Digital Reprogrammable Software Radios M3SR

Your key to interoperability

- High operational flexibility while on mission
- Interoperability with existing radios according to international standards
- Easy system integration
- Low life cycle costs
- Software download of new waveforms
- High growth potential through P^3I (preplanned product improvement)

M3SR

ROHDE&SCHWARZ

M3SR (multiband, multimode and multirole surface radio) represents an innovative and versatile generation of software radios for use in the navy, in civil and military air traffic control, air defence, and in stationary applications.

In addition to M3TR (multiband, multimode and multirole tactical radio) and M3AR (multiband, multimode and multirole airborne radio), the M3SR series is the third element of a new radio equipment generation. All three types feature a functionality that can be varied by means of software.

For the commercial user, the basic units come standard with the waveform for air traffic control (ATC) in line with EN 300676. M3SR can be used both in normal ATC operation and as an emergency backup radio.

The M3SR series is interoperable with many types of existing radio equipment and standards. For military customers, this means seamless communication with their own and allied troops. To communicate with neighbouring troops, the radio is switched to the waveform or communication protocol used there. This switchover can be made online even during a mission.

The operational functions and the available waveforms are determined by the loaded application software. Additional functions can be implemented, as required, by downloading the appropriate software and/or using plug-in hardware modules.

Modular design

The M3SR features highly modular hardware and software architecture. All M3SR units are based on the uniform Radio Basis KR 4400. The versatile upgrade concept (P^3I) of the basic version helps to avoid unnecessarily high initial investment costs.

The M3SR is available as a receiver, multireceiver, transmitter or transceiver, according to the customer's requirements.

Radio Basis KR 4400

The various models are set up on the hardware and software of the Radio Basis KR 4400, which forms the central and common part of all M3SR radios. The radio basis is independent of the RF-specific modules. Additional radio-specific hardware and software modules define the performance features of the radio.

The KR 4400 consists of the mechanical frame, the radio platform (motherboard), and a front panel with audio interface, loudspeaker and status displays. The platform is the control center of the radio. The embedded realtime operating system controls and monitors all the functions in the radio. A control panel (GB 4000C) can be integrated for local control of the radios.

The main tasks of the radio basis include:

- Monitoring and control of the complete radio unit
- Mechanical and electrical accommodation of modules and control panel
- Digital voice and data processing
- Internal routing of information data to the interfaces
- Standard interfaces to peripherals
- Audio interface, loading of encryption keys and display of status information

An oven-controlled crystal oscillator (OCXO) is integrated as standard to meet the stringent requirements regarding time stability.

For the configuration of the various radio models, the radio basis is equipped with slots for the radio modules, and a mechanical fixture on the side to accommodate the transmitter module.

Key features of the modules

The modules have the following outstanding features:

- Independent use of all modules (no alignment or manual adjustment when modules are replaced)
- Central download of software and firmware, either locally or remotely (no need to open the radio unit)
- Data exchange via radio module bus
- Type label with bar code identification down to PCB level (fast automated detection and identification)
- All modules with electromagnetic shielding (maximum EMC/EMI immunity)
- All settings made via software (reduced maintenance)
- Fast and easy replacement of modules (short MTTR)

Modules for radio module slots

VHF/UHF Synthesizer Module GF4400T
The synthesizer module is the core of the high-frequency structure of the radio unit. It covers the frequency range from 100 MHz to 512 MHz, generates the RF signal for driving the transmitter, and supplies the local oscillator (LO) signal for the receiver module. Direct digital synthesis (DDS) technology ensures fine frequency tuning with high accuracy and high speed. The extremely low-noise signal generation allows the radio to be used at sites with stringent requirements regarding large-signal immunity (collocation).

VHF/UHF Receiver Module ET4400
The Main Receiver Module ET4400 can be universally used for all operational modes in the VHF/UHF range. The use of programmable VLSI components makes for the extremely compact size of the module which occupies only one slot. The flexible digital demodulator allows processing of complex digital waveforms.

