



**ROHDE & SCHWARZ**

Test and Measurement  
Division

## Release Notes

# R&S FSQ-K70

## Vector Signal Analysis Application Firmware

### Release 4.10

for R&S FSU/FSQ/FMU/FSUP Analyzer Firmware 4.1x

Release Note Revision: 2

Printed in the Federal  
Republic of Germany

## Contents

<b>History .....</b>	<b>3</b>
<b>General Topics .....</b>	<b>3</b>
<b>Hardware Requirements .....</b>	<b>3</b>
<b>Compatibility of the R&amp;S FSQ-K70 Vector Analysis Application Firmware with other Firmware Releases .....</b>	<b>4</b>
<b>Firmware Update of the R&amp;S FSQ-K70 Vector Analysis Application Firmware .....</b>	<b>5</b>
Generation of the update disk set for R&S FSQ-K70 Vector Analysis Application Firmware...	5
Preparing installation via LAN or USB stick:.....	6
Performing the Application Firmware Update on the Instrument.....	6
Enabling the Application Firmware via License Key Code Entry .....	7
<b>Modified Functions.....</b>	<b>7</b>
<b>Problems Eliminated with option R&amp;S FSQ-K70 Vector Signal Analysis Application Firmware .....</b>	<b>8</b>
<b>Known problems with option R&amp;S FSQ-K70 Vector Analysis.....</b>	<b>8</b>
<b>Modifications to the Operating Manual and Supplements .....</b>	<b>9</b>
<b>Last minute changes to the operating manual.....</b>	<b>9</b>
Setting Demodulation - DEMOD SETTINGS Softkey.....	9
Selection of Error Display - ERROR SIGNAL Softkey.....	9
Remote Control Commands .....	12
<b>Appendix: Contact to our hotline.....</b>	<b>14</b>

## History

<b>Date</b>	<b>Rel Note Rev</b>	<b>Changes</b>
12. April 2007	1	First revision for Vector Analysis Application Firmware 4.10
06. August 2007	2	Added R&S FSUP V4.17

## General Topics

### Hardware Requirements

Please note at least revision 04.08 of Wideband Detector Board is required for R&S FSQ-K70. This can be checked in the SETUP SYSTEM INFO menu with softkey HARDWARE INFO.

For component WB DETECTOR is required:

<b>revision</b>	<b>sub revision</b>	<b>or</b>
4	≥ 8	
> 5		

#### **Hint for R&S FSUP:**

Please note at least model 08 of Wideband Detector Board is required for R&S FSQ-K70: This can be checked in the SPECTRUM -> SETUP -> SYSTEM INFO menu with softkey HARDWARE INFO. For component WBDET with order number 1130.3086 the model ≥ 08 is required.

## Compatibility of the R&S FSQ-K70 Vector Analysis Application Firmware with other Firmware Releases

The following table shows the compatible versions of the basic analyzer firmware and the Vector Analysis Application Firmware:

**Table of compatible versions:**

R&S FSQ-K70 Application Firmware	R&S FSQ Basic Firmware	R&S FSU Basic Firmware	R&S FSMR Basic Firmware	R&S FSUP Basic Firmware	R&S FMU Basic Firmware
4.10	4.15	4.11	-	4.17	4.18
4.01	-	-	-	-	4.08
4.00 SP2	4.05 SP3	4.01 SP3	-	-	-
4.00 SP1	-	-	4.06	-	-
4.00	4.05	4.01	-	-	-
3.90 SP1	3.95 SP2	-	-	-	-
3.90	3.95	-	3.96	-	-
3.80	3.85	-	-	-	-
3.70	3.75	-	-	-	-
3.60	3.65	-	-	-	-
3.50 SP1	3.55 SP2	-	-	-	-
3.50	3.55	-	-	-	-
3.40	3.45	-	-	-	-
3.30	3.35	-	-	-	-
3.28	3.25	-	-	-	-
3.24	3.15	-	-	-	-
3.21	3.05 SP1	-	-	-	-
3.20	3.05	-	-	-	-
2.30	2.35	-	-	-	-
2.28	2.25	-	-	-	-
2.24	2.15	-	-	-	-
1.21	2.05	-	-	-	-
1.00	1.85	-	-	-	-
-	1.65	-	-	-	-
-	1.55	-	-	-	-

