ROHDE&SCHWARZ

Test and Measurement
Division

Release Notes

Firmware Release 4.38 (XP)

for FMU Baseband Analyzer (Windows XP embedded)

- New Firmware Update process (base system + applications at one time).
- International keyboard driver package supported
  (German, Spanish, French, Italian and Portuguese)
- New SAVE/RECALL menu and new dialogs for file/path selection.
- Application Setup Recovery restores previous settings after application exit.
- Additional soft keys available to change the LAN configuration
- Easy access to Windows XP Start menu.
- Softfrontpanel usable with graphic resolution of 1280 x 768 pixel.
- TRACE:IQ: Extended I/Q Sample Rate range for Analog Baseband Input (200 MHz).
- ASCII Export function for Marker Peak List.
- Adjustable marker position knob stepsize.
- FSQ-B17: Digital Baseband Input supported for TRACE:IQ sub system.
- FS-K7 and FSQ-K70: Digital Baseband Input supported with R&S Ex-IQ-Box.
- FS-K7: Deemphasis is available for active Weighting AF Filter CCTTT and CCIR
- Support for FS-K8 EDR.
- Automatic FSQ-B100 Hardware Configuration update.
- Support for new 3GPP HSPA+ Application Firmware R&S FS-K74+
- Option FSQ-K91n and FSQ-K94 supported.

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History

Date	Rel Note Rev	Changes
06 August	1	First revision for V4.38.

Firmware Update

This firmware may only be installed on instruments equiped with Windows XP Embedded.

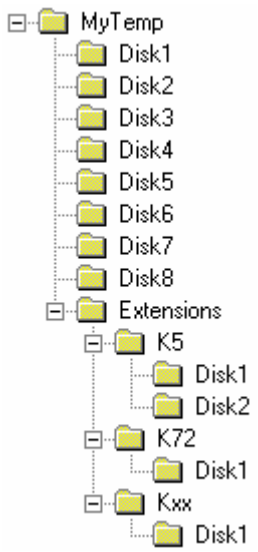
Generation of the update set

Since basic firmware version V4.38 a ZIP file with basic system firmware and the newest available applications is provided. This ZIP file is available in the instruments FIRMWARE section of the Service Board on GLORIS.

Preparing installation via USB stick or LAN:

- Download the update set ZIP file.
- Extract the contents of the ZIP file to a temporary folder, e.g. C:\MyTemp.

  Other files (e.g. release rotes) shall not be stored in these directories. These files would be copied on harddisk and may cause a disk full problem on drive E:.
- Now copy the content of the temporary folder including all sub folders to a USB stick.
- The USB stick is now ready to for performing the update.



Following extension's sub folder are used for the instrument's applications:

- K5
- K70
- K72 (includes K73)
- K82 (includes K83)
- K84 (includes K85)
- K90 (includes K91)
- K92 (includes K93, K94)

Performing the firmware update on the instrument

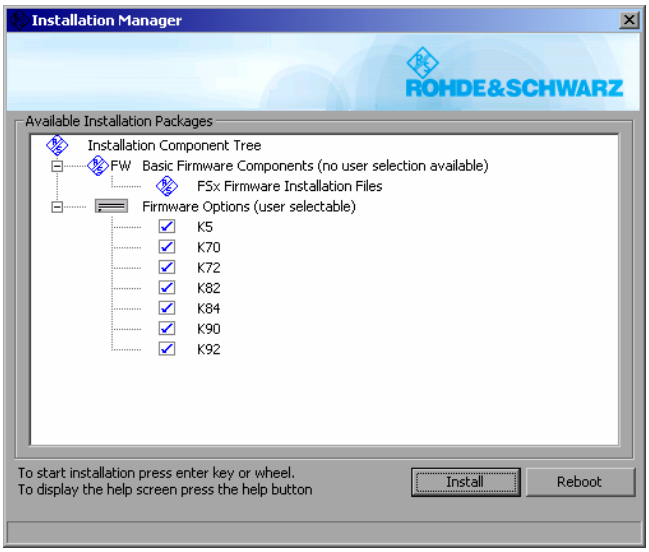
A new method to install the base system and all required applications is available, if the installed base system firmware is V4.38 or newer. For updating to version 4.38 or newer first update the bases system only to get the new update manager. Then update the base system and all applications using the new update manager.

Base System Update from version 4.08 to 4.38 or newer:
Skip this step, if the installed base system firmware is V4.38 or newer. The firmware update process is performed in the following steps:

- Switch the instrument on and wait until the Analyzer has resumed operation.
- Use the SETUP | NEXT | FIRMWARE UPDATE | UPDATE PATH softkey to specify any path for the location of the disk directory (e.g. F:\MyTemp).
- Press SETUP → NEXT → FIRMWARE UPDATE
- Confirm the query "Do you really want to update the firmware?" with OK
- Confirm the copy process.
- The instrument will perform several automatic shutdowns, until the new base system firmware is installed properly.
  Do not switch the instrument off until the update process has been finished completely.

Complete Update with update manager:
- Use the SETUP | NEXT | FIRMWARE UPDATE | UPDATE PATH softkey to specify any path for the location of the disk directory (e.g. F:\MyTemp).
- Press SETUP → NEXT → FIRMWARE UPDATE
- Confirm the query "Do you really want to update the firmware?" with OK

The *Installation Manager* will terminate the analyzer application, search for available application update set and will show a selection list.



- Deselect applications, not to be installed and start the installation process with INSTALL. REBOOT will abort the update and restart the analyzer application without any changes.
- The instrument will perform several automatic shutdowns, until the new firmware and all applications are installed properly.

  Do not switch the instrument off until the update process has been finished completely.

After a successful firmware update it is necessary to execute the instument's self alignment process by pressing CAL and softkey CAL TOTAL.

Known problems during firmware update

Automatic FSQ-B100 Hardware Configuration update may request for user action.
If a wrong hardware configuration file is detected in the FSQ-B100 board, the board will be reprogrammed during reboot after firmware update. A window requestinq a shutdown will be displayed in that case.
The following list shows the bases system firmware and the related B100 configuration file version.

Firmware Version	B100 HW Configuration Version
V4.08	V3.08
V4.38	V3.34

Warning: Due to the requested user action there will be a problem for remote updates if a changed B100 configuration file is detected.

Firmware installation of the R&S FS-K7 FM demodulator, R&S FS-K8 BLUETOOTH Analyzer software and R&S FS-K9 power sensor measurement

The R&S FS-K7, R&S FS-K8 and R&S FS-K9 application software package are included in the basic instrument firmware. It therefore needs no separate firmware update procedure.

Enabling these options via option key code entry

This section can be skipped if the option key was entered once.
For activation of these application software packages a license key for validation must be entered. The license key is printed either on a label on the rear panel of the R&S FMU or delivered as a part of the software package.
The key sequence for entering the license key for every option is:

SETUP - GENERAL SETUP – OPTIONS - INSTALL OPTION

Use the numeric keypad to input the option key number and press ENTER.

- On a successful validation the message 'option key valid‘ will appear.
- If the validation failed, the option software is not installed.

Compatibility to other Firmware Option Packages

The following firmware option packages are available with their own disks and can be installed separately. Please refer to their release notes.

