



Version
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R&S® SLx8000 Family of Transmitters

Extremely compact UHF/VHF low-power transmitters for digital and analog TV

- ◆ TV transmitters for the following standards:
 - DVB-T/DVB-H
 - ATSC, AVSB ready
 - ATV: B/G, D/K, M/N, I
- ◆ Output power up to the following values:
 - UHF: 250 W ATV, 160 W ATSC, 100 W DVB-T/-H
 - VHF: 125 W ATV, 80 W ATSC, 50 W DVB-T/-H
- ◆ Switchover from ATV to DTV by pressing a button
- ◆ Broadband use without manual precorrection
- ◆ Internal GPS option
- ◆ Receiver option for retransmitter systems or for monitoring the signal quality at the transmitter output
- ◆ Compact solutions:
 - 2 HU, 19" up to 10 W DVB-T/-H
 - 3 HU 19" up to 100 W DVB-T/-H
- ◆ Software update via remote control
- ◆ Quality power supply with an input voltage range from 90 V AC to 265 V AC
- ◆ Alternative DC voltage power supply (–48 V)
- ◆ Display and keypad
- ◆ Local or remote PC operation via standard web browser
- ◆ Numerous optional interfaces (e.g. SNMP)



ROHDE & SCHWARZ

The new R&S®SLx8000 family of products

To meet modern TV transmission requirements, existing infrastructure needs to be renewed or further expanded. This affects stationary TV based on the new DVB-T and ATSC standards as well as mobile TV based on the DVB-H standard.

Thus, an enormous number of new transmitters or retransmitters will be required in the very near future, especially for low-power applications. Despite the high quantities that will be needed, budgets should not be overstrained. Yet high transmitter quality is crucial when it comes to preventing nationwide transmitter replacements or reworking, which would entail enormous follow-up costs.

Space in low-power transmitter sites is often very tight, and the voltage supply is often not ideal. Moreover, the transmitters are sometimes difficult to access. Thus, high requirements are placed on transmitter ruggedness, flexibility, compactness, and easy transport.

To meet these demands, Rohde & Schwarz has developed the R&S®SLx8000 family of transmitters. The new transmitters, which are rugged, compact, and flexible, complement the company's low-power-range portfolio. Due to the components' extremely large scale of integration, the instruments are favorably priced and can be delivered within a short time. And these advantages come with the high quality Rohde & Schwarz stands for – also when it comes to high quantities.

Analog and digital networks

In addition to the new digital networks, the R&S®SLx8000 family of transmitters can be used in existing analog networks to modernize low-power transmitters. The R&S®SLx8000 family of transmitters supports the DVB-T/-H and ATSC standards as well as the analog B/G, D/K, M/N, and I TV standards. The highly compact 19" instruments for the UHF and VHF frequency ranges cover the power range up to 100 W DVB-T/DVB-H, 160 W ATSC, and 250 W ATV. Up to 10 W, the transmitters require only two height units; for the range from 25 W to 100 W, three height units are sufficient (power values referenced to DVB-T/-H).

An internal GPS module, integrated receivers for retransmitter or monitoring



Front view with graphical display, keypad, and LEDs

applications, an SNMP agent, and a parallel interface for remote control are optionally available. Local operation can be conveniently performed either via display and keyboard, or via web browser and laptop. The transmitters support the (n+1) including (1+1) standby configuration, which is an ideal configuration especially for digital networks.

The R&S®SLx8000 is a future-proof investment: The transmitters can be switched from analog to the installed digital standards simply by pressing a button – also via remote control.

Options

- ◆ Switchover from ATV to DTV (R&S®SLx8000A)
- ◆ Integrated GPS receiver
- ◆ DVB-T retransmitter
- ◆ DVB-T monitoring receiver
- ◆ SNMP agent
- ◆ Floating contacts
- ◆ NICAM

