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 P3I (preplanned product improvement)
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 EN300676. 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 KR4400. The versatile upgrade concept (P3I) 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 KR4400

The various models are set up on the hardware and software of the Radio Basis KR4400, 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 KR4400 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 (GB4000C) 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)

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.

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).

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.
**Internal AC/DC Power Supply IN4400A**

The IN4400A 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 IN4400A is located instead of the transmitter module. The external Universal Power Supply IN4000A is required for transceivers or transmitters.

**Local control panel**

A local control panel can be integrated in the front of the Radio Basis KR4400. If a local control panel is not required, a blank panel is fitted instead.

**Comfort Control Panel (CCP) GB4000C**

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 GB4000C. The 5” display has softkeys and a user-friendly, menu-guided user interface. The keypad is backlit 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 GH4400**

The Backplane GH4400 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 GH4400 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. FT224) 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.

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![Block diagram of M3SR](image-url)
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 IN4000A provides for AC supply of the radios.

Receivers and multireceivers have an integrated AC/DC power supply (IN4400A).

<table>
<thead>
<tr>
<th>Radio type</th>
<th>Receiver, multireceiver</th>
<th>Transmitter</th>
<th>Transceiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>DC</td>
<td>integrated</td>
<td>integrated</td>
</tr>
<tr>
<td></td>
<td>AC/DC</td>
<td>integrated</td>
<td>external IN4000A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>external IN4000A</td>
</tr>
</tbody>
</table>
**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 EN300676
- UHF (225 MHz to 399.975 MHz): LOS FM, LOS AM

### Optional waveforms

- HAVE QUICK I/II acc. to STANAG4246
- 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 STANAG5511
- Link 22 with external modem acc. to STANAG5522 on request
- Link 4A with external modem acc. to STANAG5594 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)

<±1 ppm (10⁻⁸) with OCXO

### Frequency offset (for TX only)

up to 4-carrier offset mode ±2.5 kHz/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)
- For (S+N)/N = 10 dB (weighted to ITU-T) and f₀ = 1 kHz

#### AM internal noise level

- With input signal −47 dBm, f₀ = 1 kHz, m = 0.3
- ≤−107 dBm (low-noise mode)
- ≤−101 dBm (low-distortion mode)

#### FM noise quieting

- With input signal −70 dBm, f₀ = 1 kHz, deviation = ±3.5 kHz
- ≤−104 dBm, 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 ≥50 kHz/6 dB, ≤13 kHz/60 dB
  - BW 3 for data ≥70 kHz/6 dB, ≤140 kHz/60 dB
  - BW 4 for data ≥50 kHz/6 dB, ≤150 kHz/70 dB

#### RFI (radio frequency interference) suppression

- Adjacent-channel rejection VHF ATC band acc. to EN300676 ≥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%, ∆f = 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
**Digital Reprogrammable Software Radios M3SR**

**AF outputs (voice)** (valid for A3E and F3E in plain and fixed-frequency mode)

<table>
<thead>
<tr>
<th>Line output</th>
<th>Impedance</th>
<th>Level with input signal −47 dBm, ( f_i = 1 \text{ kHz} ), ( m = 0.6 ) or ( \Delta f = 3.5 \text{ kHz} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>600 ( \Omega ) ±10%</td>
<td>0 dBm nominal (−20 dBm to +10 dBm settable) into 600 ( \Omega ), balanced (floating) allowing external grounding; 500 V minimum isolation against ground</td>
</tr>
<tr>
<td>AF response</td>
<td></td>
<td>300 Hz to 3500 Hz with ( \pm 2 \text{ dB} ) ( f_{sat} = 1 \text{ kHz} ), ≥5000 Hz with ( \pm 20 \text{ dB} ) ( f_{sat} = 1 \text{ kHz} )</td>
</tr>
<tr>
<td></td>
<td>With 8.33 kHz channel spacing</td>
<td>300 Hz to 3000 Hz with ( \pm 2 \text{ dB} ) ( f_{sat} = 1 \text{ kHz} ), ≥4000 Hz with ( \pm 20 \text{ dB} ) ( f_{sat} = 1 \text{ kHz} )</td>
</tr>
</tbody>
</table>

