



500 W to 1 kW

## VHF FM Solid-State Transmitters SR500E1

### Ideal for local sound broadcasting

- ◆ Powerful FM transmitters for the medium power range (500 W to 1 kW) with outstanding features
- ◆ Compact, clear modular design in 19-inch rack format (9 HU in total)
- ◆ Up to four transmitters in one 19-inch rack (e.g. complete (3 + 1) 1 kW transmission system)
- ◆ High degree of compatibility with Transmitter Series SR600E1 (power range 2.5 kW to 10 kW) (e.g. same exciters and BLF278 output stage transistors)
- ◆ Intelligent monitoring and fault detection system as well as remote control via bit bus or optionally via a parallel remote-control interface
- ◆ Solid-state broadband amplifiers with guard circuits and integrated harmonic filter
- ◆ High reliability through the use of microstrip technology
- ◆ Passive standby, passive exciter standby and (n+1) standby possible
- ◆ Easy installation and maintenance



**ROHDE & SCHWARZ**

## VHF FM Solid-State Transmitters SR505E1 (500 W) and SR510E1 (1 kW)

As an extension of the successful fourth generation of Solid-State Transmitters SR600E1 (power range 2.5 kW to 10 kW), Rohde&Schwarz offers a new transmitter family for the medium power range (500 W to 1 kW). Like the high-power transmitters, the new SR500E1 transmitter generation is characterized by a very compact and clear design.

The FM Transmitters SR505E1 and SR510E1 are ideal for local broadcasting stations. Like all transmitters from Rohde&Schwarz, they are designed for unimpaired operation at high power and low cost while in use. They are therefore the ideal choice for unattended stations since they can be remotely monitored.

The transmitters are fully solid-state. In the VHF range from 87.5 MHz to 108 MHz, they serve for transmitting AF sound broadcasting signals, RDS (radio data system) signals and SCA (subsidiary channel authorization) signals, e.g. DARC (data radio channel) in stereo, mono and composite modes. The nominal output power is 500 W for the SR505E1 and 1 kW for the SR510E1. The transmitters comply with the R&TTE 1999/5/EC guidelines.

## Exciter SU135

The synthesized Exciter SU 135 generates a frequency-modulated RF signal in the range 87.5 MHz to 108 MHz with an RF output power of 20 W. AF, RDS or SCA signals are fed to the exciter as modulation signals.

If an additional module is used, digital data instead of AF signals can be processed according to the bit-serial AES/EBU protocol.

Operation is menu-guided by means of control and display elements on the front panel of the exciter. Six preset channels are available with (n+1) configurations; the settings for the operating channel can be saved in non-volatile memory.

## Amplifiers VU305E1 and VU310E1 with power supply

The RF output power of the transmitter is generated by the 500 W Amplifier VU305E1 or the 1 kW Amplifier VU310E1 depending on the nominal output power. The two amplifier types have the same casing and are designed as 19" modules for rackmounting (6 HU).

The amplifier module is a broadband amplifier in the range from 87.5 MHz to 108 MHz. Since the output stage of the 500 W amplifier contains two and that of the 1 kW amplifier four BLF278 MOSFETs, high redundancy is ensured and optimum impedance matching is obtained by means of a bias circuit. The input splitters and output couplers are implemented as Wilkinson splitters/couplers; the 1 kW version has two additional subsequent 3 dB couplers.

A microprocessor integrated in the amplifier is provided to monitor important parameters such as temperature and voltage and to output them on a menu-guided display. In addition, the amplifier is protected against mismatch and over-temperature by an integrated monitoring circuit. The Exciter SU 135 monitors the output power.



**Transmitter system with 2 SR510E1 in passive standby**

A lowpass filter combined with a directional coupler integrated in the module at the output ensures an excellent harmonic suppression of >80 dB.

The amplifier is cooled by two long-life internal fans.