The FSQ-K70 application firmware versions 3.xx or 4.xx requires Windows XP. For NT based instruments a Windows-XP upgrade kit FSQ-U2, order # 1162.9696.02 is available.

**Note:**

*Applications with version number 3.xx or 4.xx are only compatible with basic firmware 3.yy or 4.yy (see table above). Do not install them on basic firmware versions below 3.00!*

## Firmware Update of the R&S FSQ-K70 Vector Analysis Application Firmware

The R&S FSQ-K70 Vector Analysis Application Firmware package is available with its own version number. This application firmware package requires an appropriate basic instrument firmware version. Compatible revisions are shown in the table above.

Please make sure to have the correct basic firmware version installed prior to installing the R&S FSQ-K70 Vector Analysis Application Firmware. Please refer to the basic firmware version release notes for firmware update information of the basic firmware.

### Generation of the update disk set for R&S FSQ-K70 Vector Analysis Application Firmware

The files needed for the R&S FSQ-K70 Vector Analysis Application Firmware update are available in the FIRMWARE section of the Service Board on GLORIS (R&S FSQ-K70).

If you already have the update disk set you can skip this paragraph.

They are grouped according to the disk contents:

Disk 1: disk1.bin (self-extracting ZIP file)  
Disk 2: data3.cab (packed contents of disk 2, will be automatically unpacked by FW update)

**The contents of disk 1 are packed in a self-extracting ZIP file and need to be unzipped.** For this purpose the following steps are necessary:

1. Create a temporary directory on your local PC (e.g. MyTemp\Extensions\K70 on drive C:)
2. Copy disk1.bin into that directory and rename it to disk1.exe
3. Execute disk1.exe. Under Windows 95/98/NT/XP/2000 this is done best using the following sequence:  
<CTRL><ESC> - RUN – C:\MyTemp\Extensions\K70\DISK1 - <ENTER> or  
<CTRL><ESC> - AUSFÜHREN – C:\MyTemp\Extensions\K70\DISK1 - <ENTER> for a German version.  
The files will be unzipped.
4. Delete disk1.exe from the temporary directory.

The temporary directory will now contain the following files:

data1.cab	data1.hdr	data2.cab	ExecCtrl.exe	id.txt	ikernel.ex_
ISSetup.exe	layout.bin	RestInst.exe	Setup.exe	Setup.ini	setup.inx

**Please make sure that all filenames exactly match with these printed above before you try to use them for the firmware update. Especially the trailing underscore ('\_') as used in ikernel.ex\_ or \_inst32i.ex\_ is essential for correct operation of the update program.**

5. Copy the contents of the temporary directory onto update disk #1.

The content of the other disk is already packed in the format required by the firmware update program and need no further processing.

The file data3.cab only needs to be copied onto disk #2.

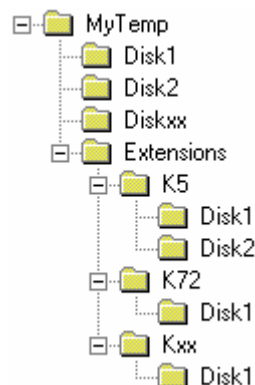
### Preparing installation via LAN or USB stick:

If the installation shall be done via LAN or USB stick (XP only) please set up the following directory structure:

Copy all files as mentioned in the previous section in the directories ..\MyTemp\Extensions\K70\Disk1 – Disk2.

Other files (e.g. release notes) shall not be stored in these directories. These files would be copied on harddisk and may cause a disk full problem on drive E:.

