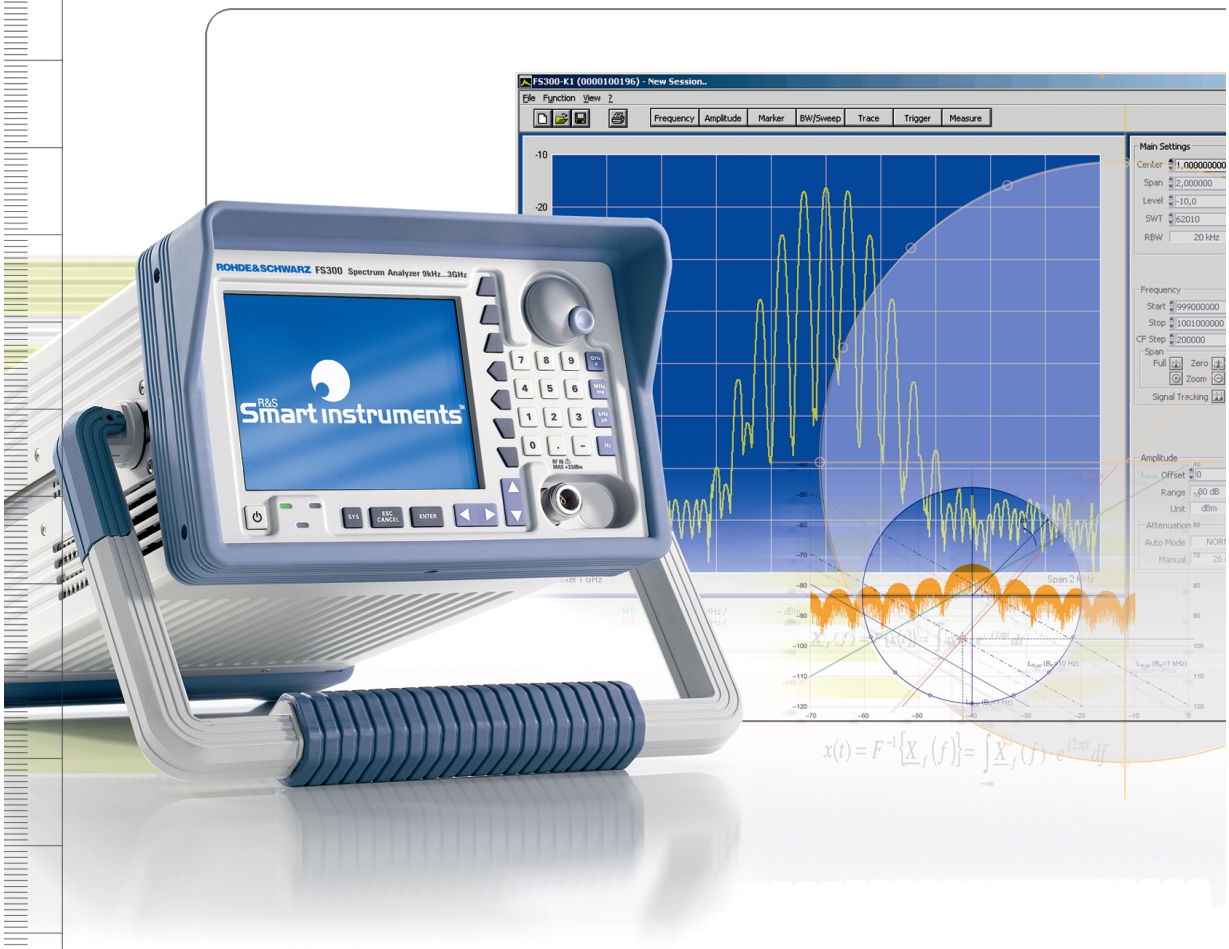

Bedienhandbuch/Operating Manual

PC-Software für Spektrum Analysator R&S FS300/ PC Software for Spectrum Analyzer R&S FS300

Bestell-Nr./Order No. 1147.1017.02

CE

Licence Agreement

Rohde & Schwarz grants you the right to install the R&S FS300-K1 software package on one or more PCs of your choice. The licence included in the software package is tied to the serial number of the Spectrum Analyzer R&S FS300 selected by you and enables you to use R&S FS300-K1 for remote-controlling this instrument when connected to the PC. You must obtain a separate licence for each additional Spectrum Analyzer R&S FS300 you wish to remote-control by means of R&S FS300-K1.

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Mühldorfstraße 15
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1st edition 8/2003
Printed in Germany.
Printed on FFC bleached paper.

Chapter Overview

Content of Manual

Operating Manual for R&S FS300

Contents

The operating manual for R&S FS300 provides information about:

- Technical characteristics of the instrument
- Safety instructions
- Support center address
- Control elements
- Putting into operation
- Basic operating procedures
- Instrument functions
- Instrument interfaces

By way of an introduction, a typical R&S FS300 measurement is described.

The operating manual also contains information about maintenance and troubleshooting based on the warnings and error messages issued by the instrument.

Operating Manual for R&S FS300-K1

Contents

This operating manual contains information about:

- Installation and configuration of the PC software
- Installation of the remote control
- Basic operation steps and elements
- Operation via menus and toolbars

By way of an introduction, a typical R&S FS300 measurement is described.

The information in operating manual R&S FS300-K1 is almost similar to that of the R&S FS300 manual. Both manuals are structured in a similar manner to facilitate specific information searches.

Note

For the purposes of this manual, it is assumed that the user is familiar with a PC and especially with the Windows™ operating system. Therefore this operating manual does not elaborate on any Windows™-typical operating instructions.

Table of Contents

1 Introduction

1.1 Applications of PC Software R&S FS300-K1

Performance features

The PC Software R&S FS300-K1 allows convenient operation of the R&S FS300 by remote control via a PC. All the functions of the spectrum analyzer are supported. In addition, you can create test reports on your PC. Highlights of the software features are:

- Fast and simple transfer of measurements between the R&S FS300 and the PC
- Permanent analysis of ongoing sweeps to the PC with evaluation capabilities (Marker, Zoom, etc.)
- Practically unlimited memory capacity for storing traces and measurement information (comparison of current and previous information)
- Extended range of functions (Limit Lines, Log File)
- Export of trace values (700 points) in .txt format for import into Microsoft Excel™
- Export of displayed data (screenshots) in JPEG format
- Printing the working window by standard Windows™ printer

Remote control using the keyboard and the mouse

All functions and measuring parameters can be set with the keyboard and the mouse using menus, toolbars or short keys.

Large display on the PC monitor

The current trace as well as parameters and status fields required for measuring result analysis are displayed clearly arranged on the monitor.

1.2 Supplied Accessories

Contents

1 USB cable

1 manual German/English

1 CD (contents: manual German/English,
PC software R&S FS300-K1,
Acrobat Reader™)

2 Installation and Configuration

System requirements The PC software runs on Windows™ 2000 and XP operating systems.

2.1 Installing the PC Software

Note To install the PC software, you must have administrator rights on your PC. (↗ Windows™ help).

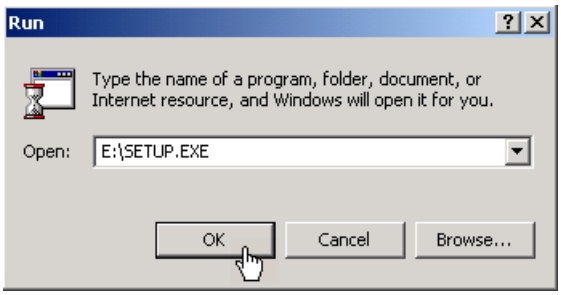
Introduction The PC software is installed in two steps. First the remote control program for the R&S FS300 is installed. The R&S FS300 should not be connected at this stage. Secondly the drivers are installed and the instruments has to be connected at this time.

2.1.1 Installing the Program

Note The <Back> button enables the user to go back one step during installation. Installation can be interrupted by pressing <Cancel>.

Installation steps

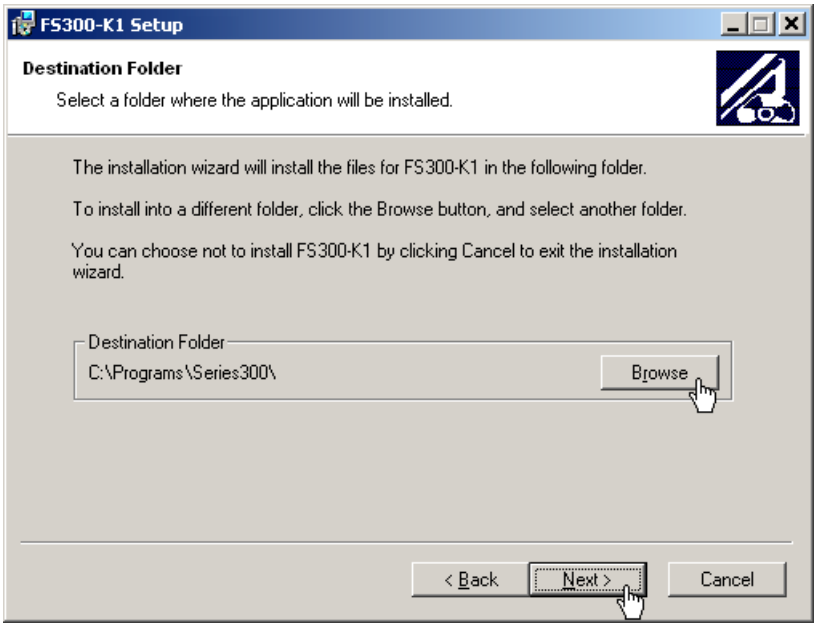
1. Place the CD ROM, which came with the product, in your installation drive. The autorun function automatically initiates installation. Alternatively you may also initiate the installation in the start menu of Windows™ **Start\Run** using the **Setup.exe** from the CD.



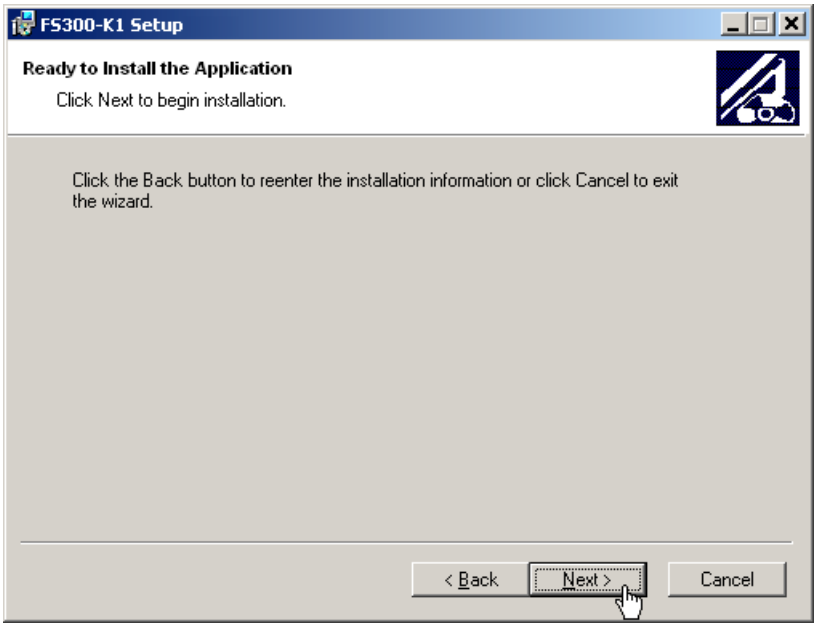
The installation is prepared and the installation wizard appears.

2. Click **<Next>** to continue the installation.

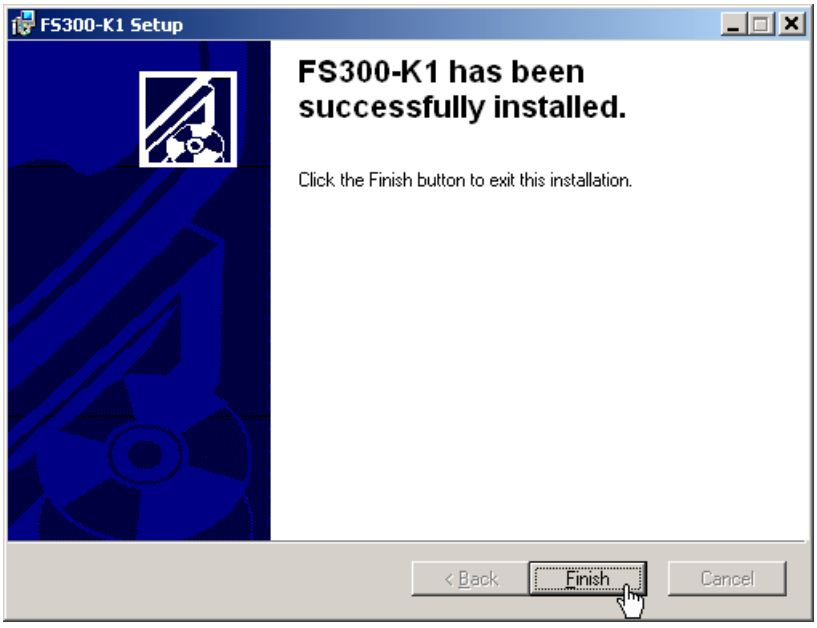
3. Click **<Browse>** to assign a new directory if you wish to install the program in another directory than proposed. Click **<Next>** to continue the installation.



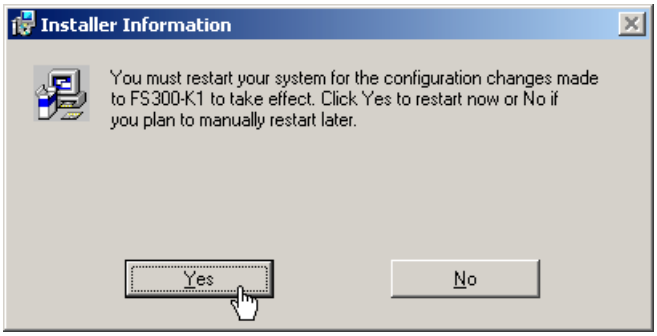
4. Click **<Next>** to continue the installation. Installation begins and the data are transferred to the PC.Please wait a moment.



5. Click **<Finish>** to successfully complete the installation.



6. Click **<Yes>** to restart the computer.



All new settings are now effective and the following appears in the Windows™ **Start\Programs\Rohde&Schwarz\Series300** start-up menu:

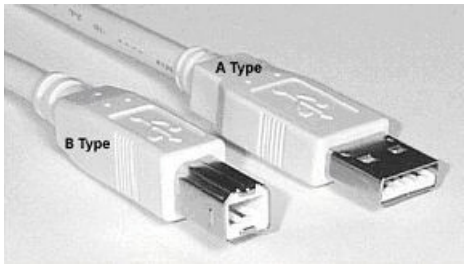
7. Install the device driver now (↗ next section).

2.1.2 Installing the Device Drivers

2.1.2.1 Installing Steps for Windows™ 2000

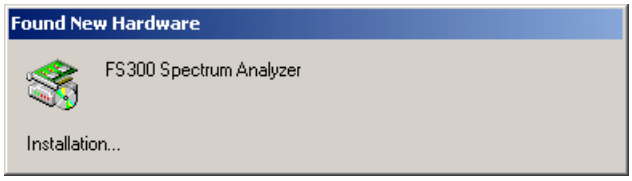
Connecting R&S FS300 to the PC

R&S FS300 is connected to the PC via the USB interface. The connection cable has two plug types. Plug A is connected to the computer (↗ computer manual) and plug B is connected to the R&S FS300 (↗ R&S FS300 manual, Ch. 2.2 Rear View).



