Broadband Monitoring System

## SA3B Spectrum-Analyzers & CMS (Carrier Monitoring-SW)

GENERAL

This new and innovative broadband remote monitoring system covers a frequency range of 5MHz...3GHz and represents the 1RU/19" broadband remote Spectrum-Analyzers SA3B & SA3B-16 (Single and 16-way monitoring) and the 3RU/19" broadband remote Spectrum-Analyzers SA3B-32 and SA3B-64 (32-way & 64-way monitoring) as well as the associated CMS (Carrier-Monitoring-Software).

This advanced and innovative broadband remote monitoring system offers a turnkey HW/SW package that is combining the advantages, features and excellent performance of the SA3B Spectrum-Analyzer units with the especially designed carrier-monitoring software program CMS.

The all-in-one HW/SW bundle features a reliable, flexible and high quality monitoring system, ideally suited for applications in Teleports, Satellite Earth-Stations, DSNG´s, Up- and Downlink operations as well as for Broadcasting and Cable/IPTV Headend architectures wherever accurate signal parameter monitoring is necessary.
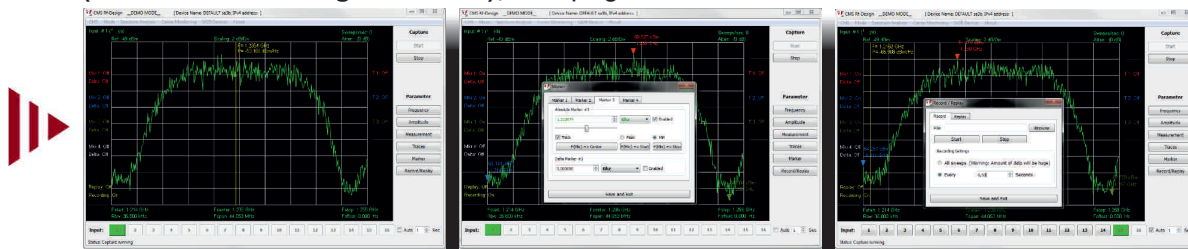
SA3B/SA3B-16/SA3B-32/SA3B-64 (Broadband Remote Spectrum-Analyzers), see page 2/3
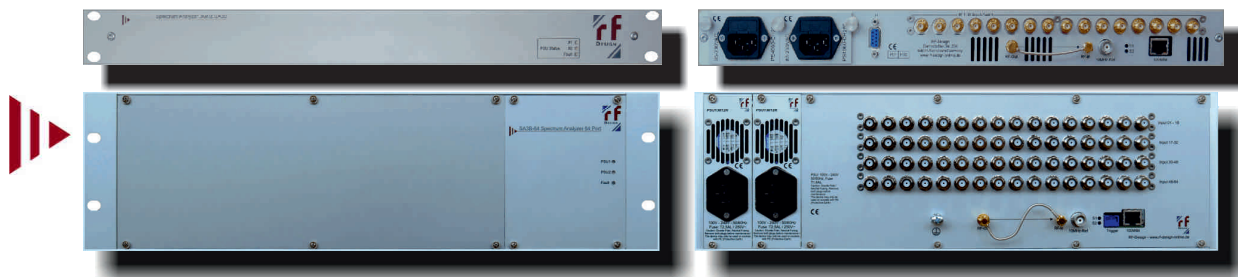
Order Information

➢ **SA3B:**	Spectrum-Analyzer, Broadband, 1 RF Input, 50Ohm SMA(f), 1RU/19", incl. CMS (SW)
➢ **SA3B-16:**	Spectrum-Analyzer, Broadband, 16 RF Inputs, 50Ohm SMA(f), 1RU/19", incl. CMS (SW)
➢ **SA3B-16-75:**	Spectrum-Analyzer, Broadband, 16 RF Inputs, 75Ohm F(f), 1RU/19", incl. CMS (SW)
➢ **SA3B-32:**	Spectrum-Analyzer, Broadband, 32 RF Inputs, 50Ohm SMA(f), 3RU/19", incl. CMS (SW)
➢ **SA3B-32-75:**	Spectrum-Analyzer, Broadband, 32 RF Inputs, 75Ohm F(f), 3RU/19", incl. CMS (SW)
➢ **SA3B-64:**	Spectrum-Analyzer, Broadband, 64 RF Inputs, 50Ohm SMA(f), 3RU/19", incl. CMS (SW)
➢ **SA3B-64-75:**	Spectrum-Analyzer, Broadband, 64 RF Inputs, 75Ohm F(f), 3RU/19", incl. CMS (SW)

