Major 4a

Software Option
Motorola MOTOTRBO

Major 5a

Software Option
Motorola MOTOTRBO

DEVELOPMENT
PRODUCTION
SOFTWARE
HARDWARE
ELECTRONICS
CONSULTING

FunkTronic
Competence in electronics

Contents

Order Information

Order No.	Description
681000.MOT	Major 4a incl. Option MOTOTRBO
714000.MOT	Major 5a incl. Option Motorola MOTOTRBO
903050	Distribution Frame (Überleitverteiler) DMR, 2-fold
903051	Distribution Frame (Überleitverteiler) DMR, 3-fold
	Distribution Frame (Überleitverteiler) DMR, available on demand up to 9-fold **Attention:** Power Supply Unit, Interface and cables are not included
900012	Power Supply Unit 230V/12V for Major 4a + Major 5a
900020	Interface-Audio-USB-RS232-RS485
900920	Connection Cable Motorola DM3400 <-> 900020, length ca. 1m

General Information

In order to allow the connection to a digital radio of the Motorola MOTOTRBO series, **Major 4a** and **Major 5a** can be equipped with the **software option Motorola MOTOTRBO**.

Thus, the Major 4a/4a with MOTOTRBO option can be used as a (remote) control panel for Motorola MOTOTRBO radios. At the moment, the following functions are supported:

- The MOTOTRBO should operate in digital mode. For channels defined as analogous channels, only some simple functions are available.
- call IDs 00001-99999
- initiate and receive/display selective call
- initiate and receive/display group call
- channel selection
- receive/display emergency call (only for DM36xx and DM46xx)
- transmit and receive call alert
- memory for call-IDs
- transmit and receive SDS with up to 24 characters

General features of Major 4a/5a:

- alphanumeric LC display with background lighting
- gooseneck microphone with high dynamic range
- plaintext menu structure for simple programming via the keypad
- all buttons are freely programmable
- two functions can be assigned to each button
- A Motorola MOTOTRBO radio can be directly connected (via 1 Audio-USB Interface-Box)
- A Motorola MOTOTRBO radio can be remotely connected (via 2 Audio-USB Interface-Box)
- Two sockets for control via headset, one of those for connection of a PTT foot switch
- 7 digital In/Outs for channel switching or other purposes
- operates via an external 12V-DC power supply

Attention: Major 4a/5a are connected via the “Non IP“-modeof the MOTOTRBO radio.
This mode is not working for the firmware version R01.06.20 with the following radios:

- DM3400 - Numeric Display Mobile Radio
- DM3401 - Numeric Display Mobile Radio with GPS
- DM3600 - Enhanced Display Mobile Radio
- DM3601 - Enhanced Display Mobile Radio with GPS

Motorola recommends the use of the preceding firmware version (R01.06) from spring 2010 or alternatively a newer version, as soon as it is available.

We recommend to use a radio of type DM36xx, as the DM34xx does not support certain fuctions. These functions are at the moment (firmware version R01.08.XX) as follows:

- display the channel name
- receive and display incoming emergency calls
- cancel an incoming call alert

Important Settings at the Motorola MOTOTRBO

For the operation of Major 4a/5a with the Motorola MOTOTRBO two settings need to be made using the “MOTOTRBO Customer Programming Software“

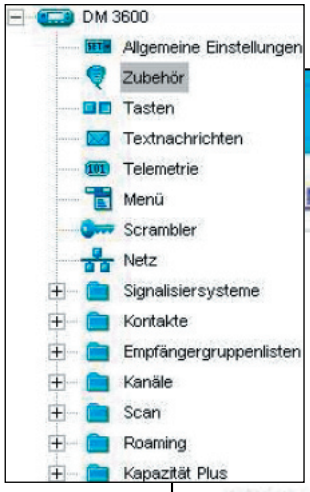
- Language: German, English,....
In the Content Tree via “General (Properties)“

- cable type: Data/Accessory at the Rear
In the Content Tree via “Accessories“

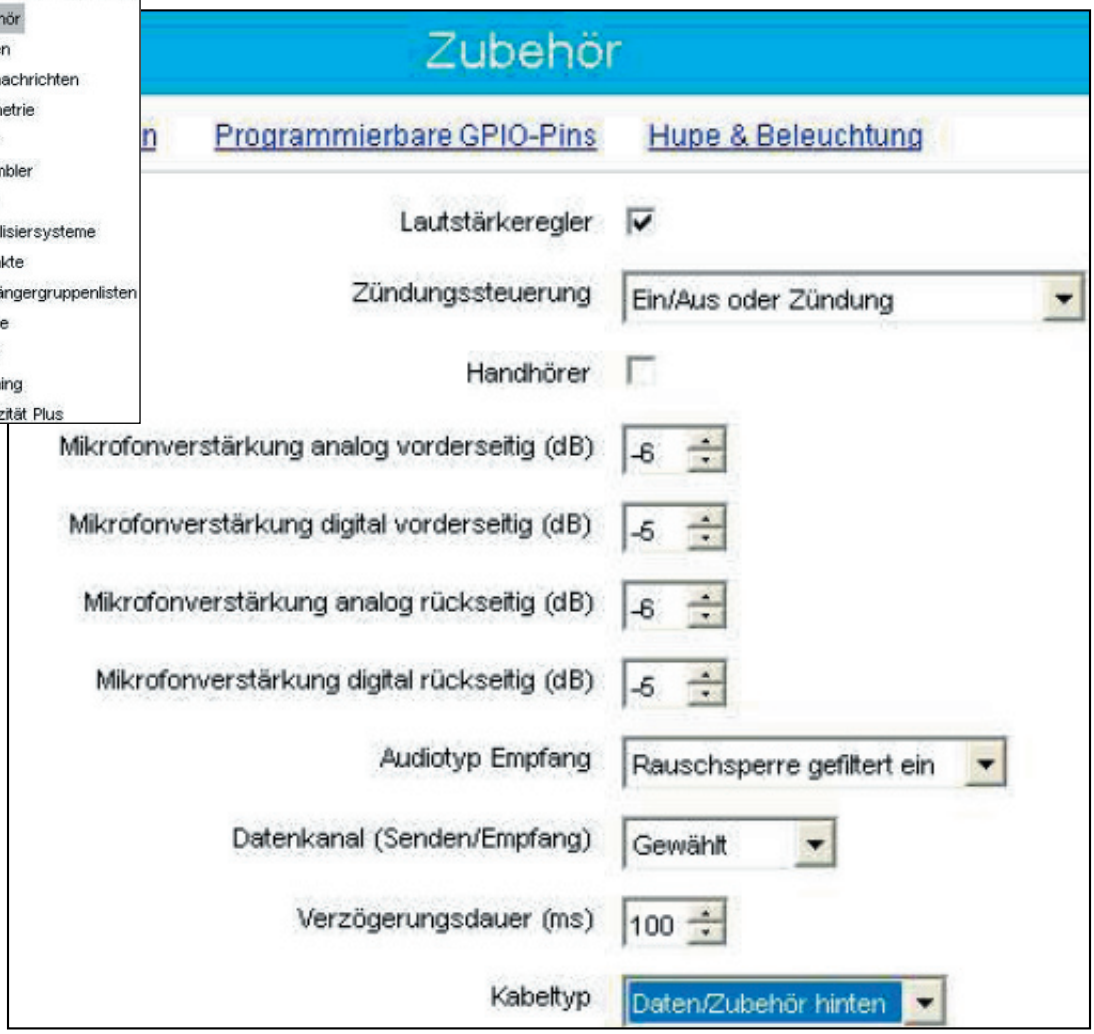
To be able to make these changes, the view must be set to “expert mode“. This is achieved via the item “view“. Here, you have to check the box named “expert“.

