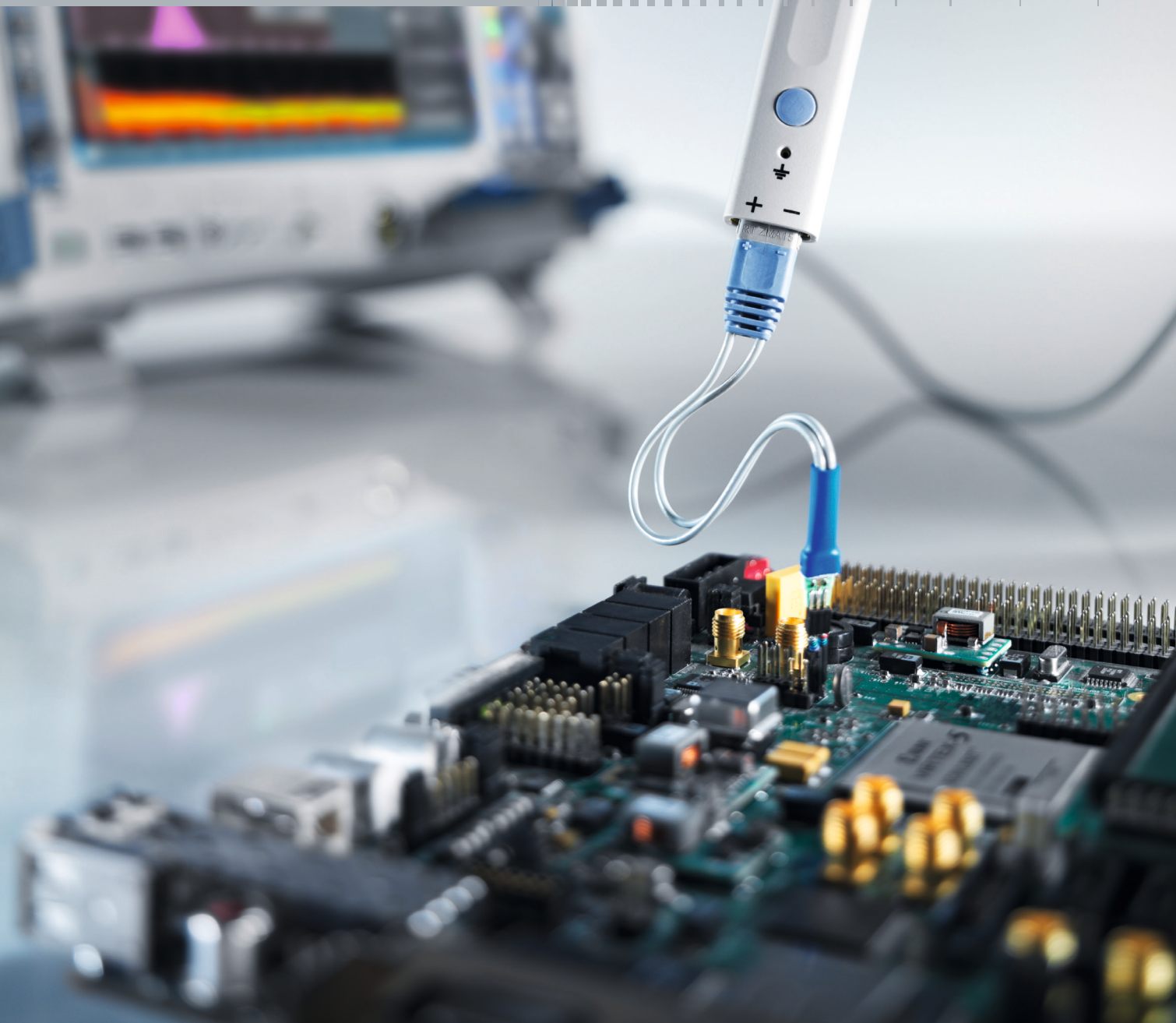


R&S® RT-ZM Modular Probe System


ROHDE & SCHWARZ

Multi
 **Mode**

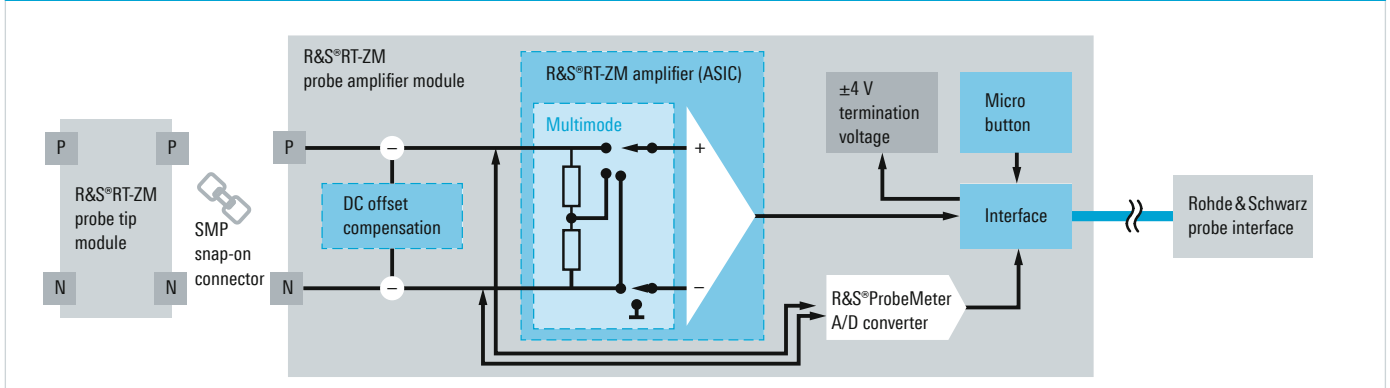


Addressing high-speed probing challenges

The R&S®RT-ZM modular probe system addresses today's probing requirements with a technically sophisticated yet easy-to-handle solution. The various probing solutions meet the demands for high probing bandwidth and dynamic range in conjunction with the need for low capacitive load. Examples include semi-permanent solder-in probe tips for physically small probing areas or a solution for environmental tests in climatic chambers at temperatures from -55°C to +125°C.

The R&S®RT-ZM modular probe system delivers high performance in combination with flexible and configurable connectivity. The system includes probe tip modules for various measurement tasks and conditions. These modules can be connected to amplifier modules with bandwidths ranging from 1.5 GHz to 16 GHz. The modular probe system also offers multimode functionality, enabling users to switch between different measurement modes. The integrated R&S®ProbeMeter functionality makes it possible to perform high-precision DC voltage measurements at the same time.

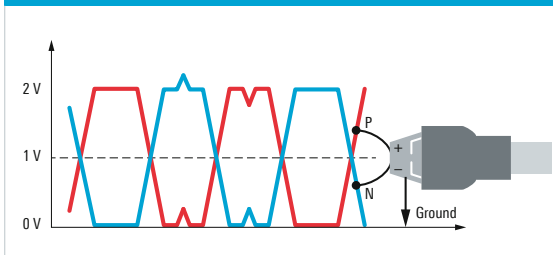
R&S®RT-ZM modular probe system with exchangeable R&S®RT-ZM probe tip module (connected via a high-performance double-socket SMP snap-on interface to an R&S®RT-ZM probe amplifier module with Rohde & Schwarz probe interface)



