



ROHDE & SCHWARZ

Test and Measurement
Division

Release Notes

Firmware

R&S[®] SMA100A

Version 2.05.68.18

Printed in the Federal Republic of Germany

Dear Customer,

throughout this manual, R&S SMA is generally used as an abbreviation for the Microwave Signal Generator R&S[®] SMA100A.

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1 General information

This document describes the procedure required to apply a firmware update to the Rohde&Schwarz Signal Generator SMA100A. It further describes the differences between the several firmware versions.

CAUTION**Potential malfunction of assembly!**

It is strongly recommended to **do no firmware downgrade** below the version the device was originally delivered with.

R&S provides **two different** ways for updating firmware on the SMA:

The first is based on an ISO-image file and provides a complete system-recovery of the SMA. Mass memory is new formatted, operating system and firmware are updated, user data is lost.

The second is based on an R&S firmware update file and provides a faster and smarter update. Less equipment is required and user data is preserved.

Note: *If you have performed an update to version 2.05.68.18 a downgrade to a firmware version 2.02.149 or lower is only possible with an ISO image (please refer to chapter 3 Firmware update using ISO image)*

2 Firmware update using R&S update package

This update procedure requires that the instrument is operational. There is no need to uninstall the current firmware. Instrument settings are preserved during the update, including user data and network settings.

Note: To perform this procedure, 'USB Device' must be enabled in the security settings. Press the **SETUP** key, select **Security** and check **USB Device** setting.

2.1 Required equipment

Software:

- RSU update file SMA_2.05.68.18.rsu or
- TRS update file SMA_2.05.68.18.trs if the current firmware is at least 2.02.149

Hardware:

- USB Memory Stick with enough free space to store the update file (about 30 to 50 MByte).

The stick does not need to be bootable and previous data on the stick is not affected. Several update files may reside on the stick in parallel. During update procedure the stick is not modified by the instrument.

2.2 Update procedure

Preserve Network Settings

For network operation the SMA provides several settings including hostname which are lost by this update procedure.

- Switch on the instrument
- Press the **SETUP** key, select **Network Settings...** and note the host name. If the IP Address Mode is set to static, also note the IP Address, Subnet Mask and Def. Gateway.
- Switch off the instrument

Prepare Memory Stick

- Download the update file from the R&S SMA100A web page (www.sma.rohde-schwarz.com; download area) on a PC
 - For an update from firmware version 2.04.299.02 or higher, please download the RSU update file SMA_2.05.68.18.rsu.
 - For an update from firmware version 2.02.149 or lower, please download the TRS update file SMA_2.05.68.18.trs.
- Connect the USB stick to the PC. The USB stick is automatically recognized and assigned to a free drive.
- Copy the update file **into the root directory**.
- Remove the USB stick.

Update a SMA100A with current firmware version higher or equal than 2.04.299.02 :

Note: *If the current firmware version of the SMA100A is higher or equal than 2.04.299.02, then it is required to execute the following steps. Otherwise see at “Update a SMA100A with current firmware version lower or equal than 2.02.149”*

- Switch on the instrument.
- Wait until the instrument is operational.
- Connect the USB stick to the instrument.
- Wait a few seconds until a message box appears. Confirm by pressing the rotary knob.
- Select the firmware version using the arrow keys and press the knob
- Wait until the „update complete“ message box appears. This may take several minutes.
- Remove the USB stick and press the knob. The instrument will reboot.

Update a SMA100A with current firmware version lower or equal than 2.02.149 :

Note: *If the current firmware version of the SMA100A is lower or equal than 2.02.149, then it is required to execute the following steps. Otherwise see at “Update a SMA100A with current firmware version higher or equal than 2.04.299.02”*

- Switch off the signal generator
- Connect the USB stick which contains the update file to the USB interface of the R&S SMA100A
- Switch on the R&S SMA100A.
- Wait until the selection menu for the available firmware versions appears (if more than one firmware version are included on the USB stick, the user can select one of them).
- Select the firmware version to be installed with the cursor up/down keys and press **[ENTER]** to confirm your selection. The user will be asked whether he really wants to install the selected version. If ‘Yes’ is selected this version will be installed.
- After the update is finished the USB stick must be removed. To reboot the R&S SMA100A the **[ENTER]** key must be pressed.