Since version 3.40 the directory path can contain more the 64 characters.



### Performing the Application Firmware Update on the Instrument

The Application Firmware update process is performed in the following steps:

- Switch the instrument on and wait until the Analyzer has resumed operation.
- For updates from LAN or USB (XP only) use the SETUP | NEXT | FIRMWARE UPDATE | UPDATE PATH softkey to specify any path for the location of the Disk1 directory (e.g. F:\MyTemp\Extensions\K70). For floppy usage the default A:\ must not be changed
- Press SETUP → NEXT → FIRMWARE UPDATE
- Confirm the query "Do you really want to update the firmware?" with OK
- Insert update disk #1 and #2 as requested (for LAN or USB just confirm the copy process)
- The instrument will perform several automatic shutdowns, until the new firmware is installed properly.  
**Do not switch the instrument off until the update process has been finished completely.**

After switching on the instrument for the first time after a successful firmware update it is necessary to execute the instrument's self alignment process by pressing CAL and softkey CAL TOTAL.

**Note:** A simplified update process is available if base system firmware 4.1x or newer is installed. More details are described in the release note of the base system firmware.

## Enabling the Application Firmware via License Key Code Entry

This section can be skipped if the option key was entered once.

After installing the application firmware package 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 FSQ or delivered as a part of the R&S FS-K70 Vector Analysis Application Firmware package.

The key sequence for entering the license key is:

SETUP - GENERAL SETUP – OPTIONS - INSTALL OPTION

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

- On a successful validation the message 'option key valid' will appear.
- If the validation failed, the application firmware is not installed.  
The most probable reason will be that the instrument is not equipped with the correct basic firmware version. Therefore a message box will appear asking for installation of the correct basic firmware version.  
If the application firmware package was not installed prior to entering the license key code, a message will appear asking for installation of the application firmware package.  
**In any case please make sure that the correct basic firmware version and the application firmware package is installed prior to entering the license key code.**

## Modified Functions

The behaviour of the following functions changed compared to earlier versions [the number in brackets indicates the firmware version that introduced the individual change]:

1. [V3.60] **EXPORT STANDARD: Query before overwriting existing file in manual operation.**
2. [V3.60] **Menu HOME VSA - FACTORY DEFAULTS now support PATTERNS, too.**
3. [V3.60] **Expanded range for Symbol Rate. The lower limit is now 100 Hz.**
4. [V3.60] **A trace in VIEW state in analyzer mode is set to CLR/WRITE when leaving the vector analysis mode.**
5. [V3.80] **Expanded range for FSK Ref. Deviation. The upper limit is now  $1.5 * \text{Symbol Rate}$ .**
6. [V3.80] **Measurements at low frequencies using baseband inputs of option FSQ-B71 by a digital down conversion are now supported.**
7. [V3.80] **Absolute marker position for marker 1 added for measurement result AM/AM - AM/PM conversion.**
8. [V3.80] **SAVE AS STANDARD additionally stores statistics parameter settings (X-AXIS QUANTIZE, X-axis and Y-axis scaling).**
9. [V3.80] **Default focus for NEW PATTERN dialog is change to pattern name.**
10. [V3.90] **Support of option FSQ-B100: Extended Record Length.**
11. [V4.00] **External trigger level in steps 0.1V over the complete range of 0.5V to 3.5V.**

## Problems Eliminated with option R&S FSQ-K70 Vector Signal Analysis Application Firmware

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

1. [V4.00] Erroneous symbol table display when modulation type is changed from 128QAM to BPSK.
2. [V4.00] FSQ-B71: Function adjust reference level does not find the best instrument setting. The resulting level may be 5 dB higher than required.
3. [V4.00] FSQ-B72: If function FORCE WB PATH is active and the symbol rate in the range 20.4 MHz ... 25 MHz is used, moving the capture buffer zoom window does not work.
4. [V4.00] A frequency offset is not correctly taken into account.
5. [V4.00] Query command "DIAG:SERV:HWINFO?" is not available in VSA mode.

