Release Notes

Firmware

R&S^{Ò} AMU200A
Version 2.05.104.56

Printed in Germany

Dear Customer,

throughout this manual, R&S AMU is generally used as an abbreviation for the Baseband Signal Generator and Fading Simulator R&S® AMU 200A.

Table of Contents

1 General Information

ATTENTION ⚠	It is strongly recommended to do **no firmware downgrade** below the version the device was delivered originally (this is the version you can see if you select "Factory Default" starting with Backup/Recovery).

This R&S AMU firmware revision consists of only one file :

AMU200A_2.05.104.56.exe

There are two possible ways to update your instrument:

Local Firmware Update

The firmware update is performed directly on the instrument, typically using an USB memory stick. Mouse and keyboard have to be connected to the instrument. For instruments without front panel display (like the SMATE) an external monitor is required too.The appropriate VGA plug is located on the rear panel.

The front panel keys like **PRESET** or **SETUP** can be emulated performing a right-click on the block diagram.

See Chapter 2.1 for details.

Remote Firmware Update

Alternatively the firmware update can be performed over LAN or SCPI from an external PC (running Windows XP). Connect the instrument via LAN or SCPI to the PC and run the firmware update from the PC.

See Chapter 2.2 for details.

2 Firmware Update

2.1 Local Firmware Update

The following description of the firmware update references the use of the USB interface. The update via LAN interface is similar.

1. Save the current version

It is recommended to save the current/running version. This can be done very easily and completely intuitive with an USB keyboard and an USB mouse.
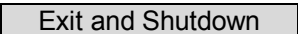
● Switch off the device and switch it on again. When the device is starting now you see the Bootmanager window (blue background, white field inside and a red selection line) after a short time. If you see this window press the cursor key ⬆ under the rotary knob, select **Backup/Recovery** and confirm this with pressing the key `BACKSPACE` on the device or `Enter` on the USB keyboard..

● After a short time the recovery and backup service ist started.
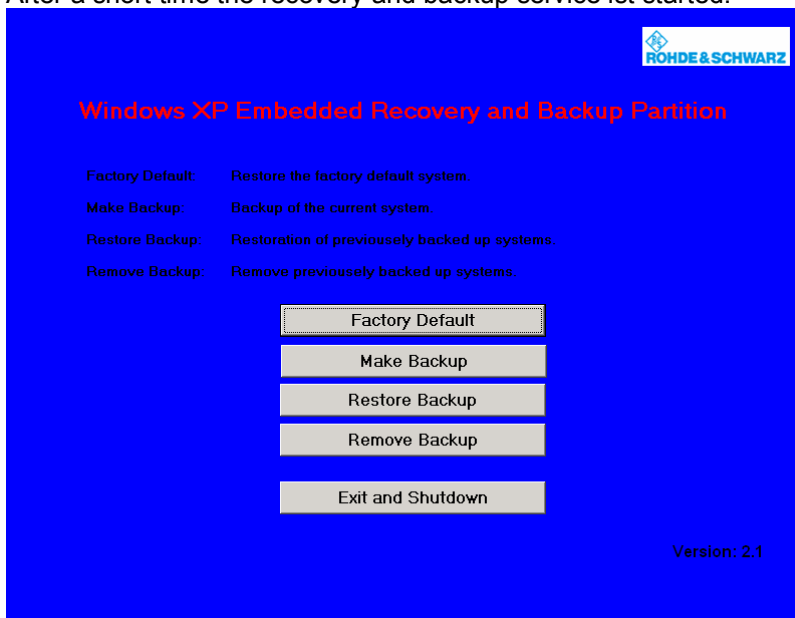
Select `Make Backup` via mouse or keyboard. The menu disappears and the device shows you the versions of what will be stored.
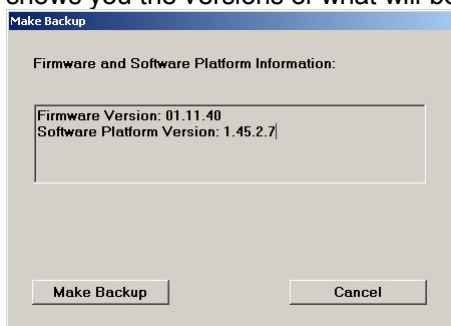
Select `Make Backup`, follow the instructions and the device starts working. The backup process takes some minutes. Please do not switch off the device, otherwise your

backup may be corrupt. It's safe to switch off the device with the | Exit and Shutdown | button, when the menu is shown again.

