

Products: R&S®FSL, R&S®FSP, R&S®FSU, R&S®FSQ, R&S®FSV, R&S®ESU, R&S®ESCI, R&S®ESPI, R&S®ESL

TraceRecorder Software Tool for Storing Trace Data

Application Note 1MA105

Unattended observation of spectrum occupancy for finding spurious emissions or seldom-occurring interferers is a common task for spectrum analyzers. Sometimes spectrum data has to be monitored over quite a long period of time. TraceRecorder, a small, free-of-charge software tool for storing measurement data from Rohde & Schwarz spectrum analyzers helps you to perform this measurement task. Running on a PC, it connects to the spectrum analyzer via a LAN interface. For standalone operation, it is possible to run it directly on a spectrum analyzer, eliminating the need for an additional computer during data acquisition.



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1 Overview

Finding spurious emissions or seldom-occurring interferers is a burdensome task for spectrum analyzers. Observation often has to be performed over long periods of time. Setting spectrum analyzers to peak hold mode does not always solve the problem, since it is impossible in later evaluation to see the time at which spectrum anomalies occurred.

TraceRecorder, a small, free-of-charge, software tool for storing measurement data from Rohde & Schwarz spectrum analyzers helps to solve this measurement task. Running on a PC, it connects to the spectrum analyzer via the LAN interface. For standalone operation, it is possible to run it directly on an spectrum analyzer, eliminating the need for a computer during data acquisition.

The stored data may later be analyzed by another application program, FsxRecordPlay, which is also available for free.

The Rohde & Schwarz R&S[®]FSL, R&S[®]FSP, R&S[®]FSQ, R&S[®]FSU and R&S[®]FSV spectrum analyzers are abbreviated with FSL, FSP, FSQ, FSU and FSV, the Rohde & Schwarz R&S[®]ESU, R&S[®]ESCI, R&S[®]ESPI and R&S[®]ESL network analyzers are abbreviated with ESU, ESCI, ESPI and ESL in the remainder of this application note.

2 Software Features

TraceRecorder allows the acquisition of trace data at a variable recording interval. The shortest possible interval depends on the sweep time settings of the spectrum analyzer and the time needed to transfer the data. With the FSP / ESPI / ESCI, FSU / ESU and FSQ, approximately six sweeps per second can be recorded; the FSL / ESL reaches approximately four sweeps per second. The longest possible interval is more than ten days. When the recording interval is set to greater than 1 s, a progress bar shows the time to the next sweep.

Installing and Starting TraceRecorder on Your PC

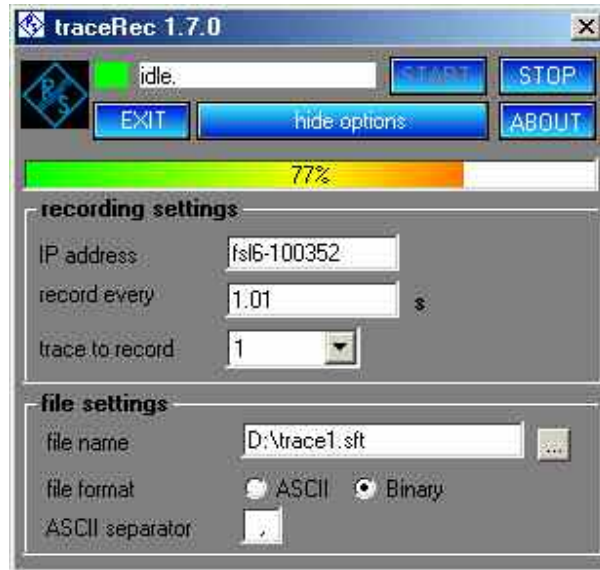


Fig 1 Software features

Once started, TraceRecorder records data until stopped manually.

You can select the trace number to be recorded. Depending on the spectrum analyzer, trace 1 to trace 4 data can be stored (one trace at a time).

