R&S® BTC
Broadcast Test Center
Release Notes
Firmware Version 02.36

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

Broadcast and Media
Release Notes
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ROHDE&SCHWARZ

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1 Information on the Current Version and History

1.1 Version 02.36 (February 2019)

New Functionality

- R&S WV-K1344, Dig. Std. 5G New Radio (WinIQSIM2), is supported

Fixed Issues

- DVB-S/DVB-S2, DSNG Coder (R&S BTC-K508):
  - Invalid transport stream content after restart/reboot of BTC
- ATSC 3.0 Coder (R&S BTC-K520):
  - No stable RF signal in case of LDM setups with HTI interleaving.
- Multimedia Generator Suite (R&S BTC-K20):
  - In some rare cases no data is available at coder input.

1.2 Version 02.34 (October 2018)

New Functionality

- ATSC 3.0 Coder (R&S BTC-K520):
  - Network mode SFN is supported.

Fixed Issues

- ATSC 3.0 Coder (R&S BTC-K520):
  - Coder is not configured properly when STL mode is switched from ON to OFF.
  - RF Signal is interrupted due to FEC Block handling issue in EncoderChain.
- ARB Generator (R&S BTC-K35):
  - Waveform is corrupted after change of transmission standard.
- RED Testing:
  - Obsolete files in directory D:\AUDIOPLAYER\CCIR559.

1.3 Version 02.32 (April 2018)

Fixed Issues

- ATSC 3.0 Coder (R&S BTC-K520):
  - Settings do not become effective, when ATSC-MH Coder (BTC-K518) is not installed.

- RED Testing:
  - The audio wave files are not available on drive D:.

1.4 Version 02.30 (March 2018)

New Functionality

- ATSC 3.0 Coder (R&S BTC-K520):
  - STL interface is supported.
- DVBS2/S2X Coder (R&S BTC-K508, R&S BTC-K510):
  - BER measurement on PL dataslices is supported.
- Audio Analyzer (R&S VT-B2370):
  - Quasi Peak Detector is supported.

Modified Functionality

- Extended Noise Generator (R&S BTC-K1043):
  - Phase noise shape profile: user mode shows actual values.
- RED Testing:
  - The audio wave files have been modified to exhibit approximately Gaussian amplitude distribution.

Fixed Issues

- Software of BTC with four fader boards sometimes freezes, when baseband signals are changed.
- DVB-T2 Coder (R&S BTC-K516):
  - Reporting of invalid subslicing value even though the configured value is standard compliant.
- Extended Noise Generator (BTC-K1043):
  - Phase Noise Profile not re-loaded correctly after device reboot.
  - Phase Noise accuracy improved.
- Distortion Simulation (R&S BTC-K1200):
  - Settings of TX Distortion do not become effective.

Known Issues

- ATSC 3.0 Coder (R&S BTC-K520):
  - Instable signal for setups with large frame duration (>1s) in (STL = Off) mode.
- DVBS2/S2X (R&S BTC-K508/510):
  - Problems when using low symbol rates (<1.2MS/s).
- External RF outputs C and D via SGTs are not synchronized with internal outputs A and B.

1.5 Version 02.20 (December 2017)

New Functionality

- R&S BTC-K520, ATSC 3.0 Coder, is supported.
- R&S WV-K818, ATSC 3.0 Waveforms, is supported.
- The latest version of the user manual is available on the instrument at C:\Program Files\Rohde-Schwarz\BTC\2.20.0\Docu\BTC_UserManual_en.pdf

Modified Functionality

- Multimedia Generator Suite (R&S BTC-K20):
  - Main dialog is re-designed
- J.83/A/B/C Coder (R&S BTC-K502):
  - BER Measurement (DVB-C, J83/B) with FSW-K70 is supported.
- DVB-T2 Coder (R&S BTC-K516):
  - SFN processing delay for multiple PLP Setups reduced
- DVB-C2 Coder (R&S BTC-K517):
  - Combination of constellation 4096QAM and code rate 4/5 is supported.
- Distortion Simulation (R&S BTC-K1200):
  - RMS-value of wanted baseband signal is indicated in diagrams.
- Power Meter (R&S BTC-K2055):
  - Current generation of power sensors is supported

Fixed Issues

- Misleading warning "C: Missing or invalid FRC calibration data. Please contact R&S service" is indicated.
- BER Measurement (R&S BTC-K2060):
  - Max. data rate is lower than specified.
- Dynamic Fading (R&S BTC-K1031):
  - A recalled fading profile name is not visible in GUI.
- Arbitrary Waveform Generator (R&S BTC-K35):
  - Change of ARB signal in RF path A causes an interrupt of the signal in RF path B and vice versa.

    To prevent this, the synchronization of the two baseband paths can be disabled at Setup ← Hardware Settings ← Synchronization
  - Multi-ARB signal is disturbed.
  - Remote command "BB:ARB:CLOC <value>" does not support units of clock frequency.
- DVBS2/S2X (R&S BTC-K508/510):
  - After setting a low symbol rate (<4MS/s) in particular cases BCH errors occur.
  - Transmission errors at combination of VCM and one IS using VL-SNR BPSK modcod.

  - No output signal with certain VCM modes.
- DVB-T2 Coder (R&S BTC-K516):
  - Time interleaver memory range check (Mti) for (T2MI Interface = On) is missing.
- Power Meter (R&S BTC-K2055):
  - The button "Auto Once" turns off the measurement.

Known Issues

- Software of BTC with four fader boards sometimes freezes, when BB-signals are changed.
- ATSC 3.0 Coder (R&S BTC-K520):
  - Instable signal for setups with large frame duration (>1s) in (STL = Off) mode.
- DVBS2/S2X (R&S BTC-K508/510):
  - Problems when using low symbol rates (<1.2MS/s).
- Distortion Simulation (R&S BTC-K1200):
  - Settings of TX Distortion do not become effective.

1.6 Version 02.10 (March 2017)

New Functionality

- R&S BTC-K256, XM Radio Waveforms, is supported.
- R&S WV-K807, China Digital Radio Waveforms, is supported.

Modified Functionality

- Extended Interface (R&S BTC-K508/510):
  - Digital I/Q Input of BB Board: Sample rate up to 160 MSymbols/s is supported.
- ISDB-T (R&S BTC-K506):
  - Different PIDs for all layers, when “Source = Test Signal”.
- DVB-T2 Coder (R&S BTC-K516):
  - SNR is improved.
- DVB-C2 Coder (R&S BTC-K517):
  - Frequency offset included into calculation of DVB-C2 frequencies.
  - SNR is improved.

Fixed Issues

- Firmware remote installation reports misleading “Fatal Error”, even though it is correctly installed.
- External Reference Frequency – “Adjustment State = Off” does not restore the calibrated reference frequency.
- Remote Command "SOURce EXTernal|MMGenerator|TESTsignal|TSPLayer" is not functional
- MMGen (R&S BTC-K20):
  - PCR fault after 15 days of continous operation.
- DVBS2/S2X Coder (R&S BTC-K508/510):
  - DVB-CID has wrong BCH coding.
  - VCM mode is not working correct.
  - VL-SNR: data symbols shifted in case of BPSK.
  - VL-SNR: spreading mode is not working correct.
- DTMB Coder (R&S BTC-K512):
  - False coloring of “Special Settings” parameter “GI Power Boost” if “Coding:Guard Interval = 595 Symbols”.
- DVB-T2 Coder (R&S BTC-K516):
  - Decoding of PLP fails after change of parameter.
- AM/FM RDS Coder (R&S BTC-K570) FM:
  - Spurious emissions at N x 380 kHz next to Carrier.
- Powermeter (R&S BTC-K2055):
  - Selection “Source = TX B” is not possible.
- BER (R&S BTC-K2060):

– Measurement of signals with low data rate, but highly bursted, is not working with TS In 1/2.

