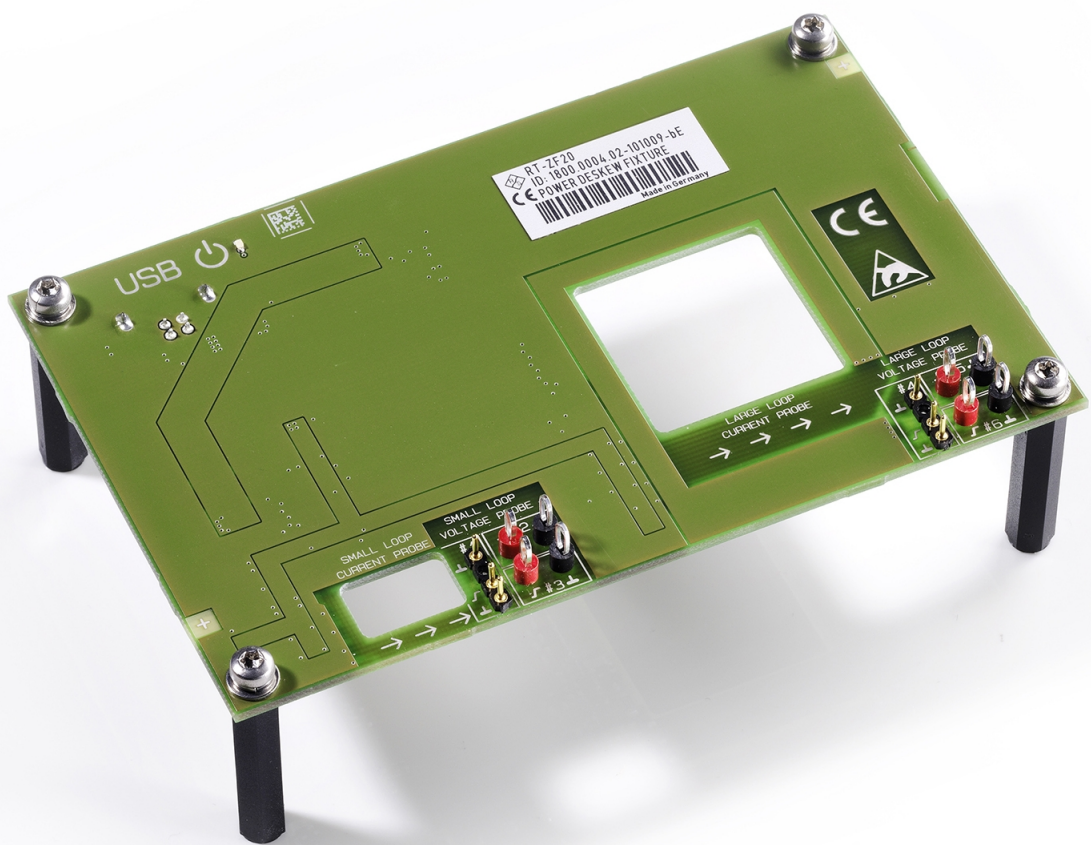


R&S[®] RT-ZF20 Power Deskew Fixture Manual



1800004002
Version 07

ROHDE & SCHWARZ
Make ideas real



This manual describes the following R&S®RT-ZF models:

- R&S®RT-ZF20 (1800.0004.01)

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1800.0040.02 | Version 07 | R&S®RT-ZF20

Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol , e.g. R&S®RT-ZF20 is indicated as R&S RT-ZF20.

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1 Safety information

The product documentation helps you to use the product safely and efficiently. Keep the product documentation nearby and offer it to other users.

Safety information warns you about the potential dangers and gives instructions how to prevent personal injuries or damage caused by dangerous situations. Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

Intended use

The equipment under test (EUT) is a signal quality test and development board, indented to be used at laboratory or test and measurement areas. These areas are used for analysis, testing and servicing and where equipment is operated by trained personnel (EN 61326-1, 3.9).

Operating site

Only use the product indoors, and keep it dry. The product has no casing and is sensitive to moisture and humidity.

The product is suitable for pollution degree 2 environments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature, see the specifications.

Safety instructions

The pins of the deskew fixture are extremely pointed and can easily penetrate clothes and the skin. Therefore, handle the deskew fixture with great care. When transporting the deskew fixture, always use the box supplied with the product.