The data is stored in ASCII format, allowing post-processing with text editors or spreadsheets such as Microsoft Word or Excel. The ASCII data separator can be set according to your needs.

If memory consumption is an issue, you can also store the data in binary format. TraceRecorder works together with another application program, FSxRecordPlay, which is available free-of-charge from Rohde & Schwarz.

3 Installing and Starting TraceRecorder on Your PC

To install the TraceRecorder program on your PC, execute the file TraceRecorder_<version number>.exe with a double-click. The installation wizard is activated; the first option is to choose the language (English or German) for the installation.

Follow the instructions from the wizard. In the course of the installation, select the directory where you want to install the program.

TraceRecorder requires approximately 12 Mbyte memory on the hard disk. The wizard also adds an entry for TraceRecorder to the Start->Programs menu of the computer.

No other parameters are required for installation.

If selected, TraceRecorder starts automatically after installation.

Installing and Starting TraceRecorder on Your PC



Fig 2 Start Menu

Click the "show options" button to see the entry fields.

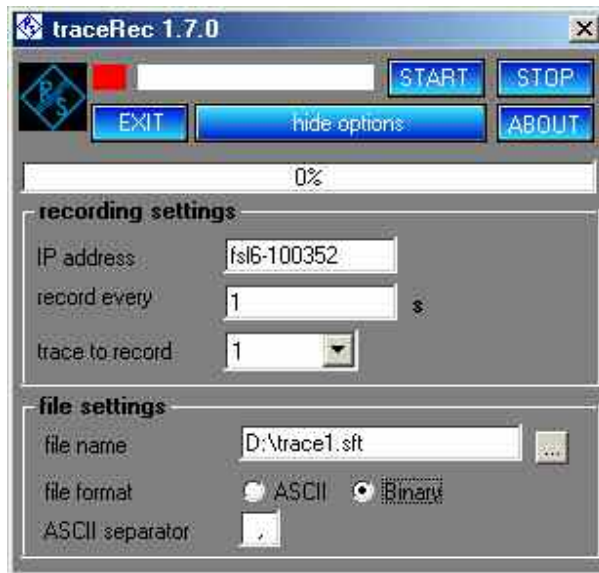


Fig 3 Optional settings

Before starting TraceRecorder, you have to set up your spectrum analyzer manually. Choose frequency settings, RF bandwidth, video bandwidth, sweep time and detector settings according to your needs.

Set the IP address of your spectrum analyzer in the IP address field of TraceRecorder. Entries like 192.168.0.10 are common. Alternatively, you can enter the computer name of your spectrum analyzer. In the picture above, this is "fsl6-100532". A DHCP and name server in your local area network are required for proper operation. For further details on LAN connection, refer to the manual for your spectrum analyzer or contact your LAN administrator.

Specify the recording interval in the field "record every".

Select the appropriate trace number to be stored.

Specify a file name for the stored data by editing the entry field. When you click the select button, a file name consisting of the IP address of your spectrum analyzer followed by the current date and time will be suggested. You can overwrite this name if you wish.

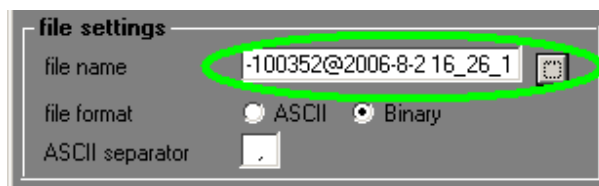


Fig 4 The select button suggests a file name

Starting TraceRecorder on a Spectrum Analyzer

You can now start recording by clicking the START button of TraceRecorder. An indicator to the left of the START button shows the activity of the program.

If you set record intervals > 1 s, a countdown indicator at the bottom of the program window will show the time to the next recording.

To stop recording, click the STOP button.

Note: *Restarting TraceRecorder without changing the file name will result in a warning. Confirm or change the file name accordingly.*

For de-installation, Rohde & Schwarz supplies the program uninstall.exe, which completely removes the TraceRecorder program from the computer.