The CD ROM must be in the installation drive in order to install the driver.

1. Switch on the R&S FS300 and the PC.
2. Connect the instrument to the PC with the USB cable. The PC (Windows™) recognizes the connected instrument and reports new hardware. This message appears only when an R&S FS300 is installed for the first time.

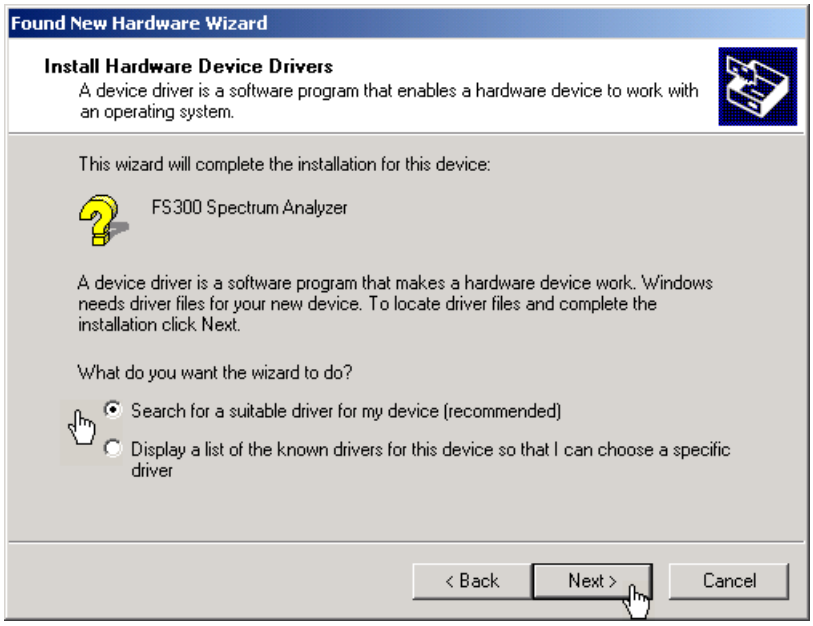


If the R&S FS300 is not automatically recognized, check that the USB master switch of the R&S FS300 is at **AUTO** (↗ R&S FS300 manual, Ch. 6.3.4.3 Configuring the Instrument Interfaces).

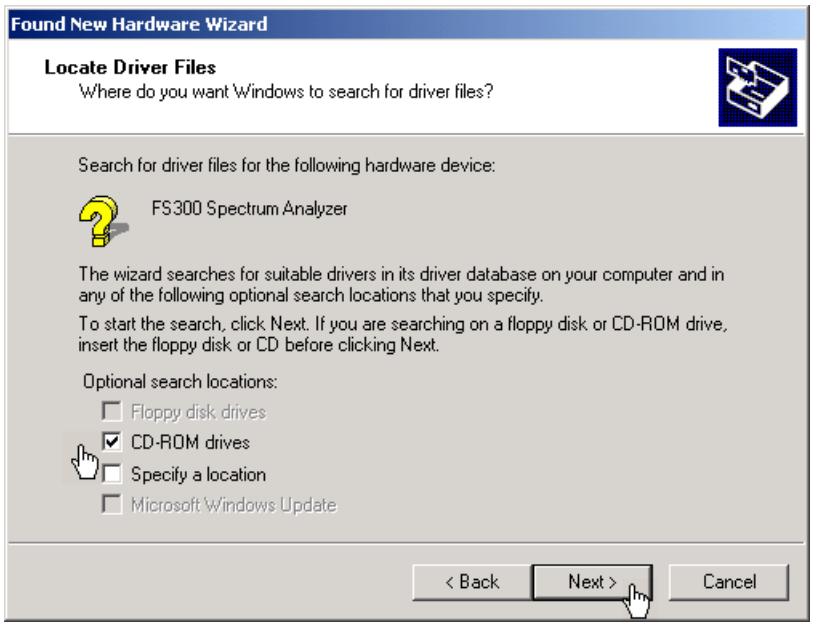
Installing device drivers

3. Click **<Next>** to continue the installation.

4. Select **Search for a suitable driver for my device** and click **<Next>** to continue the installation.

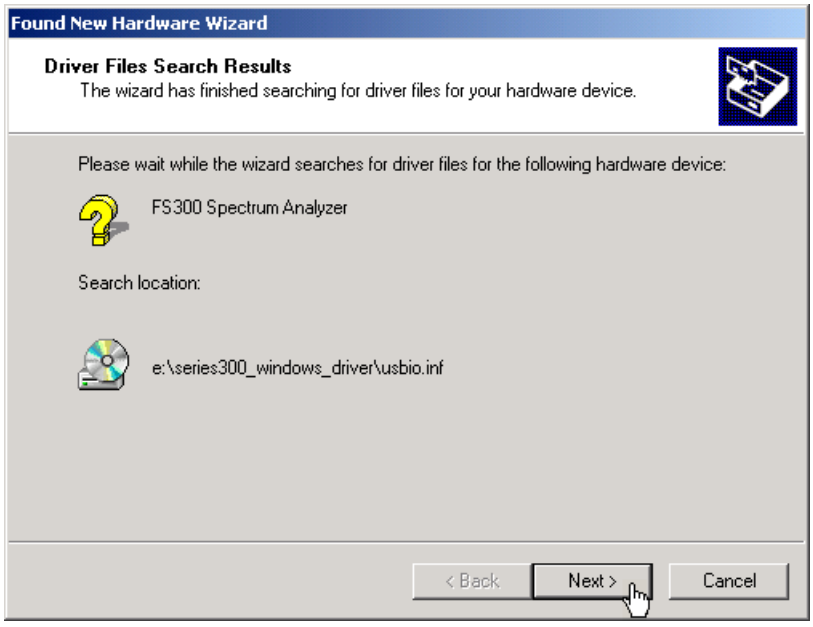


5. Select **CD-ROM drives** and click **<Next>** to continue the installation.



Then the search results for the driver data are displayed.

6. Click **<Next>** to continue the installation.

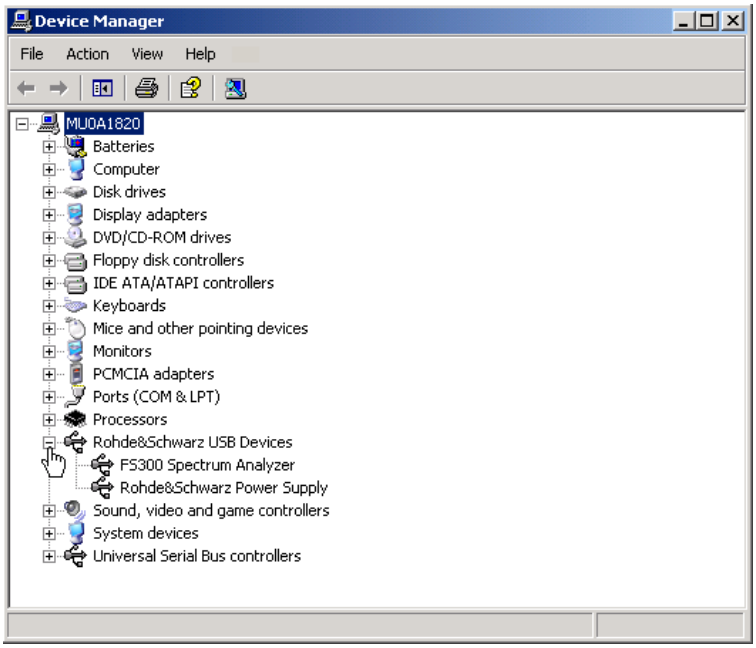


7. Click **<Finish>** to complete the installation.

This is followed by the installation of the device driver for the **Rohde & Schwarz Power Supply**. Windows generally "remembers" all the necessary information when installing the Spectrum Analyzer R&S FS300 and installs the Rohde & Schwarz Power Supply without a query. However, depending on the system, the installation assistant might be activated.

In this case, repeat instructions 3. to 7. to successfully complete the installation.

The drivers are now correctly installed and this can be checked using the device manager.

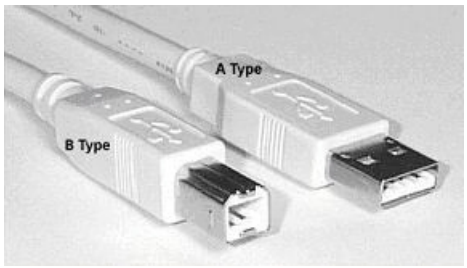


8. Enter now the key code for the computer software (↗ 2-20).

2.1.2.2 Installing Steps for Windows™ XP

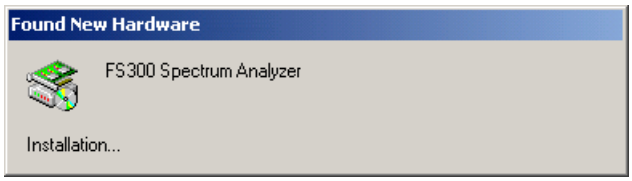
Connecting R&S FS300 to the PC

R&S FS300 is connected to the PC via the USB interface. The connection cable has two plug types. Plug A is connected to the computer (↗ computer manual) and plug B is connected to the R&S FS300 (↗ R&S FS300 manual, Ch. 2.2 Rear View).



The CD ROM must be in the installation drive in order to install the driver.

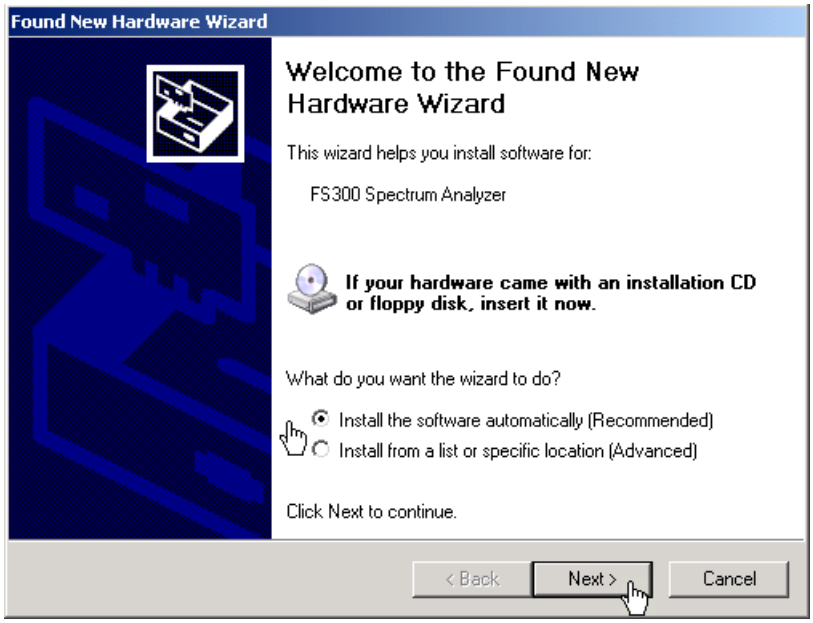
1. Switch on the R&S FS300 and the PC.
2. Connect the instrument to the PC with the USB cable. The PC (Windows™) recognizes the instrument when it is connected and reports new hardware. This message appears only when an R&S FS300 is installed for the first time.



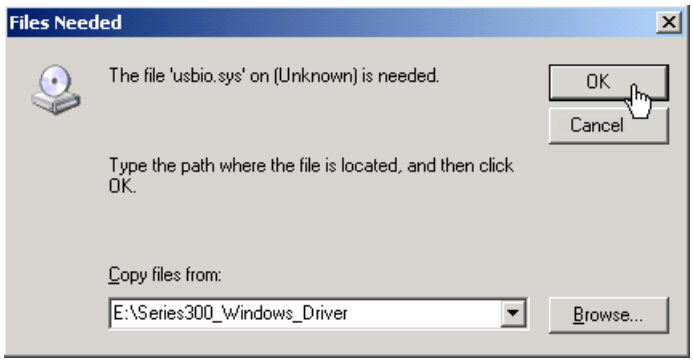
If the R&S FS300 is not automatically recognized, check that the USB master switch of the R&S FS300 is at **AUTO** (↗ R&S FS300 manual, Ch. 6.3.4.3 Configuring the Instrument Interfaces).

Installing device drivers

3. Select **Install the software automatically** and click **<Next>** to continue the installation.



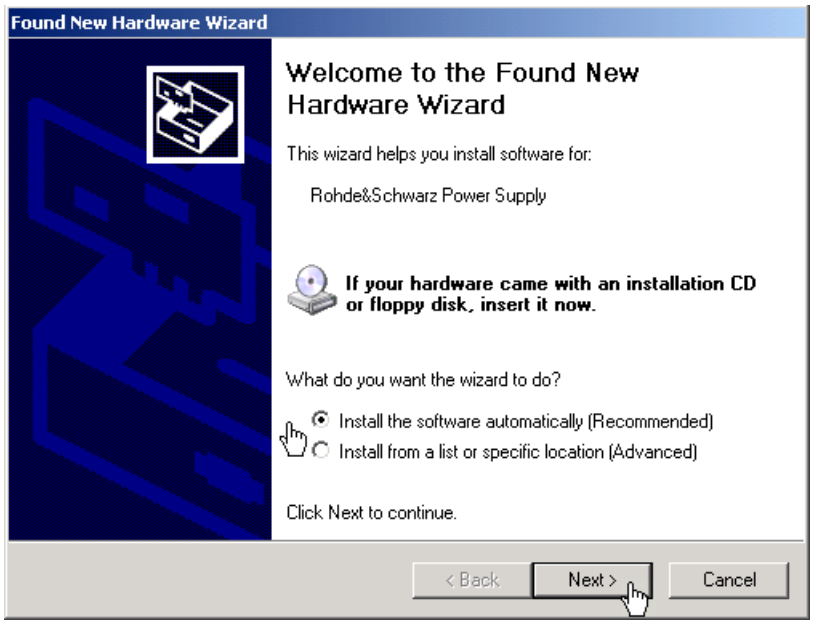
4. Click **<OK>** to continue the installation.



Then the search results for the driver data are displayed.

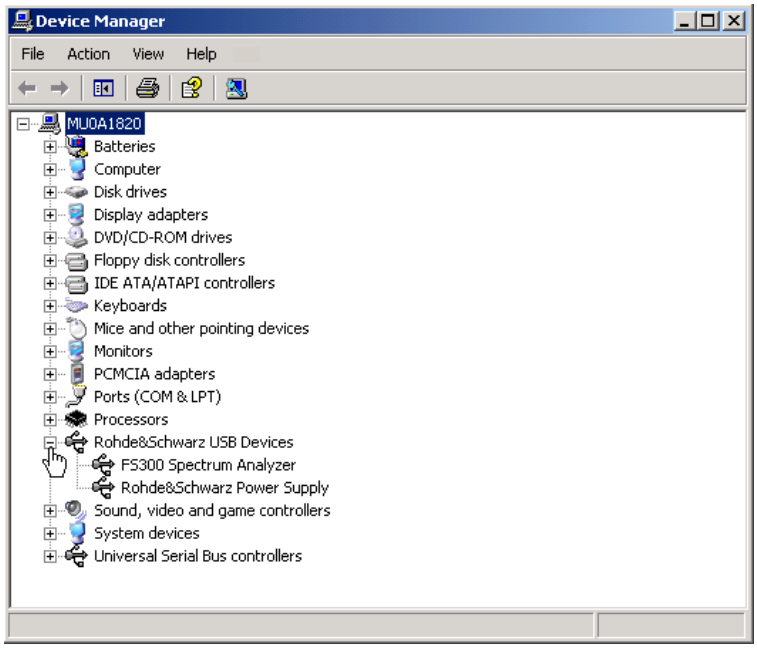
5. Click **<Finish>** to successfully complete the installation.