Multiple measurement modes with a single connection

The multimode functionality allows users to switch between single-ended, differential and common mode measurements without reconnecting or resoldering the probe tip. The multimode functionality is implemented on the company-designed high-speed R&S®RT-ZM amplifier ASIC.

Multimode measurement



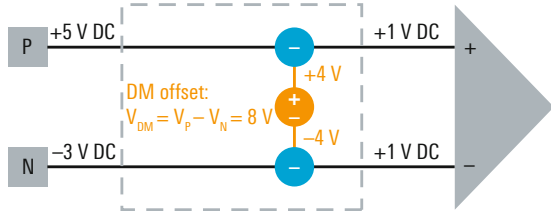
Measurement mode		Description
Differential mode (DM)		Voltage between positive and negative input pin: $V_{DM} = V_P - V_N$
Common mode (CM)		Mean voltage between positive and negative input pin versus ground: $V_{CM} = \frac{V_P + V_N}{2}$
Single-ended modes	P mode	Voltage between positive or negative input pin and ground:
	N mode	

Offset compensation for maximum resolution

The R&S®RT-ZM modular probe system offers a unique offset compensation range of ± 16 V. The DC components of a measured signal can be compensated at the probe tip, upstream of the differential R&S®RT-ZM amplifier ASIC. The benefit of this approach is that the operating voltage window is extended beyond the dynamic range of the probe amplifier module and the signal components of interest can be displayed on the oscilloscope with maximum resolution. This feature is also available in multimode operation.