CMS (Carrier-Monitoring-Software), see page 4

### Order Information

➢ **CMS:**	Carrier-Monitoring-Software (already integrated with all SA3B/-16/-32/-64 unit)
➢ **CMS-LK:**	Carrier-Monitoring-Software Licence-Key for one SA3B/-16/-32/-64 unit (needed for each unit)

SA3B-16, SA3B-32 & SA3B-64

16-Way, 32-Way& 64 Broadband Remote Spectrum-Analyzers

GENERAL

The SA3B-16 represents a 16-way broadband remote Spectrum-Analyzer in 1RU/19" design while the SA3B-32 and SA3B-64 feature 32-way and 64-way broadband remote Spectrum-Anlyzers in 3RU/19" rack-mount design. The units feature advanced broadband monitoring solutions capable to monitor 16 RF signals (SA3B-16), 32 RF-signals (SA3B-32) or 64 RF signals (SA3B-64) within a frequency range of 5MHz...3GHz (see order information on page 1). These units provide state of the art digital technology and fast fourier transformations assuring quick and accurate measurements and just in time interference reporting. The SA3B-16/SA3B-32/SA3B-64 are characterized by very low noise floor and a large dynamic range. These units are perfectly suited to measure RF carriers (such as satellite, cable, terrestrial), including small carriers, beacon signals as well as they are applicable for carrier monitoring. The units accept frequency range from 5MHz...3GHz and input power levels from -110...+5dBm, RBW from 1Hz...15MHz. An external 10MHz reference or internal reference assures improved frequency accuracy and stability. The SA3B-16 is equipped with 16 RF inputs (integrated 16:1 switch) for monitoring of up to 16 signals while the SA3B-32 and SA3B-64 have 32 or 64 RF inputs (integrated 32:1 or 64:1 switch) for monitoring of max. 32 or 64 signals (one by one, user selectable) . Furthermore the units provide 1:1 power-supply redundancy (hot swappable) while the status of each power-supply is indicated via 2 front-panel LED´s. Access to the units is being realized via an Ethernet-interface that allows to configure and to monitor the unit via the corresponding CMS (Carrier-Monitoring-SW), see more information about CMS on page 4.
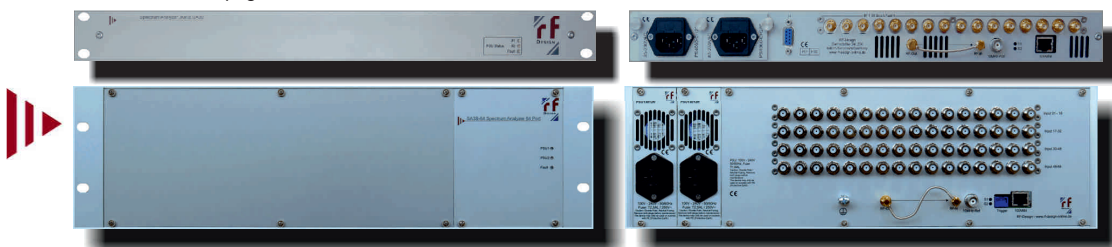
FEATURES

- 1RU/19" or 3RU/19" rack-mount design
- Broadband frequency (5MHz...3GHz) covering satellite, cable and terrestrial carriers
- Input selector/switch 16:1 (SA3B-16), 32:1 (SA3B-32) or 64:1 (SA3B-64) *(16, 32 or 64 RF signals can be selected and monitored)*
- Monitoring of 16, 32 or 64 RF carriers, manually and automatically
- Carrier monitoring function
- External 10MHz reference or internal reference
- Snapshot: N° of IQ time samples is approx. 32 million
- Linear Power/Bin (8192 Samples, 255 averages)
- Log Power/Bin (8192 Samples, 255 averages)
- Peak hold on the browser interface
- Raw IQ Samples (decimated 2...100.000 in steps of 2)
- Selectable Spectral Inversion
- Programmatic measurement
- Spectrum mode & Time Domain mode
- Easy remote access, configuration and monitoring
- SNMP status interface
- FFT sizes: 128 (Flattop), 256 (Hanning), 512 (Hamming), 1024 (Uniform), 2048/4096/8192 (Blackm.-Harris)

TECHNICAL SPECIFICATIONS

Physical, Power-supply & control specs.

