Wolf MS

Everything under control

Wolf 2MS and 1MS are state-of-the-art FM Radio Monitoring devices, designed to control the signal presence and quality over an FM Distribution Network.

Onboard twin tuners allow to accurately scan frequencies, they offer high performances in FM reception, MPX audio encoding and RDS data streaming. This cutting-edge equipment features three main operating modes: continuously reception, bandscan and smart bandscan.

With FM static mode the user can focus on a single channel, selected and monitored exclusively. Thanks to the scan mode up to 32 channels for each tuner can be scanned and supervised in a single analysis. FM static mode also receives up to 64 memories.

Wolf 1MS and 2MS allow to manage accurately RF, MPX, RDS, Audio and RDS data dynamic services. In smart mode the channel scan time is adjusted automatically according to instantaneous measurements requirements.

Wolf 1MS and 2MS are the ideal Probes for a Network Management System.

All data and information captured during the FM Monitoring can be collected by a Control Room and used to analyse the FM

Network performances in real-time or in the past.

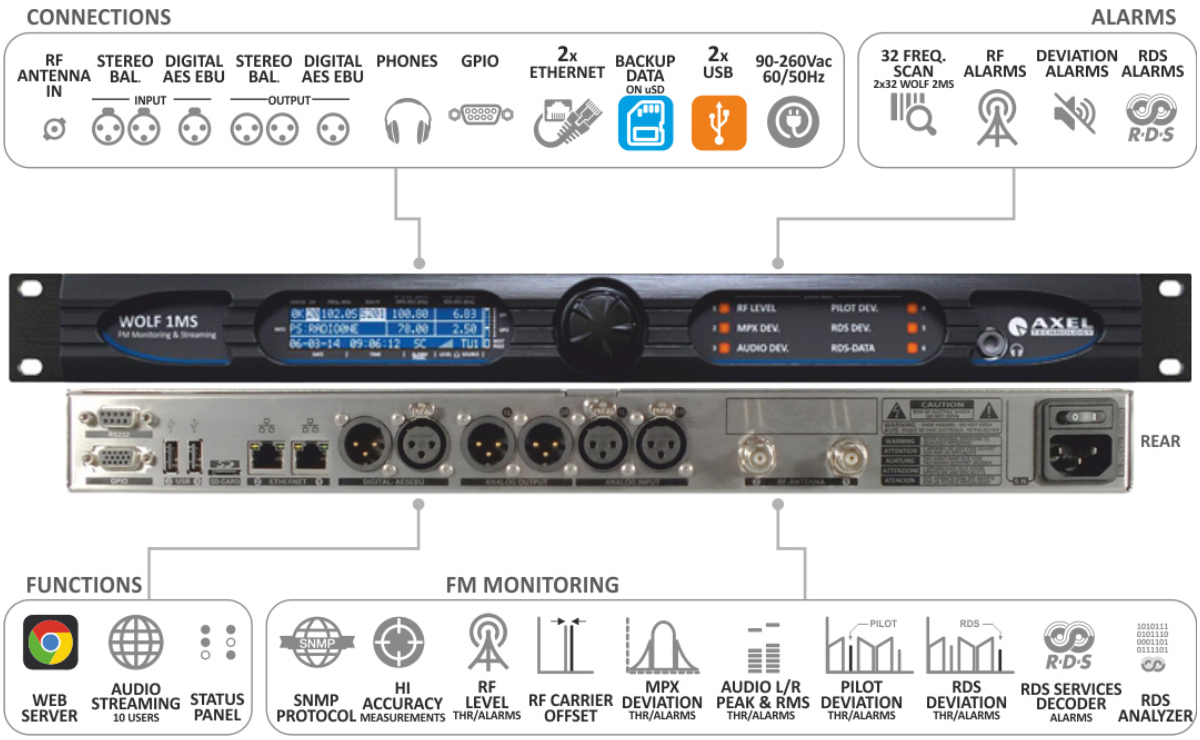
Models

For simple configurations that do not require NMS software, Wolf can send via email a daily report of the 24 hours events. Wolf provides a database sheet to manage these information. The two built-in audio streamers are the essential feature of Wolf 2MS (Wolf 1 MS has 1 built in audio streamer). Audio channels can be streamed to a remote logging system that records both, audio and data, coming from the transmitter site. It is also possible to send audio stream to a remote player for audio-on-demand purposes. Users can listen to each single FM tuner and streamed audio anywhere, using all Internet browsers.

