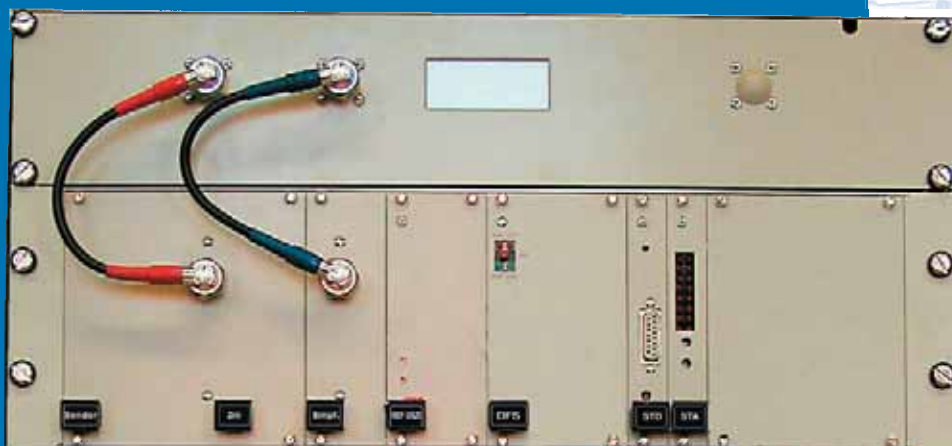


FSO-PMR station



Transmitter

Receiver

Reference modul

Digital remote control

Digital controller

Analog controller

Slot for additional devices

System description

Radio systems

Radio station FSO-PMR



Capability characteristics

- compact and modular construction with a service friendly construction
- outstanding technical data from transmitter and receiver (see technical data)
- due to mounting with a heated crystal oscillator unlimited use in simulcast radio nets
- operating mode: duplex, semiduplex or simplex
- adjustable transmitter power from 1 to 15W via handheld service device
- continuous data transmission at maximum transmitter power
- digital remote control for data transfer to an appropriate central office
- modulation-input for data transfer
- selftest function and transfer of failure reports to the central office
- transfer of control commands to the radio station e.g. channel remote circuit
- regulation-circuit for constant transmitter power over the whole temperature and frequency range at the output of the duplexer
- menu guided adjustment of all needed parameters via handheld service device
- various service functions for an easy activation and validation of the radio station

General

For the usage in networks of the non-public mobile agricultural broadcast (nömL) two new, stationary radio stations have been developed:

- FSO 416 S for the 2-m-band
- FSO 408 S for the 4-m-band

With this for both bands radio stations are available. Both have outstanding HF-technical attributes, a compact and a service friendly construction and applicable to different radio networks.



Transmitter

The transmitter module is dimensioned for single-mode and works together with a central supply voltage of DC 13,5 V.

Both subassemblies - Transmitter frequency preparation and Transmitter amplifier - are placed in a RF-dense cabinet and decoupled by an isolation device so no interference rays can get outside.

The transmitter amplifier provides an output power up to 20W to a coaxial connector of type "N" on a front panel. Thereby a maximal adjustable output power of 15W at the antenna output is guaranteed, despite of losses in directional coupler and surface wave filter.

Due to a continuous variance analysis the transmitter efficiency at the output of the combiner is constant over the whole frequency and temperature range.

A temperature sensor in the amplifier causes a power reduction from appx. 80°C radiator temperature.

Receiver

Also the receiver module is dimensioned for single-mode and works with a central supply voltage of 13,5 V DC.

The receiver is placed in a electromagnetic RF-shielded cabinet.

Its RF-input is led over a coaxial connector of „N“ type on the front panel and is also connected to the coupler resp. duplexer.