The following image shows the settings for “cable type“.

Inhaltsverzeichnis



Zubehör



Control Elements Major 4a

Control Elements Major 5a

LC Display

All alphanumeric readouts are presented by a LC display with background lighting.

Here, in the left part of the top line 14 digits are reserved for the channel name. In the right part, the input of the call ID is displayed. If permanent channel display is not activated, the whole line is used for the call ID input.
The bottom line is used to display information obtained from the radio, e.g. caller alias or other information.

Status LEDs

Carrier Display (Squelch) ▼

The carrier display LED ▼ can be controlled by voice (2-wire connection) or via squelch input (using the radio set). If the light is on, the radio circuit is occupied, that is, a carrier signal (carrier is keyed) is present.

PTT Display (Push-to-Talk) ▲

The PTT display LED ▲ is on, if the transmitter is keyed. Keying of the transmitter is achieved by pressing the PTT button during telephony or by sending a call.

Loudspeaker Display (Incoming Call)

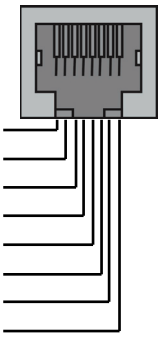
The loudspeaker display LED is on, if the loudspeaker or the earphone capsule in the handpiece are switched on.

PWR operating voltage 12V, max. 1,5 A
inside: positive terminal, outside: GND

Sockets Pinout Major 4a/5a

All of the schemes show the sockets as viewed from the rear of the Major.

Pinout S/E
Radio Circuit (ST1)

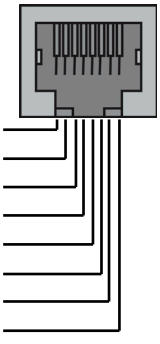


AF input B	1
AF input A	2
Squelch input	3
GND	4
output +12 V, max. 200 mA	5
PTT active, low	6
AF output A	7
AF output B	8

All AF in/outputs are equipped with transformers and, hence, potential-free. PIN 5 is for supply (+12V) of external devices (LIM-AC, FT634C).

Attention: Do not use PIN 5 to supply a radio set. 200 mA output current is not sufficient.

Pinout I/O
Digital In/Outputs (ST3)

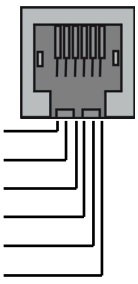


IN/OUT 0	1
IN/OUT 1	2
IN/OUT 2	3
IN/OUT 3	4
IN/OUT 4	5
IN/OUT 5	6
IN/OUT 6	7
GND	8

The digital connections can be configured as inputs or outputs, respectively. Usually, these are used as outputs for remote channel select.

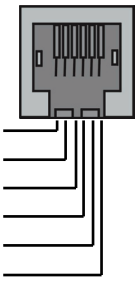
There are two sockets for connecting a headset. One is for connecting the headset, the other for the use of an external PTT button (e.g. foot switch)

Pinout HS
Headset (ST2A)



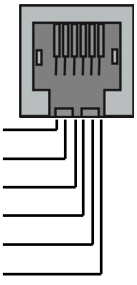
GND	1
AF input (mic. +)	2
AF earphone	3
GND earphone	4
GND AF input (mic. -)	5
PTT, active GND	6

Pinout PTT
Headset (ST2)



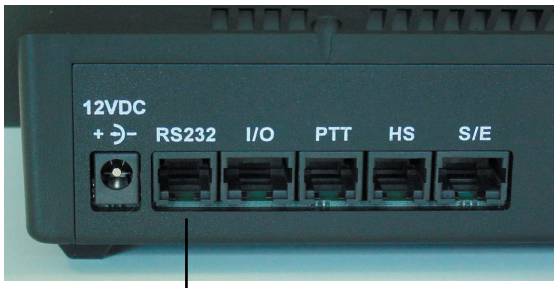
GND	1
GND AF input (mic. -)	2
NF earphone	3
GND earphone	4
AF input (mic. +)	5
PTT, active GND	6

Pinout RS232
(ST4)



NC	1
NC	2
TxD	3
RxD	4
GND	5
NC	6

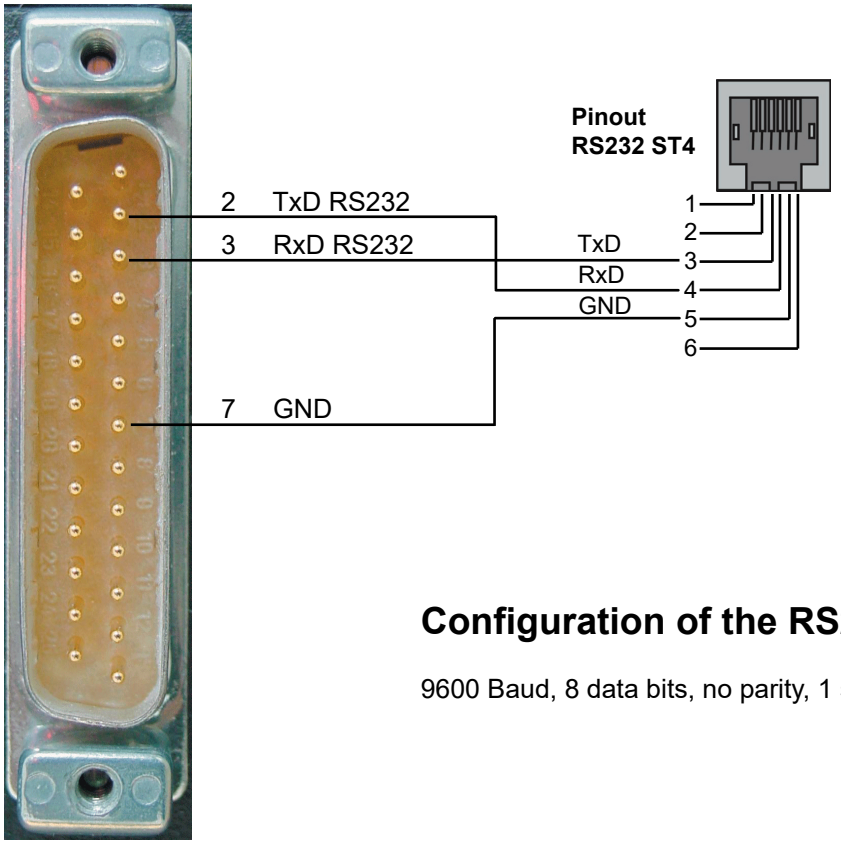
RS232 Interface



ST4 RS232 Interface

RS232 Cable for Flashing/Printing/Monitoring

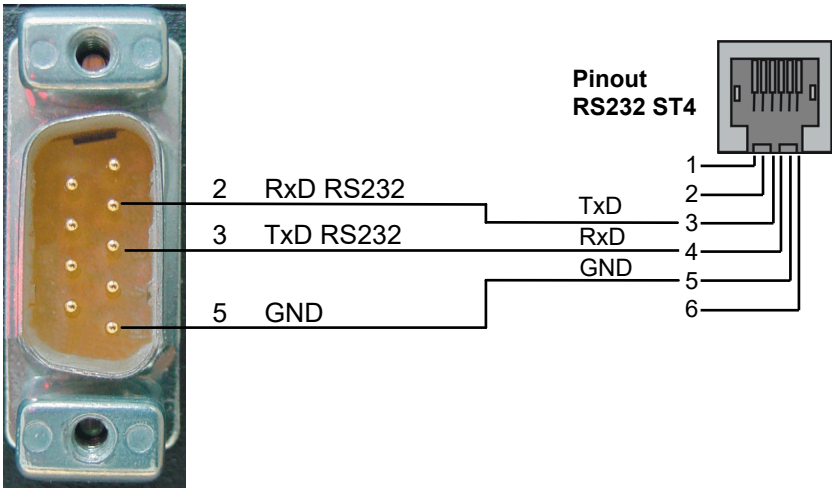
RS232 25pin connector on computer **RS232 socket on Major**