VHF/UHF Guard Receiver ET4400G
The ET4400G simultaneously monitors the emergency frequencies in the VHF (121.5 MHz) and UHF (243 MHz) ranges and can be installed in any M3SR model, irrespective of the other modules. The AF of the guard receiver can either be routed to one of the audio interfaces, or mixed with the AF of the main receiver. The software for the use of a guard receiver is supplied with the basic unit.

Electronic Protective Measures (EPM) Processor Module GP4400
The EPM Processor Module GP4400 is a powerful processor module that performs the data processing for special waveforms. It occupies one radio module slot. The module can host EPM waveforms such as SATURN, SECOS or HAVE QUICK I/II on its memory devices. The functionality of the module is determined by the loaded software. Even switching between different preloaded waveforms is possible.

Power modules

VHF/UHF Transmitter Module VT4403
The VT4403 is a universal transmitter module for all operational modes in the frequency range 100 MHz to 512 MHz and is mounted in the KR4400. This means that there is one transmitter for each radio. A PIN diode switch is provided for fast and reliable switchover between transmission and reception. Two low-noise, temperature-controlled fans are provided on the rear panel for heat dissipation of the transmitter.

Main Receiver Module ET4400

Internal AC/DC Power Supply IN 4400A
The IN 4400A is the internal AC/DC power supply required for receiver and multi-receiver radio types. Its submodules are an AC/DC converter and a DC/DC converter. The AC/DC converter delivers DC from the external mains supply. The IN 4400A is located instead of the transmitter module. The external Universal Power Supply IN 4000A is required for transceivers or transmitters.

Local control panel

A local control panel can be integrated in the front of the Radio Basis KR 4400. If a local control panel is not required, a blank panel is fitted instead.

Comfort Control Panel (CCP) GB 4000C
The ½ 19" plug-in CCP is the standard control panel and allows easy and convenient local control of the radio. All the specific functions of the radio are controlled by the GB 4000C. The 5" display has softkeys and a user-friendly, menu-guided user interface. The keypad is backlighted by LEDs. Further connected M3SR units can be controlled and monitored from a local control panel.

Interfaces

In addition to the interfaces provided as standard, interfaces in the form of interface cards can be inserted. Six free slots are available for interface cards. These cards may contain customer-specific interfaces as well as other functions.

Backplane GH 4400

The Backplane GH 4400 connects the optional interface cards and the transmitter module to the radio module bus. This passive PCB does not occupy a radio module slot. The Backplane GH 4400 is required for every M3SR configuration, except receivers which do not need interface cards.