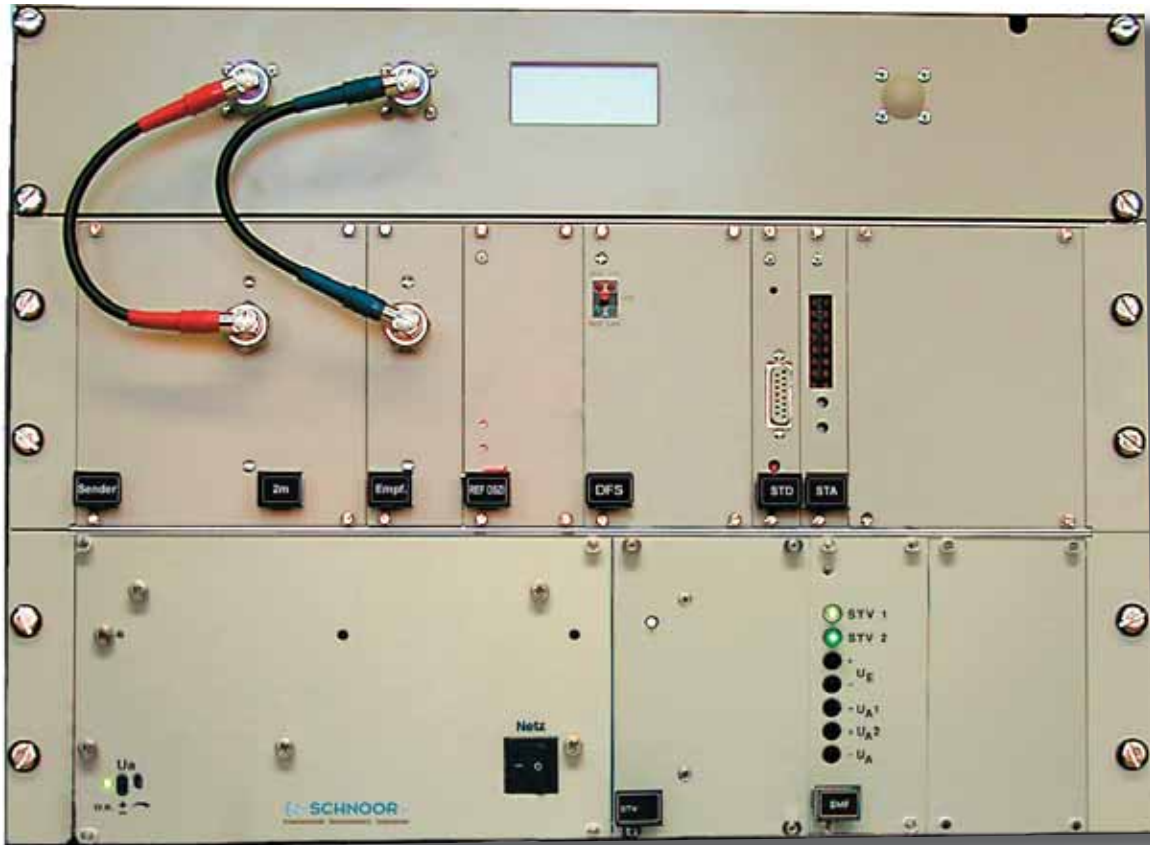
Reference module

According to the respective application, four different reference modules are necessary:

- reference module for simulcast operation
- reference module without simulcast operation

In common wave operation for the adequate high frequency constancy, a heated crystal oscillator (OCXO) is implemented.

FSO 408 S in duplex archievement



FSO-PMR switch charger and circuit measuring field

Digital controller

This assembly controls the fixed station FSO and contains the following functional modules:

- Microprocessor with data storage
- frequency tone generator
- three busmodules for the system integrated bus control
- two busmodules for external data exchange
- power supply with voltage reset
- parallel control signals for input and output

On the front a 15-pole Submin D-connector plate is arranged. It is connected to the handset UBt. Via this handset device, conversations via radio resp. wire are possible and code- and testfunctions can be invoked.