This is followed by the installation of the device driver for the **Rohde & Schwarz Power Supply**. Windows generally "remembers" all the necessary information when installing the Spectrum Analyzer R&S FS300 and installs the Rohde & Schwarz Power Supply without a query. However, depending on the system, the installation assistant might be activated.



In this case, repeat instructions 3. to 5. to successfully complete the installation.

The drivers are now correctly installed and this can be checked using the device manager.



6. Enter now the key code for the computer software (↗ 2-20).

2.2 Entering the Key Code for the PC Software

Note

Please send the following information to:
registration.smart-instruments@rsd.rohde-schwarz.com
to receive a key code for the PC software.

- Company address, email address
- Instrument specification with serial number (e.g., R&S FS300, 0000123456)
- Computer software registration number (↗ rear view of manual)

As soon as we receive this information, you will receive your key code. If it is not possible to send you the key code by email or if you have further questions please contact your R&S distributor or the nearest R&S representative. Addresses for R&S representatives can be found in the R&S FS300 manual.

Introduction

After the software has been installed, the following options are available in the Windows™ start-up menu under:
Start\Programs\Rohde&Schwarz\Series300:

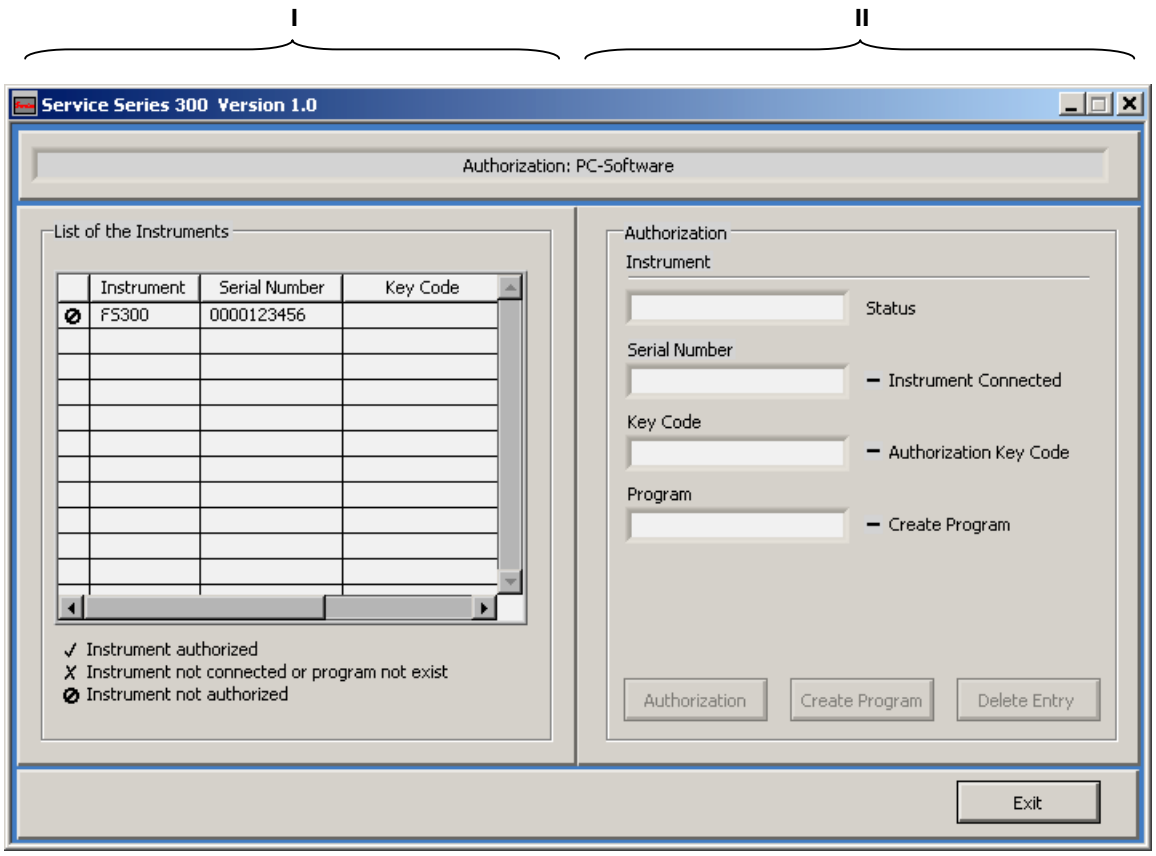
The **FS300** program is only a simulation version without instrument connection. Before you can remotely control the R&S FS300, it is neccessary enter the software key code. Use the service program **Service Series300** for this.

Starting the service program

1. In the Windows™ start-up directory select:
   Start\Programs\Rohde&Schwarz\Series300\Service Series300

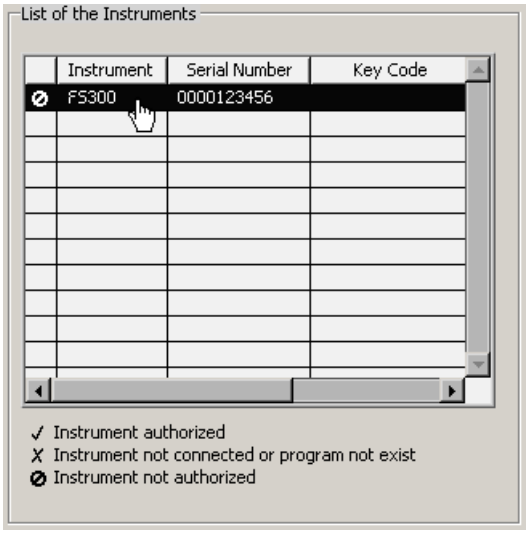
   The service program initializes. The program interface is divided into two areas:

   I A list of all previously connected Smart instruments
   II Information, status fields and command buttons for authorization



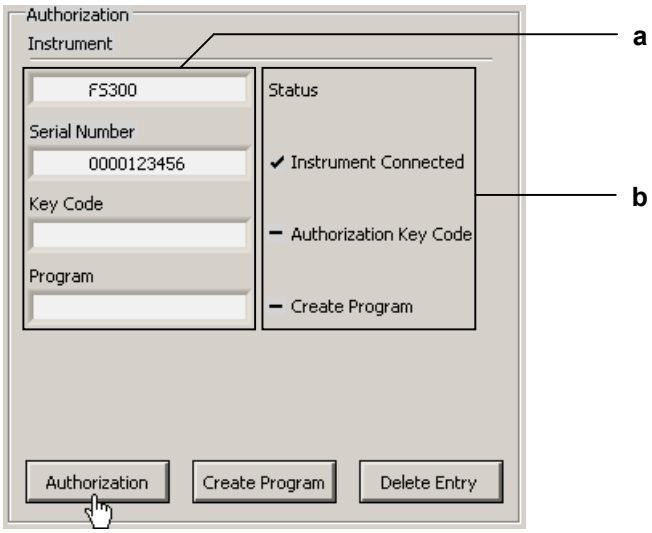
Entering the key code

2. In **I** click on the instrument for which you wish to enter the key code.

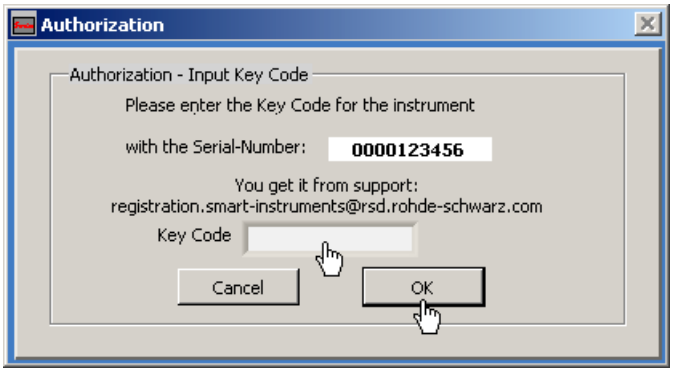


In **II** the authorization information is displayed:

(a) Current instrument information
(b) Instrument status



3. Click on **<Authorization>**. The entry field for the key code opens.

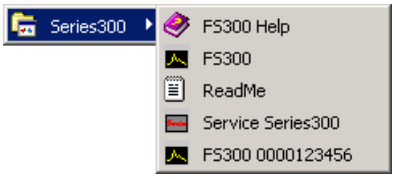


4. Enter the key code and click **<OK>**. If the key code has been entered correctly, the instrument status in **II** changes from – to ✔.

Creating the authorized program

5. Click **<Create Program>**. An authorized program is created and is displayed in **II** with the status (✔). The program number is made up of the instrument designation (**FS300**) and the serial number (**0000xxxxxx**).

6. In **II** click **<Exit>** to close the service program. After correctly entering the key code, the option **FS300 0000xxxxxx** is available in the Windows™ start-up menu **Start\Programs\Rohde&Schwarz\Series300**.



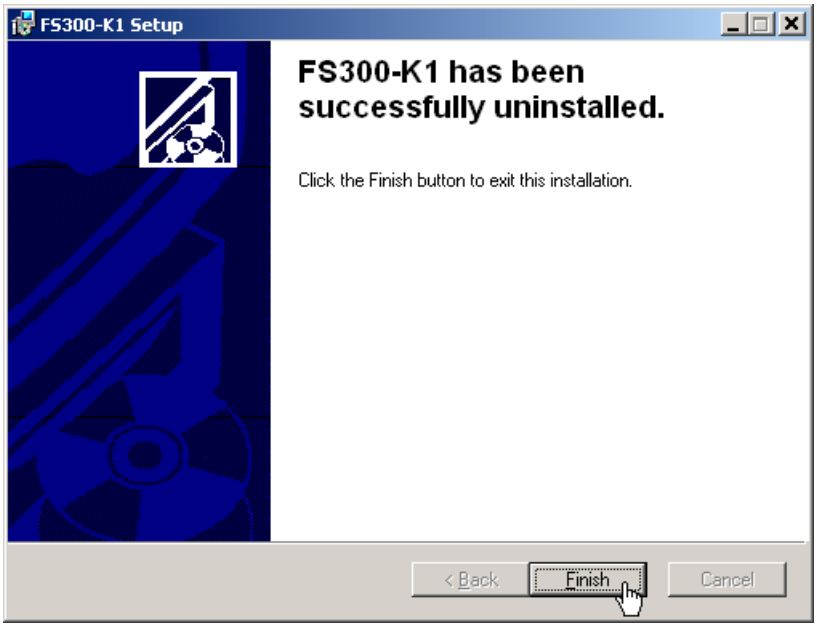
You may now start the **FS300 0000xxxxxx** program (↗ 2-23).

2.3 Uninstalling the PC Software

Installation steps for Windows™ 2000

1. Place the CD ROM, which came with the product, in the installation drive. The autorun function automatically initiates installation. Alternatively you may also initiate the installation in the start menu of Windows™ **Start\Run** using the **Setup.exe** from the CD. The uninstallation is prepared and the uninstallation assistant appears.

2. Click **<Next>** to continue the uninstallation.



3. Click **<Finish>** to complete the uninstallation.

Note The PC software can also be uninstalled using the Windows™ control panel.

3 Starting the Remote Control

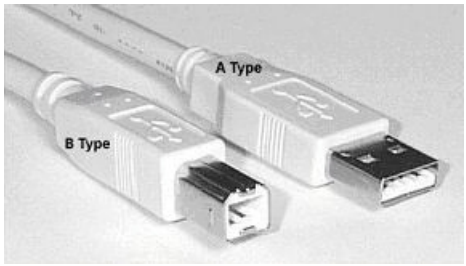
3.1 Connecting the Instrument to the PC

Note

PC software FS300-K1 must be installed before you can connect the R&S FS300 to the PC (↗ 2-9).

Introduction

R&S FS300 is connected to the PC via the USB interface. The connection cable has two plug types. Plug A is connected to the computer (↗ computer manual) and plug B is connected to the R&S FS300 (↗ R&S FS300 manual, Ch. 2.2 Rear View).



Prepare remote control

1. Switch on the R&S FS300 and the computer.

Connect instrument to PC

2. Connect the instrument to the computer with the USB cable. The computer recognizes the attached instrument and sets up a connection. The following message appears on the monitor of the R&S FS300:

If the R&S FS300 is not automatically recognized, please check that the USB master switch of the R&S FS300 is at position **AUTO** (↗ R&S FS300 manual, Ch. 6.3.4.3 Configuring the Instrument Interfaces).

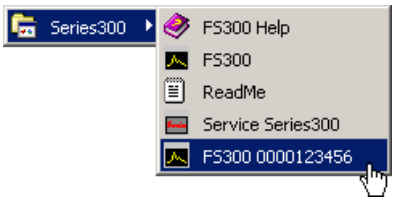
Note

In remote control mode, control of the R&S FS300 is deactivated and can only be reactivated by pressing the SYS key at the front panel of the instrument. Switching from remote to local control takes approximately 5 seconds.

3.2 Starting the Program

Starting the program

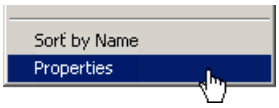
1. In the Windows™ start-up directory click on:
Start\Programs\Rohde&Schwarz\Series300\FS300 0000xxxxxx



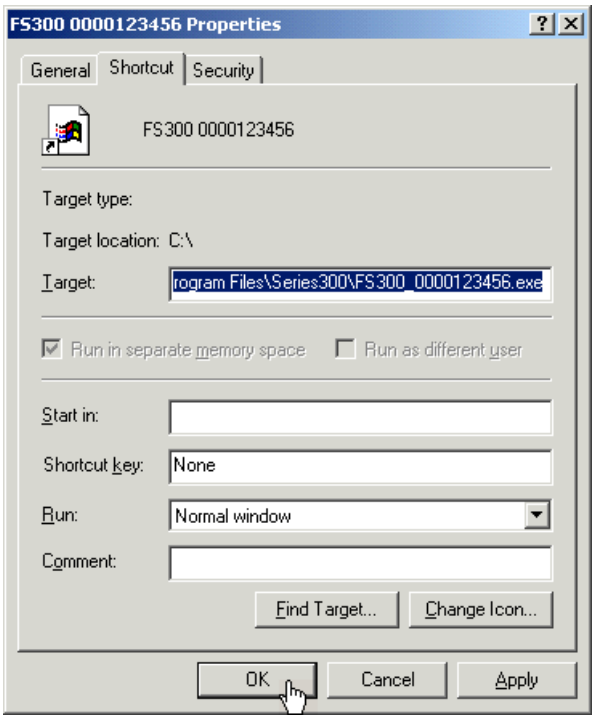
If the link is not available

2. If the program does not start, then click with the right mouse button in the Windows™ start-up directory on:
Start\Programs\Rohde&Schwarz\Series300\FS300 0000xxxxxx

Click **Properties**.