R&S FMU V4.38 is compatible to the following firmware option releases:

R&S FS-K5	R&S FSQ-K70	R&S FS-K72 FS-K73 FS-K74 FS-K74+	R&S FS-K82 FS-K83	R&S FS-K84 FS-K85	R&S FSQ-K90 FSQ-K91	R&S FSQ-K92 FSQ-K93 FSQ-K94
4.30	4.30 SP1	4.30	4.30	4.30	4.30 SP1	4.30 SP1

New Functions in Version 4.38

- **Improved Firmware Update.**
- **International keyboard driver package supported (German, Spanish, French, Italian and Portuguese).**
- **New Save/Recall menu and dialogs.**
- **Save dialog reports a warning, if no item to save is selected.**
- **New dialogs available for file/path selection (e.g. for Trace Export, Firmware Update Path).**
- **Easy access to Windows XP Start menu.**
- **LXI Class C support.**
- **Additional softkeys available to change the LAN configuration.**
- **Application Setup Recovery restores previous settings after application exit.**
- **Support for Power Sensor NRP-Z81.**
- **ASCII Export function for Marker Peak List.**
- **Adjustable marker position knob stepsize.**
- **New trace average function Power.**
- **Extended resolution for the number of sweep points.**
  In addition to currently allowed values an increment of 100 is possible now for number of points ≥ 201.
- **The increment behaviour of the step keys for parameter SWEEP POINTS is changed.**
  The behaviour of the knob wheel still has the highest possible resolution.
- **Function GRID ABS/REL supported.**
- **ACP: Overlapping Adjacent Channels allowed now for parallel measurements.**
  It is now possible to configure overlapping adjacent channels. Based on a common carrier channel setting, it is now possible to measure with two slitely different ADJ channel settings with one measurement.
  Example: TX Channel / TX Bandwidth (common for both measurement A and B)
  - ADJ used for measurement A
  - ALT1 used for measurement A
  - ALT2 used as ADJ for measurement B
  - ALT3 used as ALT1 for measurement B
- **ACP: Result output format changed for number of ADJ channels > 3.**
- **GPIB: SCPI format for binary block data extended for byte counts > 999.999.999 bytes.**
- **GPIB: New command available**
- :CALCulate<1|2>:LIMit<1...8>:ACTive? returns active limit line(s)
- **FSQ-B17: Digital Baseband Input supports resampling for TRACE:IQ sub system.**
- **FSQ-B17: R&S Ex-IQ-Box Control provided.**
- **FS-K7 and FSQ-K70: Digital Baseband Input supported.**
- **FS-K7: Deemphasis is now additionally supported for active Weighting AF Filter CCTTT and CCIR.**

- **FS-K8 Enhanced Data Rate (EDR) supported.**
- **Support for FSQ-B17 Digital Baseband Input and Output.**
- **Automatic FSQ-B100 Hardware Configuration update**
- If an old hardware configuration file is detected in the FSQ-B100 board, the board will be reprogrammed during reboot after firmware update. A window requestinq a shutdown will be displayed in that case.
- **Warning:** Due to the requested user action there will be a problem for remote updates if a new B100 configuration file is detected.
- **Support for new option 3GPP HSPA+ Application Firmware R&S FS-K74+.**
- **Support for option FSQ-K91n.**
- **Support for option FSQ-K94.**

Modified Functions

The following modifications to functions released in earlier firmware versions are included in version 3.75. The version numbers in brackets indicate the version in which the function was modified.

1. (V4.38) Improved Firmware Update.

2. (V4.38) International keyboard driver package supported (German, Spanish, French, Italian and Portuguese).

3. (V4.38) New Save/Recall menu and dialogs.

4. (V4.38) Save dialog reports a warning, if no item to save is selected.

5. (V4.38) New dialogs available for file/path selection (e.g. for Trace Export, Firmware Update Path).

6. (V4.38) Easy access to Windows XP Start menu.

7. (V4.38) LXI Class C support.

8. (V4.38) Additional softkeys available to change the LAN configuration.

9. (V4.38) Application Setup Recovery restores previous settings after application exit.

10. (V4.38) Support for Power Sensor NRP-Z81.

11. (V4.38) ASCII Export function for Marker Peak List.

12. (V4.38) Adjustable marker position knob stepsize.

13. (V4.38) New trace average function Power.

14. (V4.38) Extended resolution for the number of sweep points.
In addition to currently allowed values an increment of 100 is possible now for number of points ≥ 201.

15. (V4.38) The increment behaviour of the step keys for parameter SWEEP POINTS is changed.
The behaviour of the knob wheel still has the highest possible resolution.

16. (V4.38) Function GRID ABS/REL supported.

17. (V4.38) ACP: Overlapping Adjacent Channels allowed now for parallel measurements.
It is now possible to configure overlapping adjacent channels. Based on a common carrier channel setting, it is now possible to measure with two slitely different ADJ channel settings with one measurement.
Example: TX Channel / TX Bandwidth (common for both measurement A and B)

- ADJ used for measurement A
- ALT1 used for measurement A

- ALT2 used as ADJ for measurement B
- ALT3 used as ALT1 for measurement B

18. (V4.38) ACP: Result output format changed for number of ADJ channels > 3.

19. (V4.38) GPIB: SCPI format for binary block data extended for byte counts > 999.999.999 bytes.

20. (V4.38) GPIB: New command available
:CALCulate<1|2>:LIMit<1...8>:ACTive? returns active limit line(s)

21. (V4.38) FS-B17: Digital Baseband Input supports resampling for TRACE:IQ sub system.

22. (V4.38) FS-B17: R&S Ex-IQ-Box Control provided.

23. (V4.38) FS-K7 and FSQ-K70: Digital Baseband Input supported.

24. (V4.38) FS-K7: Deemphasis is now additionally supported for active Weighting AF Filter CCTTT and CCIR.

25. (V4.38) FS-K8 Enhanced Data Rate (EDR) supported.

26. (V4.38) Support for FSQ-B17 Digital Baseband Input and Output.

27. (V4.38) Automatic FSQ-B100 Hardware Configuration update
If an old hardware configuration file is detected in the FSQ-B100 board, the board will be reprogrammed during reboot after firmware update. A window requestinq a shutdown will be displayed in that case.
Warning: Due to the requested user action there will be a problem for remote updates if a new B100 configuration file is detected.

28. (V4.38) Support for new option 3GPP HSPA+ Application Firmware R&S FS-K74+.

29. (V4.38) Support for option FSQ-K91n.

30. (V4.38) Support for option FSQ-K94.

31. (V4.38) ACP Measurement: The number of sweep points is increased for standards CDMA2000 and WIBRO.

Problems Eliminated

The version numbers in brackets indicate the version in which the problem was observed for the first time.

1. (V4.08) The instrument is not switched OFF when the ON / STANDBY switch is pressed.
This problem only occurs if option FS-K9 (Power Sensor) is enabled.
2. (V4.08) Changing Level Range does not work using step keys or knob wheel.
The numeric input dialog for level range does not work using step keys for knob wheel. After parameter change, the dialog shows the wrong value and the wrong unit.

3. (V4.08) File manager lists time/date in Coordinate Universal Time (UTC) instead of local time.

4. (V4.08) Hardcopy: The PRINT - FILE SAVE dialog does not fully support file names longer than 12 characters.
Longer file names are cut off in the file selection list.

5. (V4.08) TRACE:IQ:DATA:MEM? does not work after INIT:IMM.

6. (V4.08) Remote command MMEM:CAT:LONG? sometimes returns a corrupt string for long file names.

7. (V4.08) Instrument reports disk boot failure after power failure.
The harddisk cache is switched off to solve this problem. In addition the operating system function to store the last read time stamp is switched off, too.

8. (V4.08) FSQ-B100: The full number of samples exceeds standard SCPI binary block format.

9. (V4.08) FSQ-B100: TRACE:IQ ignores trigger source EXTERNAL if the number of samples is above 16 MSamples

10. (V4.08) FS-K5: Update PvT PCS1900 Limit Line to 3GPP specification Release 7.

11. (V4.08) Performance loss due to Local/Remote state change for applications FSQ-K90/K91, FSQ-K92/K93.

12. (V4.08) GPIB: Reading the ACP measurement result resets the number of sweep points to the default value.

13. (V4.08) Instrument reports disk boot failure after power failure.
The harddisk cache is switched off to solve this problem. In addition the operating system function to store the last read time stamp is switched off, too.

14. (V4.08) Analyzer crashes in remote operation using command MMEM:CAT? or MMEM:CAT:LONG?.

15. (V4.08) Remote Desktop: Analyzer application crashes during connection to the instrument.

16. (V4.08) Auto Recall function does not work with filenames longer than 8 characters.

17. (V4.08) Wrong ACP settings restored after data set recall or reboot of the instrument.
The recall of a data set with modified ACP settings does not restore the complete setting. Certain parameters (e.g. channel spacing, channel bandwidth) are set to the standard dependent default values. The same problem arises after warm boot of the instrument.