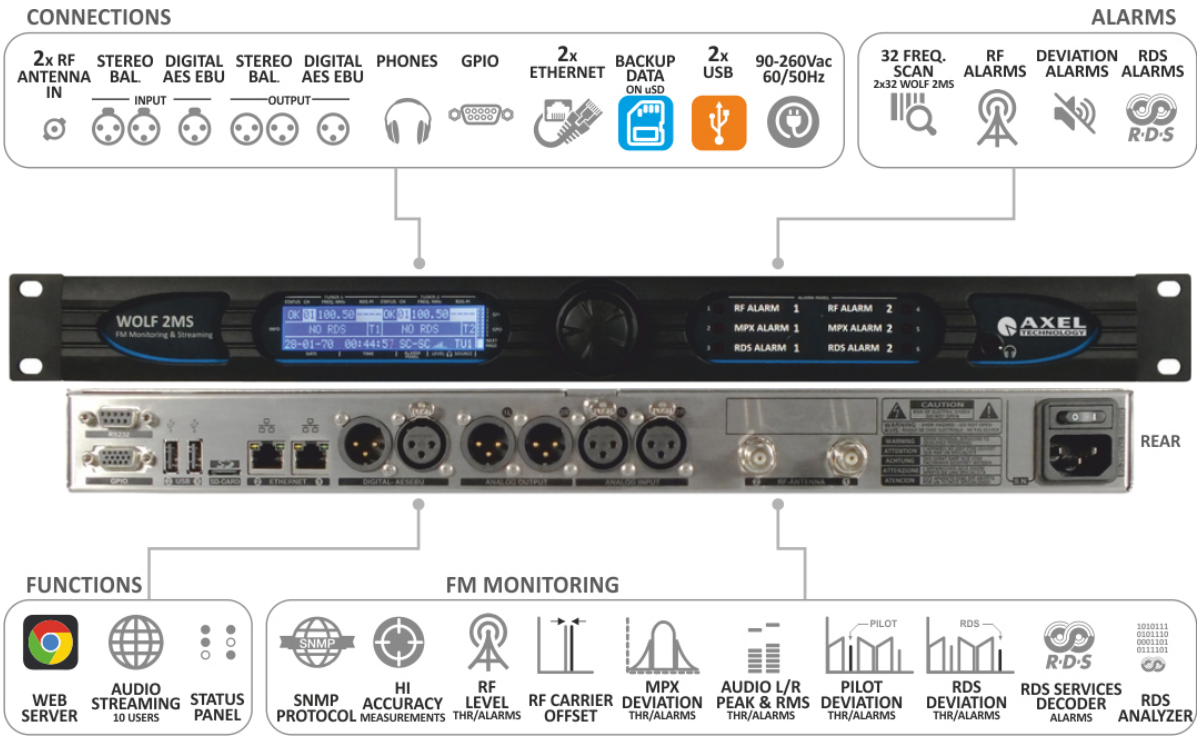
Two onboard network interfaces provide maximum flexibility in streaming and connectivity processes. From PCs, tablets and smartphones broadcasters can completely control Wolf and have full access to all data and alarms. When an alarm is trigged, NMS system sends notifications via SMS or email or takes an action to manage any possible issue.

External input sources are available: analog Left + Right and digital AES/EBU inputs. Users can connect audio to the controlled external input sources. These audio inputs are constantly monitored: silence detection, and audio presence. Tests, performed also by end users, have shown that Wolf circuits are extremely safe and completely free from any kind of radiofrequency interference.