**AF response**
With 25 kHz channel spacing and input signal −47 dBm, \( m = 0.3 \)

**AF outputs (VCXO)**
With input signal −47 dBm, \( m = 0.3 \)

**AF response**
With input signal −47 dBm, \( m = 0.9 \)

**AF outputs (data)** (valid for ASK and FSK in plain and fixed-frequency mode)

<table>
<thead>
<tr>
<th>Data rate</th>
<th>max. 32 kbit/s, higher data rates on request</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16 kbit/s baseband or diphase ( m = 0.9 ), ( \Delta f = \pm 6.25 \text{ kHz} )</td>
</tr>
</tbody>
</table>

**RF AGC**

With modulated input signals AM (\( m = 0.8 \)) or FM (\( m = 0.6 \) 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 \( \Omega \) (max. VSWR = 1.1 and nominal power supply).

**Output power**

<table>
<thead>
<tr>
<th>AM carrier power</th>
<th>30 W nominal, 1 W to 30 W adjustable</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM/FSK</td>
<td>100 W nominal, 1 W to 100 W adjust-</td>
</tr>
<tr>
<td></td>
<td>able</td>
</tr>
<tr>
<td>Power setting</td>
<td>quasi-continuously and independently</td>
</tr>
<tr>
<td></td>
<td>for AM and FM</td>
</tr>
<tr>
<td>Power reduction</td>
<td>≤1 dB</td>
</tr>
<tr>
<td></td>
<td>graceful degradation of nominal</td>
</tr>
<tr>
<td></td>
<td>power</td>
</tr>
<tr>
<td>Permissible mismatch without damage</td>
<td>short circuit to open circuit, all phases</td>
</tr>
<tr>
<td>Duty cycle</td>
<td>continuous</td>
</tr>
</tbody>
</table>

**Thermal protection**
integrated temperature-controlled fana

**Unwanted emissions**

**Harmonics suppression**
≥25 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 \( \Delta f = \pm 25 \text{ kHz} \) from carrier
≥120 dBc/Hz (VHF)/≥110 dBc/Hz (UHF)
at \( \Delta f = \pm 1 \% \) from carrier
≥150 dBc/Hz
≥165 dBc/Hz
to 19 V DC

**AM modulation depth tolerance with specified input level at AF inputs**
80% to 98%

**FM frequency deviation**
configurable acc. to the mode used; examples

<table>
<thead>
<tr>
<th>Voice</th>
<th>3.5 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wb/data</td>
<td>6.25 kHz</td>
</tr>
</tbody>
</table>

**AF inputs (voice)** (valid for A3E and F3E in plain and fixed-frequency mode)

<table>
<thead>
<tr>
<th>Nominal input level voice audio</th>
<th>0 dBm</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF line input voice</td>
<td>≤−15 dBm to +10 dBm settable, into 600 ( \Omega ), balanced; transformers with center tap for phantom circuit; 500 V minimum isolation against ground</td>
</tr>
</tbody>
</table>

Digital Reprogrammable Software Radios M3SR 7
### 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: 30 Hz to 12000 Hz with ±2 dB
- Extended frequency range on request: 30 Hz to 16000 Hz with ±2 dB

**AF response (valid for F9E)**

- With nominal input signal: 300 Hz to 12000 Hz with ±2 dB
- Extended frequency range on request: 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
  - $m = 0.9$; $\Delta F = ±2.5$ 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, $f_{ref} = 5$ 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