R&S VT-Options in BTC

Known Issues

- HDMI CEC/DDC analyzer (R&S VT-K2391):
  – "SCDC Read" function returns wrong values.
    Use the "SCDC" tab of the HDMI analyzer or HDMI generator for reading the correct values.
- HDMI TX (R&S VT-K364):
  – Pixel repetition factors > 4 lead to an incorrect video output.
- HDMI RX (R&S VT-K2364):
  – In rare cases, there is no video picture or a distorted picture at the HDMI analyzer, video analyzer and AV distortion analyzer.
- Audio analysis (R&S VT-K2150), "Quality" tab:
  – Left hand scale not visible on Mos-LQ graphs, if the range (max-min) is small.
- AV distortion analyzer (R&S VT-K2111):
  – Component signal sampling rate and video frequency not coupled.
- Video composite measurement (R&S VT-K2101):
  – Level accuracy for sinx/x measurement not sufficient.
- Video measurements (R&S VT-K2101), video component measurement:
  – In rare cases, measurement of some parameters switched off (not reproducible so far).
- Remote issue:
  – In rare cases, the firmware blocks after intensive usage of the remote interface. A firmware restart solves the issue.

1.7 Version 02.00 (June 2016)

New Functionality

- DRM Stream Library (R&S LIB-K60) is supported.
- DRM/DRM+ Coder (R&S BTC-K519) is supported.
- HDMI2.0 RX/TX (R&S VT-B2363) is supported.

Modified Functionality

- DVB-T2 Coder (R&S BTC-K516): MER is improved.

Fixed Issues

- In remote operation, application stops with system error.

- LO Coupling between RF channel A and B with Fading Mode == Advanced indicates wrong frequency for channel B.
- Single license option is not reliably available in two-path device.
- ARB Generator (R&S BTC-K35):
  - Memory management is corrupt under certain conditions.
- J.83/A/B/C Coder (R&S BTC-K502):
  - Test Signal setting is corrupt.
- DVB-S2 Coder (R&S BTC-K508) :
  - With Annex M active: Error in PL Header PLS coding.
  - Wrong constellation used for modcod25.
- DVB-S2x Coder (R&S BTC-K510):
  - Wrong Walsh-Hadamard Sequence used for modcod 91.
- DVB-T2 Coder (R&S BTC-K516):
  - Setting of Used Bandwidth does not become effective.
  - With Used Bandwidth == 7MHz, BER is increased.
- AWGN Generator (R&S BTC-K1040):
  - Signal level is changed after switching Noise Only --> Add.
- Impulsive noise (R&S BTC-K1043):
  - Remote setting of minimum values for spacing parameters is not accepted.
- Phase Noise Generator (R&S BTC-K1043):
  - SCPI remote command to select phase noise profile does not work.

Known Issues

- MMGen (R&S BTC-K20):
  - TSMux doesn't work with output data rates higher than 215 Mbit/s.
- DVB-C2 Coder (R&S BTC-K517):
  - Menu item “Input Format” in menu “Input Signal” does not work.
- Fading Simulator (R&S BTC-K103x):
  - Manual restart is not working.
- Sync. bandwidth on external reference with module STD SYNTHESIS III is always narrow for 5/13MHz.

R&S VT-Options in BTC

New Functionality

- New HDMI CEC/DDC analyzer supported (R&S VT-K2391).
- Audio analysis (R&S VT-K2150): S/PDIF input compressed audio is supported.

Fixed Issues

- HDMI TX (R&S VT-K364)

  - In rare cases, the DDC bus may block which requires a restart of the software.
- HDMI RX (R&S VT-K2364)
  - Sometimes HDCP 1.4 authentication can take few seconds. In rare cases, a reconnect is necessary.
  - In rare cases, there is no video picture or a distorted picture at the HDMI analyzer, video analyzer and AV distortion analyzer.
- Video measurements (R&S VT-K2101), video component measurement:
  - Scope: The blanking area is shifted by 2 pixels.
    Not all VESA standards lead to a valid measurement result.

Known Issues

- HDMI CEC/DDC analyzer (R&S VT-K2391):
  - "SCDC Read" function returns wrong values.
    Use the "SCDC" tab of the HDMI analyzer or HDMI generator for reading the correct values.
- HDMI TX (R&S VT-K364):
  - Pixel repetition factors > 4 lead to an incorrect video output.
- HDMI RX (R&S VT-K2364):
  - In rare cases, there is no video picture or a distorted picture at the HDMI analyzer, video analyzer and AV distortion analyzer.
- Audio analysis (R&S VT-K2150), "Quality" tab:
  - Left hand scale not visible on Mos-LQ graphs, if the range (max-min) is small.
- AV distortion analyzer (R&S VT-K2111):
  - Component signal sampling rate and video frequency not coupled.
- Video composite measurement (R&S VT-K2101):
  - Level accuracy for sinx/x measurement not sufficient.
- Video measurements (R&S VT-K2101), video component measurement:
  - In rare cases, measurement of some parameters switched off (not reproducible so far).
- Remote issue:
  - In rare cases, the firmware blocks after intensive usage of the remote interface. A firmware restart solves the issue.

1.8 Version 01.90 (November 2015)

New Functionality

- Fading Simulator Extension (R&S BTC-B1034) is supported.
- MIMO Fading Routing (R&S BTC-K1034) supports mode 1x3 and mode 1x4.
- DVB-T2 Coder (R&S BTC-K516):
  - Improved post delay calculation for SFN operation added.
  - FEF PRBS payload generation with power equal to T2 frame supported.

Fixed Issues

- MMGen Player Stop Data Switch not working correctly with Remux or Gateway.
- Warning “A: MMGen: Player 2: Switched Off at Input Config” appears after reset.
- Interferer = ARB or I/Q Dig. is not functional, when no DTV option is installed.
- Hardcopy sometimes doesn't save the data.
- DVB-T2 Coder (R&S BTC-K516):
  Sometimes working transmission, but corrupt transport stream after recall application.
- AWGN (R&S BTC-K1040):
  Setting of Receiver Bw. sometimes changes Generated Noise Bw.
- Extended Noise Generator (R&S BTC-K1043): The remote command `[:SOURce{1..2}]:NOISe:PHASenoise:SHAPe:SELect[?]` is not functional.

Known Issues

- MMGen(R&S BTC-K20):
  TRP Player causes PCR errors when useful data rate is extremely varying.
- CMMB Coder (R&S BTC-K516): Data rate too low/high is indicated by mistake.

R&S VT-Options in BTC

New Functionality

- HDMI TX 300 MHz module (R&S VT-B360):
  - New HDMI 1.4 CTS test cases for HDMI CTS sink test (R&S VT-K365): 8-27, 8-28
- Video analyzer (R&S VT-B2370): New remote control commands
  - For querying the sync status of the video signal:
    `:READ:SCALar:VIDeo:SIGNal? SYNCok|UNSYnc`
  - For switching the external synchronization for analog component signals:
    `ROUTe{hw}:VIDeo:SSELect ON|OFF`
- HDMI analyzer (R&S VT-K2365):
  - Improvements on CTS test: HF1-12 "TMDS Prot 6G" – Basic Prot and Scrambling: Additional video formats.
- AV distortion analyzer (R&S VT-K2111):
  - Configuration of APL synchronization is supported.