Check for PCI-FPGA Update

- Press the **SETUP** key, select **Update** and execute **PCI-FPGA**.
The firmware checks if an update is required.
- If the PCI-FPGA is up to date, continue with internal adjustments
- If an update is required, follow the instructions and wait until the firmware confirms success.
The update may take several minutes. Afterwards, reboot the instrument.

CAUTION



Risk of instrument malfunction!

Do not interrupt the PCI-FPGA update and do not switch off power during the update.

- To apply the new FPGA configuration data a power off/on cycle is required. Press OK to shut down the instrument and wait until yellow stand by led lights up.
- Restart instrument using the power button and wait until instrument is operational.

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.

Restore Network Settings

Restoring the hostname requires the protection level 1 to be unlocked.

- Press the **SETUP** key, select **Protection** and then **Protection Level 1**.
Enter Password "**123456**".
- Press the **SETUP** key, select **Network Settings...** and enter host name. The factory Host Name is of the form "rssma100axxxxxx" where "xxxxxx" is replaced by the serial number.
- If the IP Address Mode was **Static** restore the IP-Address, the Subnet Mask and the Def. Gateway.

3 Firmware update using ISO image

CAUTION**Potential loss of data!**

User Data will be lost during this procedure. Instrument serial number, software options and all calibrations requiring external measuring equipment are not affected.

This procedure is required when the instrument does not operate at all due to corrupt or clean mass memory.

3.1 Required equipment

Software:

- ISO image for firmware update SMA_2.05.68.18.iso

Hardware:

- **External** USB CD or DVD ROM burner with USB cable.
- 1 CD Recordable.
- PC with burning program that can burn ISO images onto CD.

About ISO image

This is a standardized file format for creating CD images. A CD image is a single file encapsulating the whole data of a CD including directories and files. Unpacking the image to a CD restores the original data. Almost any CD burning program is able to write CDs based on ISO images.

3.2 Update procedure

Preserve Network Settings

For network operation the SMA provides several settings including hostname which are lost by this update procedure.

- Switch on the instrument
- Press the **SETUP** key, select **Network Settings...** and note the host name. If the IP Address Mode is set to static, also note the IP Address, the Subnet Mask and the Def. Gateway.
- Switch off the instrument

Burn ISO image onto CD

The software “Nero Burning” is used in this example:

- Connect the external USB CD/DVD drive to the PC
- Insert a CD recordable
- Start the burning software, for e.g. Nero.
- Select medium „CD“
- Select „Create Data CD“
- Open the file SMA_2.05.68.18.iso from the File menu
- Click on "burn"
- When finished, close the burning software and disconnect the external USB CD/DVD drive

Note: *If the CD does not boot ensure that you have burned the ISO-image as an “image” and not as a single file. Check the CD for the following files: BOOT.CAT, FULLIMG.GZ, ISOBOOT, ISOLINUX.BIN, ISOLINUX.CFG, ISOROOT.*

Install new firmware on the R&S SMA100A

- The instrument must be switched off
- Connect the external USB CD/DVD drive to the R&S SMA100A
- Switch on the instrument
- The instrument boots from the external drive
- Follow the instructions on the screen
- Disconnect the external USB device
- Reboot the instrument

Check for PCI-FPGA Update

- Press the **SETUP** key, select **Update** and execute **PCI-FPGA**.
The firmware checks if an update is required.
- If the PCI-FPGA is up to date, continue with internal adjustments
- If an update is required, follow the instructions and wait until the firmware confirms success.
The update may take several minutes. Afterwards, reboot the instrument.

CAUTION



Risk of instrument malfunction!

Do not interrupt the PCI FPGA update and do not switch off power during the update.

-
- To apply the new FPGA configuration data a power off/on cycle is required. Press OK to shut down the instrument and wait until yellow stand by led lights up.
 - Restart instrument using the power button and wait until instrument is operational.

Execute internal adjustments

- Press the **[PRESET]** key on the instrument front panel.
- Press the **[SETUP]** key, select Internal Adjustments and execute **Adjust All**.
This procedure 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.

Restore Network Settings

Restoring the hostname requires the protection level 1 to be unlocked.