4 Starting TraceRecorder on a Spectrum Analyzer

To store data from TraceRecorder without using a computer connection, you can run TraceRecorder on your spectrum analyzer. TraceRecorder uses a Visual Basic runtime engine, which is normally not installed on your spectrum analyzer. The TraceRecorder setup program copies all necessary files to the spectrum analyzer.

Note: *To prevent damage to the software of your analyzer, only experienced users should perform this process.*

To install the TraceRecorder program on your spectrum analyzer, connect a keyboard and mouse to your instrument.

Note: *Prior to installing TraceRecorder on the **FSP**, **FSU** and **FSQ** spectrum analyzers, you must install crtDll.dll. CrtDll.dll is a Windows component, which is normally not necessary for spectrum analyzer operation, but is a prerequisite for the installer program used for TraceRecorder. CrtDll.dll is installed by using crtDll.exe. Download crtDll.exe from [1MA105](#).*

Copy the TraceRecorder setup program and crtDll.exe to a memory stick and attach the stick to your spectrum analyzer. If your instrument does not have USB ports, contact TM-Applications@rohde-schwarz.com for assistance.

1. Execute the file crtDll.exe with a double-click.
2. Execute the file TraceRecorder_<version number>.exe with a double-click. The installation wizard is activated; the first option is to choose the language (English or German) for the installation wizard.

Follow the instructions from the installation wizard. In the course of the installation, select the directory where you want to install the program.

TraceRecorder requires approximately 12 Mbyte on the mass memory of the spectrum analyzer. The installation wizard also adds an entry for TraceRecorder to the Start->Programs menu of the spectrum analyzer.

Hardware and Software Requirements



Fig 5 Installation on a spectrum analyzer

The default settings of the program show the entry "localhost" in the IP address field. This corresponds to IP address 127.0.0.1 and addresses the computer on which the program is running, which is the spectrum analyzer in this case.

You now can operate the program as described above.

Note: Do not store trace data on the storage medium of the spectrum analyzer. Use a memory stick or an external hard disk driver to store data.

For de-installation, Rohde & Schwarz supplies the program uninstall.exe, which completely removes the TraceRecorder program from the spectrum analyzer.

5 Hardware and Software Requirements

PC hardware requirements

	Minimum	Recommended
CPU	Pentium 600 MHz	Pentium III 600 MHz or later
RAM	256 Mbyte	256 Mbyte
Hard disk	15 Mbyte free space	50 Mbyte free hard disk space
Monitor	SGA monitor (800x640)	SVGA color monitor, resolution 800x600 or better
LAN	10 Mbit	100 Mbit

Memory Consumption of Stored Data and Record Length

PC software requirements

	Minimum	Recommended
OS	Windows 2000 / XP	Windows 2000 / XP
OS add-ons	---	Microsoft Internet Explorer 5.0 or later
LAN driver	---	---
VISA	---	---

The software also runs under Windows 7 32- and 64-bit operating systems.

5.1.1.1 Memory Consumption of Stored Data and Record Length

A stored trace file consists of a header of 553 bytes and 5008 bytes per trace of ASCII data or 2040 bytes of binary data. The header is only stored once in every file.

You can estimate the capabilities of storing data on a memory stick as follows:

If you use a memory stick with a capacity of 128 Mbyte, you can store approximately $128,000,000 / 5008 = 25500$ traces in ASCII format. If you record one trace every second, this gives you a recording time of $25500 * 1$ s or nearly 7 hours.

If you want to record data over a period of 20 days for example, you must set the record time interval longer than 68 s or use a memory stick with a higher storage capacity.

The calculation of data stored in binary format is similar. Binary format yields about 2.5 times more recording time compared to ASCII format.