Modified Functionality

- Audio analysis (R&S VT-K2150):
  - Frequency response measurement at low frequencies is improved.
- HDMI analyzer, HDMI CTS source test (R&S VT-K2365):
  - The test case HF1-51 now requires the HDMI CTS RX/TX 600 MHz module (R&S VT-B2362) or the HDMI RX/TX 600 MHz module (R&S VT-B2363). This is due to new 6G capability requirement in the CTS 2.0 V7.
- Video measurements (R&S VT-K2101), video component measurement:
  - Name changes: "Field Period" to "Frame Period", "Field Frequency" to "Frame Frequency".
  - Default location windows are changed for "LinearDistortions", "ST Dist" parameters in YCbCr(PbPr) configuration.
- Video measurements (R&S VT-K2101), video composite and component measurement:
  - When leaving the Auto measurement, the measurement values are marked as invalid.
  - Occasionally, it was observed that some parameters showed the status "OFF" if there was no sync. These parameters now show "Signal?" status.
  - If you try to load an incompatible configuration (RGB, YCbCr(PbPr), PAL, NTSC), an error message is shown. Previously, loading of the configuration was simply ignored.
- MHL analyzer, MHL CTS system source test (R&S VT-K2355):
  - If one test is selected, all other tests are automatically deselected.

Fixed Issues

- HDMI analyzer, HDMI RX 300 MHz module (R&S VT-B2361):
  - In rare cases, the values "H Front Porch Pixels" and "H Sync Pixels" were not shown correctly if the DUT changed. This has been corrected.
- Video analyzer: After a large number of input changes, a deadlock situation was observed. This resulted in a SCPI time out error. In addition, the HDMI input was not working anymore within the Auto measurement. This has been corrected.

Known Issues

- Audio analyzer, "Quality" tab:
  - Left hand scale not visible on Mos-LQ graphs, if the range (max-min) is small.
- AV distortion analyzer (R&S VT-K2111):
  - Component signal sampling rate and video frequency not coupled.
- Video composite measurement (R&S VT-K2101):
  - Level accuracy for sinx/x measurement not sufficient.
- Video measurements (R&S VT-K2101), video component measurement:
  - Not all VESA standards lead to a valid measurement result.
  - In rare cases, measurement of some parameters switched off (not reproducible so far).

1.9 Version 01.80 (August 2015)

New Functionality

- Extended Baseband Routing (R&S BTC-K8) is available.
- DVB-S/DVB-S2, DSNG Coder (R&S BTC-K508):
  PL Header Scrambling in DVB-S2 (AMC Option) is available.
- Fading, 2 Channel Interferer is supported.
- Output signals are blanked during re-configuration of the instrument.
- Support of Hardcopy via SCPI.
- LIB-K58 Additonal Patterns for EMC Application are available.

Fixed Issues

- MMGen(R&S BTC-K20): TRP-Player, PTS/PCR is not constant.
- DVB-S/DVB-S2, DSNG Coder (R&S BTC-K508):
  - Stuffing = off results in wrong Symbol rate.
  - DVB-S2X 80 MS/s with higher constellations are not working correct.
  - DVB-S2X code rate 7/15 does not work correct.
- DVB-C2 Coder (R&S BTC-K517):
  - Transport stream errors if TS over IP input is used and Data Slice Type is 2.
  - PLP Bundling is not working with short FEC frames.
- Extended Interface (R&S BTC-K2500):

  - Sometimes no Signal at IQ Digital Out on Baseband Main Module.
  - Digital IQ Output on Baseband Generator sometimes does not connect to sink device.
  - Analog IQ Output: Q Bias and Offset are not settable.
- MIMO Fading Routing (R&S BTC-K1034):
  Switching from Fading Configuration Mode Standard, Signal Routing A->(open), B->A and B to Mode Advanced causes a RF signal loss.

Known Issues

- MMGen(R&S BTC-K20):
  TRP Player causes PCR errors when useful data rate is extremely varying.
- DVB-T2 Coder (R&S BTC-K516):
  Sometimes working transmission, but corrupt transport stream after recall application.

R&S VT-Options

No changes.

1.10 Version 01.70 (May 2015)

New Functionality

- DVB-T2 Multi-Profile Gateway (R&S BTC-K24) is supported.
- HEVC Transport Stream Library (R&S LIB-K78) is supported.
- DVB-S/DVB-S2, DSNG Coder (R&S BTC-K508):
  - Phase noise profile shape1 is available.
  - Carrier ID signal is available.
- DIRECTV Legacy Coder (R&S BTC-K509):
  - Phase noise shapes added
  - Menu item "CW Mode" added to phase noise menu
- DVB-S2-X Coder Extension (R&S BTC-K510): VL-SNR Settings are supported.
- Extended Interface (R&S BTC-K2500): Digital IQ output at BTC-B1 and –B2 is supported.
- DTMB Coder (R&S BTC-K512): SFN is supported.
- DVB-C2 Coder (R&S BTC-K517): Display of data slice frequencies is optimized.
- AM/FM RDS Coder (R&S BTC-K570): File menu, “Save RDS” and “Load RDS” is implemented.
- Fading Simulator 1st Channel (R&S BTC-B1031) without Fading Simulator 2nd Channel (R&S BTC-B1032) is supported in 2-path BTC.
- Fading Simulator: Frequency Shift and Frequency Spread Range extended.
- Dynamic Fading (R&S BTC-K1031):

  - BirthDeath is supported.
  - Moving Propagation is supported.
- Extended Noise Generator (R&S BTC-K1043): Impulsive noise C/I setting range is extended to -35 dB.
- Internal 1PPS generator: configuration is extended.
- Modulation settings: spectrum inversion is supported.
- Preset dialog supports context sensitive help.
- Setup: Information on device is improved.

Fixed Issues

- Warning “Pep value greater than allowed level vs. Frequency” does not disappear.
- Switching transmission standard on a 2-path BTC with only one license per standard shows "missing option ...".
- Only positive frequency increments are possible with frequency step state = increment.
- Using LO coupling the output frequency is wrong after switching from coupled to internal.
- Tx-Input Signal-Source: settings are sometimes not consistent with GUI settings.
- TRP Player does not replay files with base encryption.
- TRP Player shows wrong orig. loop time after preset.
- Remote command “MMGen:PLAYer<player>:CONFigure:PID” has malfunction.
- Remote command “MMGen:PLAYer<player>:READ:FILeinfo?” always returns “???”.
- Arbitrary Waveform Generator (R&S BTC-K35):
  - Uninterrupted level setting is not working.
  - Waveform files containing “EMPTYTAG” are not supported.
- 8VSB-Coder (R&S BTC-K518): Special Settings = Off does not enable the scrambler
- AM/FM RDS Coder (R&S BTC-K570): when setting radiotext by remote the first character code is decremented by one.
- DVB-C2 Coder (R&S BTC-K517):
  - incorrect state after recall.
  - pressing “Adjust RF Frequency” modifies “Start Frequency” and “Calc. Center Frequency” by mistake.
- AWGN Generator (R&S BTC-K1040):
  - generated noise bandwidth changes receiver bandwidth.
  - AWGN signals of paths A and B are correlated.
- Extended Noise Generator (R&S BTC-K1043): some phase noise user profiles cause spurios in output signal.
- Extended Interface (R&S BTC-K2500):
  - Sometimes RF output level with Digital IQ input signal is wrong.
  - Sometimes missing signal at Digital IQ output of Baseband Main Module.