Differential mode

DM offset compensation scheme

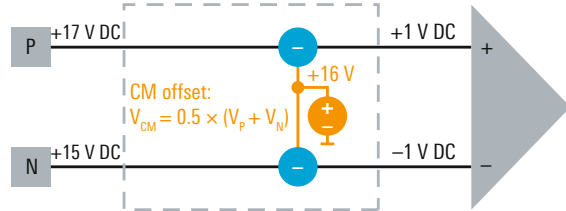


Application

Probing single-ended signals, e.g. on power rails with high DC components and small AC signals, using the R&S®RT-ZMA30 browser module

Common mode

CM offset compensation scheme

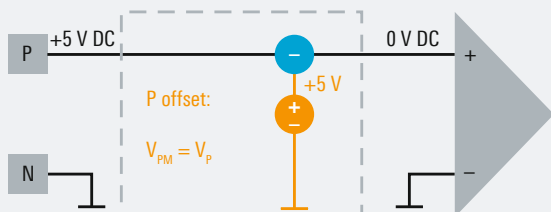


Application

Measurement of differential signals with high common mode levels, e.g. on serial bus interfaces

Single-ended P mode

P mode offset compensation scheme

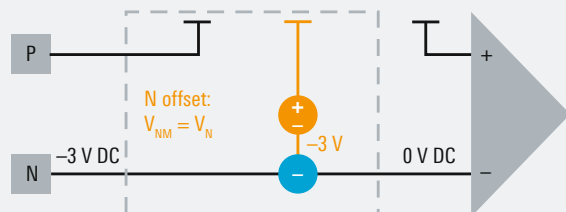


Application

Measurement of single-ended AC signals with high superimposed DC components at the positive pin

Single-ended N mode

N mode offset compensation scheme

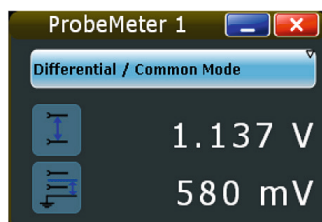


Application

Measurement of single-ended AC signals with high superimposed DC components at the negative pin

Integrated high-precision voltmeter

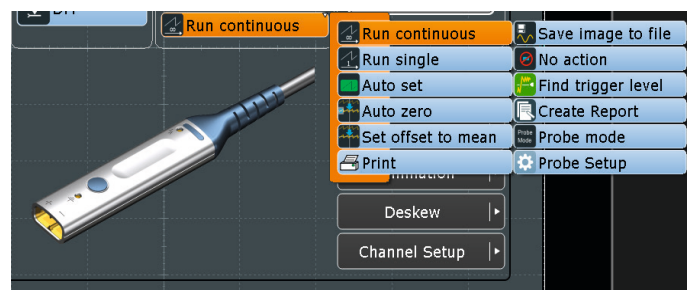
The integrated R&S®ProbeMeter is unique to active probes from Rohde&Schwarz. It operates independently from the oscilloscope and measures the DC component of a signal with an accuracy of 0.05%. This measurement is performed continuously and in parallel with the waveform acquisition of the oscilloscope. The high precision is achieved with a dedicated ADC inside the R&S®RT-ZM probe amplifier module that immediately digitizes the measured DC voltage.



Voltmeter

Integrated micro button for convenient instrument control

The R&S®RT-ZM probe amplifier module comes with an integrated micro button that allows users to stay focused on their measurement tasks and conveniently operate their oscilloscopes. The micro button can be configured on Rohde & Schwarz oscilloscopes to perform a variety of functions such as run/stop, auto set, save waveform, find trigger level or to create an automated test report. The R&S®RT-ZM modular probe system can also be configured for multimode switching.



Micro button configuration

R&S®RT-ZM probe amplifier modules

The R&S®RT-ZM modular probe system is available with amplifier modules offering bandwidths from 1.5 GHz to 16 GHz. These modules come with a Rohde&Schwarz probe interface that allows automatic probe detection and configuration on Rohde&Schwarz oscilloscopes. The amplifier is equipped with a miniaturized high-quality, high-frequency coaxial double-socket SMP connector for flexible snap-on use with various probe tip modules.