<table>
<thead>
<tr>
<th>Serial interfaces</th>
<th>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)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN</td>
<td>2 interfaces acc. to Ethernet IEEE 802.3, RJ-45 connectors, 10baseT; for radio control, configuration and software download</td>
</tr>
<tr>
<td>RF power amplifier (PA) and RF filter control interfaces</td>
<td>2 user-configurable interfaces for Rohde &amp; Schwarz PA and filters: 2 x PA or 2 x filter + 1 x filter; others on request</td>
</tr>
<tr>
<td>RF connectors for antennas</td>
<td>N female for TX or common TX/RX antenna and BNC female for RX</td>
</tr>
<tr>
<td>AF standard interfaces</td>
<td>2 narrowband, 2 wideband; for voice and user data</td>
</tr>
<tr>
<td>External reference frequency</td>
<td>for special applications; input/output (BNC connector); 0.8/1.25/5 or 10 MHz configurable, can be daisy-chained</td>
</tr>
<tr>
<td>Timing system</td>
<td>input/output to receive/transmit TOD (time of day) from/to external timing system (e.g. GT-400) acc. to STANAG 4246, STANAG 4430, ICD-GPS-060</td>
</tr>
<tr>
<td>Key distribution device interface (fill gun)</td>
<td>KYK-13, K01-18, OTD (data transfer device) conforming to DS100/DS101/DS102; Rohde &amp; Schwarz KD0 (key distribution device), external maintenance tool</td>
</tr>
<tr>
<td>External crypto devices</td>
<td>KY 58 (others on request)</td>
</tr>
<tr>
<td>Miscellaneous interfaces</td>
<td>e.g. PTT, carrier SQ, NOGO, INHIBIT, switched DC for external devices; other I/Os on request</td>
</tr>
<tr>
<td>DTMF</td>
<td>on request</td>
</tr>
<tr>
<td>Headphones output</td>
<td>max. 1 V at 150 Ω (adjustable to lower values down to 0 V); NF7-type headset connector</td>
</tr>
<tr>
<td>Integrated loudspeaker</td>
<td>max. 0.4 W, volume adjustable via knob</td>
</tr>
<tr>
<td>Microphone inputs</td>
<td>dynamic mic: 0 mV to 25 mV into 150 Ω, amplifier mic: 0 V to 1 V/150 Ω, 15 mA to 20 mA, 9 V DC max., NF7-type headset connector</td>
</tr>
</tbody>
</table>
### General data

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>–20°C to +55°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>–40°C to +70°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>≤±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</td>
</tr>
<tr>
<td>Dust and water protection</td>
<td>Control unit: IP 54, IP 20</td>
</tr>
<tr>
<td>Fungus</td>
<td>protected to MIL-STD-810C method 508.2</td>
</tr>
<tr>
<td>Permissible altitude</td>
<td>Permanent operation 5 min operation: 5000 m asl, 10000 m asl</td>
</tr>
<tr>
<td>Vibration</td>
<td>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</td>
</tr>
<tr>
<td>Shock</td>
<td>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</td>
</tr>
<tr>
<td>EMI/EMC</td>
<td>EN300 339, MIL-STD-461E, CE101, CE102, CE106, CS101, CS114, RE101, RE102, RS101 (maximally achieved test field strength 168 dBp), RS-103 (2 MHz to 1 GHz, test field strength 10 V/m)</td>
</tr>
<tr>
<td>Transients and spikes (AC supply)</td>
<td>STANAG 1008 edition 8 and MIL-STD-1999 sec. 103 type 1</td>
</tr>
<tr>
<td>Electrical safety</td>
<td>Directive 72/23/EEC (CE mark), IEC 950, VDE 0881, VDE 0886, VDE 0895</td>
</tr>
<tr>
<td>Cooling</td>
<td>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</td>
</tr>
</tbody>
</table>

#### 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    | 90 V to 264 V, 47 Hz to 63 Hz, 110 V at 480 Hz to 440 Hz (with external IN4000A) |
| AC/DC operation, Power consumption | automatic switchover; priority to AC depending on configuration and DC/AC supply |

(example: VHF/UHF transceiver with CCP, EPM, guard RX)

| 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 IN4000A**: 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 \( m = 0.3 \))**: ≤−101 dBm
- **Selectivity (IF bandwidth)**: ≥30 kHz/6 dB, ≤75 kHz/80 dB
- **Image and spurious rejection**: 80 dB
- **AM internal noise level (with input signal –47 dBm, \( f_m = 1 \text{ kHz}, m = 0.8 \))**: (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.
## Ordering information