18. (V4.08) The instrument does not support to store a save set using special characters (e.g. 'ü', 'á') in the file name but no error message is reported.

19. (V4.08) Function ”REF Level = MKR” is not available in Frequency Domain, MAG/PHASE with Screen A.

Known Problems

This chapter includes firmware problems related to the basic instrument firmware.

For problems related to option packages R&S FS-Kxx please refer to the corresponding release notes of the individual option package.

The version numbers in brackets indicate the version in which the error was observed for the first time.

1. (V4.38) Menu SETUP - GENERAL SETUP – GPIB: The softkey COUPLING FSP/HP is visible but always disabled.
This function is not supported by R&S FMU but the softkey is not hidden.

2. (V4.38) FSQ-B17 The PN sequence data is treated as measurement data when a LVDS data connection is established.

To establish a connection to an external digital input device with option FSQ-B17 a protocol is initiated by the receiving analyzer. As part of this protocol a pseudo noise (PN) data sequence is transfered from the transmitting device to the receiving analyzer used for an internal alignment. This protocol is correctly handled only in continuous sweep mode. The PN data are erroneously displayed as measurement data.
This adjustment is done every time the application (K7 or K70) is entered or when the LVDS cable is plugged in.

Work around:
- enter the application K7 or K70 (with digital baseband input selected and configured).
- switch to continuous sweep mode.
- wait a fixed time until the connection is established. After a few seconds a burst will be visible caused by the PN sequence.
- now continue with normal measurement operation.

Note: The required delay time depends on the reaction time of the sending device.

3. (V4.38) FSQ-B17: Digital Baseband Output is not supported if Digital Baseband Input is switched on, but the related softkeys are available in that case.

4. (V4.38) FSQ-B100: A resamling ratio > 2 is currently not supported for option FSQ-B100 and digital baseband inputs (FSQ-B17).

A resampling ratio (application sampling rate / digital baseband input sample rate) > 2 is currently not supported for digital baseband input if the number of samples exceeds 16Msamples. The application sample rate is the data rate, required by the application, e.g. the sample rate specified in the TRACE:IQ:SET command for TRACE:IQ or the Symbol rate * Points_per_Symbol for FSQ-K70.

Modifications to the Operating Manual

The order numbers for the manual sets are:

Operating Manual "Baseband Signal Analyzer FMU36":

- 1303.3545.12-01 (English).

The corresponding PDF-Files are separately available on the service board.

Last minute changes to the operating manual

Manual Operation

Basic Settings - Instrument Drives Usage

The instrument's harddisk is divided in 3 (or 2) logical drives:

C: Contains the operating system Windows XP, printer driver, network driver,…

Other user programs, applications, driver should be stored/installed on drive C:.

D: Contains instrument's firmware and related data sets (limit lines, transducer,...)
D:\user\config is the default location for customer's instrument settings
D:\R_S\instr\temp is the default directory for hardcopy files.

Other user data should be stored on drive D:.

E: Backup storage location for Windows XP. Here a copy of the operating system is saved.
This drive is used to restore Windows XP using "Analyzer Firmware Backup" function on Power On. A copy of the currently installed update sets are located on this drive, too.
This drive is not available on instruments with option B18 Removable Harddisk

No additional data should be stored on this drive.

Basic Settings - International Keyboard Support

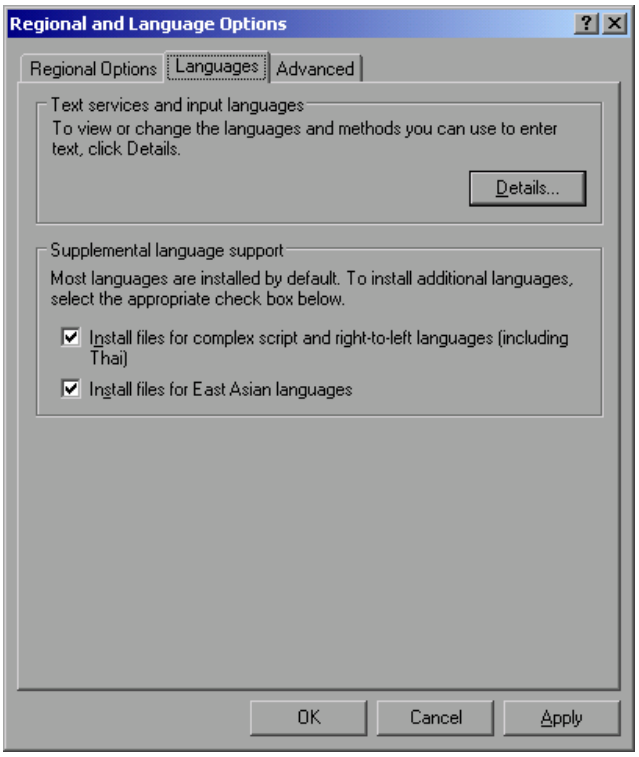
Since firmware version 4.3x following international keyboard drivers are supported.

- **French Keyboards**
- **German Keyboards**
- **Italian Keyboards**
- **Portuguese Keyboards**
- **Spanish Keyboards**

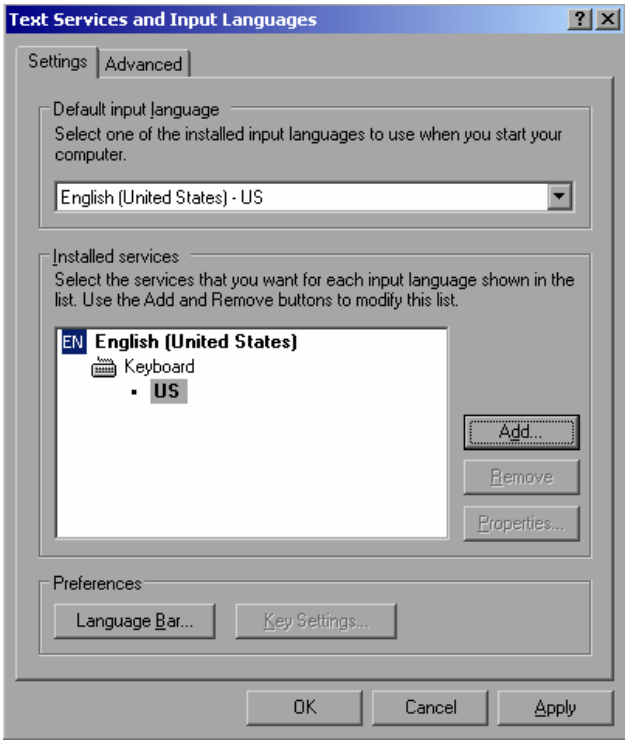
These drivers are pre installed if the instrument is shipped with version 4.3x or later. A separate installer file is available on the instrument's download area.

To change the keyboard driver language proceed with the following steps:

1) Start Windows Explorer
2) Start the installation procedure with double click onto the file **FsxInternationalKeyboards.msi**.
3) Reboot the analyzer.
4) Now open the windows start menu by pressing the windows key or <CTRL> <ESC>.
5) Select *Settings - Control Panel - Reginal and Language Options - Languages*.

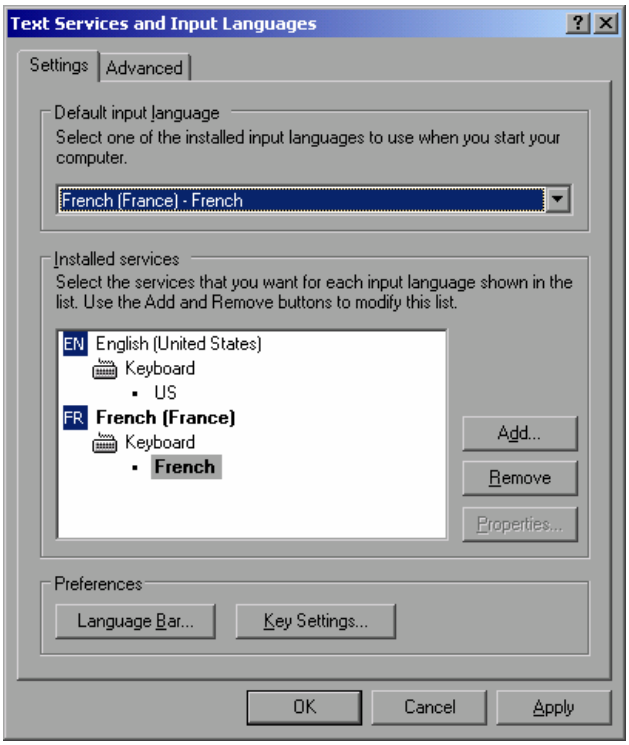


6) Select *Details*.