Configuration of the RS232 Interface

9600 Baud, 8 data bits, no parity, 1 stop bit, no protocol

RS232 9pin connector on computer **RS232 socket on Major**

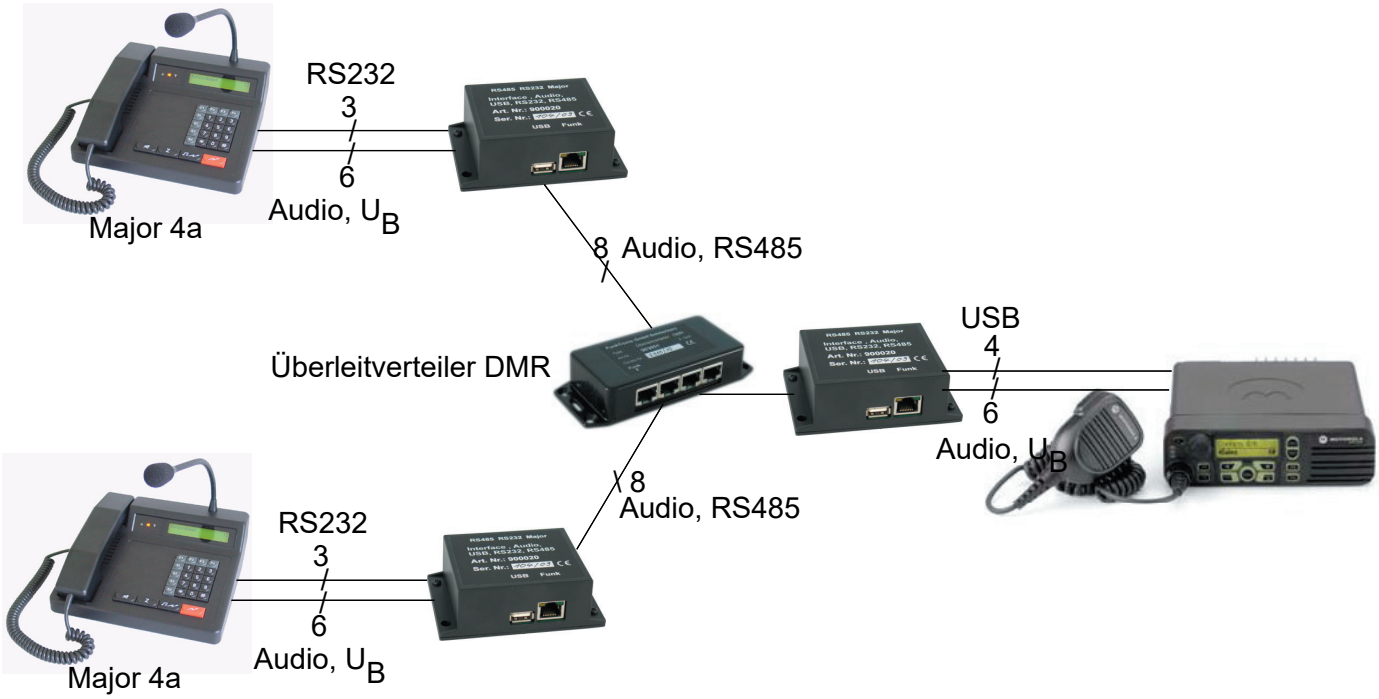


Example Configurations

Direct Connection to the Radio

Remote Control of the Radio

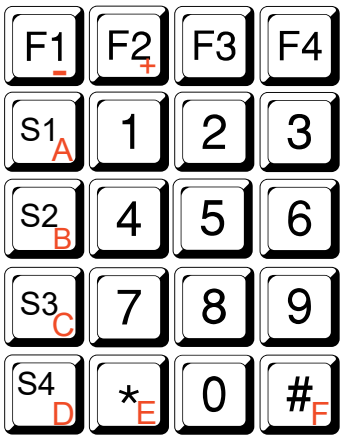
Several Control Panels, remotely Connected to the Radio



Standard Keypad Assignment Major 4a

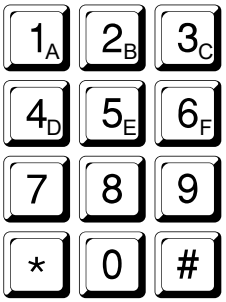
0 ... 9 : number input (call, channel, status...)
* short : transfer ID-code to call input
* long : delete whole call input
# short : scroll through ID-code memory
# long : delete ID-code from memory
F1 : channel input
: PTT gooseneck mic / status
: short: toggle selective call / group call
long: send call alert to call ID

: volume control



Standard Keypad Assignment Major 5a

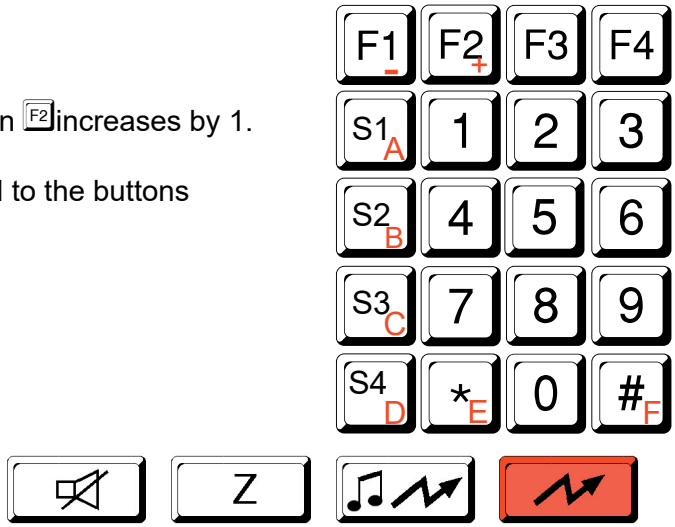
Comparable to Major 4a, but without the additional buttons S1...S4 and F1...F4.



Keypad Assignment Major 4a in Programming Mode

Button F1 reduces by 1, button F2 increases by 1.

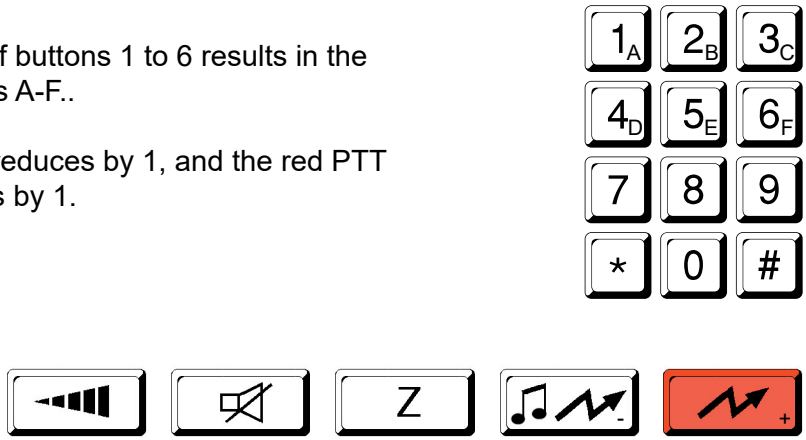
The values A - F are assigned to the buttons S1...S4, * and #.