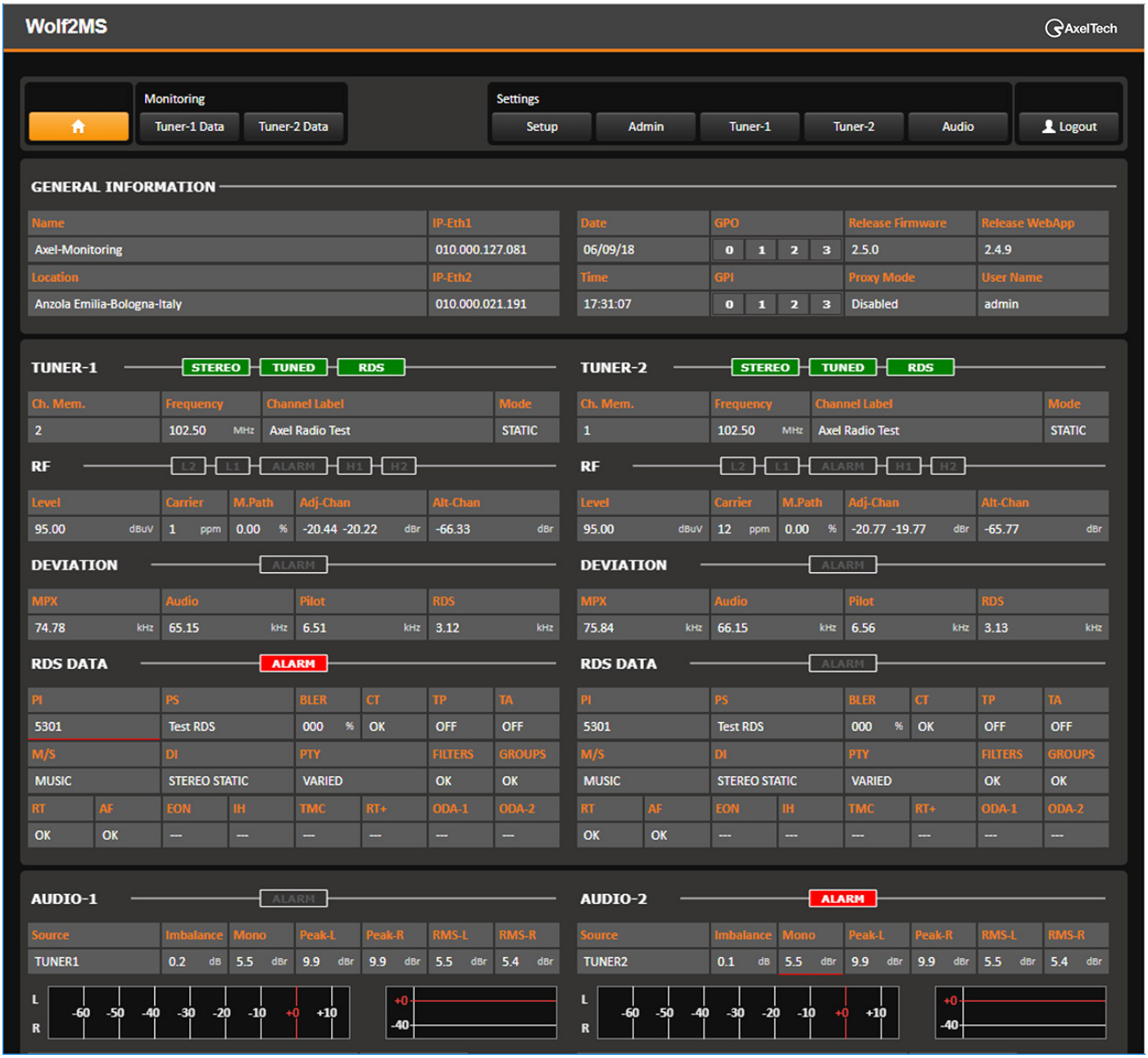
Wolf 1MS



Wolf 2MS



Highlights



General

- Real time measurements for FM networks, fully digital
- Wolf 1 MS: single FM Tuner and single audio over-IP streaming for monitoring
- Wolf 2MS: double FM tuner and double audio over-IP streaming for monitoring
- More than 30 alarms for any frequency received (Wolf 2MS 64. Wolf 1 MS 32)

- Fully independent time, Thr, Hysteresis, for any frequency parameter
- Configurable bandscan for each FM tuner
- Embedded web server for worldwide consultation
- Analysis modulers: RF, MPX, audio and RDS
- RDS decoder with group sequence decoding for each tuner
- SNMP and HTTP web interface and FTP supported
- Double ethernet ports and double USB interfaces
- Front LCD display
- Front panel headphone output
- Analog auxiliary input and AES/EBU
- Main Supply 90--260Vac 50/60Hz. 25W
- Graphic display
- Form factor: 1RU 19” - Inox steel
- High immunity to strong RF fields, designed to be installed in high power TX sites
- Fully programmable by a simple and intuitive Web GUI interface
- Headphones output with level control

Monitoring Parameters

- RF parameters:

Alarms & Parameters

- Silence detector on analog input

- RF level, Carrier offset, Multipath, Adjacent carriers level (+/- 100kHz), Alternative carriers level (+/- 200kHz)
- Deviation parameters
- MPX level, Audio level, Pilot level and RDS level
- Audio parameters
- Inbalance L/R, Mono, Peak left, Peak right, RMS left, RMS right, MPX power
- RDS parameters
- PI, PS, BLER, CT, TP, TA, M/S, DI, PIN & PTY (Day/Hour/Min/PTY), FILTERS, GROUPS, RT, AF, EON, IF, TMC (AID/Group/Data), RT+(AID/Group/Data), ODA-1(AID/Group/Data), ODA-2(AID/Group/Data), LA, EG, ILS, LSN, SLC0-SCL7
- 64 list of 25 frequencies always decoded
- 10 EON for each frequency received with PI, PS, PIN (date, hour, minute) PTY, TP, TA, LA EG, ILS, LSN, AF
- Received groups stats 0A-15A,
- Silence detector on digital input
- 4 alarm on RF level with 4 Thr (RFL2, RFL1, RFH1, RFH2).
- Deviation level (Thr, Hysteresis, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- Pilot low level (Thr, Hysteresis, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- Pilot window (Thr Min, Thr Max, Hysteresis, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- RDS low level (Thr, Hysteresis, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- RDS window (Thr Min, Thr Max, Hysteresis, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- Audio deviation silence (Silence Thr, Validation Time and Hold Time, Mask, Label, Email and Trap enable)

0B-15B

- RDS Stream with groups filters with download function

Communications & Management

- Ethernet/USB/RS232/GPIO connections
- SNMP V2c
- NTP Address for Time and Date synchronization
- 1 RS232 for RDS UECP data streaming
- 4 GPI and 4 Relay (DB 15p F HD)
- 2 USB A-Type
- HTTP, FTP, SNMP, SMTP, UDP, TCP support
- Alarms via: TRAP (SNMP), email(SMTP), GPO, HTTP
- uSD Card for clone function, for maintenance and easy replace of a faulty unit
- Import and export configurations function
- Logs 24/7 with export functions
- Right access management
- Easy configuration page setup with info connection diagrams
- Audio left deviation silence (Silence Thr, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- Audio right deviation silence (Silence Thr, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- Audio mono level (Thr, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- Audio stereo in-balance level (Avg, Thr, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- RDS-PI (PI-1, PI-2, PI-3, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- RDS-PS (PS-1, PS-2, PS-3, PS-4, Wild Char, Validation Time and Hold Time, Mask, Label, Email and Trap enable)
- RDS-TP (Ref, Validation Time and Hold Time, Mask, Label, Email and Trap enable)

