

R&S[®] SMA100B

RF Signal Generator

Getting Started



1419862002

Contents

1 Safety Information.....	7
2 Key Features.....	8
3 Documentation Overview.....	9
3.1 Getting Started Manual.....	9
3.2 User Manuals and Help.....	9
3.3 Service Manual.....	9
3.4 Instrument Security Procedures.....	10
3.5 Basic Safety Instructions.....	10
3.6 Data Sheets and Brochures.....	10
3.7 Release Notes and Open Source Acknowledgment (OSA).....	10
3.8 Application Notes, Application Cards, White Papers, etc.....	11
4 Preparing for Use.....	12
4.1 Putting into Operation.....	12
4.1.1 EMI Suppression.....	13
4.1.2 Unpacking and Checking the Instrument.....	14
4.1.3 Accessory List.....	14
4.1.4 Placing or Mounting the Instrument.....	14
4.1.5 Connecting AC Power.....	17
4.1.6 Turning the Instrument On and Off.....	17
4.1.7 Functional Check.....	19
4.1.8 Checking the Supplied Options and Licenses.....	19
4.2 Connecting USB Devices.....	20
4.3 Setting Up a Network (LAN) Connection.....	20
4.3.1 Connecting the Instrument to the Network.....	21

5 Instrument Tour	23
5.1 Front Panel Tour	23
5.1.1 Touchscreen.....	24
5.1.2 Utility Keys.....	26
5.1.3 On/Standby.....	26
5.1.4 Function Keys.....	26
5.1.5 Keypad.....	27
5.1.6 Navigation Controls.....	27
5.1.6.1 Rotary Knob.....	27
5.1.6.2 Editing Keys.....	27
5.1.6.3 Navigation Keys.....	28
5.1.7 Display Keys.....	29
5.1.8 USB Connector.....	29
5.1.9 SD card slot.....	29
5.1.10 Sensor.....	29
5.1.11 RF 50 Ω.....	30
5.1.12 Pulse Signal Connectors.....	31
5.1.13 LF Modulation Connectors.....	32
5.1.14 Clock Synthesizer Connectors.....	32
5.2 Rear Panel Tour	32
5.2.1 Connectors.....	34
6 Trying Out the Instrument	37
6.1 Generating an Unmodulated Carrier	37
6.2 Generating an RF Frequency Sweep Signal	41
6.3 Saving and Recalling Settings	43
7 Instrument Control	47
7.1 Possible Ways to Operate the Instrument	47

7.2 Means of Manual Interaction.....	48
7.3 Understanding the Display Information.....	48
7.3.1 Status Bar.....	49
7.3.2 Tile Diagram.....	49
7.3.3 Taskbar.....	50
7.3.4 Additional Display Characteristics.....	51
7.4 Accessing the Functionality.....	52
7.5 Entering Data.....	53
7.5.1 Entering Numeric Parameters.....	54
7.5.2 Entering Alphanumeric Parameters.....	54
7.5.3 Undo and Redo Actions.....	55
7.6 Getting Information and Help.....	55
7.7 Remote Control.....	57
7.8 Remote Operation over VNC.....	58
Index.....	59

1 Safety Information

The product documentation helps you use the R&S SMA100B safely and efficiently. Follow the instructions provided here and in the printed "Basic Safety Instructions". Keep the product documentation nearby and offer it to other users.

Intended use

The R&S SMA100B is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments. Use the R&S SMA100B only for its designated purpose. Observe the operating conditions and performance limits stated in the data sheet.

Where do I find safety information?

Safety information is part of the product documentation. It warns you about the potential dangers and gives instructions how to prevent personal injuries or damage caused by dangerous situations. Safety information is provided as follows:

- The printed "Basic Safety Instructions" provide safety information in many languages and are delivered with the R&S SMA100B.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

2 Key Features

The R&S SMA100B is a new high-performance signal generator developed to meet demanding customer requirements. Offering excellent signal characteristic and straightforward and intuitive operation, the signal generator makes signal generation fast and easy.

Outstanding key features of the R&S SMA100B are:

- Frequency range from 8 kHz to up to 67 GHz (overrange 72 GHz)
- Excellent signal quality
- Excellent single sideband (SSB) phase noise
- Nearly no wideband noise
- Very high output power
- Low harmonics
- Unique pulse train generation
- High-stability reference oscillator
- Intuitive operation via touchscreen with the tile diagram as key element

For more information, see data sheet.

3 Documentation Overview

This section provides an overview of the R&S SMA100B user documentation. Unless specified otherwise, you find the documents on the R&S SMA100B product page at:

www.rohde-schwarz.com/manual/sma100b

3.1 Getting Started Manual

Introduces the R&S SMA100B and describes how to set up and start working with the product. Includes basic operations, typical measurement examples, and general information, e.g. safety instructions, etc. A printed version is delivered with the instrument.

3.2 User Manuals and Help

Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the getting started manual.

The contents of the user manuals are available as help in the R&S SMA100B. The help offers quick, context-sensitive access to the complete information.

All user manuals are also available for download or for immediate display on the Internet.

3.3 Service Manual

Describes the performance test for checking the rated specifications, module replacement and repair, firmware update, troubleshooting and fault elimination, and contains mechanical drawings and spare part lists.

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS, <https://gloris.rohde-schwarz.com>).

3.4 Instrument Security Procedures

Deals with security issues when working with the R&S SMA100B in secure areas. It is available for download on the Internet.

3.5 Basic Safety Instructions

Contains safety instructions, operating conditions and further important information. The printed document is delivered with the instrument.

3.6 Data Sheets and Brochures

The data sheet contains the technical specifications of the R&S SMA100B. It also lists the options and their order numbers and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

See www.rohde-schwarz.com/brochure-datasheet/sma100b

3.7 Release Notes and Open Source Acknowledgment (OSA)

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation.

The open source acknowledgment document provides verbatim license texts of the used open source software.

See www.rohde-schwarz.com/firmware/sma100b

Application Notes, Application Cards, White Papers, etc.

3.8 Application Notes, Application Cards, White Papers, etc.

These documents deal with special applications or background information on particular topics.

See www.rohde-schwarz.com/application/sma100b

4 Preparing for Use

- [Putting into Operation](#)..... 12
- [Connecting USB Devices](#).....20
- [Setting Up a Network \(LAN\) Connection](#).....20

4.1 Putting into Operation

This section describes the basic steps to be taken when setting up the R&S SMA100B for the first time.

⚠ WARNING

Risk of injury due to disregarding safety information

Observe the information on appropriate operating conditions provided in the data sheet to prevent personal injury or damage to the instrument. Read and observe the basic safety instructions provided with the instrument, in addition to the safety instructions in the following sections. In particular:

- Do not open the instrument casing.
-

NOTICE

Risk of instrument damage due to inappropriate operating conditions

Specific operating conditions are required to ensure accurate measurements and to avoid damage to the instrument. Observe the information on appropriate operating conditions provided in the basic safety instructions and the instrument's data sheet.

NOTICE**Instrument damage caused by electrostatic discharge**

Electrostatic discharge (ESD) can damage the electronic components of the instrument and the device under test (DUT). Electrostatic discharge is most likely to occur when you connect or disconnect a DUT or test fixture to the instrument's test ports. To prevent electrostatic discharge, use a wrist strap and cord and connect yourself to the ground, or use a conductive floor mat and heel strap combination.

NOTICE**Risk of instrument damage due to inappropriate operating conditions**

An unsuitable operating site or test setup can damage the instrument and connected devices. Before switching on the instrument, observe the information on appropriate operating conditions provided in the data sheet. In particular, ensure the following:

- All fan openings are unobstructed and the airflow perforations are unimpeded. A minimum distance of 10 cm to other objects is recommended.
- The instrument is dry and shows no sign of condensation.
- The instrument is positioned as described in the following sections.
- The ambient temperature does not exceed the range specified in the data sheet.
- Signal levels at the input connectors are all within the specified ranges.
- Signal outputs are connected correctly and are not overloaded.

4.1.1 EMI Suppression

Electromagnetic interference (EMI) may affect the measurement results.

To suppress generated Electromagnetic Interference (EMI),

- Use suitable shielded cables of high quality. For example use double-shielded RF, BNC and LAN cables (CAT6 STP).
Note: USB cables are of varying and often poor quality. Therefore, check the quality of each individual USB cable as described in the service manual.
- Always terminate open cable ends.

Note the EMC classification in the data sheet.

4.1.2 Unpacking and Checking the Instrument

Unpack the R&S SMA100B carefully and check the contents of the package.

- Check if all items listed on the delivery note, including this getting started manual, are included in the delivery.
- Check the R&S SMA100B for any damage.
If the contents are damaged, immediately contact the carrier who delivered the package.



Packing material

Retain the original packing material. If the instrument needs to be transported or shipped later, you can use the material to protect the control elements and connectors.

WARNING

Risk of injury during transportation

The carrying handles at the front and side of the casing are designed to lift or carry the instrument. Do not apply excessive force to the handles. If a handle is ripped off, the falling instrument can cause injury.

4.1.3 Accessory List

The instrument comes with the following accessories:

- Power cable
- Getting Started printed manual

4.1.4 Placing or Mounting the Instrument

The R&S SMA100B is designed for use under laboratory conditions, either on a bench top or in a rack using the standard rackmount kit.

Bench top operation

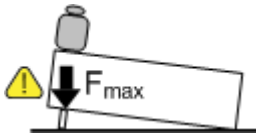
If the R&S SMA100B is operated on a bench top, the surface must be flat. The instrument can be used in horizontal position, standing on its feet, or with the support feet on the bottom extended.

⚠ WARNING

Risk of injury if feet are folded out

The feet can fold in if they are not folded out completely or if the instrument is shifted. Collapsing feet can cause injury or damage the instrument.

- Fold the feet completely in or out to ensure stability of the instrument. Never shift the instrument when the feet are folded out.
- When the feet are folded out, do not work under the instrument or place anything underneath.
- The feet can break if they are overloaded. The overall load on the folded-out feet must not exceed 500 N.

