

**ROHDE & SCHWARZ**

Make ideas real



# OSCILLOSCOPE INNOVATION. MEASUREMENT CONFIDENCE.

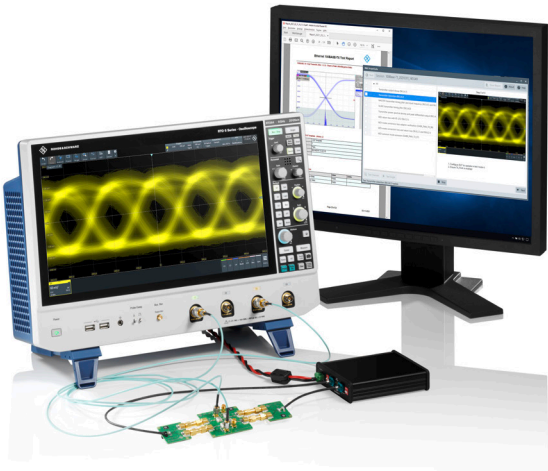
[www.rohde-schwarz.com/oscilloscopes](http://www.rohde-schwarz.com/oscilloscopes)



### Innovative technology for superior results

The company has invested in oscilloscope technology for over 15 years and produces advanced oscilloscopes with capabilities found nowhere else on the market. What makes Rohde&Schwarz oscilloscopes different? Generations of ASIC technology, developed in-house for responsive performance and usability that quickly illuminates signal details that other oscilloscopes miss. The MXO series revolutionized the industry with the world's fastest capture rate that capture up to 99% of real time. The ASIC based zone trigger across time, math and spectrum domains has unique triggering capabilities that complement the patented digital trigger architecture. Try a Rohde&Schwarz oscilloscope in your lab and see the difference.

Rohde&Schwarz oscilloscopes have an R&S®SmartGrid user interface for higher productivity and comes standard on all MXO and R&S®RTx oscilloscopes and make life easier users with multiple instruments. Rohde&Schwarz consistently delivers new and updated measurement and analysis applications for industry-specific needs, including serial buses, power analysis, automotive debugging and RF testing. The oscilloscope probe portfolio includes a wide range of passive and active probes, such as the R&S®RT-ZISO isolated probing system. This probing technology combines high bandwidth with superior isolation to address critical wide bandgap challenges in power electronics.



Fastest acquisitions with  
4.5 million waveforms/s

Highest precision of  
12-bit ADC/18-bit HD resolution

Fast spectrum acquisitions with  
zone trigger capability

Deep memory capture with  
> 400 million points/channel

Highest sensitivity with  
advanced digital trigger

## See the big picture in all its details



MXO 4

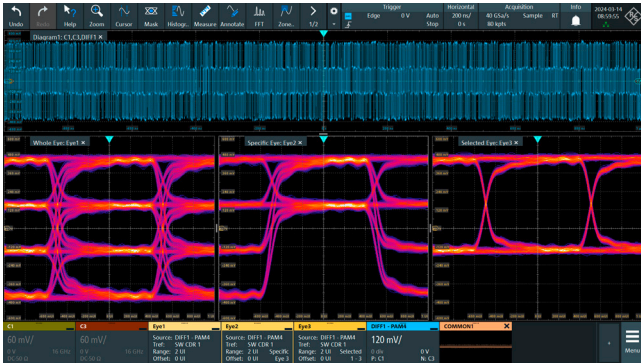
MXO 5C

MXO 5

# THE MXO SERIES

## Signal integrity debugging and analysis

Experience unmatched signal integrity analysis with the R&S®RTP and R&S®RTO6 series oscilloscopes. The advanced instruments have a vast set of tools for high-speed interface challenges, including jitter and noise decomposition, advanced eye verification, serial pattern triggering with HW-CDR and TDR/TDT analysis. Uncover true signal behavior with real-time deembedding or emulate the impact of embedded cable or equalizer signal recovery. Electrical compliance testing and protocol decoding optimize signal quality for high-speed USB, Ethernet, PCIe, MIPI and DDR interfaces. Unlock a design's full potential with innovative PAM-N analysis for next-generation high-speed interfaces.