Keypad Assignment Major 5a in Programming Mode

Long pressing of buttons 1 to 6 results in the additional values A-F..

The call button reduces by 1, and the red PTT button increases by 1.



Differences Major 4a - Major 5a

The Major 4a is different from the Major 5a in the following points:

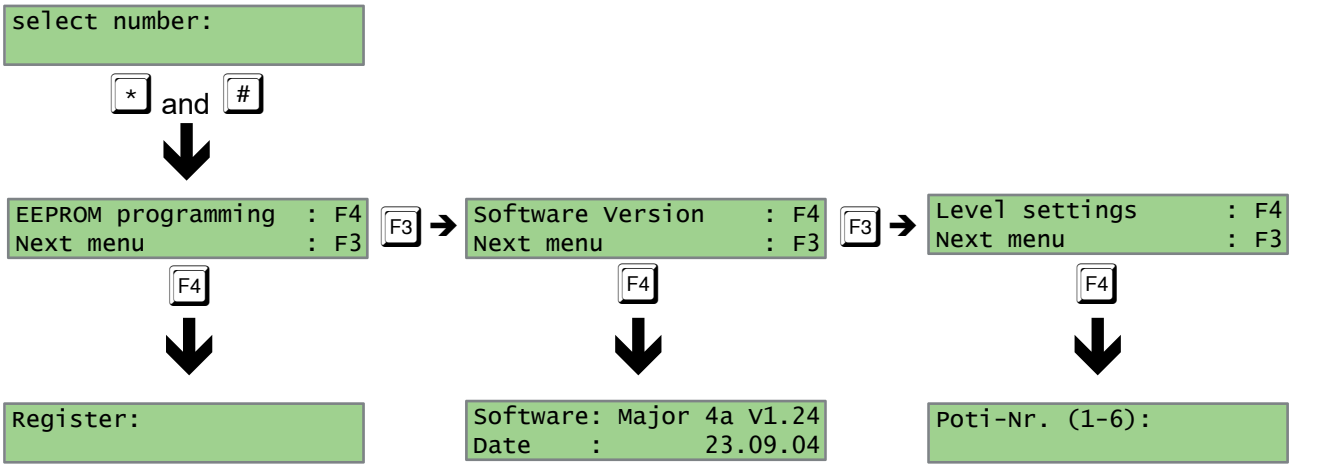
1. different keypads
2. Major 4a has a handset, Major 5a has none
3. differences in the software, mainly resulting from point 1+2

Menu Structure

Simultaneuos pressing of the buttons * and # opens the menu.

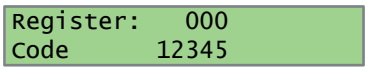
Due to the different keypad designs, for the same operations different keys are used in Major 4a and Major 5a. In the following, the handling of Major 4a is described. For the respective keys that have to be used in Major 5a please consider the table below.

Function	Major 4a	Major 5a
next menu	F3	*
select menu item	F4	#
escape discarding changes	F3	*
save changes and escape	F4	#
increase value by 1	F2	
reduce value by 1	F1	



- enter the register number to be programmed

- with 222 the factory default values are programmed



- overwrite the code with the desired values

F3 = escape menu discarding changes

F4 = save changes, escape menu

- displayed 3 seconds

*

GN = gooseneck
HP = handpiece
HS = headset

1 = input level
nominal value: 300mV
indicated on the display
2 = output level
as required
3 = GN microphone level *
4 = HA microphone level *
5 = HS microphone level *
6 = DTMF output level

- the potis can be adjusted from 0 to 255
- input directly via keypad
or

F2 = increase value by 1

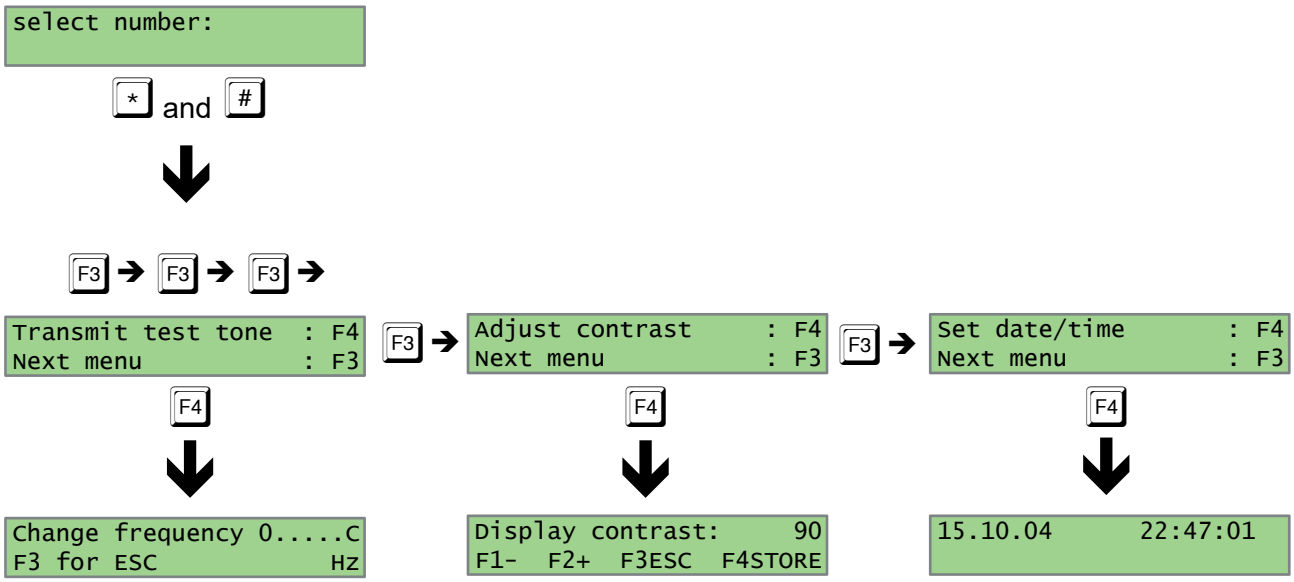
F1 = reduce value by 1

F3 = escape menu discarding changes

F4 = save changes, escape menu

Menu Structure

continued



0 = 200 Hz
1 = 300 Hz
2 = 400 Hz
3 = 600 Hz
4 = 800 Hz
5 = 1000 Hz
6 = 1600 Hz
7 = 2400 Hz
8 = 3400 Hz
9 = 4000 Hz
S1 = 2900 Hz
S2 = 3000 Hz
S3 = 3100 Hz
S4 = 3300 Hz
* = 1200 Hz
# = 1800 Hz

F3 = escape menu

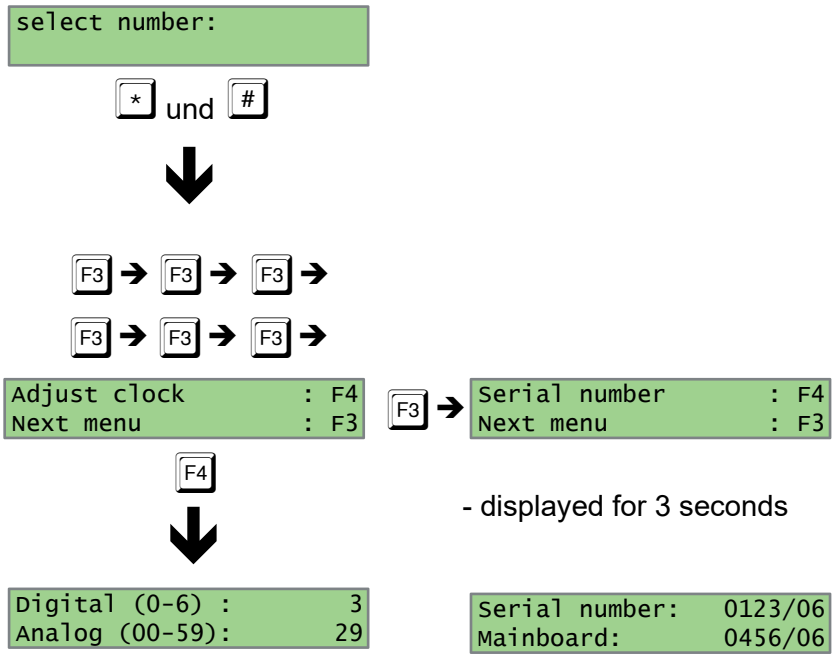
F1 = reduce contrast by 1
F2 = increase contrast by 1
F3 = escape menu discarding changes
F4 = save changes, escape menu

F1 = one digit to the left
F2 = one digit to the right
F3 = escape menu discarding changes
F4 = save changes, escape menu

The values can be changed directly using the buttons 0 to 9.