Known Issues

- MMGen(R&S BTC-K20):
  - TRP Player causes PCR errors when useful data rate is extremely varying.
- DVB-C2 Coder (R&S BTC-K517):
  - Transport stream errors if TS over IP input is used and Data Slice Type is 2.
  - Bundling is not working with short FEC frames.
- DVB-T2 Coder (R&S BTC-K516): Sometimes working transmission, but corrupt transport stream after recall application.
- Extended Interface (R&S BTC-K2500): Sometimes Digital IQ output at BTC-B1 and –B2 does not connect to external instrument.
- MIMO Fading Routing (R&S BTC-K1034): Switching from Fading Configuration Mode Standard, Signal Routing A->(open), B->A and B to Mode Advanced causes a RF signal loss.

R&S VT-Options

New Functionality

- New CTS tests for Time Domain Analyzer (R&S VT-K2385):
  - HDMI1.4: 7-1 EDID Related Behavior, 7-8 TMDS Clock Duty Cycle, 7-10 TMDS Data Eye Diagram, 7-11 +5V Power, 7-12 Hot Plug Detect, 7-13 DDC/CEC Capacitance and Voltage, 7-15 Line Degradation.
  - HDMI2.0: HF1-6 TMDS 6G Clock Duty Cycle.
- New CTS tests for HDMI Analyzer (R&S VT-K2365):
  - HDMI1.4: 7-33a Interoperability with multiple VSDB.
  - HDMI2.0: HF1-36 3D Audio (L-PCM) Packet Format, HF1-37 3D Audio (One Bit) Packet Format, HF1-38 MS Audio (L-PCM and 61937) Packet Format, HF1-39 MS Audio (One Bit) Packet Format, HF1-40 CEA-861-F Audio, HF1-41 3D Audio IEC Sample Packet.
- AV Delay Measurement for time code synchronization with test tone (R&S VT-K2111).
- Additional configuration parameters for “Freeze” in AV Distortion Analysis (R&S VT-K2111).

Modified Functionality

- Analog Video Component Measurement (R&S VT-K2101): the default setting for the “Line Counter” in the “Location Editor” has been changed to “Full Field”.
- Video Analyzer scope uses improved interpolation filters.
- Limit Values for Time Domain Analyzer CTS tests (R&S VT-K2385) are now part of the CTS report.
- Improved CTS report format for Time Domain Analyzer (R&S VT-K2385).
- Implementation of the dependencies of the Audio Analyzer options R&S VT-K2151, VT-K2158 and VT-K2159 corrected.
- HDMI CTS Sink Test HF2-25 (R&S VT-K365) can now be configured.

Fixed Issues

- Analog video component measurement (R&S VT-K2101): Interchannel delay measurement became unstable in very rare cases.
  - Interchannel delay measurement works reliably now.
- Improvements on Video Analyzer vector scope:
  - recognizes an SMPTE color bar now.
  - Handles VESA signals properly now.
- HDMI Analyzer 6G CTS tests (R&S VT-2365): dynamically created EDIDs did not contain an HF-VSDB. As a consequence 6G end products did not output a 6G signal.
  - This problem has been solved.
- Audio Analyzer (R&S VT-K2150): accuracy of THD+N measurements improved.
- Audio Analyzer (R&S VT-K2150): accuracy of frequency measurement improved.
- Compressed Audio Support (R&S VT-K2151) : improved measurement for sampling rates above 48 kHz.

Known Issues

- AV distortion analyzer (R&S VT-K2111):
  - Component signal sampling rate and video frequency not coupled.
- Time Domain Analyzer CTS Tests (R&S VT-K2385):
  - Limit mask can not be centered manually.
  - Center of eye not always detected correctly.
- Video composite measurement (R&S VT-K2101):
  - Level accuracy for sinx/x measurement not sufficient.
- Video component measurement (R&S VT-K2101):
  - Not all VESA standards lead to a valid measurement result.
  - In rare cases measurement of some parameters switched off (not reproducible so far).
- HDMI Analyzer (R&S VT-B2361) :
  - In rare cases the values “H Front Porch Pixels” and “H Sync Pixels” are not shown correctly if the DUT changes (not reproducible so far).

1.11 Version 01.62 (December 2014)

New Functionality

- DVB-T (R&S BTC-K501): With special settings, carriers can be switched off.
- DTV interferers (R&S WV-K1114): DVB-T2 5MHz and 6MHz interferer supported.
- BBB: Secure Boot Device Update supported.
- Remote: Commands "CAL{1..2}:ALL[?]" and "CAL{1..2}:IQM:LOC[?]" is supported.
- Prepared for HEVC Stream Library (R&S LIB-K78).

Fixed Issues

- BTC sometimes shows a blue screen while remotely operated via AVBRun.
- BTC runs into a dead loop after several days of remote operating with AVBRun and certain test cases.
- BTC becomes unresponsive after 4-5 days of idle running
- DVB-S2-X Coder (R&S BTC-K510): missing phase jump in PL header.
- DVB-C2 Coder (R&S BTC-K517): PLP Bundling not working high input data rates.
- DVB-C2 Coder (R&S BTC-K517): PLP Bundling synchronization loss after TS input error.
- DVB-C2 Coder (R&S BTC-K517): switching input signal leads to transmission errors in Type 1 Data Slice.
- Extended Noise Generator (R&S BTC-K1043): Too high precision of filter coefficients causes spurios in output signal.
- Remote: "CALibration:LEVel[:MEASure]:DATE?/qonly/" is not supported
- Sometimes the “go to local” button on touch screen is not responding when BTC is remote controlled.
- *ESR? returns 0 after invalid setting value.
- Inactive warning messages still visible.
- DVB-T2 MI streams (R&S SFU-K227): False NorDig configuration SAVRCL files for BCMux.

Known Issues

- MMGen (R&S BTC-K20): shows wrong Orig. Loop time after preset.
- Arbitrary Waveform Generator(R&S BTC-K35): Uninterrupted level setting is not working.
- ISDB-T Coder (R&S BTC-K506): Remux off is not functional.
- DVB-S2 Coder (R&S BTC-K510): TS over IP data rates higher than 216 Mbit/s are not supported.
- DVB-C2 Coder (R&S BTC-K517): Pressing "Adjust RF Frequency" modifies "Start Frequency" and "Calc. Center Frequency" by mistake.
- DVB-C2 Coder (R&S BTC-K517): Transport stream errors if TS over IP input is used and Data Slice Type is 2.
- DVB-C2 Coder (R&S BTC-K517): incorrect state after recall.

- Audio BC (R&S BTC-K570): File: Save RDS and Load RDS is not implemented.
- AWGN Generator (R&S BTC-K1040): Signals of paths A and B are not uncorrelated.
- Extended Noise Generator (R&S BTC-K1043): Some phase noise user profiles cause spurios in output signal.
- Remote: “MMGen:PLAYer<player>:CONFigure:PID” has malfunction.
- Remote: “MMGen:PLAYer<player>:READ:FILeinfo?” always returns ???
- Tx - Input Signal - Source settings sometimes not consistent with GUI settings.

