HF Transceiver RS150T

Brief description

RS150T is a 150 W HF transceiver, based on XK2100 technology. Its small size, robust design and easy-to-use characteristics make in an ideal choice for mobile vehicles of all kinds, including armored vehicles with mortars.

The transceiver features excellent high-frequency characteristics and intelligent internal control (continuous monitoring of functions on module level), can be easily operated from a detached control unit, and is very reliable.

RS150T in its basic configuration is capable of transmitting morse, speech and teletype data. All common classes of emission such as SSB (USB, LSB), ISB, AME, CW, FSK, AFSK, weather fax and FM are available. The transceiver covers 1.5 to 30 MHz for TX, 10 kHz to 30 MHz for RX, with 401 freely programmable channels. The unit meets MIL-STD-810 for environment, MIL-STD-461 and EN50081/50082 for EMC State-of-the-art technologies have been used in RS150T, such as digital signal processing in the intermediate-frequency part of the transceiver and the automatic connection unit.

The transceiver comes equipped with ALIS automatic connection adaptive system or ALE system (MIL-STD 188-141A).

Typical applications are shortwave telephone and fax, transmission of picture and computer data with 5400 bits/s, data services as DATA LINK Y,LINK E,LINK 11/LINK 22 and MAHRS expandability.

Communication processors to international standards, fast and reliable data transmission as well as message handling (eg with MERLIN) allow XK2000 to be integrated into modern multimedia systems, thus providing the basis for reliable, worldwide-com-munication independent of existing infrastructures.

Automatic link establishment (ALE) ALE Processor GS2200 automatically sets up the optimum radio communication link using the adaptive Rohde & Schwarz ALIS 2000 procedure or FED-STD-1045/1046/1049 (MIL-STD-188-141A). As for ALIS this procedure is 100% compatible with the HF850 family of radio equipment.

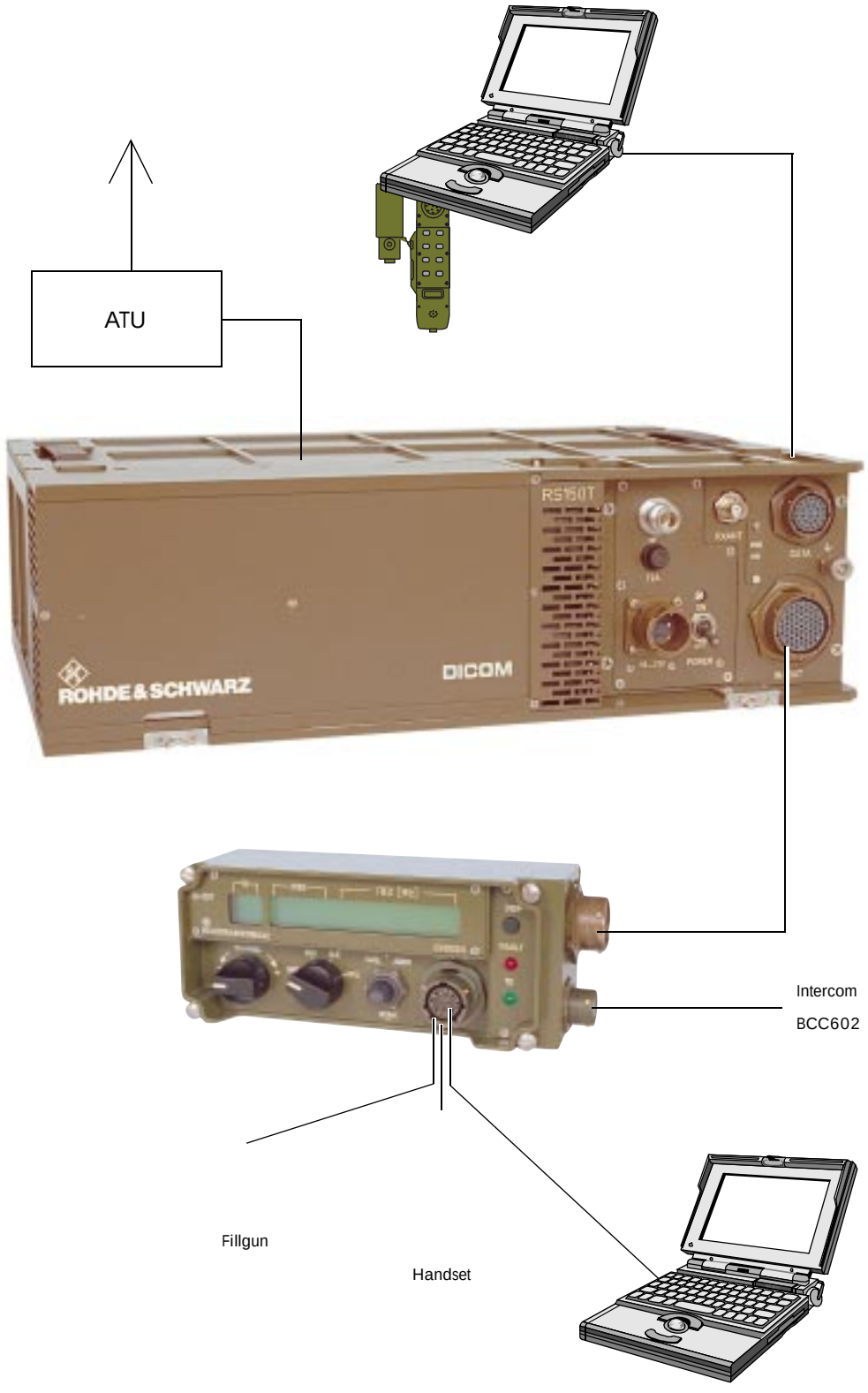
Data transmission: Up to 5400 bits/s are possible by means of the internal multimode HF-modem GM2100. Selectable waveforms are R&S standard, MIL-STD-188-110A, and STANAG 4285/4481. This enables the transmission and reception of telefax messages, computer data, and color video still pictures, for example. Connection between the data terminal (fax machine, video camera) and XK2000 is made by system processor MERLIN from Rohde & Schwarz or an equivalent PC with the appropriate software.