If you want to restore a previously saved version select **Restore Backup** in the same way.

2.   **Install the new firmware version on the R&S AMU**

- Switch off the instrument.

- Connect the external mouse and keyboard to the USB interface.

- Switch on the instrument.
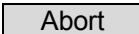
- *Access Windows XP desktop*

  Operating with the mouse

  - Wait until R&S AMU firmware boot window with the progress bars appears.

  - Click on the | Abort | button in the boot window. Booting of the instrument firmware is aborted and the Windows XP desktop is displayed.

  Operation with the keyboard

  - Wait until R&S instrument firmware has booted and the application has started.

  - Press | **Alt** | **+** | **F4** | to close the application. The Windows XP desktop is displayed.

- *Install new firmware version*

  - Plug in the USB memory stick which contains the update file.

  - Double-click the item **AMU200A_2.05.104.56.exe**

  - Select Next / Install and wait until installation has finished.

  - Confirm that you want to reboot the instrument in order to activate the firmware update (the instrument then restarts automatically, the USB memory stick has to be removed)

3.   **Execute Internal Adjustments**

  - Press the **PRESET** key on the instrument front panel.

  - Press the **SETUP** key, select **Internal Adjustments** and execute **Adjust All**.
    This process updates internal instrument adjustments and will take several minutes. Adjustments requiring external measurement equipment are not affected by the firmware update and need not to be performed.

The firmware has been updated and the installation is completed.

2.2 Remote Firmware Update

1. **Install firmware**

    Ø Run **AMU200A_2.05.104.56.exe** on your PC

    Ø Select "Remote Installation"
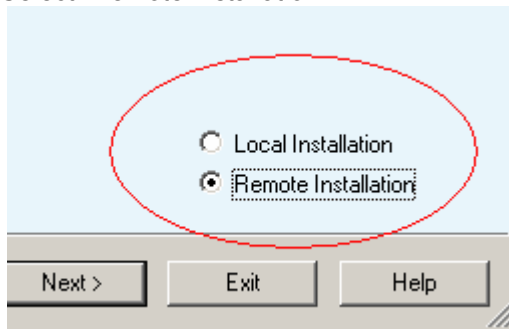
    and click the button "Next>"

    Ø After scanning SCPI and your LAN subnet all found instruments are listed. Select the instruments you want to update:
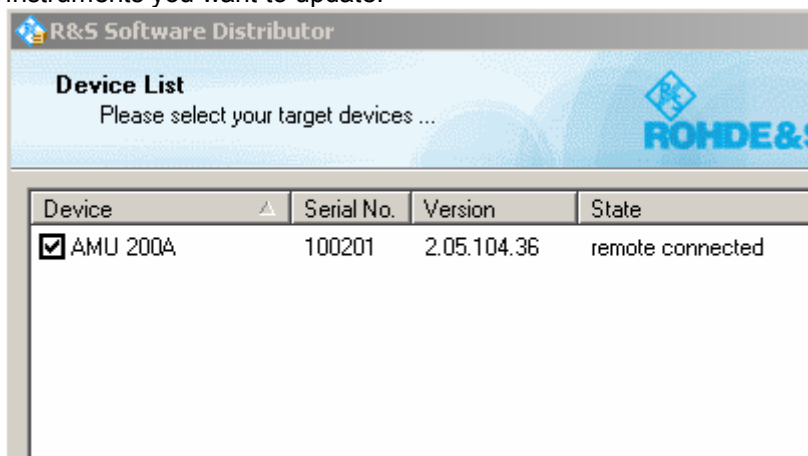
| ATTENTION | Please be careful and check twice if you have selected the correct instruments. Depending on your company's network structure also instruments of other departments will show up! |

    Ø Additonal help will be displayed after clicking the button "Help"

    Ø Start installation by selecting "Install"

    Ø Confirm that you want to reboot the instrument in order to activate the firmware update (the instrument then restarts automatically)

2. **Execute internal adjustments**

    Ø Press the **PRESET** key on the instrument front panel

Press the **SETUP** key, select **Internal Adjustments** and execute **Adjust All**.
This process updates internal instrument adjustments and will take several minutes. Adjustments requiring external measurement equipment are not affected by the firmware update and need not to be performed.