The power supply is designed to provide double voltage conversion:

- ◆ Voltage rectification from 230 V AC to 400 V DC with the power factor regulator
- ◆ Transformation of 400 V DC to 48 V DC with a clock frequency of 30 kHz (short-circuit protective circuits included)

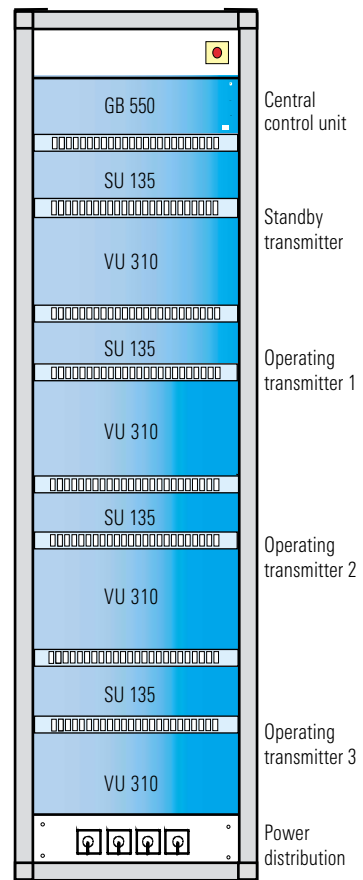
### System integration and remote control

The remote-control interfaces are fully compatible with the switchover control devices from Rohde&Schwarz for passive standby or (n+1) configurations. If the SR505E1 or SR510E1 is used as a

standby transmitter in an (n+1) system, the exciter can process up to six programmed transmit frequencies. Individual settings for output power, frequency drift and input signal mode can be stored for each program. The exciter also monitors the amplifier and is fitted with a serial bit-bus remote-control interface. A parallel remote-control interface is available as an option.

### Transmitter rack

The VHF FM Solid-State Transmitters SR505E1 and SR510E1 are available either as 19" modules, which can be integrated into any 19" rack, or are supplied as 12 HU desktop version in a 19" cabinet or as a 42 HU rack. This is illustrated by the figure on the right.



**Transmission system with 4 SR510E1, (3+1) standby, in 19" rack**

### Specifications

Frequency	
Frequency range	87.5 MHz to 108 MHz
Internal tuning	menu-controlled in 10 kHz steps
External tuning	6 frequencies selectable
Frequency drift	<500 Hz/year
Center frequency offset at a frequency deviation of ±75 kHz	cannot be determined
Rated frequency deviation	±75 kHz
Maximum frequency deviation	±100 kHz
Class of emission	F3 E
Stereo emissions	to CCIR Recommendation 450-2 (pilot tone method)
RF output	
Nominal impedance	50 Ω
Permissible SWR (VSWR)	≤3
Connector	7-16 coupler

Spurious emissions outside transmission bandwidth (±150 kHz)			
Harmonic suppression	≥80 dB		
Spurious emission (with modulation)	0.2 MHz from carrier	110 dBc (1 Hz)	
	0.3 MHz from carrier	126 dBc (1 Hz)	
Spurious emission (without modulation)	<1 μW		
SSB noise power density ≤2 MHz from carrier	150 dBc (1 Hz)		
Transmission characteristics			
Mode	mono	stereo	multiplex
Signal inputs (loop-through connectors (LEMOSA) on front panel or connectors at top of unit)	L	L and R	L (MPX)
Modulation frequency range	30 Hz to 15 kHz		30 Hz to 100 kHz
Input impedance	600 Ω or >2 kΩ, balanced or unbalanced, selectable with internal jumper		
AF input level for 40 kHz	-6 dBu to +10 dBu, settable by adjusting the deviation frequency in steps of approx. 0.1 dB		

