Major BOS 2b2

serial number 3799 and later

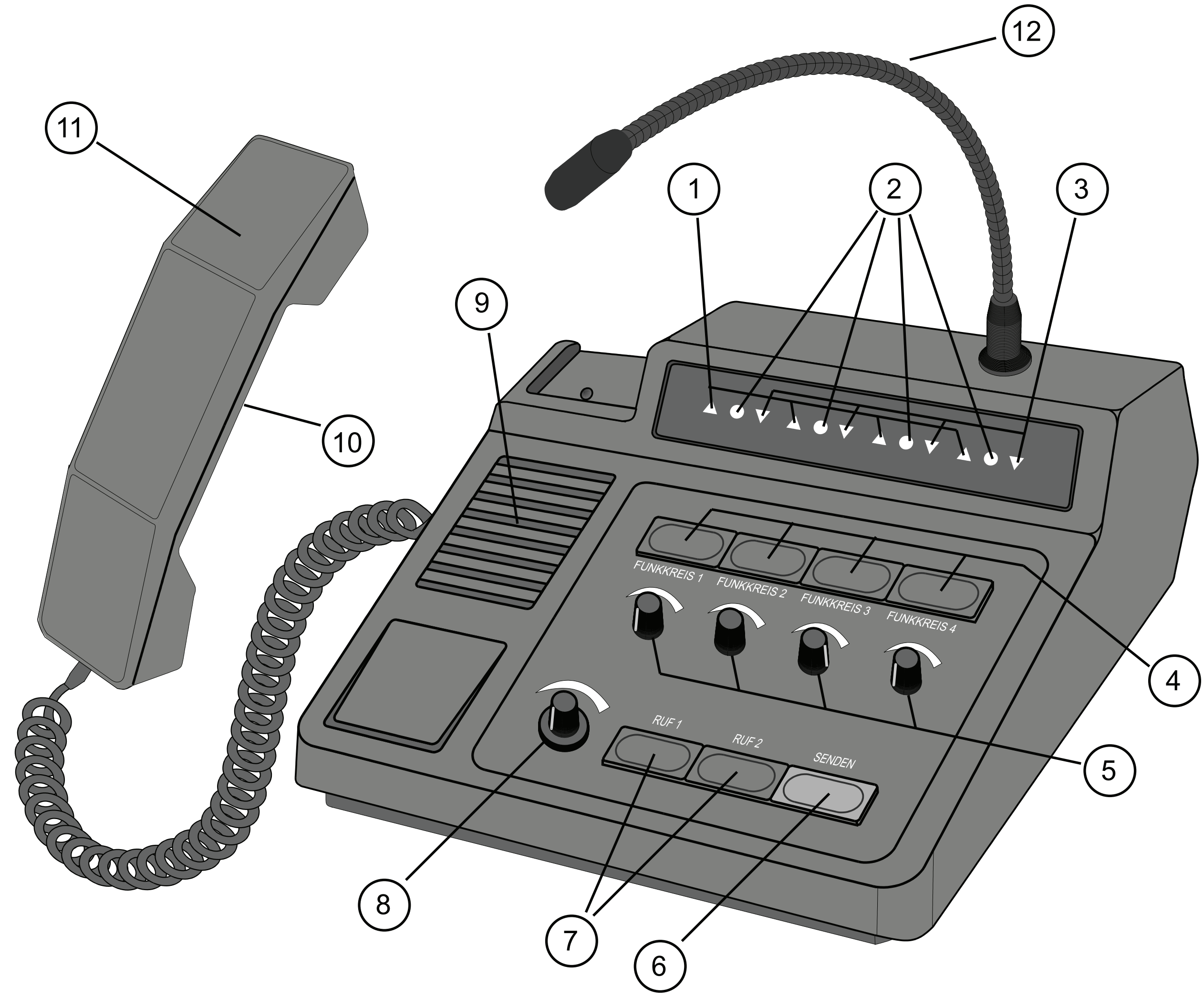
FunkTronic
Kompetent für Elektroniksysteme