Dimension:	1RU/19" (SA3B-16)
	3RU/19" (SA3B-32 & SA3B-64)
Power-supply:	85...230VAC, 50/60Hz
	1:1 redundant (hot-swappable)
Power-consumption:	<5W (SA3B-16)
Control Interface:	TCP/IP API, SNMP, http (CMS)

Broadband RF Input

Frequency range:	5MHz…3GHz
RF Inputs:	16 (SA3B-16), 32 (SA3B-32), 64 (SA3B-64)
Input Power level:	-110...+5dBm

RF Impedance/Connectors:	50 Ohm/SMA(f) or 75Ohm/F(f)
Noise floor:	-150dBm/Hz (typ. @ min. atten.)
	-130dBm/Hz (typ. @ max. atten.)
Isolation:	>70dB
Phase Noise: (worst case @ 3GHz)	-80dBc/Hz @ 1kHz offset
	-95dBc/Hz @ 100 kHz offset
	-125dBc/Hz @ 1MHz offset
Max. safe input:	+10dBm

Measurements

Amplitude accuracy:	±0.5dB (@ 25°C), ±1dB (0- 50°C)
Frequency Accuracy:	±2,6ppm (internal)
	as per external reference
Frequency Resolution:	1Hz
Resolution Bandwidth:	1Hz...15MHz
Frequency Response:	< ±1,5dB
Spurious:	
• DC Offset	< -55dBc (typ.)
• Images	< -55dBc (typ.)
• Aliasing	< -55dBc (typ.)
• Analysis bandwidth	1kHz...200MHz
• Averaging up to	255 cycles

Measurement speed:

• 500MHz span, 1MHz RBW		0,5 sec.
• 200MHz span, 30kHz RBW		0,5 sec.
• 3,5MHz span, 8kHz RBW		0,1sec.

Maximum Span:	5MHz...3GHz

Further specification

10MHz Reference:	10MHz, -5dBm...+13dBm
	(connector 50Ohm BNC)
Env. conditions:	ETS300019, Part 1-3, Class 3.1
Operating temp. range:	0...45°C

SA3B

Broadband Remote Spectrum-Analyzer Unit (1 RF Input)

GENERAL

The SA3B Spectrum Analyzer in 1RU/19" design features an advanced remote broadband monitoring solution capable to monitor 1 RF signal within 5MHz...3GHz frequency range (see order information on page 1). The unit provides state of the art digital technology and fast fourier transformations assuring quick and accurate measurements and just in time interference reporting. The SA3B unit is characterized by very low noise floor and a large dynamic range while it is perfectly suited to measure RF carriers (such as satellite, cable, terrestrial), including small carriers, beacon signals as well as they are applicable for carrier monitoring.

The SA3B accepts frequency range from 5MHz...3GHz and input power levels from -110...+5dBm, RBW from 1Hz...15MHz. An external 10MHz reference or internal reference assures improved frequency accuracy and stability.

It is equipped with 1 RF input for monitoring of one RF signal. Furthermore it provides 1:1 power-supply redundancy (hot swappable), while the individual powers-supply status is indicated via 2 front-panel LED´s. Access to the unit is being realized via the Ethernet-interface that allows to access, to configure and to monitor the unit via the corresponding CMS (Carrier-Monitoring-SW) refer to page 4.

SA3B-16   SA3B-16

FEATURES

- 1RU/19" design for flexible & space saving integration
- Broadband frequency covering satellite, cable and terrestrial carriers (5MHz...3GHz)
- Measurement of 1 RF signal
- Carrier monitoring function
- External 10MHz reference or internal reference
- Snapshot: N° of IQ time samples is approx. 32 million
- Linear Power/Bin (8192 Samples, 255 averages)
- Log Power/Bin (8192 Samples, 255 averages)
- Peak hold on the browser interface
- Raw IQ Samples (decimated 2...100.000 in steps of 2)
- Selectable Spectral Inversion
- Programmatic measurement
- Spectrum mode & Time Domain mode
- Easy remote access, configuration and monitoring
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- FFT sizes: 128 (Flattop), 256 (Hanning), 512 (Hamming), 1024 (Uniform), 2048/4096/8192 (Blackm.-Harris)

TECHNICAL SPECIFICATIONS

Physical, Power-supply & control specs.

Dimension:	1RU/19"
Power-supply:	85...230VAC, 50/60Hz
	1:1 redundant (hot-swappable)
Power-consumption:	<5W
Control Interface:	TCP/IP API, SNMP, http (CMS)

Broadband RF Input

Frequency range:	5MHz…3GHz
RF Input-ports:	1 (SA3B)
Input Power level:	-110...+5dBm

RF Impedance/Connectors:	50 Ohm SMA(f)
Noise floor:	-150dBm/Hz (typ. @ min. atten.)
	-130dBm/Hz (typ. @ max. atten.)
Isolation:	>70dB
Phase Noise:	-80dBc/Hz @ 1kHz offset
(worst case @ 3GHz)	-95dBc/Hz @ 100 kHz offset
	-125dBc/Hz @ 1MHz offset
Max. safe input:	+10dBm

