

Product: SFQ "TV TEST TRANSMITTER" and FSEx, FSx, FSP spectrum analyser

SFQ Noise Correction Calibration Software SFQ_CNCAL

Application Note

This program applies to SFQs which are equipped with the first generation of noise generators (Var 02) and with FW version 1.24 or higher

One of the most important measurements of DVB systems concern noise margins. The C/N signal produced by the SFQ needs to be as accurate as possible. The present application note is intended to this purpose, with a special calibration process.



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1 Overview

This software is a noise correction calibration program for SFQs equipped with old noise generators (Var 02) in order to produce high accuracy on C/N values.

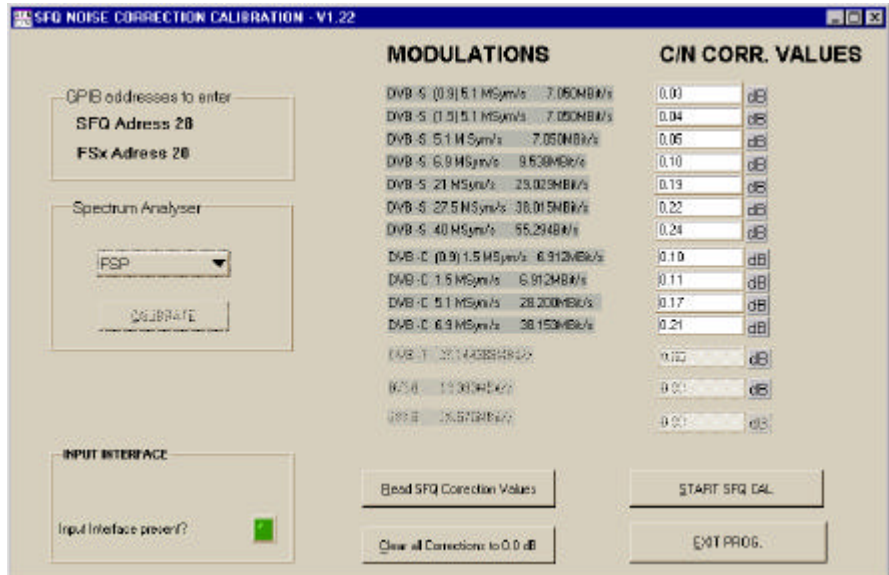
After having run this program, the user can expect high accuracy on noisy signals.

Note: If the noise generator is of Var03 an external calibration is not necessary. Make an SFQ internal calibration with the front panel buttons! You can run the program, but the correction values are not loaded in the SFQ.

2 Software Features

At launching, the program checks for internal installed modulations (encoders) in the SFQ. It determines what are the modulations to be verified, the FW version and the ID number of the noise generator card.

The modulations checked are DVB-S, DVB-C, DVB-T, 8VSB and J.83B.



List of functionality's of the user interface.

- **Spectrum Analysator** : selection of the connected analysator
- **START SFQ CAL** : begins the automatic calibration of noise generator
- **Clear all corrections to 0.0 dB** : resets all correction values in the SFQ
- **Read SFQ correction values** : fetches and displays the SFQ internal stored correction values
- **Exit** : terminates the program.

- **Input interface**: Indicator for the presents of an input interface
- **GPB addresses to enter**: Indicator for the addresses with have to be set on the SFQ and the analysator.

SFQ Noise Correction Calibration

Procedure

For each modulation present in the SFQ, the program executes the following :

Measurement of the Carrier value by means of an average over the whole spectrum analyser trace (500 points). The flatness of the passband is chosen at its maximal spacing and the range in the spectrum analyser to its minimum (10 dB / screen).

Setting the C/N to 0dB.

Switching of the carrier.

Measurement of the Noise value which is generated over a 10 MHz or 60 MHz passband. The method of calculation is same as above.

Calculation of C/N value using the above two results.

Transfer of the result into the SFQ. These values are displayed.

For all modulations the used lowpasses are taken into account . Through this several correction values are determined per modulation.

List of the determined correction values:

DVB –S

(0.9) 5.1 Ms/s	7.050 Mb/s
(1.5) 5.1 Ms/s	7.050 Mb/s
5.1 Ms/s	7.050 Mb/s
6.9 Ms/s	9.538 Mb/s
21 Ms/s	29.029 Mb/s
27.5 Ms/s	38.015 Mb/s
40 Ms/s	55.294 Mb/s

Note: The values for 0.9 and 1.5 Ms/s are taken by 5.1 Ms/s since a C/N of 0dB can not be obtained.

DVB –C

(0,9) 1.5 Ms/s	6.912 Mb/s
1.5 Ms/s	6.912 Mb/s
5.1 Ms/s	28.200 Mb/s
6.9 Ms/s	38.153Mb/s

Note: The values for 0.9 Ms/s is taken by 1.5 Ms/s since a C/N of 0dB can not be obtained.

