

R&S®RTO and R&S®RTE

Oscilloscopes

Release Notes

Firmware Version 3.70.1.0

These Release Notes are for following models of the R&S®RTO and R&S®RTE:

R&S® RTO 2002, order no. 1329.7002K02, R&S® RTO 2004, order no. 1329.7002K04,
R&S® RTO 2012, order no. 1329.7002K12, R&S® RTO 2014, order no. 1329.7002K14,
R&S® RTO 2022, order no. 1329.7002K22, R&S® RTO 2024, order no. 1329.7002K24,
R&S® RTO 2032, order no. 1329.7002K32, R&S® RTO 2034, order no. 1329.7002K34,
R&S® RTO 2044, order no. 1329.7002K44, R&S® RTO 2064, order no. 1329.7002K64

R&S® RTO 1012, order no. 1304.6002K12, R&S® RTO 1014, order no. 1304.6002K14,
R&S® RTO 1022, order no. 1304.6002K22, R&S® RTO 1024, order no. 1304.6002K24,

R&S® RTO 1002, order no. 1316.1000K02, R&S® RTO 1004, order no. 1316.1000K04,
R&S® RTO 1012, order no. 1316.1000K12, R&S® RTO 1014, order no. 1316.1000K14,
R&S® RTO 1022, order no. 1316.1000K22, R&S® RTO 1024, order no. 1316.1000K24,
R&S® RTO 1044, order no. 1316.1000K44

R&S® RTE 1022, order no. 1317.2500K22, R&S® RTE 1024, order no. 1317.2500K24,
R&S® RTE 1032, order no. 1317.2500K32, R&S® RTE 1034, order no. 1317.2500K34,
R&S® RTE 1052, order no. 1317.2500K52, R&S® RTE 1054, order no. 1317.2500K54,
R&S® RTE 1102, order no. 1317.2500K02, R&S® RTE 1104, order no. 1317.2500K04,

R&S® RTE 1022, order no. 1326.2000K22, R&S® RTE 1024, order no. 1326.2000K24,
R&S® RTE 1032, order no. 1326.2000K32, R&S® RTE 1034, order no. 1326.2000K34,
R&S® RTE 1052, order no. 1326.2000K52, R&S® RTE 1054, order no. 1326.2000K54,
R&S® RTE 1102, order no. 1326.2000K62, R&S® RTE 1104, order no. 1326.2000K64,
R&S® RTE 1152, order no. 1326.2000K72, R&S® RTE 1154, order no. 1326.2000K74,
R&S® RTE 1202, order no. 1326.2000K82, R&S® RTE 1204, order no. 1326.2000K84

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The following abbreviations are used throughout this document:
R&S® RTO is abbreviated as R&S RTO, R&S® RTE as R&S RTE.

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1 Current Version and History

1.1 New Functions

The following table lists the new functions and indicates the version in which the new function was introduced:

| Version | Function |
|----------|---|
| 3.70.1.0 | Support for Option R&S® RTO-K57 - 100BASE-T1 Triggering & Decoding |
| 3.70.1.0 | Support for Option R&S® RTE-K57 - 100BASE-T1 Triggering & Decoding |
| 3.70.1.0 | Support for Option R&S® RTO-K64 - USB 3.1 SSIC Triggering & Decoding |
| 3.70.1.0 | Support of R&S® RTE-B6 Waveform Generator for RTE |
| 3.70.1.0 | Support of R&S® RT-ZPR40 Power Rail Probe |
| 3.70.1.0 | Support of the differential probes R&S® RT-ZD002 and R&S® RT-ZD003 |
| 3.70.1.0 | User button for taking the R&S® RT-ZPR powermeter value as channel offset value |
| 3.70.1.0 | RTO1000 and RTO2000: The user can couple all measurements to one single gate via gate coupling |
| 3.70.1.0 | RTO2000: Print option to create a screenshot without the signal bar |
| 3.70.1.0 | RTO-K18: Peak list in FFT can be sorted by frequency or by value |
| 3.70.1.0 | Decode result table supports automatic zoom on frame by clicking frame table entry |
| 3.70.1.0 | Option R&S® RTO/RTE-K50: supports search features |
| 3.65.1.0 | In addition to floating and preview position of the measurement result dialogs a docked position is added. In docked position the measurement results are always placed into the lower part of the display area |
| 3.60.1.0 | Support of R&S® RT-ZVC Multi Channel Power Probe for RTO2000 and RTE |
| 3.60.1.0 | Support of R&S® RTO-B6 Waveform Generator for RTO2000 |
| 3.60.1.0 | Cursors allow to set two different sources for the first and the second cursor line (for example Ch1 for first cursor line and Ch2 for second cursor line) |
| 3.60.1.0 | For the paired cursor type the cursor style vertical line & Rhombus is supported that displays the vertical lines and draws a rhombus indicator at the cursor position |
| 3.50.1.2 | Support for Option R&S® RTO-K61 - USB 3.1 Gen 1 Triggering & Decoding (RTO2064 only) |
| 3.50.1.2 | Support for Option R&S® RTO-K63 - USB Power Delivery Triggering & Decoding |
| 3.50.1.2 | Support for Option R&S® RTE-K63 - USB Power Delivery Triggering & Decoding |
| 3.50.1.2 | Support for Option R&S® RTO-K72 - PCI Express 1.1/2.0 Triggering & Decoding (RTO2064 only) |
| 3.50.1.2 | Support for Option R&S® RTO-K81 - PCI Express 1.1/2.0 Compliance Test (RTO2064 only) |
| 3.50.1.2 | Support for Option R&S® RTO-K87 - 1000BASE-T1 Compliance Test |
| 3.50.1.2 | Support of R&S® RT-ZPR20 Power Rail Probe |
| 3.50.1.2 | Rising and falling slew rate measurement added as standard measurements |
| 3.50.1.2 | Vertical position indicator shows around which position the vertical scaling is done |
| 3.50.1.2 | Graphical Recall of SaveSets: SaveSets can be sorted by name or by date |
| 3.50.1.2 | Easy selection of recently loaded files in the File Open Dialog for each file type like SaveSets, Reference Waveforms respectively |
| 3.50.1.2 | Option R&S® RTO-K52: support for 8b10b triggering |
| 3.40.1.2 | Support for Option R&S® RTx-K76 - CXPI Triggering & Decoding |
| 3.40.1.2 | Support of the probes R&S® RT-ZS10L, R&S® RT-ZD02, R&S® RT-ZD08, R&S® RT-ZC03 and R&S® RT-ZC02 as predefined probes |
| 3.40.1.2 | User setting flag for an auto deskew of all active probes with internal offset support |
| 3.40.1.2 | Additional Microbutton functionality to open the probe dialog |

| Version | Function |
|----------|---|
| 3.40.1.2 | Addition of bitmap in probe dialog for the attenuator R&S® ZA15 for easy visibility, if attenuator is active |
| 3.40.1.2 | The relevant area for the channel power measurement in the FFT is displayed graphically |
| 3.40.1.2 | The R&S service report can be created directly from the App Cockpit under the "R&S Apps" tab |
| 3.40.1.2 | VNC Integration into instrument's web browser without necessity of any user installation |
| 3.40.1.2 | RTO2000: It is selectable, whether the horizontal knob modifies the trigger position or the trigger reference point |
| 3.40.1.2 | Option R&S® RTx-K3 / K9: Symbolic names can be exported with results |
| 3.40.1.2 | Option R&S® RTx-K8: Decoding of sleep frames |
| 3.40.1.2 | Option R&S® RTx-K50: CRC check support |

1.2 Modified Functions

The following table lists the modified functions and indicates the version in which the modification was carried out:

| Version | Function |
|----------|--|
| 3.70.1.0 | Option R&S® RTO/RTE-K1: Performance enhancements for the SPI decode |
| 3.70.1.0 | Option R&S® RTO/RTE-K2: Performance enhancements and 9-bit support for UART |
| 3.70.1.0 | Default color of math functions is change to get better readability of the math function grid annotation |
| 3.70.1.0 | The date and the base unit is written into the header file when exporting a waveform |
| 3.70.1.0 | Menu item "Tutorials" has moved into menu "File" |
| 3.65.1.0 | More than one digital bus is allowed to be displayed in one diagram area |
| 3.65.1.0 | In remote control mode the "Wait for trigger" status bit is set after < 100 ms for a faster check if the instrument is armed for trigger events for a single. In earlier versions the status bit was set after > 1 s |
| 3.60.1.0 | RTO1000 SaveSets can be loaded into the RTO2000 |
| 3.50.1.2 | RTO2000: Sampling rate in rollmode up to 20 MSamples/sec |
| 3.50.1.2 | RTE: SCPI remote commands for setting the absolute reference levels |
| 3.50.1.2 | Improved Autoset for PWM signals with short pulses and long pulse delays |
| 3.50.1.2 | CAL*? gives more detailed return values on the status of the selfalignment |
| 3.50.1.2 | If a selfalignment of the instrument is started before the warmup time is finished a warning message is displayed. Per SCPI remote command no selfalignment is possible before the warmup time is finished |
| 3.40.1.2 | The displayed sampling rate always shows the ADC sampling rate instead of the interpolated sampling rate |