Mode	mono	stereo	multiplex
Preemphasis (disconnectible, selectable with jumper)	50 µs/75 µs	50 µs/75 µs	–
Frequency response (with reference to 400 (500) Hz)			
30 Hz to 15 kHz	–	≤±0.25 dB	≤±0.25 dB
30 Hz to 53 kHz			≤±0.1 dB
53 kHz to 75 kHz			≤±0.3 dB
75 kHz to 100 kHz			≤±0.4 dB
L/R stereo separation			
30 Hz to 40 Hz	–	≥42 dB	≥42 dB
40 Hz to 100 Hz		≥42 dB	≥50 dB
100 Hz to 15 kHz		≥50 dB	≥52 dB
Harmonic distortion (THD+N) (harmonics up to 300 kHz)	30 Hz to 15 kHz	30 Hz to 15 kHz	30 Hz to 75 kHz
at ±40 kHz frequency change	≤0.04%	≤0.1%	≤0.06%
at ±75 kHz frequency change	≤0.08%	≤0.1%	≤0.2%
at ±100 kHz frequen- cy change	≤0.5%	≤0.2%	≤0.2%
Intermodulation distortion at ±75 kHz frequency change	5 kHz to 15 kHz d2 to ≤0.1% d3 to ≤0.1%	5 kHz to 15 kHz d2 to ≤0.1% d3 to ≤0.1%	5 kHz to 53 kHz d2 to ≤0.05% d3 to ≤0.05%
S/N ratio (referred to $f_{mod} = 500$ Hz and ±75 kHz frequency deviation, RMS value)	<b>mono</b>	<b>stereo</b> (with stereo genera- tor)	<b>stereo</b> (without stereo generator)
unweighted	≥90 dB	≥83 dB	≥85 dB
weighted	≥85 dB	≥80 dB	≥82 dB
S/N ratio (referred to $f_{mod} = 500$ Hz and ±40 kHz frequency deviation, peak value)	<b>mono</b>	<b>stereo</b> (with stereo genera- tor)	<b>stereo</b> (without stereo generator)
unweighted to DIN 54405	≥80 dB	≥75 dB	≥77 dB
weighted to CCIR Rec. 468-2	≥75 dB	≥70 dB	≥72 dB
Residual asynchronous AM, weighted	–72 dB	–72 dB	–72 dB
Residual synchronous AM, weighted	–70 dB	–70 dB	–70 dB

Certified Environmental System  
**ISO 14001**  
REG. NO 1954

Certified Quality System  
**ISO 9001**  
DQS REG. NO 1954



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MPX input at rear panel (BNC connector)	
Frequency range	30 Hz to 75 kHz
AF input level for ±40 kHz frequency change	+6 dBu
<b>Auxiliary frequencies</b>	
Pilot tone frequency	19 kHz ±1 Hz
Amplitude	–9.6 dBu, internally selectable through ±2 dB
Output (connecting cable)	selectable with jumper, 5 V TTL square- wave signal, mark-to-space ratio 2:1 or MPX signal or 2 V sinewave ( $V_{pp}$ )
Auxiliary carrier frequency	38 kHz ±2 Hz
<b>Additional signals</b>	
RDS (radio data system) and SCA (subsidiary channel authorization)	
Input connector	BNC connector at rear panel
Frequency range	53 kHz to 100 kHz
Input impedance	600 Ω or 10 kΩ, selectable with jumper

#### General data

AC supply voltage	230 V, 47 Hz to 63 Hz
Permissible voltage variation	±15%
Power ratio	>0.95
Rated temperature range	+1°C to +45°C
Storage temperature range	–40°C to +60°C
Maximum altitude	2000 m above sea level
Maximum relative humidity	≤90% at 26°C
Dimensions (W x H x D)	
19" rack (12 HU) (desktop version)	555 mm x 600 mm x 700 mm
19" rack (42 HU)	580 mm x 2000 mm x 1000 mm
	<b>SR505E1</b> <b>SR510E1</b>
Rated output power	500 W      1 kW
Weight	42 kg      45 kg
Power consumption with exciter	approx. 0.9 kW      approx. 1.7 kW

#### Ordering information

VHF FM Solid-State Transmitter		
(12 HU)	<b>SR505E1</b>	3534.0507.04
(12 HU)	<b>SR510E1</b>	3534.1003.04
VHF FM Solid-State Transmitter		
(42 HU)	<b>SR505E1</b>	3534.0507.02
(42 HU)	<b>SR510E1</b>	3534.1003.02