6 Evaluation of Stored Data

Data stored in ASCII format may easily be evaluated with a spreadsheet such as Microsoft Excel.

```
ENDSTOP;0x00000097
CAPDELAYTIME;1.000000
Type;FSL-6;

Version;1.30;

Date;01.August 2006;

Mode;Spectrum;

Center Freq;100000004.500000;Hz

Freq Offset;0.000000;Hz

Span;0.000000;Hz

x-Axis;Linear;

Start;99999999.500000;Hz

Stop;100000009.500000;Hz

Ref.Level;0.000000;dBm

Level Offset;0.000000;dB

Ref Position;100.000000;%

y-Axis;Logarithmic;

Level Range;100.000000;dB

RF Att;20.000000;dB

BW;1000000.000000;Hz

VBW;3000000.000000;Hz

SWT;0.002500;s

Trace Mode;Clear Write;

Detector;RMS;

Sweep Count;0;

Trace 1:;;

x-Unit;Hz;

y-Unit;dBm;

Values;501;
Section 1;2006.8.1_15.59.10:550
-65.54443,-66.87174,-66.73483,-65.09657,-62.56383,
```

Fig 6 File stored in ASCII format, "," used as separator (not all trace data shown)

Evaluation of Stored Data

The format of a file stored in binary format is as follows:

```

ENDSTOP;0x1
CAPDELAYTIME;1.000000
Type;FSL-6;

Version;1.30;

Date;01.August 2006;

Mode;Spectrum;

Center Freq;100000004.500000;Hz

Freq Offset;0.000000;Hz

Span;0.000000;Hz

x-Axis;Linear;

Start;99999999.500000;Hz

Stop;100000009.500000;Hz

Ref.Level;0.000000;dBm

Level Offset;0.000000;dB

Ref Position;100.000000;%

y-Axis;Logarithmic;

Level Range;100.000000;dB

RF Att;20.000000;dB

RBW;1000000.000000;Hz

VBW;3000000.000000;Hz

SWT;0.002500;s

Trace Mode;Clear Write;

Detector;RMS;

Sweep Count;0;

Trace 1;;;

x-Unit;Hz;

y-Unit;dBm;

Values;501;
Section1;2006.8.1_15.58.58:538
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```

Fig 7 File stored in binary format

Data stored in binary format may be evaluated with the FsxRecordPlay program. FsxRecordPlay is available free-of-charge from Rohde & Schwarz. Please contact TM-Applications@rohde-schwarz.com to obtain a copy of this program.

With FsxRecordPlay, you can display stored data either in the Frequency Spectrum display mode or in the Spectrum History mode, which is also known as a waterfall display.