Menu Structure

continued



F1 = one digit to the left

F2 = one digit to the right

The onboard clock is factory calibrated. Before changing the values please note down the current values. Higher values accelerate the clock, while lower values slows it down. Changes made in digital have more effect than changes made in analog. Fine adjustment must be done in analog, step by step.

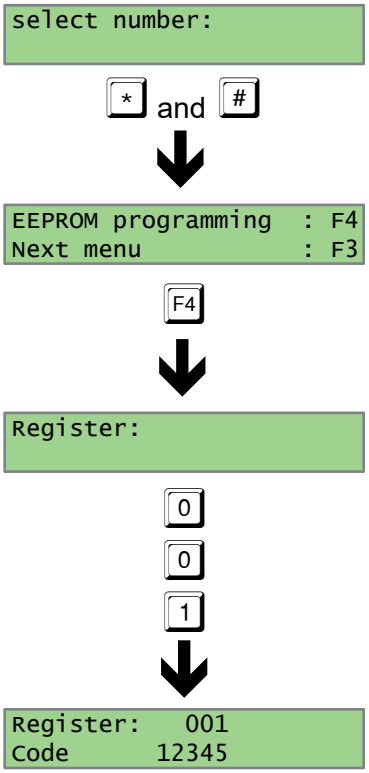
F3 = escape menu
discarding changes

F4 = save changes,
escape menu

Programming Short Call

In the following a programming example of the Major‘s registers is shown. The procedure is always the same. Depending on the desired effects, however, the programming of several registers can be necessary.

This example illustrates the programming of short call 1 in register 001 with the tone sequence 12345.



The line „Code“ shows the present programming of the register. The displayed value can be overwritten with the new value.

With button **F3** the menu can be quit any time discarding the changes.

With button **F4** the displayed value is programmed.

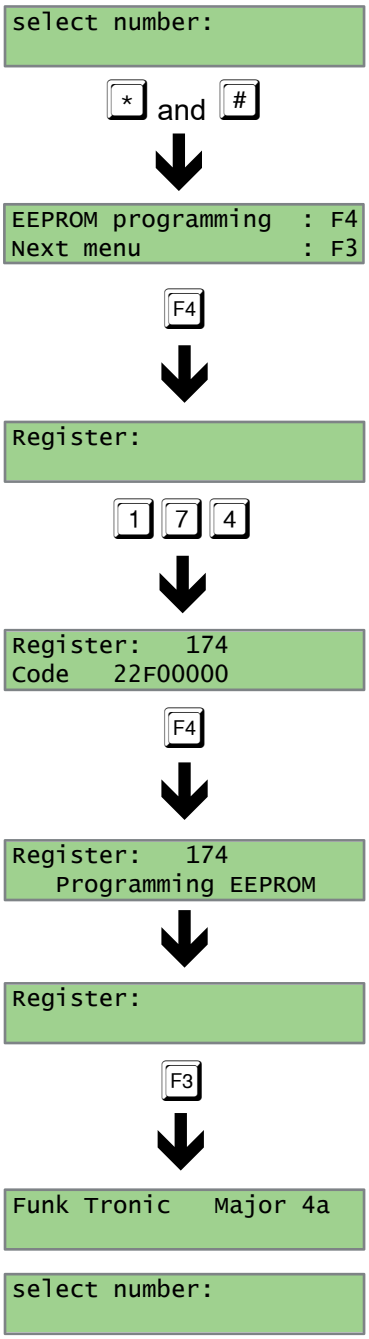
As every button of the Major 4a/5a is freely programmable, the registers 174 and 175 for the Z-button have to be programmed with the right values. As this already is the case in the factroy defaults, this step is not necessary.

Hence, register 174 (function Z-button, short press) usually is programmed with 22F01 and register 175 (function Z-button, long press) with 00000. The first 0 in register 175 defines that no additional function of the button is exercised upon long pressing.

The digits of register 174 have the following functions:

1. digit = 2 --> function 2 - transmit call
2. digit = 2 --> enter short call
3. digit = F --> awaiting input

Here are the steps that are necessary to check if the programming in register 174 is suitable for short call selection.

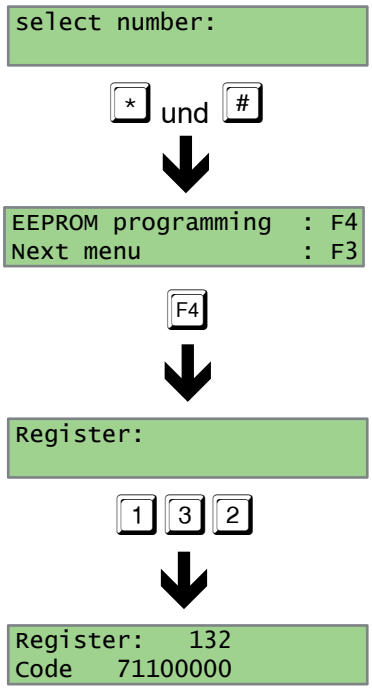


Changing the Assignment of Button Functions

All buttons of the Major 4a/5a are freely programmable. The numeric keys, the * and # keys as well as the function buttons for volume (only Major 5a), loudspeaker, short call, call and PTT are programmed ex factory for the respective tasks.
Every button can be assigned two different functions. One is achieved by pressing the button shortly and the other by pressing it for a longer time.
If the button is pressed for less than a second, the function programmed for „short press“ is executed. For longer pressing the function programmed for „long press“ is executed. If no function is programmed for long press, the „short press“ function is executed immediately.
Programming of the button‘s functions is done in registers 130-179. For every button 2 registers are reserv ed, the first onie for short press, the second one for long press (see Table of Registers, registers 130-179). Every register contains 8 digits. For details on all function see section ***Programmable Functions***.
The function of the LEDs in buttons F1 to F4 is defined in registers 180-183.

Here‘s an example for programming button 1.