Standard	UHF	VHF
DVB-T/-H, ATSC	R&S®SLV8000	R&S®SLW8000
ATV (B/G, D/K, M/N, I)	R&S®SLV8000A	R&S®SLW8000A

A suitable transmitter for each standard

Design

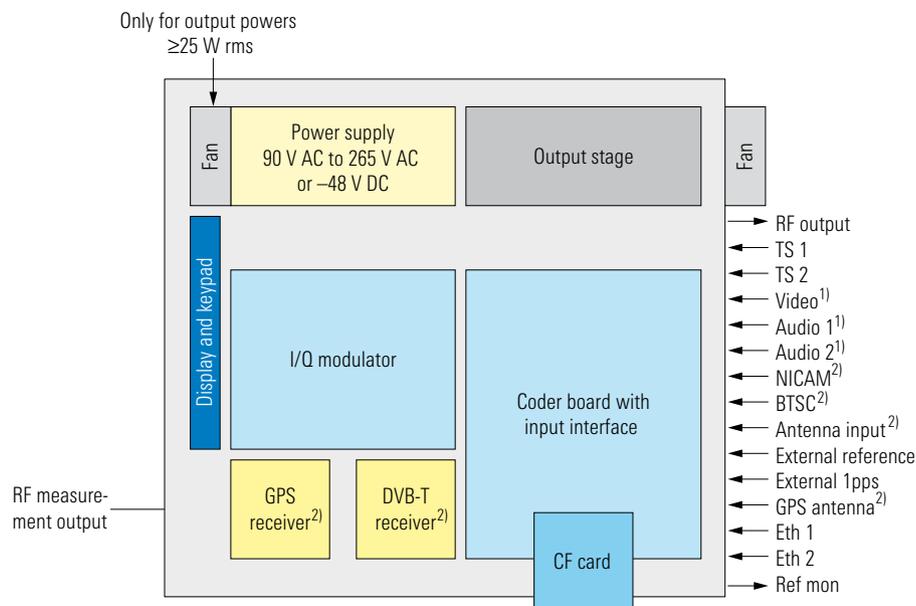
A transmitter of the R&S®SLx8000 family consists of the following components:

- ◆ 19" housing of two or three height units
- ◆ Display with keypad
- ◆ Coder board/input interface
- ◆ Modulator board
- ◆ Output-stage module
- ◆ Housing fan (attached outside)
- ◆ Power supply unit

Reliable quality for lowest power requirements in TV networks

From networks for DVB-T, ATSC, and ATV transmission to infrastructure for mobile TV applications such as DVB-H – the versatile R&S®SLx8000 family of low-power transmitters can be flexibly and reliably adapted to the requirements at hand.

The R&S®SLx8000 as the latest transmitter generation incorporates the most recent results of the company's long-standing experience and know-how in transmitter technology. The R&S®SLx8000 family, which is extremely compact and very favorably priced, relies on state-of-the-art technology and large-scale component integration.



Block diagram of the R&S®SLx8000(A) family of low-power transmitters

¹) Only for R&S®SLx8000A.

²) Optional.



Rear view with signal and data connectors

DVB-T/H and ATSC

Two data inputs (ASI/SMPTE 310M) are provided for all digital standards so that the signals can be applied redundantly. Owing to the seamless switching function, viewers remain unaware of any interruptions during switchover. Alternatively, the two inputs can be used with DVB-T/H for the hierarchical modes. In addition, interfaces for reference signals, Ethernet network connection, and output signal monitoring are available.

In single frequency networks, an integrated SFN adapter is used for data synchronization timing. An optional GPS receiver, which is also integrated in the instrument, provides the required references. External reference signals can also be applied via existing connectors.

An RF receiver card allows the signals to be applied over the air. The input signal is supplied by another transmitter, which turns the R&S® SLx8000 transmitters into retransmitters. This option is suitable for all DVB-T modes.

The option can also be used as an integrated monitoring receiver. In this case, the output signal is internally tapped at the output of the output-stage modules and demodulated. Different quality parameters can thus be obtained. The individual values can be viewed via the display, a web browser, or SNMP.

Analog standards

In addition to the more modern digital standards, the transmitters can also transmit the analog B/G, D/K, M/N, and I TV standards. All color transmission methods as well as the sound transmission methods mono, stereo/dual sound (in line with IRT), and BTSC are implemented. NICAM transmission is optionally available.

In the UHF bands, output power up to 250 W (sync peak) is possible, in the VHF range up to 125 W (sync peak) – and this although the transmitter occupies only three height units.

In addition to the required analog "video", "audio1", and "audio2" inputs, the input section includes all interfaces for digital standards.

Thus, all transmitters can be subsequently turned into digital transmitters by means of a software key. There is no need to modify the instrument hardware in any way.

The R&S®SLx8000 family of transmitters makes for a fully flexible and thus future-proof investment. If required, analog instruments can be switched to a digital standard by pressing a button – also via remote control.