R&S VT-Options

See release notes for VTC/VTE/VTS firmware version 01.70.

1.12 Version 01.60 (August 2014)

New Functionality

- DVB-S2-X Coder Extension (R&S BTC-K510) is supported.
- DAB / DAB+ / T-DMB Coder (R&S BTC-K511): SFN is supported.
- CMMB Coder (R&S BTC-K515) is supported.
- MIMO 2x2 (BTC-K1034) is supported.
- Distortion Simulation (R&S BTC-K1200): RX Distortion is supported.
- DVB-CID Waveforms (R&S WV-K810) is supported.
- MHL CTS sink test (R&S VT-K355) is supported.
- MHL RX/TX Module (R&S VT-B2350) is supported.
- MHL RX PackedPixel Module (R&S VT-B2351) is supported.
- MHL CTS source test (R&S VT-K2355) is supported.
- MHL CBUS tracer (R&S VT-K2356) is supported.
- Completion of HDMI CTS sink tests (R&S VT-K365).
- Extended functionality for MHL generator (R&S VT-B2350).
- Video Analyzer: Vector Scope supported.
- Audio Analyzer: POLQA measurement supported (R&S VT-K2159).
- Audio Analyzer: PESQ measurement supported (R&S VT-K2158).
- Audio Analyzer: Compressed Audio for AC3 supported (R&S VT-K2151).
- HDMI Analyzer: Sample EDID files are installed (R&S VT-B2360/2361).
- HDMI Analyzer: Indication of compressed audio formats in EDID for CTS Test ID 7-36 supported (R&S VT-K2365)
- Improvements for Video measurement (R&S VT-K2101):
  - Group Nonlinear distortions for component signals supported.
  - Group Timing measurements for component signals supported.
  - Group Jitter measurements for component signals supported.

  - Filter settings for NTSC noise measurements can be configured.
  - 2T Pulse KPB for composite signals supported.
- Update of old BIOS versions with firmware update.

Modified Functionality

- MMGen (R&S BTC-K20): TS SERIAL OUT supports SMPTE and ETI format.
- 1PPS output is supported.
- Frontend TS over IP is supported as input signal.
- Setting of TS Input Format is global for all TX applications.
- RF frequency resolution is enhanced to 0.001 Hz.
- Remote Control is indicated on the display of the BTC, when Update Display = On.
- Remote-Commands for shutdown and restart are implemented.
- Software update: Boot devices are only updated if required.
- ARB (R&SBTC-K35): ARB in Path A and B is synchronized.
- ARB (R&SBTC-K35): Max. sample rate is extended to 200MSymbols/s.
- ARB (R&SBTC-K35): Range of interferer attenuation is extended.
- ARB (R&SBTC-K35): Warning for exceeded memory sample rate is available.
- ISDB-T Coder (R&S BTC-K506): EEW (earthquake early warning) is supported.
- DAB / DAB+ / T-DMB Coder (R&SBTC-K511): shoulder distance is improved.
- DVB-C2 Coder (R&S BTC-K517): PLP Bundling is supported.
- ATV Multi-Standard Modulator (R&S BTC-K595): Analog Audio/Video Generator supports BTSC.
- ATV Multi-Standard Modulator (R&S BTC-K595): Std. M with BTSC is supported.
- Fading (R&S BTC-B1031,-B1032): "Set to Default" and "All Equal" functionality added.
- Fading (R&S BTC-B1031,-B1032): “Common Speed all Paths” is available.
- Fading (R&S BTC-B1031,-B1032): “Correlation Path“ and “Log Normal State” is supported.
- Fading (R&S BTC-B1031,-B1032): New parameter "Act. Doppler Shift" added.
- Fading (R&S BTC-B1031,-B1032): New profiles “Gauss Watters”, “WM Doppler” und “WM Rice” are supported.
- AWGN (R&S BTC-K1040): Minimal Receiver Bandwidth of 1 kHz is supported.
- Extended Noise Generator (R&S BTC-K1043): DIRECTV legacy coder phase noise profile supported.
- Extended Interface (R&S BTC-K2500): I/Q Digital Output settings improved.

Fixed Issues

- No warning is indicated when boot device update of modules is required.
- "Missing option xxx" is shown sometimes.
- Internal 1PPS generator is not sync to transport streams.
- SCPI: Error bit in ESR is set by warnings.
- Setup/Adjustment - Adjust I/Q Modulator On/Off is not functional.
- Setup-LAN-Service-Parameters are changed by Save/Recall.
- Application cannot handle SavRcl files of an old firmware version.
- Baseband Main Module 2-Channel (R&S BTC-B12): sometimes data synchronisation fails and causes impairments in the respectively other path.
- MMGen (R&S BTC-K20): Cannot be activated after *RST.
- MMGen (R&S BTC-K20): Player does not support Pause.
- MMGen (R&S BTC-K20): Save/Recall does not work correct for some parameters.
- MMGen (R&S BTC-K20): Remux can be swiched on and off.
- ARB (R&SBTC-K35): Interferer Frequency offset is limited to +-60MHz.
- ARB (R&SBTC-K35): No warning for exceeded memory sample rate is available.
- AVDA runs in BTC with "out of memory" crashes.
- DVB-T2 Coder (R&S BTC-K516): False NorDig configuration SCPI script files.
- DVB-C2 Coder (R&S BTC-K517): input stream error messages fixed.
- Fading (R&S BTC-B1031,-B1032): Predefined fading settings mismatch.
- Fading (R&S BTC-K1032): GaussDoppler profile does not work correct.
- Fading (R&S BTC-K1032): GaussWatters profile: Additional parameters are missing.
- AWGN (R&S BTC-K1040): Noise Only level displayed is wrong.
- Extended Noise Generator (R&S BTC-K1043) Impulsive Noise Only: Displayed level is not correct.
- Extended Noise Generator (R&S BTC-K1043): Phase noise only has wrong level.
- Distortion Simulation (R&S BTC-K1200): Save/Recall: Default values are not saved.
- Extended Interface (R&S BTC-K2500): Connectors not illustrated in TX signal flow chart.
- RF frequency resolution is limited to 0.1 Hz.
- RF level resolution is limited to 0.1 dB.
- Improvements for Audio Analyzer:
  - Cross talk measurement has been improved.
  - Frequency Response measurement has been improved.
- Improvements on Video measurements (R&S VT-K2101):
  - Component noise measurements on ramp signal improved.
  - Composite noise measurements improved.

  - Precision of interchannel delay measurement for analog component signals is consistent with specification.
- HDMI Generator: HDCP was switched off by mistake if bcaps register is set to 0 (R&S VT-B360)

Known Issues

- Solved issue: Extended Noise Generator (R&S BTC-K1043): Some phase noise user profiles cause spurios in output signal.
- Audio BC: (R&S BTC-K570): File: Save RDS and Load RDS is not implemented.
- AV distortion analyzer (R&S VT-K2111): Component signal sampling rate and video frequency not coupled.
- Video analysis (R&S VT-K2100): HDMI2.0 signals with 4:2:0 coding are currently not supported.

1.13 Version 01.52 (February 2014)

Fixed Issues

- Only the boot device of one VT-Bxxx module is updated, although more than one VT-Bxxx module is installed.