- Multi-user contemporary acces

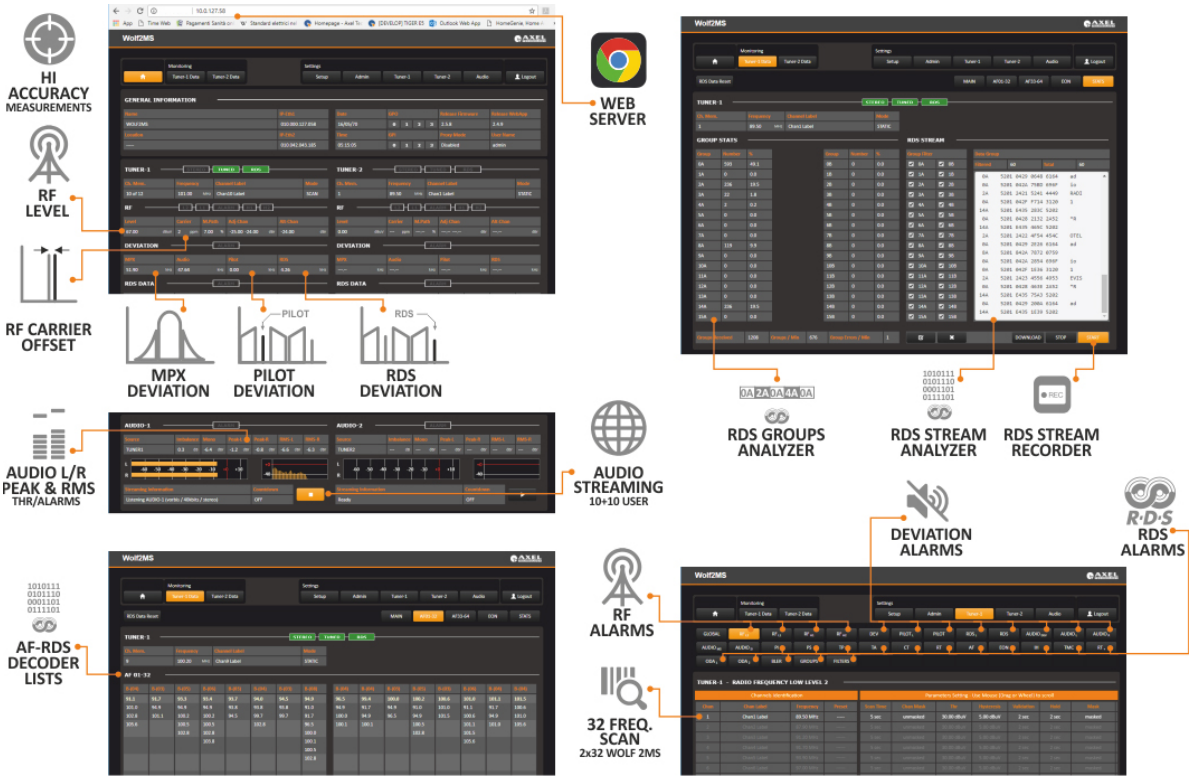
Inputs & Outputs Audio

- Balanced analog input on XLR
- Balanced analog output on XLR
- Balanced digital AESEBU input on XLR
- Balanced digital AESEBU output on XLR