Inhalt

Technical Data

Supply Voltage	+12V DC -15% +25%
Current consumption	max. 1000 mA
AF input level	
Recommended value for earpiece AF	500 mV (at 10 kOhm)
Input impedance	approx. 10 kOhm
AF output level	
Factory default	500 mV at 200 Ohm
Range	300mV to 700mV
Output impedance (Transmitting)	approx. 200 Ohm
Output impedance (Receiving)	high impedance (disconnected)
Tape Recorder output level	
Factory default	- 6 dBm (at 600 Ohm)
Range (Potentiometer P8)	- 14 dBm to - 2 dBm (at 600 Ohm)
Output impedance	approx. 600 Ohm
Weight (without cable)	approx. 1650 g
Size (without gooseneck microphone)	
weight x depth x height	245 x 220 x 90 mm

Controls of Major BOS 2b2



1	-	Transmitter indication
2	-	Selection indication
3	-	Receiver indication (Squelch)
4	-	Selection key
5	-	Monitoring volume
6	-	PTT key
7	-	Tone Call key (Call I and Call II)
8	-	Master volume
9	-	Loudspeaker
10	-	PTT key handset
11	-	Handset
12	-	Gooseneck microphone

Major BOS 2b2

Major BOS 2b2 is identical to Major BOS 2a2, except that Major BOS 2b2 has an additional internal connection board making it largely compatible to Major BOS 4a and 8a. The most important difference is found in the PTT output which always switches to 12 V in Major BOS 2b2 while the polarity can be chosen for Major BOS 4a and 8a.
Most of the working parameters can be configured via a computer using the programming software.

Regarding functionality and connector pin assignment, Major BOS 2b2 compatible to Major BOS 2b.

Of course, there are several changes and new features:
- electrical, programmable potentiometers have replaced the analogous potentiometers
- programmable registers instead of jumpers
- programmable headset volume
- programmable amplification of the audio inputs from radio
- noise suppression for the inputs from radio
- tunable minimum volume for single radio circuits and tunable minimum overall volume
- AF settings (mute, listening, max. volume) can be adjusted separately for earpiece, loudspeaker, and tape
- software option "NF-Squelch" (AF squelch)
- software option "Encoder/Decoder" permitted for up to four radio circuits
- flashing squelch LED and alarm tone on decoding of a call (call 1, call 2)

Programming

The Major BOS 2a2 can be configured using the Major BOS 2a2/2b2 programming software (download at www.funktronic.de -> Service). Alternatively, the functions can be programmed directly in the respective registers using a terminal program (e.g. hyper terminal).

The adjustment of the potentiometers, in general, is done using the terminal program.

Connectivity

The Major BOS 2b2 is connected to a 12V DC power supply unit. Up to four radios can be connected to the control set. For every radio, squelch input, PTT output, busy-line (compatible to Major BOS 4a/8a, but NOT to Major BOS 2a2) as well as NF in- and outputs are available. Furthermore, Major BOS 2b2 features connections for a headset, an external signalling device and a tape output. Via the RS 232 interface a PC connection for programming purposes can be established.
As the NF outputs are only open during transmission, several Major BOS 2b2 can be connected in parallel circuit.

Tastatur

The keypad consists of four selection keys for the different radio circuits, two tone call keys and the red PTT key.

Carrier Indication (Squelch)

Every one of the four radio circuits provides its own carrier indicator (Squelch), which is located above the corresponding selection key. If using junction box MBOS2AB1, for activation the squelch input needs a voltage between 5V and 14V. If MBOS2AB6 is used, the logic of the carrier indication is configurable. The polarity of the carrier indication and the AF muting when no carrier is present can be programmed.

Transmitter Indication (PTT)

Every radio circuit has its own transmitter indication, which is lit when the transmitter is activated. This happens upon pushing the PTT button or one of the two tone call buttons. The LED blinks if a parallel Major BOS 2b2 is on transmission.

Selection Indication

The selection indicator is permanentely luminous if the corresponding radio circiut is selected and active. If it is in blinking state this circuit is busy and cannot be selected.

Selection of Base Stations / Radio Circuits

To connect to one of the four radio circuits the corresponding selection key has to be pressed. A subsequent button press sets the circuit to inactive. To activate more than one channel hold the first pressed button down and select further circuits. Programming the Major BOS2b2 can disable this feature. Acitve circuits are indicated by a luminous selection indication LED. A busy radio cuircuit is idicated by a blinking LED and cannot be activated. Radio circuits can be disabled, active radio circuits on power-on can be programmed.

Loudspeaker and Volume Control

On transmission the loudspeaker is turned off automatically. If it is off, when the handset ist lifted, can be programmed. The loudspeaker volume can be adjusted with the master volume control.