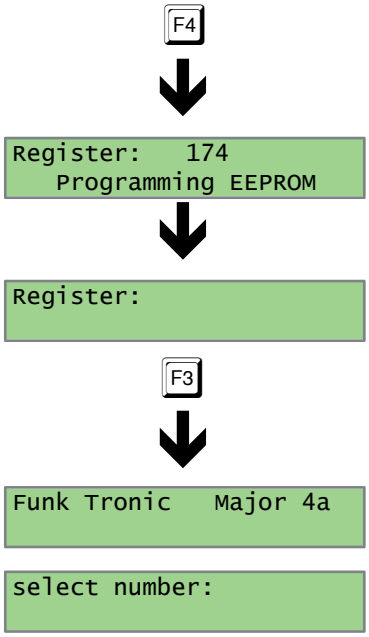
Programming „short press“:



1. digit 7 = function --> number input
2. digit 1 = number input --> new input
3. digit 1 = value 1 (0...F possible)

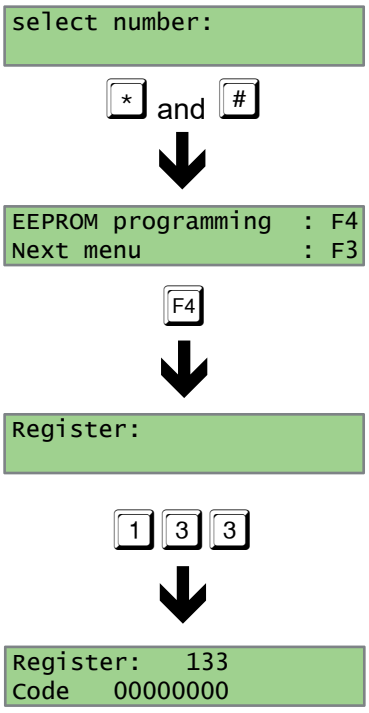
4.-8. digit 0 = not regarded

For saving, the following actions are necessary:



Ex factory, no function is programmed for long press of button 1. As an example, we are programming th button to set the volume to “1“. wird hier die Lautstärke Stufe 1 programmiert.

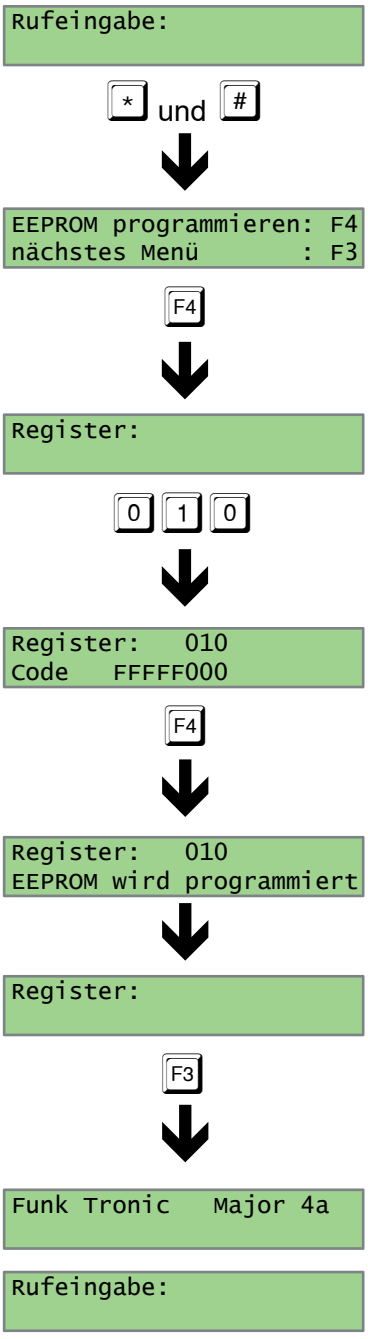
Programming „long press“:



Customizing the Call Input

In **reg. 010** you can define the variable digits for **selective call input**.
If **reg. 010** is **FFFFF000**, all 5 digits must be entered via the keypad. If digits 1-3 should be fixed and only digits 4+5 are to be entered, **015FF000** must be programmed.
The **group call input** is configured accordingly in reg. 012.

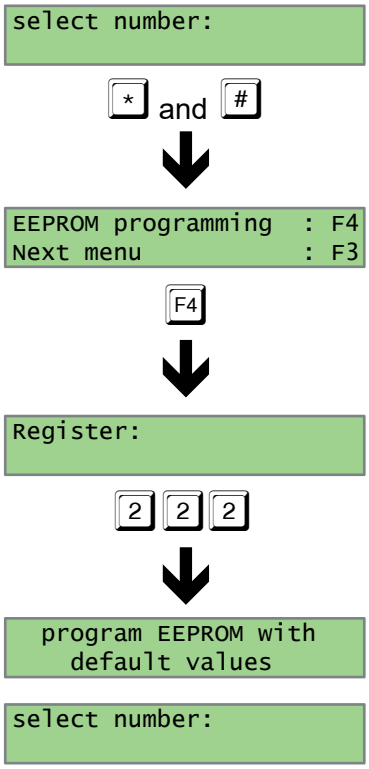
Example: Input of all 5 digits via the keypad



Reset to Factory Defaults

Using the following steps, Major 4a can be reset to factory defaults.

Attention! All parameters are reset to the default values without further confirmation.



When entering register 223 the potentiometers are also reset to factory defaults.

Transmit/Receive SDS(sinceV3.03)

Transmit SDS

The Major can send 10 different SDS messages with lengths of up to 24 characters, each. These messages are transmitted to the currently displayed group call number or selective call number. To achieve this, a suitable button must be programmed with the respective function (e.g. **253F0000**, see section **Programmable Functions**).

In order to program your customized SDS texts, the Major 4a/5a must be connected to a PC using a RS232 connection cable. If your PC does not have a real COM port (9-pin SUB-D socket) a USB-to-COM adapter can be used.

In order to read-out the texts you have to enter the following 6 characters into your terminal program:
Ctrl-B + “SDS?“ + Ctrl-C

To program the texts you have to enter the following 30 characters:

Strg-B + “SDSxyyy...y“ + Strg-C,
where x is the SDS number (0-9), the y‘s are the characters of the text (24 in total).

Receive SDS

Received SDS messages are stored in the ID-code memory. Here, a single SDS consists of max. 14 characters for the originator‘s name and max. 2x14 characters text. The display alternatingly switches through the name and the 2 text lines. As in the Kenwood radios, no alias is available, the originator‘s call ID is displayed.
For configuration of SDS display and ID-code see **reg. 087**.

Necessary Settings - Audio/USB Interface

For support of the new SDS functions an Audio-USB interface with software V1.06 or newer is needed. In the interface‘s register 010, the same CAI values need to be programmed, as as are programmed in the radio (CPS: network > radio network > CAI network and CAI group network).

reg.010/1-3:	CAI network	(Def.:012)
reg.010/4-6:	CAI group network	(Def.:225)
reg.010/7:	transmit pos/neg. acknowledge-ment tone	

Analog Channels

For software version 3.05 and newer up to 4 channels can be defined as analog channels. However, the functions are limited to the most essential ones (e.g. 5-tone encoder/decoder and PTT). In contrast to the digital channels, a call is transmitted using the call button, like in the standard software of Major 4a/5a.

The following registers are used for configuration:

Reg. 013:	5-tone encoder
Reg. 067:	channel numbers of the analog channels
Reg.184/185:	function of the call button in analog mode

ACK Request

For SW version 3.06 an newer the acknowledge (ACK) request is supported for the more recent NEXEDGE radios (SW version 4.40.00 and newer), too. To send ACK requests with the PTT, **digit 8 in reg.050** must be programmed to **1**.

Default Group Call (since V3.06)

It is now possible to define a standard group call, to which the display is reset after a certain idle time. Thus, your standard group does not have to be entered, but is usually available just by pressing the red PTT button (see **Reg. 060**).