1.3 Improvements

The following table lists the eliminated issues and indicates the version in which the issues were eliminated:

| Version | Function |
|----------|--|
| 3.70.1.0 | The probe group delay is specific for different RT-ZCxB variants |
| 3.70.1.0 | The full offset range of the R&S® RT-ZPR probe is taken into account in Autoset |
| 3.70.1.0 | Long term display with time as x-scale was not always displayed correctly with respect to the time axis. This issue is fixed |

| Version | Function |
|----------|---|
| 3.70.1.0 | Track export was not saved when multiple waveform export was turned on. This issue is fixed |
| 3.70.1.0 | If the trigger is set to "Normal" and Autozero is executed for probes, the trigger was set to "Auto" afterwards. This issue is fixed |
| 3.70.1.0 | There were cases when the Autozero for probes modified the offset settings of other channels. This issue is fixed |
| 3.70.1.0 | It could happen that a measurement result dialog was shifted out of the visible display area. This issue is fixed |
| 3.70.1.0 | When loading a user defined preset with a different language setting than the active language, the firmware crashed. This issue is fixed |
| 3.65.1.0 | When an active current probe was detached from a channel and a passive voltage probe was attached instead the units still showed ampere instead of volt. This issue is fixed |
| 3.65.1.0 | Deactivated masks were listed in the report output. This issue is fixed |
| 3.65.1.0 | In the graphical recall SaveSets could not be deleted. This issue is fixed |
| 3.60.1.0 | The channel offset value could not be changed for R&S® RT-ZCxxB Current Probes. This issue is fixed |
| 3.60.1.0 | When turning the navigation wheel to move a zoom windows the waveforms were not updated in the zoom windows any more. This issue is fixed |
| 3.60.1.0 | The status registers for the ADC overflow status now correctly represent the upper and lower violation |
| 3.60.1.0 | RTE: Software frontpanel in the webcontrol and when pressing F11 on the instrument now shows the RTE specific frontpanel. Previously the RTE showed the RTO's software frontpanel |
| 3.60.1.0 | Mask violations were not correctly displayed in single sweep mode when "On successful completion" was selected as action event. This issue is fixed. |
| 3.50.3.1 | In rare cases pressing hardkeys on the instrument's frontpanel could result in an instrument crash. This issue is fixed |
| 3.50.3.1 | When a histogram was active and the channel offset was strongly increased in some cases the instrument did not respond any more. This issue is fixed |
| 3.50.1.2 | When moving the cursor with the navigation knob the acceleration for fast scrolling of the knob was not supported any more. This issue is fixed |
| 3.40.1.2 | The persistence of waveforms within a zone trigger is the same as the waveforms persistence |
| 3.40.1.2 | The threshold in FFT measurements is not modified when changing the vertical scaling of the FFT. The default threshold value is -70 dBm |
| 3.40.1.2 | The default path for all file operations is not modified when loading a SaveSet |

1.4 Known Issues

The following table lists the known issues and indicates since which version the issue could be observed:

| Since | Function |
|-------|----------|
| | None |

1.5 Modifications to the Documentation

Revision History:

| Date | Release Notes Revision | Changes |
|------------|------------------------|--|
| 05.12.2017 | 3.70.1.0 | Support for Options R&S® RTO-K57and R&S® RTO-K64 |
| 06.09.2017 | 3.65.1.0 | Addition of docked position for measurement results |
| 27.06.2017 | 3.60.1.0 | Support of RT-ZVC Multi Channel Power Probe |
| 28.03.2017 | 3.50.3.1 | Instrument responsiveness for active histogram with large instrument offsets |
| 03.03.2017 | 3.50.1.2 | Support for Options R&S® RTO-K61, R&S® RTO-K63, R&S® RTE-K63, R&S® RTO-K72, R&S® RTO-K81 |
| 22.12.2016 | 3.40.1.2 | Support for Option R&S® RTO-K76 and R&S® RTE-K76 |

2 Firmware Update

Firmware updates for the R&S RTO and R&S RTE are available as a single download from the Rohde&Schwarz web page <http://www.scope-of-the-art.com> or <http://www.rohde-schwarz.com>.

The installation file for R&S RTO and R&S RTE with Windows 7 is named “**Setup_Rtx_V3.70.1.0_x64.exe**”. The installation will be rejected, if the installation file is used on an RTO instrument with Windows XP.

After the update to version RTx V3.70.1.0 the instrument will start with preset instrument settings. To check the installed firmware version select “Setup” from the “File” menu and switch to the system tab. The firmware version is shown in the upper left corner of this dialog.

2.1 Preparing the Installation

There are several ways how to update the device after downloading the firmware installation file. Please make sure, that the installation file “**Setup_Rtx_V3.70.1.0_x64.exe**” is used for R&S RTO and R&S RTE with Windows 7.