## Known problems with option R&S FSQ-K70 Vector Analysis

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

1. [K70 V2.24/V3.24] Export trace functions available in the FILE menu.

The trace export function of menu FILE is not supported in FSQ-K70, but the soft keys are not disabled.

**Workaround:** Use functions of menu TRACE.



## Modifications to the Operating Manual and Supplements

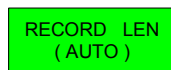
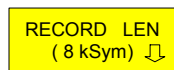
The R&S FSQ-K70 analyzer functions are included in a separate new manual set. Please refer to the following order numbers:

- 1161.8073.42-07 (German and English)

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

### Last minute changes to the operating manual

#### Setting Demodulation - DEMOD SETTINGS Softkey



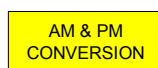
The *RECORD LEN* softkey opens a submenu for setting the size of the IQ buffer for data recording.

Time entries are internally converted into the unit symbol and are rounded to integer symbols.

The screen display range of the MAG CAP BUFFERS is exclusively determined by the setting of the RECORD LEN.

The upper limit of the record length is 4194104 symbols.

#### Selection of Error Display - ERROR SIGNAL Softkey



The *AM & PM CONVERSION* softkey displays the amplitude or phase error of the measurement signal relative to the reference signal level (i.e. of an ideal, undistorted transmission signal). The test points are used to calculate the distortion characteristic, on which the markers move.

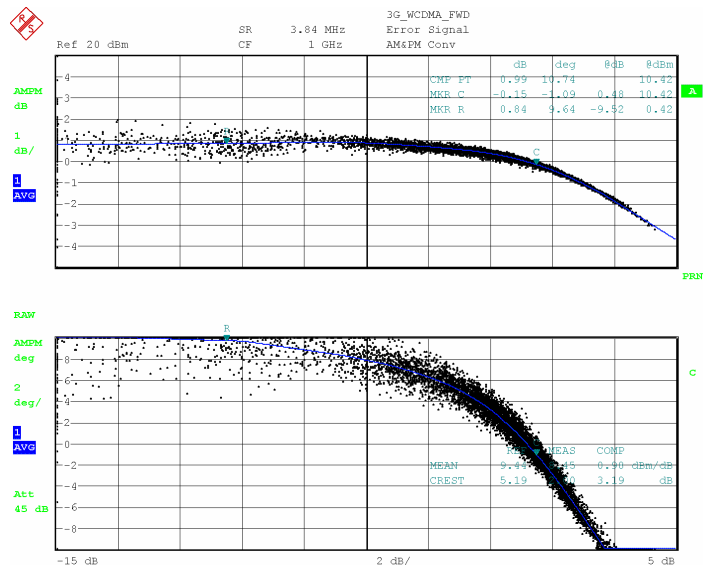
The result window is divided into two parts:

The *AM/AM* display shows the logarithm level of the reference signal horizontally and the logarithm level of the measurement signal vertically. Nonlinear level distortion causes trace deviations from the 0 dB line.

The *AM/PM* display shows the logarithm level of the reference signal horizontally, and the linear phase error vertically. Phase distortion also causes trace deviations from the 0° line.

This measurement is only available with PSK and QAM modulation.