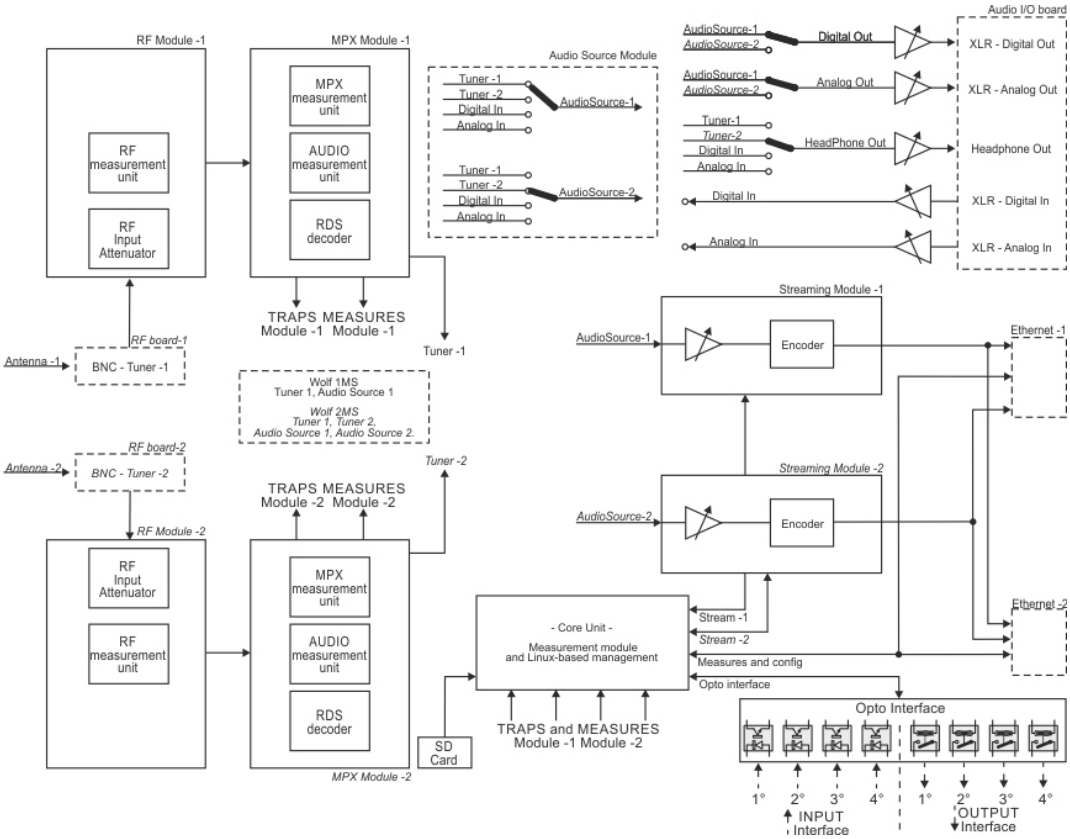
- RDS-TA (MaxOnTimeout, NoVarTimeout, Mask, Label, Email and Trap enable)
- RDS-CT (Timeout, Max Offset, Mask, Label, Email and Trap enable)
- RDS-RT (Timeout, Hold Time, Mask, Label, Email and Trap enable)
- RDS-AF (Validation Time, Hold Time, Mask, Label, Email and Trap enable)
- RDS-EON (Validation Time, Hold Time, Mask, Label, Email and Trap enable)
- RDS-IH (Data Timeout, Group Timeout, Hold Timeout, Mask, Label, Email and Trap enable)
- RDS-TMC (Reg. Timeout, Data Timeout, Hold Timeout, Mask, Label, Email and Trap enable)
- RDS-RT+ (Reg. Timeout, Data Timeout, Hold Timeout, Mask, Label, Email and Trap enable)
- RDS-ODA-1 (AID, Reg. Timeout, Data Timeout, Hold Timeout, Mask, Label, Email and Trap

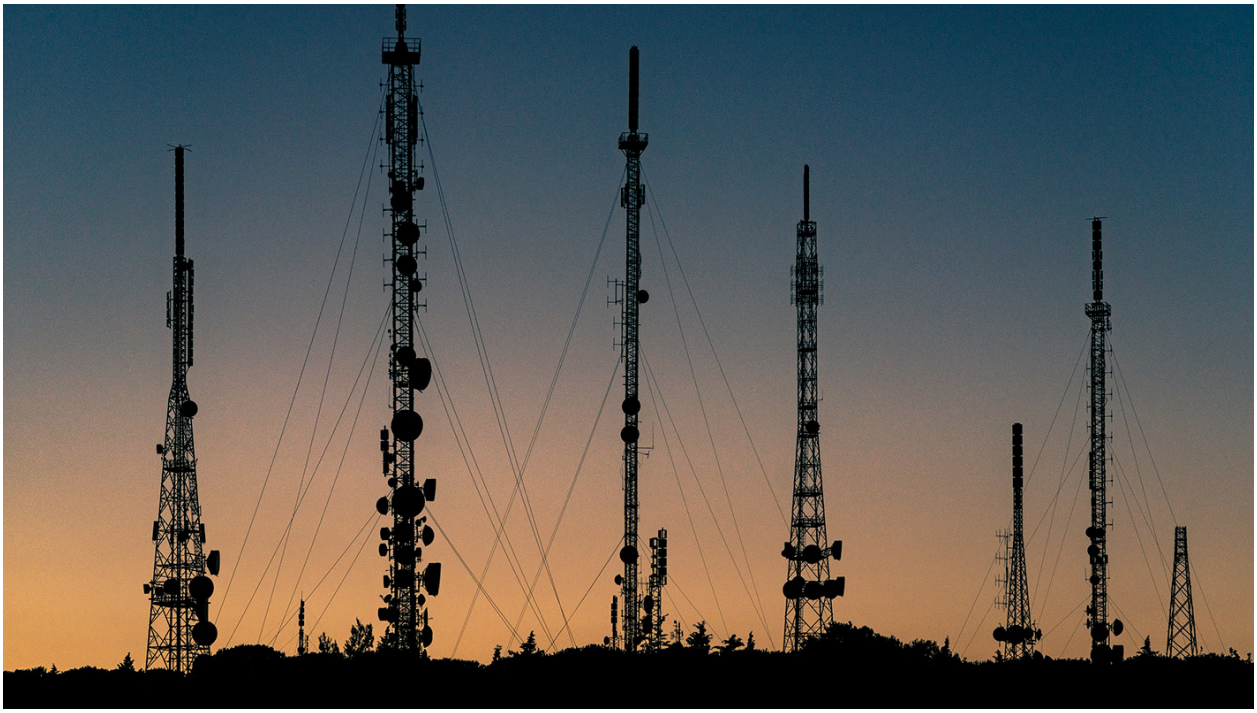
enable)

- RDS-ODA-2 (AID, Reg. Timeout, Data Timeout, Hold Timeout, Mask, Label, Email and Trap enable)
- RDS-BLER (Max, Hysteresis, Validation Time, Hold Time, Mask, Label, Email and Trap enable)
- RDS-GROUPS (Group mask, Timeout, Validation Time, Hold Time, Mask, Label, Email and Trap enable)
- RDS Filters (Block-1 Mask Ref., Block-2 Mask Ref., Block-3 Mask Ref., Block-4 Mask Ref., Timeout, Validation Time, Hold Time, Mask, Label, Email and Trap enable)



Block Diagram





Wolf 1MS and Wolf 2MS are FM monitoring systems designed for FM Off Air signal monitoring purpose.