HF E-Mail

R&S Multimedia/medium product line called PostMan now provides the user with seamless online communication, based on wireless TCP/IP protocol, with an open system approach, offering error free, fast and reliable LAN / WAN connections via HF.

Features and Benefits

- compatible with XK 2000, HF850, and R-150 A
- high mechanical and weather resistance
- simple and easy-to-operate via the external control unit
- one hundred presettable channels with complete list of parameters and classes of emission
- configurable from fill-gun or PC
- transceiver, control unit and antenna tuner software upgradeable from PC
- speech compressor, syllabic squelch
- self-contained ALIS or ALE connection system
- optional HF modem with date transfer rate up to 5400 bps
- single coaxial cable link between transceiver and antenna tuner
- continuous monitoring of transceiver parameters and functions
- high reliability



Block diagram of R-150T HF transceiver set

Specifications

Frequency

Transmission	1.5 to 30 MHz
Reception	10 kHz to 30 MHz
Frequency setting	decadic in 1-Hz steps
Frequency error	<1 x 10^{-9}/°C <1 x 10^{-9}/day
Aging	<1 x 10^{-7}/year
Channel memory	
User-programmable channels	401
thereof half-duplex channels	100
Fixed-programmed channels (ITU)	401 to 2240
Additional channels for ALE	120
Transmit power	150 W PEP into 50 Ω 3 power levels
Classes of emission	- A1A (CW) - J3E (USB, LSB) - H3E (AME/USB) - J7B (A7J, J3E for data transmission) - B8E (ISB) - F1B (FSK, AFSK, baud rate 50 to 600 Bd, shift 42.5 to 425 kHz) - F3E (FM) - F1C (FAX)
Switchover times	
Tx/Rx, Rx/Tx	<10 ms
Frequency change	<30 ms

Transmission

Output power into 50 Ω/VSWR <1.5	150 W +0.5/–1 dB PEP 100 W +0.5/–1 dB CW (power reduction according to VSWR, no switchoff for VSWR∞)
Power levels	10/30/100 W
Spurious suppression	>70 dB, typ. 80 dB (into 50 Ω)
Harmonics suppression	>45 dB, typ. >60 dB (into 50 Ω)
Intermodulation products (referred to PEP)	>32 dB, typ. >36 dB (referred to PEP)
S/N ratio	>150 dB (referred to 1 Hz test bandwidth, Δf >1 MHz)
Weighted S/N ratio (H3E)	>50 dB (referred to PEP), weighted to CCIT (0.41 / P53)
Carrier suppression	>60 dB (reffered to PEP), typ. >70 dB
Suppression of unwanted sideband	>60 dB (referred to PEP)
Voice compression	built in