- Press the **[SETUP]** key, select **Protection** and then **Protection Level 1**.
Enter Password "**123456**".
- Press the **[SETUP]** key, select **Network Settings...** and enter host name. The factory Host Name is of the form "rssma100axxxxx" where "xxxxxx" is replaced by the serial number.
- If the IP Address Mode was **Static** restore the IP-Address, the Subnet Mask and the Def. Gateway.

4 Modifications in Current Version

Due to customer demands, starting with Firmware Version 2.05.68.13 **the reference oscillator settings are moved out of the scope of PRESET and *RST**. This change has been made since the reference oscillator loop takes several seconds to synchronize and unintentional modification following *RST lead to long measurement times and disturbance of other instruments relying on the reference.

So the focus of *RST is to reset states regarding internal instrument operation while leaving settings which are associated to the measurement and remote control environment.

In addition to the reference oscillator the following settings are out of the scope of *RST:

- GPIB address
- Network settings
- Emulation settings
- Keyboard and Screen Saver settings
- Start / Stop GUI update
- Security settings

These settings can easily being reset to factory values by using the new function **Factory Preset**, located at the bottom of the SETUP Menu. **Factory Preset** includes PRESET.

The new firmware offers the following functional improvements:

4.1 Version 2.05.68.18

- None

4.2 Version 2.05.68.17

- None

4.3 Version 2.05.68.13

- Support of new standard synthesis (SSYN) with part number 1141.4220.02
- Support of new synthesis extension (SMA-B20, SYNEX) with part number 1142.0270.02
- Support of new clock synthesis (SMA-B29, ClkSyn) with part number 1400.2749.02
- Support of NRP-Zxx power sensors (power viewer and user correction)
- Chirp modulation, this feature is available only for interface boards with part number 1400.0530.02
- Phase Continuous Frequency Settings
- DC offset for clock synthesis (SMA-B29), this feature is available only for clock synthesis with part number 1400.2749.02
- Remote control emulation for HP 8643/8644
- LF generator: LF generator frequency resolution changed from 0.1 Hz down to 0.01 Hz
- RF Frequency Sweep: Support of new shape 'triangle'
- RF Level Sweep: Support of new shape 'triangle'
- LF Frequency Sweep: Support of new shape 'triangle'
- The behaviour of the **WINBAR** key has been modified. The **WINBAR** key toggles through all open windows
- The behaviour of the **DIAGRAM** key has been modified. The **DIAGRAM** key toggles between diagram, the summary screen and the last open dialog
- Dialog File Manger: Handling improved
- Support of up to four USB mass memory devices (e.g. USB memory sticks) for user data
- New function "Factory Preset" (Setup-Menu) resets settings not covered by **PRESET** Key
- PRESET (*RST) does not affect reference oscillator settings any more

4.4 Version 2.05.04

- Support of new interface board (IfBoard) with part number 1400.0530.02
- New feature remote control emulation for Aeroflex 2030/2031/2032/2040/2041/2042
- New feature remote control emulation for Racal 3102
- Sweep: Minimum dwell time change from 10 ms down to 3 ms
- Pulse generator: New limits for pulse period (20 ns to 100 s), pulse width (5 ns to 100 s), pulse Delay (10 ns to 100 s), double pulse width (5 ns to 100 s), double pulse delay (10 ns to 100 s) and resolution (5 ns)
- Modulation ILS: Resolution of ILS DDM changed from 1 μ A to 0.1 μ A (higher resolution)

4.5 Version 2.04.299.02

- New feature USB remote Control
- New feature RAW TCP/IP remote Control
- New feature remote control within a web browser
- Support of new clock synthesis with offset
- Enhancements for SMA-K25

4.6 Version 2.02.149

- Operating altitude up to 4600m (Options R&S SMA-B46)

4.7 Version 2.02.136

- None

4.8 Version 2.02.102

- None

4.9 Version 2.02.91

- Support of frequencies up to 6 GHz (Options R&S SMA-B106 / R&S SMA-B106L)
- New feature VOR (Option R&S SMA-K25)
- New feature ILS-GS and ILS-LOC (Option R&S SMA-K25)
- New feature MKR-BCN (Option R&S SMA-K25)
- New feature ADF (Option R&S SMA-K25)

4.10 Version 2.02.76

- New sweep mode external start/stop

4.11 Version 2.01.11

- Display the option R&S SMA-B81 (if installed) in the setup → software options dialog
- Date and time can be set
- Info manager shows messages only once
- Improvement for fast hop bus