Wolf 1MS is provided with one high quality FM tuner, while Wolf 2MS allows the broadcaster to receive up to two frequencies thanks to an internal double tuner.

Tuners are independent and they can operate in three ways: Continuous reception, Bandscan and SmartScan.

Internal tuner ensures high performances in FM reception, RF and MPX audio analysis and RDS data stream output. The monitoring made on FM channels can be a basic RF analysis or an advanced RF, MPX and AUDIO measurement.

- Continuous reception: a single carrier is selected and monitored;
- Bandscan mode: 32 FM Channels can be scanned and monitored in Wolf 1MS and 64 FM Channels can be scanned and monitored in Wolf 2MS. The bandscan time is also user definable, in a range from 1 second up to 10 seconds for each channel;
- SmartScan mode allows a smart and variable scan time that is adjusted automatically to fit the instantaneous measurement requirements. Thanks to this feature it is possible to avoid false-positive rising errors.

Special Features

During continuous reception mode, each single tuner checks and completely decodes the multiplexed signal:
Mono level, Pilot level, Audio and RDS levels are measured and they are always under control. All datas, captured during FM Channel monitoring, can be sent to a Network Management System (such as AxelTech's Ranger) or they can be shown in a common password protected web page. Communication between Wolf and Ranger NMS is SNMP v2C protocol. For all single parameters under monitoring, a threshold can be set. If one or more values go out of range, alarms are delivered.

Once the RF signal is received, audio should be streamed from the transmitter site back to a remote logging system. The streamer input allows to do an internal selection between all inputs available: Tuners, External Analog In, External AES/EBU In.

Wolf 1MS and Wolf 2MS are completed with an "External Input" source: analog Left + Right input and Digital Left + Right in AES/EBU format. This audio input is continuously monitored: silence detection (Threshold/time and level), left and right presence, peak left, peak right. Rear-panel audio output always presents the audio decoded from Tuner-1 or Tuner-2 and this setting is user definable, while audio is available on analog or AES/EBU format.

Wolf 1MS and Wolf 2MS provide a large variety of connection: double Ethernet port, USB and front panel headphone output, 4x GPIn opto coupled and 4x GPOut over relays. Rs232 serial port for RDS-UECP bridging and rebroadcasting purposes, and rear panel placed SD card to store or recall the complete equipment

configuration.

RF antenna inputs are over BNC connectors, a XLR balanced stereo analog input and output, AES/EBU input and output. OS and datas are loaded and stored over solid state memory as SD and flash RAM. Universal switching power supply, 1 rack unit space in fan-less configuration, allows to operate worldwide.

Measures

Field	Type of measure	Description	U.M.
RF	4x RF Level lower threshold	Measure, alarm via email/trap SNMP	dBµV
	2x Adjacent channel L1 threshold	Measure, alarm via email/trap SNMP	
	Alternative channel - Worse	Measure	dBr
	Carrier precision	Measure	ppm
	Multi path	Measure	%
MPX	Deviation max	Measure, alarm via email/trap SNMP	kHz/dBr
	2x Pilot lower level - 2 threshold level	Measure, alarm via email/trap SNMP	
	MPX power – ITU-R BS.412	Measure, alarm via email/trap SNMP	
RDS Level	RDS level lower threshold	Measure, alarm via email/trap SNMP	
	RDS level higher threshold	Measure, alarm via email/trap SNMP	
Audio	Peak left - Peak right threshold	Measure, alarm via email/trap SNMP	dBr
	RMS left - RMS right threshold	Measure, alarm via email/trap SNMP	
	Audio imbalance – L/R delta threshold	Measure, alarm via email/trap SNMP	
	Mono silence – L+R threshold	Measure, alarm via email/trap SNMP	
	Audio MPX deviation threshold	Measure, alarm via email/trap SNMP	kHz

Field	Type of measure	Description	U.M.
	Audio MPX Silence detection threshold	Measure, alarm via email/trap SNMP	s
	Audio left – Right silence det. threshold	Measure, alarm via email/trap SNMP	
RDS Data	AF - Complete decoding + Visualization PS – 4 PS matching reference PI – 3 PI Code matching reference CT – Time offset DI – Decoder information PTY – Program type TP/TA – timeout TA M/S – Music speech BLER – Block error rate TMC – AID – Group – Data EON Enhance other channel RT – RT+ data decoding LA – EG – ILS – LSN-PIN ODA TMC ODA RT+ ODA - 1 ODA - 2 SLC0 - SLC1 - SLC2 - SLC3 - SLC4 - SLC5 - SLC6 - SLC7	RDS Data decoding group, visualization and storage. Alarm generation in case of error, can be shown in a common web page or delivered via email. Interfacing with up to 4 NMS allows equipment to deliver traps using SNMP protocol.	