1.14 Version 01.50 (January 2014)

New Functionality

- DVB-T (R&S BTC-K501): SFN simulation is supported.
- DVB-S2 (R&S BTC-K508): new features ACM, Annex M, TimeSlicing added.
- DAB / DAB+ / T-DMB Coder (R&S BTC-K511) is supported.
- DVB-C2 Signals (R&S WV-K817) is supported.
- Distortion Simulation (R&S BTC-K1200) is supported.
- Power Meter (R&S BTC-K2055) is supported.
- BER Application (R&S BTC-K2060) is supported.
- Extended Interface (R&S BTC-K2500) is supported.
- Low Phase Noise Option (R&S BTC-B3100) is supported.
- LIB-K74...K77 supported.

Modified Functionality

- Option management: Floating licenses are supported.
- Setup: Option key management: Support of “Install License File” and “Save Response Key to File” added.
- Internal BB frequency response calibration is supported.
- BTC compatible SFU remote driver is available.
- Closing of BTC application in Start Menue supported.

- BTC TS In: Input Format SMPTE 310 supported.
- MMGen(R&S BTC-K20): Audio/Video Player: Crypted waveforms are supported.
- MMGen (R&S BTC-K20): Improved File selection.
- J.83B (R&S BTC-K502): MER value improved.
- J.83B (R&S BTC-K502): Roll-off filter improved.
- ISDB-T (R&S BTC-K506): SFN network simulation is supported.
- DIRECTV Legacy Coder (R&S BTC-K509): Phase noise mask added.
- DVB-C/S/S2/T: when Stuffing = Off, only packet length 188 is valid.
- DVB-T2 Coder (R&S BTC-K516): 1PPS routing supported.
- DVB-T2 Coder (R&S BTC-K516): Output spectrum has less amplitude ripple.
- DVB-T2 Coder (R&S BTC-K516): T2-MI interface ON: Bandwidth not remote adaptable.
- AWGN (R&S BTC-K1040): AWGN source before fading added.
- Extended Noise Generator (R&S BTC-K1043): Impulsive Noise is supported.
- Extended Noise Generator (R&S BTC-K1043): Phase Noise GUI improved.
- WV-K1114 DTV infererers - DVB-T2 1.7MHz interferer supported.

Fixed Issues

- Help is not context sensitive.
- File dialog: Display of some characters in filenames (e.g. Save/Recall) not correct.
- Setup: Hardware settings: LO Coupling Mode External allows setting of RF frequency.
- System Tab: Setting of IP adress sometimes unreliable.
- Tooltip conflict with numeric input and error in file editor.
- BTC firmware does not start up.
- Tx: Frequency settings:setting of RF frequency in channel B is not disabled if channel B is coupled to channel A.
- Tx: Parameter “Delta Phase” not disabled for certain LO Coupling modes.
- Tx: Modulation: BaseBand Impairments settings incorrect.
- Tx: Unexpected Channel Table behaviour.
- ARB (R&S BTC-K35): Wrong settings of ARB and interferer after Save/Recall.
- ARB (R&S BTC-K35): Signal and interferer levels are not related to carrier signal.
- DVB-T (R&S BTC-K501): Stuffing = OFF is settable in case of hierarchical Coding.
- DVB-T/DVB-H (R&S BTC-K501): No input signal from MMGEN.
- J.83B (R&S BTC-K502): Symbol rate setting is wrong.
- DVB-T2 Coder (R&S BTC-K516): False coding and modulation check in T2-MI Analyzer.
- DVB-T2 Coder (R&S BTC-K516): Malfunction of BBFrame header parser and L1 signal processing.
- DVB-T2 Coder (R&S BTC-K516): message “Invalid T2-MI setup (not DVB-T2 compliant)” missing.

- DVB-T2 Coder (R&S BTC-K516): MultiPLP time interleaver malfunction if NumBlocks value is large for one PLP.
- Fading (R&S BTC-B1031 and R&S BTC-B1032): Insertion Loss is not editable in mode “LowACP” and “Normal”.
- AWGN (R&S BTC-K1040): Eb/No not displayed correctly, C/N has reduced setting range, Generated Noise Bandwidth not settable.
- AV Distortion Analysis (R&S VT-K2111): Home button clears selected reference.
- AV distortion Analysis (R&S VT-K2111): Reference Time Code: Frames without Time Codes are not dropped.

Known Issues

- No warning is indicated when boot device update of modules is required.

  Important: see chapter 3.2.1 Performing an Update of PCI Devices.
- RF frequency resolution is limited to 0.1 Hz.
- RF level resolution is limited to 0.1 dB.
- RF sweep dwell time minimum is 0.01s.
- Application cannot handle SavRcl files of an old firmware version.
- Two baseband paths (R&S BTC-B12): sometimes data synchronisation fails and causes impairments in the respectively other path.
- Arbitrary Waveform Generator (R&SBTC-K35): sample rate is limited to 160Msymbols.
- Arbitrary Waveform Generator (R&SBTC-K35): Interferer Frequency offset is limited to +-60MHz.
- Arbitrary Waveform Generator (R&SBTC-K35) No warning for exceeded memory sample rate is available.
- AWGN (R&S BTC-K1040): Noise Only level is not correct.
- Extended Noise Generator (R&S BTC-K1043): Noise Only level is not correct.
- Extended Noise Generator (R&S BTC-K1043): Some phase noise user profiles cause spurios in output signal.
- Video Analysis (R&SVT-K2100): INPUT tab shows wrong quantization range for 10 and 12bit pixel resolution.
- HDMI RX/TX HEC (HDMI Ethernet Channel) sometimes losses the connection and is not usable.
- Video Analysis (R&SVT-K2100): CCVS Auto Tab: Incorrect test results for Field Jitter, Vtxt Decoding Margin, Vtxt Timing Margin, Vtxt Error Rate measurements.
- Video Analysis (R&SVT-K2100): Scope CCVS: Line counting for standard. M/NTSC is continuously from the first to last line of a frame and does not show 1st and 2nd field information.
- AV Distortion Analysis (R&S VT-K2111): No support of audio analysis for HDMI/MHL signals with a sample rate higher then 48 kHz.
- AV Distortion Analysis (R&S VT-K2111): Remote command :READ:AVDA:LIST:SIGN? returns incorrect state immediately after :INIT:AVDA command.

- AV Distortion Analysis (R&S VT-K2111): Component signals show poor test results.
- AV Distortion Analysis (R&S VT-K2111): A remote command that tries to load a non existing reference file, does not result in an error message.
- HDMI CEC Tracer (R&S VT-K2366) doesn't work on some set top boxes.

1.15 Version 01.42 (July 2013)

New Functionality

- AM/FM RDS modulator (R&S BTC-K570) is supported.
- ATV multistandard coder (R&S BTC-K595) is supported.
- Extended noise generator (R&S BTC-K1043) is supported.

Known Issues

- Help is not context sensitive.
- Several DTV transmission standards: SFN is not supported.
- ARB/interferer: Output level is not related to carrier signal.