4.12 Version 2.00.43.01

- First release

5 Problems eliminated

5.1 Version 2.05.68.18

- External Pulse Modulation: Unwanted double pulse at rising pulse edge → fixed (Prep 6839)

5.2 Version 2.05.68.17

- Modulation ILS-GS/ILS-LOC: Entering DDM values less than -0.8 (ILS-GS) or less than -0.4 (ILS-LOC) crashes the software, if DMM is coupled to SDM → fixed (Prep 6590)

5.3 Version 2.05.68.13

- Remote Control: The command SOURce:POWer UP does not work → fixed (Prep 6427)
- Modulation ILS-GS/ILS-LOC: The DDM could not be entered in μ A → fixed (Prep 6412)
- Remote Control Emulation: A user defined selection of *IDN? does not have any effect → fixed (Prep 6319)
- Remote Control Emulation: *IDN? selection does not saved while firmware shutdown → fixed (Prep 6318)
- Remote Control Emulation Aeroflex203x/4x: CFRQ? Does not return the current frequency → fixed (Prep 6317)
- Remote Control: Time parameters do not work in exponential description → fixed (Prep 6309)
- Listmode: Listmode does not work for $f > 3$ GHz, if SMA-B106 and SMA-B20 installed → fixed (Prep 6272)
- Modulation ILS-GS/ILS-LOC: No coupling between GS and LOC → fixed (Prep 6076)
- Modulation ILS-LOC: Setting of modulation frequency does not have any effect → fixed (Prep 6183)
- Menu→Setup→Ethernet does not open the remote settings for Ethernet → fixed (Prep 6181)
- Online Help: Missing help pages for few pulse generator and listmode parameters → fixed (Prep 6174)
- Save/Recall: Could not recall saved setups → fixed (Prep 5779)

5.4 Version 2.05.04

- The last selected remote control emulation, is not activated after startup → fixed (Prep 6033)
- Keyboard repetition rate to high → fixed (Prep 6131)
- Dialog 'Info Manager': Only the button 'History' appears in the dialog → fixed (Prep 6130)
- Adjustment: Error messages during 'Internal Adjustment' → fixed (Prep 6065)
- Listmode: Lost focus while editing a listmode list → fixed (Prep 5772)
- REARR-Button moves the Winbar → fixed (Prep 5657)
- Dialog 'File Manger': After 'Create New Directory' the instrument doesn't operate → fixed (Prep 5435)
- Changing the GPIB address has no effect → fixed (Prep 5390)
- Frequency resolution sometimes 0.02 Hz → fixed (Prep 5056)
- Window size is sometimes zero → fixed (Prep 4461)
- SCPI: wrong error message after *rst → fixed (Prep 4430)
- RF Freq Sweep: No variation at the lowest digit possible → fixed (Prep 4387)
- The firmware crashes after preset → fixed (Prep 4365)
- Dialog 'Clock Synthesis': Window size changed if the 'Variation Step' is changed → fixed (Prep 4318)
- Front panel check: truncated descriptions → fixed (Prep 4317)
- Status bar changes its size when switching RF ON/OFF → fixed (Prep 4316)
- Dialog 'LF Freq Sweep': Variation of 'Start Freq' wrong → fixed (Prep 4298)

5.5 Version 2.04.299.02

- Dialog 'Reference Oscillator': Input field for Adjustment DAC value too small → fixed (Prep 5795)
- Dialog 'Frequency': Rotary knob click on frequency crashes the firmware → fixed (Prep 5793)
- Dialog 'Update' doesn't appears under setup menu → fixed (Prep 5763)
- Problems editing list mode table → fixed (Prep 5612)
- The screen saver wait time doesn't have any effect → fixed (Prep 5438)
- Dialog Security: Disable USB device and disable LAN connections doesn't work → fixed (Prep 5437)
- Dialog Security: User password and VNC password couldn't be changed → fixed (Prep 5436)
- Setting times RF Off → RF On are longer than RF On → RF Off → fixed (Prep 5359)
- While rebooting the instrument, the IP address is lost → fixed (Prep 5284)
- List mode: While learning no progress bar appears → fixed (Prep 5235)
- Level error for FM and Pulse modulation by $f < 6.6$ MHz → fixed (Prep 5023)
- Winbar shows only one modulation → fixed (Prep 4829)
- Polarity could be changed for pulse generator gate → fixed (Prep 4808)
- Preset crashes the firmware → fixed (Prep 4795)
- LOCAL key doesn't work → fixed (Prep 4448)