### Basic radios

<table>
<thead>
<tr>
<th>Order designation</th>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic transceiver models with OCXO, fixed-frequency software and <strong>without</strong> control panel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VHF Receiver</td>
<td>EU4460A</td>
<td>6122.0502.03</td>
</tr>
<tr>
<td>VHF Transmitter</td>
<td>SU4460A</td>
<td>6122.0402.03</td>
</tr>
<tr>
<td>VHF Transceiver</td>
<td>XU4460A</td>
<td>6122.0302.03</td>
</tr>
<tr>
<td>UHF Receiver</td>
<td>ED4460A</td>
<td>6122.0802.03</td>
</tr>
<tr>
<td>UHF Transmitter</td>
<td>SD4460A</td>
<td>6122.0702.03</td>
</tr>
<tr>
<td>VHF/UHF Receiver</td>
<td>ET4460A</td>
<td>6122.0202.03</td>
</tr>
<tr>
<td>VHF/UHF Transmitter</td>
<td>ST4460A</td>
<td>6122.0102.03</td>
</tr>
<tr>
<td>VHF/UHF Transceiver</td>
<td>XT4460A</td>
<td>6122.0002.03</td>
</tr>
</tbody>
</table>

### Options for basic radios

<table>
<thead>
<tr>
<th>Order designation</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Comfort Control Panel (CCP)</td>
<td>GB4000C 6105.6006.02</td>
</tr>
<tr>
<td>VHF/UHF Guard Receiver</td>
<td>ET4400G 6102.8508.02</td>
</tr>
<tr>
<td>Link 11 (software only suitable for transceiver configurations)</td>
<td>DS4400A 6102.2000.13</td>
</tr>
<tr>
<td>SECOS 5/16</td>
<td>on request</td>
</tr>
<tr>
<td>SECOS 5/16 with DPP</td>
<td>on request</td>
</tr>
<tr>
<td>HAVE QUICK I</td>
<td>on request</td>
</tr>
<tr>
<td>HAVE QUICK II</td>
<td>on request</td>
</tr>
<tr>
<td>SATURN</td>
<td>on request</td>
</tr>
<tr>
<td>UHF DAMA</td>
<td>on request</td>
</tr>
<tr>
<td>Full duplex operation</td>
<td>on request</td>
</tr>
<tr>
<td>Interface for separate RX/TX antennas</td>
<td>GI4403 6103.4758.02</td>
</tr>
<tr>
<td>Packages for later upgrade to Link 11, SECOS, HAVE QUICK I/II, SATURN etc. on request. Multiline equipment on request.</td>
<td></td>
</tr>
</tbody>
</table>

### Auxiliary equipment

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal Power Supply IN4000A</td>
<td>6105.5500.03</td>
</tr>
<tr>
<td>Power supply cable M3SR-IN4000A, 1 m</td>
<td>6105.5639.10</td>
</tr>
</tbody>
</table>

### 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 4000

| GB406xx | on request |

### Audio accessories

<table>
<thead>
<tr>
<th>Headset, rugged type</th>
<th>GA013 0683.7712.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headset, standard type</td>
<td>GA015 0583.6912.02</td>
</tr>
<tr>
<td>Headset, light type</td>
<td>GA015L 6062.9663.02</td>
</tr>
<tr>
<td>Headset, rugged type</td>
<td>GA012 0683.7664.02</td>
</tr>
<tr>
<td>Microphone, dynamic, handheld type</td>
<td>GA016H1 0583.5568.02</td>
</tr>
</tbody>
</table>

### 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)

<table>
<thead>
<tr>
<th>Full Connector Set</th>
<th>ZF4410 6105.9011.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector Set without circular connector</td>
<td>ZF4410 6105.9011.03</td>
</tr>
</tbody>
</table>

### Antennas

<table>
<thead>
<tr>
<th>VHF (100 MHz to 163 MHz)</th>
<th>HK012 0459.7611.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>UHF (225 MHz to 400 MHz)</td>
<td>HK001 0425.2781.03</td>
</tr>
<tr>
<td>VHF/UHF (100 MHz to 1300 MHz)</td>
<td>HK014 0644.1514.02</td>
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</tbody>
</table>

### Miscellaneous

<table>
<thead>
<tr>
<th>VHF/UHF Diplexer (100 MHz to 163 MHz/ 225 MHz to 400 MHz)</th>
<th>FT224 0525.5117.03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rohde &amp; Schwarz Timing System</td>
<td>GT400 on request</td>
</tr>
</tbody>
</table>

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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.