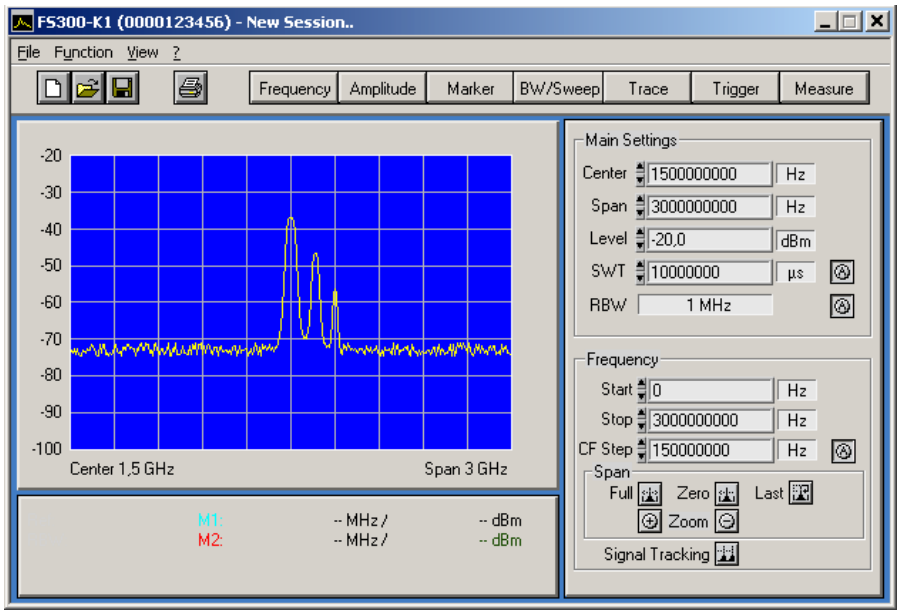
Click **<OK>** to create a link between the programm and start-up directory.



Start the program again (↗ above, instruction 1.)

Program interface

The program starts up and you may begin using the R&S FS300 remote control.



Loading the current instrument settings

A new session opens automatically when you start the program. The current R&S FS300 settings are loaded. The following settings are display and evaluation functions and are not transferred to the PC software:

- Marker functions (↗ 6-46)
- Scale of measuring diagram (Range, Unit)
- Trace functions (↗ 6-49)
- Measure functions (↗ 6-50)

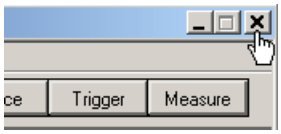
Note

If the message **Device not connected** appears on the program interface, you need to check the connection to the instrument (↗ 3-24).

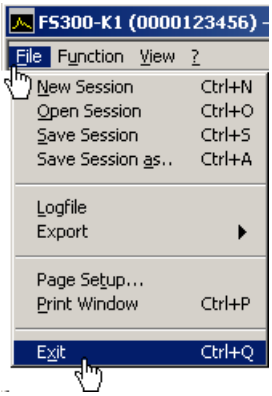
3.3 Closing the Remote Control

Closing the program

1. In Windows™ click on the close symbol **x**.



You may also select the option **Exit** in the pull-down menu **File**.



Closing the remote control

2. Remove the USB cable from one side or press the SYS key at the front panel of the R&S FS300.

Switching between remote and local control takes approximately 5 seconds.

4 Getting Started

4.1 Level and Frequency Measurement

4.1.1 Measuring Task

Caution The input stage of the R&S FS300 can be destroyed by overloads or DC components. If there is a possibility that the limits specified in the data sheet may be violated, the input must be protected with an attenuator and/or a DC block.

Measurement problem Determining the level and frequency of a signal is one of the most common measuring tasks which can be solved with a spectrum analyzer. When measuring an unknown signal the PRESET (factory) setting (↗ R&S FS300 manual, Ch. 6.1 R&S FS300 Factory Settings) is used as a start-up setting.

Solution Important functions for the level and frequency measurement are setting the center frequency (CENTER) and the frequency display span (SPAN) as well as the MARKER functions.

4.1.2 Measuring Sequence

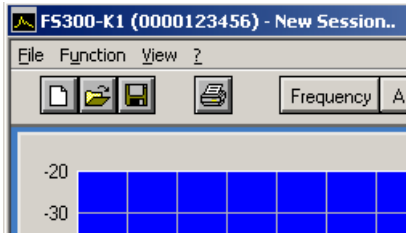
Introduction In this example, a signal with a frequency of 200 MHz and a level of –30 dBm is applied to the HF input of the R&S FS300. The center frequency and the frequency display span are set manually. Carry out the following steps:

- Reset the R&S FS300
- Apply a signal to the R&S FS300
- Set the center frequency (Center) to 200 MHz
- Reduce frequency display span (Span) to 1 MHz
- Measure the level and frequency with the marker
- Measure the frequency with the built-in frequency counter

Resetting the R&S FS300

1. Start the PC software (FS300 0000123456.EXE) on your PC.

Alternatively you may also open a new session when the PC software is already started. To do so, press **<Ctrl+N>**. The default settings are now active (↗ R&S FS300 manual, Ch. 6.1 R&S FS300 Factory Settings).

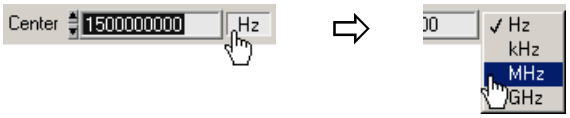


Applying a signal to the R&S FS300

2. Apply the measuring signal to the HF input socket.

Setting the center frequency (Center) to 200 MHz

3. Use the mouse to set the measuring unit **<MHz>** for the input window **Center**.

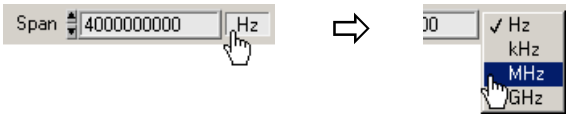


4. Press **<Ctrl+Shift+C>**. The input window **Center** is active again.

5. Enter the value **<200>** with the numeric keys. Complete the input by pressing **<Enter>**.

Reducing the frequency display span (Span) to 1 MHz

6. Use the cursor to set the measuring unit **<MHz>** for the input window **Span**.

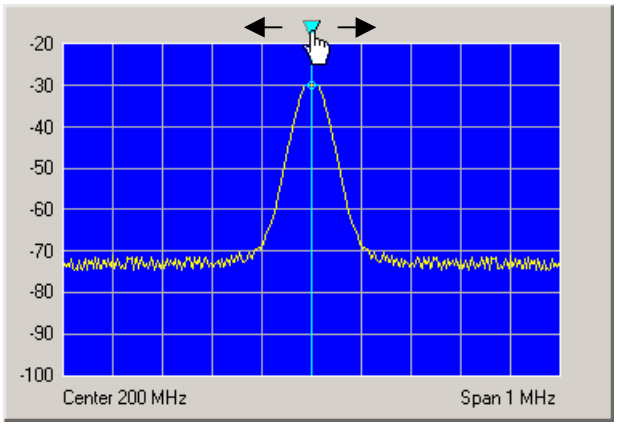


7. Press **<Ctrl+Shift+S>**. The input window **Span** is active.

8. Enter the value **<1>** with the numeric keys. Complete the input by pressing **<Enter>**.

Measuring the level and frequency with the marker

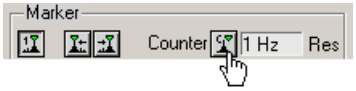
9. Press **<Ctrl+Shift+M>**. The marker jumps to the signal peak. An arrow appears above of the diagram at the position of the marker.



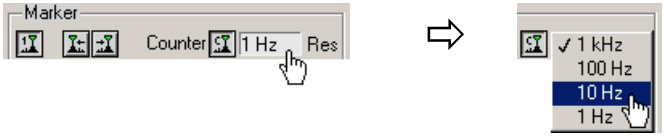
10. You can change the position of the marker by moving the arrow with the left **<Mouse Button>**. The parameter field below shows the marker values M1.

Measuring the frequency with the built-in frequency counter

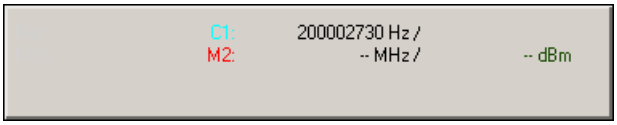
11. In the **Function** display **Marker** click on **<Counter>** with the left **<Mouse Button>**



12. Set the resolution of the frequency counter in the selection window **<Res>**.



The exact frequency value C1 can be seen in the parameter field below.



5 Control Concept

5.1 PC Monitor Display

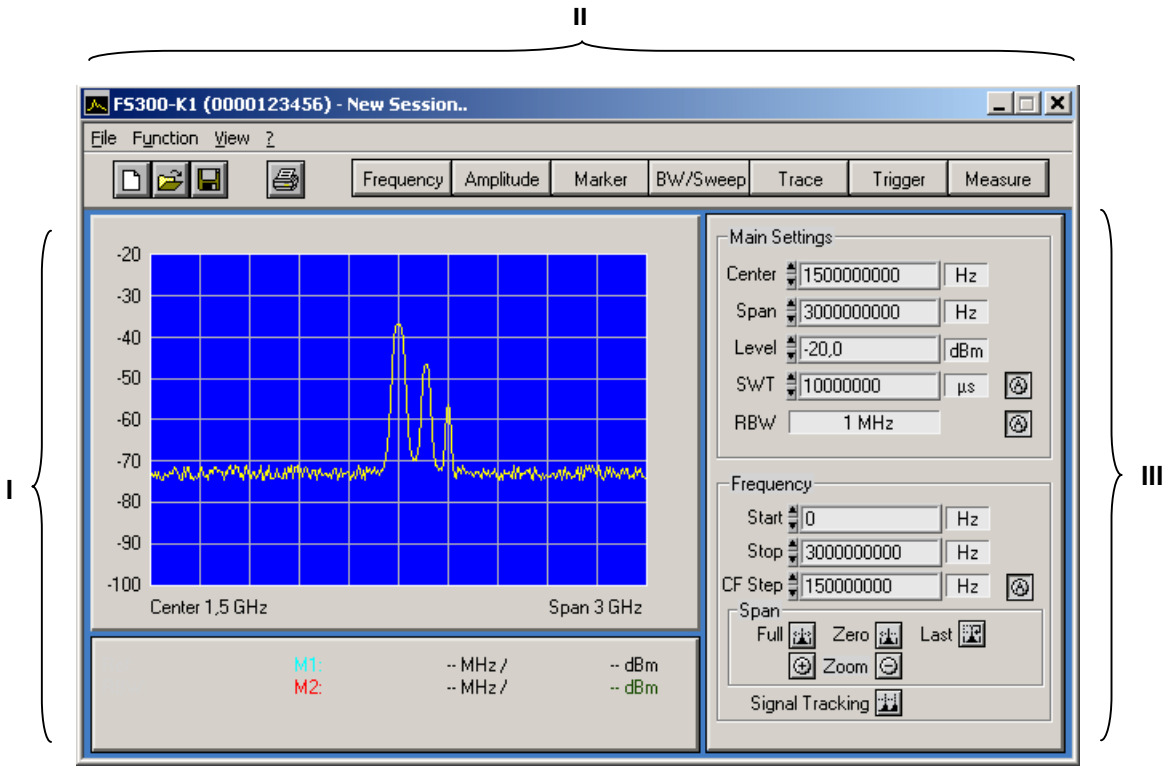
Introduction

The PC monitor provides continuous information about the results and parameters of the selected measuring functions. The display format for the measuring results and the insertion of the function displays depend on the current settings.

Structure of the program interface

The program interface is divided into three areas:

I Diagram
II Menus
III Functions

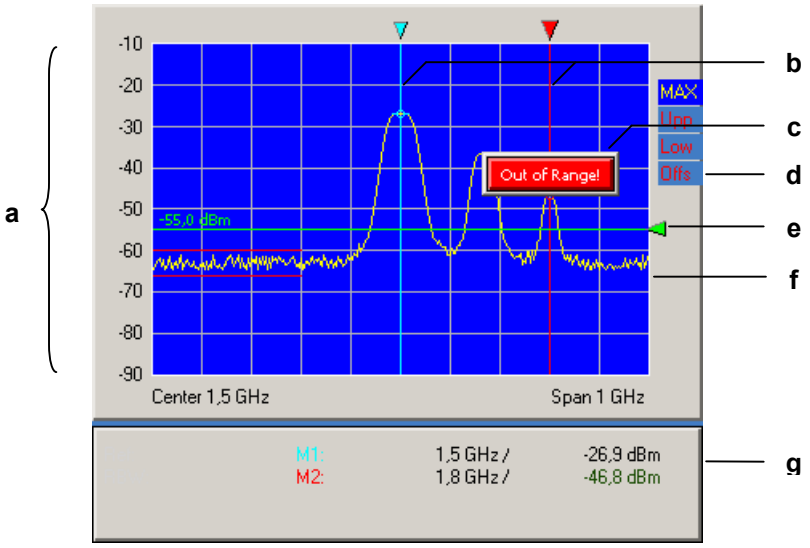


5.1.1 Diagram

Diagram displays

The diagram area contains:

- Measuring diagram with scale (**a**) and traces (**f**)
- Measuring value displays, e.g., display lines (**e**) and markers (**b**)
- Limit lines (**g**)
- Parameter field (**h**) and status displays (**c**)
- Pop-up error messages (**d**)



Measuring diagram

A 10 x 8 grid is superimposed on the diagram to facilitate traces analysis.

Parameter field and status display

The following values are displayed in the parameter field:

M1: - marker 1 with marker position and level value
M2: - marker 2 with marker position and level value

The status display provides information about:

Offs - level offset is switched on
Upp - limit line Upp is switched on
Low - limit line Low is switched on
MAX - current trace display, e.g., maximum value.

Note

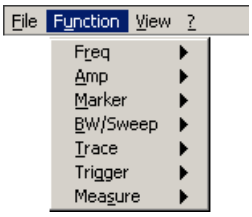
When the message **Out of Range!** appears, close it with the mouse or the Enter key.

Further system messages and warnings in illegal modes of operation are described in detail in chapter 9 of the R&S FS300 manual.

5.1.2 Menus

Calling up and displaying menus

Different pull-down menus can be accessed in the menu area.



In addition, Windows™-typical menu items can be called up via a toolbar (icons).

Menus for setting the measuring parameters and functions are also available as a toolbar and can be selected directly.

Note

The ▸ arrow after a menu option in the pull-down menu indicates that a sub-menu will appear after opening, e.g., Amp ▸.

