R&S®RT-ZM MODULAR PROBE SYSTEM

Flyer | Version 03.00

Multi Mode

ROHDE&SCHWARZ

Make ideas real

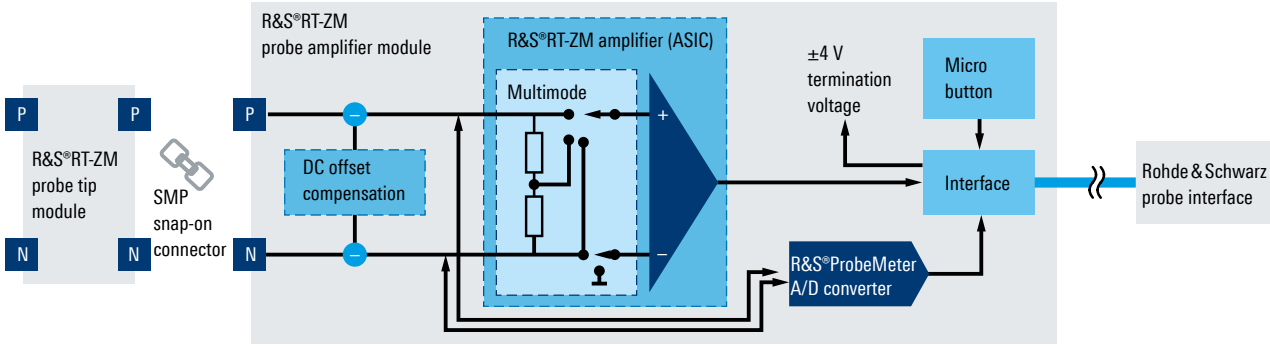
HIGH-SPEED PROBING CHALLENGES

The R&S®RT-ZM modular probe system addresses current probing requirements with a technologically sophisticated yet easy-to-use solution. The various probing solutions meet demand for high probing bandwidth and dynamic range along 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 along with flexible and configurable connectivity. The system includes probe tip modules for various measurement tasks and conditions. The modules can be connected to amplifier modules with bandwidths from 1.5 GHz to 16 GHz. The modular probe system also has a multimode function that lets users switch between different modes. The integrated R&S®ProbeMeter function means that multiple high-precision DC voltage measurements can be carried out at the same time.

R&S®RT-ZM modular probe system with exchangeable R&S®RT-ZM probe tip module

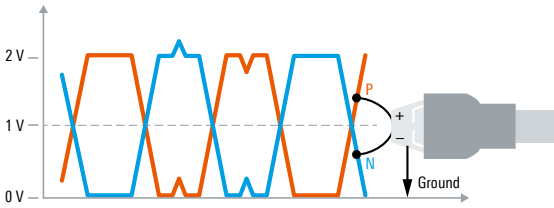
(connected via a high-performance double-socket SMP snap-on interface to an R&S®RT-ZM probe amplifier module with Rohde&Schwarz probe interface)



Multiple measurement modes with a single connection

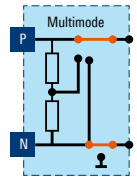
The multimode function lets users switch between single-ended, differential and common mode measurements without reconnecting or resoldering the probe tip. The multimode function is implemented on the company-designed high-speed R&S®RT-ZM amplifier ASIC.

Multimode measurement

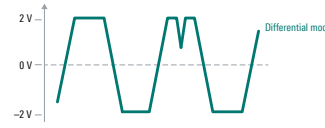


Measurement modes

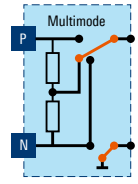
Differential mode (DM)



Voltage between positive and negative input pin: $V_{DM} = V_P - V_N$



Common mode (CM)

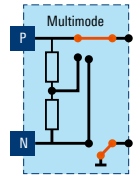


Mean voltage between positive and negative input pin versus ground:

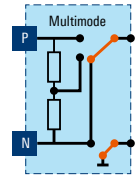
$$V_{CM} = \frac{V_P + V_N}{2}$$

Single-ended modes

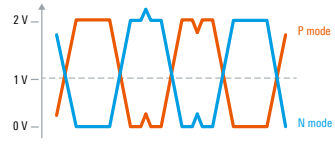
P mode



N mode



Voltage between positive or negative input pin and ground:

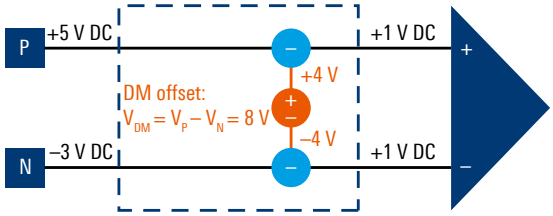


Offset compensation for maximum resolution

The R&S®RT-ZM modular probe system has an offset compensation range of ±16 V. A signal's DC components can be compensated at the probe tip, upstream of the ASIC in the differential R&S®RT-ZM amplifier and the operating voltage window can be extended beyond the dynamic range of the probe amplifier module and signal components of interest displayed on the oscilloscope with maximum resolution. The feature also enables multimode operation.