Antenna connector configurations

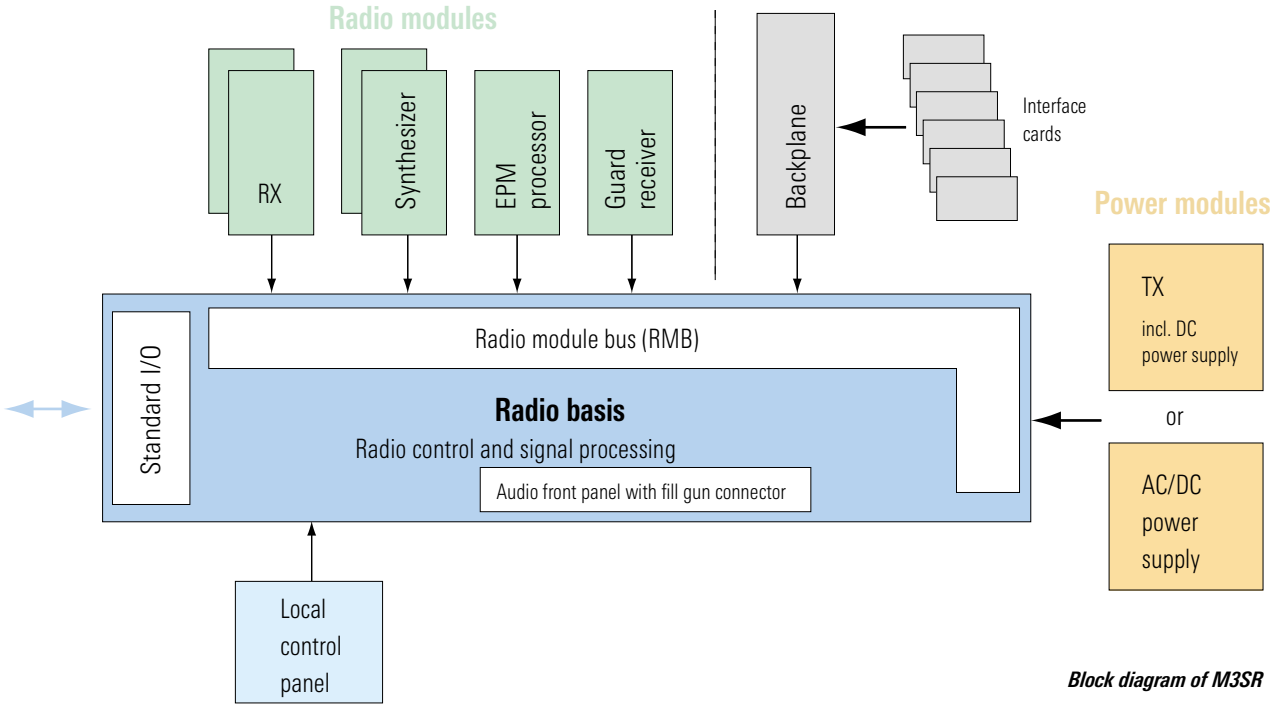
The connector for a combined transmitting/receiving antenna is configured as standard. Depending on the antennas used, various connector combinations are offered. This means that either separate or combined antenna connectors are available for main receiver, guard receiver and transmitter.

Due to the use of a universal wideband amplifier, only one antenna connector is required, irrespective of the frequency range. If separate operation of the VHF and UHF range is required for special applications, an external diplexer (e.g. FT 224) has to be used.

Remote control

A variety of standardized interfaces is available for remote control of the radio units. An integrated LAN (local area network) hub allows easy integration into data networks. Any number of radios can thus be controlled from a central operator position.

The M3SR radios can be remote-controlled via external remote control units, other M3SR units with integrated control panel, Rohde&Schwarz remote control systems or customer-specific solutions.



Block diagram of M3SR

Built-in test (BIT) concept

An efficient BIT concept allows identification and location of functional failures down to module level. All failures detected during the test can be indicated locally and remotely.

- Power-up BIT (PBIT)
  Automatic test after power-up of the unit
- Continuous BIT (CBIT)
  Automatic start after successful PBIT and continuous and automatic monitoring of all modules including radio basis during operation
- Initiated BIT (IBIT)
  Interactive test in non-operating status to support maintenance of the radio units; can be triggered locally or remotely. Test and analysis of the signal path in the radio with the aid of test signals without disconnecting the antenna connector (test signal generator already built-in; simplified diagnostics possible without opening the unit)

Radio failure archive

All failures detected and error messages are stored in the radio failure archive. The archive can be read locally on the CCP and remotely. Each entry also contains a description in plain text.

Inventory report

The software and hardware states of the radio system are entered in full detail into the inventory report. The report allows a fast overview of the total configuration status without having to open the unit.

Power supply concept

Transceivers and transmitters are supplied from DC. The external Universal Power Supply IN 4000A provides for AC supply of the radios.

Receivers and multireceivers have an integrated AC/DC power supply (IN 4400A).

Radio type / Power supply	Receiver, multireceiver	Transmitter	Transceiver
DC	integrated	integrated	integrated
AC/DC	integrated	external IN 4000A	external IN 4000A

Specifications for basic fixed-frequency radio

Common data for transmitter, transceiver and receiver radio configurations

Unless stated otherwise, specs are valid for the frequency range from 108 MHz to 174 MHz and 225 MHz to 400 MHz. For the remaining ranges down to 100 MHz and up to 512 MHz minor deviations may occur.