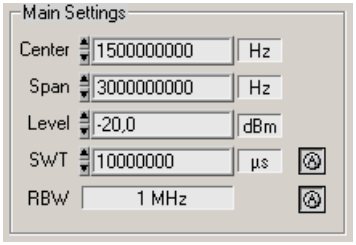
5.1.3 Functions

Main functions display

The **main functions** of the FS300 are always displayed in the top part of the function display. These are:

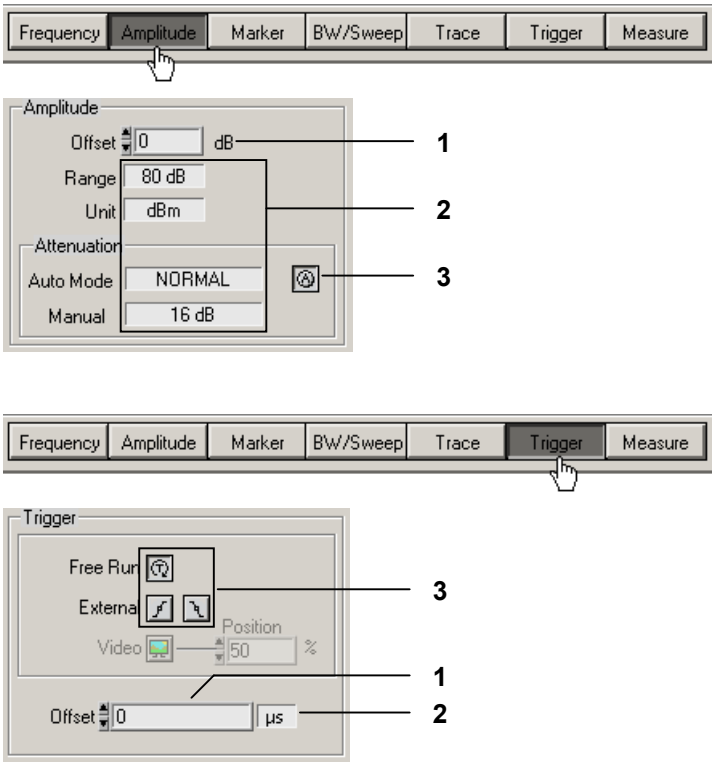
- Center frequency (Center)
- Frequency display span (Span)
- Reference level (Level)
- Sweep time (SWT)
- Resolution band width (RBW)

These may be changed at any time.



Inserting specific functions

In the lower part of the function display, different function displays with input fields (1), selection fields (2) and control buttons (3) are displayed e.g., **Amplitude** or **Trigger** etc., according to menu selection (↗ 5-39).



Note: If a selection is not highlighted, it has currently no function (current setting).

5.2 Input via Keyboard and Mouse

Introduction

The R&S FS300 is remote controlled via PC keyboard and mouse with the help of menus. The most important keys are:

- Numeric keys 0 ... 9
- Arrow keys ◄ / ► / ▼ / ▲
- Function keys F5 ... F11
- Action keys Enter, Esc
- Tab key Tab
- Space bar Space
- Mouse buttons left, right

5.2.1 Numeric Keys

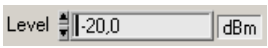
Function

The numeric keys are used to enter numerical parameters.

0 ... 9 – At cursor, insert numbers **<0>** ... **<9>**

, – At cursor, insert commas **<,>**

- – At cursor, insert minus sign **<->**



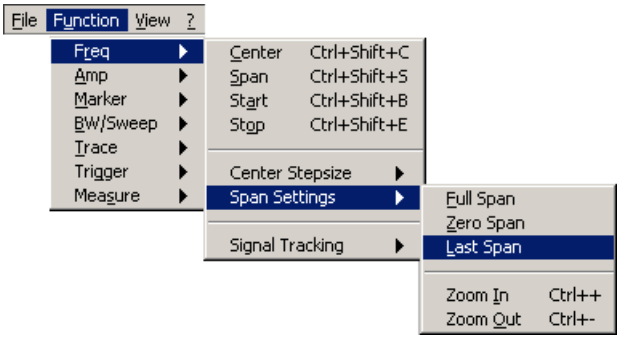
5.2.2 Arrow Keys

Function

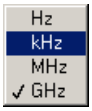
In addition to numeric keys, the arrow keys are used to enter parameters. They can also be used to navigate through the menus.

◄ / ► / ▼ / ▲ The arrow keys have the following functions:

– **Navigating the pull-down menus** with all arrow keys

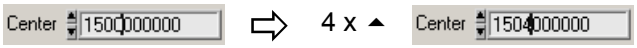


– **Navigating** the selection fields with the ▼ / ▲ arrow keys



– **Positioning** the cursor in the input fields with the ◀ / ▶ arrow keys

– **Increasing** or **decreasing** numerical parameter inputs with the ▼ / ▲ arrow keys



5.2.3 Function Keys

Function

Function keys open the menus to set the measuring parameters and measuring functions and insert the corresponding function display.

F5 – Inserts the **Frequency** function display (↗ 6-44)

F6 – Inserts the **Amplitude** function display (↗ 6-45)

F7 – Inserts the **Marker** function display (↗ 6-46)

F8 – Inserts the **BW/Sweep** function display (↗ 6-48)

F9 – Inserts the **Trace** function display (↗ 6-49)

F10 – Inserts the **Trigger** function display (↗ 6-50)

F11 – Inserts the **Measure** function display (↗ 6-50)

5.2.4 Action Keys (Enter, Esc)

Function The action keys complete the menu-operated settings.

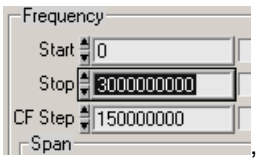
Enter key – This key **closes the input or selection**. The **new value** now applies.

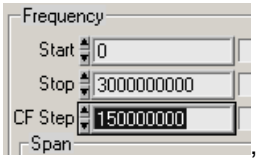
Esc key – This key **closes the selection**. The **old value** is preserved.

5.2.5 Tab Key

Function The tab key activates the input fields, the selection fields and the buttons within a function display.

Tab key – Jumps from one control element to another in a function display



,


, etc.

Note: The tab key can be only used to make selections when an input field, a selection field or a control button has been selected in the function display via a menu (↗ 5-39) or with the mouse (↗ 5-38).

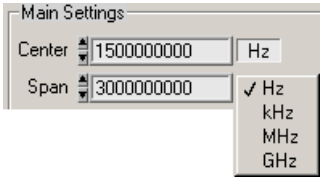
5.2.6 Space Key

Function After selecting an input field, a selection field or a control button with the tab key, different actions are initiated by pressing the space key:

Space key – Immediate function **execution** of the function e.g., Zoom +

– **Toggle** a setting, e.g., switch on/off signal tracking

– **Open** selection fields, e.g., set the measuring unit for Span



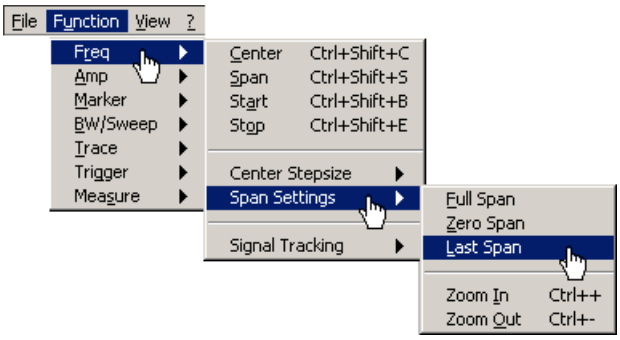
5.2.7 Mouse Buttons

Function

Placing the mouse pointer over and clicking on any program interface item will allow for different actions.

Left mouse button

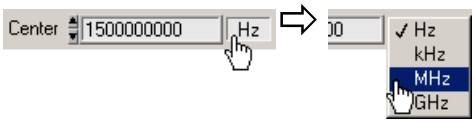
– Pull-down menus can be **opened** with the mouse



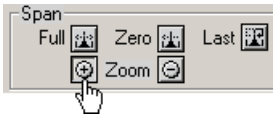
– The contents of input fields can be **highlighted** with mouse button pressed and held

– The cursor can be **positioned** in the input fields by clicking the mouse button

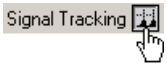
– Selection fields can be **opened** and settings can be **selected** with mouse button pressed and held



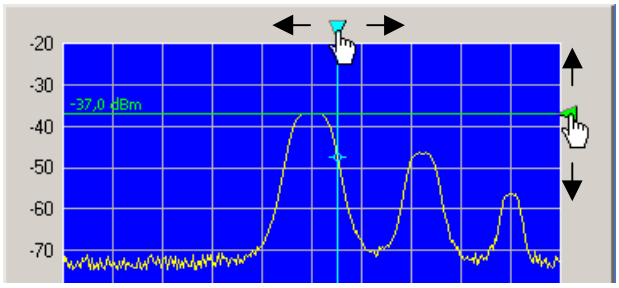
– Immediate **execution** of any function by clicking the mouse button



– **Toggling** a setting with multiple mouse clicks



– **Moving** markers and limits, also in the diagram area, with mouse button pressed and held



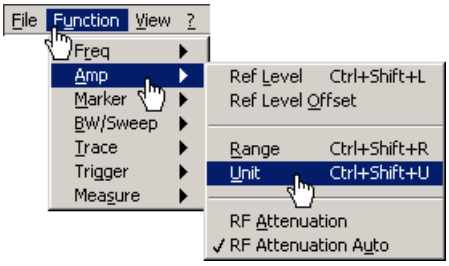
5.3 Calling up and Changing the Menus

Various methods are possible

The R&S FS300 is remote controlled via a menu. The keyboard and the mouse can be used to select a menu (↗ 5-35).

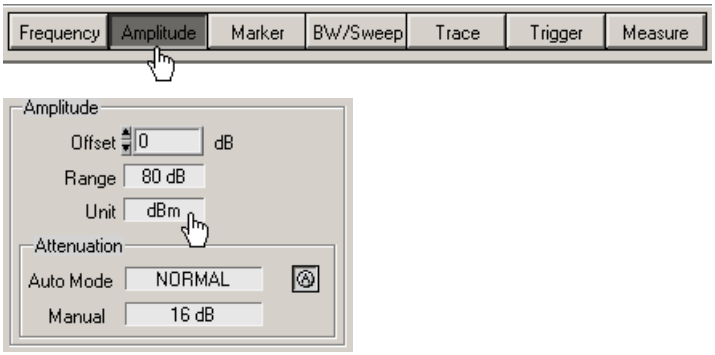
Instrument parameters (and program functions) can be selected in different ways on the PC interface, e.g., unit for the level display:

- **Selecting with the pull-down menu**



- **Selecting with short keys**

- **Selecting with the toolbar menu** and **selecting the selection field** directly in the function display



Note

The ▸ arrow after a menu option in the pull-down menu indicates that a sub-menu will appear after opening, e.g. Amp ▸.

5.4 Setting the Parameters

Introduction

Parameters can be set in different ways:

- Selecting an instrument function directly (command button)
- Selecting settings in the selection fields
- Inputting numerical parameters in the input fields
- Moving markers

The keyboard and mouse can be used for the settings (↗ 5-35).

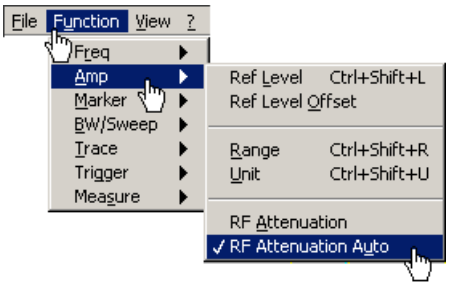
5.4.1 Direct Selection of a Instrument Function

Various methods are possible

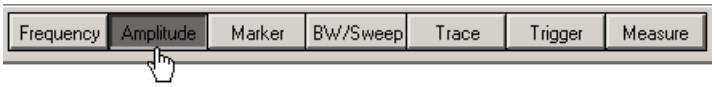
Some instrument functions are executed immediately after selection, e.g., automatic setting of the HF input attenuator.

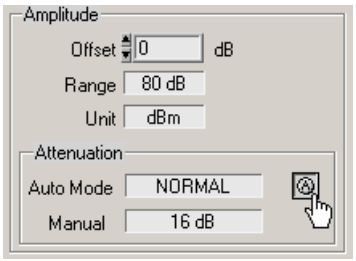
Instrument parameters (control buttons) can be selected in different ways:

- **Selecting and switching on using a pull-down menu**. The current setting is indicated by a tick mark (✔).



- **Selecting using a toolbar menu** and **switching on in the function display**



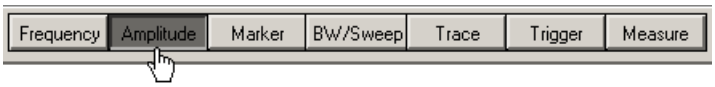


5.4.2 Selecting the Settings

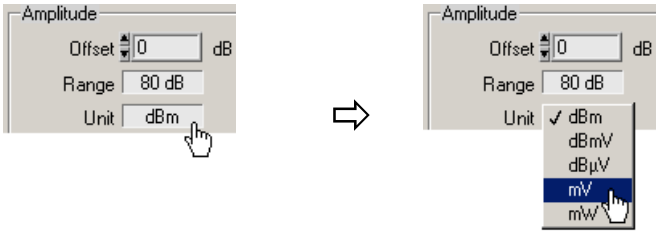
Setting the instrument functions in selection windows

Several settings are available for certain instrument functions, e.g., level display unit.

The selection window can be **reached** in a number of different ways (↗ 5-39), e.g., selection using the toolbar menu.



Opening the selection window and **selecting the instrument functions** takes place in the **function** display. The current setting is indicated by a tick mark (✔).



5.4.3 Inputting the Numerical Parameters

Setting instrument functions in the input window

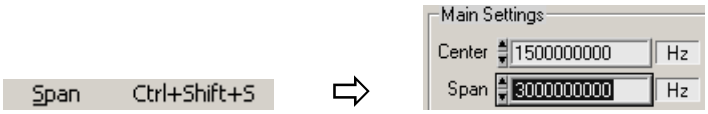
Two methods are available for entering the numerical parameters, e.g., inputting the frequency display range:

- **Inputting** a value with **numeric keys**
- **Inputting** a value with **arrow keys**

You should use the arrow keys for inputting if the value to be measured cannot be determined accurately beforehand. Given that the screen is constantly updated while the values are changing, browsing is possible.

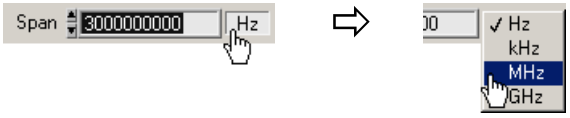
Selecting input window

The input fields can be selected in a number of different ways (↗ 5-39), e.g., using short keys:



Selecting the unit

Inputting takes place in the active measuring unit. This is displayed behind the input field in the selection field and can be changed:



The selection field has to be selected again, e.g., using short keys:

Inputting with numeric keys

Inputting using the numeric keys can be done in a number of different ways:

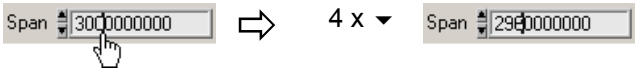
- Highlighting and **overwriting numbers**

- Selecting a decimal point and **inserting numbers**

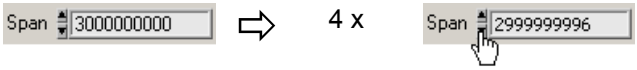
Inputting with arrow keys

Inputting using the arrow keys can be done in a number of different ways:

- Selecting a decimal point and incrementation or decrementation **with the ▼ / ▲ arrow keys on the keyboard**



- Incrementing or decrementing **with the arrow keys on the user interface**



Note: When entering the center frequency, increment size can be set on the rotary knob (↗ R&S FS300 manual, Ch. 6.2.1.3 Entering the Step Width of the Center Frequency). The value is then incremented or decremented according to this set value.