3 Modifications in Current Version

The new firmware offers the following functional improvements:

Version 2.05.104.56

- None

Version 2.05.104.54

New standards/options/modules

- AMU-K57 (FM stereo)
- AMU-K59 (HSPA+)

Other features

- Software update in one file and over LAN
- LXI Class C including web server
- Sophisticated hardcopy function
- Factory preset, standard Preset/*RST does not reset reference oscillator or power on state (level)
- Several layouts of external keyboards supported
- All windows can be resized in height using <REARR> button
- Busy display for Preset/Save/Recall and switching digital standards
- Fading Simulator : new profiles 3GPP "high speed train" and 1xEVDO
- Custom Digital Modulation : support of QAM128, several improvements of data list editor
- All sweeps support now shapes sawtooth and triangle
- Phase continuous frequency setting
- Setting times for level/frequency reduced by typ. 150 µs
- Display of NRP-Z81 peak power
- AMU B17 (BBIN) : Extended setting range for PEP and crest factor
- XM-Radio : frame counter implemented

EUTRA/LTE

Compatibility

- All supported features are in line with the following official 3GPP specifications unless not revised by the according CRs listed below:
  - TS36.211 v.8.2.0
  - TS36.212 v.8.2.0
  - TS36.213 v.8.2.0
- The following CRs are implemented:
  - R1-081248: PRS sequence generation for downlink reference signal

- o R1-081518: Draft CR on Correction of the number of subcarriers in PUSCH transform precoding
- o R1-081520: Draft CR on Correction of PUCCH resource index for PUCCH format 2
- o R1-081576: Correction of the number of subcarriers in PUSCH precoding
- o R1-081577: Correction of PHICH mapping
- o R1-081578: Correction of PUCCH resource index for PUCCH format 2
- The Downlink of this version of the SMx-K55 is compatible with FSQ-SW LTE K100/K101/K102 Version 2.2 BETA 3

General Features

- Updated bandwidth definitions 1.4MHz and 3MHz (previously supported by user defined settings)
- Support of User Filter: user-defined TX-filter can be generated (e.g. by means of R&S FiltWiz) and then uploaded to the SMx-K55.

Downlink

- Full support of P-SYNC, S_SYNC and DL Reference Signal derived from CELL ID
- Supports channel coding for PDSCH
- Support channel coding for PBCH
- Supports scrambling for PDSCH and PBCH
- Full MIMO and Transmit Diversity support (all precoding and CDD formats)
- Support of PCFICH
- Support of PHICH
- Support of PDCCH: An arbitraray bit stream (PN9, data list, pattern...) is used by the SMx-K55 (can be uploaded from external if needed), and PDCCH processing starts with "scrambling" (see 36.211, 6.8.2). The next steps of PDCCH are performed as defined in 36.211. The user is responsible for the content of the several PDCCHs (see 36.212, 5.3.3.1 DCI Formats) and the multiplexing of them. SMx-K55 does the scrambling, layer mapping, precoding and RE mapping including permutation and cyclic shifting.

Uplink

- Support of new definitions of reference signal sequences
- Update on demodulation and sounding reference signals
- Support of group and sequence hopping
- Supports channel coding for PUSCH including multiplexing of data and control information
- Supports scrambling of PUSCH
- Support of all PUCCH formats

3GPP-FDD

New Features

- HSPA+
  - higher order modulation: downlink 64QAM
  - CPC: HS-SCCH less operation
  - MIMO support
  - new H-Sets 7-9 (3GPP Rel.7)
- new H-Set 10 (3GPP Rel. 8)
- more flexibility in the H-Set configuration („User" – H-Set)
- The user gets support by the user interface for selecting the right ARB sequence length when generating H-Set signals.
- For H-Sets, the (least necessary) UE-category is displayed.
- third OCNS-Mode „HSDPA 2" (according to TS 25.101)
- E-AGCH: now with user coding

