

Quick reference guide

Radio unit for voice and data transmission in the 70 cm band



Safety precautions



Please note!

- **The units are not suitable for operation in rooms with an explosive atmosphere as well as damp environments or in rooms with aggressive air or increased electromagnetic requirements.**
- **Mind the instructions for putting into operation.**
- **Both the casing and the antenna may become very hot (you may get burned) during sending operation. Provide for sufficient cooling and air circulation.**
- **Installation of the antenna needs to be in accordance with the valid regulations and requirements for protection of human beings within electromagnetic fields.**
- **Avoid to touch conductive parts of the device.**
- **Do not open the device yourself, only permit repairs by the manufacturer.**



ESD protection measures

Comply with the ESD protection measures according to DIN EN 61340-5-1/2 when opening the unit (potential equalisation between body and ground of the unit via high-value resistance (approx. 1 M Ω) e. g. with a usual wrist band.).

Read the user manual carefully to be able to use the wealth of features of your new WZ FSE 70-3. You can find further information about this topic on our website <http://www.fmncom.com>.

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1. General instructions

- In order to be allowed to operate the radio unit you must apply for a license at your local authorities and they will assign you a frequency.

- All connection cables have to be equipped with an earth-connected shielding.

The connection cable for the antenna has to be equipped with a wave impedance of 50Ω .

- The manufacturer recommends to mount devices in printed circuit board version into a metal housing.
 - Corresponding mechanisms are to be used for the detection of single bit errors during a data transmission (e.g. protocol with creation of check sum).
 - Only use antennas designated for the frequency range. Failure to observe this instruction will cause the approval to expire and may result in legal action.
 - The connected antenna has to be tuned to the working frequency of the radio set to get a maximum range.
 - The use of an antenna that has not been tuned can lead to destruction of the radion unit!
 - Provide sufficient cooling! (e.g. a heat energy of about 30 W has to be eliminated in case of a transmitting power of 6 W.)
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- **Further troubleshooting can be necessary in case of operation e. g. at switching power supplies.**
- **The compliance with the instructions for use and for putting into operation also belongs to the intended use. Every other use is considered to be not intended. The manufacturer accepts no liability for any damages resulting from such other use.**

2.2 Interfaces of the radio unit

2.2.1 Pin assignment of the power supply

The pins are assigned as follows:

Pin designation at the socket	Assignment
1	Voltage supply 10.8 ... 15.6 V DC
2	Ground
3	Ground
4	Voltage supply 10.8 ... 15.6 V DC

Table 2-1: Pin assignment of the power supply

2.2.2 Pin assignment of the user interface for analogue peripherals

Pin	Assignment	Function
1	STAST	Input, digital
2	RSSI	Output, digital
3	MOD+	Input, analogue
4	MOD-	Input, analogue
5	NF+	Output, analogue
6	NF-	Output, analogue
7	RS232_IN	Input, digital
8	AUDIO DATA	Input, digital,
9	DATA_IN	Input, analogue
10	GND	Input, digital
11	DATA_OUT	Output, analogue

Pin	Assignment	Function
12	$\overline{\text{SEL0}}$	Input, digital
13	$\overline{\text{SEL1}}$	Input, digital,
14	$\overline{\text{SEL2}}$	Input, digital
15	$\overline{\text{SEL3}}$	Input, digital
16	$\overline{\text{SEL4}}$	Input, digital
17	+5V_OUT	Output
18	$\overline{\text{UET}}$	Output, digital
19	RS232_OUT	Output, digital
20	$\overline{\text{ERROR}}$	Output, digital

2.2.3 Pin assignment of the user interface for digital peripherals

(FFSK or GMSK modem)

Pin	Assignment	Function
1	$\overline{\text{RTS}}$	Input, digital, RS232
2	RSSI	Output, analogue
3	$\overline{\text{RXD}}$	Output, digital
4	$\overline{\text{DCD}}$	Output, digital
5	$\overline{\text{TXD}}$	Input, digital
6	GND	Ground
7	RS232_IN	Input, digital
8	$\overline{\text{TXC}}$	Output, digital
9	$\overline{\text{BAUD0}}$	Input, digital
10	GND	Ground
11	$\overline{\text{BAUD1}}$	Input, digital

Pin	Assignment	Function
12	$\overline{\text{SEL0}}$	Input, digital
13	$\overline{\text{SEL1}}$	Input, digital
14	$\overline{\text{SEL2}}$	Input, digital
15	$\overline{\text{SEL3}}$	Input, digital
16	$\overline{\text{SEL4}}$	Input, digital
17	$\overline{\text{RXC}}$	Output, digital
18	$\overline{\text{UET}}$	Output, digital
19	RS232_OUT	Output, digital
20	$\overline{\text{ERROR}}$	Output, digital