Invalid parameter entry

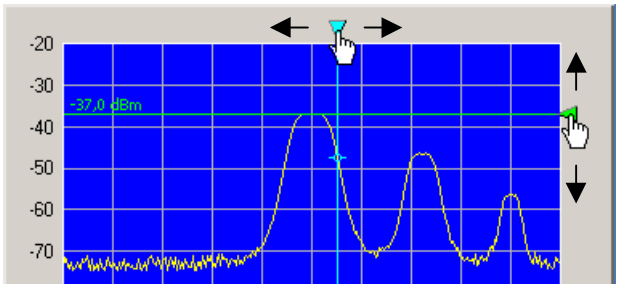
If an invalid parameter is entered, the value is limited automatically or an error message appears:

- Acknowledge the error message with the mouse or the Enter key and repeat the entry with the correct value.

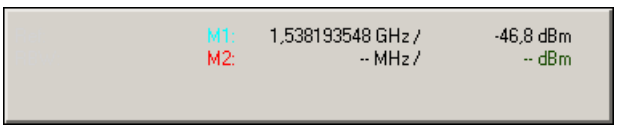
5.4.4 Moving the Markers

Introduction

In the diagram area, lines (markers, limits, etc.) can be inserted to analyze the trace. In addition, an arrow is displayed at the edge of the diagram at the position of the corresponding line. The position of the line can be changed by moving the arrow with the left mouse button.



The marker values can be read in the parameter fields below.



6 Overview of all Menus and Functions (Shortcuts)

6.1 File

Menus to prepare for a Session

The following options are available in the pull-down menu **File:** open, save and close a session; create a log file; export data; print screen.

New Session Ctrl+N	Begin new session	(↗ 7-52)
Open Session Ctrl+O	Open saved session	(↗ 7-52)
Save Session Ctrl+S	Save current session	(↗ 7-53)
Save Session as.. Ctrl+A	Save current session as	(↗ 7-53)
Logfile	Create a log file for the current session	(↗ 7-57)
Export ▶	Export data	(↗ 7-59)
Page Setup...	Page setup for printing	(↗ 7-61)
Print Window Ctrl+P	Print current window	(↗ 7-61)
Exit Ctrl+Q	Exit program	(↗ 3-27)

6.2 Function

Note Instrument functions are accurately described in chapter 6 of the R&S FS300 manual.

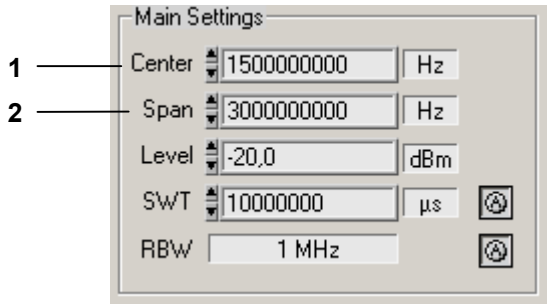
Menus for configuring and starting measurements

The menus used to set the spectrum analyzer are displayed in the pull down menu **Functions** or in the toolbar menu. The order of the menus mirrors that of the procedure for configuring and starting measurements.

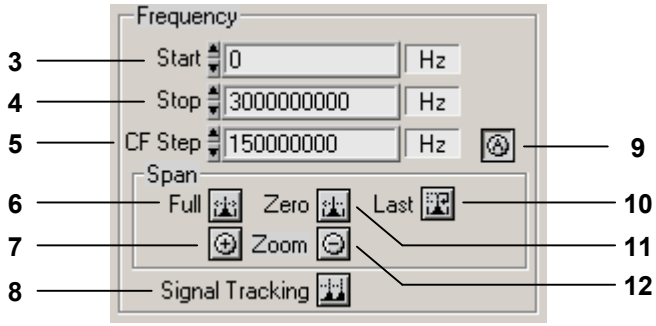
Freq ▶	Selecting the frequency span (setting the x axis in the diagram area)
Amp ▶	Setting the level axis and the RF input (setting the y axis in the diagram area)
Marker ▶	Signal analysis with marker functions
BW/Sweep ▶	Setting the bandwidths and the sweep time
Trace ▶	Displaying the trace
Trigger ▶	Triggering the measurement
Measure ▶	Measurement functions

6.2.1 Freq Menu

Main function display (always visible)



Function display (insert with F5 key)

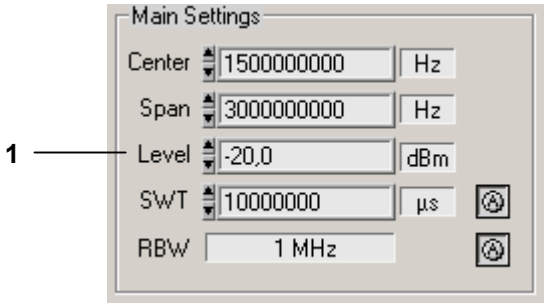


Function and shortcut

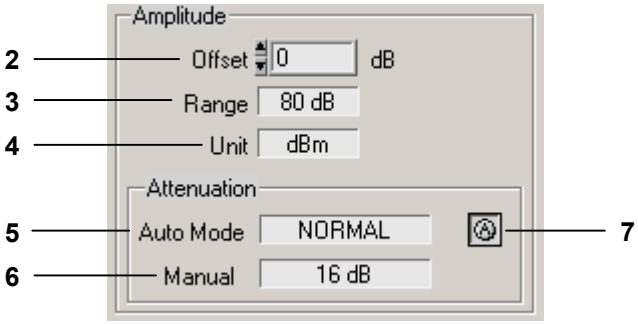
Center Ctrl+Shift+C	Entering the center frequency	**(1)**
Span Ctrl+Shift+S	Entering the span	**(2)**
Start Ctrl+Shift+B	Entering the start frequency	**(3)**
Stop Ctrl+Shift+E	Entering the stop frequency	**(4)**
Center Stepsize ▶	**Open submenu:** Entering the step width of the center frequency	
manual	Setting the step size manually	**(5)**
auto	Setting the step size automatically	**(9)**
= Centerfrequency	Setting the step size to the center frequency	
= Markerfrequency	Setting the step size to the marker frequency	
Span Settings ▶	**Open submenu:** Display modes for the frequency axis	
Full Span	Displaying the whole frequency range	**(6)**
Zero Span	Switching over to the ZERO SPAN	**(11)**
Last Span	Restoring the previous setting	**(10)**
Zoom In Ctrl++	Reducing the span	**(7)**
Zoom Out Ctrl+-	Increasing the span	**(12)**
Signal Tracking ▶	**Open submenu:** Signal tracking	
on	Activating signal tracking	**(8)**
off	De-activating signal tracking	**(8)**

6.2.2 Amp Menu

Main function display (always visible)



Function display (insert with F6 key)

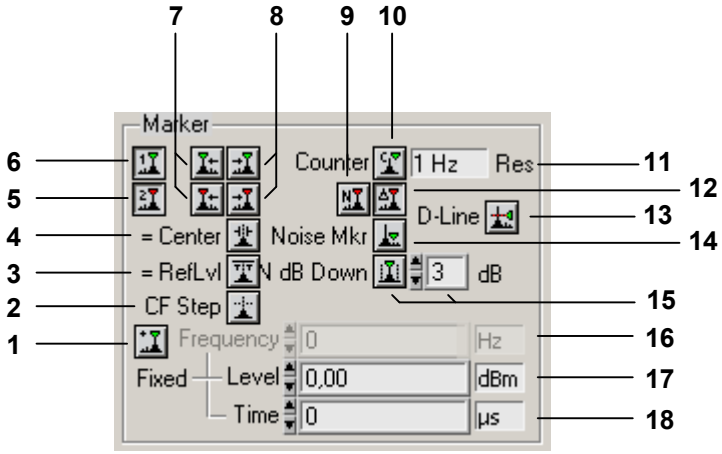


Function and shortcut

Ref Level Ctrl+Shift+L	Entering the reference level	**(1)**
Ref Level Offset	Entering a level offset	**(2)**
Range Ctrl+Shift+R	Selecting the level display range	**(3)**
Unit Ctrl+Shift+U	Selecting a unit for the level display	**(4)**
RF Attenuation	Setting the RF input attenuation manually	**(6)**
RF Attenuation Auto	Setting the RF input attenuation automatically	**(5), (7)**

6.2.3 Marker Menu

Function display (insert with F7 key)



Function and shortcut

Marker 1 ▸ **Open submenu:**
Activate marker 1

Peak Ctrl+Shift+M	Place marker 1 on the trace maximum	**(6)**
next Peak left	Place marker 1 on the next trace maximum to the left	**(7)**
next Peak right	Place marker 1 on the next trace maximum to the right	**(8)**
Signal Count	Measure the signal frequency: Start measurement	**(10)**
Signal Count Resolution	Measure signal frequency: Set resolution	**(11)**
off	De-activate marker 1	**(6)**

Marker 2 ▸ **Open submenu:**
Activate marker 2

Peak	Place marker 2 on the trace maximum	**(5)**
next Peak left	Place marker 2 on the next trace maximum to the left	**(7)**
next Peak right	Place marker 2 on the next trace maximum to the right	**(8)**
Marker norm	Set marker 2 as a normal marker (NORM)	**(9)**
Marker delta	Set marker 2 as a delta marker (DELTA)	**(12)**
off	De-activate marker 2	**(5)**

Marker > ▸ **Open submenu:**
Accepting marker values as settings

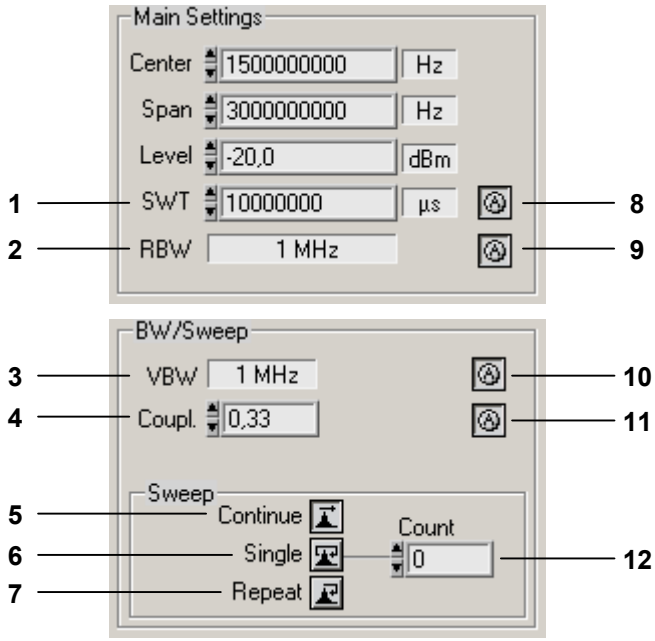
Center = Marker Freq	Set the center frequency to the marker frequency	**(4)**
Ref Level = Marker Level	Set the marker level as a reference level	**(3)**
Center Stepsize = Marker Freq	Set the step size for entering the center frequency to the marker frequency	**(2)**

Marker Functions ▶	**Open submenu:** Marker measurement functions	
Noise Marker	Measuring noise power density	**(14)**
n dB down	Measuring signal bandwidth	**(15)**
D-Line Ctrl+Shift+D	Bring display line up on screen	**(13)**
Limit Line	Bring limit line up on screen	(↗ 7-54)
Ref fixed ▶	**Open submenu:** Reference points for measuring level differences	
on	Activating the entry of arbitrary reference points	**(1)**
off	Using M1 marker values as a reference point	**(1)**
Ref Point Level	Entering the reference-point level	**(17)**
Ref Point Freq	Entering the reference-point frequency	**(16)**
Ref Point Time	Entering the reference-point time	**(18)**

6.2.4 BW/Sweep Menu

Main function display (always visible)

Function display (insert with F8 key)

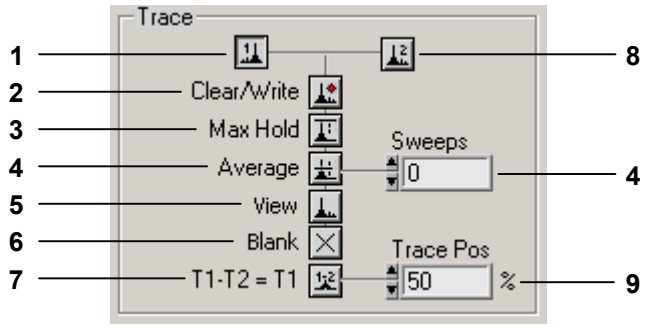


Function and shortcut

Res BW manual Ctrl+Shift+W	Setting the resolution bandwidth manually	**(2)**
Res BW auto	Activating automatic resolution bandwidth setting	**(9)**
Video BW manual	Setting the video bandwidth manually	**(3)**
Video BW auto	Activating automatic video bandwidth setting	**(10)**
Coupl Ratio ▶	**Open submenu:** Setting the RBW/VBW coupling ratio	
RBW/VBW manual	Setting the coupling ratio manually	**(4)**
RBW/VBW auto	Activating the default setting for the coupling ratio	**(11)**
Sweep ▶	**Open submenu:** Setting the sweep time	
Cont Sweep Ctrl+!	Starting a continuous frequency sweep	**(5)**
Single Sweep Ctrl+"	Performing an n-times sweep	**(6)**
No. of Sweeps	Setting the number of sweeps	**(12)**
Repeat Single Sweep	Repeating n-times sweeps	**(7)**
Sweep time manual	Setting the sweep time manually	**(1)**
Sweep time auto	Activating automatic sweep-time setting	**(8)**

6.2.5 Trace Menu

Function display (insert with F9 key)

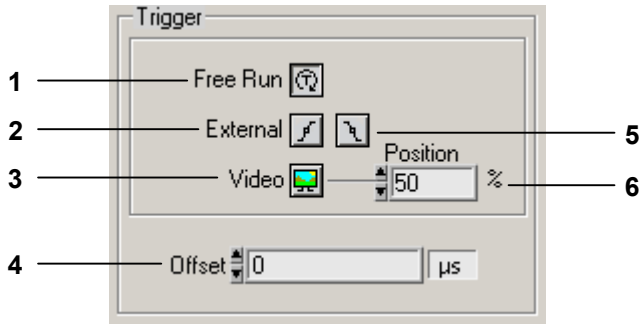


Function and shortcut

Select Trace ▶	**Open submenu:** Selecting the active trace	
Trace 1	Turning on and activating Trace 1	**(1)**
Trace 2	Turning on and activating Trace 2	**(8)**
Clear/Write	Trace display mode: Overwrite mode	**(2)**
Max Hold	Trace display mode: Max. hold	**(3)**
Trace Average	Trace display mode: Averaging	**(4)**
View	Freezing the trace	**(5)**
Blank	Blanking out the trace	**(6)**
Math ▶	**Open submenu:** Trace difference	
T1-T2=>T1	Turning on the trace-difference mode	**(7)**
Trace Pos	Repositioning Trace 1 (result)	**(9)**
off	Turning off the trace-difference mode	**(7)**

6.2.6 Trigger Menu

Function display (insert with F10 key)



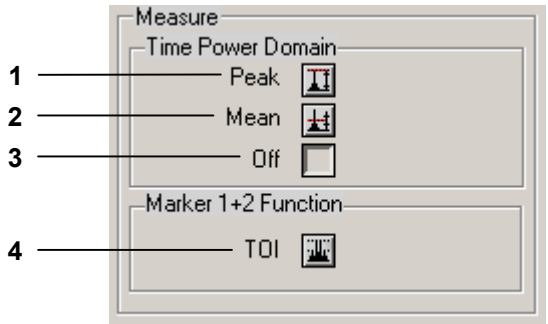
Function and shortcut

Free Run	Free-running measurements	**(1)**
External ▶	**Open submenu:** Triggering by an external TTL signal	
rising edge	Triggering on positive-going edge	**(2)**
falling edge	Triggering on negative-going edge	**(5)**
Video	Triggering by the display level	**(3), (6)**
Offset	Entering a trigger offset	**(4)**

Note The trigger function **LINE** (triggering by the AC-line frequency) is not supported.