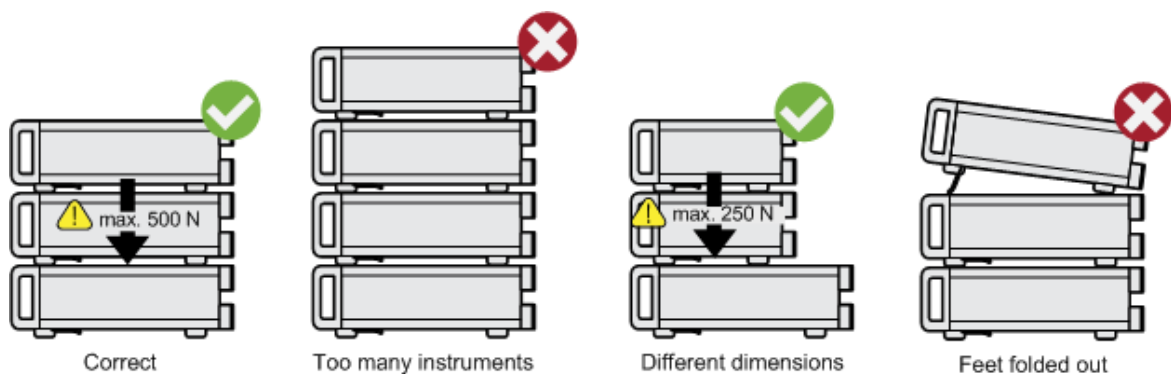


⚠ WARNING**Risk of injury when stacking instruments**

A stack of instruments can tilt over and cause injury if not stacked correctly. Furthermore, the instruments at the bottom of the stack can be damaged due to the load imposed by the instruments on top.

Observe the following instructions when stacking instruments:

- Never stack more than three instruments. If you need to stack more than three instruments, install them in a rack.
- The overall load imposed on the lowest instrument must not exceed 500 N.
- It is best if all instruments have the same dimensions (width and length). If you need to stack smaller instruments on the top, the overall load imposed on the lowest instrument must not exceed 250 N.
- If the instruments have foldable feet, fold them in completely.

**Mounting in a rack**

The R&S SMA100B can be installed in a rack using a rack adapter kit (Order No. see data sheet). The installation instructions are part of the adapter kit.

NOTICE**Risk of instrument damage due to insufficient airflow in a rack**

If you mount several instruments in a rack, you need an efficient ventilation concept to ensure that the instruments do not overheat. Insufficient airflow for a longer period can disturb the operation and even cause damage.

4.1.5 Connecting AC Power

The R&S SMA100B is equipped with an AC power supply connector, that can be operated with different AC power voltages. Once it is connected, the instrument automatically adjusts to the given voltage. Refer to the data sheet for the requirements of voltage and frequency. There is no need to set the voltage manually or change fuses.

The [AC supply and power switch](#) is at the rear of the unit.

To connect the AC supply

- ▶ Connect the R&S SMA100B to the AC power source using the supplied power cable.

Note: Since the instrument is designed in compliance with standard EN 61010-1 safety class I, it must only be connected to an outlet that has a ground contact.

Characteristics of the AC power supply:

- 100 V to 240 V AC
- 50 Hz to 60 Hz; 400 Hz
- 3.5 to 1.6 A, 2HU height unit (R&S SMAB-B92)
- 7.3 to 4.6 A, 3HU height unit (R&S SMAB-B92)

4.1.6 Turning the Instrument On and Off

To turn on the R&S SMA100B

1. [Connect the instrument to the AC supply](#).
2. Turn on the main AC power switch at the rear panel of the R&S SMA100B (position "I" (on)).

The instrument is supplied with AC power.



Warm-up time for OCXO

When the instrument is switched on, the OCXO requires an extended warm-up time (see data sheet).

To start the R&S SMA100B

Starting the R&S SMA100B requires that it is **connected** and **turned on**.

- ▶ At the front panel, press the [On/Standby] key briefly.

The instrument boots the operating system and starts the instrument firmware.

After booting, the instrument is in the state before the last power off (standby or ready), indicated by the color of the [On/Standby] key's LEDs:

- Green: the R&S SMA100B is running and ready for operation.
All modules are power-supplied.
- Orange: the R&S SMA100B is in standby mode (main AC power switch is in position "I").

The standby power mode keeps the power switch circuits and the oven-controlled crystal oscillator OCXO active. In this state, it is safe to switch off the AC power and disconnect the instrument from the power supply.

To switch between standby and ready state, briefly press the [On/Standby] key.

If a previous session was terminated regularly, the instrument uses the last setup with the relevant instrument settings.

- ▶ To set up a new configuration, press the [Preset] key to return the instrument to its defined reset/preset state.

To shut down and turn off the R&S SMA100B

NOTICE

Risk of losing data

If you switch off the running instrument using the rear panel switch or by disconnecting the power cord, the instrument loses its current settings. Furthermore, program data can be lost.

Press the On/Standby key first to shut down the application properly.

1. Press the [On/Standby] key.

The current setup is saved, the operating system shuts down and sets the instrument to standby state.

The [On/Standby] LED must be orange.

2. Turn off the main AC power switch at the rear panel of the R&S SMA100B (position "0" (off)).

The instrument is no longer supplied with AC power.



Turning off the AC power

You can leave the AC power on permanently. Switching off is required only if the instrument must be disconnected from all power supplies.

4.1.7 Functional Check

When the instrument is switched on, it automatically monitors the main functions.

A detected fault is indicated by an "Error" message displayed in the "Info" line of the instrument together with a brief error description. For an in-depth identification of the error, tap on the "Info" indication. In response, a description of the errors is displayed. For more information, refer to the "Troubleshooting and Error Messages" section in the user manual.

Apart from the automatic monitoring, the R&S SMA100B provides internal adjustments to check correct functioning. See the corresponding sections under "Maintenance" in the user manual.

4.1.8 Checking the Supplied Options and Licenses

The instrument can be equipped with both, hardware and firmware options. To check whether the installed options correspond to the options indicated on the delivery note, proceed as follows:

1. Press the [Setup] key.
2. Select "Instrument Assembly > Hardware Config" and "Software / Options".
A list with hardware and firmware information is displayed.
3. Check the availability of the hardware options as indicated in the delivery note.
For an overview of the available options, refer to the data sheet.

4.2 Connecting USB Devices

The USB interfaces of the R&S SMA100B allow you to connect USB devices, including USB hubs directly to the instrument. Due to the large number of available USB devices, there is almost no limit to the expansions that are possible with the R&S SMA100B.

The following list shows various USB devices that can be useful:

- Memory stick for easy transfer of data to/from a computer (for example firmware updates)
- Keyboard or mouse to simplify the entry of data, comments, filenames, etc.
- Power sensors of the R&S NRP families

All USB devices can be connected to or disconnected from the instrument during operation.

Connecting a USB storage device

When a USB storage device like a memory stick, a CD-ROM drive, or a hard disk is connected, it is detected automatically. The device is made available as a new drive (`/usb`). The name of the drive is manufacturer-dependent.

Connecting a keyboard

A keyboard is detected automatically when it is connected. The default keyboard layout is English – US.

Connecting a mouse

A mouse is detected automatically when it is connected.

4.3 Setting Up a Network (LAN) Connection

The R&S SMA100B is equipped with a network interface and can be connected to an Ethernet LAN (local area network). Provided the appropriate rights have been assigned by the network administrator, the interface can be used, for example:

- To transfer data between a controller and the instrument, for example to run a remote control program.

Setting Up a Network (LAN) Connection

- To access or operate the instrument from a remote computer using the Ultr@VNC program (or a similar tool, like another VNC client or any Web browser supporting Java).
- To transfer data from a remote computer and back, for example using network folders.
- To use power sensors with network capability, e.g. the R&S NRP LAN power sensors.

This section describes how to configure the LAN interface.

**Accessing operating system**

No access to the operating system is required for normal operation. All necessary system settings can be made in the "Setup" dialog.

4.3.1 Connecting the Instrument to the Network

There are two methods to establish a LAN connection to the instrument:

- A non-dedicated network (Ethernet) connection from the instrument to an existing network
- A dedicated network connection (Point-to-point connection) between the instrument and a single computer

For addressing, both the instrument and the computer require an IP address. The address information is usually assigned to the devices automatically, depending on the network capabilities.

If the IP address is not assigned automatically, see "Assigning the IP Address" in the R&S SMA100B user manual, for information on how to assign the address manually.

To set up a network (LAN) connection

NOTICE

Risk of network failure

Consult your network administrator before performing the following tasks:

- Connecting the instrument to the network
- Configuring the network
- Changing IP addresses

Errors can affect the entire network.

- ▶ Connect the instrument to the network or to a single PC.

If the instrument is connected to the LAN, the operating system automatically detects the network connection and activates the required drivers.

By default, the instrument is configured to use DHCP (dynamic host configuration protocol) configuration and to obtain the whole address information automatically.

When connected, the R&S SMA100B displays the address information on the screen.

System Config

IP: 10.113.0.19
GPIB Address: 28
FW: 4.00.040



Risk of network connection failure

Network cables and cable connectors of poor quality, or failures in the auto-negotiation process, can cause network connection failures.

If the network connection to the instrument fails, check the network infrastructure and contact your network administrator.

For details, see section "Troubleshooting and Error Messages" in the R&S SMA100B user manual.

5 Instrument Tour

The following topics help you to get familiar with the instrument and perform the first steps:

- [Chapter 5.1, "Front Panel Tour"](#), on page 23
- [Chapter 5.2, "Rear Panel Tour"](#), on page 32

This section explains the control elements and the connectors of the R&S SMA100B with the aid of the front and rear views. For specifications of the interfaces, refer to the data sheet.

5.1 Front Panel Tour

This section provides an overview of the control elements at the front panel of the R&S SMA100B. Most of the connectors are at the rear panel and are described in [Chapter 5.2, "Rear Panel Tour"](#), on page 32.



Figure 5-1: Front panel view of the R&S SMA100B RF Signal Generator with height unit 2HU (option R&S SMAB-B92)

- 1 = Touchscreen
- 2 = Utility keys
- 3 = [On/Standby]
- 4 = Function keys
- 5 = Keypad
- 6 = Navigation controls
- 7 = Display keys
- 8 = USB connector
- 9 = SD card slot
- 10 = Sensor connector
- 11 = RF output connector

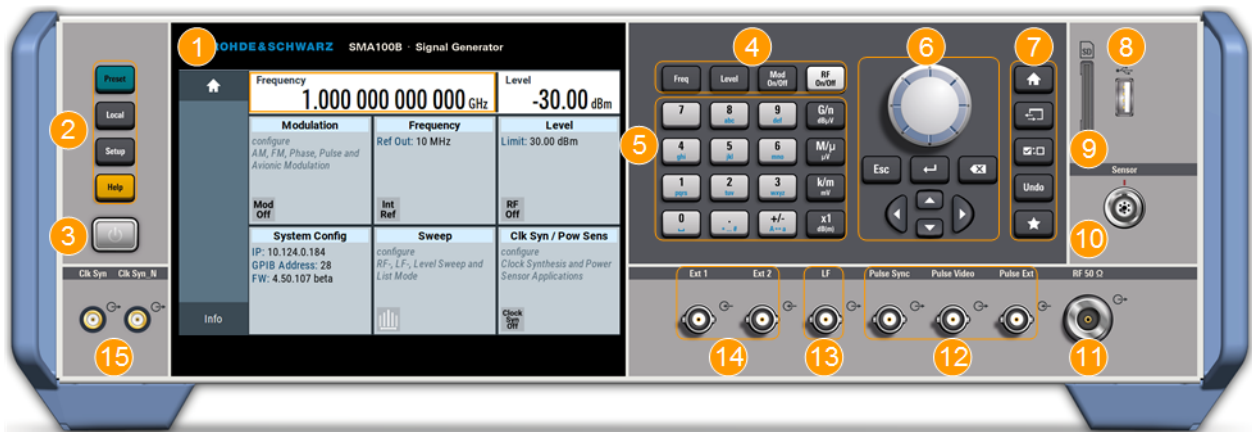


Figure 5-2: Front panel view of the R&S SMA100B RF Signal Generator with height unit 3HU (option R&S SMAB-B93)

- 1 = Touchscreen
- 2 = Utility keys
- 3 = [On/Standby]
- 4 = Function keys
- 5 = Keypad
- 6 = Navigation controls
- 7 = Display keys
- 8 = USB connector
- 9 = SD card slot
- 10 = Sensor connector
- 11 = RF output connector
- 12 = Pulse signal input and output connectors
- 13 = LF output connector
- 14 = Ext1/2 input connectors
- 15 = Clk Syn and Clk Syn N output connectors (SMA)

5.1.1 Touchscreen

The screen at the front panel is the graphical user interface. It shows the settings dialogs and parameters, and the current configuration at a glance, see [Chapter 7.3, "Understanding the Display Information"](#), on page 48.