3. Putting into operation

3.1 Basic mode when the unit has been switched on

see manual WZ FSE 70-3

3.2 Memory selection at the user interface

see manual WZ FSE 70-3

4. Settings

4.1 Software commands

Com- mands	Value range	Description	See chapter in user manual
V		Output of the software version	5.1.1
N	ASCII 16 digits	Output of the serial number of the unit	5.1.2
EX	X = 0 ... 1	Echo of the commands (X = 0 -> no echo, X = 1 -> echo)	5.1.3
?EX	X = 0 ... 1	Output mode (X = 0 -> normal, X = 1 -> extended) (service command)	5.1.4
M		Output of all the information about the 32 memories (T, R, P)	5.1.5
MX	X = 0 ... 31	Output of the information about a single memory (T, R, P)	5.1.5

Com- mands	Value range	Description	See chapter in user manual
SMX	X = 0 ... 31	Software selection: selection of the memory and the relevant TX/ RX channels and the power level	5.1.6
KX	X = 0 ... 31	Setting the number of the memory (for TX, RX and PX command)	5.1.7
TX	X = 0 ... 2518	Programming a new transmit channel (on the selected memory -> KX)	5.1.7
RX	X = 0 ... 2518	Programming a new receive channel (on the selected memory -> KX)	5.1.7
PX	X = 1 ... 5	Programming a new power level (on the selected memory -> KX)	5.1.7
?T		Output of the current TX channel number (service command)	5.1.8
?R		Output of the current RX channel number (service command)	5.1.9

Com- mands	Value range	Description	See chapter in user manual
?P		Output of the current power level (service command)	5.1.10
?SM		Output of the number of the current memory (service command)	5.1.11
SM		Hardware selection: selection of the memory and the relevant TX/ RX channels and the power level depending on the hardware setting (connection of the inputs SEL0 ... SEL4 (pins 12 ... 16))	5.1.12
A0		Output of the analogue RSSI signal (input level)	5.1.13
XX	X = 0 ... 1	Xon/Xoff - protocol: X = 0 -> switch off, X = 1 -> switch on	5.1.14
F		Restoring the factory preset	5.1.15

Tabelle 4-1: Overview of the commands

4.2 Calculating the channels and frequencies

$$\text{Channel} = \frac{\text{Frequency [MHz]} - \text{Start frequency [MHz]}}{\text{Channel spacing [MHz]}} + \text{Channel offset}$$

$$\text{Frequency [MHz]} = \text{Start frequency [MHz]} + (\text{Channel} - \text{Channel offset}) * \text{Channel spacing [MHz]}$$

Equation 4-1: General formulas for calculation of the channels and frequencies

Channel range	Channel spacing	Start frequency	Stop frequency	Channel offset
WZ FSE 70-3/O				
0 ... 1600	12.5 kHz	450 MHz	470 MHz	0
WZ FSE 70-3/M				
0 ... 1600	12.5 kHz	430 MHz	450 MHz	0
WZ FSE 70-3/U				
0 ... 1600	12.5 kHz	410 MHz	430 MHz	0

Table 4-2: Overview of the specific parameters of the relevant unit for calculating

5. Troubleshooting

5.1 Messages in normal output mode

The WZ FSE is connected to the terminal program via serial interface.

Error message	Description
OK	Command is valid and has been executed correctly
ERROR	Command is valid but could not be executed correctly
CMD-ERROR	Command is invalid

Table 5-1: Normal output mode („?E0”)

5.2 Messages in extended output mode

The WZ FSE is connected to the terminal program via serial interface.

Message	Value range	Description
OK		Command is valid and has been correctly executed
CMD-ERROR		Command is invalid
RX OK		Programming of RX channel was successful
TX OK		Programming of TX channel was successful
PWR OK		Programming of power level was successful
ERROR XX	XX = 00 ... FF	Command is valid but has not been correctly executed
RX ERROR XX	XX = 00 ... FF	Error when programming the RX channel
TX ERROR XX	XX = 00 ... FF	Error when programming the TX channel
PWR ERROR XX	XX = 00 ... FF	Error when programming the power level

Table 5-2: Extended output mode („?E1”)

6. Conformity

The FMN communications GmbH declares that the radio unit WZ FSE 70-3 complies with the basic requirements and the other relevant provisions of the directive 1999/5/EG (R&TTE directive).

The WZ FSE 70-3 can be operated in the countries of the European Union (EU). Outside of the EU apply the national regulations of the relevant country.

The complete declaration of conformity can be found and downloaded on our website <http://www.fmncom.com>.

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