Using a memory stick:

1. Copy the file(s) to a directory of the memory stick and insert the memory stick into one of the USB sockets of the instrument.

Using the remote desktop and copying the installation files to a directory of the instrument:

1. Connect the instrument to your LAN
2. Start the remote desktop on your PC (C:\winnt\system32\mstsc.exe)
3. Enter the TCP/IP address of the instrument that you want to update. Ensure that the “local resources” > “drives” option is selected and press the “Connect” button
4. Login to the instrument (user name: “instrument” and password “894129” by default)
5. Copy the firmware installation file from your PC to a new folder on the instrument
6. You can now access this directory with the installation file from the instrument firmware

Using a network drive:

1. Connect your instrument to your LAN, and establish a connection to one of your servers (ask your local IT administrator for support)
2. Copy the firmware installation file from your PC to a directory on this server
3. You can now access the directory with the installation file from the instrument firmware

2.2 Performing the Firmware Update on the Instrument

The firmware update process is performed with the following steps:

1. Switch the instrument on and wait until the Oscilloscope has resumed operation
2. Ensure that the acquisition mode is not running. If the RUN CONT or the RUN Nx SINGLE key is shining green, press this key to stop the acquisition
3. Press the SETUP key or select "Setup" from the "File" menu at the bottom of the screen
4. Select the "System" tab
5. The selected dialog box contains a box with the title "Select setup for firmware update". Press the Button "Open" within this box. A file selection dialog appears
6. Change the path to the drive and directory which you prepared in the step 2.1 (USB stick directory, remote PC directory or directory on a server) and close the dialog with the "Select" button
7. The installation starts and a new dialog box appears. Press the "Next" button to navigate to the selection of the firmware packages. By default all applications should be installed
8. Press the "Install" button to start the firmware update:
The installation continues and the firmware is stopped. After a few minutes the system restarts automatically.
Depending on the previously installed firmware version, a reconfiguration of the hardware may be required during the first start of the firmware. In this case, a message box is displayed and the update of the FPGA starts automatically. **Do not switch off the instrument during this update!** After the update of the FPGA the instrument performs another instrument restart automatically.
If a special FPGA update is required the instrument must execute a cold boot. In such a case, a message appears on the screen asking to switch off the instrument. Press the "Ok" button and wait until the instrument is completely switched off. As a final step switch on the instrument. The instrument resumes operation.
9. After the firmware update a self alignment is recommended. Select "Self alignment" from the "File" menu. Select "Start Alignment" to start the self alignment procedure.
A message box appears to indicate the running alignment procedure. Wait until this message box disappears. This will take several minutes.

Now the instrument is ready for operation.

2.3 Performing the Firmware Update without a running oscilloscope application

If a firmware update shall be executed without running firmware, the windows explorer can be started. Change the path to the drive and directory prepared in step 2.1. Make a double click on this file and proceed with step 7 to update the instrument firmware.

2.4 Firmware downgrade

A firmware downgrade is handled like a normal firmware installation with the following exceptions:

R&S RTO2000: A firmware downgrade from version 3.50 or higher to version 3.40.1.2 or lower requires a manual restart of the instrument after the automatic finalization of the installation procedure to ensure the correct functioning of the touchscreen.

R&S RTO2000: A firmware downgrade from version 3.30 or higher to version 3.0.1.1 or lower is not supported.

R&S RTO1000: A firmware downgrade from version 2.0 or higher to version 1.60 or lower is not supported for instruments with Windows 7.

2.5 Installing Firmware Options

The firmware update includes all currently available firmware options. No additional installation is required. A firmware update has no side effects to firmware options already installed.

The instructions in this chapter are only needed, if a firmware option is purchased and needs to be enabled on the instrument.

Enabling Options by Entering Option Key Codes

To activate firmware options, enter a license key for validation. The license key is in the device certificate or delivered as a part of the software package. The process is performed in the following steps:

1. Press the SETUP key. A dialog box appears. Select the "SW options" tab. The selected tab contains a box with the title "Install a new option". There are two ways to install a firmware option:
 - a) If a file including the option key is provided, select "Open" in the box with the title "Install from file". Navigate to the directory containing the option key file. Choose the file and click "Select"
 - b) If an option key number is provided double click on the data entry field with the title "Enter new option key". A key pad appears. Enter the option key number and press the "Enter" button.
2. After successful validation the message "option key valid" is displayed. If the validation failed, the firmware option is not installed.
3. If more than one firmware option shall be installed, step 1 and 2 needs to be repeated several times.
4. Reboot the device or restart the firmware.

3 Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

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