Technical Specifications

PARAMETERS	DESCRIPTION
Main Power	100 Vac - 240 Vac 50/60 Hz internal, universal power supply
Power consumption	25 W
Power connector	IEC plug filter with internal fuse 2.0 AT
Headphones	Stereo Jack 6.3 mm
Safety and EMC	Compliant to CE laws
Working temperature	0° to 50° C (storage -5 to + 50 °C)
Housing dimensions	19 inch x 1u x 240 mm (depth)

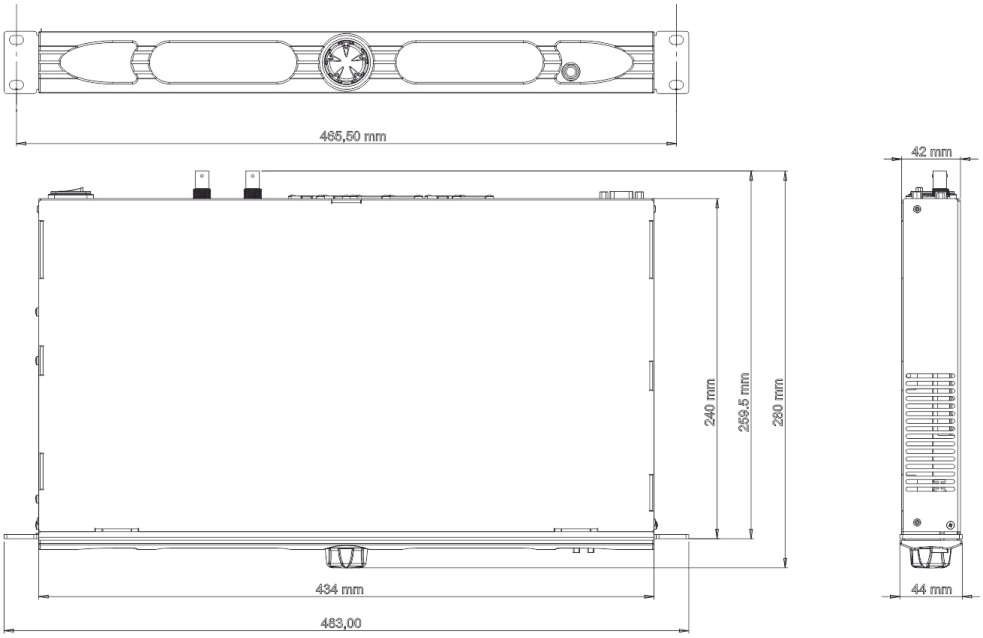
PARAMETERS	DESCRIPTION
Weight	3.5 kg
RF TUNERS	
Tuner frequency	87.5 MHz - 108.0 MHz
Tuner step	10 kHz
RF tuning stability	+/- 500 Hz
RF input sensitivity	20 to 120 dBµV
RF input nominal level	80 to 100 dBµV
RF inputs main	2x BNC, with 50 Ohm unbalanced
Max frequency deviation	125 kHz
IF filter bandwidth	34 kHz to 138 kHz – Manual or automatic
Input RF level	30 dBµV – 120 dBµV with internal attenuator
Bandscan carrier number	32 channels
Bandscan time	Static Mode, Scan 2s to 20s and Smart Mode*
Selectivity at ± 120 kHz	> -3 dB
Selectivity at ± 200 kHz	> -40 dB
Selectivity at ± 300 kHz	>- 50 dB
Selectivity at ± 400 kHz	>-65 dB
Image rejection @ 22.5 kHz	70 dB
Adjacent channel rejection	63 - 65 dB
Alternate channel rejection	65 - 72 dB
THD @ dev=75 kHz	0.05 – 0.1 %
Mono (S+N)/N	75 dB typ – 68 dB min (No A-Weighting 30 Hz – 15 kHz)
STEREO DECODERS	
Stereo (S+N)/N	61 dB Stereo/61 dB mono @ 40 dBµV 65 dB Stereo @ 50 dBµV 80 dB Stereo @ 70 dBµV
Pilot 19kHz suppression	55 dB (Stereo modulation L = 1, R = 0,Deviation=67.5 kHz, Pilot deviation=6.75 kHz)
Stereo THD + N	Measures @ 70 dBuV with 75 kHz deviation 100 Hz - 0.055 % 1 kHz - 0.061 % 5 kHz - 0.19 %