Electromagnetic emissions

Applied test requirements are:

- Radiated emission limits for group I, class B equipment
- Immunity test requirements for basic environment (EN 61326-1 table 2)

ESD and EMI impact

The product is sensitive to electrostatic discharge (ESD) because of open modules. Protect the work area against electrostatic discharge to avoid damage to electronic components. Always work at a static-approved workstation.

Do not touch the circuits on the bottom of the R&S RT-ZF20 to avoid damage of electronic components.

Electromagnetic interference (EMI) can affect the measurement results. To avoid any impact, use only USB cables shorter 3 m.

To ensure sufficient cable quality, use USB 2.0 cable order number 6145.1492.00, which has a USB-B connector with ferrite.

Disposal



In line with EN 50419, the product cannot be disposed of in the normal household waste. Even disposal via the municipal collection points for waste electrical and electronic equipment is not permitted.

Rohde & Schwarz has developed a disposal concept for the ecofriendly disposal or recycling of waste material. Rohde & Schwarz fully assumes its obligation as a producer to take back and dispose of electrical and electronic waste. Contact your local service representative to dispose of the product.

2 Product description

2.1 Key features

The R&S RT-ZF20 power deskew fixture is a tool to align the time delay (skew) of any combination of Rohde & Schwarz voltage and current probes. The fixture can be used with any oscilloscope.

The R&S RT-ZF20 generates pulses with different transit times, voltage swings and current swings that can be tapped at various probe connectors. To align two probes, the delay time of the measurement channels is adjusted until the pulses coincide on the oscilloscope display.

Also, the fixture can be used for a functional check of the rise time of Rohde & Schwarz current probes.

For data, see the "R&S RT-ZFxx Oscilloscope Test Fixtures - Specifications" at www.rohde-schwarz.com/brochure-datasheet/rto.

2.2 Unpacking the product

The following items are included in the delivery:

- R&S RT-ZF20 power deskew fixture
- USB power cord
- User manual
- Carrying case

2.2.1 Inspecting the contents









1. Unpack the product carefully.
2. Retain the original packing material. Use it when transporting or shipping the product later.
3. Using the delivery notes, check the equipment for completeness.

4. Check the equipment for damage.

If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

2.3 Board description

The R&S RT-ZF20 has three sections, see [Figure 2-1](#):

- Power section
 - USB connector for power supply
 - Status LED: a green light indicates that power is on
- Small loop section
 - Small cutout for clamping R&S RT-ZC15B/20/20B/30/31 current probes. Arrows indicate the direction of the current.
 - Pin header to connect R&S RT-ZD and R&S RT-ZS active probes (#1). The alignment pulse is applied to pins marked with a  symbol. Pins marked with a  symbol connect to GND.
 - Two clamp-on connectors to connect probes with hooks (#2, #3). The alignment pulse is applied to red connectors ( symbol), black ones ( symbol) connect to GND.
- Large loop section
 - Large cutout for clamping R&S RT-ZC05B/10/10B current probes. Arrows indicate the direction of the current.
 - Pin header to connect R&S RT-ZD and R&S RT-ZS active probes (#4). The alignment pulse is applied to pins marked with a  symbol. Pins marked with a  symbol connect to GND.
 - Two clamp-on connectors to connect probes with hooks (#5, #6). The alignment pulse is applied to red connectors ( symbol), black ones ( symbol) connect to GND.