Bugfixes / Changes
- Computationally expensive realtime-signals (e.g. RMC384 or H-Set3) were sporadically shifted in time after retrigger: fixed.
- Conflicts between H-Sets and OCNS in the channel configuration are avoided now.
- When switching off the OCNS-Mode, the OCNS-Channel state is switched off now (in previous releases the channels were only converted to normal DPCHs, but with state on).
- When generating H-Set 6, the database was read out at the wrong positions: fixed.
- HARQ-Feedback:
  - Immediately after retrigger, the packets were sent with random retransmission sequence number (RSN): fixed.
  - When changing from one RSN to another, the last 1024 chips of the old packet were sent already with the new RSN: fixed.

Wimax

- CSTD (Cyclic Delay Diversity)
- Coupled Baseband Modes (Baseband B is controlled from Baseband A for STC configurations)
- Transmit Diversity with 4 antennas
- Band AMC modes for 2x3 AMC
- Band bitmap for sounding
- Additional user definable power boosting for each zone
- Time Plan displays inactive zones in grey (such as SISO zones on Antenna 1)
- Multiple PDUs per burst
- DCD and UCD added for OFMD mode
- UL-MAP and DL-MAP in one burst for OFDM mode

Version 2.04.303.32

- None

Version 2.04.303.31

- AMU-K65 : Assisted GPS

Version 2.04.303.16

- AMU-K47: 1xEV.DO Rev.A

- AMU-K53: T-DMB/DAB

- Support of R&S EX-IQ-Box 1409.5505.02

Version 2.04.303.03

- AMU-K54: IEEE 802.11n (WLAN N)

- AMU-K74: MIMO-Fading

Extentions to existing standards / Improvements

WiMAX

- Corrigendum2/D4 compatibility

- Uplink Sounding

- Added Zone_Switch_IE in DL-MAP

- Mixed STC Matrix A and B configuration within the same zone

- CID_Switch_IE inclusion in DL-MAP can be toggled

- Added Collaborative Spacial Multiplexing in uplink

- Fading: ITU profiles now available without option AMU-K72

CDMA2000

- Improved default settings for CDMA2000 Uplink

Multicarrier CW

- Increased number of carriers in Multicarrier CW

Fading

- New Fader Seed parameter

Version 2.04.202.01

- None

Version 2.04.202

New standards/options

- AMU-K55 : EUTRA/LTE

- AMU-K56 : XM-Radio

- AMU-K72 : new fading profiles for WiMAX/Gauss

- AMU-K6   : Support of external Pulse Sequencer Software

Other

- The service manual is included

Version 2.04.182

● First customer release

Note:

The service manual is not included and will be provided with the next customer release.

Version 2.04.103

● First version for Typ 1B

4 Problems Eliminated

Version 2.05.104.56

Options AMU-K47 (1xEV-DO) and K53 (T-DMB/DAB) not visible: fixed

Version 2.05.104.54

Custom Digital modulation : bit clock now used falling slope with external data and symbol clock	6627
GSM : Instrument crashes using external retrigger mode : fixed	6754
Remote control : transfer fails if character 0x0A is in first block of binary data : fixed	6783
BBIN : selftest fails : fixed	7695
Fading : settings cannot be exchanged between AMU and SMU : fixed	6804
Several hyperlinks in online help not working : fixed	5323
Construction of multi segment waveform in path B erroneous	5366
Out of memory calculating dynamic fading scenarios : fixed	5961
Fading standard 3GPP VA30 (UE) does not set all parameters (speed) : fixed	6269
Level sweep without dropouts : fixed	6533
Trigger not stored in multisegment waveform : fixed	6589
Several bugs with multi segment waveform : fixed	5205
ARB file selection dialog improved (tool tipp with all comments) : fixed	5884
DigMod: Pure Gauss parameter not accessible from SCPI : fixed	6168
Several small changes in user manual / online help : fixed	6334
DigMod: 16QAM Edge not properly working : fixed	6434