Usable frequency range	100 MHz to 512 MHz without gap
Waveforms contained in standard radio configuration	VHF (108 MHz to 173.975 MHz): LOS FM LOS AM Civil ATC AM acc. to EN 300676 UHF (225 MHz to 399.975 MHz): LOS FM LOS AM
Optional waveforms	– HAVE QUICK I/II acc. to STANAG 4246 – SATURN acc. to STANAG 4372 – UHF DAMA with external modem acc. to MIL-STD-188-181/2/3 – Link 11 with external modem acc. to STANAG 5511 – Link 22 with external modem acc. to STANAG 5522 on request – Link 4A with external modem acc. to STANAG 5504 on request – Link Y Mk2 with external modem on request – SECOS voice, Rohde&Schwarz TRANSEC/COMSEC waveform – SECOS with data preprocessor (DPP) – SECOS with TDMA on request – other waveforms on request
Channel spacing	8.33 kHz, 25 kHz, 75 kHz (HAVE QUICK mode)
Frequency spacing	8.33 kHz, 12.5 kHz and 25 kHz synthesizer increments
Frequency drift (–20 °C to +55 °C)	<0.1 ppm (10^{-7}) with OCXO
Frequency offset (for TX only)	up to 4-carrier offset mode ±2.5 kHz/5 kHz/7.5 kHz 5-carrier offset mode on request
Preset pages (channel configuration, including all operational parameters)	200
Classes of emission	AM: A3E, A9E, AXX (16 kbit/s baseband and diphase) FM: F3E, F9E, FSK, FSK-MSK

Receiver data

Sensitivity	
With AM (m = 0.3)	≤–107 dBm (low-noise mode) ≤–101 dBm (low-distortion mode)
With FM (±3.5 kHz deviation)	≤–110 dBm (low-noise mode) ≤–104 dBm (low-distortion mode)
For (S+N)/N = 10 dB (weighted to ITU-T) and f_m = 1 kHz	
For values with guard receiver installed see page 9.	
AM internal noise level (with input signal –47 dBm, f_m = 1 kHz, m = 0.3)	(S+N)/N ≥40 dB (modulated-to-unmodulated), weighted to ITU-T
FM noise quieting (with input signal –70 dBm, f_m = 1 kHz; deviation = ±3.5 kHz)	(S+N)/N ≥40 dB, weighted to ITU-T
Selectivity (IF bandwidth)	
Main RX	
BW 1 for 25 kHz channel spacing	≥26 kHz/6 dB, ≤50 kHz/80 dB
BW 2 for 8.33 kHz channel spacing	≥7 kHz/6 dB, ≤13 kHz/60 dB
BW 3 for data	≥50 kHz/6 dB, ≤150 kHz/70 dB
BW 4 for data	≥70 kHz/6 dB, ≤140 kHz/60 dB
RFI (radio frequency interference) suppression	
Adjacent-channel rejection	VHF ATC band acc. to EN 300676 ≥60 dB for 8.33 kHz and 25 kHz channel spacing
Desensitization S+N/N >10 dB, weighted to ITU-T	wanted signal –95 dBm/m = 0.6, unwanted signal +80 dBc VHF at >±200 kHz UHF at >±200 kHz
IF/image rejection	≥80 dB
Spurious rejection	80 dB
Suppression of 3rd order intermodulation products Low-distortion mode, ref = –101 dBm, m = 30%, Δf = 100 kHz	≥70 dB
Local oscillator reradiation at antenna connector	≤–90 dBm
Squelch	
(S+N)/N setting range	6 dB to 20 dB
Squelch hysteresis	1.5 dB to 6 dB
Squelch attenuation (muting) (AF output with activated squelch threshold)	≤–70 dBm

