

Exciter R&S®SU 800

Digital FM exciter – compact and versatile

The new Exciter R&S®SU 800* combines the excellent specifications of the best analog exciters with the reliability of modern digital signal processing. Thus, it is very compact and occupies only one height unit in a rack. It provides an integrated digital AES/EBU interface as standard.

State-of-the-art technology in only one height unit

The Exciter R&S®SU 800 (FIG 2) is a component of the new VHF FM Transmitter Family R&S®NR 8200 [1]. All signal processing including frequency modulation is performed digitally. By using powerful digital technology and state-of-the-art D/A converters, this exciter meets the high requirements for spurious and spectrum masks.

The R&S®SU 800 is very compact – input interface, digital signal processing, RF section, control and power supply are all integrated on one board.

The exciter provides a built-in AES/EBU interface for direct input of digital audio data and thus makes full use of the advantages offered by digital signal processing. This feature eliminates all analog interferences from the studio up to the output of the frequency modulator.

You can switch the signal feed from analog to digital at any time. Analog audio signals can be applied in parallel, either as AF (left / right) or as multiplex (MPX) signals. You can connect two of the three possible signal feeds simultaneously; this allows you to easily switch to standby feed from a remote location.

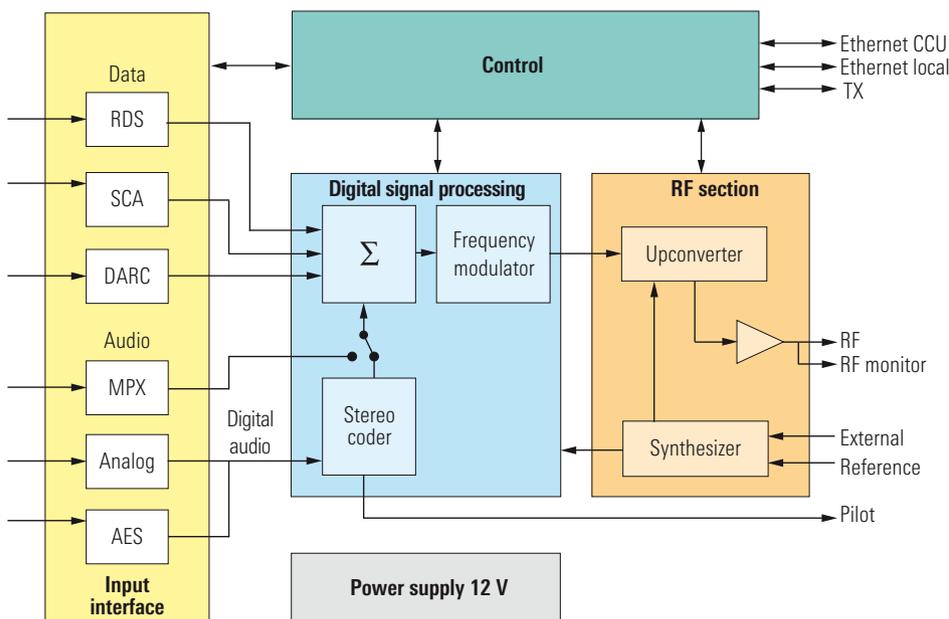
Input interface

Analog (left / right) and digital audio signals (AES/EBU) are applied separately (FIG 1). Additionally, you can supply an MPX signal which has been generated in an external stereo coder.

The input interface provides three analog inputs for RDS, SCA and DARC signals. The R&S®SU 800 digitizes these signals and adds them to the internal MPX signal. It decodes the AES signal and converts it into a constant sampling rate. This allows you to process input data at different sampling rates up to 192 kHz and to eliminate jitter effects simultaneously.

To suppress interference, all incoming analog data input signals are first routed via analog lowpass filters, their level adjusted, and then separately digitized

FIG 1 Block diagram of the Exciter R&S®SU 800.



* The development of this innovative product was co-financed by the European Union.



FIG 2 The new Exciter R&S®SU800 occupies only one height unit: input interface, digital signal processing, RF section, control and power supply are all integrated on one board.

and fed to the digital signal processing system. Digitization is handled by high-quality A/D converters – with 24-bit resolution for analog audio signals and with 16-bit resolution for MPX and additional data. You can define a specific level for nominal deviation for each input.

Digital signal processing

The fully digital signal processing function, which is handled by a powerful field programmable gate array (FPGA), ensures a consistently high level of signal quality, free from random sources of error such as temperature fluctuations or quality variations of the component. Due to the consistent use of digital technology, the entire module needs virtually no adjustment.

The digitized audio signals are routed via a lowpass, and a bandpass suppresses interfering signal components outside the data signal spectrum. The internal stereo coder processes the filtered audio signals to yield a standard-conforming MPX signal. For stereo signals, you can set the level of the pilot tone. The digital MPX signal is used for frequency modulation of a high-precision direct digital synthesizer (DDS).

RF section

The RF section converts the digital signal into an analog signal by means of a fast 16-bit D/A converter. The signal is then filtered – to meet the requirements for spurious and spectrum masks – and converted to the output frequency. The selected switching concept allows frequency switching without adjustments.

The synthesizer provides all necessary clock and mixer frequencies. If you need exceptionally good frequency stability, the exciter allows you to synchronize the internal clock to an external reference (10 MHz or 1 pps).

Control

A powerful microcontroller configures and monitors the R&S®SU800. It initializes the hardware from a compact flash memory that contains the complete software and firmware as well as all settings.

The R&S®SU800 concept is based on the R&S®Nx8000 transmitter platform and is also used in the TV Exciter R&S®Sx800 [2]. Important control features are thus uniform, which simplifies maintenance

and operation significantly. During operation, for example, the exciter is configured and monitored by the Control Unit R&S NetCCU®800 via the Ethernet interface on the rear panel.

If the control unit is not available, you can also operate the exciter from a local PC via the Ethernet interface on the front panel. To do this, you simply need to open the web browser and establish a connection to the exciter. No special operation software is needed since a web server providing all necessary functions runs on the exciter.

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More information and data sheet
at www.rohde-schwarz.com
(search term: SU800)

REFERENCES

- [1] Family of VHF FM Transmitters R&S®NR8200: Compact, air-cooled transmitters for 2.5 kW to 30 kW. News from Rohde & Schwarz (2005) No. 186, pp 44–45
- [2] Exciter R&S®Sx800: Multistandard exciter for ATV and DTV. News from Rohde & Schwarz (2005) No. 186, pp 41–43