VLF-HF Receiver EK 2000

A "quick-change artist" with every modulation in its repertoire

With VLF-HF Receiver EK 2000 Rohde & Schwarz is adding an attractive receiver featuring state-of-the-art technology to its XK 2000 family of shortwave radio equipment. This receiver is able to handle all relevant types of modulation, includes an HF modem as an option, and can also serve as a modulator for separate transmitters. In next to no time the receiver can be changed into a transceiver or exciter.

Photo 43 353

EK 2000 not only handles all types of modulation, it can easily swap roles thanks to a removable power supply. In next to no time it can be turned into either a 150 W transceiver or receiver/exciter

Proven technology growth

The need for HF receivers equipped with the reliable modules of the XK 2000 family [1; 2] and featuring versatile system interfaces led to the development of this new equipment. The sturdy design and water- and dust-proof front panel (IP 42 protection class) taken from XK 2000 allow use even in the toughest conditions. Of course, the receiver complies with the environmental specifications of MIL-ST-810E.

Understands every modulation

VLF-HF Receiver EK 2000 (FIG) is envisaged not only for **classic reception**, it is also ideal for **broadcast reception**, eg in BRASS (broadcast and ship to shore) marine use and **split-site mode**. Remote Control Processor GP 2000 [3] is best suited for controlling the receiver.

Due to the use of DSP technology, EK 2000 features the outstanding characteristics of the latest generation of receivers and **is able to handle all types of modulation** used in military and civil communication. For the reception of morse, speech, teletype and data signals, the receiver can be operated in the modes SSB (USB/LSB), ISB, AME, CW, FSK, AFSK, F1C and

FM, and meets MIL-STD-188-141A thanks to its excellent receive characteristics.

Equipped with the appropriate options it provides:
- link 11 mode to MIL-STD-188-203-1A or STANAG 5511,
- link 22 mode to STANAG 5522, and
- reception in SLEW mode (single-tone link eleven waveform) and with link Y Mk-II modem.

With its built-in HF Modem GM 2100, the receiver fulfills every conceivable requirement. The modem option enables EK 2000 to receive data signals transmitted in single-tone mode (PSK) in accordance with MIL-STD-188-110A, STANAG 4481 (without FSK), 4285 and 4529. And the receiver has ready functionality for future modulation modes, which can be quickly and simply installed by software upgrades.

A whole lot of extras

One of the special advantages of EK 2000 is that it can be used as a **modulator for separate transmitters in** FSK and PSK modes (STANAG 4285,

4529 and MIL-STD-188-110A). All that is needed is a line to the transmitter and audio signals at the receiver.

EK 2000 integrates a **fast frequency scan** with freely selectable step size as well as a **channel scan**. In both cases the dwell time, hold time and RF thresholds can be set individually.

All settings can be performed either manually on the menu-guided **man-machine interface, optimized for reception**, or conveniently via the **remote-control interface** using Radio Remote Control Software DS 110.

Quick-change artist

The receiver includes its own power supply unit for 97 to 253 V AC (47 to 440 Hz). Alternatively, it can be operated with DC voltages from 24 to 31 V, eg from a backup battery. **The removable power supply makes EK 2000 a "quick-change artist"**. This power supply can be taken out by undoing a few screws and replaced by a 150 W power amplifier or an interface board. This simple operation transforms EK 2000 into either a **150 W Transceiver XK 2100** or a **Receiver/Exciter**

Unmistakable family likeness
EK 2000 features numerous characteristics for which the transceivers of the XK 2000 family are outstanding:
- 17 group-delay-compensated IF filter bandwidths between 50 Hz and 8 kHz
- Automatic and manual gain control with settable control voltage
- Settable notch filters
- Passband tuning
- Syllabic squelch
- Noise blanker
- Voice Processing Unit (GN 2110), an option for enhancement of speech quality that can be equipped with speech encryption
- High-performance mixer in receiver input, ensuring brilliant large-signal characteristics (IP2 typ. +70 dBm and IP3 typ. +35 dBm)
- Outstanding receiver noise figure
- High input sensitivity and large-signal immunity
- Fast-switching Preselection FK 2010, easily integrated and digitally tuned and offering minimum attenuation of 20 dB at 10% frequency offset, thus allowing critical operation under simultaneous conditions; it increases input voltage immunity to 200 V EMF
- Motor-tuned Preselection FK 2850 for 40 dB attenuation at 10% frequency offset

GX 2900 L for controlling a 500 W or 1 kW transceiver of type XK 2500 or XK 2900.

Robert Träger

Condensed data of VLF-HF Receiver EK 2000

Frequency range/resolution	10 kHz to 30 MHz/1 Hz
Frequency error	2×10^{-8}/°C (TCXO)
	1×10^{-9}/°C (OCXO)
Modes (standard)	A1A, J3E, H3E, J7B, B8E, F1B, F3E, F7B, F1C, A3E
Modes (optional)	B7D, MIL-STD-188-203-1A, STANAG 5511, 5522, 4481 (w/o FSK), 4285, 4529, MIL-STD-188-110A
Sensitivity (w/o preamplifier)	
for S/N =10 dB, A1A, BW = 300 Hz	typ. 0.4 µV EMF
J3E, J7B, BW = 2.7 kHz	typ. 1.1 µV EMF
H3E, 1 kHz, m = 60%, BW = 6 kHz	typ. 3 µV EMF
Signal/noise ratio (H3E)	>46 dB SINAD for 1 mV EMF to CCITT (O.41/P53)
Operating temperature range	–25 °C to +55 °C
Dimensions	19", 3 HU (bench version or rackmount)
Weight	approx. 13 kg (without options)

Reader service card 163/07

REFERENCES

[1] Helmke, B.; Wachter, G.: HF Transceiver XK 2100 – Digital shortwave for future-proof, long-haul communication. News from Rohde & Schwarz (1994) No.144, pp 4 – 7

[2] Träger, R.: HF Transceiver XK 2500 and XK 2900 – The new members of HF Transceiver Family XK 2000. News from Rohde & Schwarz (1997) No. 153, pp 12 – 13

[3] Kneidel, T. A.: Remote Cotrol Processor GP 2000 – The wild card in shortwave communication. News from Rohde & Schwarz (1998) No.157, pp 10 – 11