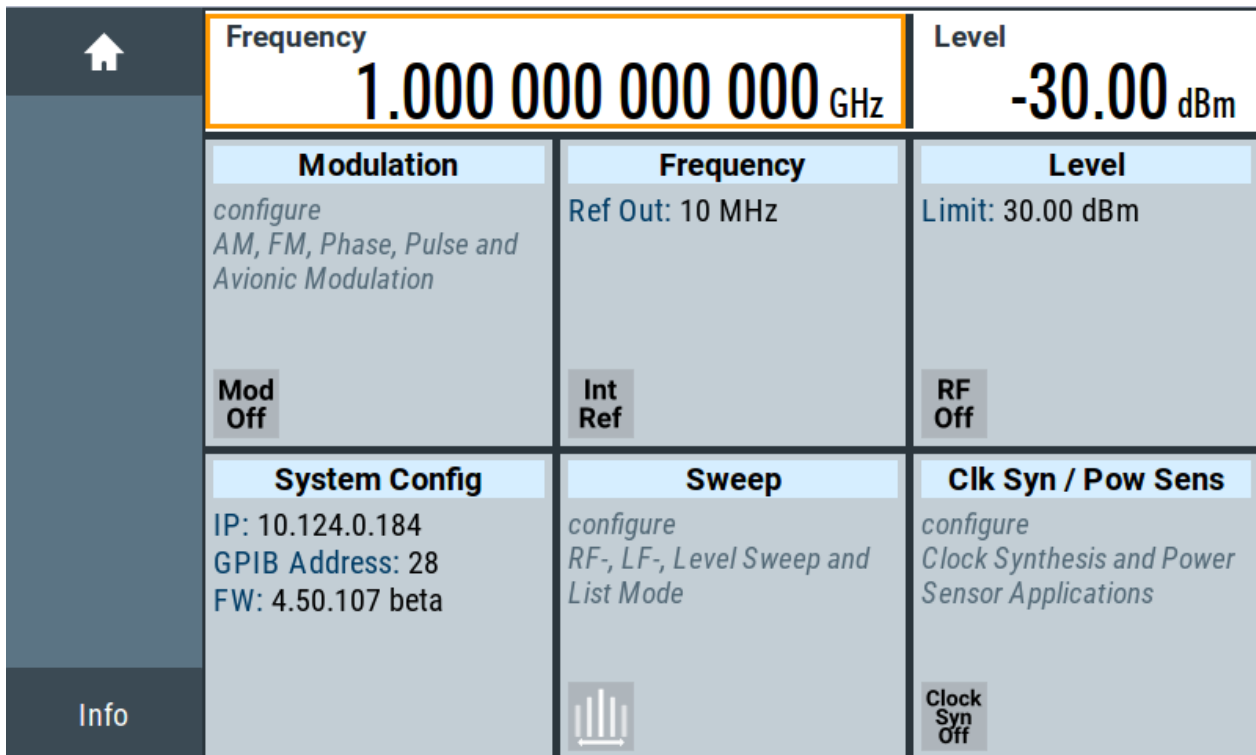


Figure 5-3: Touchscreen

The touch-sensitive panel provides an alternative means of user interaction for quick and easy handling of the instrument, see [Chapter 7.2, "Means of Manual Interaction"](#), on page 48.

NOTICE

Risk of touchscreen damage

Inappropriate tools or excessive force can damage the touchscreen.

Observe the following instructions when operating the touchscreen:

- Never touch the screen with ball point pens or other sharp objects, use your fingers instead.
As an alternative, you can use a stylus pen with a smooth soft tip.
- Never apply excessive force to the screen. Touch it gently.
- Never scratch the screen surface, for example with a finger nail.
- Never rub the screen surface strongly, for example with a dust cloth.
For instructions on cleaning the screen, see the Maintenance chapter in the R&S SMA100B user manual.

5.1.2 Utility Keys

The utility keys set the R&S SMA100B to a defined state, and provide access to basic settings and information on assistance.

Table 5-1: Utility keys

Utility Key	Assigned functions
[Preset]	Sets the instrument to a defined state
[Local]	Switches from remote control to local (manual) control
[Setup]	Accesses the general instrument settings
[Help]	Displays context-sensitive help text

5.1.3 On/Standby

The [On/Standby] key starts up and shuts down the instrument, and switches between the standby and the ready state.

- In the ready state, On/Standby key lights green. The instrument is ready for operation.
- In the standby state, the On/Standby key lights orange. The standby power mode keeps the power switch circuits and the oven-controlled crystal oscillator OCXO active. In this state, it is safe to switch off the AC power and disconnect the instrument from the power supply.

5.1.4 Function Keys

Function keys provide access to the most common generator settings and functions. You can find a detailed description of the corresponding functions in the user manual.

Table 5-2: Function keys

Function key	Assigned functions
[Freq]	Activates frequency entry.
[Level]	Activates level entry.
[Mod on/off]	Switches the modulation on and off.
[RF on/off]	Switches the RF output on and off.

5.1.5 Keypad

The keypad enables you to enter alphanumeric parameters, including the corresponding units. It contains the following keys:

Table 5-3: Keys on the keypad

Type of key	Description
Alphanumeric keys	Enter numbers and (special) characters in edit dialog boxes.
Decimal point	Inserts a decimal point "." at the cursor position.
Sign key	Changes the sign of a numeric parameter. In the case of an alphanumeric parameter, inserts a "-" at the cursor position.
Unit keys (G/n dB μ V, M/ μ μ V, k/m mV and x1 dB(m))	These keys add the selected unit to the entered numeric value and complete the entry. In the case of level entries (e.g. in dB) or dimensionless values, all units have the value "1" as multiplying factor. Thus, they have the same function as an [Enter] key.

5.1.6 Navigation Controls

The navigation controls include a rotary knob, navigation keys, and the display keys. They allow you to navigate within the display or within dialog boxes.

5.1.6.1 Rotary Knob

The rotary knob has several functions:

- Increments (clockwise direction) or decrements (counterclockwise direction) the instrument parameter at a defined step width in the case of a numeric entry.
- Moves the selection, e.g. to a function block in the block diagram
- Shifts the selection bar within focused areas (e.g. lists).
- Acts like the [Enter] key, when it is pressed.

5.1.6.2 Editing Keys

Editing keys enable you to confirm an entry, delete individual characters, or exit the current operation.

Table 5-4: Editing keys

Type of key	Description
[Esc] key	<p>Closes all kinds of dialog boxes, if the edit mode is not active. Quits the edit mode, if the edit mode is active. In dialog boxes that contain a "Cancel" button it activates that button.</p> <p>For "Edit" dialog boxes the following mechanism is used:</p> <ul style="list-style-type: none"> • If data entry has been started, it retains the original value and closes the dialog box. • If data entry has not been started or has been completed, it closes the dialog box.
[Enter] key	<p>Has the same effect as pressing the rotary knob</p> <ul style="list-style-type: none"> • Concludes the entry of dimensionless entries. The new value is accepted. • With other entries, this key can be used instead of the default unit key. • In a dialog box, selects the default or focused element. • Calls the next dialog level. • Confirms and closes open input windows.
[Backspace] key	Deletes the character to the left of the cursor in editing mode.

5.1.6.3 Navigation Keys

As an alternative to the rotary knob or the touchscreen, you can use the navigation keys to navigate through dialog boxes, diagrams, or tables.

Table 5-5: Navigation keys

Type of key	Description
[Up/Down] Key	<p>The [Up] and the [Down] key does the following:</p> <ul style="list-style-type: none"> • In a numeric edit dialog box, increase or decrease the instrument parameter. • In a list, scroll forward and backward through the list entries. • In a table, move the selection bar vertically. • In windows or dialog boxes with vertical scrollbar, move the scrollbar.
[Left/Right] Key	<p>The [Left] and the [Right] key does the following:</p> <ul style="list-style-type: none"> • In an alphanumeric edit dialog box, move the cursor. • In a list, scroll forward and backward through the list entries. • In a table, move the selection bar horizontally. • In windows or dialog boxes with horizontal scrollbar, move the scrollbar.

5.1.7 Display Keys

The display keys arrange different windows on the display.

Table 5-6: Display keys

Display key	Assigned functions
[Home]	Returns to the initial feature screen.
[Next window]	Toggles between the entry fields in the taskbar.
[On/Off]	<ul style="list-style-type: none"> • Switches highlighted elements or a function block on and off. • Switches between two or more settings, e.g. items of selection lists. At the end of a list, the cursor is set on the first entry again.
[Undo]	Reverts the last operation.
[★ (User)]	Adds a parameter to the user menu for quick access.

5.1.8 USB Connector

USB (universal serial bus) interfaces of type A (host USB).

- Connection of peripherals such as mouse or keyboard
- Connection of memory stick for file transmission
- Firmware update



Further USB interface type A (host USB) and a USB interface type B (USB In) are available on the rear panel.

5.1.9 SD card slot

Slot for removable mass storage (option R&S SMAB-B85).

To prevent from unauthorized removal, the SD card holder includes wholes that provide the opportunity of sealing the SD card. We recommend that you seal the SD card crosswise.

5.1.10 Sensor

Connector for R&S NRP sensors.

The R&S SMA100B supports the use of R&S NRP power sensors in various ways including the use as a power viewer.

A power sensor is connected to the R&S SMA100B by inserting the male connector. To disconnect, pull the connector by its sleeve. You cannot disconnect the sensor simply by pulling at the cable or the rear part of the connector.