Microphone Selection

The Major BOS2b2 has three microphone routings available. The PTT button in the handset turns on the handset's microphone. The red PTT button and the headset's PTT input can be configured independently. Possible associations are gooseneck microphone, headset microphone or automatic selection. If automatic selection is on, the headset microphone is used if a headset is detected otherwise the gooseneck microphone is used.

Tone Call Decoder

The optional software "Encoder/Decoder" allows the Major BOS2b2 to decode Tone Call1 and Tone Call2 on any radio circuit and to activate the corresponding circuit automatically.

Tone Call Encoder

The Major BOS 2b2 includes a encoder for Tone Call 1 and Tone Call 2. The tone calls are sent with the corresponding keys of the keypad. The tone is sent as long as the button is pushed.

Recording Conversations

Via the installed tape recorder output the recording of conversations is possible. The interface comprises a potential-free AF output as well as a potential-free contact (electronic relay) to control a recording device.

Several Control Sets in Parallel Circuit

As the AF outputs are only cut in during transmission and the NF inputs can be switched to high-resistance using Jumpers J1 and J2, several Major BOS 2b2 can be connected to each other. Therefor, all connections to the radio circuits (TX-AF, RX-AF, squelch and PTT keying) must be connected in parallel (bus or star wiring). The outputs for the radio circuits are compatible to Major BOS 4a and 8a and can be combined. Only the PTT heying represents an exception. It is always active to +12V for Major BOS 2b2 and cannot be changed to PTT keying vs. GND.
A special task is fulfilled by the busy-lines of the radio circuits, that are only connected between the control sets. The busy-lines of Major BOS 2b2, 4a and 8a are compatible with each other but they are **NOT** compatible to those of Major BOS 2a2 and may not at all be connected to those!

Activate Busy-Lines

Every control set that is connected to the respective busy-line can signalise to the control sets connected in parallel if a circuit is activated or if transimission is already in progress.

Read Busy-Lines

Every control set that is connected to the busy-line recognizes if the respective circuit is busy and indicates this by a flashing transmission indicator or selection indicator. Furthermore can be configured how Major BOS 2b2 reacts to busy radio circuits, e.g. PTT keying or selection of the circuit can be blocked and/or incoming AF can be muted.

External Signalling Device

An external signalling device can be connected to Major BOS 2b2. The sensitivity of this potential-free input is 500 mV at 3 kohm and cannot be varied. By operating the corresponding PPT input (PTT3) the external signal is transmitted to the selected circuits.

AF telephone connection

By connecting the external headset adapter the headset can be used for conversation via telephone and radio. Switching of the headset to telephone mode is achieved via the optocoupler input that has to be programmed appropriately (see section Optocoupler Input).

Operating in FMS mode

With the software option "Encoder/Decoder" Major BOS 2b2 can be extended to a FMS control panel. Possible FMS functions are the ID transmission at PTT keying and the transmission of up to two arbitrary, programmed FMS telegrams (e.g. conversation request) using the two call buttons. in this case, these are, of course, no longer available to transmit call 1 or call 2.
By conneting our FMS handset Commander 5 FMS to the D-Sub connector for external conversation devices (handpiece or headset), the Major becomes ready for FMS use.
Here, the FMS handset can also be used as an alternative to the usual handpiece of the Major. Therefor, the PTT output of the Commander 5 FMS must be configured to GND.

Functions for TETRA digital radios (SW version 1.02 or higher)

For application in digital radio monitoring of the conversation request tone is necessary. As the Major mutes its loudspeaker (LS) during transmission, this function has not been available if transmission is conducted using the gooseneck (GN) microphone.

Thus, in version V1.02 and higher the LS can also stay active during a transmission with the GN microphone. Circuits, on which no transmission takes place, are muted. Listening to active circuits (current transmissions) is still possible during transmission. Here, the volume can be reduced.

This function can also be active if the LS would be muted because the handset is taken off.

For transmission using a different microphone (headset, handset or via external input) this option is not available.

New registers:

270: Circuit 1
271: Circuit 2
272: Circuit 3
273: Circuit 4

Description for all 4 registers:

1st digit: 0 = if SH-PTT is keyed and handpiece is taken off, the LS status depends on register 016/2
1 = if SH-PTT is keyed and handpiece is taken off, the LS is always active

4th-8th digit: max. volume for SH-PTT: 00000 (LS aus) to 32767 (max. volume)
Here, the listening volume for the circuit is set, the total volume depends on the overall volume settings

Potentiometers

By the use of the potentiometers the volume settings of the different radio circuits can be adjusted.