## RF analysis up to 170 GHz with R&S®RTP oscilloscopes

The unique combination of analog input performance, digital trigger, real-time deembedding, industry leading spectrum capabilities, integrated I/Q interface and sophisticated vector signal analysis software make the R&S®RTP oscilloscope ideal for wideband RF analysis, including coherent multichannel and RF-pulse analysis. Fully calibrated frontend modules with integrated LO can access popular frequency ranges up to 170 GHz.



# Instant insight meets in-depth information.



R&S®RTO6

R&S®RTP

Analog bandwidth  
from 600 MHz to 16 GHz

Fastest waveform acquisition in class  
(1 million waveforms/s)

Fast overlapping FFT  
with zone trigger capability

Pristine signal performance  
with low noise and HD resolution

Extensive signal processing tools  
with realtime performance

# ANALYSIS

Our oscilloscope portfolio is continuously enhanced with new models, applications and accessories for high-quality analysis.

## Feature type

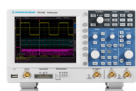
- General measurements
- Mathematics
- Serial protocol trigger and decode <sup>1)</sup>
- Applications <sup>1)</sup>
- Generator <sup>1)</sup>
- Compliance testing <sup>1)</sup>

	R&S®RTH1000	R&S®RTC1000	R&S®RTB 2	R&S®RTM3000	MXO 4	MXO 5/ MXO 5C	R&S®RTO6	R&S®RTP
	cursor, parameter	cursor, parameter	cursor, parameter incl. statistics	cursor, parameter incl. statistics	cursor, parameter incl. statistics	cursor, parameter incl. statistics	cursor, parameter incl. statistics	cursor, parameter incl. statistics
	elementary	elementary	basic (math on math)	basic (math on math)	advanced (formula editor)	advanced (formula editor)	advanced (formula editor, Python interface)	advanced (formula editor, Python interface)
<b>Low-speed serial</b>	I <sup>2</sup> C, SPI, UART/ RS-232/422/485	I <sup>2</sup> C, SPI, UART/ RS-232/422/485	I <sup>2</sup> C, SPI, UART/ RS-232/422/485	I <sup>2</sup> C, SPI, UART/ RS-232/422/485	I <sup>2</sup> C, SPI, UART/ RS-232/422/485, QUAD-SPI	I <sup>2</sup> C, SPI, UART/ RS-232/422/485, QUAD-SPI	I <sup>2</sup> C, SPI, UART/ RS-232/422/485	I <sup>2</sup> C, SPI, UART/ RS-232/422/485
<b>Automotive</b>	CAN, CAN FD, SENT, LIN	CAN, LIN	CAN, LIN	CAN, LIN	CAN, CAN FD, CAN XL, LIN, SENT	CAN, CAN FD, CAN XL, LIN, SENT	CAN, CAN FD, FlexRay, SENT, LIN, CXPI	CAN, CAN FD, SENT, LIN
<b>Audio</b>				I <sup>2</sup> S			I <sup>2</sup> S	
<b>Aerospace</b>				MIL-STD-1553, ARINC 429	MIL-STD-1553, ARINC 429		MIL-STD-1553, ARINC 429, SpaceWire	MIL-STD-1553, ARINC 429, SpaceWire
<b>MIPI low speed</b>					SPMI, RFFE	SPMI, RFFE	MIPI RFFE	MIPI RFFE
<b>Automotive Ethernet</b>					10BASE-T1S	10BASE-T1S, 100BASE-T1	100/1000BASE-T1	100/1000BASE-T1
<b>USB</b>							USB 2.0/HSD/Power Delivery, USB 3.1 Gen1, USB-SSIC	USB 2.0/HSD/Power Delivery, USB 3.1 Gen1/2/, USB-SSIC
<b>PCI Express</b>							PCIe 1.1/2.0, 8b10b	PCIe 1.1/2.0/3.0, 8b10b
<b>Ethernet</b>							10/100BASE-TX, MDIO	10/100BASE-TX, MDIO
<b>Custom</b>							Manchester, NRZ	Manchester, NRZ
<b>MIPI high speed</b>							D-PHY, M-PHY/ UniPro	D-PHY, M-PHY/ UniPro
<b>Power</b>	digital voltmeter, harmonics analysis	digital voltmeter	digital voltmeter	digital voltmeter, power analysis	digital voltmeter, power analysis	digital voltmeter, power analysis	digital voltmeter, power analysis	digital voltmeter, power analysis
<b>Bode plot</b>			frequency response analysis	frequency response analysis	frequency response analysis	frequency response analysis		
<b>Jitter and eye</b>							jitter and noise decomposition, clock data recov- ery, advanced eye, , PAM-N analysis	jitter and noise decomposition, clock data recov- ery, advanced eye, PAM-N analysis
<b>Signal integrity</b>							deembedding, embedding, equal- ization, TDR/TDT analysis	real-time deembedding, embedding, equal- ization, TDR/TDT analysis
<b>RF analysis</b>	FFT	FFT	FFT, spectrogram	FFT, spectrogram	FFT	FFT	FFT, spectrogram, I/Q data and RF analysis (R&S®VSE)	FFT, spectrogram, I/Q data and RF analysis (R&S®VSE), external frontend control
<b>Special</b>	user scripting, frequency counter	component tester					Python scripting	Python scripting
	–	1-channel function, 4 bit pattern <sup>1), 2)</sup>	1-channel function/ arbitrary, 4 bit pat- tern <sup>1), 2)</sup>	1-channel function/ arbitrary, 4 bit pat- tern <sup>1), 2)</sup>	2-channel function/arbitrary	2-channel function/arbitrary	2-channel function/ arbitrary, 8 bit pat- tern <sup>1), 2)</sup> , 16 GHz differ- ential pulse source	2-channel function/ arbitrary, 8 bit pat- tern <sup>1), 2)</sup> , 16 GHz differ- ential pulse source
	–	–	–	–	–	–	see specifications (PD 5216.1640.22)	see specifications (PD 3683.5616.22)