Reception

Input impedance	50 Ω, VSWR <3
Noise figure	
without preamplifier	17 dB
with preamplifier	9 dB
Input sensitivity (typ.) (for S/N = 10 dB, f = 0.2 to 30 MHz)	
without preamplifier	
A1A (CW)	0.4 μV_{EMF} , BW = 300 Hz
J3E (SSB), J7B	1.0 μV_{EMF} , BW = 2.7 kHz
H3E (AME), 1kHz, m = 60%	2.7 μV_{EMF} , BW = 6 kHz
with preamplifier	
A1A (CW)	0.15 μV_{EMF} , BW = 300 Hz
J3E (SSB), J7B	0.4 μV_{EMF} , BW = 2.7 kHz
H3E (AME), 1kHz, m = 60%	1.0 μV_{EMF} , BW = 6 kHz

Receiving bandwidhts	3 dB	60 dB
	± 75 Hz	± 150 Hz
	± 150 Hz	± 225 Hz
	± 300 Hz	± 430 Hz
	± 500 Hz	± 770 Hz
	± 750 Hz	± 990 Hz
	± 1050 Hz	± 1600 Hz
	± 1200 Hz	± 1760 Hz
	± 1350 Hz	± 1900 Hz
	± 1550 Hz	± 2100 Hz
	± 3000 Hz	± 4200 Hz
	± 4000 Hz	± 5200 Hz

AGC	<3dB (1 mV to 1 V EMF)
Response to a 60-dB step variation	
Attack time	<10ms
Decay time	25/150/500 ms, 1 s/3 s
AF distortion	
Line output 0 dBm	<1 %
Loudspeaker	<10 % at rated power
Weighted S/N ratio (H3E)	>46 dB SINAD for 1mV EMF, weighted with filter to CCIT (0.41 / P53)
Nonlinearities (1.5 to 30MHz)	
Blocking	3-dB signal attenuation (Δf = 30 kHz, useful signal 2 mV EMF, interfering signal 5V EMF)
Desensitization	>20 dB SINAD (Df >30 kHz, BW = 2.7 kHz, useful signal 30 µV, interfering signal 100mV)
Intercept point IP_3	>30 dB (Δf >30 kHz, interfering signal 2 x 0 dBm)
Crossmodulation	<10 % (Δf >30 kHz, useful signal 1 mV EMF, interfering signal 4 V EMF, 1 kHz, m = 30 %)
Inherent spurious signal	<–113 dBm, with few exceptions
Immunity to interference (Δf >30 kHz)	
Image-frequency rejection	>80 dB, typ. >90 dB
IF rejection	>80 dB, typ. >90 dB
Oscillator reradiation	<10 µV (at antenna input)
Protection of receiver input	<100 V_{EMF} (f <30MHz)

General data

Operating temperatures range	–25 °C to +55 °C
Storing temperatures range	–40 °C to +85 °C
Supply voltage	+21 to +31 VDC
Maximum altitude	3000 m above sea level, Tamb=35 °C
Humidity	to MIL-STD-810E, Meth. 507.3, 26°/41 °C, 95% RH, 5 days
Mechanical test (with shockmount OS150T1)	
Vibration	6g / 5 to 500 Hz
Shock	3000g / 0.2 to 0.5 ms
EMC	MIL-STD 461
MTBF	>9600 h
Dimensions (W x H x D)	435 mm x 130 mm x 291 mm
Weight	15 kg

Ordering Information

HF Transceiver	RS150T	6091.9004.02
HF Modem	RM150T	6091.9104.02
Remote Control Unit	DO150T	6091.9204.02
Antenna Tunning Unit	AD150T	6091.9304.02
Filling Device	PK150T	6091.9404.02
Handset with Control	MO150T	6091.9504.02
Handset without Control	MB150T	6091.9604.02
Coaxial Cable	KA150T	6091.9704.02
Cable for Interconnection	KS150T1	6091.9804.02
Shockmount for Transceiver	OS150T1	6091.9904.02
Shockmount for ATU	OA150T1	6092.0000.02