Version 2.04.303.32

Sometimes the device does not shut down correctly : fixed	6424
AMU with BBOUT (AMU-K18) but without BBIN (AMU-K17): some problems with ExBox fixed	
Sporadic bit errors in GSM and 3GPP FDD signal generation (problem was observed only in combination with UNICOD version > 6.00): fixed	

Version 2.04.303.31

Sporadic extension of setting times for level and frequency (CW mode) : fixed	6273
Wrong display of AWGN values in display mode baseband: fixed	6290
Support of multilevel user correction protected with a registry key; feature now available for all	6196
AM: Sometimes an error message "..output unlevelled" occurred when using AM with low deviation	6206

Version 2.04.303.16

XM-Radio. No markers in physical layer mode "Terrestrial A" and "Terrestrial B"	5834
TD-SCDMA options not visible	5998
IEEE 802.16 WiMAX: system crash possible when changing from uplink to downlink, standard is active and predefined settings are used	6000
IEEE 802.11 n: Indikator „MOD OFF" does not disappear when this standard is activated	6042
Level failure after activation of a modulation with crest factor	6122

Version 2.04.303.03

CDMA2000: new default setting (one channel switch to ON to avoid error messages when setting state to ON)	5263
Sometimes a system crash occurs when toggling BASEBD LEVEL/DIAGRAM buttons very often	5353
WiMax: - Subchannel rotation fixed for uplink PUSC zones including FastFeedback and Ranging bursts - Fix in uplink AMC2x3 mode - STC Matrix B mode fixed	5355
ARB: sine generator: error message when using sine generator immediately after switching on EUTRA (AMU-K55)	5356
Custom Digital Modulation: List editor: system crash when using "goto"-command	5385
W3GPP: Enhanced channel 11: selecting "config data" shows no reaction (menu don't open)	5542
ARB: Loading AMIQ/SMIQ waveforms sometimes causes an error message	5597
SCPI: all return values of "…:stat?" is OFF/ON instead of 0/1 (bug in V2.04.202 only)	5610
Custom Digital Modulation: "user filter" doesn't work in path B	5655
CDMA2000: "Set To Default" resets settings in path A and B (not the selected path only!)	5751
W3GPP: error message when selecting "PRACH Preamble only" with trigger mode "Armed Auto external"	5801
W3GPP: copy BS1 to BS2 doesn't copy all relevant parameters	5802
WLAN: when setting state to ON the filter settings are always the default one, not the displayed one!	5816
AWGN: Doesn't work if no option B9/10/11 or B17 is installed (bug in V2.04.202 only)	5833
GSM: Recall doesn't set the frames	5882
WLAN: sequence length not limited correctly	5894
Fading: system crash when copying a path group to an other one	5905
CDMA2000: unknown exception when using predefined settings RC4 with frame length = 80 ms	5930

Version 2.04.202.01

Signal summation of two pathes after fader: in some cases baseband level error

Version 2.04.202

ARB test sine signals : some remote commands not working	4376
CustomDigMod/FSK : envelope not constant with root cosine filter and some roll-off factors	4763
ARB sequence length : maximum depending on ARB size	4815
3GPP FDD : Save waveform not working for uplink	4850
WLAN : predefined frames not working correctly	4903
WiMax/3GPP : clipping not working correctly	4907
WiMax : output power not correct when using more than 15 frames	4913
Save/Recall : 'exclude frequency" and "exclude level" without impact	5109
Data lists exceeding 256 Mbyte cannot be loaded to B9	5161
EUTRA: incorrect usage of parameter "sampling rate variation" in path B fixed	5328
Info History: missing persistence fixed	5342
Multicarrier CW: missing or wrong online help corrected	5384
Digital Modulation: crash in pattern data editor fixed	5385
Digital Modulation: missing or wrong online help corrected	5386

Version 2.04.182

First customer version

Version 2.04.103

First version

5 Open Source Acknowledgement

This firmware makes use of the following open source software package. The verbatim license text is provided in the following chapters.

Package	Link	License
OpenSSL	http://www.openssl.org/	OpenSSL / SSLeay

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com) and software written by Tim Hudson (tjh@cryptsoft.com).

Rohde & Schwarz would like to thank the open source community for their valuable contribution to embedded computing. The source code of the open source packages is available on request.

OpenSSL / SSLeay License

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