The SMP connector on the amplifier is specially designed for a bandwidth from DC to 26.5 GHz. It offers minimum return loss and ensures high repeatability for many connect/disconnect cycles. The double-socket SMP connector has built-in connector alignment to safeguard the connection between the probe amplifier module and the probe tip module to provide highly repeatable signal transmission conditions.

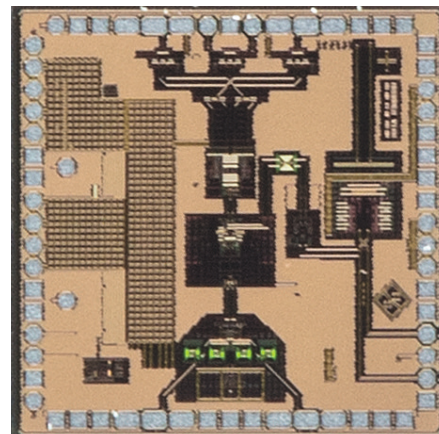
The key component of the probe amplifier module is an in-house designed, advanced high-speed ASIC that ensures highest signal fidelity across the entire bandwidth of the amplifier module.

The unique, single-core ASIC on thin film ceramic features switchable gain settings for lowest system noise. The multimode functionality for the R&S®RT-ZM modular probe system is also implemented on the ASIC.


The sophisticated RF design of the probe amplifier module, including board design, shielding and high-speed ASIC, results in industry-leading low zero and attenuation error over temperature for all gain settings and measurement modes.



R&S®RT-ZM probe amplifier module with Rohde&Schwarz probe interface. The amplifier is equipped with a double-socket SMP connector.



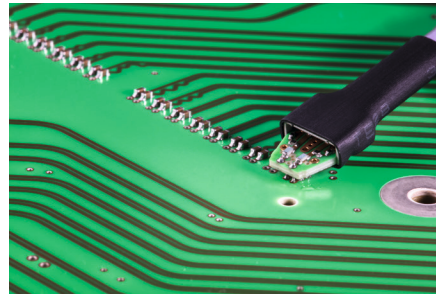
In-house designed single-core high-speed ASIC of R&S®RT-ZM probe amplifier module.

Specifications in brief	
Available bandwidths (all models support multimode operation)	<ul style="list-style-type: none"> ■ R&S®RT-ZM15: 1.5 GHz ■ R&S®RT-ZM30: 3 GHz ■ R&S®RT-ZM60: 6 GHz ■ R&S®RT-ZM90: 9 GHz ■ R&S®RT-ZM130: 13 GHz ■ R&S®RT-ZM160: 16 GHz
Dynamic range (switchable gain settings for low system noise)	<ul style="list-style-type: none"> ■ with 10:1 attenuation: ± 2.5 V ■ with 2:1 attenuation: ± 0.5 V
Rise time 	<ul style="list-style-type: none"> ■ R&S®RT-ZM15: < 230 ps ■ R&S®RT-ZM30: < 100 ps ■ R&S®RT-ZM60: < 75 ps ■ R&S®RT-ZM90: < 50 ps ■ R&S®RT-ZM130: < 35 ps ■ R&S®RT-ZM160: < 28 ps
Operating voltage window	± 5 V plus DC offset voltage
DC offset voltage	± 16 V in all operating modes
Input resistance	400 k Ω in differential mode, 200 k Ω in single-ended mode
Additional features	integrated high-precision voltmeter and micro button for convenient instrument control
Supported Rohde&Schwarz oscilloscopes	R&S®RTE, R&S®RTO1000, R&S®RTO2000, R&S®RTP

R&S®RT-ZM probe tip modules

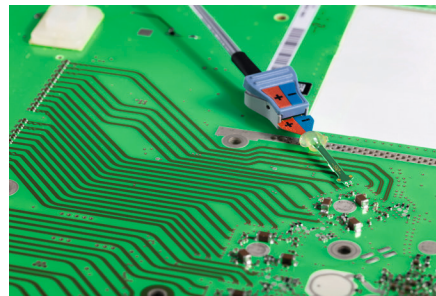
R&S®RT-ZMA10/-ZMA11 solder-in probe tip modules

The R&S®RT-ZMA10 and R&S®RT-ZMA11 solder-in probe tip modules are solutions for contacting test points with a narrow probing pitch or that are hard to reach. Both modules enable semi-permanent solder-in connections for multimode measurements, which do not require resoldering.