Measurements

Amplitute accuracy:	±0.5dB (@ 25°C), ±1dB (0- 50°C)
Frequency Accuracy:	±2,6ppm (internal)
	as per external reference
Frequency Resolution:	1Hz
Resolution Bandwidth:	1Hz...15MHz
Frequency Response:	< ±1,5dB
Spurious:	
♦ **DC Offset**	< -55dBc (typ.)
♦ **Images**	< -55dBc (typ.)
♦ **Aliasing**	< -55dBc (typ.)
♦ **Analysis bandwidth**	1kHz...200MHz
♦ **Averaging up to**	255 cycles

Measurement speed:		
♦ 500MHz span, 1MHz RBW		0,5 sec.
♦ 200MHz span, 30kHz RBW		0,5 sec.
♦ 3,5MHz span, 8kHz RBW		0,1sec.

Maximum Span:	5MHz...3GHz

Further specification

|	
Reference:	10MHz, -5dBm...+13dBm
	(connector 50Ohm BNC)
Env. conditions:	ETS300019, Part 1-3, Class 3.1
Operating temp. range:	0...45°C

CMS

Carrier-Monitoring-Software

GENERAL

The CMS (Carrier-Monitoring-Software) is a straight forward and easy to use Software program especially designed for the broadband remote Spectrum-Analyzer units SA3B, SA3B-16, SA3B-32 and SA3B-64.

The CMS is perfectly suited for monitoring the status and performance of any incoming RF signal, e.g from Satellite, Cable or Terrestrial carries (5MHz...3GHz). This program and the associated Spectrum-Analyzers feature a perfect and cost effective single and multi-input broadband monitoring solution for Teleports, Satellite earth stations, D-SNG vehicles, Up- and Downlink operations, Broadcasters as well as Cable/IPTV Headends where it is imperative always to assure accurate signal parameter monitoring.

It monitors and displays the most relevant parameters as well as it is perfectly for maintaining signal quality and identifying interferences including error messaging. Furthermore it has advanced features like trace recording, full screen mode, bandwidth and channel-power monitoring, print mode, record/replay function and a history mode that is providing a graphical display and recording of channel power and C/N parameters.
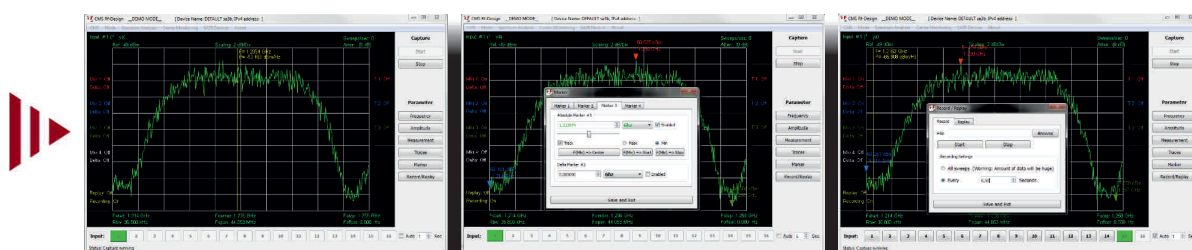
> **Spectrum Analyzer mode**

  - Broadband, 5MHz...3GHz monitoring range

  - Adjustable span, RBW, input attenuator, FFT-window

  - Max./Min/Hold function, 3 traces

  - 4 absolute markers with corresponding delta markers

  - Channel power and C/N measurement

  - LNB polarization decoupling measurement

  - Input selector for max. 16, 32 or 64 RF-signals/ports (SA3B-16, SA3B-32, SA3B-64 only)

  - Manual and automatic switching between carriers 1...16 (SA3B-16). 1...32 (SA3B-32), 1...64 (SA3B-64)

  - Bandwidth and Channel-power monitoring/displaying

  - Record/Replay function

  - Trace record & full-screen mode function

  - Configuration file load and safe function

  - Print function (relevant parameters & spectrum display)

> **Carrier monitoring mode**

  - Scheduller based automatic carrier monitoring

  - Definable limits for channel power and C/N

  - 24 hour history recording and storage for any defined transponder

  - Event handling featuring error messaging to up to 3 predefined e-mail addresses

> **Access criteria / System conditions**

  - CMS communicating with SA3B & SA3B-16/-32/-64 Spectrum-Analyzer unit via ethernet (TCP/IP)

  - Easy remote access, monitoring, recording and printing

  - Operates on MS-Windows (XP, Vista, 7)