<sup>1)</sup> Upgradeable.

<sup>2)</sup> Requires an option.

# OSCILLOSCOPE PORTFOLIO



	R&S®RTH1000	R&S®RTC1000	R&S®RTB 2	R&S®RTM3000
<b>Vertical system</b>				
Bandwidth <sup>1)</sup>	60/100/200/350/500 MHz	50/70/100/200/300 MHz	70/100/200/300 MHz	100/200/350/500 MHz/1 GHz
Number of channels	2 plus DMM/4	2	2/4	2/4
Vertical resolution; system architecture	10 bit; 16 bit	8 bit; 16 bit	10 bit; 16 bit	10 bit; 16 bit
V/div, 1 M $\Omega$	2 mV to 100 V	1 mV to 10 V	1 mV to 5 V	500 $\mu$ V to 10 V
V/div, 50 $\Omega$	–			500 $\mu$ V to 1 V
Digital channels (MSO)	8	8	16	16
<b>Horizontal system</b>				
Sampling rate per channel (in Gsample/s)	1.25 (4-channel model); 2.5 (2-channel model); 5 (all channels interleaved)	1; 2 (2 channels interleaved)	1.25; 2.5 (2 channels interleaved)	2.5; 5 (2 channels interleaved)
Maximum memory (per channel; 1 channel active)	125 kpoints (4-channel model); 250 kpoints (2-channel model); 500 kpoints	1 Mpoints; 2 Mpoints	10 Mpoints; 20 Mpoints	40 Mpoints; 80 Mpoints
Acquisition rate (in waveforms/s)	50 000	10 000	50 000 (300 000 in fast segmented memory mode)	64 000 (2 000 000 in fast segmented memory mode <sup>2)</sup> )
<b>Trigger</b>				
Types	digital	analog	analog	analog
Sensitivity	–	–	at 1 mV/div: > 2 div	at 1 mV/div: > 2 div
<b>Display and operation</b>				
Size and resolution	7" touchscreen, 800 x 480 pixel	6.5", 640 x 480 pixel	10.1" touchscreen, 1280 x 800 pixel	10.1" touchscreen, 1280 x 800 pixel
<b>General data</b>				
Dimensions in mm (W x H x D)	201 x 293 x 74	285 x 175 x 140	390 x 220 x 152	390 x 220 x 152
Weight in kg	2.4	1.7	2.5	3.3
Battery	lithium-ion, > 4 h	–	–	–

<sup>1)</sup> Upgradeable.

<sup>2)</sup> Requires an option.

<sup>3)</sup> For 8-channel versions only.

Rohde & Schwarz oscilloscopes have excellent signal fidelity, high acquisition rates, an innovative trigger system and a smart user interface.