The female connector allows the mechanical connection of 6-pole and 8-pole male connectors.

It mates with the interface cables R&S NRP-ZK8 and R&S NRP-ZK6, used for connecting R&S NRPxx power sensors, and also with the six-pole push-pull plugs of the R&S NRP-Zxx series.

However, the signal pair of the common time base clock assigned to the two pins in the center of the male connectors is not available. These pins are used by Rohde & Schwarz power meters to synchronize several power sensors.

5.1.11 RF 50 Ω

Output of the RF signal.

NOTICE

Maximum input levels

Do not overload the RF output.

The instrument is equipped with a reverse power protection that prevents the RF output against back feed, see section "Reverse Power Protection" in the operating manual. However, the maximum permissible reverse power is specified in the data sheet.

The connector type depends on the installed frequency option.

Table 5-7: Overview of RF connector types depending on the frequency range

Required option	Connector type
RF: R&S SMAB-B103	N female
RF: R&S SMAB-B106	N female
RF: R&S SMAB-B112	Test port adapter, PC 3.5 mm female

Required option	Connector type
RF: R&S SMAB-B120	Test port adapter, PC 3.5 mm female
RF: R&S SMAB-B131	Test port adapter, PC 3.5 mm female
RF: R&S SMAB-B140(N)	Test port adapter, PC 3.5 mm female
RF: R&S SMAB-B150(N)	PC 1.85 mm female
RF: R&S SMAB-B167(N)	PC 1.85 mm female

NOTICE**Risk of RF connector and cable damage**

If you tighten the connectors too strongly, you can damage the cables and connectors. If you do not tighten the connectors enough, the measurement results can be inaccurate.

Always use an appropriate torque wrench suitable for this type of connector and apply the torque specified in the application note [1MA99](#).

The application notes are available on the Internet and provide additional information on care and handling of RF connectors.

Rohde & Schwarz offers appropriate torque wrenches for various connectors. For ordering information, see the R&S SMA100B data sheet or product brochure.

5.1.12 Pulse Signal Connectors**Pulse Sync**

Output signal for synchronizing the pulse generator signal. The synchronization signal is generated at the beginning of each pulse. For double-pulse generation, the synchronization signal is generated at the beginning of the first pulse.

Pulse Video

Output of the internal pulse generator signal or the looped through pulse signal from Pulse Ext connector (video signal).

Pulse Ext

Input for an external pulse modulation signal or an external trigger/gate signal for the pulse generator.

5.1.13 LF Modulation Connectors

LF

Output for internal LF generator signal.

See also data sheet and user manual, section "Analog Modulation".

Ext

Input for external analog modulation signals.

5.1.14 Clock Synthesizer Connectors

Clk Syn/Clk Syn N

Connectors for output of the clock synthesizer signal, or the inverted signal.

5.2 Rear Panel Tour

This section provides an overview of the connectors at the rear panel of the instrument. For technical data of the connectors, refer to the data sheet.

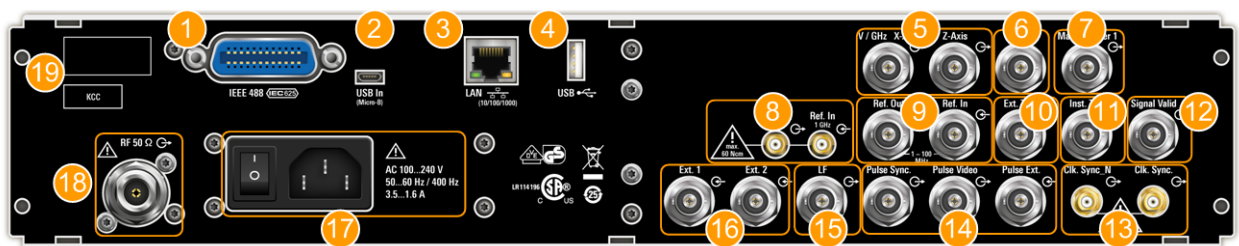


Figure 5-4: Rear panel view of the R&S SMA100B RF Signal Generator with height unit 2HU (option R&S SMAB-B92)

- 1 = IEC 625/IEEE 488 connector
- 2 = USB In connector (type micro-B)
- 3 = LAN connector
- 4 = USB connector (type A)
- 5 = V/GHz X-Axis and Z-Axis output connectors (BNC)
- 6 = Stop input and output connector (BNC)
- 7 = Marker User1 output connector (BNC)
- 8 = Ref In 1GHz and Ref Out 1GHz connectors (SMA)
- 9 = Ref In and Ref Out connectors (BNC)
- 10 = EFC input connector (BNC)

- 11 = Inst Trig input connector (BNC)
- 12 = Signal Valid output connector (BNC)
- 13 = Clk Syn and Clk Syn N output connectors (SMA)
- 14 = Pulse Sync, Pulse Video and Pulse Ext connectors (BNC)
- 15 = LF output connector (BNC)
- 16 = Ext 1/2 input connectors (BNC)
- 17 = AC power supply connection and main power switch
- 18 = RF output connector
- 19 = Serial number (six digits in the string 1419.8888.02-<serial number>-<checksum>)

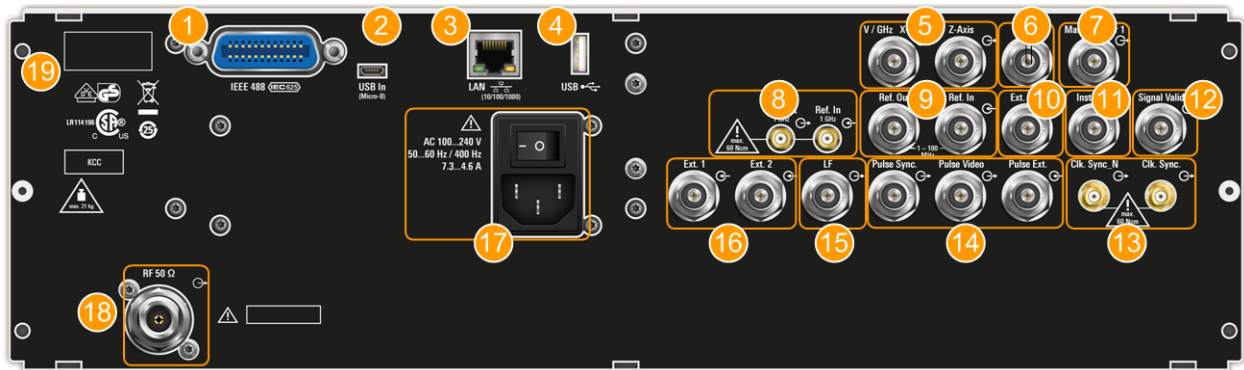


Figure 5-5: Rear panel view of the R&S SMA100B RF Signal Generator with height unit 3HU (option R&S SMAB-B93)

- 1 = IEC 625/IEEE 488 connector
- 2 = USB In connector (type micro-B)
- 3 = LAN connector
- 4 = USB connector (type A)
- 5 = V/GHz X-Axis and Z-Axis output connectors (BNC)
- 6 = Stop input and output connector (BNC)
- 7 = Marker User1 output connector (BNC)
- 8 = Ref In 1GHz and Ref Out 1GHz connectors (SMA)
- 9 = Ref In and Ref Out connectors (BNC)
- 10 = EFC input connector (BNC)
- 11 = Inst Trig input connector (BNC)
- 12 = Signal Valid output connector (BNC)
- 13 = Clk Syn and Clk Syn N output connectors (SMA)
- 14 = Pulse Sync, Pulse Video and Pulse Ext connectors (BNC)
- 15 = LF output connector (BNC)
- 16 = Ext 1/2 input connectors (BNC)
- 17 = AC power supply connection and main power switch
- 18 = RF output connector
- 19 = Serial number (six digits in the string 1419.8888.02-<serial number>-<checksum>)

5.2.1 Connectors

IEC 625/IEEE 488

Option: R&S SMAB-B86

GPIB-bus interface for remote control of the instrument.

The IEC 625 interface is in compliance with IEEE488 and SCPI. A computer for remote control can be connected via this interface. To set up the connection, we recommend that you use a shielded cable.

Note: To avoid electromagnetic interference (EMI) caused by open lines, always terminate any connected IEC-bus cable with an instrument or a controller.

See also "Annex: Hardware Interfaces" and chapter "Network and Remote Control" in the user manual.

USB/USB In

- Female USB type A connector, to connect devices like a keyboard, a mouse, a memory stick, or the R&S NRP-Z3/Z4 cable for the R&S NRP power sensors
- Female USB In connector (USB type B), for example for remote control.
Option: R&S SMAB-B86

See also [Chapter 4.2, "Connecting USB Devices"](#), on page 20.

LAN

The LAN interface can be used to connect the R&S SMA100B to a local network for remote control, remote operation, and data transfer.

V/GHz X-Axis

Output of a voltage ramp:

- "V / GHz": the voltage is proportional to the frequency.
- "X-Axis": output of a voltage ramp for the X deflection of an oscilloscope or an XY recorder.

Z-Axis

Output of a voltage pulse, e.g. for the combined blanking and marker generation of network analyzers.

Stop

Input and output for stopping the sweep in all modes.

This connector is bidirectional. Used as:

- "Input": enables you to stop a sweep triggered by an external network analyzer.
- "Output": enables the R&S SMA100B to stop the sweep of an external network analyzer.

Marker User1

Output signal for marker or trigger signal.

Signal Valid

Output signal that marks the valid signal times (valid level and frequency) for all analog modulations.

Inst Trig

Input for external trigger of sweeps and list mode.

EFC

Input connector for an EFC (external frequency control) signal for electronic tuning of the internal reference frequency.

Ref In/Ref Out

Input/output for external reference signal.

Incl. dedicated connectors for the 1GHz reference signal.

Clk Syn/Clk Syn N

Connectors for output of the clock synthesizer signal, or the inverted signal.

Pulse Ext

Input for an external pulse modulation signal or an external trigger/gate signal for the pulse generator.

Pulse Video

Output of the internal pulse generator signal or the looped through pulse signal from Pulse Ext connector (video signal).

Pulse Sync

Output signal for synchronizing the pulse generator signal. The synchronization signal is generated at the beginning of each pulse. For double-pulse generation, the synchronization signal is generated at the beginning of the first pulse.

LF

Output for internal LF generator signal.

See also data sheet and user manual, section "Analog Modulation".

Ext 1/2

Inputs for external analog modulation signal, and an external detector voltage.

AC supply and power switch

The AC power supply connector and the main power switch are located in a unit on the rear panel of the instrument.

Main power switch function:

- Position 1: The instrument is in operation.
- Position 0: The entire instrument is disconnected from the AC power supply.