Differential mode

DM offset compensation scheme

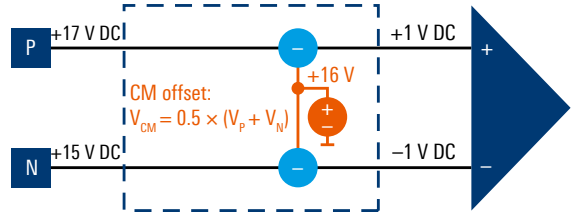


Application

Using the R&S®RT-ZMA30 browser module to probe single-ended signals on power rails with large DC components and slight AC signals

Common mode

CM offset compensation scheme

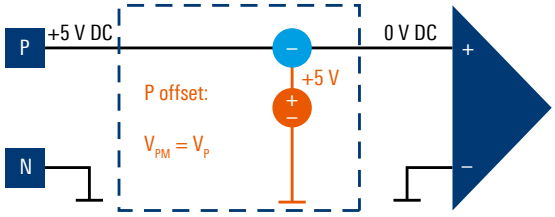


Application

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

Single-ended P mode

P mode offset compensation scheme

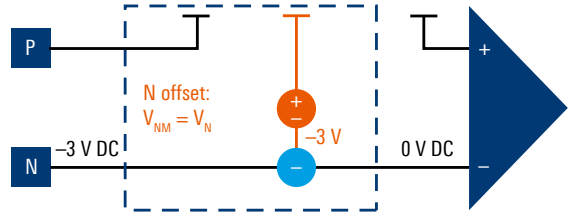


Application

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

Single-ended N mode

N mode offset compensation scheme

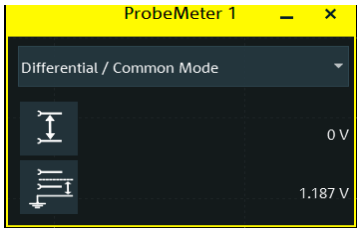


Application

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

Integrated high-precision voltmeter

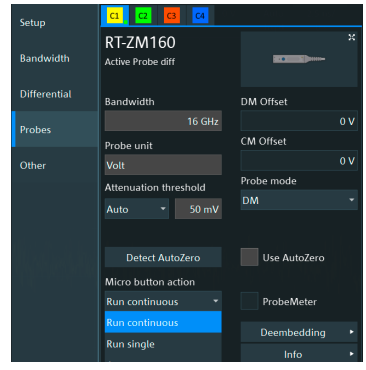
The integrated R&S®ProbeMeter is a unique active probe from Rohde&Schwarz that operates independently of the oscilloscope and measures DC signal components with accuracy of 0.05%. Measurements are continuously performed in parallel with the oscilloscope waveform acquisition. A dedicated ADC inside the R&S®RT-ZM probe amplifier module immediately digitalizes measured DC voltage and helps keep measurements accurate.



R&S®ProbeMeter: high precision DC measurement, independent of instrument settings and in parallel with the measurement channel

Integrated micro button for convenient instrument control

The R&S®RT-ZM probe amplifier module comes with an integrated micro button so you can focus on your measurement and operate the oscilloscope. 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 create automated test reports. The R&S®RT-ZM modular probe system can also be configured for multimode switching.



Flexible micro button configuration on the oscilloscope

R&S®RT-ZM PROBE AMPLIFIER MODULES

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

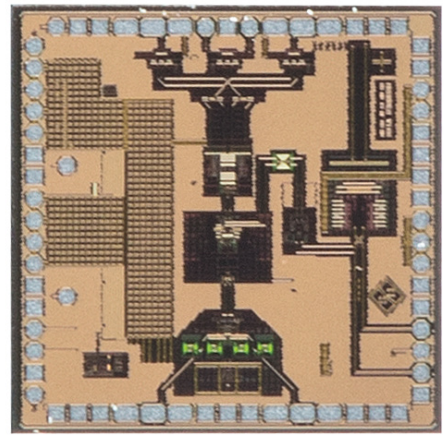
The SMP connector on the amplifier is specially designed for bandwidths from DC to 26.5 GHz. It has minimal return loss and high repeatability for many connect/disconnect cycles. The double-socket SMP connector has built-in connector alignment to safeguard connections between probe amplifier modules and probe tip modules for highly repeatable signal transmission conditions.

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

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

The sophisticated RF probe amplifier module includes board design, shielding and high-speed ASIC for an 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)	▶ 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)	▶ with 10:1 attenuation: ±2.5 V ▶ with 2:1 attenuation: ±0.5 V
Rise time 90% 10%	▶ 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 kΩ in differential mode, 200 kΩ in single-ended mode
Additional features	integrated high-precision voltmeter and micro button for convenient instrument control
Supported Rohde&Schwarz oscilloscopes	R&S®RTP, R&S®RTO6, MXO 4, MXO 5, MXO 5C

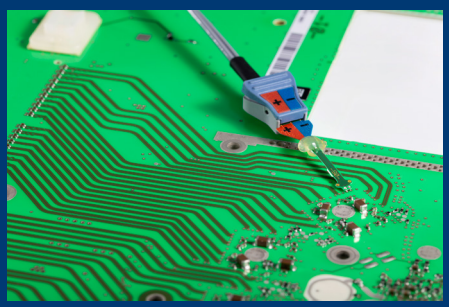
R&S®RT-ZM PROBE TIP MODULES

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 used for contacting test points with a narrow probing pitch or are hard to reach. Both modules enable semi-permanent solder-in connections for multimode measurements, which do not require resoldering.