AF outputs (voice) (valid for A3E and F3E in plain and fixed-frequency mode)	
Line output	
Impedance	600 Ω ±10%
Level with input signal –47 dBm, f_m = 1 kHz, m = 0.6 or Δf = 3.5 kHz	0 dBm nominal (–20 dBm to +10 dBm settable) into 600 Ω, balanced (floating) allowing external grounding; 500 V minimum isolation against ground
AF response	
With 25 kHz channel spacing and input signal –47 dBm, m = 0.3	300 Hz to 3500 Hz with ±2 dB ≤150 Hz with ≤–15 dB (f_{ref} = 1 kHz) ≥5000 Hz with ≤–20 dB (f_{ref} = 1 kHz)
With 8.33 kHz channel spacing and input signal –47 dBm, m = 0.3	300 Hz to 3000 Hz with ±2 dB ≤150 Hz with ≤–15 dB (f_{ref} = 1 kHz) ≥4000 Hz with ≤–20 dB (f_{ref} = 1 kHz)
THD (total harmonic distortion) (with input signal –79 dBm to +3 dBm, f_m = 1 kHz and 600 Ω termination)	
With m = 0.6	≤5%
With m = 0.9	≤10%
Noise peak limiter threshold range	m = 0.3 to 0.9 adjustable
AF AGC with input variation m = 0.3 to 0.9	≤1 dB AF output variation
AF outputs (WB) (valid for A9E and F9E in plain and fixed-frequency mode)	
Line output	
Impedance	600 Ω ±10%
Level with input signal –47 dBm, f_m = 1 kHz, m = 0.9 or ±6.25 kHz FM deviation	1.4 V peak-peak nominal (1 V to 8 V peak-peak settable) into 600 Ω unbalanced
AF response	
With input signal –47 dBm, m = 0.9	30 Hz to 12000 Hz with ±2 dB 25000 Hz with ≤–10 dB (f_{ref} = 1 kHz)
Extended frequency range on request	30 Hz to 16000 Hz with ±2 dB
THD (with input signal –79 dBm to +3 dBm, m = 0.9, f_m = 1 kHz and 600 Ω termination)	≤10%
AF outputs (data) (valid for ASK and FSK/MSK)	
Data rate	max. 32 kbit/s, higher data rates on request 16 kbit/s baseband or diphase m = 0.9; ΔF = ±6.25 kHz
RF AGC	
With modulated input signals AM (m = 0.6) or FM (±4.66 kHz deviation) –107 dBm to +1 dBm (LN mode) or –101 dBm to +7 dBm (LD mode)	≤3 dB AF output variation
For values with guard receiver installed see page 9.	

Transmitter data

Unless stated otherwise, specs refer to the antenna terminal and involve an antenna impedance of 50 Ω (max. VSWR = 1.1 and nominal power supply).

Output power	
AM carrier power	30 W nominal, 1 W to 30 W adjustable
FM/FSK	100 W nominal, 1 W to 100 W adjustable
Power setting	quasi-continuously and independently for AM and FM
Power reduction	
for VSWR ≤2	≤1 dB
for VSWR >2	graceful degradation
for 26 V (FM)/28 V (AM) to 19 V DC	graceful degradation from nominal power
Permissible mismatch without damage	short circuit to open circuit, all phases
Duty cycle	continuous transmission
Thermal protection	integrated temperature-controlled fans
Unwanted emissions	
Harmonics suppression	≥65 dB for 2nd harmonic ≥80 dB for 3rd harmonics and higher higher suppression with external add-on filters to comply with EN300676
Nonharmonic spurious suppression (for >100 kHz from carrier frequency)	≥80 dBc, 90 dBc typ.
Phase noise attenuation	
at Δf = ±25 kHz from carrier	≥120 dBc/Hz (VHF)/≥110 dBc/Hz (UHF)
at Δf = ±1% from carrier	≥150 dBc/Hz
at Δf = >±10 MHz	165 dBc/Hz
AM modulation depth tolerance with specified input level at AF inputs	80% to 98%
FM frequency deviation	configurable acc. to the mode used; examples
Voice	3.5 kHz
WB/data	6.25 kHz
AF inputs (NB voice) (valid for A3E and F3E in plain and fixed-frequency mode)	
Nominal input level voice audio	0 dBm
AF line input voice	–15 dBm to +10 dBm settable, into 600 Ω ±10% balanced; transformers with center tap for phantom circuit; 500 V minimum isolation against ground