PARAMETERS	DESCRIPTION
	10 kHz - 0.46 % 45 dB (Stereo modulation L = 1, R = 0,Deviation=67.5 kHz, Pilot deviation=6.75 kHz)
Stereo separation	48 dB @ 400 Hz 48 dB @ 1 kHz 48 dB @ 5 kHz 38 dB @ 10 kHz 38 dB @ 14.7 kHz
RDS DECODER	
RDS sensitivity	20 dBµV (dev f = 2 kHz, RDS BLER < 5%)
RDS synchronization time	80 ms (dev f = 2 kHz RF input = 60 dBµV)
RDS PI lock time	100 ms (dev f = 2 kHz RF input = 60 dBµV)
RDS data decoding and streaming	RDS level indication and deviation (voltage, kHz and dBr)
RDS data decoding services	PS, PI, M/S, DI, TP, TA, AF, AF List Presence A/B Method, Scrolling PS, AF EON, Radio Text, Radio Text Plus, CT, PTY, PIN, IH, TMC, EWS, TDC. ODA generic services. RDS error detection with three shold adjustable
RF MEASUREMENT MODULE	Ranges – Resolution - Precision
RF Level	0 – 80 dBµV (resolution 1 dBµV, precision 2 dBµV) 82 – 120 dBµV (resolution 2 dBµV, precision 5 dBµV)
Deviation	0-125 kHz (resolution 1 kHz, precision 2 kHz)
Tuned carrier frequency offset	0-250 ppm (resolution 2 ppm, precision 5 ppm)
Multipath	0-100 %
Adjacent channel RF level	0 – 80 dBµV (resolution 1 dBµV, precision 2 dBµV) (+-200kHz)
MPX MEASUREMENT MODULE	Ranges - Resolution - Precision
Pilot level	0-20 kHz (resolution 0.1 kHz, precision 0.2 kHz)
Rds level	0-20 kHz (resolution 0.1 kHz, precision 0.2 kHz)
Mpx power ITU-R-BS412 (Estimated)	-20 dBr to + 12 dBr (resolution 0.1 dBr, precision 0.5 dBr)
Stereo	Valid Stereo signal detector
AUDIO MEASUREMENT MODULE	Ranges – Resolution – Precision

PARAMETERS	DESCRIPTION
Left Quasi Peak	Programmable attack time from 0 mS to 2 mS (Resolution 0.1 dB)
Right quasi peak	Programmable attack time from 0 mS to 2 mS (resolution 0.1 dB)
Audio silence	Threshold - 80 dB to 0 dB, Time: 1-120 Sec
Unbalanced stereo signal	Threshold - 80 dB to 0 dB, Time: 1-120 Sec
AUDIO OUTPUT	
Available output on XLR	Tuner - 1 or Tuner - 2, definable via web page. Same audio on analog and AES/EBU
Audio frequency response	30 Hz - 15 kHz, ± 0,3 dB
Phones (Front panel)	Stereo jack 6.3 mm, 150 Ohm, 0.8 W
ANALOG OUTPUT MODULE	
D/A Conversion	24bit Sigma - Delta conversion - 32 kHz Sample rate
Connectors	2x XLR, male - Electronically balanced
Output level	-12.0 dBu to +14.0 dBu (0.1 dBu Step) - Max (+20 dBu)
Impedance Source	47 Ω
Load impedance	600 Ω or greater
Distortion	Less than 0.02% TDH + Noise (0.0dBu @ 1Khz)
Dynamic range	108 dB (110 dB A-weighted, 20Hz - 15kHz)
Sources	Streamer1_Source , Streamer2_Source
DIGITAL OUTPUT MODULE	
Connectors:	XLR, Male - Electronically balanced
Format	AES3/EBU
Sample rates	32 kHz
Resolution	24 bits
Operative nominal level:	From 0.0 dBFs to - 24dBFs (0.1 dBu step)
Dynamic range:	125 dB (Typ), 122 dB (Min)
Distortion	less than 0.01% TDH+NOISE (-20dBFs @ 1Khz)
Freq. response	20Hz -15kHz
Dynamic range	108 dB
Sources	Streamer1_Source , Streamer2_Source
AUDIO INPUT	
Encoder streaming	User selectable between Tuner-1, Tuner-2, External Input Analog, External Input

PARAMETERS	DESCRIPTION
input source	AES/EBU
DIGITAL INPUT MODULE	
Connectors:	XLR, female – Electronically balanced
Format	AES3/EBU
Sample rates	32 kHz/44.1 kHz/48 kHz/96 kHz with src and jitter correction
Operative nominal level:	From 0.0 dBFs to - 24dBFs (0.1 dBu step)
Dynamic range:	125 dB (Typ)
Distortion	less than 0.01% TDH + Noise (-20dBFs@ 1Khz)
Input modes:	Stereo, Mono (Left), Mono (Right), Mono (Left + Right)
ANALOG INPUT MODULE	
A/D conversion	24bit Sigma - Delta conversion - 32kHz sample rate
Connectors:	XLR, female - Electronically balanced
AD clipping point	+20.0dBu
Operative nominal level:	From - 12.0dBu to +12.0dBu (0.1dBu Step)
Line impedance	10 kΩ (Electronically balanced selectable) EMI - suppressed
Distortion:	less than 0.02% TDH+NOISE (0.0dBu @ 1kHz)
AD dynamic range:	108 dB RMS (110 dB A - weighted, 20Hz - 15kHz)
Input modes:	Stereo, Mono (Left), Mono (Right), Mono (Left + Right)
AUDIO & RDS STREAMING MODULES	
Protocols	UDP/RTP, TCP/IP, IceCast2
Encoders	OGG - VORBIS
Interface	Ethernet port 10/100 Mb/s
Bitrate	User select 24 kbps to 192 kbps
Sample rates	32Ksamples/sec
RDS streaming	Proprietary redundant protocol over UDP or RAW-TCP/IP
Administration	User right management

Dimensions



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