For details, refer to [Chapter 4.1.6, "Turning the Instrument On and Off"](#), on page 17.

RF

Rear panel connector for the RF signal. This connector is for use of the instrument in a 19" rack.

6 Trying Out the Instrument

This chapter introduces the first steps with the R&S SMA100B. It shows how to operate and configure the instrument using simple examples. The complete description of the functionality and its usage is given in the R&S SMA100B user manual. Basic instrument operation is described in [Chapter 7, "Instrument Control"](#), on page 47.

Prerequisites

The instrument is set up, connected to the power supply, and started up as described in [Chapter 4, "Preparing for Use"](#), on page 12.

The first signal generation tasks explain how to generate an unmodulated signal, to configure the RF signal output, and how you can vary the RF frequency and level in sweep mode.

The instrument is manually operated via the touchscreen. Try out the following:

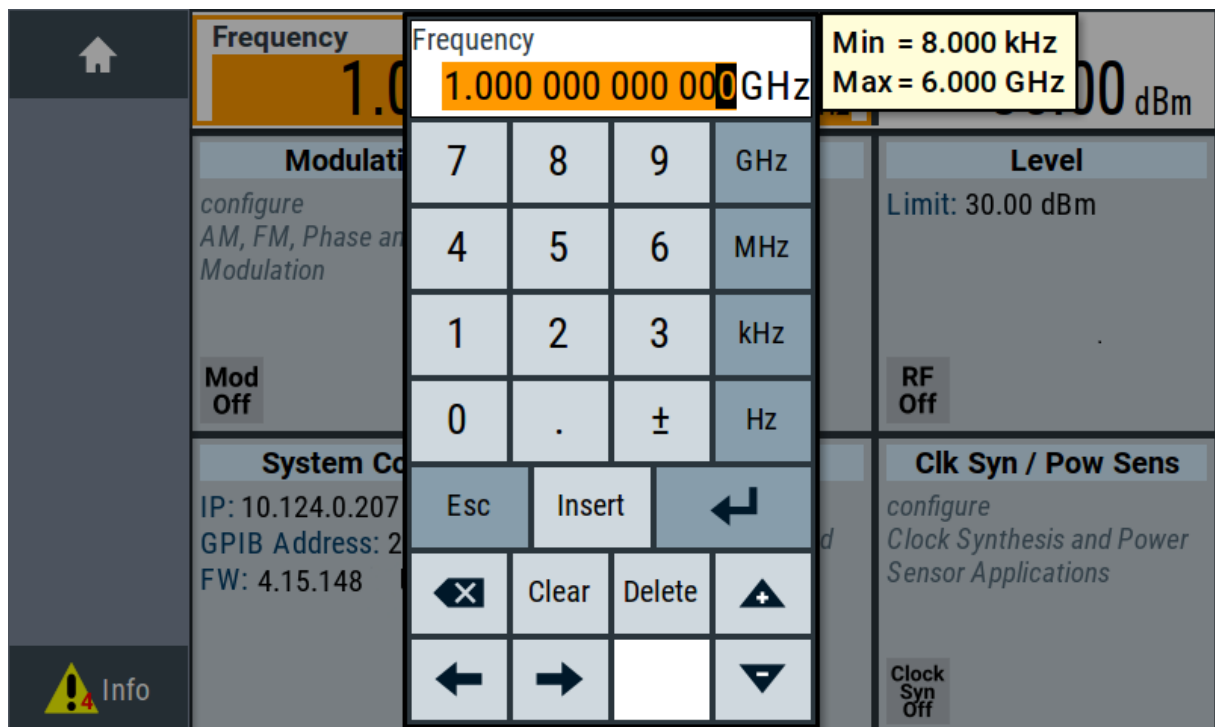
- [Generating an Unmodulated Carrier](#)..... 37
- [Generating an RF Frequency Sweep Signal](#).....41
- [Saving and Recalling Settings](#)..... 43

6.1 Generating an Unmodulated Carrier

We start to generate a simple unmodulated signal. In this example, the R&S SMA100B can be in its minimal configuration.

1. On the R&S SMA100B front panel, press the [Preset] key to set a defined initial instrument state.
2. Set the frequency:
 - a) In the "Status Bar", tap the "Frequency" field.
 - b) On the on-screen keypad, enter "6" and press the "GHz" key.

Generating an Unmodulated Carrier



The on-screen key pad closes and the frequency value is displayed.

3. To set the signal level, tap the "Level" field and enter the level in the same way.
4. To activate RF signal output, select "Level" > "RF On" in the tile diagram.

Frequency 6.000 000 000 000 GHz		Level -25.00 dBm
Modulation <i>configure</i> <i>AM, FM, Phase and Pulse Modulation</i>	Frequency Ref Out: 10 MHz	Level Limit: 30.00 dBm
Mod Off	Int Ref	Level <input checked="" type="checkbox"/> RF ON
System Config IP: 10.124.0.207 GPIB Address: 28 FW: 4.15.148	Sweep <i>configure</i> <i>RF-, LF-, Level Sweep</i> <i>List Mode</i>	Level... Attenuator... Automatic Level Control...

The blue colored "RF On" icon indicates that the RF output is activated.

The R&S SMA100B provides the 6 GHz signal at the RF A connector at the front panel.


Frequency 6.000 000 000 000 GHz		Level -25.00 dBm
Modulation <i>configure</i> <i>AM, FM, Phase and Pulse Modulation</i> Mod Off	Frequency Ref Out: 10 MHz Int Ref	Level Limit: 30.00 dBm RF On
System Config IP: 10.124.0.207 GPIB Address: 28 FW: 4.15.148	Sweep <i>configure</i> <i>RF-, LF-, Level Sweep and List Mode</i> 	Clk Syn / Pow Sens <i>configure</i> <i>Clock Synthesis and Power Sensor Applications</i> Clock Syn Off

Figure 6-1: Generating an unmodulated signal

Alternative ways to access the instrument functions

To fulfill the same task, you can also use the front panel keys or the setting parameters provided in the frequency and level dialogs.

Try out the settings dialogs

1. In the "Frequency" tile, select "Frequency...".
 - a) In the "RF Frequency" tab, tap the "Frequency" field.
 - b) Set the frequency via the on-screen keypad.
2. Access the "RF Level" dialog via the "Level" tile.
 - a) In the "RF Level" tab, select "Amplitude".
 - b) Set the amplitude (level) via the on-screen keypad.
3. Select "RF State > On" to activate the RF signal generation.

Try out the front panel keys

- ▶ Use the [Freq], [Level], and [RF on/off] key on the front panel.



Connect RF of the R&S SMA100B to a signal analyzer, for example R&S®FSW, to display the generated signal.

For the required settings of the signal analyzer, refer to its user manual or its online help.

6.2 Generating an RF Frequency Sweep Signal

The "Sweep" operating mode allows you to generate an RF signal with periodically varying frequencies or amplitudes.

This example deals with an RF signal with varying frequency and constant level. To configure the sweep, you need to determine a defined start and end frequency with constant time intervals between the frequency steps.

The sweep function does not require specific options.

1. On the front panel, press the [Preset] key to set a defined initial instrument state.
2. Set the signal output level, if required, e.g. set "Level > -25 dBm".
3. In the tile diagram, select "Sweep" > "Frequency Sweep".
4. In the "General" tab:

Generating an RF Frequency Sweep Signal

General <i>Auto</i>		Frequency Range	
State	0	Current Frequency 570.000 000 000 MHz	
Mode	Auto		
Shape	Sawtooth		
Spacing	Linear	Dwell Time 15.0 ms	
Reset Sweep			

- Select "Mode > Auto" to run the sweep continuously.
- Select "Shape > Sawtooth" to set the waveform shape of the sweep signal.
- Select "Spacing > Linear", to determine the calculation method for the frequency shift of a step.
- Set "Dwell Time > 15.0 ms", to determine the time interval of the sweep steps.

5. Select the "Frequency Range" tab.

Start Frequency 200.000 000 000 MHz	Stop Frequency 600.000 000 000 MHz
Center Frequency 400.000 000 000 MHz	Span 400.000 000 000 MHz
Spacing Linear	Step Linear 10.000 000 000 MHz

- Set "Start Freq > 200 MHz" and "Stop Freq > 600 MHz" to determine the frequency sweep range.
- Set the step width "Step Lin > 10.0 MHz" to determine the width for a frequency step.

6. In the "General" tab, activate the frequency sweep with "State > On".
7. Close the sweep dialog.
(Alternatively, tap the "Home" button to minimize the dialog. The R&S SMA100B indicates the "Sweep" dialog as active dialog in the task bar.)
8. To activate the RF signal output, select "Level" > "RF On".

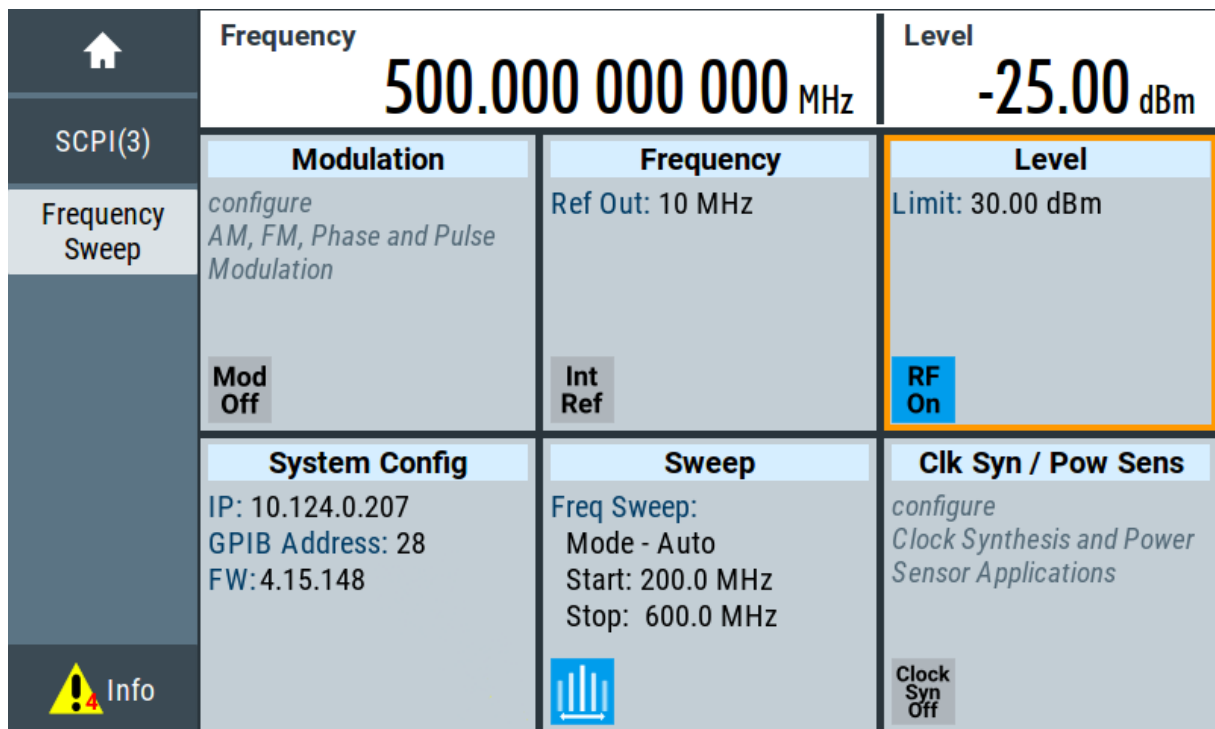


Figure 6-2: Generating a frequency sweep signal

The frequency field in the status bar indicates the continuously changing frequency, i.e. the running sweep.