7) Select *Add*, choose one of the available input languages and confirm with OK and the dialog will be close.

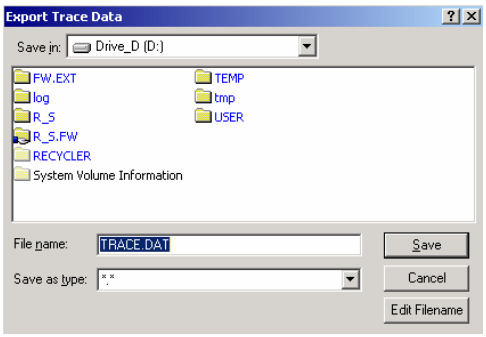
8) Now change the *Default input language* as needed and close all open dialogs with OK.



9) Reboot the analyzer.

Basic Settings - File and Path Selection using front panel keys

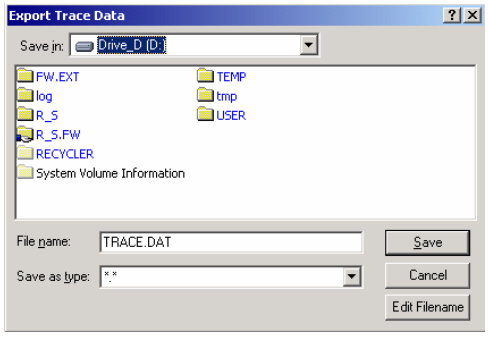
Since firmware version 4.3x the analyzer base system firmware supports new dialogs to select a folder and/or a file, e.g. for trace export.
The following section describes the usage of the instrument's front panel keys using TRACE EXPORT as an example.



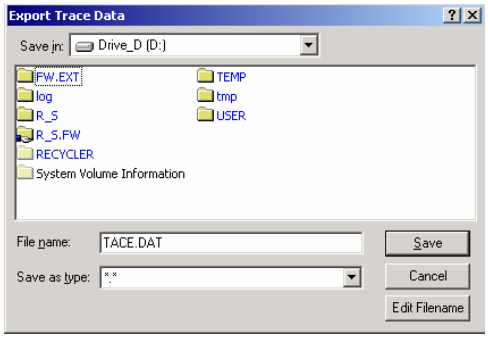
TRACE - NEXT - ASCII FILE EXPORT opens the dialog. *File name* has the focus and it is now possible to edit the filename using numerical keys, CURSOR LEFT/RIGHT and BACK.
The drive to be used is checked in following order:

- Connected USB memory stick
  if not available then
- Drive A:
  if not available or no floppy disk inserted then
- Drive D:

Note: Path and filename are reset to default values with PRESET.

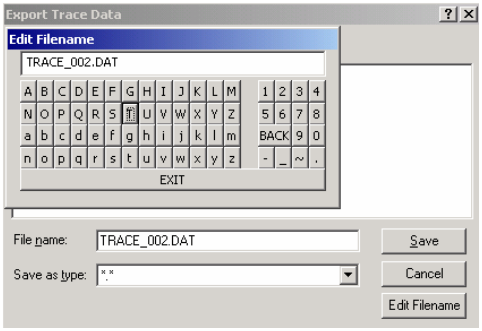


To *change the drive* use the rotary knob until *Save in* gets the focus and press CURSOR RIGHT. Now use CURSOR UP/DOWN to select the drive and press ENTER key or the rotary knob.



To *select a sub folder* or to *select a file* use the rotary knob until the file/sub folder list gets the focus. A selection frame is visible in that case.

Now use CURSOR UP/DOWN to select a folder and press ENTER key or the rotary knob to change the path or select a file to overwrite this file with the new data.



To enter alpha numeric characters fort he file name use the rotary knob to set the focus on *edit filename* and press ENTER key or the rotary knob.

Menu File

Save / Recall functions are split in seperate sub menus for save and recall (see below).
In addition the save function is extended by an automatic generation of save set names.

SAVE ⇩	SAVE FILE	
	SAVE PATH	
	SELECT FILE	
	EDIT FILE NAME	
	EDIT COMMENT	
	SELECT ITEMS⇩	SELECT ITEMS
		ENABLE ALL ITEMS
		DISABLE ALL ITEMS
	DELETE FILE	
	NEW FOLDER	

RECALL ⇩	RECALL FILE	
	SAVE PATH	
	SELECT FILE	
	EDIT FILE NAME	
	EDIT COMMENT	
	SELECT ITEMS⇩	SELECT ITEMS
		ENABLE ALL ITEMS
		DISABLE ALL ITEMS
	DELETE FILE	
	NEW FOLDER	
STARTUP RECALL		
FILE MANAGER ⇩		

SAVE - Edit File Name

Sets the focus on the File Name field.

In the Save dialog box, the field already contains a suggestion for a new name: the file name used in the last saving process is counted up to the next unused name. For example, if the name last used was "test_004", the new name "test_005" is suggested, but only if this name is not in use. If the name "test_005" is already in use, the next free name is suggested, e.g. "test_006". You can change the suggested name to any name conform to the following naming conventions.

The name of a settings file consists of a base name followed by an underscore and three numbers, e.g. "limit_lines_005". In the example, the base name is "limit_lines". The base name can contain characters, numbers and underscores. The file extension is added automatically and can not be changed.

Menu AMPL – NEXT

AMPL	GRID ABS | REL

GRID ABS | REL

The GRID ABS/REL softkey switches between absolute and relative scaling of the level axis. GRID ABS is the default setting. For setting RANGE LINEAR (linear scaling, labelling of axes in %) the softkey is not displayed since the unit % itself implies a relative scale.

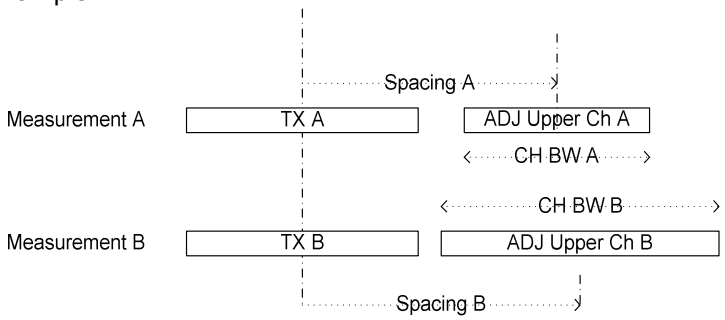
Remote command: DISP:WIND:TRAC:Y:MODE ABS

IEC/IEEE-bus command:
DISP:WIND:TRAC:Y:MODE ABS | REL

Menu MEAS – Channel and Adjacent-Channel Power Measurement

Since firmware version 4.3x is is possible to configure overlapping adjacent channels. Based on a common carrier channel setting, it is now possible to measure with two slitely different ADJ channel settings with one single measurement at a time.

Example:



ACP Measurement A and Measurement B are using identical TX channel settings (Channel Bandwidth).
The ADJ settings for Measurement A and measurement B are different.

It is now possible to do both measurement at a single time.

- Configure the ACP measurement with number of ADJ channels = 2.
- Define ADJ settings (bandwidth, spacing) as required for measurement A.
- Define ALT1 settings (bandwidth, spacing) as required for ADJ channel of measurement B
- Performe the ACP measurement
- Read the ACP measurement result
  The Carrier Power belongs to measurement A and B
  The ADJ result is the ADJ result of measurement A
  The ALT1 result is the ADJ result of measurement B.

Note: This feature is only supported for ACP but not for Multi Carrier ACP measurement.