Operation

Locally, the transmitter can be conveniently operated via the backlit graphical display (200 × 48 pixel) and the front-panel keypad. The menus displayed on the graphical display are straightforward, allowing intuitive navigation. Shortcuts permit frequently

used entries to be accessed quickly. The most important operating parameters are displayed via LEDs and on the display's overview menu.

The transmitter can be locally or remotely PC-operated via a JAVA-capable standard web browser. The network connection on the instrument is set up via Ethernet. The transmitters can also be remote-controlled and remote-monitored by means of an SNMP agent. Thus, they can be integrated in a network management system (NMS) structure.

An optional module with floating contacts allows external site equipment to be controlled. Control and query is feasible via the transmitter front-panel keypad, the web, or SNMP. In areas without a fast network infrastructure,

the transmitters can be controlled via these floating contacts.

All operation-relevant data is stored on a CompactFlash card. If a transmitter needs to be replaced, the card can be removed from the card slot and transferred to another transmitter. The replacement transmitter immediately takes up operation with the correct setting parameters. The data sets of a transmitter can be downloaded via Ethernet to a controller or central server, from where they can also be reloaded.

The transmitter operating software can also be conveniently updated. If the TV standard used is to be changed or improved, the software packages updated by Rohde & Schwarz can be transferred to the transmitters via remote control.

Benefits

- ◆ Reliable technology also for low-power applications
- ◆ The R&S®SLx8000 has been optimized to meet high quantity demands at favorable prices
- ◆ Investing in quality pays off – especially when it comes to low-power transmitters: Considering the large quantities of transmitters set up across a large geographical area, service operations are extremely expensive
- ◆ The transmitters of an analog network are to be switched to a digital standard? In this case, the installed TV standards can be selected in the transmitter menu by pressing a button – or via remote operation using a web browser or an SNMP command
- ◆ Software updates ensure flexibility and future-proofness: Modifications and expansions of modern standards can be conveniently included, also via remote operation
- ◆ Precise transmitter synchronization owing to the GPS receiver option that can be integrated
- ◆ An internal DVB-T receiver converts the transmitters into retransmitters; the infrastructure required for feeding signals can thus be minimized – without compromising on signal quality (option)
- ◆ Modern means of communications such as HTTP/JAVA or SNMP (option) allow the transmitters to be controlled in the network
- ◆ (n+1) standby systems of the R&S®SLx8000 can be easily expanded by means of additional transmitters for further multiplexes (maximally eight)
- ◆ Quality power supply with an input voltage range from 90 V AC to 265 V AC ensures smooth operation under diverse conditions
- ◆ Using the DC option (–48 V), the R&S®SLx8000 can be integrated in common mobile radio infrastructures – without the need for external hardware
- ◆ Easy transport and minimum space requirements owing to a highly compact design
- ◆ The DVB-T output signal quality can be analyzed and monitored by means of a demodulator – also via remote operation (option)

Amplifier output stages

Different amplifier modules meet the power requirements of the UHF and VHF frequency ranges. The appropriate module is attached directly in the air intake of the external fan in the transmitter housing to ensure adequate cooling even at maximum output power.

For the UHF range, modules with a maximum output power of 2 W to 100 W (referenced to DVB-T/-H) are integrated. They are uniformly based on the current and reliable LDMOS transistors.

Modules with 25 W or 50 W DVB power are available for the VHF band. In this case, the signal is amplified by means of VMOS transistors.