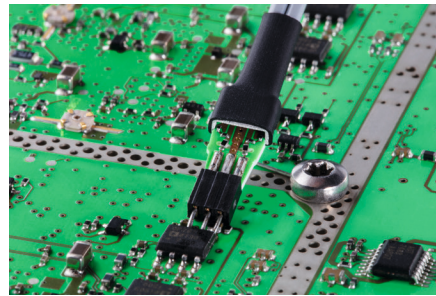
R&S®RT-ZMA14 solder-in flex connect probe tip modules

The R&S®RT-ZMA14 solder-in flex connect probe tip modules are ideal for contacting test points with narrow probing pitches. The module comes with 10 solder-in probe tips to prepare connections to multiple test points. The probe tip module supports multimode measurements.



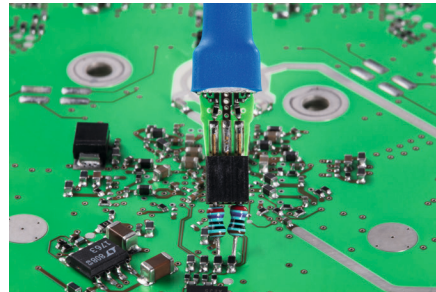
R&S®RT-ZMA12 square-pin probe tip module

The R&S®RT-ZMA12 square-pin probe tip module is the right choice for probing your DUT up to 6 GHz. The module is connected to the DUT by plugging it onto the DUT's test leads or soldered test pins. Pin strips with a pitch of 1.27 mm can also be used.



R&S®RT-ZMA15 quick-connect probe tip module

The R&S®RT-ZMA15 quick-connect probe tip module is a solution for quickly connecting and disconnecting to your DUT. The connection is established via soldered-in 270 Ω resistors. The module is connected to the DUT by plugging it onto the soldered-in 270 Ω resistors and the ground lead. These resistors are supplied with the module and are required to ensure optimal performance and signal integrity across the full bandwidth of the probe amplifier module.



R&S®RT-ZMA30 browser module

The R&S®RT-ZMA30 browser module quickly and conveniently probes DUTs. It supports differential and single-ended measurements. The probing pins of the R&S®RT-ZMA30 are spring loaded (0.5 mm spring travel); the spacing between the pins is adjustable from 0.5 mm to 8 mm.



R&S®RT-ZMA40 SMA module

The R&S®RT-ZMA40 SMA module delivers multimode measurements in a 50 Ω/100 Ω environment. The module applies the termination voltage (±4 V) supplied from the R&S®RT-ZM probe amplifier module to the DUT to measure against a DUT-specific common mode DC voltage instead of ground. The coaxial connectors are compatible with 3.5 and 2.92 systems.



R&S®RT-ZMA50 extreme temperature kit

The R&S®RT-ZMA50 enables measurements in the temperature range from -55 °C to +125 °C by separating the probe tip module from the probe amplifier module using a 1 m extension cable. The kit consists of an R&S®RT-ZMA11 solder-in probe tip module and a pair of matched cables.



Tip module	Bandwidth	Rise time	Input capacitance	DC input resistance	Multimode	Temperature range
R&S®RT-ZMA10	max. 16 GHz	10/90: 28 ps 20/80: 17 ps	DM: 77 fF SE: 96 fF	DM: 400 kΩ SE: 200 kΩ	P/N/DM/CM	-30 °C to +80 °C
R&S®RT-ZMA12	max. 6 GHz	10/90: 75 ps 20/80: 45 ps	DM: 279 fF SE: 521 fF	DM: 400 kΩ SE: 200 kΩ	P/N/DM/CM	-30 °C to +80 °C
R&S®RT-ZMA14	max. 16 GHz	10/90: 28 ps 20/80: 17 ps	DM: 90 fF SE: 144 fF	DM: 400 kΩ SE: 200 kΩ	P/N/DM/CM	-30 °C to +80 °C
R&S®RT-ZMA15	max. 12 GHz	10/90: 37 ps 20/80: 22 ps	DM: 109 fF SE: 150 fF	DM: 400 kΩ SE: 200 kΩ	P/N/DM/CM	-30 °C to +80 °C
R&S®RT-ZMA30	max. 16 GHz	10/90: 28 ps 20/80: 17 ps	DM: 32 fF SE: 52 fF	DM: 400 kΩ SE: 200 kΩ	DM	0 °C to +40 °C
R&S®RT-ZMA40	max. 16 GHz	10/90: 28 ps 20/80: 17 ps	input return loss > 12 dB	DM: 100 Ω SE: 60 Ω to VT	P/N/DM/CM	0 °C to +40 °C
R&S®RT-ZMA50 (incl. R&S®RT-ZMA11)	max. 12 GHz	10/90: 37 ps 20/80: 22 ps	DM: 77 fF SE: 96 fF	DM: 400 kΩ SE: 200 kΩ	P/N/DM/CM	-55 °C to +125 °C