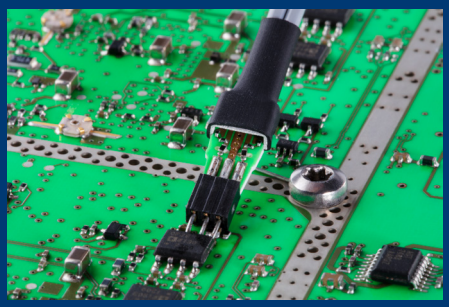
R&S®RT-ZMA14 solder-in flex connect probe tip modules

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



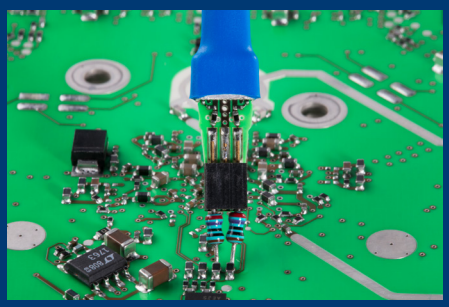
R&S®RT-ZMA12 square-pin probe tip module

The R&S®RT-ZMA12 square-pin probe tip module is ideal for DUTs up to 6 GHz. The module is plugged directly into the DUT test leads or soldered test pins. Pin strips with a pitch of 1.27 mm can also be used.



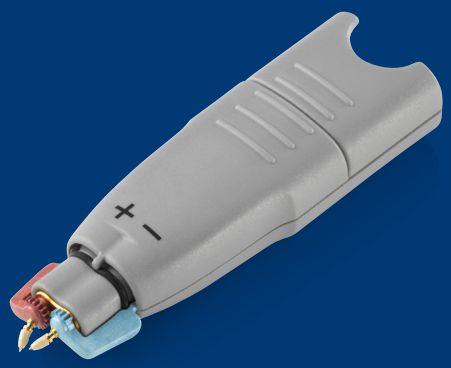
R&S®RT-ZMA15 quick-connect probe tip module

The R&S®RT-ZMA15 quick-connect probe tip module can quickly connect and disconnect your DUT. The connection uses soldered-in 270 Ω resistors. The module is plugged onto the soldered-in 270 Ω resistors and ground lead to connect to a DUT. The resistors are supplied with the module for optimal performance and signal integrity across the full bandwidth of the probe amplifier module.



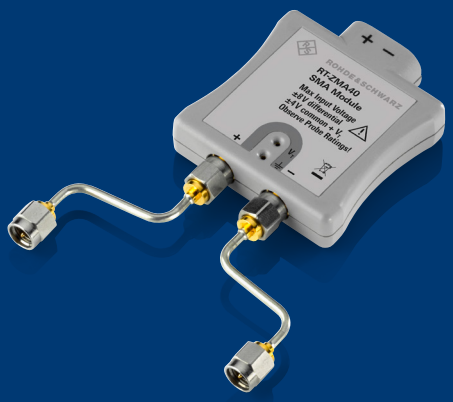
R&S®RT-ZMA30 browser module

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



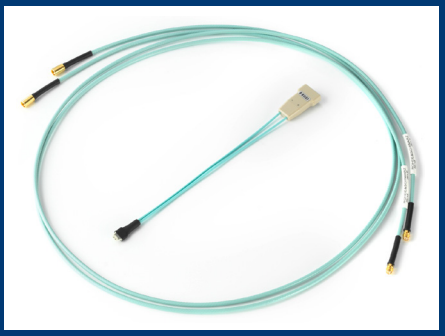
R&S®RT-ZMA40 SMA module

The R&S®RT-ZMA40 SMA module delivers multimode measurements in a 50 Ω/100 Ω environment. The module applies termination voltage (±4 V) 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 can bused for measurements in the temperature range from –55 °C to +125 °C by separating the probe tip module from the probe amplifier module with a 1 m extension cable. The kit includes an R&S®RT-ZMA11 solder-in probe tip module and a pair of matched cables. The extreme temperature kit is designed for environmental tests in climatic chambers. It covers the maximum temperature range required for testing electronics used in automotive applications.



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 (additional FlexPCB with 10 solder-in tips, order no: 1337.9781.02)	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 (additional browser pin (red), order no: 1800.4416; browser pin (blue), order no: 1800.4422.00)	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

Accessories

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

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&measurement, technology systems and networks&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.

www.rohde-schwarz.com

Sustainable product design

- Environmental compatibility and eco-footprint
- Energy efficiency and low emissions
- Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

Rohde&Schwarz training

www.training.rohde-schwarz.com

Rohde&Schwarz customer support

www.rohde-schwarz.com/support

PD 3607.5690.32 | Version 03.00 | February 2025 (sk)
R&S®RT-ZM Modular Probe System
Data without tolerance limits is not binding | Subject to change