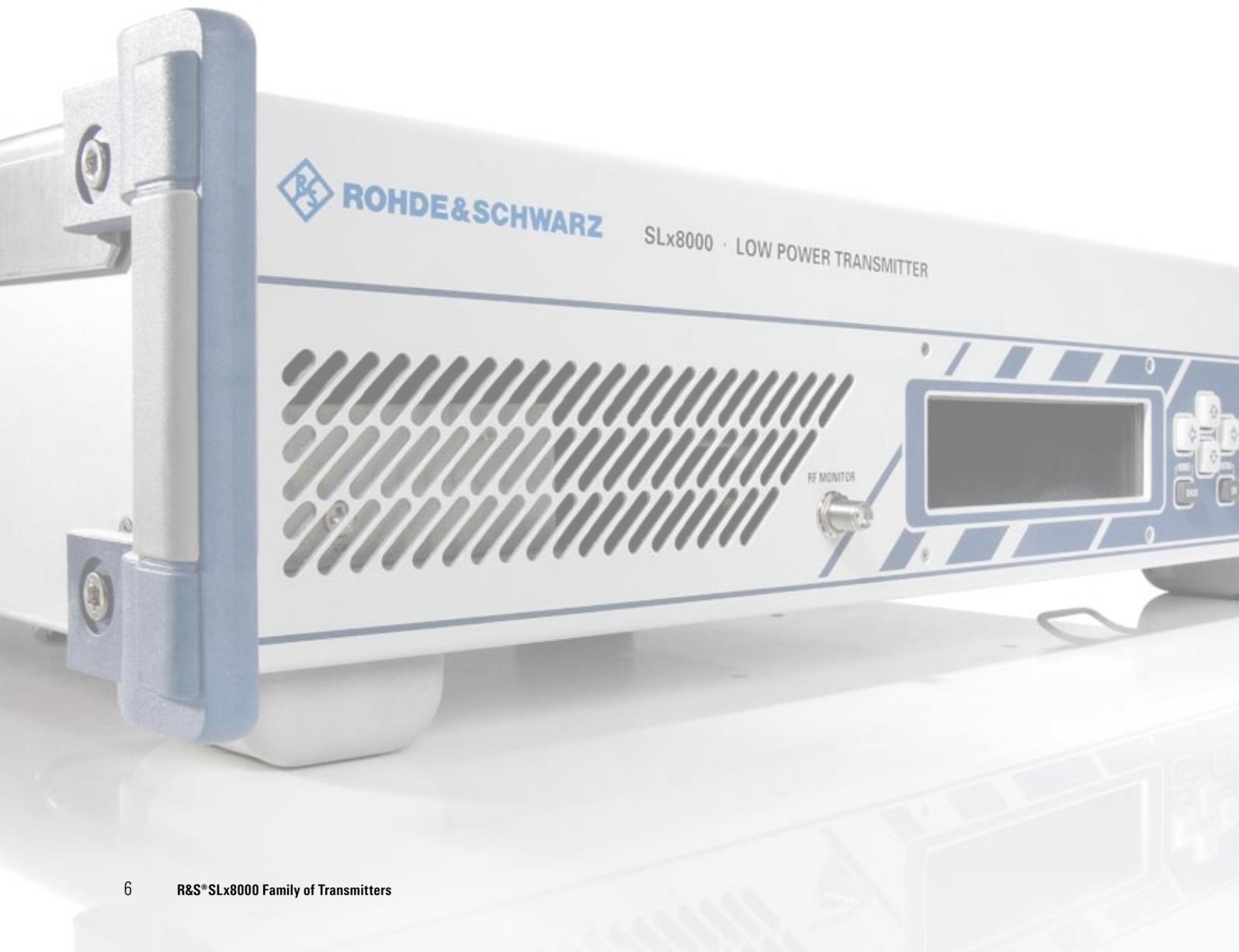
Analog TV signals can be transmitted with up to 250 W sync peak output power. The logic of the output stage modules automatically recognizes the currently active operating mode (ATV or DTV). Protection circuits are used to prevent overtemperature or transistor damage due to excessive reflection, for example.

The output power of the modules can be reduced by up to 6 dB. A set of prestored precorrection curves allows

Receiver > Measure Values	
RF Input	
Constellation	QPSK
Packet Lock	OK
FFT Length	2K
Guard Interval	1/32
Coderate	1/2
MER	34.1 dB
BER a. Viterbi	0

The parameters of the monitoring receiver

the transmitters to be used in broadband applications without additional precorrection. If the channel is changed, the optimal precorrection curve can be automatically loaded and used.





Convenient operation via a JAVA-capable standard web browser

Power supplies

The transmitters are equipped with high-quality power supplies that are dimensioned with sufficient power margin. The AC voltage supply can vary between 90 V and 265 V. Alternatively, a DC voltage of -48 V can be applied to a DC/DC converter option. Thus, the transmitters can be optimally integrated in mobile radio environments.

Redundancy design

The family of R&S®SLx8000 transmitters supports the (n+1) redundancy concept, which is especially favored by digital TV networks. In this case, a common standby transmitter is available for one to eight main transmitters. The standby transmitter stores all data required for the active transmitter systems and can replace the affected transmitter in the event of a failure.

The entire system, including all associated distribution and switching units in the signal paths, is monitored and controlled by an independent, higher-level switchover unit. The R&S®NetCCU800® is the switchover unit for all transmitter families from Rohde & Schwarz. To set up this type of system, Rohde & Schwarz offers different rack configurations, TS distribution matrices, and RF switching sets.