6.2.7 Measure Menu

Function display (insert with F11 key)



Function and shortcut

Time Power Domain ▶	**Open submenu:** Measure the power in the time domain (ZERO SPAN)	
Peak	Output the peak value within the section	**(1)**
Mean	Output the mean value within the section	**(2)**
off	Switch off the power measurement	**(3)**
TOI	Measure the third-order intercept point	**(4)**

6.3 View

Menus for configuring the program interface

Menus for resizing the window and setting screen colors are available in the pull-down menu **View**.

large Window Ctrl+W	Switch on/off large window	(↗ 8-62)
Color Ctrl+L	Set screen color	(↗ 8-63)

6.4 ? Help

Help menus

Menus for opening the help function and displaying the program information are available in the pull-down menu **Help**.

Help	Start help function	(↗ 9-64)
Info Ctrl+I	Display program information	(↗ 9-64)

7 Saving/Exporting Data (File)

7.1 Opening the Session

Application

A new session is opened automatically when the program is started (↗ 3-25). The current R&S FS300 settings are loaded. The following settings are display and evaluation functions and are not transferred to the PC software:

- Marker functions (↗ 6-46)
- Scale of measuring diagram (Range, Unit)
- Trace functions (↗ 6-49)
- Measure functions (↗ 6-50)

However, you may also open a new session while in remote control mode. Default settings are automatically loaded (↗ R&S FS300 manual, Ch. 6.1 R&S FS300 Factory Settings).

You can save and load specific instrument settings if you plan to work with these on a regular basis.

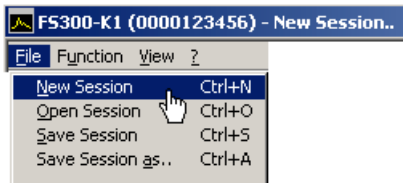
7.1.1 Beginning New Measurement

Beginning the measurement with current instrument setting

- Start the PC software on your PC.

Beginning the measurement with factory setting

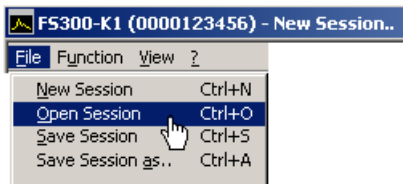
- Select menu item: **New Session**.



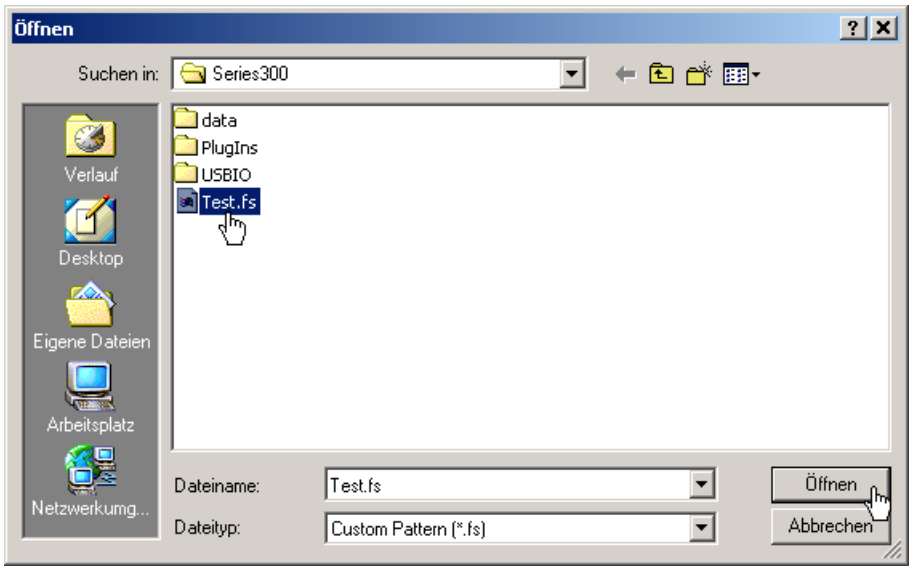
7.1.2 Loading the Saved Settings

Beginning the measurement with saved instrument settings

1. Select menu item: **Open Session**.



2. Select a file from the directory and click **<Open>**.



7.2 Saving the Session

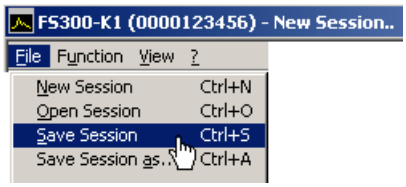
Application

You can save specific instrument settings if you plan to work with them on a regular basis (Save Session).

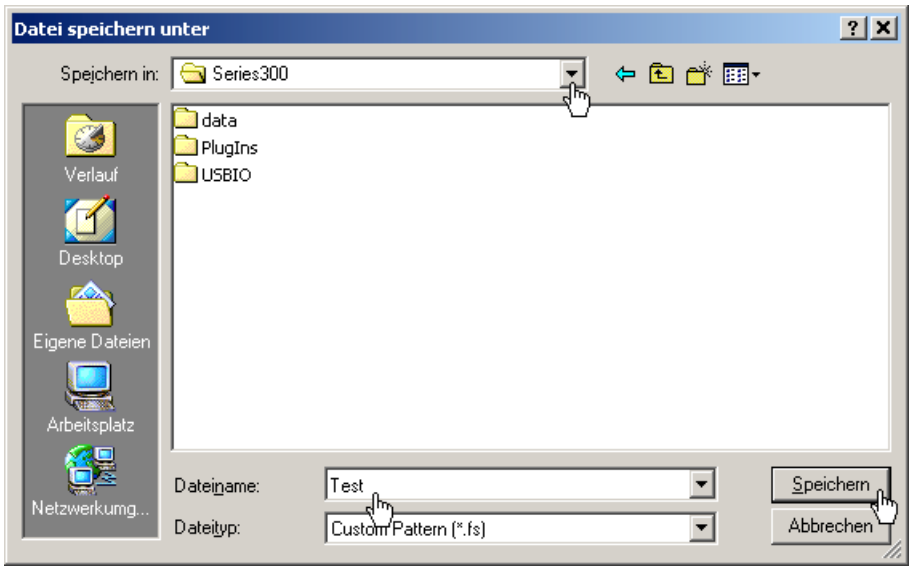
You may also change a previously saved instrument setting and save it under a different file name (Save Session as..).

Saving instrument settings

1. Select menu item: **Save Session** or **Save Session as..**.



2. Select a directory, enter a file name and click **<Save>**.



7.3 Monitoring the Measuring Values

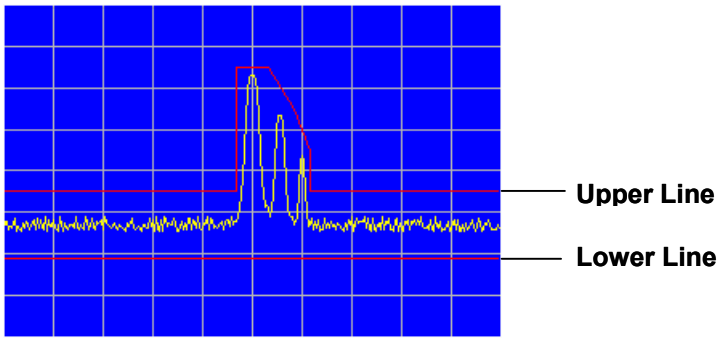
Introduction

If you wish to monitor deviation of measuring values you may set limit lines (Limit Lines) to monitor them. A logfile is created which can be opened with any text editor or with Microsoft Excel™.

7.3.1 Inserting the Limit Lines

Application

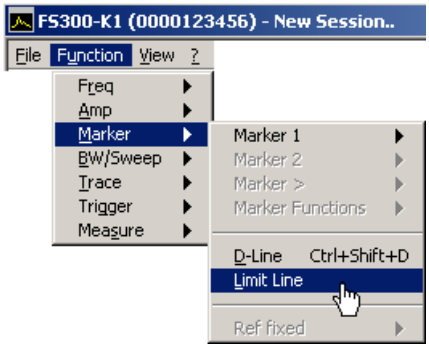
Measuring values which **overshoot** the limit lines are monitored with an **Upper Line** and measuring values which undershoot the limit lines are monitored with a **Lower Line**. The shape of the limit lines are entered into a table in value pairs (frequency, amplitude), they may then be inserted into the measuring diagram.



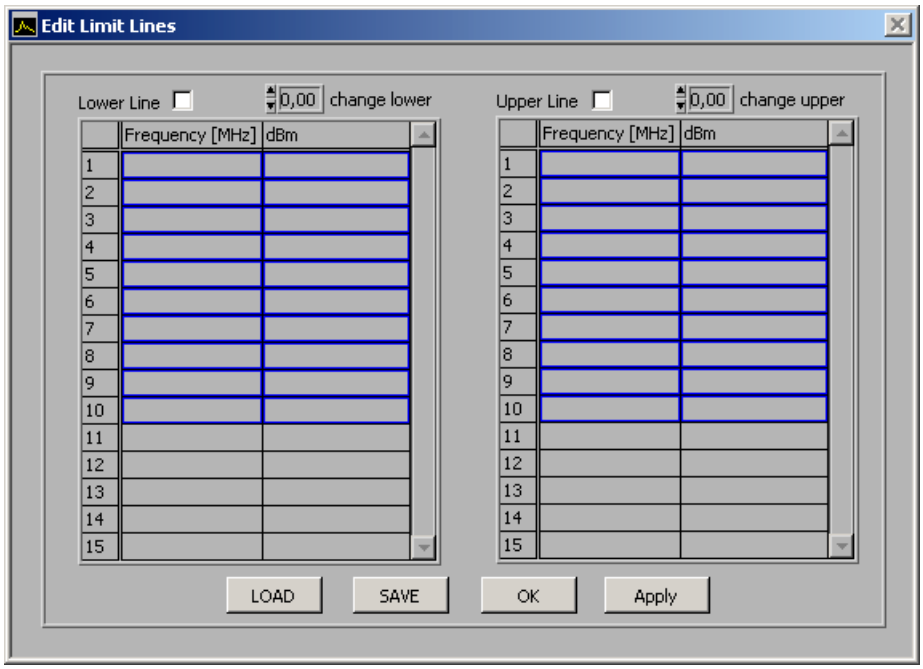
You can create limit lines with up to 50 value pairs, these may be saved and loaded for later use.

Entering limit lines

1. Select menu item: **Limit Line**.

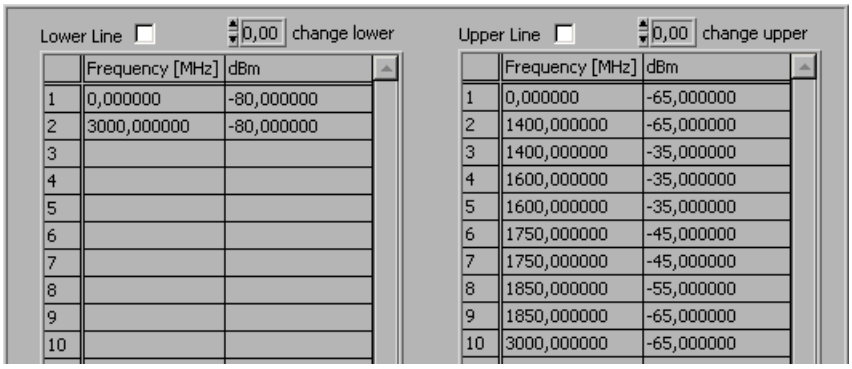


Edit Limit Lines window opens.

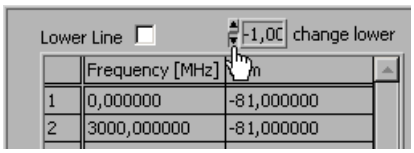


2. Use the left-hand table to enter the frequency and amplitude values for the lower lines and use the right-hand table to enter the upper lines.

Each row in the table describes a reference point on the limit line. At least 2 value pairs (reference points) per line must be entered, e.g., lower line: -80 dB for full span.

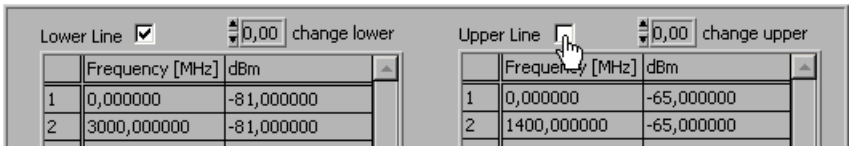


Note: You may increase and decrease the amplitude values of a limit line for all value pairs with the input fields: **change lower**/**change upper**.

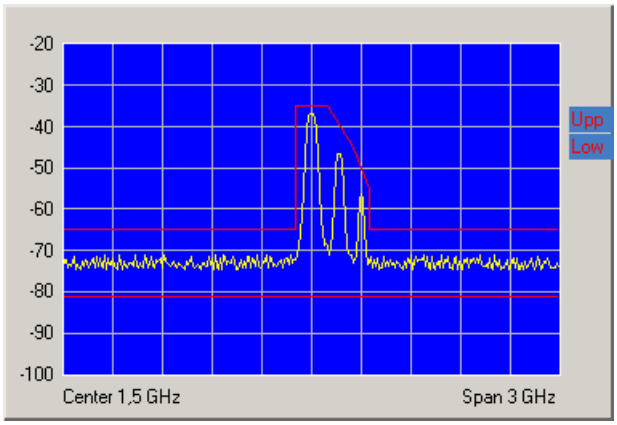


Inserting limit lines

3. Tick the check boxes for **Lower Line** and/or **Upper Line** to activate the limit line(s).



4. Click **<APPLY>** to activate the limit line(s). The status information **Upp** and/or **Low** are displayed in the diagram.



Saving and loading limit lines

1. Press **<SAVE>** if you plan to use the current settings again.

The **Save File as** window opens.

2. Select a directory, enter a file name and click **<Save>**. The current settings are saved.
3. Press **<LOAD>** if you wish to use the saved settings again.

The **File open** window opens.

4. Select the (**.lim**) file from your directory and click **<Open>**. The saved settings (frequency and amplitude values) are loaded.

Closing the window

- Press **<OK>** to close the **Edit Limit Lines** window. The current settings remain active in the diagram.