The functions of the potis are described in the table below:

Poti	Function/Level
P1	RX-AF (listen) circuit 1
P2	RX-AF (listen) circuit 2
P3	RX-AF (listen) circuit 3
P4	RX-AF (listen) circuit 4
P5	loudspeaker AF, (total)

Service Program

For Major BOS 2b2 the programming of the registers and the calibration of the electronic potentiometers is accomplished using the service program. This program is accessible via the serial interface (for pin assignment see section **Cable Connection to PC**). For this purpose a suitable terminal program can be used: e.g. HyperTerminal (Windows), minicom (Linux).

The configuration of the serial interface is as follows:

data transfer rate	9600 bit/s
start bit	1
data bits	8
parity	none
stop bit	1
flow control	none

If the Major BOS 2a2 is switched on and the terminal program is started, the service program starts after pressing ENTER ⏎. showing the following menu:

```
Online - Monitor MBOS2a2
------------------------

Software: MBOS2a2
Version : V1.00
SW-Datum: 07.04.10
Option  : Encoder/Decoder + AF-Squelch

Rxxx................read register xxx
Pxxx yyyyyyyy.......program register xxx with yyyyyyyy
A...................potentiometer calibration
Tx..................TX-output off/on (0/1)
Ixxxx...............switch on tone generator with xxxxHz (0000=off)
H...................detection of a headset
Q...................software reset
X...................exit monitor
```

Registers of Major BOS 2a2

Register		Function	
000		Radio circuit configuration 1	
	1st digit	circuit 1 enabled, y = 1, n = 0	
	2nd digit	circuit 2 enabled, y = 1, n = 0	
	3rd digit	circuit 3 enabled, y = 1, n = 0	
	4th digit	circuit 4 enabled, y = 1, n = 0	
	5th digit	several active circuits possible y = 1, n = 0	
	6th digit	on PTT if no circuit is active: use previous circuit = 0, error = 1	
	7th digit	default "previous" circuit after power-on (binary sum of circuits = 0 - F)	
001		Radio circuit configuration 2	
	1st digit	circuit 1 enabled at power-on, j = 1, n = 0	
	2nd digit	circuit 2 enabled at power-on, j = 1, n = 0	
	3rd digit	circuit 3 enabled at power-on, j = 1, n = 0	
	4th digit	circuit 4 enabled at power-on, j = 1, n = 0	
	5th digit	circuits at power-on according to digits 1 - 4 = 0, previously enabled circuits = 1	
002		Squelch configuration 1	
	1st digit	circuit 1	
	2nd digit	circuit 2	
	3rd digit	circuit 3	
	4th digit	circuit 4	
	1st - 4th digit	SQL active:	AF = 2 (only with option AF-squelch) high = 1 low = 0
003		Squelch configuration 2	
	1st digit	circuit 1 AF is on: on squelch = 1, always = 0	
	2nd digit	circuit 2 AF is on: on squelch = 1, always = 0	
	3rd digit	circuit 3 AF is on: on squelch = 1, always = 0	
	4th digit	circuit 4 AF is on: on squelch = 1, always = 0	
004		Busy Out configuration	
	1st digit	Busy Out circuit 1	
	2nd digit	Busy Out circuit 2	
	3rd digit	Busy Out circuit 3	
	4th digit	Busy Out circuit 4	
	1st - 4th digit	Busy Out	Busy always off = 0 Busy active if TX is active = 1 Busy active if circuit is on = 2
005		Busy In LED configuration	
	1st digit	Busy In circuit 1	
	2nd digit	Busy In circuit 2	
	3rd digit	Busy In circuit 3	
	4. digit	Busy In circuit 4	
	1st - 4th digit	Busy LED	no function = 0 Busy active: TX-LED flashes = 1 Busy active: circuit-LED flashes = 2