Evaluation of Stored Data

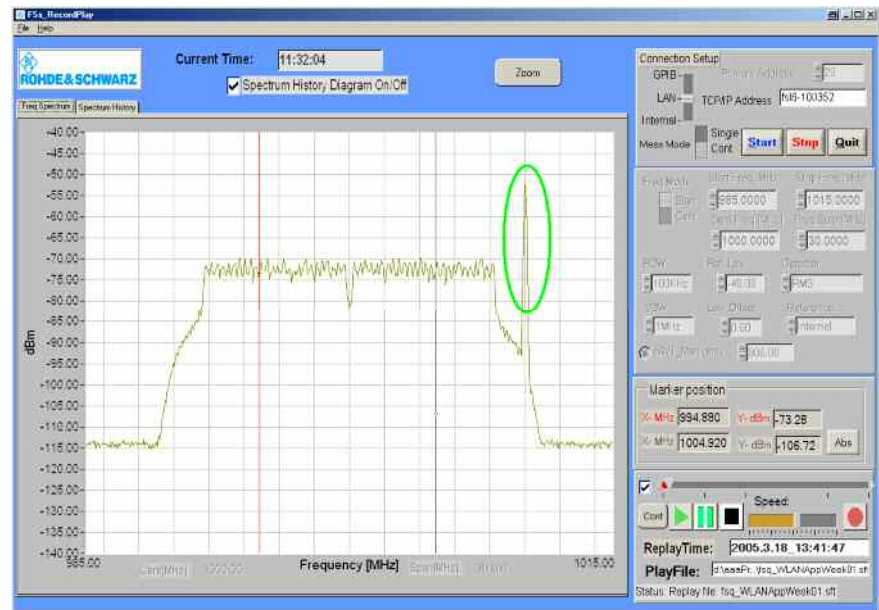


Fig 8 Frequency Spectrum display of FsxRecordPlay

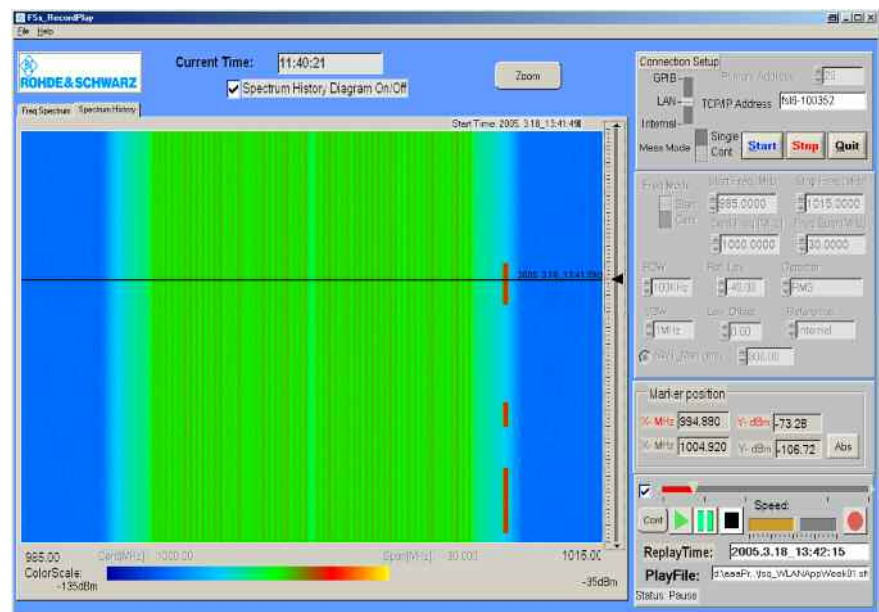


Fig 9 Spectrum History display of FsxRecordPlay

7 Additional Information

This Application Note and the associated TraceRecorder program are updated from time to time. Please visit the website [1MA105](#) to download the latest versions. After installation, the latest program information can be found in the file *history.rtf* in the installation directory. You can also access this file from the link *Programs / TraceRecorder / History* in your *Start Programs* folder.

Please send any comments or suggestions about this application note to TM-Applications@rohde-schwarz.com.

8 Ordering Information

Please note that a complete range of spectrum analyzers is available from Rohde & Schwarz.

For additional information about these analyzers, see the Rohde & Schwarz website www.rohde-schwarz.com or contact your local representative.

Signal, spectrum and network analyzers and receivers, ordering information

Type of instrument	Designation and range	Order No.
R&S [®] FSPxx	Spectrum Analyzer 9 kHz to 40 GHz	1093.4495.xx
R&S [®] FSQxx	Signal Analyzer 20 Hz to 26.5 GHz	1155.5001.xx
R&S [®] FSUxx	Spectrum Analyzer 20 Hz to 46 GHz	1166.1660.xx
R&S [®] FSLxx	Spectrum Analyzer 9 kHz to 18 GHz	1300.2502.xx
R&S [®] FSVxx	Sign. & Spectr.Analyzer 9 kHz to 40 GHz	1307.9002.xx
R&S [®] ESUxx	EMI Test Receiver 20 Hz to 40 GHz	1302.6005.xx
R&S [®] ESCix	EMI Test Receiver 9 kHz to 7 GHz	1166.5950.xx
R&S [®] ESPIx	EMI Test Receiver 9 kHz to 7 GHz	1164.6407.xx
R&S [®] ESLx	EMI Test Receiver 9 kHz to 6 GHz	1300.5001.xx



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This application note and the supplied programs may only be used subject to the conditions of use set forth in the download area of the Rohde & Schwarz website.