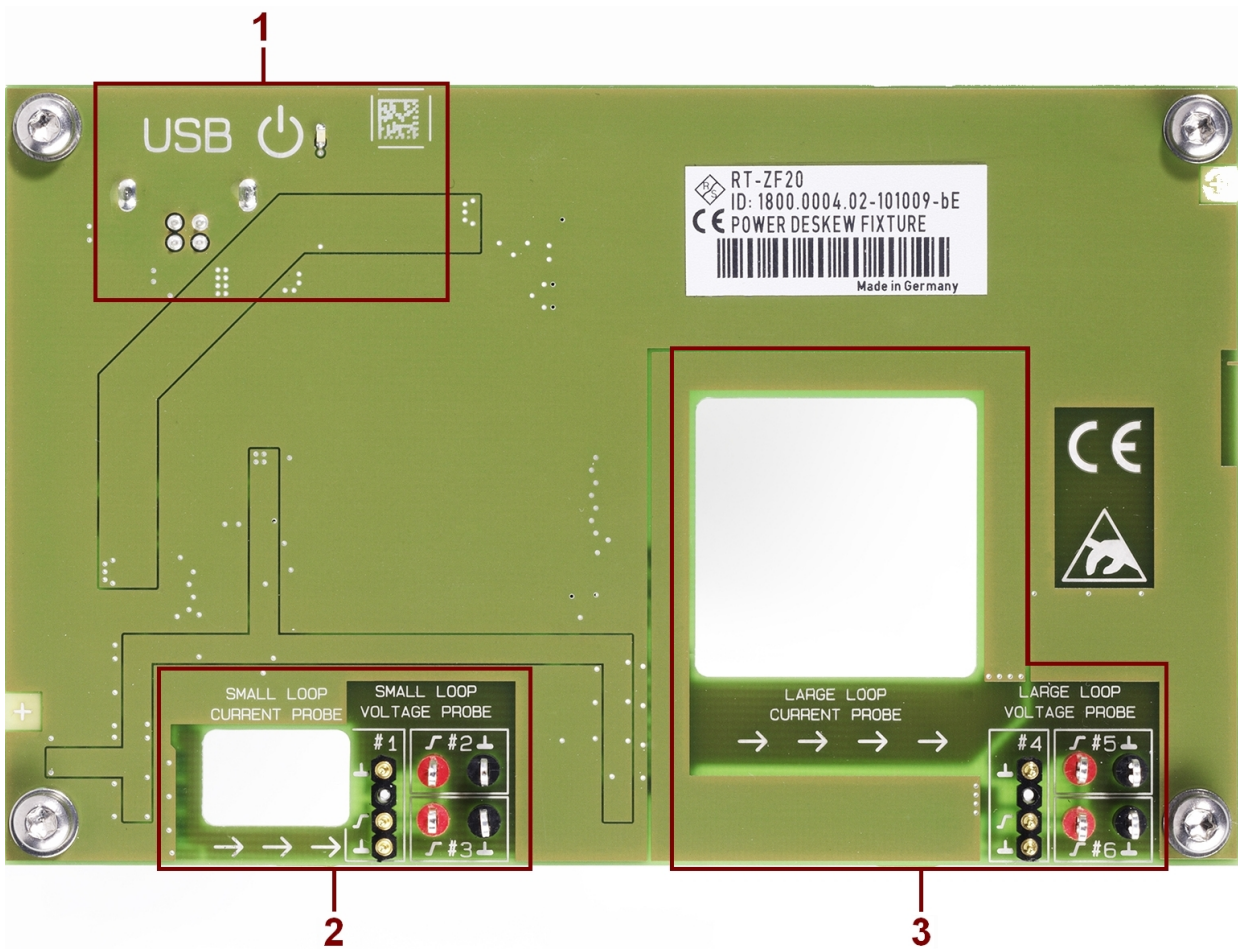


Figure 2-1: R&S RT-ZF20 power deskew fixture

- 1 = Power section with USB connector
- 2 = Small loop section to connect R&S RT-ZC15B/20/20B/30/31
- 3 = Large loop section to connect R&S RT-ZC05B/10/10B

2.4 Operating principle

The fixture generates a continuous pulse sequence in the small loop and large loop sections. The pulses in both sections alternate with one another. The time delay between the pulses is around 35 ms and the pulse width is around 10 μ s.

As shown in [Figure 2-2](#), the falling edges are much steeper than the rising edges in both sections. The edges in the small loop section are much steeper than the edges in the large loop section.