Menu MKR – NEXT – NEXT

MKR	STEPSIZE STANDARD
	STEPSIZE SWP POINTS

STEPSIZE STANDARD

STEPSIZE SWP POINTS

These softkeys control the knob increment/decrement of the marker position. STEPSIZE STANDARD uses the grid resolution (span/625), STEPSIZE SWP POINTS uses the available sweep points configured in the SWEEP menu.

IEC/IEEE-bus command:
CALC:MARK:X:SSIZE STANDARD | POINTS

Menu MKR→ – NEXT – NEXT

MKR	AUTO MAX PEAK
	AUTO MIN PEAK

AUTO MAX PEAK

AUTO MIN PEAK

AUTO MAX PEAK / *AUTO MIN PEAK* adds an automatic peak search action for Marker 1 at the end of each particular sweep. This function may be used during adjustments of a device under test to keep track of the actual peak marker position and level.
The actual marker search limit settings (*LEFT LIMIT*, *RIGHT LIMIT*, *THRESHOLD,* EXCLUDE LO) are taken into account.

IEC/IEEE-bus command:
```
CALCulate<1|2>:MARKer<1...4>:MAXimum:AUTO ON | OFF
CALCulate<1|2>:MARKer<1...4>:MINimum:AUTO ON | OFF
```

The suffix at MARKer is ignored.

Menu MKR FCTN

PEAK LIST ⇩	Side menu
	PEAK LIST EXPORT
	DECIM SEP

PEAK LIST EXPORT

The PEAK LIST EXPORT softkey stores the content of the marker peak list in ASCII format to the specified file.

IEC/IEEE-bus command: MMEM:STOR:PEAK ''ilename'

DECIM SEP

Selects '.' or ',' as the decimal point.

Menu MKR FKT – PHASE NOISE

MKR FKT	PHASE NOISE	AUTO PEAK SEARCH

AUTO PEAK SEARCH

The phase noise *AUTO PEAK SEARCH* adds an automatic peak search action for the reference fixed marker 1 at the end of each particular sweep. This function may be used for tracking of a drifting source whilst phase noise measurement. The delta marker 2 which shows the phase noise measurement result keeps the delta frequency value. Therefore the phase noise measurement in a certain offset is valid although the source is drifting. Only when the marker 2 is reaching the border of the span the delta marker value is adjusted to be within the span. Choose a larger span in such situations.

IEC/IEEE-bus command:

```
CALCulate<1|2>:DELTamarker<1...4>:FUNCtion:PNOise:
AUTO ON | OFF
```

The suffix at DELTamarker is ignored.

Menu TRACE – NEXT

AVG MODE (LOG) ⇩	LIN
	LOG
	POWER

AVG MODE

The *AVG MODE* softkey selects logarithmic or linear averaging for the logarithmic level display mode.

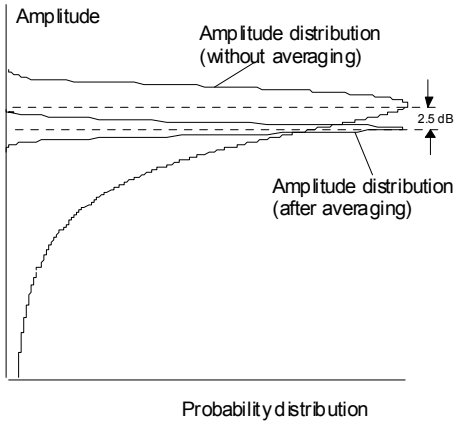
At the same time the difference calculation is switched between linear and logarithmic in submenu *TRACE MATH*.

With logarithmic averaging, the dB values of the display voltage are averaged or substracted from each other with trace mathematical functions. With linear averaging the level values in dB are converted into linear voltages or powers prior to averaging. Voltage or power values are averaged or offset against each other and reconverted into level values.

For stationary signals the two methods yield the same result.

Logarithmic averaging bzw. Verrechnung is recommended if sinewave signals are to be clearly visible against noise since with this type of averaging noise suppression is improved while the sinewave signals remain unchanged.

For noise or pseudo-noise signals the positive peak amplitudes are decreased in logarithmic averaging due the characteristic involved and the negative peak values are increased relative to the average value. If the distorted amplitude distribution is averaged, a value is obtained that is smaller than the actual average value. The difference is -2.5 dB.



This low average value is usually corrected in noise power measurements by a 2.5 dB factor. Therefore the FSG offers the selection of linear averaging. The trace data are delogarithmized prior to averaging, then averaged and logarithmized again for display on the screen. The average value is always correctly displayed irrespective of the signal characteristic.

Following selections are available:

LOG:	logarithmic averaging
LIN	linear averaging (delogarithmization depends on selected unit) For units VOLT and AMPERE the level values are converted into linear voltages prior to averaging.
POWER	linear averaging (delogarithmization to power for all units)

Note: For correct power averaging with units VOLT or AMPERE, selection POWER has to be used.

IEC/IEEE-bus command `CALC:MATH:MODE LIN | LOG | POW`

Menu SETUP – NEXT

SETUP	Side menu	
	OPEN START MENU	
	APPL SETUP RECOVERY	

OPEN START MENU

Softkey OPEN START MENU opens the windows XP start menu. and provides an easy access to standard windows functions if a mouse is connect.

IEC/IEEE-bus command: -

APPL SETUP RECOVERY

Softkey APPL SETUP RECOVERY (Application Setup Recovery) controls the instrument behaviour when changing the active application, e.g from SPECTRUM to FM DEMOD and back from FM DEMOD to SPECTRUM.
In the default state OFF a few parameters of the current analyzer setting are passed to the application (e.g. center frequency, level settings) or from the application back to the analyzer mode.

If APPL SETUP RECOVERY is switched ON, the settings of the applications are independent of each other. Leaving the FM DEMOD application will restore the previous state of the ANALYZER.

Note: The individual application settings are stored on the internal harddisk.

IEC/IEEE-bus command: -
SYSTem:APPLication:SRECovery[:STATe] ON | OFF

Menu SETUP – GENERAL SETUP

SETUP	GENERAL SETUP	CONFIGURE NETWORK	COMPUTER NAME
			IP-ADDRESS
			SUBNET MASK
			DHCP ON OFF
			CONFIGURE NETWORK
			SHOW CONFIG
		OPTIONS	INSTALL OPTION
			REMOVE OPTION
			INSTALL FW EXT
		LXI	DISPLAY ON OFF
			LCI

Configure Network

COMPUTER NAME

Softkey COMPUTERNAME opens a dialog to enter the computer name. The naming conventions of Windows apply. For further details refer to the *Quickstart Guide, Appendix B: LAN Interface*.

IP ADDRESS

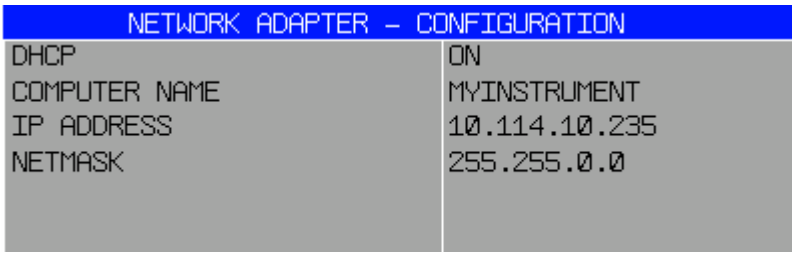
Softkey IP ADDRESS opens a dialog to configure the instrument's IP address. The TCP/IP protocol is preinstalled with the IP address 10.0.0.10. If the DHCP server is available (DHCP ON) the softkey is not available. For further details refer to the *Quickstart Guide, Appendix B: LAN Interface*.

SUBNET MASK

Softkey SUBNET MASK opens a dialog to configure the instrument's TCP/IP subnet mask. The TCP/IP protocol is preinstalled with the subnet mask 255.255.255.0.
The subnet mask consists of four number blocks separated by dots. Each block contain 3 numbers in maximum (e.g.100.100.100.100), but also one ore two numbers are allowed in a block (as an example see the preinstalled address). For further details refer to the *Quickstart Guide, Appendix B: LAN Interface*.

SHOW CONFIG

Softkey SHOW CONFIG show the current network configuration.