Register Programming Major 4a, Major 5a

reg.	function
000	short call 0-9
-009	1st digit: 0 = group call, 1 = selective call
	2nd-6th digit: variable digits, that must be entered
010	selective call register
	1st-5th digit: digits for selective call variable digits are coded as **F**
	6th digit: display the programmed group call if digits 1-5 are not programmed y/n (1/0)
011	general configuration
	1st digit: language
	0 = German
	1 = English
	2 = French
	3 = Dutch
	4 = Italian
	5 = Czech
	4th digit: RS232 monitor is on/off (1/0) at power-on
	5th digit: pressing *+# (or F1+F4) is necessary for n*1s to enter programming mode
	0 = immediately
	F = disabled
012	group call register
	1st-5th digit: digits for group call variable digits are coded as **F**
	6th digit: display the programmed group call if digits 1-5 are not programmed y/n (1/0)
013	5-tone encoder (analog channels)
	1st-5th digit: e-tone sequence, variable digits are coded as **F**
	6th-8th digit: must be coded as **0**
020	decoder 1
021	decoder 2
022	decoder 3
023	decoder 4
024	decoder 5
025	decoder 6
026	decoder 7
027	decoder 8
028	decoder 9
029	decoder 10
020-029:	
	1st-7thdigit: decoder, program unused digits with an F
	8thdigit: 0 = decoder off
	1 = decoder on
030	configuration 1 for decoder 1
031	configuration 1 für decoder 2
032	configuration 1 für decoder 3
033	configuration 1 für decoder 4
034	configuration 1 für decoder 5
035	configuration 1 für decoder 6
036	configuration 1 für decoder 7
037	configuration 1 für decoder 8
038	configuration 1 für decoder 9
039	configuration 1 für decoder 10
030-039:	
	1stdigit: alarm tone type
	2nddigit: alarm tone duration n*200ms
	3rddigit: alarm tone volume (0-9, A..F=Offset +0...5)
	4thdigit: call volume duration n*200ms
	5thdigit: call volume
040	configuration 2 für decoder 1
041	configuration 2 für decoder 2
042	configuration 2 für decoder 3
043	configuration 2 für decoder 4
044	configuration 2 für decoder 5
045	configuration 2 für decoder 6
046	configuration 2 für decoder 7
047	configuration 2 für decoder 8
048	configuration 2 für decoder 9
049	configuration 2 für decoder 10
040-049:	
	1stdigit: ID-mode of call
	0 = 5-tone sequence
	2nddigit: switching output:
	number: 0 (none), 1-7
	3rddigit: switching output:
	0(off) F(on)
	for a variable time: 1-D (0-13)s
	4thdigit: acknowledgement:
	0 = no acknowledgement
	1 = acknowledgement
	2 = single tone
	3 = own ID-code
	4 = received ID-code
	5thdigit: Loudspeaker / LED:
	0 = no action
	1 = LS on
	2 = LED fashes
	3 = LS on + LED flashes

reg.	function
050	loudspeaker (LS) configuration 1st-3rd digit: LS timer: nnn * 1s (000=no timer, FFF=open mode) 4thdigit: LS on taking earphone (only M4a) 0 = off 1 = on 2 = unchanged 6thdigit: n*200ms time for call-back after termination of incoming call alert 7thdigit: termination of incoming call alert is permitted? 0=auto (DM36xx - yes, DM34xx - no) 1 = yes, 2 = no
051	general configuration 1st-3rd digit: transmission time limit nnn * 1s. 4thdigit: 0 = 4-wire simplex 1 = 4-wire duplex 2 = 2-wire simplex 3 = 2-wire duplex 5thdigit: 0 = LS is off after call tone sequence is not heard 1 = LS is on after call tone sequence is not heard 2 = LS is off after call tone sequence is heard 3 = LS is on after call tone sequence is heard
052	display lighting 1st-3rddigit: lighting is active for nnn *1s 000 = lighting disabled 001 = lighting is always on
055	general configuration 3rddigit: key beep (on/off = 1/0)
060	timer for reset to default group 1st-3rd digit: time until reset nnn*1s 000 = deactivated 6th-8th digit: default group FFFFF: reset deletes group
066	configuration for channel select 1st digit: 0 = ne channel select 1 - 3 = channels of 1-3 digits 5 - 7 = channels of 1-3 digits which are displayed permanently 2nd digit: 0 = numeric channel display 1 = display channel name (not available for DM34xx and DM44xx)

reg.	function
067	analog channels digits 1+2, 3+4, 5+6, 7+8: numbers of the analog channels e.g.: 01FFFFFF = channel 01 is analog
083	configuration for radio mute 1st digit: output for radio mute 0=off 1-7,8=TX 2nd digit: logics of radio mute function 1=RX 2=TX 3=RX+TX 1-3=active low if criteria are met 5=RX 6=TX 7=RX+TX 5-7=active low if criteria are not met 3rd digit: after-run time (n*1s)
087	ID-code display 1st+2nd digit: display time ID-code/SDS nn*100ms 3rd+4th digit: display time of one SDS part nn*100ms 5th digit: no flashing of the LS LED upon incoming: 1: ID-code 2: SDS 3: ID-code or SDS
095	configuration I/O 1-5 (digits 1-5)
096	configuration I/O 6-7,TX (digits 1-3)
095-096:	0: none 1: output 2: input, active low 4: input, active high 8: output, outside switching 9: output, inverted
097	service password (master password)
099	customer password
100	volume 1st digit: save last volume y/n (1/0) 2nddigit: volume at power-on
103	short call A
104	short call B
105	short call C
106	short call D
107	short call E

reg.	function

In registers 108 to 129 the functions of the inputs are programmed. Every input has two functions: one upon activation (passive => active) and one upon deactivation (active => passive).

108 function PTT2 passive > active
109 function PTT2 active > passive
110 function IN1 passive > active
111 function IN1 active > passive
112 function IN2 passive > active
113 function IN2 active > passive
114 function IN3 passive > active
115 function IN3 active > passive
116 function IN4 passive > active
117 function IN4 active > passive
118 function IN5 passive > active
119 function IN5 active > passive
120 function IN6 passive > active
121 function IN6 active > passive
122 function IN7 passive > active
123 function IN7 active > passive
124 function TX passive > active
125 function TX active > passive
126 function RX (SQL) passive > active
127 function RX (SQL) active > passive
128 function DC passive > active
129 function DC active > passive

In registers 130 to 179 the functions of the buttons are programmed. Every button has two functions, too: one for short pressing of the button and one for long pressing.

130 function 0 -button short
131 function 0 -button long
132 function 1 -button short
133 function 1 -button long
134 function 2 -button short
135 function 2 -button long
136 function 3 -button short
137 function 3 -button long
138 function 4 -button short
139 function 4 -button long
140 function 5 -button short
141 function 5 -button long
142 function 6 -button short
143 function 6 -button long
144 function 7 -button short
145 function 7 -button long
146 function 8 -button short
147 function 8 -button long
148 function 9 -button short
149 function 9 -button long
150 function S1-button short

reg.	function

151 function S1-button long
152 function S2-button short
153 function S2-button long
154 function S3-button short
155 function S3-button long
156 function S4-button short
157 function S4-button long
158 function * -button short
159 function * -button long
160 function # -button short
161 function # -button long
162 function F1-button short
163 function F1-button long
164 function F2-button short
165 function F2-button long
166 function F3-button short
167 function F3-button long
168 function F4-button short
169 function F4-button long
170 function PTT-button short
171 function PTT-button long
172 function RUF-button short
173 function RUF-button long
174 function Z-button short
175 function Z-button long
176 function LS-button short
177 function LS-button long
178 function VOL-button short (only Major 5a)
179 function VOL-button long (only Major 5a)
184 CALL-button in analog mode short
185 CALL-button in analog mode long

In **registers 180 to 183** the **meaning of the LEDs** in the F-buttons is programmed.
180 function LED in F1
181 function LED in F2
182 function LED in F3
183 function LED in F4
180-183: 1st digit: function
0: no function
1: display switching output status
2: display channel
3: display telephone mode
4: display decoder status

if 1st digit = 1: display status of switching output
2nd digit: 1-7: number of the switching output (1-7)
3rd digit:
0: display, if active low (normal)
1: display, if active high (inverted)

if 1st digit = 2: display channel
2nd+3rd digit: 00-99 (channel 00-99)

if 1st digit = 5: display monitor status
2.Stelle: 0 = LED on if monitor is on
1 = LED on if monitor is off

189 headset configuration
1st-3rd digit: threshold voltage (analog-digital converter for headset detection nnn (000-999) * 5mV,
headset is present if voltage is lower

222 restore factory defaults
223 restore factory defaults including potentiometer settings

Attention: factory defaults are restored without further confirmation directly after input of the register number

Programmable Functions

Programmable functions for buttons and inputs: The first digit of the respective register contains one of the following functions. The additional digits define the function in detail.