6.3 Saving and Recalling Settings

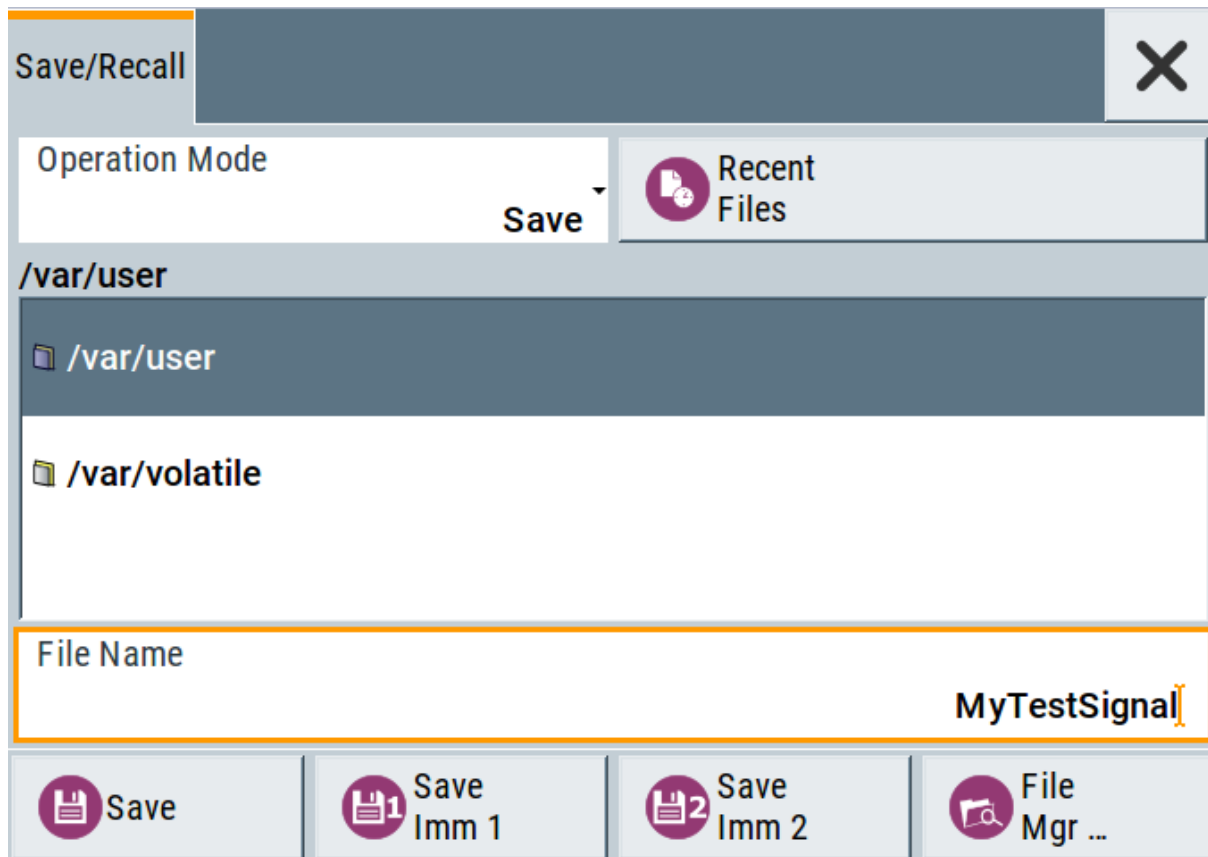
To restore the results of our measurements later, we save the instrument settings in a file.

To save the instrument settings in a file

We assume, a test configuration as described in [Chapter 6.2, "Generating an RF Frequency Sweep Signal"](#), on page 41.

1. Press the [Setup] key on the front panel.

- In the "Setup" menu, select "Settings > Save/Recall".
- In the "Save/Recall" dialog, select "Operation Mode > Save".



- Tap the "Filename", use the on-screen keyboard, and enter *MyTestSignal*.
- Tap the "Save" button.

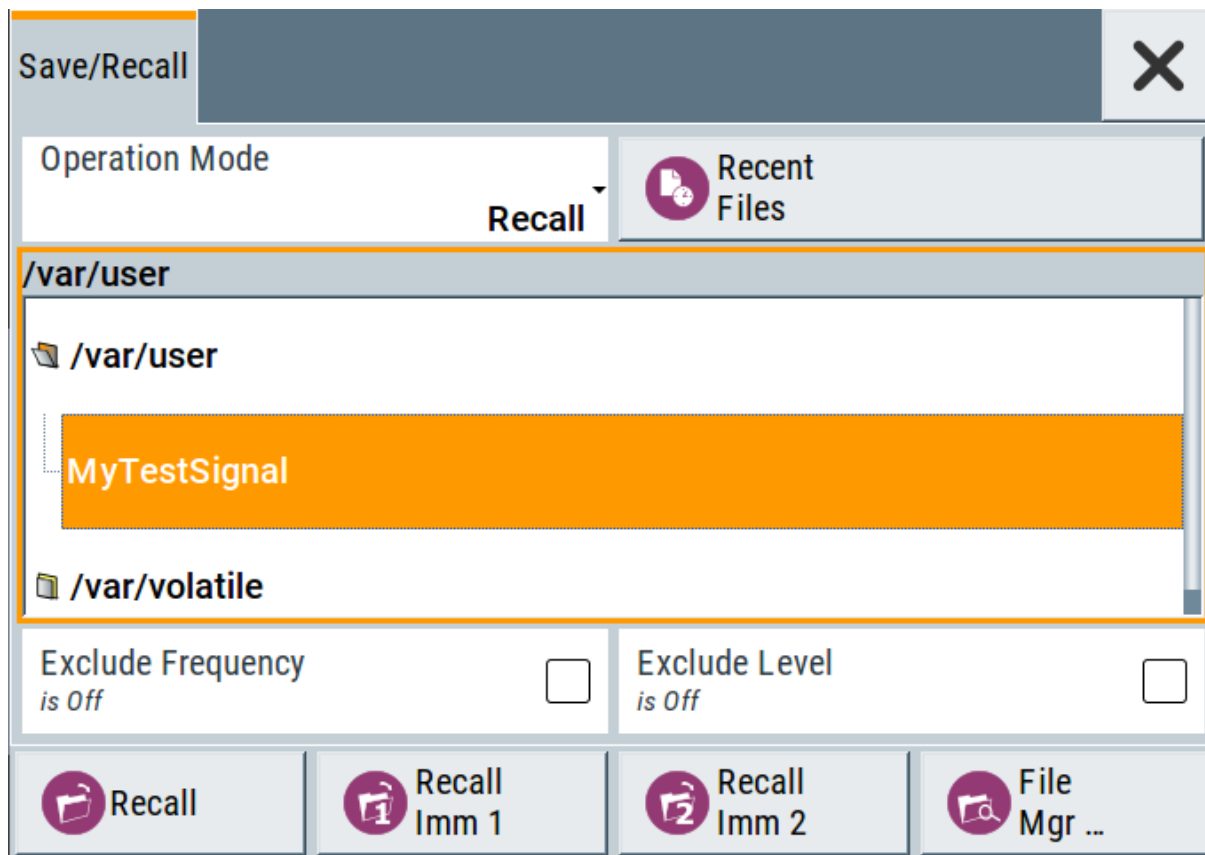
The file `MyTestSignal.savrc1.txt` is stored in the default directory `/var/user/`.

To load saved instrument settings

You can restore the settings to the instrument at any time using the settings file.

- Press the [Preset] button to restore the default instrument settings so you can check that the stored user settings are restored afterwards.
- Press the [Setup] key on the front panel.
- In the "Setup" menu, select "Settings > Save/Recall".
- In the "Save/Recall" dialog, select "Operation Mode > Recall".

Navigate to the directory the file is saved in and select the `MyTestSignal` file.



5. Tap the "Recall" button.

All instrument settings are restored and the display resembles [Chapter 6.2, "Generating an RF Frequency Sweep Signal"](#), on page 41, which shows the instrument display right before the settings were saved.





How to display all parameters with values different to their preset values

When you load a file to your instrument, you do not have enough information on the changed settings. In such case, it is useful to visualize all parameters that have been changed from their default state.

Try out the following:

- Touch and hold a spot in the tile diagram for at least 1 second to access the context-sensitive menu.
- Select "Mark All Parameters Changed from Preset".


 Mark All Parameters Changed from Preset

 Start SCPI Recording




 Undo

 Redo

 Help

 Key Emulation

- All changed parameters are highlighted.

	Frequency 410.000 000 000 MHz		Level -25.00 dBm
	SCPI(3)		
Frequency Sweep	Modulation <i>configure AM, FM, Phase and Pulse Modulation</i>	Frequency Ref Out: 10 MHz	Level Limit: 30.00 dBm
	Mod Off	Int Ref	RF On
 Info	System Config IP: 10.124.0.207 GPIB Address: 28 FW: 4.15.148	Sweep Freq Sweep: Mode - Auto Start: 200.0 MHz Stop: 600.0 MHz	Clk Syn / Pow Sens <i>configure Clock Synthesis and Power Sensor Applications</i>
			Clock Syn Off

7 Instrument Control

This chapter provides an overview on how to work with the R&S SMA100B.

It covers the following topics:

• Possible Ways to Operate the Instrument.....	47
• Means of Manual Interaction.....	48
• Understanding the Display Information.....	48
• Accessing the Functionality.....	52
• Entering Data.....	53
• Getting Information and Help.....	55
• Remote Control.....	57
• Remote Operation over VNC.....	58

7.1 Possible Ways to Operate the Instrument

There are three ways to operate the R&S SMA100B:

- Manual operation:
Use the touchscreen, hard keys and rotary knob, or an optional mouse and/or keyboard.
The following description shows how to operate the instrument manually.
- Remote control:
Create programs to automatize repeating settings, tests and measurements.
The instrument is connected to a computer running the program.
This way of operation is described in the user manual, chapter "Network and Remote Control Operation".
- Remote operation from a computer:
Remote monitoring and control of the instrument from a connected computer is based on the common cross-platform technology VNC (Virtual Network Computing). On the remote computer, any standard web browser (supporting Java) or a dedicated VNC client (like Ultr@VNC) can be used. See also [Chapter 7.8, "Remote Operation over VNC"](#), on page 58.