Note: The Network Configuration softkeys above are available since Firmware Version 4.3x.
Instruments shipped with Windows XP Service Pack1 require an additional installation package (LXI installer) if the softkeys are not visible. This installation package is available on the R&S instrument's download area.

The configuration via softkeys is only possible if the LAN is connected to the instrument.

CONFIGURE NETWORK

The CONFIGURE NETWORK softkey opens the windows dialog box with the network settings. The most important parameters are accessible by the softkeys COMPUTER NAME, IP ADDRESS, SUBNET MASK and DHCP ON/OFF.

Options

INSTALL FW EXT

Softkey INSTALL FW EXT opens a dialog to select and start a Firmware Extension Installer MSI File. This softkey is only visible if an application requires an extension of the Windows XP environment.
Due to the installer package size it is not allowed to install these FW Extension Pages on instruments with option FSQ-B18 - Removable Harddisk and therefore this softkey is not available in that case.

Note: A message window will pop up when an option key code is enter for an application requiring a certain FW Extension Package. After installation of the FW Extension Package the option key has to be entered a second time.

LXI

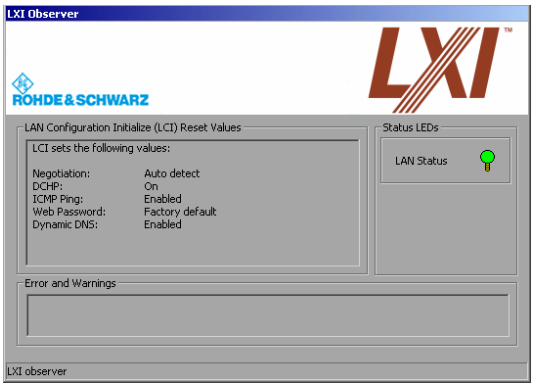
DISPLAY ON OFF

The LXI menu offers some functions for LXI Class C.

LCI

Note: This menu is only available, if the LXI package is installed and activated (see: LXI Installation).

The DISPLAY ON/OFF softkey switches the LXI Observer window on and off.



Pressing LCI will execute the *LAN Configuration Initialize (LCI)*.

LXI Installation:

The LXI Class C support package is pre installed, if the analyzer is shipped with version 4.2x or newer. A link LXI is visible in the windows start menu.

The installation of the LXI Class C support package requires an external keyboard and/or a mouse. To install the LXI Class C support package please:

- Download the installer file from the R&S download area.
- Select windows start menu (Windows key or CTRL ESC) and start the windows explorer
- Create the sub directory **D:\LXI**, if this directory does not exist.
- Copy the installer file to this directory via LAN or USB stick.
- Start the installation by double click on the MSI file.

LXI Activation and Deactivation:

After the successful packet installation the LXI support has to be activated:

- Connect the analyzer to the LAN.
- Select windows start menu (Windows key or CTRL ESC)
- Select *LXI*.
- Select *LXI Config*. An LXI configuration dialog will be opened.
- Select the correct instrument (FMU).
- Select *Rescan*. The current IP address will be visible in the bottom line.
- Select Save, after successful rescan operation.

To switch LXI OFF, use again the LXI entry from the start menu and select the LXI TURN OFF button.

Remote Operation

Structure of a Command Line - Parameters

Block data

Block data are a transmission format which is suitable for the transmission of large amounts of data. A command using a block data parameter has the following structure:

Example: `HEADer:HEADer #45168xxxxxxxx`

ASCII character # introduces the data block. The next number indicates how many of the following digits describe the length of the data block. In the example the 4 following digits indicate the length to be 5168 bytes. The data bytes follow. During the transmission of these data bytes all End or other control signs are ignored until all bytes are transmitted.
This format only supports a byte count up to 9 digits for the number of bytes. For more than 999999999 bytes, following additional format is used:

Example: `HEADer:HEADer` **#(**1100000000**)** `xxxxxxxx`

The byte length count if put into brackets. In the example the byte counts indicates a length of 1.100.000.000 bytes. The data bytes follow the close bracket.

:CALCulate<1|2>:LIMit<1...8>:ACTive?

This commands queries the names of all active limit lines. The numeric suffixes at CALCulate and LIMit are ignored. The list is sorted in alphabetic order. Any empty string is returned, if no limit line is active.

Example: ":CALC:LIM:ACT?"

Characteristics: *RST value : -
SCPI: device-specific

:MMEMory:STORe<1|2>:MARKer <file_name>

This command saves the data of active markers to a file < file_name >.

Example: File content with 2 active marker in screen A:

```
Marker;1;T1
-25.87;dBm
19.920000000;GHz
Delta;2;T1
-21.90;dB
-5.920000000;GHz
```

Example: `"MMEM:STOR:MARK 'C:\marker.txt'"` 'Creates the file 'marker.txt, with all marker data of screen A.

Characteristics: *RST-Wert: -
SCPI: device-specific

Mode: A

This command is an event and therefore has no *RST value and no query.

:SYSTem:APPLication:SRECovery[:STATe] ON | OFF

This command controls the instrument behaviour when changing the active application, e.g from SPECTRUM to FM DEMOD and back from FM DEMOD to SPECTRUM. In the default state OFF a few parameters of the current analyzer setting are passed to the application (e.g. center frequency, level

settings) or from the application back to the analyzer mode. If APPL SETUP RECOVERY is switched ON, the settings of the applications are independent of each other. Leaving the FM DEMOD application will restore the previous state of the ANALYZER.

Note: The individual application settings are stored on the internal harddisk.

Example: ":SYST:APPL:SREC ON ' use independent settings

Characteristics: *RST value: OFF
SCPI: device-specific

:SYSTem:IDENtify:FACTory

With this command it is possible to reset the *IDN string to the factory default (Softkey: ID STRING FACTORY). The command in the form of a query returns "1" for the factory default state and "0" if the ID string is changed.

Example: ":SYST:IDEN:FACT" 'sets the ID string to the factory default

Characteristics: ***RST value:** **-**
SCPI: device-specific

:SYSTem:KLOCk ON | OFF

The alias remote command SYST:KLOC can be used to activate the LLO (local lockout) or to return to the local mode (GTL go to local). Parameter ON is LLO, OFF is GTL.

Example: "SYST:KLOC ON " 'activates LLO

Characteristics: *RST value: OFF
SCPI: device-specific

:SYSTem:LXI:DISPlay ON | OFF

This command shows or hides the LXI Observer dialog box. To use this command, the LXI Class C functionality must be installed and enabled.

Example: ":SYST:LXI:DISP ON" 'shows the LXI Observer dialog box.

Characteristics: *RST value: OFF
SCPI: device-specific

:SYSTem:LXI:LCI

This command executes the LAN configuration initialize (LCI) on the instrument. To use this command, the LXI Class C functionality must be installed and enabled.
This command is an event and therefore has no *RST value and no query.

Example: ":SYST:LXI:LCI" 'sets the LAN configuration initialize (LCI).

Characteristics: *RST value: -
SCPI: device-specific

TRACE:IQ Sub-system Extension

:TRACe<1|2>:IQ:FILTer:FLATness NORMal | WIDE

This command allows measurement with extended usable signal bandwidth for sample rates in the range of 20.4 MHz to 40.8 MHz.

NORMal Normal operation

WIDE Extended usable signal bandwidth, reduced selectivity

Sample Rate Range	Usable Bandwidth	
	NORMal	WIDE
10.2 MHz < Sample Rate <= 20.4 MHz	0.8 * Sample Rate	0.9 * Sample Rate
20.4 MHz < Sample Rate <= 40.8 MHz	0.68 * Sample Rate	0.8 * Sample Rate

Example: `"TRAC:IQ:FILT:FLAT WIDE"`

Characteristics: *RST value: NORM
SCPI: device-specific

Using the R&S FMU baseband input in the options

The options FSQ-K5, FSQ-K70, FS-K72/K73/K74, FS-K82/K83, FS-K84/K85, FSQ-K90/K91 and FSQ-K92/K93/K94 are available for instruments with RF input (e.g. R&S FSP), for instruments with RF input and baseband input (e.g. R&S FSQ, option FSQ-B71) and for instruments with baseband input only (R&S FMU).