1.16 Version 01.00 (June 2013)

New Functionality

- Multimedia generator suite (R&S BTC-K20) is supported.
- Arbitrary waveform generator (R&S BTC-K35) is supported.
- DVB-T/DVB-H coder (R&S BTC-K501) is supported.
- J.83/A/B/C coder (DVB-C, US cable, ISDB-C) (R&S BTC-K502) is supported.
- ISDB-T/ISDB-T_B/ISDB-T_{SB} coder (R&S BTC-K506) is supported.
- DVB-S/DVB-S2, DSNG coder (R&S BTC-K508) is supported.
- DIRECTV legacy coder (R&S BTC-K509) is supported.
- DTMB coder (GB20600-2006) (R&S BTC-K512) is supported.
- DVB-T2 coder (R&S BTC-K516) is supported.
- DVB-C2 coder (R&S BTC-K517) is supported.
- ATSC M/H, 8VSB coder (R&S BTC-K518) is supported.
- Dynamic fading (R&S BTC-K1031) is supported.
- Additive white Gaussian noise (AWGN) (R&S BTC-K1040) is supported.

2 Modifications to the Documentation

The current documentation is up-to-date.

3 Firmware Update

Your R&S BTC is delivered with the latest firmware version available. Firmware updates are provided on the Rohde & Schwarz Home Page (http://www.rohde-schwarz.com/firmware/btc), by Rohde & Schwarz service centers or sales offices.

The firmware update consists of one file:

- *SetupRsBtc(Release).exe*

Further information

- Installing software options
  See user manual, chapter "Basic Instrument Configurations".
- Connecting the instrument to a network (LAN)
  See the user manual, chapter "Operating Concepts".
- Sharing and accessing instrument drives
  See the user manual, chapter "Operating Concepts".
- Making a backup before installing new firmware
  See the user manual, chapter "Installed Software".

3.1 Installing the New Firmware Version

You can choose between a local and a remote installation.

3.1.1 Remote Installation (Recommended Procedure)

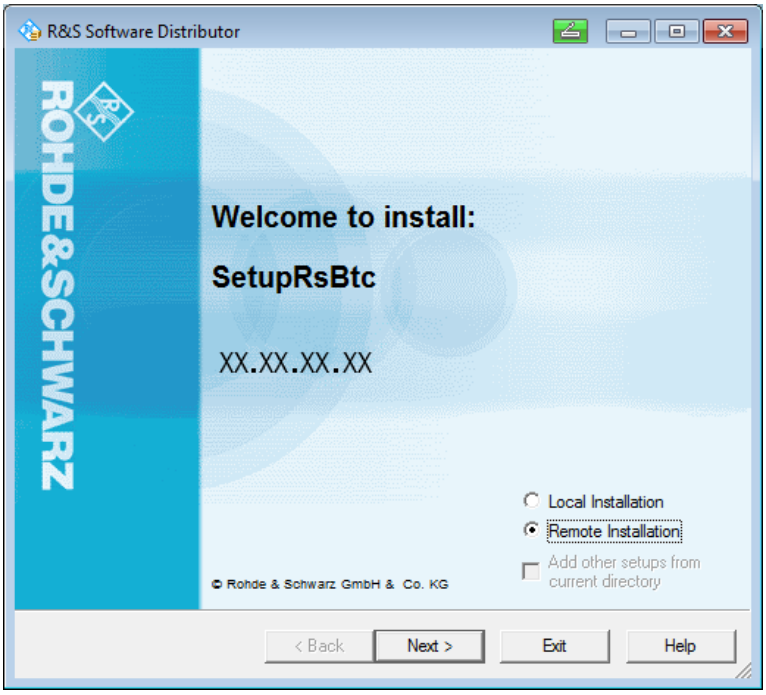
This is the recommended procedure to install a new firmware version. You can update several R&S BTCs simultaneously.

Prerequisites:

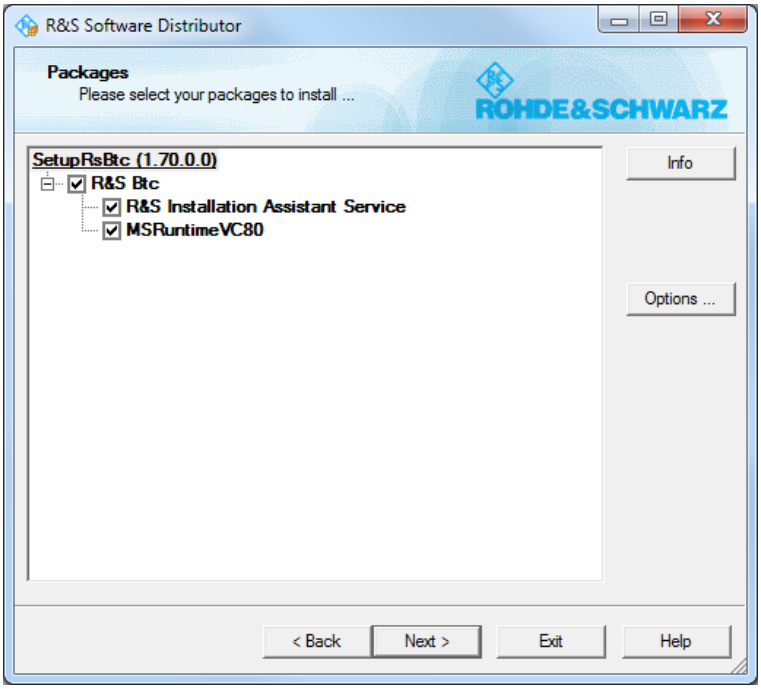
- The R&S BTCs are connected to the LAN.
- The downloaded update file is stored on a network directory.
- The external host computer that you use for the installation is also connected to the LAN.

Performing the installation

1. Execute *SetupRsBtc(Release).exe*.
   The R&S Software Distributor is displayed.

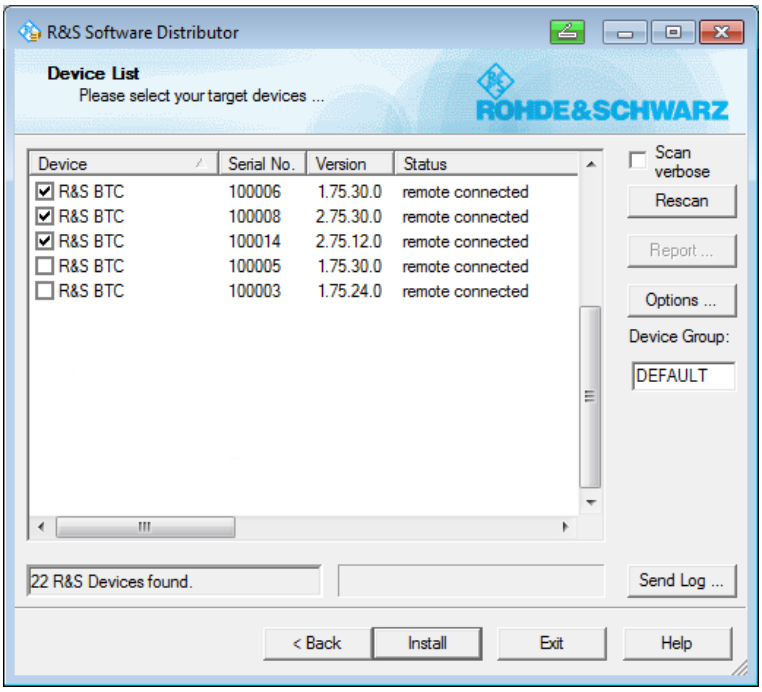


2. Select "Remote Installation".
3. Click "Next >".



All packages that you need to install are already selected.