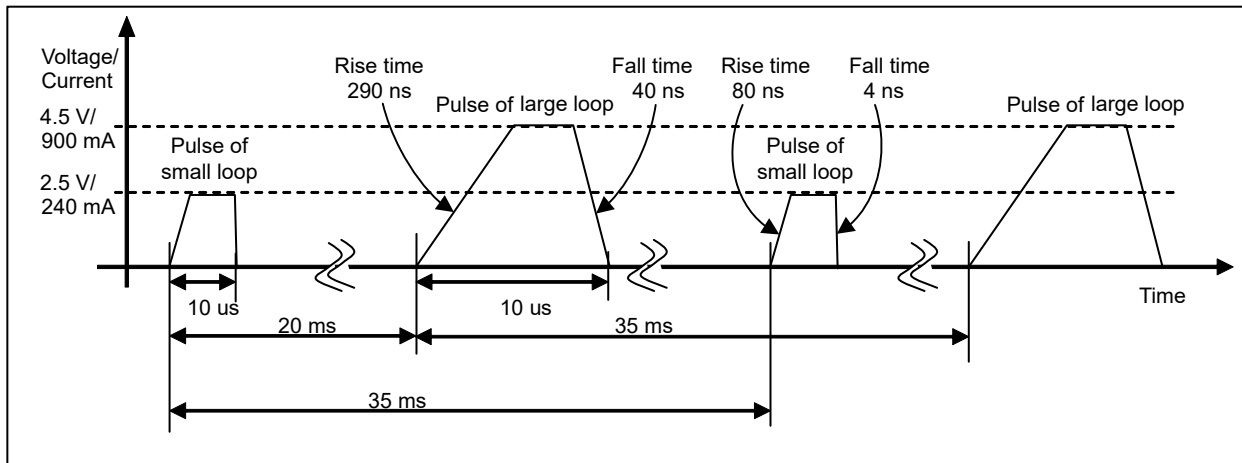


Figure 2-2: Timing and voltage/current swing of pulses of both loops

Figure 2-2 also shows the voltage and current swings of both sections. The large loop current swing is the sum of multiple windings integrated in the printed circuit board. The different transit times, voltage and current swings allow you to deskew a wide variety of probes independently of their bandwidths and sensitivities.

3 Using the power deskew fixture

3.1 Connecting the power

The USB connector is used for powering only. The fixture cannot be controlled as a USB device.

- ▶ Connect the USB cable to the USB connector of the fixture and to a free USB connector of any USB host, e.g. R&S oscilloscope, computer or USB hub.
The green LED lights up, and the fixture starts pulsing.

3.2 Connecting probes to R&S oscilloscopes

1. To connect a R&S RT-ZC current probe to the oscilloscope, e.g. to CH1 input, connect and configure the probe as described in the probe's user manual.
2. Set the vertical scale for the input channel of the current probe, e.g. CH1:
 - Large loop, R&S RT-ZC05B/10/10B: 200 mA/div
 - Small loop, R&S RT-ZC15B/20/20B/30/31: 50 mA/div
3. To connect a voltage probe to another channel, e.g. to CH2 input:
 - If the probe has a read-out pin or an Rohde & Schwarz probe box, the channel is configured automatically.
 - If you use a probe that is not automatically detected, configure the probe as described in the oscilloscope's user manual.
4. Set the vertical scale for the input channel of the voltage probe, e.g. CH2:
 - Large loop: 1 V/div
 - Small loop: 500 mV/div
5. Set the horizontal scale (see [Table 3-1](#)):
 - Large loop: 100 ns/div (for probes <20 MHz)
 - Small loop, rising edge: 20 ns/div (for probes <200 MHz)
 - Small loop, falling edge: 1 ns/div (for fast probes)
6. Set up the trigger:

Connecting probes to the fixture

- a) Source = channel of the voltage probe, e.g. CH2
- b) Trigger type = Edge
- c) Slope = Rising or falling edge, see [Table 3-1](#)
- d) Level = 1 V

3.3 Connecting probes to the fixture

Both probes must be connected to the same loop using the accessories required for the measurement application.

To achieve accurate measurement results, you have to ensure identical conditions for deskewing and measurement. Use the accessories required for the measurement application also for deskewing the probe.

1. **NOTICE!** Deskew only probes connected to the same section. Never deskew a probe connected to the large loop section and a probe connected to the small loop section.