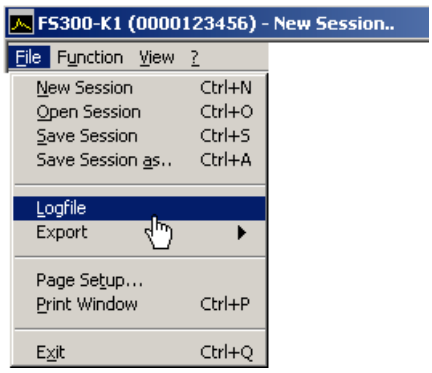
7.3.2 Monitoring

Aim

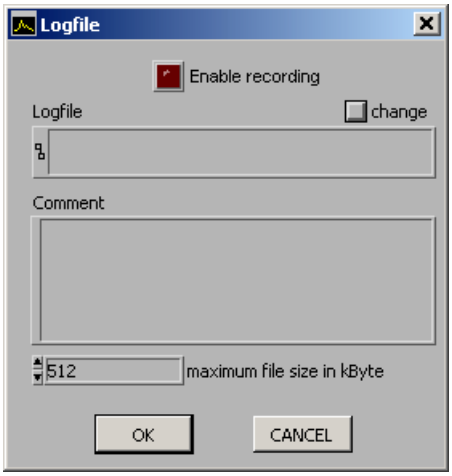
A logfile is created during the monitoring process, which documents over- and undershooting of a limit line. This allows random events to be captured.

Creating the logfile

1. Select menu item: **Logfile**.



The **Logfile** window opens.



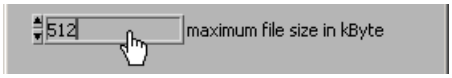
2. Click **<change>** if a logfile has not yet been created.

   The **Save File as** window opens. Select a directory, enter a file name and click **<Save>**. The current logfile path is displayed.

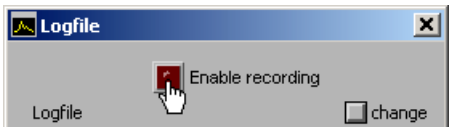
3. Click in the **Comment** window to enter a logfile comment.

Starting the monitoring

4. Enter the maximum logfile memory size in KB. The default setting is ”512 KB”.



5. Click **<Enable recording>** to start the monitoring process. The button lights up red.



If an over- or undershoot of a limit is detected, the corresponding status information **Upp** and/or **Low** flashes in the diagram. The measuring values are monitored 10x per second and each over- or undershoot of a limit line is recorded.

Stopping the monitoring

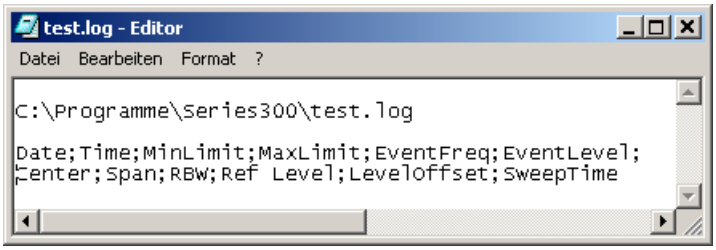
6. Click **<Enable recording>** to finish the monitoring process. The button no longer lights up red.

7. Click **<OK>** to close the **Logfile** window.

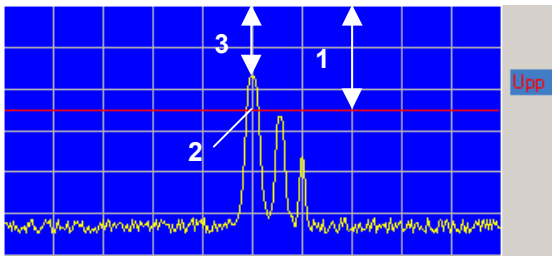
7.3.3 Analyzing the Logfile

Logfile content

The logfile contains the measuring data, which were recorded during the monitoring process. A record is created from the following parameters when a limit line has been over- or undershot.



- **Date** - event date
- **Time** - event time
- **MinLimit** **(1)** - limit line level Upp
- **MaxLimit** - limit line level Low
- **EventFreq** **(2)** - event frequency value
- **EventLevel** **(3)** - event maximum level
- **Center** - center frequency
- **Span** - span
- **RBW** - resolution bandwidth
- **Ref Level** - reference level
- **Leveloffset** - level offset
- **SweepTime** - sweep time



Analyzing the logfile

If the logfile (.log) is saved as a text file (.txt) the data can be opened and analyzed in Microsoft Excel™.

7.4 Exporting the Measuring Data

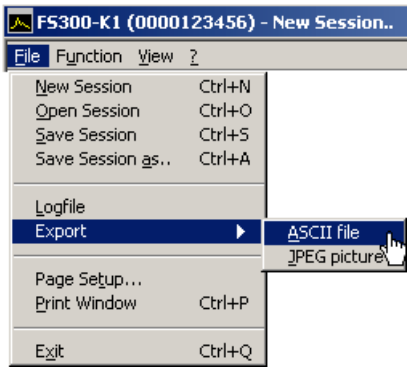
Application

To record the measurements, you can save the current diagram with the most important parameter settings in ASCII code or you can save a screenshot of the current window as a JPEG.

7.4.1 Creating the ASCII File

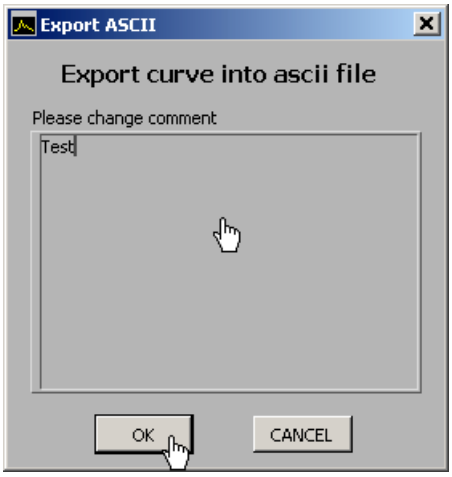
Creating the ASCII file

1. Select menu item: **ASCII file**.



The **Export ASCII** window opens.

2. Click in the **Please change comment** window to enter a logfile comment and click **<OK>**.

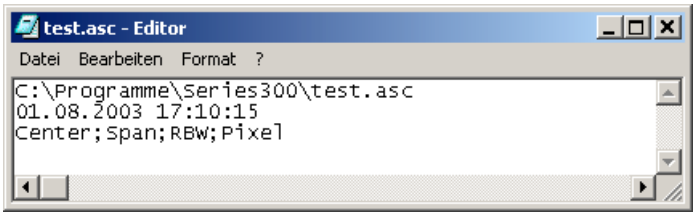


The **Save File as** window opens.

3. Select a directory, enter a file name and click **<Save>**.

ASCII File contents

The ASCII file contains the following parameters:



- **Center** - center frequency
- **Span** - span
- **RBW** - resolution bandwidth
- **Pixel** - level values of the trace

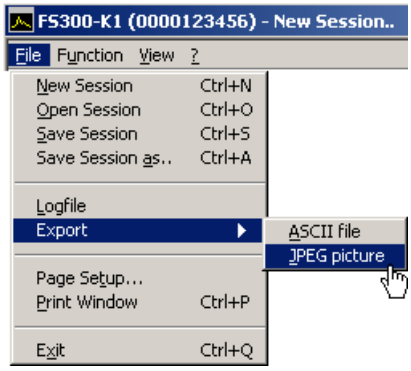
Note

The number of exported level values (pixels) depends on the setting for the size of the window. (↗ 8-62, small window: 310 pixels, large window: 700 pixels)

7.4.2 Creating the Screenshot

Creating the screen-shot

1. Select menu item: **JPEG picture**.



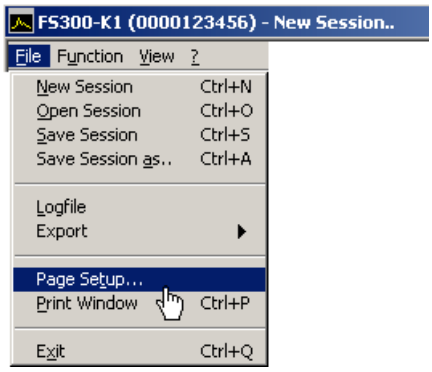
The **Save File as** window opens.

2. Select a directory, enter a file name and click **<Save>**.

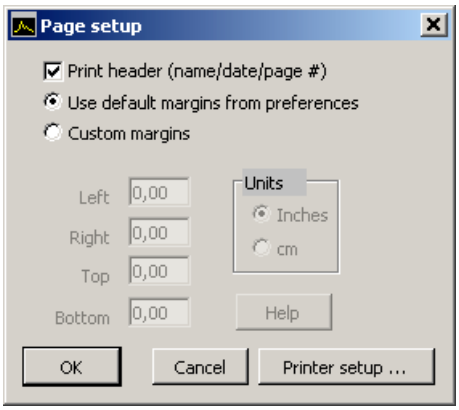
7.5 Printing the Window

Page setup

1. Select menu item: **Page setup**.



The **Page setup** opens.



2. Check the **<Print header>** box (✔) to print a header with the file name, date and page number.
3. Check **<Use default margins from preferences>** to print page with the presettings.

   You may also check **<Custom margins>** to print page with user-defined settings. You may then adjust the page margins: **<Left>**, **<Right>**, **<Top>** and **<Bottom>**.
4. Click **<Printer setup>** to select your printer settings.
5. Click **<OK>** to close the **Page setup** window.

Printing the window

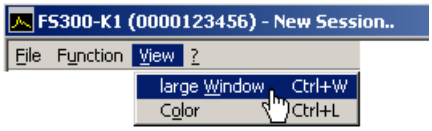
6. Select menu item: **Print Window** from the **File** pull-down menu to print the current program window.

8 Customizing the Working Window (View)

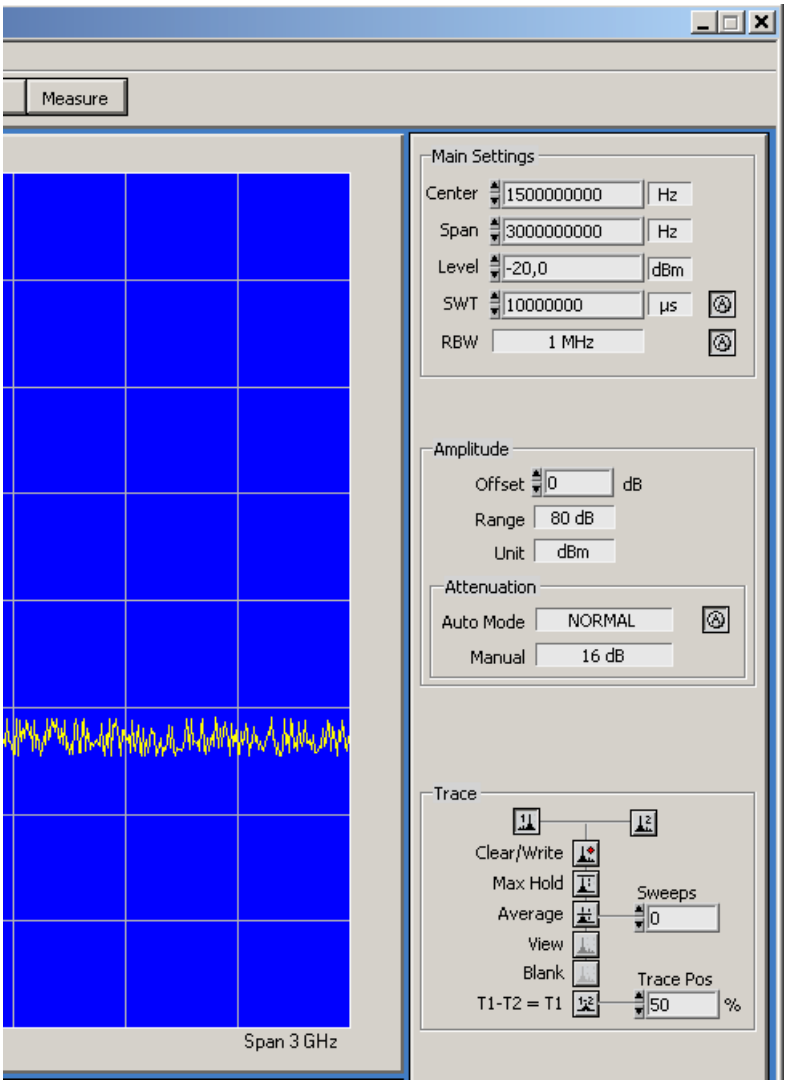
8.1 Adjusting the Window Size

Adjusting the window size

1. Select menu item: **Large Window** to enlarge the program window.



The diagram is enlarged by a factor of 2. In addition to the **Main Settings**, two function displays appear in the function display area. The first function display (e.g., **Amplitude**) refers to the current menu selection and the second function display (e.g., **Trace**) refers to the last menu selection.

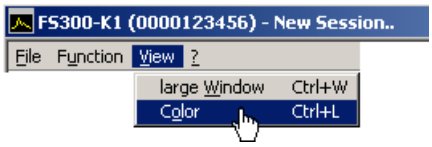


2. Select the **Large Window** menu item again to reduce the window size.

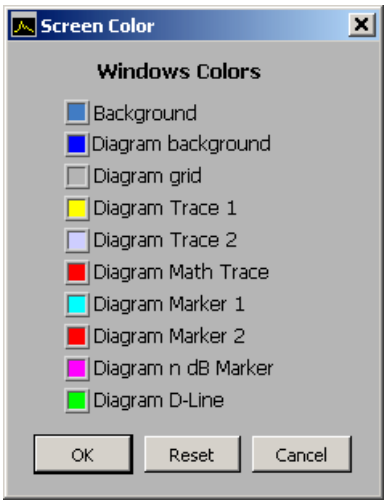
8.2 Changing the Window Color

Changing the window color

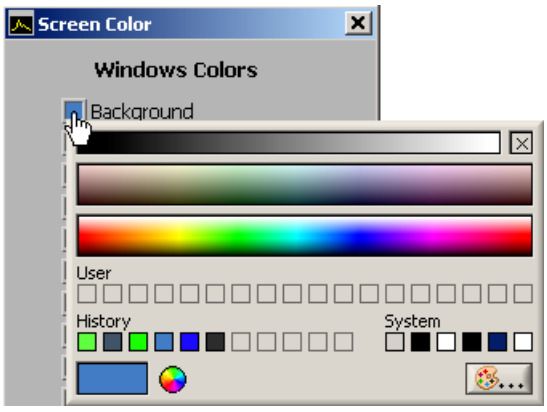
1. Select menu item: **Color**.



The **Screen Color** window opens. Colors for the listed window elements can be changed.



2. Click on a color field to change the color for the corresponding windows element. A color scheme opens.



3. Move the mouse over the color bars and click on your preferred color. The color scheme closes and the new color appears in the color field of the window element.

4. Click **<OK>** to close the **Screen Color** window and to activate the new window colors.

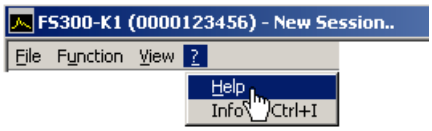
   You may also click **<Reset>** and **<OK>** to revert to the default color settings.

9 Getting Help (?)

9.1 Starting the Help

Starting the help

- Select menu item: **Help** to start the Windows™ Help for program **FS300 0000xxxxxx**.

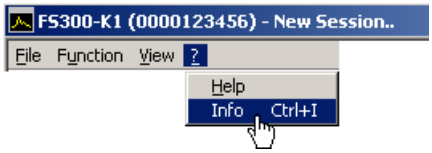


Acrobat Reader™ (↗ CD-ROM) starts up and the English R&S FS300-K1 operating manual opens.

9.2 Displaying the Program Version

Opening/closing the program version

1. Select menu item: **Info** for information about the **FS300 0000xxxxxx** program.



An information field opens.

2. Click in the information field with the mouse to close.

   You may also wait approximately 10 seconds for the information field to close automatically.

10 Index