DVB –T

DVB-T	27.144386 Mb/s
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SFQ Noise Correction Calibration

8VSB

8VSB 19.393 Mb/s

J83B

J83B 26.97035 Mb/s

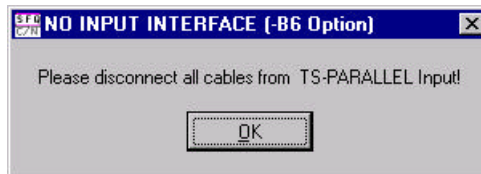
The values are finally stored in a log file with time and date.

The filename is **results.txt**.

Please note that the procedure uses undocumented GPIB commands for access to intern modules.

Use of SFQ without Input Interface (-B6):

In this case, the user is asked to disconnect all cables from the TS-PARALLEL input. Otherwise the SFQ would try to lock to the external bitrate and the customer would have to set the right bitrates at the input for every modulation.



The calibration is carried out as when devices with input interface.

IMPORTANT: Only correction values are accepted in the area of $\pm 2\text{dB}$. If larger deviations are calculated, the program should be started a second time.

If the deviations remain, the level of the noise generator has to be readjusted according to the existing service circular (tuning the noise level potentiometer).

3 Hardware and Software Requirements

Hardware Requirements

The program will run on any IBM AT compatible computer with

- CPU: 486, Pentium or better; clock rate >100 MHz
- RAM: > 32 Mbyte (for Windows NT >48 Mbytes)
- Monitor: VGA colour monitor minimum 800x600 ; recommended 1024x768
- GPIB: GPIB (IEEE) -bus card Rohde & Schwarz: IEEE 488.2 Bus Interface PS-B4, 1006.6207.04 or National Instruments AT-GPIB / TNT

The SFQ to be calibrated must be equipped with a noise generator of Var 02.

The spectrum analyser used is a FSxx model from Rohde & Schwarz.

Software Requirements

- Windows 95/98 or Windows NT (version 4.0 or later)
- GPIB(IEC) - bus driver for Windows from National Instruments (appropriate to operating system)

4 Connecting the Computer and the Instrument

Connecting the instruments

Connect the SFQ and the analyser via GPIB cables to the controller.

Connect the RF output of the SFQ with the RF input of the analyser.

5 Installing the Software

The SFQ_CNCAL is supplied as a packed file.

Download the file. Then install the program.

Downloading

For Windows 95\98 and for Windows NT download SFQ_CNCAL.zip

Expand the downloaded ZIP file.

The following 3 files are expanded to the chosen directory on your hard disk:

SFQNoise.001

SFQNoise.002

setup.exe

Installation

To install the C/N Calibration Program from the hard disk run setup.exe.

The setup program prompts for the installing directory.

Once the setup program has run the directory is containing the program files.

Creating Installation Disks

You will need two disks.

Copy setup.exe and SFQNoise.001 to Disk 1,
and SFQNoise.002 to Disk 2

To install the SFQ_CNCAL from the disks, insert Disk 1 in the disk drive and start setup.exe.

6 Starting the Software

Pre-setting the SFQ and the spectrum analyser

Before start of the operation, please configure the GPIB addresses of your instruments :

SFQ must be set at address 28

FSxx must be set at address 20

SFQ and Spectrum analyser calibration

IMPORTANT: In order to achieve best results, the SFQ must be calibrated (I/Q-Mod. and Learn table) before starting the noise calibration. Allow for at least 1 hour warmup before carrying out a calibration.

After starting Learn Table a level must be passed on between -1.5dBm and +1.5dBm after setting the output level of the SFQ to 0dBm (Check with a power meter). If the level isn't in this tolerance, the external level correction must be executed with the SFQ. If this program isn't available, the output level also can be taken to this area by an external attenuator.

The spectrum analyser has to be calibrated as well. In order to be accurate in using different spectrum analysers of the same model, the calibration of this analyser must be done prior launching the SFQ calibration.

This spectrum analyser calibration ensures, that an SFQ signal has an identical representation using the same reference levels so that the curve is properly positioned on the screen and whatever the device used in the same family.

Spectrum analyser calibration

In order to do this, press the "CAL" softkey on front panel of FSEx or FSPs and "HELP" on the front panel of the FSx/FSBx family.

SFQ calibration

Press SETUP INFO, then go to HARDWARE and select CALIBRATING.

Starting the programme

Select the type of the connected analysator.

Press **START SFQ CAL** button on panel to launch the program.

The program runs depending on installed modulations 1 to 8 minutes.

At the end the results determined newly are in the displays.



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