Ordering information

R&S®RT-ZM probe amplifier modules

Type	Description		Order No.
	System bandwidth	Rise time (10% to 90%)	
R&S®RT-ZM15	> 1.5 GHz	< 230 ps	1800.4700.02
R&S®RT-ZM30	> 3 GHz	< 100 ps	1419.3005.02
R&S®RT-ZM60	> 6 GHz	< 75 ps	1419.3105.02
R&S®RT-ZM90	> 9 GHz	< 50 ps	1419.3205.02
R&S®RT-ZM130	> 13 GHz	< 35 ps	1800.4500.02
R&S®RT-ZM160	> 16 GHz	< 28 ps	1800.4600.02

R&S®RT-ZM probe tip modules

Type	Description	Order No.
R&S®RT-ZMA10	Solder-in probe tip module for R&S®RT-ZM probe amplifier module, length: 15 cm, multimode: P/N/DM/CM	1419.4301.02
R&S®RT-ZMA10-6	Set of 6 R&S®RT-ZMA10 solder-in probe tip modules	1801.4349.02
R&S®RT-ZMA11	Solder-in probe tip module for extended temperature range from -55 °C to +125 °C for R&S®RT-ZM probe amplifier module, length: 15 cm, multimode: P/N/DM/CM	1419.4318.02
R&S®RT-ZMA12	Square-pin probe tip module for R&S®RT-ZM probe amplifier module, length: 15 cm, multimode: P/N/DM/CM	1419.4324.02
R&S®RT-ZMA14	Flex connect solder-in probe tip module for R&S®RT-ZM probe amplifier module, length: 15 cm, multimode P/N/DM/CM	1338.1010.02
R&S®RT-ZMA15	Quick-connect probe tip module for R&S®RT-ZM probe amplifier module, length: 15 cm, multimode: P/N/DM/CM	1419.4224.02
R&S®RT-ZMA30	Browser module for R&S®RT-ZM probe amplifier module, multimode: DM	1419.4353.02
R&S®RT-ZMA40	SMA module for R&S®RT-ZM probe amplifier module, 50 Ω/100 Ω, suitable for SMA, 3.5 mm and 2.92 mm systems, termination voltage ±4 V, supplied from R&S®RT-ZM probe amplifier module, multimode: P/N/DM/CM	1419.4201.02
R&S®RT-ZMA50	Extreme temperature kit for R&S®RT-ZM probe amplifier module; consists of R&S®RT-ZMA11 and a pair of matched extension cables, cable length: 1 m, temperature range: -55 °C to +125 °C, multimode: P/N/DM/CM	1419.4218.02

Accessory

Type	Description	Order No.
R&S®RT-ZMA1	Probe tip module case for up to 6 R&S®RT-ZMAxx probe tip modules	1419.3928.02
R&S®RT-ZF30	Test fixture for probe characterization with R&S®RTP-B7	1333.2099.02
R&S®RT-ZAP	3D positioner with central tensioning knob for easy clamping and positioning of probes (span width: 200 mm, clamping range: 15 mm)	1326.3641.02

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www.rohde-schwarz.com

Regional contact

- | Europe, Africa, Middle East | +49 89 4129 12345
customersupport@rohde-schwarz.com
- | North America | 1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
- | Latin America | +1 410 910 79 88
customersupport.la@rohde-schwarz.com
- | Asia Pacific | +65 65 13 04 88
customersupport.asia@rohde-schwarz.com
- | China | +86 800 810 82 28 | +86 400 650 58 96
customersupport.china@rohde-schwarz.com

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