AF response With 25 kHz channel spacing and nominal input signal	300 Hz to 3500 Hz with ±2 dB ≤100 Hz with ≤–20 dB (f_{ref} = 1 kHz) ≥5000 Hz with ≤–25 dB (f_{ref} = 1 kHz)
With 8.33 kHz channel spacing and nominal input signal	300 Hz to 2500 Hz with ±2 dB ≤100 Hz with ≤–20 dB (f_{ref} = 1 kHz) ≥3200 Hz with ≤–25 dB (f_{ref} = 1 kHz)
AF inputs (WB)	
Nominal input level wideband	1.4 V peak-peak
AF line input WB/data	1 V to 8 V peak-peak adjustable, into 600 Ω ±10%
AF response (valid for A9E) With nominal input signal Extended frequency range on request	 30 Hz to 12000 Hz with ±2 dB 30 Hz to 16000 Hz with ±2 dB
AF response (valid for F9E) With nominal input signal Extended frequency range on request	 300 Hz to 12000 Hz with ±2 dB 300 Hz to 16000 Hz with ±2 dB
AF inputs (data) (valid for ASK and FSK/MSK)	
Data rate	max. 32 kbit/s, higher data rates on request 16 kbit/s baseband or diphase m = 0.9; ΔF = ±6.25 kHz
Distortion AM/FM (with 0 dBm input (300 Hz to 3500 Hz))	≤8%
ALC (automatic level control) function selectable Modulation depth variation for ±15 dB, with input level setting –15 dBm to 0 dBm	 m = 0.8 to 0.98
Noise modulation (S+N/N) (m = 0.9, 1 kHz; f_m = 5 kHz)	≥40 dB
Special tones and PTT	
Test tone	1 kHz/m = 0.9; generator included as standard; for local and remote tests
Sidetone (in plain AM/FM (normal voice) mode, level related to adjusted RX output)	 sidetone derived from carrier (AM) or power monitor (FM) and introduced into normal AF output 0 dB to 10 dB adjustable
PTT signalling	variety of methods (configurable): parallel (ground or voltage), serial or via audio inband tone (e.g. 2040 Hz) on request

Built-in interfaces

Serial interfaces	2 serial interfaces up to 115 kbit/s; one RS-232-C, the other one can be configured as RS-232-C/RS-422/RS-485, parameters adjustable; for radio control, configuration, software download and user data (SECOS mode with DPP)
LAN	2 interfaces acc. to Ethernet IEEE 802.3, RJ-45 connectors, 10baseT; for radio control, configuration and software download
RF power amplifier (PA) and RF filter control interfaces	 2 user-configurable interfaces for Rohde&Schwarz PA and filters: 2 x PA or 2 x filter or 1 x filter + 1 x PA; others on request
RF connectors for antennas	N female for TX or common TX/RX antenna and BNC female for RX
AF standard interfaces	2 narrowband, 2 wideband; for voice and user data
External reference frequency	for special applications; input/output (BNC connector): 0.8/1/2/5 or 10 MHz configurable, can be daisy-chained
Timing system	input/output to receive/transmit TOD (time of day) from/to external timing system (e.g. GT400) acc. to STANAG 4246, STANAG 4430, ICD-GPS-060
Key distribution device interface (fill gun)	 KYK-13, KOI-18, DTD (data transfer device) conforming to DS100/DS101/DS102; Rohde&Schwarz KDD (key distribution device); external maintenance tool
External crypto devices	KY 58 (others on request)
Miscellaneous interfaces	e.g. PTT, carrier SQ, NOGO, INHIBIT, switched DC for external devices; other I/Os on request
DTMF	on request
Headphones output	max. 1 V at 150 Ω (adjustable to lower values down to 0 V), NF7-type headset connector
Integrated loudspeaker	max. 0.4 W, volume adjustable via knob
Microphone inputs	dynamic micro: 0 mV to 25 mV into 150 Ω amplifier micro: 0 V to 1 V/150 Ω, 15 mA to 20 mA, 9 V DC max., NF7-type headset connector