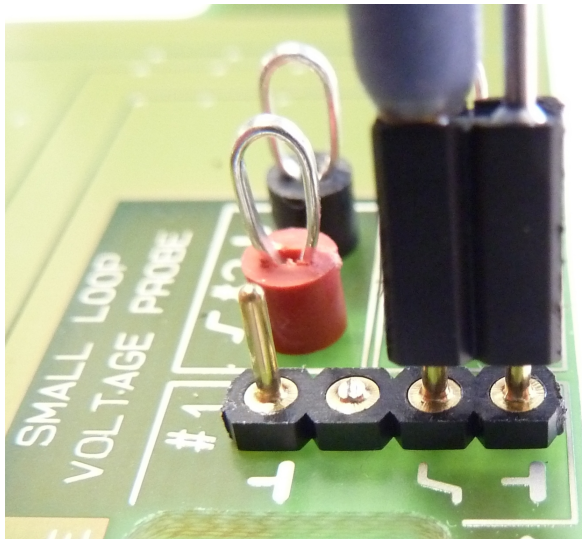
Connect the current probe:

- Connect a R&S RT-ZC15B/20/20B/30/31 to the small loop cutout.
 - Or: Connect a R&S RT-ZC05B/10/10B to the large loop cutout.
2. If you use probes with a compensation trimmer, e.g., R&S RT-ZP or R&S RT-ZH models, always compensate the probe before deskewing.
 3. If you use a Rohde & Schwarz active single-ended voltage probe, e.g. R&S RT-ZS10/10E/20/30/60 or R&S RT-ZZ80:
 - a) Using the square pin adapter, connect the signal socket to the pulse pin

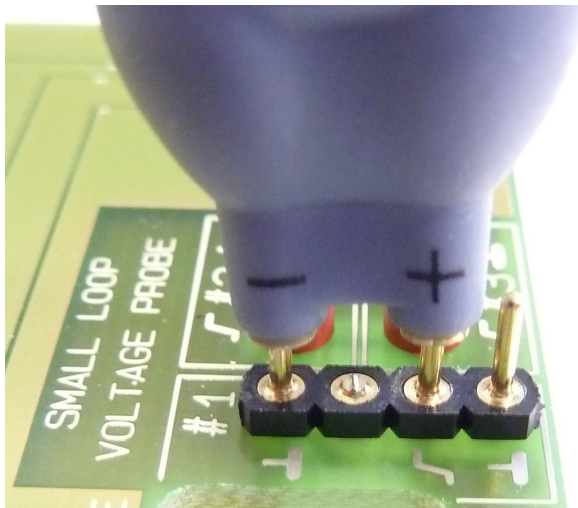


Connecting probes to the fixture

- b) Using the square pin adapter, connect the ground socket to the ground pin \perp .



4. If you use a Rohde & Schwarz differential voltage probe, e.g. R&S RT-ZD08/10/20/30/40:
- Connect the positive socket to the pulse pin \checkmark directly or using the square pin adapter.
 - Connect the negative socket to the ground pin \perp directly or using the square pin adapter.

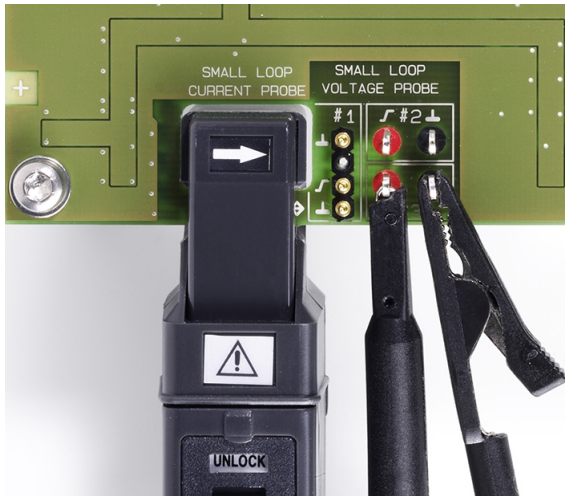


Note: The R&S RT-ZD40 cannot be connected directly. Use the square pin adapter to connect this probe.

5. If you use a high voltage probe, e.g. R&S RT-ZH, R&S RT-ZD002/003/01/02, R&S RT-ZHD, or a passive single ended probe, e.g. R&S RT-ZP:
- Clamp the signal hook/positive hook to the red pulse clamp-on connector.

Connecting probes to the fixture

- b) Clamp the ground hook/negative hook to the black ground clamp-on connector.



- 💡 To deskew multiple current probes, use a voltage probe as reference and align each current probe with the reference voltage probe.