The following section describes those softkeys used to control the baseband input which are identical in all of the named options, as well as any other characteristics which are common to all options. Baseband functions of options not listed here can be found in the respective manual.

The individual application measurements that can be performed with the baseband input are described separately for each application.

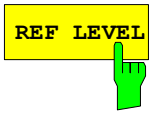
The applications themselves are described in the respective manuals.

Configuring the I/Q baseband input in the applications

The lowpass filter of the baseband input cannot be switched off and dithering cannot be switched on within the applications.

When the baseband input is active, it is also not possible to make the following settings in the named options:

- RF attenuation (automatically derived from reference level)
- Video bandwidth (irrelevant)
- Sweep time (frequency domain)



In the baseband, the reference level is entered in volt peak. The level in the diagram label is specified in dBm, however, since the limit values in the mobile radio standards are also specified in dBm. 1 volt peak corresponds to 10 dBm.

The following values are permissible:
0.0316 V
0.0562 V
0.1 V
0.178 V
0.316 V
0.562 V
1 V
1.78 V
3.16 V only with IMPEDANCE LOW (50 Ω)
5.62 V only with IMPEDANCE LOW (50 Ω)

IEC/IEEE bus command: `SENS:VOLT:IQ:RANGE 1V`

By entering an adequate reference level offset (to compensate for the output amplifier of a base station or mobile phone not available in the measurement path), the values can be shifted to the appropriate range.
The y-axis scaling is changed accordingly.

The setting range is ±200 dB in 0.1 dB steps.

IEC/IEEE bus command: `DISP:WIND:TRAC:RLEV:OFFS -10dB`

Note: The options FSQ-K90/K91 and FSQ-K92/K93/K94 have there own configuration items (see *General Settings - Advanced Settings* in the respective manuals).

Application FS-K5

When the baseband input is active, the following measurements can be performed with application FS-K5 (GSM and EDGE):

Measurement	Available for FMU	Available for FSQ Baseband Input
PHASE/FREQ ERROR (GSM)	yes	yes
MODULATION ACCURACY (EDGE)	yes	yes
CARRIER POWER	yes	no
POWER VS TIME	yes	yes
MODULATION SPECTRUM	no	no
TRANSIENT SPECTRUM	no	no
SPURIOUS	no	no
AUTO LEVEL&TIME	yes	yes

Application FS-K7

When the baseband is active, all measurements can be performed with application FS-K7 (FM demodulator).

Application FS-K8

When the baseband input is active, the following measurements can be performed with application FS-K8 (Bluetooth):

Measurement	Available for FMU	Available for FSQ Baseband Input
OUTPUT POWER	yes	yes
TX SPEC ACP	no	no
MODULATION CHAR	yes	yes
INIT CARR FREQ TOL	yes	yes
CARR FREQ DRIFT	yes	yes
EDR - REL TX POWER	yes	yes
EDR - SPURIOUS EMISSIONS	no	no
EDR - CARR FREQ STABILITY	yes	yes
EDR - DIFF PHASE	yes	yes

Application FSQ-K70

When the baseband is active, all measurements can be performed with application FSQ-K70 (vector signal analysis).

Applications FS-K72 and FS-K73

When the baseband input is active, the following measurements can be performed with applications FS-K72/K74 (3G FDD BS) and FS-K73 (3G FDD MS):

Measurement	Available for FMU	Available for FSQ Baseband Input
POWER	yes	no
ACLR [1)]	yes	no
MULTI CARR ACLR (K72/K74) [1)]	yes	no
SPECTRUM EM MASK	no	no
OCCUPIED BANDWIDTH	yes	no
STATISTICS	yes	no
CODE DOM POWER	yes	yes
SPURIOUS	no	no
RF COMBI	no	no

Note:
[1)] The useable number of adjacent channels is limited by the mamimum baseband input bandwith (36 MHz for *I Only*, *Q Only* and 72 MHz *for I + jQ*).

Applications FS-K82 and FS-K83

When the baseband input is active, the following measurements can be performed with applications FS-K82 (CDMA 2k BS) and FS-K83 (CDMA 2k MS):

Measurement	Available for FMU	Available for FSQ Baseband Input
POWER	yes	no
ACLR [1)]	yes	no
MULTI CARR ACLR (K82) [1)]	yes	no
SPECTRUM EM MASK	no	no
OCCUPIED BANDWIDTH	yes	no
CODE DOM POWER	yes	yes
SIGNAL STATISTICS	yes	no

Note:
[1)] The useable number of adjacent channels is limited by the mamimum baseband input bandwith (36 MHz for *I Only*, *Q Only* and 72 MHz *for I + jQ*).

Applications FS-K84 and FS-K85

When the baseband input is active, the following measurements can be performed with applications FS-K84 (1xEVDO BS) and FS-K85 (1xEVDO MS):

Measurement	Available for FMU	Available for FSQ Baseband Input
POWER	yes	no
ACLR [1)]	yes	no
MULTI CARR ACLR (K84) [1)]	yes	no
SPECTRUM EM MASK	no	no
OCCUPIED BANDWIDTH	yes	no
CODE DOM POWER	yes	yes
SIGNAL STATISTICS	yes	no
POWER VS TIME (K84)	yes	no

Note:
[1)] The useable number of adjacent channels is limited by the mamimum baseband input bandwith (36 MHz for *I Only*, *Q Only* and 72 MHz *for I + jQ*).

Applications FSQ-K90/K91 and FSQ-K92/K93

When the baseband is active, all measurements can be performed with applications FSQ-K90/K91 (WLAN) and FSQ-K92/K93/K94 (WIMAX).

R&S FS-K7 Extensions

Operating Manual "FM Measurement Demodulator R&S FS-K7":

- 1141.1821.42-06 (English). and
- 1141.1821.41-06 (German)

The corresponding PDF-Files are separately available on the service board.

Last minute changes to the R&S FS-K7 operating manual

None.

R&S FS-K8 Extensions

The additional Enhanced Data Rate functions are described in a new revision of the operating manual.

Operating Manual "Application Firmware for Bluetooth Measurements R&S FS-K8":

- 1157.2597.42-02 (English). and
- 1157.2597.41-02 (German)

The corresponding PDF-Files are separately available on the service board.

Last minute changes to the R&S FS-K8 operating manual

TRACe:DATA? BTOBits

Reads the packet data bits.

Example:
```
"INST:SEL:BTO "          'activate bluetooth application
"CONF:BTO:MEAS MCH"      'select Modulation Characteristics.
"TRACe:DATA? BTOB"       'Read data bits
```

Characteristics:
*RST value: -
SCPI: device-specific

TRACe:DATA? BTOFm

Reads the FM trace with selected oversampling factor (Pointer per Symbol).

Example:
```
"INST:SEL:BTO "          'activate bluetooth application
"CONF:BTO:MEAS MCH"      'select modulation characteristics
"TRACe:DATA? BTOF"       'read FM trace
```

Characteristics:
*RST value: -
SCPI: device-specific

R&S FS-K9 Extensions

In addition to the normal function of *MEAS->REF* and *REFERENCE VALUE* softkeys the unit of the power sensor display is changed from the absolut unit dBm or Watt to the relative unit dB or %. Use the *UNIT/SCALE* key if absolute units are required again.

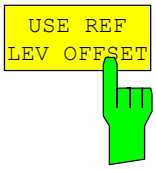
Software Manual "Measurements with Power Sensors, Application Firmware R&S FS-K9":

- 1157.3029.42-03 (English). and
- 1157.3029.44-03 (German)

The corresponding PDF-Files are separately available on the service board.

Last minute changes to the R&S FS-K9 operating manual

Menu PWR METER with option R&S FS-K9 - NEXT



The USE REF LEV OFFSET softkey controls whether the analyzer reference level is taken into account of the measured power (state ON) or not (sate OFF).