General data

Operating temperature range	–20 °C to +55 °C
Storage temperature range	–40 °C to +70 °C
Humidity	≤95% at +45 °C to MIL-STD-810D method 507.2 and DIN IEC 68-2-30 without condensation and 50% at –5/+20 °C to DIN IEC 68-2-14
Dust and water protection Control unit Radio	 IP 54 IP 20
Fungus	protected to MIL-STD-810C method 508.2
Permissible altitude Permanent operation 5 min operation Transport	 5000 m asl 10000 m asl 10000 m asl
Vibration	5 Hz to 55 Hz, 0.4 mm double amplitude, test period: 30 min to DIN IEC 68-2-14, MIL-STD-167-1 type 1, STANAG 4138
Shock	45 Hz to 2000 Hz, ≤40 g, 3 shocks in two of three axes to DIN IEC 68-2-27, MIL-STD-810D method 516.3
EMI/EMC	EN 300 339 MIL-STD-461E: CE101, CE102, CE106, CS101, CS114, RE101, RE102, RS101 (maximally achieved test field strength 160 dBpT), RS-103 (2 MHz to 1 GHz, test field strength 10 V/m)
Transients and spikes (AC supply)	STANAG 1008 edition 8 and MIL-STD-1399 sec. 103 type 1
Electrical safety	Directive 72/23/EEC (CE mark), IEC 950, VDE 0804, VDE 0805, VDE 0866, EN 60950
Cooling	sensor-controlled forced-air cooling by integrated fans, air flow direction from front to rear side; if there is a front door, it should have sufficient air inlets
Power supply	
DC operation	28 V nominal, 19 V to 31 V with some degradations (acc. to Directives 89/336/EEC and 72/23/EEC)
AC operation Receiver Transmitter, transceiver	 90 V to 264 V, 47 Hz to 63 Hz 90 V to 264 V, 47 Hz to 63 Hz; 110 V at 400 Hz to 440 Hz (with external IN4000A)
AC/DC operation	automatic switchover; priority to AC
Power consumption (example: VHF/UHF transceiver with CCP, EPM, guard RX)	depending on configuration and DC/AC supply approx. 80 W (receive mode, DC) approx. 380 W/505 VA for VHF/UHF 30 W AM/100 W FM (transmit mode, AC/DC)

Dimensions	
Transceiver/transmitter (DC)	19" plug-in, 3 HU
Transceiver/transmitter set (AC/DC)	19" plug-in, 3 HU + 1 HU (AC power supply)
Receiver/multiple receiver (AC/DC)	19" plug-in, 3 HU
Additional space for rear cabling	200 mm recommended
Weight	
Receiver	approx. 14 kg
Transceiver	approx. 16.5 kg
EPM transceiver incl. guard receiver	approx.17.5 kg
External Universal Power Supply IN 4000A	5.7 kg
Logistics	
MTTR on module level	15 min typ.

Important note: All adjustments, settings and configurations stated above can be performed locally or remotely via software.

Plug-in option

Guard Receiver ET4400G

Guard (distress) frequencies	121.5 MHz and 243 MHz in parallel at the same time
Input signal protection	≤+21 dBm
Sensitivity (with AM (m = 0.3), 121.5/243 MHz) ITU-T S+N/N = 10 dB	 ≤–101 dBm
Image and spurious rejection	80 dB
Selectivity (IF bandwidth)	≥30 kHz/6 dB, ≤75 kHz/60 dB
AM internal noise level (with input signal –47 dBm, f_m = 1 kHz, m = 0.8)	(S+N)/N = 40 dB (modulated-to-unmodulated), weighted to ITU-T

Note: If a guard receiver with common main receiver antenna is installed in an M3SR, the sensitivity of the main receiver is reduced by 4 dB.