7.2 Means of Manual Interaction

For the manual interaction with the R&S SMA100B, you have several methods that you can use as an alternative to perform a task:

- **Touchscreen:**
Touchscreen operation is the most direct way to interact. Almost all control elements and actions on the screen are based on the standard operating system concept. You can tap any user interface element to set parameters in dialog boxes, enter data, scroll within a dialog etc., as if you work with a mouse pointer.
Tapping the screen works like clicking mouse buttons:
 - Touch quickly = click: Selects a parameter or provokes an action.
 - Touch and hold = right-click: Opens a context-sensitive menu.
 - Touch and swipe = drag: Scrolls through the contents of a display element larger than the screen, e.g. a list or a table.
- **Function keys and rotary knob:**
The front panel provides nearly all functions and controls to operate the instrument in the classic way, without touchscreen.
- **Optional mouse and/or keyboard:**
These devices work like known from PCs. The navigation keys on the front panel correspond to the keys on the keyboard.

This manual describes the manual interaction with the instrument via the touchscreen. It mentions the alternative methods using the keys on the instrument or the on-screen keypads if it deviates from the standard operating procedures. The usage of the touchscreen and navigation keys is described in [Chapter 7.4, "Accessing the Functionality"](#), on page 52.

Throughout the manual, the term "select" refers to any of the described methods, i.e. using a finger on the touchscreen, a mouse pointer in the display, or a key on the instrument or on a keyboard.

7.3 Understanding the Display Information

The home screen of the R&S SMA100B displays all main settings and generator states, divided into three main operation areas.

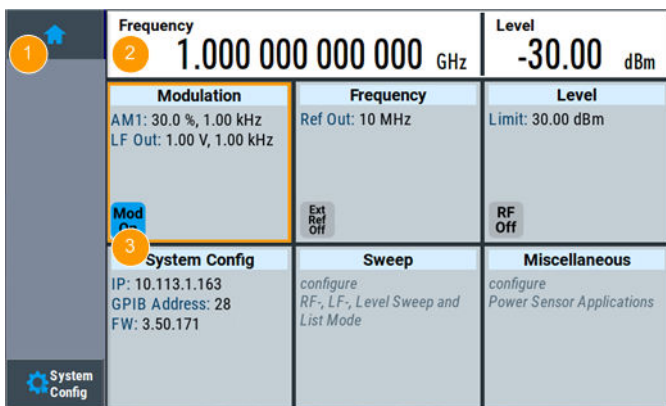


Figure 7-1: Home screen

- 1 = Taskbar/softkey bar with "Home" and "System Config" key
- 2 = Status bar
- 3 = Tile diagram

- [Status Bar](#)..... 49
- [Tile Diagram](#)..... 49
- [Taskbar](#)..... 50
- [Additional Display Characteristics](#)..... 51

7.3.1 Status Bar

The status bar at the top of the screen indicates the RF frequency and the level of the output signal provided to the DUT. You can set both parameters directly here.

7.3.2 Tile Diagram

The tile diagram is the main entry to the settings of the R&S SMA100B.

Tile	Access to:
"Modulation"	<ul style="list-style-type: none"> • Analog and stereo¹⁾, and pulse¹⁾ modulation settings • Built in LF generator
"System Config"	<ul style="list-style-type: none"> • "Save/Recall": settings for saving and loading instrument configurations • "Remote access": Network and emulation settings. • "Setup": general system configuration
"Sweep"	<ul style="list-style-type: none"> • Frequency and level sweeps • List mode

Tile	Access to:
"Frequency"	<ul style="list-style-type: none"> • RF frequency and phase • Reference frequency
"Level"	<ul style="list-style-type: none"> • RF level • Attenuator • Automatic level control • User correction
"Clk Syn / Pow Sens"	<ul style="list-style-type: none"> • Clock synthesis¹⁾ • Power sensors
1) requires additional options	

7.3.3 Taskbar

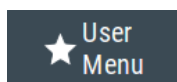
The "Taskbar" shows a home and an info button, and assigns a labeled button whenever you open a dialog. If more dialogs are open than the taskbar can display, touch and swipe the taskbar to scroll up and down.

The buttons shown in the following example represent the variants.

Table 7-1: Example of buttons in the taskbar



"Home" button
Returns to the home screen.

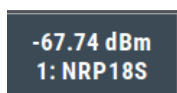


"User Menu"
Lists parameters that can be defined for quick access.

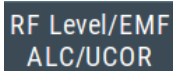


Shows the current remote access connections when the instrument is remotely controlled.

Tip: An indicator in the "System Config" tile shows the current remote control status.

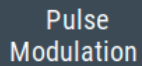


R&S NRP power sensors
Shows a connected external power sensor. The button displays the current readings when the sensor is active.


 RF Level/EMF
ALC/UCOR

Active dialogs

Indicates the dialog name of each active dialog in a separate button.


 Pulse
Modulation


 Info

"Info" key

Provides access to status and error messages.

Note: The warning symbol signifies a permanent error message.

7.3.4 Additional Display Characteristics

The following section provides a short insight on the indication of the screen in general, and significant elements that you see under specific operating modes, in dialogs or settings.

- **Appearance of active elements**

- *Active* elements like On/Off switches, state buttons have a **blue** background.
- *Selected* elements are framed or highlighted **orange**.
- *Inactive* elements are **gray**.

- **On-Screen keypads**

As additional means of interacting with the instrument without having to connect an external keyboard, either a numerical or alphanumerical on-screen keypad appears when you activate an entry field (see [Chapter 7.5, "Entering Data"](#), on page 53).

- **Info line**

The "Info line" shows brief status information and error messages. It appears when an event generates a message.

- **Key parameters indicated in tab labels**

Most dialogs are divided into tabs with logically grouped parameters. The tab label expresses the content and can also contain status indicators or the set value of a key parameter.

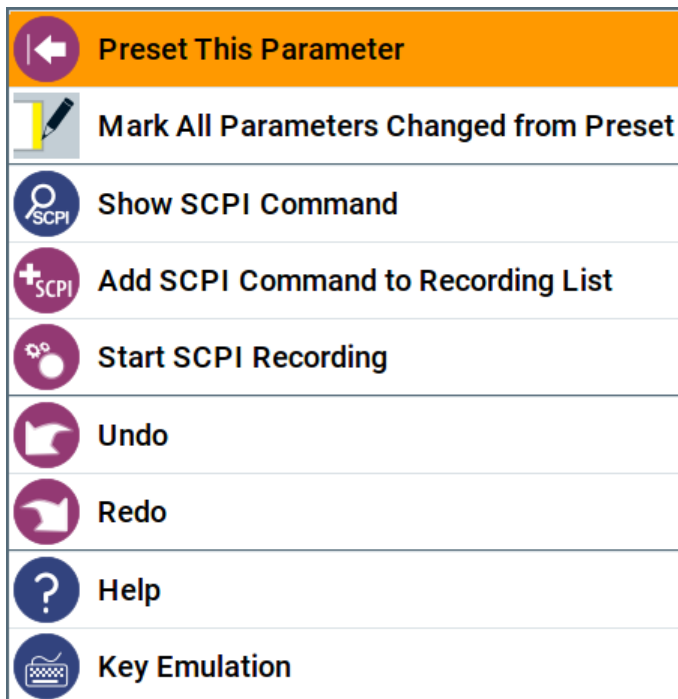
- **Scroll bar handle**

An arrow icon that appears when you touch a scroll bar helps you to scroll in a dialog or list.

If no scrollbar handle appears, you can touch and swipe an element to scroll up and down.

- **Context-sensitive menus**

Within the entire screen display, including single parameters, you can access context-sensitive menus that provide some additional functions.



7.4 Accessing the Functionality

All functionalities are provided in dialog boxes as known from computer programs. You can control the instrument intuitively with the touchscreen. This section provides an overview of the accessing methods.

The instrument's functions and settings can be accessed by selecting one of the following elements:

- System and function keys on the front panel of the instrument
- Taskbar/softkeys on the touchscreen
- Context-sensitive menus for specific elements on the touchscreen
- Elements on the status bar in the touchscreen
- Displayed setting on the touchscreen, that means block diagram and all settings available in dialogs.

To open a dialog box

- ▶ Perform one of the following actions:

- Tap the required tile, and then the menu entry.
- Tap the minimized view (button) on the taskbar.

Some of the utility keys access a dedicated dialog, too.

To minimize a dialog box

1. To return to the home screen, tap the "Home" button.
2. To switch to another dialog, press the [Next Window] button.

To close a dialog box

To close a dialog box, you have the same controls as you know from computers or devices with touchscreen.

- ▶ Perform one of the following actions:
 - Tap the "Close" icon in the upper right corner.
 - Press the [Esc] key on the front panel.
 - Drag and drop a minimized dialog from the taskbar to the tile diagram.

To select an option in a dialog box

- ▶ Tap the required option.

7.5 Entering Data

Some parameters have their own key on the front panel.

For data input in dialog boxes, the instrument provides on-screen keypads for entering numeric and alphanumeric values. Thus, you can always set the parameters via the touchscreen, the front panel, or an external keyboard.

Correcting an entry

1. Using the arrow keys, move the cursor to the right of the entry you want to delete.
2. Press the [Backspace] key.
3. Deletes the entry to the left of the cursor.
4. Enter your correction.

Completing the entry

- ▶ Press the [Enter] key or the rotary knob.

Aborting the entry

- ▶ Press the [Esc] key.
The dialog box closes without changing the settings.

7.5.1 Entering Numeric Parameters

To enter values with the on-screen keypad

For numeric settings, the instrument displays the numeric keypad. The units specified correspond to the units of the parameter.

1. Enter the numeric value.
2. Tap the unit button to complete the entry.
The unit is added to the entry.
3. If the parameter does not require a unit, confirm the entered value by pressing "Enter".

To enter values by using the front panel controls

1. Change the currently used parameter value by using the rotary knob or the [Up/Down] keys.
2. If the parameter does not require a unit, confirm the entered value by pressing the [Enter] key or any of the unit keys.
The instrument highlights the editing line to confirm the entry.

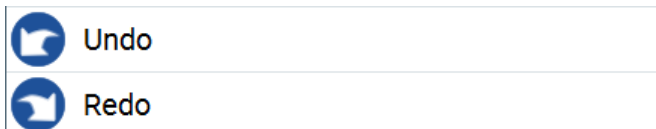
If you edit numeric data in tables, the entry field must be in edit mode: Press [Enter], or the rotary knob to activate the edit mode.