Analog controller

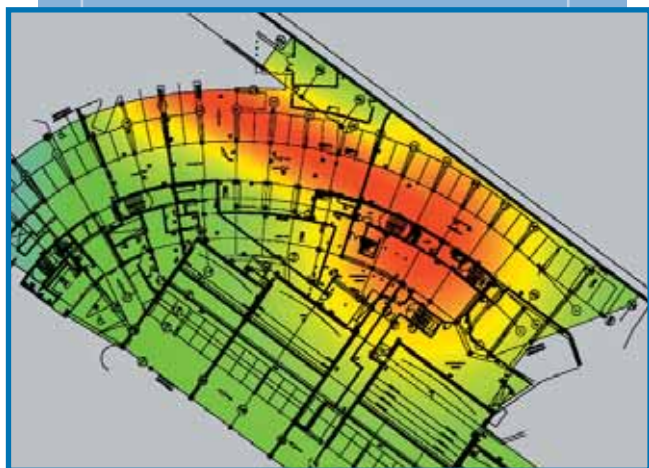
This assembly controls analogue signals (AF-connections) of the fixed stations FSO:

- AF from receiver, AF to transmitter
- Data-NF (FSK) to/from datamodem
- AF of the tone generator
- AF of the service handheld device

Each of these signals is switchable both in way „wire“ and in way „radio“ .

Switching a wire- resp. radio loop (RS1) is possible. The relative condition of the radio station is shown.

FSO 408 S in duplex achievement



Radio field measurement and graphical analysis

DFS-modul (optional)

The DFS modul (digital remote control) completes the 3 existing command- and report functions of the controller to additional 5 more digital commands and reports.

Important operating conditions of the DFS are shown on a LED-display field

A conduction analysis button exists for the manual inspection of the conductions in direction to the central office

Extra plug-ins

For the enhancement with additional devices several slots are available beside the analog controller.

For the usage of the receiver range unit UeDi-L for one-channel-radio networks with multi receiver locations:

- receiver-card modul SKMS
- transmitter-card modul SKMS

for over four wire-cable connected fixed stations:

- four wired-adjustment VDAS



Voltage control of the cabinets

Service handset

Handling and programming of the radio station is done by the extra easy-to-handle and comfortable via the handheld-device UBt.

The service handset is placed either in a tub below the S-/E-assembly or if required attached to the 15-pole Submin-D connector of the digital controller .

Besides the switching functions necessary for the operation circuit, all specific service functions like code- and testing functions are available. The display of all important data takes place via an alpha numeric display, status display and a series of LEDs for radio field power.

Duplexer

In the mode of DUPLEX, a separate assembly „duplexer“ is placed above the transmitter-receiver unit in the cabinet.

In the duplexer an evaluation of the antenna adaptation is done by directional coupler measurement and the forward- and return efficiency is shown.

It is dimensioned for up to 50W and connected to the transmitter, receiver and the antenna via three connectors (type N) on the front panel.

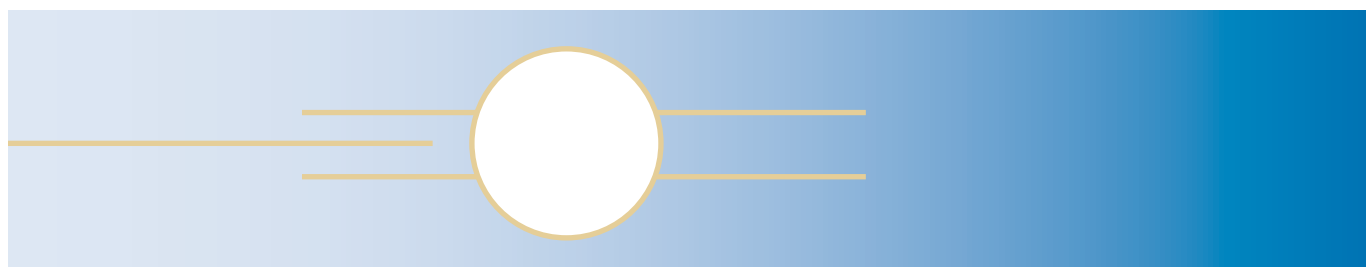
Technical specifications

General:

	4 m: FSO 408 S	2 m: FSO 416 S
BZT-approval	A116094E	A119632F
Frequency range	68 ... 87,5 MHz	146 ... 174 MHz
Duplex density	9,8 MHz	4,6 MHz
No. of channels	32 duplex pairs	
Channel screen	20 kHz	
HF-circuit switch bandwidth	2 MHz (\leq 1 MHz with switch)	
Type of modulation	PM, FM	
Operating mode	simplex, semiduplex, duplex	
Frequency conditioning	PLL-Oscillator for RX, admix method with PLL-Oscillator and VCXO for TX	
Frequency programming	with micro processor	
Power supply; internal	DC 13,5 V	
Temperature range	within limits of datasheet: -25 °C to +55 °C, operative: -30 °C bis +60 °C	
Dimensions (H x B x T)	760 mm x 600 mm x 350 mm	