Certified Environmental System ISO 14001 REG. NO 1954

Certified Quality System ISO 9001 DQS REG. NO 1954

Ordering information

Basic radios

Order designation	Type	Order No.
Basic transceiver models with OCXO, fixed-frequency software and **without** control panel		
VHF Receiver	EU4460A	6122.0502.03
VHF Transmitter	SU4460A	6122.0402.03
VHF Transceiver	XU4460A	6122.0302.03
UHF Receiver	ED4460A	6122.0802.03
UHF Transmitter	SD4460A	6122.0702.03
UHF Transceiver	XD4460A	6122.0602.03
VHF/UHF Receiver	ET4460A	6122.0202.03
VHF/UHF Transmitter	ST4460A	6122.0102.03
VHF/UHF Transceiver	XT4460A	6122.0002.03

Options for basic radios

Local Comfort Control Panel (CCP)	GB4000C	6105.6006.02
VHF/UHF Guard Receiver	ET4400G	6102.8508.02
Link 11 (software only suitable for transceiver configurations)[1]	DS4400A	6102.2000.13
SECOS 5/16		on request
SECOS 5/16 with DPP		on request
HAVE QUICK I		on request
HAVE QUICK II		on request
SATURN		on request
UHF DAMA		on request
Full duplex operation		on request
Interface for separate RX/TX antennas	GI4403	6103.4758.02
Packages for later upgrade to Link 11, SECOS, HAVE QUICK I/II, SATURN etc on request. Multiline equipment on request.		

Auxiliary equipment

Power supply		
Universal Power Supply	IN4000A	6105.5500.03
Power supply cable M3SR-IN4000A, 1 m		6105.5639.10
Compatible remote control units		
Comfort Control Unit (DC)	GB4000C	6105.6006.03
Comfort Control Unit (AC/DC) (suitable for all radio types, incl. software)	GB4000C	6105.6006.04
Remote Control Units of Series 400U[2]	GB406xx	on request
Audio accessories		
Handset, rugged type	GA013	0693.7712.02
Headset, standard type	GA015	0583.6012.02
Headset, light type	GA015L	6082.9663.02
Headset, rugged type	GA012	0693.7664.02
Microphone, dynamic, handheld type	GA016H1	0583.5568.02
External filters and amplifiers		
All Rohde&Schwarz filters and amplifiers in the radio frequency range are suitable. They can be remote-controlled via the basic radio without any need for additional interface cards or software.		
Mating connectors (suitable for all radio types)		
Full Connector Set	ZF4410	6105.9011.02
Connector Set without circular connector	ZF4410	6105.9011.03
Antennas		
VHF (100 MHz to 163 MHz)	HK012	0459.7611.02
UHF (225 MHz to 400 MHz)	HK001	0425.2781.03
VHF/UHF (100 MHz to 1300 MHz)	HK014	0644.1514.02
Miscellaneous		
VHF/UHF Diplexer (100 MHz to 163 MHz/ 225 MHz to 400 MHz)	FT224	0525.5117.03
Rohde&Schwarz Timing System[3]	GT400	on request

[1] Link 11 operation with RF monitoring using a second synthesizer on request.

[2] With GB406xx, only the operational remote-control functions of M3SR are available. Please ask for special firmware to control M3SR.

[3] Recommended for time synchronization of frequency hopping systems. Including GPS receiver and disciplined rubidium oscillator.

Printed in Germany 0701 (Bi ko)

ROHDE & SCHWARZ

ROHDE & SCHWARZ GmbH & Co. KG · Mühldorfstraße 15 · 81671 München · Germany
P.O.B. 8014 69 · 81614 München, Germany · Telephone +4989 4129-0 · Fax +4989 4129-13663 · www.rohde-schwarz.com