**Note:** *If a MEAS filter in the demodulation path has been switched on, the setting MEAS RESULT -> RESULT = RAW must be selected, otherwise the characteristic will be falsified by the MEAS filtering.*



Date: 17.JUL.2003 10:38:48

Fig. 5-58 AM & PM CONVERSION result display (AM-AM upper diagram, AM-PM lower diagram)

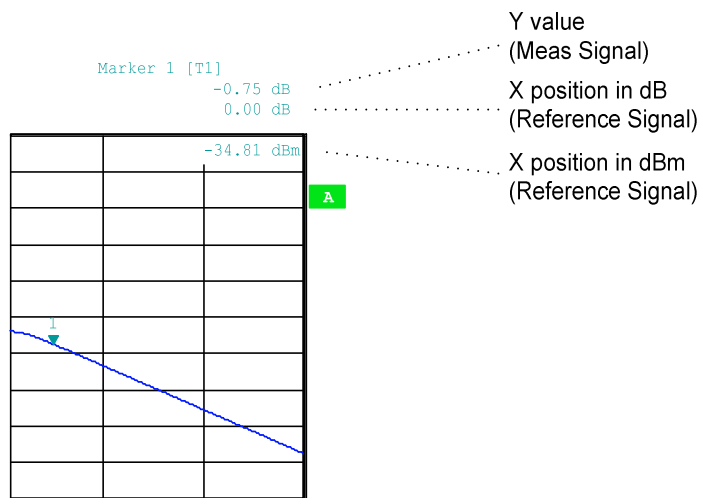


Fig. 5-59 AM & PM CONVERSION result display, marker field

The MKR FCT -> COMP PT marker functions are used to calculate the compression point from the trace and the input power upper diagram). The difference between the mean powers or crest factors of the measurement and reference signals is used to calculate the results for the power compression at the current modulation of the DUT. The results (power compression and reduction of the crest factor) are shown in the lower diagram. These values are determined by using two markers which are automatically positioned on the interpolated distortion characteristic. If one of the two markers leaves the display area, these numeric values will not be displayed.

IEC/IEEE bus command

```
:CALC:FEED 'XTIM:DDEM:ERR:MPH'
```

```
:CALC:FORM CONV
```

```
:CALC:MARK1:X:CONV:ABS?
```

## Remote Control Commands

### CALCulate<1|2>:MARKer<1 to 4>:X:CONVersion:ABSolute?

This command returns the absolute X marker position for AM & PM conversion measurement. The value is returned in dBm. This function is only available for marker 1.

**Example:** "CALC1:MARK1:X:CONV?" 'Returns the absolute horizontal marker position.

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

**Mode:** VSA

### :[SENSe<1|2>:]DDEMod:FORMat QPSK | PSK | MSK |QAM | FSK | VSB | UQAM

This command selects the digital demodulation mode.

<b>Parameter:</b>	QPSK	Quad Phase Shift Key
	PSK	Phase Shift Key
	MSK	Minimum Shift Key
	QAM	Quadrature Amplitude Modulation
	FSK	Frequency Shift Key
	VSB	Vestigial Sideband
	UQAM	User QAM, only available with user mapping files

**Example:** "DDEM:FORM QPSK" 'Switch QPSK demodulation on.

**Characteristics:** \*RST value: Depends on the demodulation standard.  
SCPI: device-specific

**Operating mode:** VSA

### :[SENSe<1|2>:]DDEMod:UQAM:FORMat '<UQAM\_Mapping>'

This command selects the specific demodulation mapping for UQAM .

**Parameter:** <UQAM\_Mapping> 'Mapping name

**Example:** "DDEM:FORM UQAM" 'Switch UQAM demodulation on.  
"DDEM:MSK:FORM TYPE2" 'Switch DMSK demodulation on.

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

**Operating mode:** VSA

This command is only available for UQAM demodulation. Related mapping files have to be imported.

**:[SENSe<1|2>:]DDEMod:UQAM:NSTate?**

This command returns the specific modulation level for FQAM. .

**Parameter:** -

**Example:** "DDEM:FORM UQAM" 'Switch User QAM demodulation on.  
"DDEM:UQAM:FORM 'special'" 'Selects user mapping 'special'.  
"DDEM: UQAM:NST?" 'returns the modulation level.

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

**Operating mode:** VSA

This command is only available for UQAM demodulation.

## 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](mailto: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](mailto: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](mailto:CustomerSupport@rohde-schwarz.com)