4. Click "Next >".
5. In the "Device" column, select all R&S BTCs that you want to update.



6. Click "Install".
   The installation process itself is self-explanatory.
7. After the installation, click "Exit".

3.1.2 Local Installation

Use this procedure if your R&S BTC is not connected to the LAN.

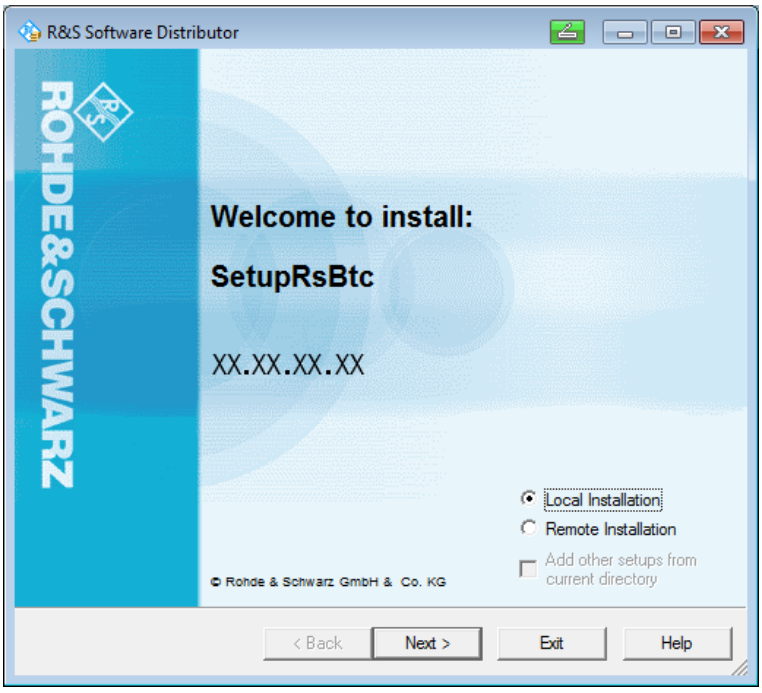
Prerequisite:

- A mouse or a keyboard is connected to the USB interface of the R&S BTC.
- The downloaded update file is stored on the R&S BTC hard disk (*D:\BTC\Installations)* or an external storage medium (USB memory stick, CD-ROM with external drive).
- If you use an external storage medium, connect it to the R&S BTC.

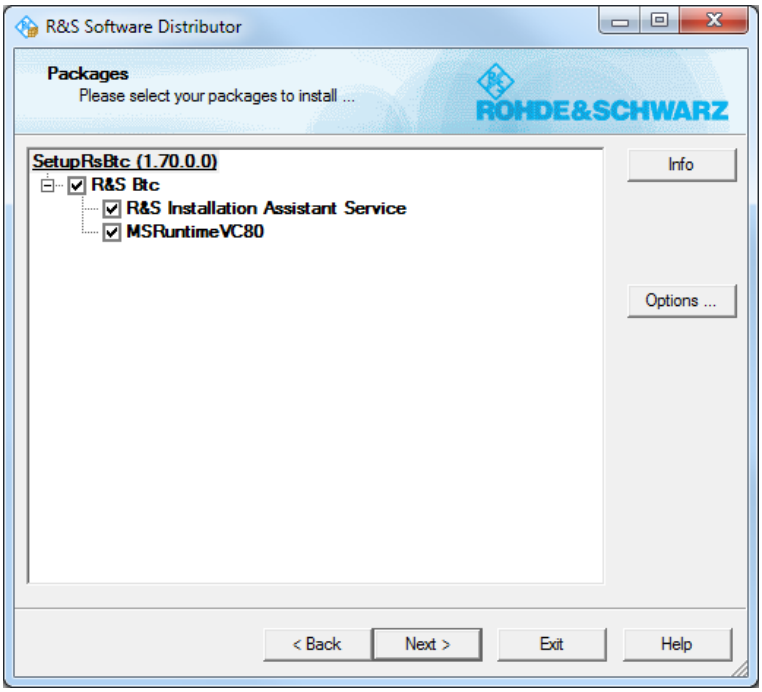
Performing the installation

1. Close the R&S BTC application to access the Windows 7 desktop.
   - Operation with mouse: Click the OS button in the toolbar and close the BTC window.
   - Operation with keyboard: Press ALT+F4.

8. Execute *SetupRsBtc(Release).exe*.
   The R&S Software Distributor is displayed.



9. Select "Local Installation".
10. Click "Next >".



All packages that you need to install are already selected.

11. Click "Install".
    The installation process itself is self-explanatory.

    NOTICE! Risk of instrument failure

    The installation takes some minutes. Please be patient and do not switch off the R&S BTC during the installation.

    During the installation, a boot device(s) update is performed. If you switch off the R&S BTC during this boot device(s) update, the R&S BTC will fail and has to be returned to the R&S service center in Munich. Be aware that only the R&S service center in Munich is able to fix this failure.

After the installation, a reboot is performed.

3.2 Checking If Further Steps Are Required

Depending on the installed firmware version prior to this version, additional steps are required.

1. Start the R&S BTC application.
2. Check the errors and warnings by tapping the information icon in the title bar.

3.2.1 Performing an Update of PCI Devices

Necessary if error text
“**Update PCI-FPGA: A PCI FPGA update is recommended**”
is indicated. Otherwise no action is required.

1. In the toolbar, tap the setup icon. 
3. In the "Setup" dialog, select the "Hardware Settings" tab.
4. Select the "Update" subtab.
5. Tap "PCI FPGA" to check if an update is necessary.

   If no action takes place, an update is not necessary, the update is complete, but a restart of the application is recommended.

   Otherwise, the PCI update is starting.

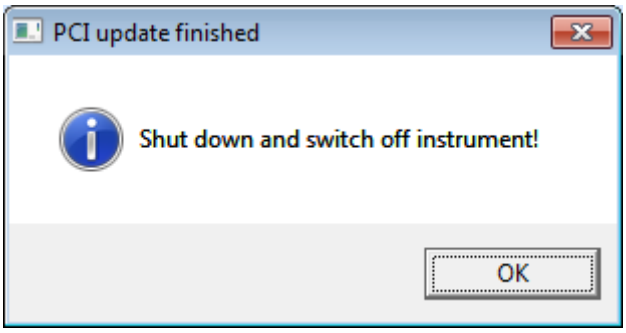
   NOTICE! Risk of instrument failure

   The installation takes some minutes. Please be patient and do not switch off the R&S BTC during the installation.

   During the installation, a boot device(s) update ("PCI update") is performed. If you switch off the R&S BTC during this boot device(s) update, the R&S BTC will fail and has to be returned to the R&S service center in Munich. Be aware that only the R&S service center in Munich is able to fix this failure.

6. After the PCI update is finished, shut down and switch off the R&S BTC.

   Note: A reboot is not sufficient.



   After the restart, the PCI update is complete.

3.2.2 Internal Adjustments

Necessary if error text
"**Missing or invalid <module> adjustment data. Run internal adjustment (Adjust All) please!**"
is indicated. Depending on prior installed version, internal adjustments might be improved in this version. In this case errors are indicated, caused by obsolete or missing adjustment data.

1. In the toolbar, tap the setup icon. 
2. In the "Setup" dialog, select the "Adjustment" tab.
3. Tap "Adjust All" to start the internal adjustments.
   Depending on the hardware options installed, this may last up to 90 minutes.

The firmware update is complete now.

4 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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