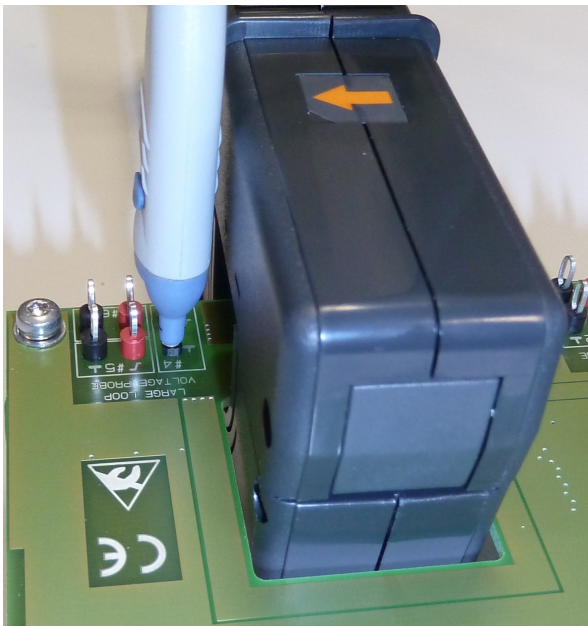


Figure 3-1: R&S RT-ZC10 and R&S RT-ZD30 differential probe at large loop

3.4 Deskewing probes

Deskewing means to align the edges of two waveforms output by two different probes. Therefore, skew offset is set to one of the used input channels. Use the following transition depending on the probe with the smallest bandwidth.

Table 3-1: Transition and probe dependencies

Probe	Transition
R&S RT-ZC05B/10/10B Any other probe with bandwidth <20 MHz Faster probe with 20 MHz bandwidth filter	Large loop Rising edge
R&S RT-ZC15B/20/20B/30/31 or R&S RT-ZD01 Any other probe with bandwidth <200 MHz Faster probe with 200 MHz bandwidth filter	Small loop Rising edge
Other probes	Small loop Falling edge

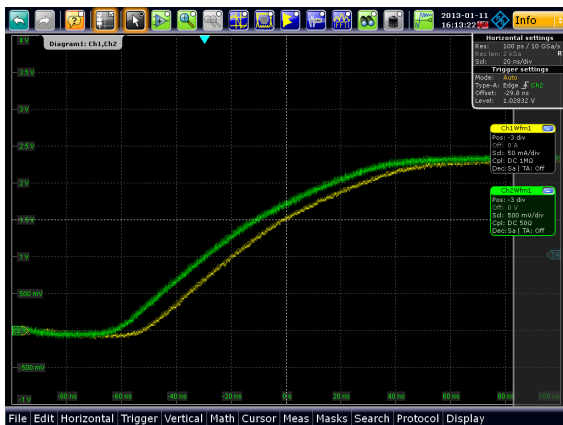


Figure 3-2: Deskewing

Left = no skew offset, time delay between waveforms

Right = skew offset set, aligned waveforms

1. On your oscilloscope, go to the deskew setting ("Skew offset", "Deskew" or similar, depending on the instrument model). Refer to the oscilloscope's user manual for available functionality and its usage.
2. Adjust the value until both waveforms are aligned.

3.5 Additional features

Besides deskewing two Rohde & Schwarz probes, the R&S RT-ZF20 can be used for a functional check of the rise time of Rohde & Schwarz current probes.

1. Connect a R&S RT-ZC05B/10/10B to the large loop or a R&S RT-ZC15B/20/20B/30/31 to the small loop as described in [Chapter 3.2, "Connecting probes to R&S oscilloscopes"](#), on page 10.
2. Adjust the trigger to the falling edge.
3. Enable a fall time measurement for the channel connected to the current probe.
4. Set the relative reference levels to "20/50/80".

The measured fall time should be around:

- R&S RT-ZC30/31: 4 ns
- R&S RT-ZC20/20B: 5 ns
- R&S RT-ZC15B: 10 ns
- R&S RT-ZC10/10B: 50 ns
- R&S RT-ZC05B: 250 ns

4 Contacting customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support, or follow this QR code:



Figure 4-1: QR code to the Rohde & Schwarz support page