Choose from a wide range of oscilloscopes, from high-volume oscilloscopes for service, maintenance and education to top-class instruments for R&D and EMI debugging in the 600 MHz to 16 GHz range. Benefit from the high product quality and the in-depth development and production expertise at Rohde & Schwarz.



MXO 4	MXO 5/MXO 5C	R&S®RT06	R&S®RTP
200/350/500 MHz/1/1.5 GHz	100 <sup>3)</sup> /200 <sup>3)</sup> /350/500 MHz/1/2 GHz	600 MHz/1/2/3/4/6 GHz	4/6/8/13/16 GHz
4	4/8	4	4
12 bit; 18 bit	12 bit; 18 bit	8 bit; 16 bit	8 bit; 16 bit
500 $\mu$ V to 10 V	500 $\mu$ V to 10 V	1 mV to 10 V (HD mode: 500 $\mu$ V to 10 V)	with R&S®RT-Z1M: 2 mV to 10 V (HD mode: 1 mV to 10 V)
500 $\mu$ V to 1 V	500 $\mu$ V to 1 V	1 mV to 1 V (HD mode: 500 $\mu$ V to 1 V)	2 mV to 1 V (HD mode: 1 mV to 1 V)
16	16	16	16
2.5; 5 (2 channels interleaved)	5 on 4 channels; 2.5 on 8 channels (2 channels interleaved)	10; 20 (2 channels interleaved in 4 GHz and 6 GHz model)	20; 40 (2 channels interleaved)
standard: 400 Mpoints; max. upgrade: 800 Mpoints <sup>2)</sup>	standard: 500 Mpoints max. upgrade: 1 Gpoint <sup>2)</sup>	standard: 200 Mpoints/800 Mpoints; max. upgrade: 1 Gpoint/2 Gpoints	standard: 100 Mpoints/400 Mpoints; max. upgrade: 3 Gpoints
> 4500000	> 4500000 on 4 channels	1 000 000 (2500000 in ultra-segmented memory mode)	750 000 (3200000 in ultra-segmented memory mode)
advanced (includes zone trigger), digital trigger (15 trigger types)	advanced (includes zone trigger), digital trigger (15 trigger types)	advanced (includes zone trigger), digital trigger (15 trigger types), high speed serial pattern trigger including 5 Gbps clock data recovery (CDR) <sup>2)</sup>	advanced (includes zone trigger), digital trigger (14 trigger types) with real-time deembedding <sup>2)</sup> , high speed serial pattern trigger including 8/16 Gbps clock data recovery (CDR) <sup>2)</sup>
0.0001 div, across full bandwidth, user controllable	0.0001 div, across full bandwidth, user controllable	0.0001 div, across full bandwidth, user controllable	0.0001 div, across full bandwidth, user controllable
13.3" touchscreen, 1920 x 1080 pixel (Full HD)	for MXO 5 only: 15.6" touchscreen, 1920 x 1080 pixel (Full HD)	15.6" touchscreen, 1920 x 1080 pixel (Full HD)	13.3" touchscreen, 1920 x 1080 pixel (Full HD)
414 x 279 x 162	MXO 5: 445 x 314 x 154 MXO 5C: 445 x 105 x 405	450 x 315 x 204	441 x 285 x 316
6	MXO 5: 9 MXO 5C: 8.7	10.7	18
-	-	-	-

# PROBE PORTFOLIO

## Probe type

- Passive
- Active single-ended
- Active differential
- Modular
- Power rail
- Multichannel
- High voltage
- Current
- Near-field
- Logic probes
- Accessories



