RFFE, USB 2.0/HSIC, MDIO, 8b 10b, Ethernet, Manchester, NRZ, SENT, MIPI D-PHY, SpaceWire, MIPI M-PHY/UniPro, CXPI, USB 3.1 Gen1, USB-SSIC, PCIe 1.1/2.0, USB Power Delivery, automotive Ethernet 100BASE-T1 (27)
–	histogram, trend, track [2]	histogram, trend, track [2]
power, digital voltmeter (DVM), spectrum analysis and spectrogram	power, 16-bit high definition mode (standard), advanced spectrum analysis and spectrogram	power, 16-bit high definition mode, advanced spectrum analysis and spectrogram, jitter, clock data recovery, I/Q data, RF analysis
–	–	various options available, for details see data sheet (PD 3607.2684.22)
10.1", color, 1280 × 800 pixel	10.4", color, 1024 × 768 pixel	12.1", color, 1280 × 800 pixel
optimized for touchscreen operation, parallel button operation		
390 × 220 × 152	427 × 249 × 204	427 × 249 × 204
3.3	8.6	9.6
–	–	–

Service that adds value

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

Rohde&Schwarz

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ISO 9001

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R&S®RTA4000 Oscilloscope

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