5.6 Version 2.02.149

- Modulation ILS: display DDM definition → fixed (Prep 5057)
- Modulation ILS-GS, ADF: COM ID removed for ILS-GS and added to ADF → fixed (Prep 5055)
- HP Emulation: Display info message if RF is off in emulation mode → fixed (Prep 4992)
- HP Emulation: The remote command ms crashes the firmware → fixed (Prep 4984)
- HP Emulation: Corrections of command as → fixed (Prep 4384)

5.7 Version 2.02.136

- An error message “Unhandled Interrupt ...” occurred while executing adjustment → fixed (Prep 4965)
- Frequency steps from 2999.9 MHz to 3000.1 MHz with SMA-B20 are wrong → fixed (Prep 4964)
- Phase settings between 180 MHz $\leq f \leq$ 750 MHz wrong → fixed (Prep 4777)
- Some remote settings won't be stored during shutdown of the system → fixed (Prep 4711,4712)
- The info manager hasn't any delete buttons → fixed (Prep 4482)

5.8 Version 2.02.102

- Pulse modulation doesn't work in rare cases → fixed (Prep 4759)
- Missing SCPI command FM:INT:FREQ → fixed (Prep 4754)
- Firmware crashes if incompatible modulations are switch on → fixed (Prep 4748)
- Online Help: SCPI command for FM/PM EXT impedance is wrong → fixed (Prep 4696)

5.9 Version 2.02.91

- Wrong setting of GPIB address after power off → fixed (Prep 4675)
- Pulse modulator and pulse generator: switching of input impedance wrong → fixed (Prep 4544)
- An update overwrites the hostname → fixed (Prep 4451)
- FM deviation: missing SCPI commands → fixed (Prep 4450)
- FM/PhiM: switching of input impedance incorrect → fixed (Prep 4185)
- CF-Cards could not be changed between different instruments → fixed (Prep 4407)

5.10 Version 2.02.76

- Entering IP Address crashes the software → fixed (Prep 4494)
- Host name might be changed only with protection level 1 → fixed (Prep 4491)
- List mode frequency higher than 3 GHz doesn't work → fixed (Prep 4449)
- 2 tone AM deviation incorrect → fixed (Prep 4447)
- List mode doesn't stop by Preset → fixed (Prep 4414)
- List mode doesn't support more than 30 elements → fixed (Prep 4411)
- Firmware hangs while writing time monitoring data → fixed (Prep 4410)
- MMEM have problems with spaces → fixed (Prep 4405)
- Firmware restarts while open dialog level → fixed (Prep 4394)
- Some help pages are wider than the display → fixed (Prep 4358)
- Button "Adjust FM Offset" has to be remove in extern digital selection → fixed (Prep 4269)
- Pulse generator trigger input: wrong settings → fixed (Prep 4265)

5.11 Version 2.01.11

- Problems with the merging of the ENTER and x1 key → fixed (Prep 4285)
- Input of Noise Bandwidth (dialog LF Output) not possible with unit keys → fixed (Prep 3962, 4003, 4310)
- Level Sweep Dialog: The width of start freq and stop freq editbox increase → fixed (Prep 4165)
- In the RF menu it isn't possible to scroll to the top → fixed (Prep 4300)
- Pulse generator: Slope of the external trigger input couldn't be changed → fixed (Prep 4265)
- No automatically detection of network connection → fixed (Prep 4227)

6 Open Source Acknowledgement

This instrument firmware makes use of the operating system LINUX® and other valuable open source software packages. The most important of them are listed below together with their corresponding open source license. The verbatim license texts are provided in the following chapters.

| Package | Link | License |
|---------------|---|------------------|
| LINUX® Kernel | http://www.linux.org/ | GPL 2 |
| gLibc | http://www.gnu.org/software/libc/ | LGPL |
| busybox | http://www.busybox.net/ | GPL 2 |
| OpenSSL | http://www.openssl.org/ | OpenSSL / SSLeay |
| XFree86 | http://www.xfree86.org/ | XFree86 |

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

LINUX® is a trademark of Linus Torvalds.

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.

6.1 GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

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7 Our Hotline

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