Type (R&S®)	Description	Bandwidth	Dynamic range
RT-ZP03S/ZP05S/ZP10/ZP11	general purpose, 10:1, 10 MΩ	300 MHz to 700 MHz	up to 400 V (RMS)
RT-ZP1X	specialized, 1:1, 1 MΩ	38 MHz	DC: 60 V, AC: 30 V (RMS)
RT-ZPMMCX	specialized MMCX tip, 25:1, 14.9 MΩ	700 MHz	DC: 60 V, AC: 30 V (RMS)
RT-ZZ80	broadband, 10:1, 500 Ω	8 GHz	20 V (RMS)
RT-ZS10(E)/20/30/60	high bandwidth single ended, 10:1, 1 MΩ <sup>1), 2)</sup>	1 GHz to 6 GHz	±8 V
RT-ZD10/20/30/40	high bandwidth differential, 10:1, 1 MΩ <sup>1), 2)</sup>	1 GHz to 4.5 GHz	±5 V
RT-ZA15	attenuator for R&S®RT-ZD10/20/30, 10:1	depends on RT-ZD	±70 V DC, ±46 V AC (peak)
RT-ZM15/30/60/90/130/160	probe amplifier module, 10:1/2:1, 400 kΩ <sup>1), 2)</sup>	1.5 GHz to 16 GHz	depends on tip module used
RT-ZMA10/12/14/15	R&S®RT-ZM tip: solder-in/square-pin/flex solder-in/ quick-connect	<sup>3)</sup>	±2.5 V (10:1), ±0.5 V (1:1)
RT-ZMA30/40/50	R&S®RT-ZM tip: browser/SMA/extreme temperature kit	<sup>3)</sup>	±2.5 V (10:1), ±0.5 V (1:1)
RT-ZPR20/40	high bandwidth power rail, 1:1, 50 kΩ(DC), 50 Ω(AC) <sup>1), 2)</sup>	2 GHz/4 GHz	±850 mV
RT-ZVC02/04	2/4 channels, small voltage and current, 10 MΩ	1 MHz	±1.8 V to ±15 V, ±4.5 μA to ±10 A
RT-ZI10(C)/11	isolated, 10:1/100:1, 10(10)/100 MΩ	500 MHz	600 V CAT IV (300 V CAT III)/600 V CAT IV
RT-ZH10/11	passive, single-ended, 100:1/1000:1, 50 MΩ	400 MHz	1 kV (RMS)
RT-ZHD07/15/16/60	differential, 25:1 to 100:1 / 250:1 to 1000:1 <sup>1), 2)</sup>	100 MHz to 200 MHz	±750 V to 6000 V (peak)
RT-ZISO	isolated, high bandwidth, high CMRR, 0.04:1 to 120:1 <sup>1), 2)</sup>	100 MHz to 1 GHz	depends on tip module used
ZISO-Z101/201/202/203	R&S®RT-ZISO tip: MMCX/MMCX/square pin, wide square pin	DC to 1 GHz	tip to reference input: 8/300/750/2500 V (RMS)
ZISO-Z301/302	R&S®RT-ZISO tip: isolated browser tip	DC to 500 MHz	tip to reference input: 300 V/3540 V (RMS)
RT-ZC02	high range, 0.01 / 0.001 V/A	20 kHz	1000 A (RMS)
RT-ZC03	basic AC/DC current probe	100 kHz	20 A (RMS), ±30 A (peak), 0.1 V/A
RT-ZC05B/10(B)	mid range 0.01 V/A <sup>1)</sup>	2 MHz/10 MHz	500 A/150 A (RMS), ±700 A/±300 A (peak)
RT-ZC15B/20(B)/30	high range 0.1/0.1/1 V/A <sup>1)</sup>	50/100/120 MHz	30/30/5 A (RMS), ±50/50/7.5 A (peak)
RT-ZC31	three range 0.1 V/A, 1 V/A, 10 V/A switchable	120 MHz	30 A (RMS), ±50 A (peak)
HZ-15/17	passive E and H near-field probe set/compact	30 MHz to 3 GHz	N/A
RT-ZL03/04	logic probes, 8 channels	300 MHz/400 MHz	
RT-ZA9	N(m) adapter for R&S®RT-Zxx probes	depends on probe	
RT-ZA29	bipod probe positioner		
RT-ZAP	3D probe positioner		
RT-ZA50	adapter, Rohde & Schwarz probe interface to 2.92 mm/3.5 mm/SMA		
RT-ZA51	adapter, 2.92 mm/3.5 mm/SMA to Rohde & Schwarz probe interface		
RT-Z2T	probe interface adapter, for selected Tektronix probes with TekProbe BNC level II interface		

For more information, see product brochure "Probes and accessories for Rohde & Schwarz oscilloscopes" (PD 3606.8866.12)

<sup>1)</sup> Includes Rohde & Schwarz probe interface.

<sup>2)</sup> Includes R&S®ProbeMeter and micro button for instrument control.

<sup>3)</sup> Depends on amplifier module.

## Service at Rohde & Schwarz You're in great hands

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

### **Rohde & Schwarz**

The Rohde & Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test and measurement, technology systems, and networks and cybersecurity. Founded 90 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

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### **Rohde & Schwarz training**

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