IEC/IEEE bus command: SENSe1:PMETer:ROFFset[STATe] ON | OFF

R&S FSQ-B17 Extensions

General Hints

Using R&S AMU and R&S SMU as a signal source for Digital Baseband Input

To directly connect the signal generator R&S AMU or R&S SMU to the digital baseband input of the analyzer with option FSQ-B17 a minimum generator firmware version is required:

R&S AMU 2.05.104.32 (or newer)
R&S SMU 2.05.104.33 (or newer)

Recommended Power On Sequence

A certain power on sequence is required if the LVDS interface cable is plugged in during power on. The sending device of the digital baseband data (e.g. SMU) has to be switched on first in that case. The receiving device (analyzer) as to be switched on last.

Establishing the digital baseband input connection from R&S AMU, R&S SMU to R&S FSQ

The recognizion of the digital baseband source is possible only with applications supporting the digital baseband input (e.g. FS-K7, FSQ-K70). If one of this applications is selected and running in continuous sweep mode, the R&S AMU and R&S SMU will detect the data sink and list the analyzer in the related dialog.

Last minute changes to the R&S FSQ-B17 operating manual

Operating Manual "Digital Baseband Interface R&S FSQ-B17":

- 1303.4098.12-01 (English)

The corresponding PDF-Files are separately available on the service board.

INPut<1|2>:SELect AIQ | DIQ

This command switches between analog and digital baseband input. *This command is not available in the FFT Analyzer mode.*

AIQ: Analog baseband input
DIQ: Digital baseband input
Only supported for TRACE:IQ sub system, requires option FSQ-B17.

Example: `"INP:SEL DIQ"`

Characteristics: *RST value: AIQ
SCPI: instrument-specific

The numeric suffix <1|2> is irrelevant with this command.

:INPut<1|2>:DIQ:RANGe[:UPPer] <numeric_value>

This command defines the voltage corresponding to the maximum input value of the digital baseband input (value 7FFF hex). This command is only available with option FSQ-B17.

Example: ":INPut:DIQ:RANGe 1.2" ' defines 1.2 V as full scale

Characteristics: *RST value: 1.0
SCPI: device-specific

:INPut<1|2>:DIQ:SRATe <numeric_value>

This command defines the input date sample rate read by the digital baseband input. This command is only available with option FSQ-B17.

Example: ":INPut:DIQ:SRAT 40.0MHZ" ' input data sample rate is 40 MHz

Characteristics: *RST value: 81.6 MHz
SCPI: device-specific

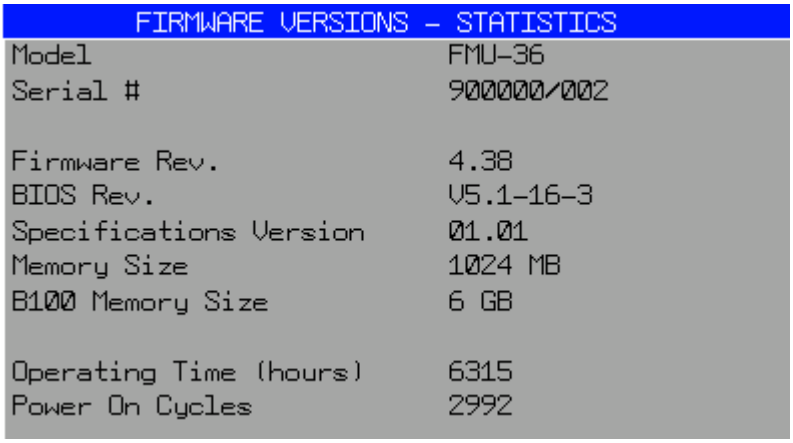
Option FSQ-B100 I/Q Memory Extension

Since version V4.08 the options FSQ-B100/B102 I/Q Memory Extension are supported.
The available memory is listed in table SETUP - SYSTEM INFO STATISTICS, B100 Memory size.

I/Q Memory Extensions	Maximum memory size:
FSQ-B100	235 MSamples
FSQ-B100 + FSQ-B102	705 MSamples

The order numbers are:
1169.5244.02 FSQ-B100 I/Q Memory Extension - 235 MSamples
1169.5444.04 FSQ-B100 I/Q Memory Extension - extends to 705 MSamples

Press SETUP - SYSTEM INFO - STATISTICS to check the available I/Q memory:



The B100 Memory Size is rounded to Giga Bytes and listed in row *B100 Memory Size*:
2 GB for FSQ-B100 only
6 GB for FSQ-B100 + FSQ-B102

Following functions in the base system and listed applications are affected:

Application:	**Base System (TRACE:IQ sub system)**		
Analog Baseband Input			
Sample Rate SR	**Maximum Number of Samples**		**Comment**
	B100 + B102	**B100 only**	
81.6MHz < SR ≤ 200.0 MHz	704.642.560	234.880.512	
SR = 81.6 MHz	1.409.285.632	469.761.536	
40.8 MHz ≤ SR < 81.6 MHz	N = INT(k * SR [MHz] + 0.5)		N: Allowed Number of Samples
	k = 8635325,475	k = 2878437,64	
e.g. SR =			
81.0 MHz	699.461.364	233.153.449	
80.0 MHz	690.826.039	230.275.011	
70.0 MHz	604.472.784	201.490.635	
60.0 MHz	518.119.529	172.706.258	
50.0 MHz	431.766.274	143.921.882	
42.0 MHz	362.683.670	120.894.381	
41.0 MHz	354.048.345	118.015.943	
816 kHz < S < 40.8 MHz	1.409.285.632	469.761.536	
400 Hz ≤ S ≤ 816 kHz	1.006.632.448	335.543.808	

Application:	**FSQ-K70 (VSA)**		
Analog Baseband Input			
Symbol Rate SR	**Maximum RECORD LENGTH [Symbols]**		**Comment**
	B100 + B102	**B100 only**	
10.2 MHz < SR ≤ 50 MHz	176.160.568	58.720.056	
204 kHz < SR < 10.2 MHz	352.321.336	117.440.312	
100 Hz ≤ SR ≤ 204 kHz	251.658.040	83.885.880	

Note: Maximum Record Length noted for Points/Symbol ≤ 4. If Points/Symbol is increased, the maximum Record Length is reduced by the same factor.

Application	**Mode**	**User Parameter / Comments**	**Maximum I/Q Capture Length**	
			B100 + B102	**B100 only**
FS-K72/74 **FS-K73**	3G FDD BS 3G FDD UE	**Maximum CAPTURE LENGTH** for Analog Baseband Input	3.000 frames	1.000 frames
FS-K82 **FS-K83**	CDMA2k BS CDMA2k MS	**Maximum SET COUNT** for RF and Analog Baseband Input (1 set = 64 PCGs *))	1.140 sets	380 sets
		Number of captured chips	112.066.560 Chips	37.355.520Chips
		Capture time	91.2 sec	30.4 sec
FS-K84 **FS-K85**	1xEVDO BS 1xEVDO MS	**Maximum SET COUNT** for RF and Analog Baseband Input (K84: 1 set = 32 slots) (K85: 1 set = 64 half slots)	1.710 sets	570 sets
		Number of captured chips	112.066.560 Chips	37.355.520 Chips
		Capture time	91.2 sec	30.4 sec

Notes:
*) PCG: Power Control Group

Appendix: Contact to our hotline

Any questions or ideas concerning the instrument are welcome by our hotline:

USA & Canada

Monday to Friday (except US public holidays)
8:00 AM – 8:00 PM Eastern Standard Time (EST)

Tel. from USA	888-test-rsa (888-837-8772) (opt 2)
From outside USA	+1 410 910 7800 (opt 2)
Fax	+1 410 910 7801
E-mail	Customer.Support@rsa.rohde-schwarz.com

East Asia

Monday to Friday (except Singaporean public holidays)
8:30 AM – 6:00 PM Singapore Time (SGT)

Tel.	+65 6 513 0488
Fax +	65 6 846 1090
E-mail	Customersupport.asia@rohde-schwarz.com

Rest of the World

Monday to Friday (except German public holidays)
08:00 – 17:00 Central European Time (CET)

Tel. from Europe	+49 (0) 180 512 42 42
From outside Europe	+49 89 4129 13776
Fax	+49 (0) 89 41 29 637 78
E-mail	CustomerSupport@rohde-schwarz.com