Transmitter:

Transmitter power	adjustable in 0,1W-steps from 1 to 15 W
Stability of the adjusted RF-power	better than $\pm 0,5$ dB above frequency and temperature
Hub stability	better than $\pm 0,5$ dB above frequency and temperature
Senderhohtastzeit	≤ 5 ms (TX direct) für 90 % RF-efficiency
AF-level (Mod.-input)	86 mV _{eff} for nominal stroke= 60 % max. Hub und $f_{\text{mod}} = 1$
kHzDistortion at Nennhub	≤ 3 %
AF-level(data input)	857 mV _{SS} for nominal stroke= 60 % max. Hub
Transmitter-fault stroke (not modulated)	< 20 Hz
Modulation-fault distance (evaluated)	≥ 53 dB refered to nominal stroke
AF-Transfer sector	50 to 3000 Hz at +1/-3 dB
Data input speech and tone	prevented via Software
Data modulation input	prevented via Software



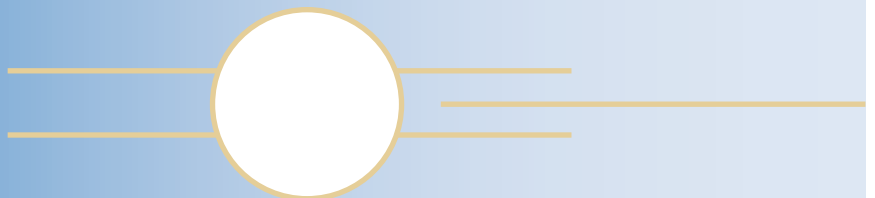
Technical specifications

Receiver:

Sensibility:	PM: $\leq 0,5 \mu\text{V}$ / FM: $\leq 0,7 \mu\text{V}$ (on 50 Ohm at 20 dB SINAD, evaluated)
Intercept-point at the RF-input	>13 dBm at maximum sensibility
Selection (static)	>130 dB (except alongsite receiving point)
Selection (dynamic)	>80 dB
NF-exit level	664 mV _{eff} an 2,7 k Ohms (unevaluated at discriminator)
NF-receive-output level	664 mV _{eff} at 2,7 k Ohms at nominal stroke and $f_{\text{mod}} = 1 \text{ kHz}$
Distortion at nominal stroke	$\leq 7 \%$
Fault distance	(unevaluated)
Carrier $\geq -67 \text{ dBm}$ an 50 Ohm	$\geq 49 \text{ dB}$
Radio signal strength output (RSSI)	($R_i < 100 \text{ Ohm}$) 0 to 5 V (without delay)
Squelch	Threshold 13 to 26 dB S/N (hysteresis $\leq 3 \text{ dB}$) rise-time $\leq 2 \text{ ms}$, fall-time $\leq 10 \text{ ms}$
Highpass 250 Hz	active ex factory
simplex/duplex-switchover	via software

Reference oscillator:

Frequency	6,400 000 MHz
Frequency stability-standard (working area)	$\leq \pm 1 \text{ ppm}$
Simulcast	$\leq \pm 0,05 \text{ ppm / year}$





Our range of power

- Radio systems (digital and analogue)
- In-house radio according to BOS-guidelines
- In-house supply, tunnel radio systems
- Planning of radio nets
- Radio field measurement and building pattern measurements
- Operation centers for police and fire brigades, ADAC etc.
- Telematic systems (digital and analogue)
- Observation- and control systems
- Transmission of data and measuring data
- PC screen configuration and control
- Memory programmable controls

Our performance spectrum

- Planning and projecting
- Product design (hardware and software)
- Prototype design and production
- System implementing and maintenance
- Technical support
- Trainings

We are certified to DIN ISO 9001 : 2000

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