Specifications in brief

Output power, standards, and interfaces of the R&S®SLx8000 family of transmitters

DTV UHF output power of the R&S®SLV8000						
	R&S®SLV8002	R&S®SLV8005	R&S®SLV8010	R&S®SLV8025	R&S®SLV8050	R&S®SLV8100
DVB-T/-H (rms)	2 W	5 W	10 W	25 W	50 W	100 W
ATSC	3 W	8 W	16 W	40 W	80 W	160 W
DTV VHF output power of the R&S®SLW8000						
	R&S®SLW8025			R&S®SLW8050		
DVB-T/-H (rms)	25 W			50 W		
ATSC	40 W			80 W		
ATV UHF output power of the R&S®SLV8000A						
	R&S®SLV8025A		R&S®SLV8050A		R&S®SLV8100A	
Output power (sync peak)	50 W		125 W		250 W	
ATV VHF output power of the R&S®SLW8000A						
	R&S®SLW8025A			R&S®SLW8050A		
Output power (sync peak)	50 W			125 W		
DVB-T/-H standards and interfaces						
Coding and modulation	in line with EN 300744, EN 302304 (optional)					
Inputs	2 × ASI (all ASI modes)					
ATSC standards and interfaces						
Coding and modulation	in line with Doc. 53/1995					
Inputs	2 × SMPTE 310M or 2 × ASI					
ATV standards and interfaces						
TV standards	B/G, D/K, M/N, I					
Color transmission	PAL, NTSC, SECAM					
Sound transmission	mono, stereo, or IRT dual sound BTSC (M, N standards) optionally NICAM (coder/modulator)					
Inputs (video)	1 × video, BNC					
Inputs (audio)	2 × audio, XLR 1 × BTSC, BNC					
NICAM input	NICAM 728 data input, BNC					

Ordering information

Designation	Type	Order No.
DTV UHF		
DVB-T/ATSC Transmitter from 2 W/3 W to 10 W/16 W	R&S®SLV8000	depending on configuration
DVB-T/ATSC Transmitter from 25 W/40 W to 100 W/160 W	R&S®SLV8000	depending on configuration
DTV VHF		
DVB-T/ATSC Transmitter from 25 W/40 W to 50 W/80 W	R&S®SLW8000	depending on configuration
ATV UHF		
Transmitter from 50 W to 250 W	R&S®SLV8000A	depending on configuration
ATV VHF		
Transmitter from 50 W to 125 W	R&S®SLW8000A	depending on configuration

Detailed information about possible configurations, options, and other accessories can be obtained from your local Rohde & Schwarz sales office.

Specifications in brief

R&S®SLx8000 family of transmitters

Voltage supply	90 V AC to 265 V AC ¹⁾ , 47 Hz to 63 Hz; alternatively: –48 V DC, see options
Operating temperature range	+1 °C to +45 °C
Permissible temperature range (specifications may not be complied with)	0 °C to +50 °C
Storage temperature range	–30 °C to +70 °C
Relative humidity (max.)	95 %, non-condensing
Max. installation height	2000 m above sea level (>2000 m on request)
RF output connector	N
Synchronization	
Reference frequency	10 MHz, 0.1 V to 5 V (V_{pp}) or TTL, BNC
Reference pulse	1 pps (1 Hz, TTL, BNC)
Dimensions (W × H × D)	
Instruments with 2 HU (2 W to 10 W ²⁾)	483 mm × 88 mm × 467 mm (19.0 in × 3.5 in × 18.4 in)
Instruments with 3 HU (25 W to 100 W ²⁾)	483 mm × 132 mm × 474 mm (19.0 in × 5.2 in × 18.7 in)
Operation	
Display, keypad, and status LEDs	local operation and display
Ethernet interface, RJ-45	convenient local or remote control via standard web browser
Options	
Switchover from ATV to DTV	local or remote by pressing a button (for R&S®SLx8000A only)
GPS receiver	integrated receiver for GPS reference signals
RF receiver	retransmitter or monitoring applications
SNMP agent	remote monitoring and control via standardized network management systems (NMS)
NICAM	coder or modulator function
Floating contacts	parallel interface or integration of station equipment
DC voltage supply, –48 V	DC voltage input for mobile radio environments

¹⁾ 100 V AC to 265 V AC for 250 W sync peak ATV UHF.

²⁾ Referenced to DVB-T/H.





More information at
www.rohde-schwarz.com
(search term: SLx8000)



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