7.5.2 Entering Alphanumeric Parameters

If a field requires alphanumeric input, you can use the on-screen keyboard to enter letters and (special) characters.

7.5.3 Undo and Redo Actions

Accessed via the context-sensitive menus, "Undo" allows you to restore one or more actions on the instrument. Depending on the available memory, the "Undo" steps can restore all actions.



"Redo" restores a previously undone action.

7.6 Getting Information and Help

In some dialog boxes, graphics are included to explain the way a setting works.

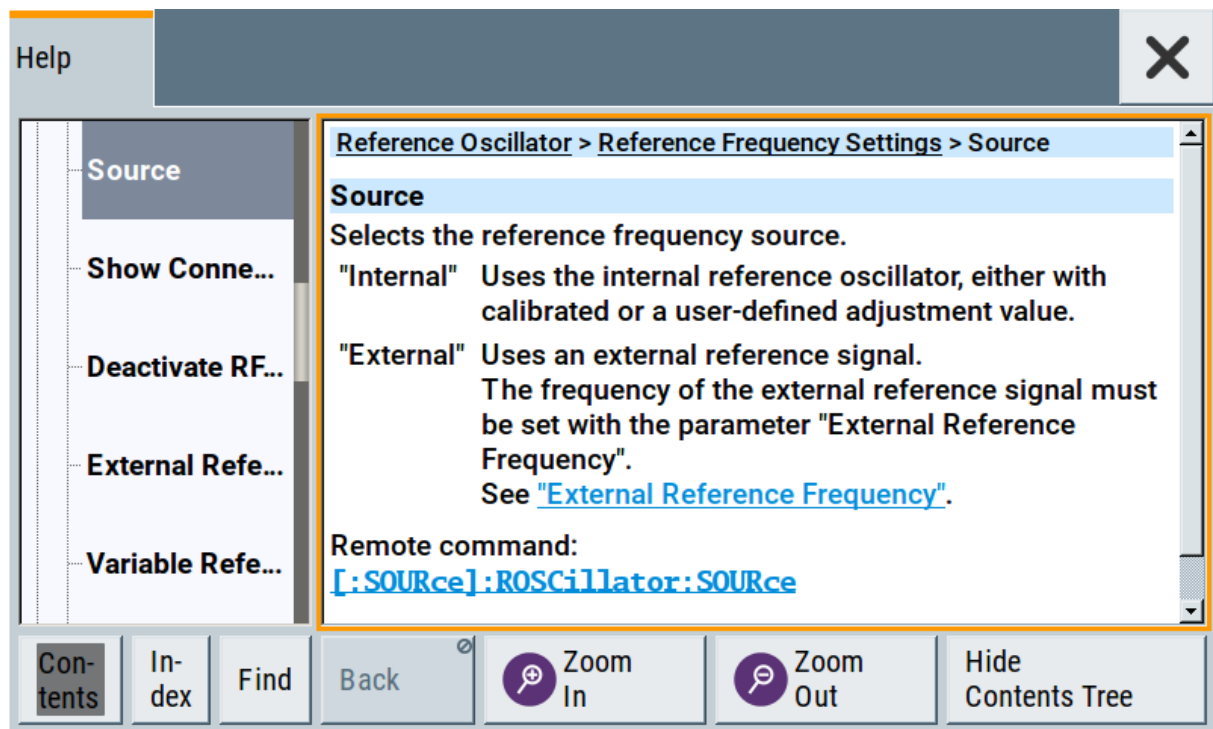
For further information, you can use the following sources:

- Tooltips give the value range of the parameter.
- The context help provides functional description on a setting.
- The general help explains a dialog box, provides instructions, and general information.

To display context help

- ▶ To access a help topic, perform one of the following:
 - a) Tap and hold the parameter for which you need information and tap "Help" in the context menu.
 - b) Tap the parameter and press the [Help] key.

The "Help" dialog opens. You can browse the help for further information.



Contents of the help dialog box

The help dialog box covers two main areas:

- "Contents" - contains a table of help contents
- "Topic" - contains a specific help topic

The help system also provides an "Index" and a "Find" area, and "Zoom" functions that are accessed via the corresponding buttons.

To open general help

- ▶ Press the yellow [Help] key on the front panel.

If a dialog box is opened, the help topic for the current tab is shown. Otherwise the "Contents" page appears.

Navigating in the table of contents and in the help topics

1. To move through the displayed contents entries, tap on an entry and scroll or use a connected mouse or the [Up/Down] keys. Entries with a plus sign contain further entries.
2. To display a help topic, tap on the topic name or double click on the topic name or press the [Enter] key.

3. To follow a cross-reference, tap on the link text.
4. To return to the previous page, select "Back".
This function scrolls back all steps you have performed before.
5. Use the "scroll bars" to shift the visible section of content shown.
6. To maximize the "Topics" area, tap the "Hide Contents Tree" button to hide the contents tree.

Using the index

1. Select the "Index" button.
2. Enter the first characters of the topic you are interested in.
The entries starting with these characters are displayed.
3. Tap on the index entry.
The corresponding help topic is displayed.

7.7 Remote Control

In addition to working with the R&S SMA100B interactively, located directly at the instrument, it is also possible to operate and control it from a remote PC.

The R&S SMA100B supports various methods for remote control:

- Connecting the instrument to a (LAN) network (see [Chapter 4.3, "Setting Up a Network \(LAN\) Connection"](#), on page 20)
- Using the LXI browser interface in a LAN network
- Connecting a PC via the IEC-bus (IEEE 488) interface
- Remote control via the USB interface



For remote control over LAN or USB, you can use the R&S VISA (Virtual Instrument Software Architecture) library provided for download at the Rohde & Schwarz website <http://www.rohde-schwarz.com/rsvisa>.

How to configure the remote control interfaces is described in the user manual, chapter "Network and Remote Control Operation".

7.8 Remote Operation over VNC

The VNC is an application which can be used to access and control the instrument from a remote computer through a LAN connection. While the instrument is in operation, the instrument screen contents are displayed on the remote computer, and VNC provides access to all applications, files, and network resources of the instrument. Thus, remote operation of the instrument is possible.



Instrument control from a remote computer

To access the basic utility functions of the R&S SMA100B, perform a right mouse click on the block diagram and select "Key Emulation".

A key panel to the right of the block diagram gives access to the utility functions provided by the front panel keys.

The VNC is an add-on program, included in operating system Linux/Unix, and available as a free-of-charge download on the internet.

For more information, refer to the R&S SMA100B user manual, chapter "How to Set Up Remote Operation via VNC".

Index

- A**
- AC supply 17
 - Active elements 51
 - Alphanumeric parameters 54
 - Application cards 11
 - Application notes 11
 - Auto-negotiation
 - see Autonegotiation 22
 - Autonegotiation
 - Failure 22
- B**
- Brochures 10
- C**
- Clk Syn connector 32, 35
 - Connector
 - AC power supply 36
 - Clk Syn N 32, 35
 - EFC 35
 - Ext 32, 36
 - GPIB 34
 - IEC/IEEE 34
 - Inst Trig 35
 - LAN 34
 - LF 32, 36
 - Marker User1 35
 - Pulse Ext 31, 35
 - Pulse Sync 31, 35
 - Pulse Video 31, 35
 - Ref In 35
 - Ref Out 35
 - RF 30, 36
 - Sensor 29
 - Signal Valid 35
 - Stop 34
 - USB 29, 34
 - USB In 34
 - V/GHz X-Axis 34
 - Z-Axis 34
 - Context-sensitive menu 51
- D**
- Data entry 53
 - Data sheets 10
 - Dialog boxes 52
- Display**
- Active elements 51
 - Context-sensitive menu 51
 - Info line 51
 - Information 48
 - On-screen keypad 51
 - Overview 24
 - Status bar 49
 - Tab labels 51
 - Taskbar 50
 - Tile diagram 49
- Documentation overview 9
- E**
- Electrostatic discharge 13
 - EMI suppression 13
 - Emulating front panel keys 58
 - ESD 13
- F**
- Failure
 - Network connection 22
 - Front panel tour 23
 - Function check 19
 - Function keys
 - Details - see user manual 26
 - Overview 26
- G**
- Getting started 9
- H**
- Help 9, 55
- I**
- Info line 51
 - Input connector 31, 32, 35, 36
 - Input connectors
 - Stop 34
 - Instrument control 47
 - Instrument help 9
 - Instrument security procedures 10
 - Instrument tour 23

K

Key

★ (User)	29
Access on a remote computer	58
Arrow	28
Backspace	27
Down	28
Emulation	58
Enter	27
Esc	27
Freq	26
Help	26
Home	29
Left	28
Level	26
Local	26
Mod on/off	26
Next window	29
On/Off	29
On/Standby	26
Preset	26
Resize window	29
RF on/off	26
Right	28
Setup	26
Up	28

Keyboard

On-screen	53
Usage	48

Keypad

On-screen	53
Overview	27

L

LAN configuration	20
-------------------------	----

LAN connection

Not working	22
-------------------	----

Loading

Trying out	44
------------------	----

M

Manual interaction	48
--------------------------	----

Marker User1	35
--------------------	----

Mounting

Rack	16
------------	----

Mouse

Usage	48
-------------	----

N

Navigation

Keys	28
Navigation controls	
Overview	27
Network connection	
Error	22
Numeric data entry	53
Numeric parameters	54

O

On-screen keyboard	54
On-screen keypad	51
Open source acknowledgment (OSA)	10
Operation	
Manual	48
Output connector	31, 35
Output connectors	
Clk Syn	32, 35
Marker User1	35
Pulse Sync	31, 35
RF	30, 36
Stop	34
V/GHz X-Axis	34
Z-Axis	34

P

Parameters

Entering	54
Power On	26
Power supply	
Connector	36
Power switch	17
Pulse Sync connector	31, 35

R

Rack

Mounting	16
Rack installation	36
Ready state	18
Release notes	10
Remote access	
see Remote operation from a computer	
.....	47
Remote connection	
Not working	22
Remote control	57
Remote operation	58
RF connector	30, 36

Rotary knob	27	U	
S		User manual	9
Safety instructions	10	Utility keys	
Saving	43	Details - see user manual	26
SD card slot	29	Overview	26
Service manual	9	V	
Shutting down	18	V/GHz X-Axis connector	34
Softkey bar		VNC	
see Taskbar	50	Using in a LAN	58
Standby	18, 26	W	
Starting	18	White papers	11
Status bar		Z	
Display	49	Z-Axis connector	34
Stop connector	34		
T			
Tab labels	51		
Text entry	53		
Tile diagram			
Display	49		
Tooltips			
Show	55		
Touchscreen	24		
Compared with mouse	48		
Usage	48		
Turn on	17		



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