1st digit: function
0: no function
2: transmit call
3: PTT
4: volume
5: channel selection / switching output
6: ID-code memory
7: calling number/tone input
9: ext. inputs

Function 2 (transmit call):

1st digit: 2: transmit call
2nd digit: 2: transmit short call
3rd digit: 0-9: transmit short call n
F: manual input of short call number
1st digit: 2: call
2nd digit: 5: switch call mode
3rd digit: 0: activate group call
1: activate selective call
2: status input on/off
3: activate SDS
E: toggle group call / selective call

1st digit: 2: call
2nd digit: 5: switch call mode
3rd digit: 3: activate SDS
4th digit: 0-9: SDS 0-9
8th digit: 0: send SDS immediately
1: send SDS whenn PTT is pressed

1st digit: 2: call
2nd digit: 7: send SDS to group
3rd digit: 0-9: SDS 0-9
4th-8th digit: 00000-99999: group number, to which the SDS is sent

Function 3 (PTT):

1st digit: 3: PTT
2nd digit: 0-3: button starts PTT
(ends when button is released)
4-7: input starts PTT
(ends with function PTT off)
0,4: gooseneck mic.
1,5: headset mic.
2,6: handset mic.
3,7: gooseneck- or headset mic.
8: switching of GN / HS mic.
F: PTT off
(if started with input)

1st digit: 3: PTT
2nd digit: 8: switching of GN / HS mic.
3rd digit: 0: GN microphone is on
1: HS microphone is on
2: automatic HS detection
(Standard after power-on)
E: toggle GN/HS
F: input
4th digit: 0: no text display
1: n*100ms text display

Function 4 (volume):

1st digit: 4: volume
2nd digit: 0: toggle loudspeaker (on/off)
1: volume
3: toggle monitor function
1st digit: 4: volume
2nd digit: 1: volume
3rd digit: 0-9: volume
A: increase by 1 step
B: decrease by 1 step
F: input
4th digit: 0-9: minimum volume 0-9
5th digit: 0-9: maximum volume 0-9

Function 5 (channel selection / switching outputs):

1st digit: 5: channel selection
2nd-4th digit: 000-999: channel nnn
FFF: input

1st digit: 5: switching outputs
2nd digit: E: set status of switching output
3rd digit: 1-7:number of the switching output (1-7)
F: manual input of the number
4th digit: 0: switching output off (passive, high)
1: switching output on (active, low)
3: switching output on for defined time
E: toggle switching output (on/off)
F: manual input of the status
6th-8th digit: 001-255: n*100ms (if 4th digit = 3)

Function 6 (ID-code / SDS memory):

2nd digit: 0: delete ID-code
1: display next ID-code
2: display most recent ID-code
5: copy ID-code to call input
(for call-back)

Function 7 (input calling number/tone):

1st digit: 7: input of calling tone
2nd digit: 0: delete input
1: new input
2: input of complete call

1st digit: 7: input of calling tone
2nd digit: 0: delete input
3rd digit: 0: delete call completely
1: delete last input
2: call +1 (see 4th digit)
3: call -1 (see 4th digit)

1st digit: 7: input of calling tone
2nd digit: 1: new input
3rd digit: 0-E: calling tone 0-E
F: break

1st digit: 7: input of calling tone
2nd digit: 2: input of complete call
3rd digit: 1-5: number of digits
4th-8th digit: 1-5 digits

Function 9 (ext. inputs):

1st digit: 9: external inputs
2nd digit: 1: external muting
3rd digit: 0: muting off
1: muting on
4th digit: 0: TX-LED is off during silence
1: TX-LED flashes during silence

Function C (simulate MOTOTRBO button):

This function is needed to delete an incoming emergency call. Here, one has to define the button for which “emergency call off” is programmed at the DM36xx or DM46xx.

2nd digit:
1: button P1 at DM36xx
2: button P2 at DM36xx
3: button P3 at DM36xx
4: button P4 at DM36xx

9: button at DM46xx

Technical Data

Operating Voltage	12 V
Current Consumption	max. 800 mA
Weight	1,5 kg
Dimensions WxDxH (without gooseneck)	245 x 220 x 95 mm
input impedance 2-wire/4-wire	600 Ohm
input level 4-wire	50 mV (-24 dBm) bis 775 mV (0 dBm)
input level 2-wire	70 mV (-21 dBm) bis 1050 mV (+2,5 dBm)
output impedance 2-wire/4-wire	600 Ohm
output level at 600 Ohm	
AF without additional pilot-tone	30 mV (-28 dBm) to 550 mV (-3 dBm)
AF with additional pilot-tone	30 mV (-28 dBm) to 450 mV (-5 dBm)
Set ex factory to	450 mV

General Safety Information

Please read the operating instructions carefully before installation and setup.

The relevant regulations must be complied to when working with 230V line voltage, two-wire-lines, four-wire-lines and ISDN-lines. It is also very important to comply to the regulations and safety instructions of working with radio installations.

Please comply to the following safety rules:

- All components may only be mounted and maintained when power is off.
- The modules may only be activated if they are built in a housing and are scoop-proof.
- Devices which are operated with external voltage - especially mains voltage - may only be opened when they have been disconnected from the voltage source or mains.
- All connecting cables of the electronic devices must be checked for damage regularly and must be exchanged if damaged.
- Absolutely comply to the regular inspections required by law according to VDE 0701 and 0702 for line-operated devices.
- Tools must not be used near or directly at concealed or visible power lines and conductor paths and also not at and in devices using external voltage – especially mains voltage - as long as the power supply voltage has not been turned off and all capacitors have been discharged. Electrolytic capacitors can be still charged for a long time after turning off.
- When using components, modules, devices or circuits and equipment the threshold values of voltage, current and power consumption specified in the technical data must absolutely be complied to. Exceeding these threshold values (even if only briefly) can lead to significant damage.
- The devices, components or circuits described in this manual are only adapted for the specified usage. If you are not sure about the purpose of the product, please ask your specialized dealer.
- The installation and setup have to be carried out by professional personnel.

Returning of Old Equipment

According to German law concerning electronic devices old devices cannot be disposed off as regular waste. Our devices are classified for commercial use only. According to § 11 of our general terms of payment and delivery, as of November 2005, the purchasers or users are obliged to return old equipment produced by us free of cost. FunkTronic GmbH will dispose of this old equipment at its own expense according to regulations.

Please send old equipment for disposal to:

FunkTronic GmbH
Breitwiesenstraße 4
36381 Schlüchtern

>>> Important hint: freight forward deliveries cannot be accepted by us.

2 February, 2006

Subject to change, Errors excepted

Release Notes

Oct-09, 2014	- Translation of German manual dated from Oct-08, 2014
Nov-25, 2016	- Function C (simulate MOTOTRBO button) corrected