Register		Function	
006		Busy In, configuration of functions	
	1st digit	Busy In circuit 1	
	2nd digit	Busy In circuit 2	
	3rd digit	Busy In circuit 3	
	4th digit	Busy In circuit 4	
	1st - 4th Stelle	Busy In	no function = 0
			active, mutes circuit = 1
			active, disables PTT keying =2
			active, disables PTT keying and mutes circuit = 3
			active, disables circuit activation = 4
			active, disables circuit activation and mutes circuit = 5
			active, disables activation of any circuit = 6
			active, disables activation of any circuit and mutes circuit = 7
007		TX In LED configuration	
	1st digit	TX In circuit 1	
	2nd digit	TX In circuit 2	
	3rd digit	TX In circuit 3	
	4th digit	TX In circuit 4	
	1st - 4th digit	TX In	no function = 0
			active, TX-LED flashes = 1
008		TX In Funktionskonfiguration	
	1st digit	TX In circuit 1	
	2nd digit	TX In circuit 2	
	3rd digit	TX In circuit 3	
	4th digit	TX In circuit 4	
	1st - 4th digit	TX In	no function = 0
			active, mutes circuit = 1
			active, disables PTT keying = 2
			active, disables PTT keying and mutes circuit = 3
009		Duplex configuration	
	1st digit	TX In circuit 1	
	2nd digit	TX In circuit 2	
	3rd digit	TX In circuit 3	
	4th digit	TX In circuit 4	
	1st - 4th digit		simplex = 0
			duplex = 1
010		AF input configuration of deactivated circuits	
011		AF input configuration of activated circuits	
	1st digit	circuit 1 to loudspeaker	
	2nd digit	circuit 2 to loudspeaker	
	3rd digit	circuit 3 to loudspeaker	
	4th digit	circuit 4 to loudspeaker	
	5th digit	circuit 1 to earpiece	
	6th digit	circuit 2 to earpiece	
	7th digit	circuit 3 to earpiece	
	8th digit	circuit 4 to earpiece	
	1st - 8th digit	circuit is muted = 0	
		listening volume = 1	
		maximum volume = 2 or 3	

Register		Function
012		Tape relay configuration 1
	1st digit	relay on: at TX, y = 1, n = 0
	2nd digit	relay on: at every SQL, y = 1, n = 0
	3rd digit	relay on: at SQL on an activated circuit, y = 1, n = 0
013		Tape relay configuration 2
	1st - 3rd digit	overrun time of tape relay: nnn * 1 s (0 - 655 s)
012		AF input configuration of deactivated circuits
013		AF input configuration of activated circuits
	5th digit	circuit 1 to tape
	6th digit	circuit 2 to tape
	7th digit	circuit 3 to tape
	8th digit	circuit 4 to tape
	5th - 8th digit	circuit is muted = 0
		listening volume = 1
		maximum volume = 2 or 3
014		Headset configuration 1
	1st digit	microphone for red PTT-button
	2nd digit	microphone for external PTT-button
	1st - 2nd digit	gooseneck (GN) microphone = 0
		headset (HS) microphone = 1
		automatically switch to HS = 2
		(no HS => GN microphone; headset present => HS microphone)
015		Headset configuration 2
	1st digit	threshold value for headset detection nnn (000 - 999) * 5 mV
		if voltage is lower than threshold => headset is considered connected
016		Configuration of earpiece and loudspeaker
	1st digit	earpiece is off, if hung up = 0, earpiece is always on = 1
	2nd digit	loudspeaker is off, if earpiece taken off = 0, louspeaker is always on = 1
019		Functions of buttons CALL1, CALL2, PTT
	1st digit	function FMS ID code on PTT, y = 1, n = 0
	2nd digit	function CALL1-button
	3rd digit	function CALL2-button
	2nd - 3rd digit	no function = 0
		CALL1/2 transmits as long as button is pushed = 1
		send FMS 1/2 telegram = 2 (option Encoder/Decoder)
		send tone sequence 1/2 = 3 (option Encoder/Decoder)
	6th digit	circuit(s) for CALL1-button, current = 0, binary sum of circuits = 1 - F
	7th digit	circuit(s) for CALL1-button, current = 0, binary sum of circuits = 1 - F
020		FMS telegram for PTT buttons
	1st - 8th digit	FMS ID-code (BLOOFFFF)
021		FMS telegram for CALL1 button
	1st - 8th digit	FMS 1 telegram (BLOOFFFF)
022		FMS telegram for CALL2 button
	1st - 8th digit	FMS 2 telegram (BLOOFFFF)

Register		Function
023		Digits 9 and 10 in all of the 3 FMS telegrams
	1^{st} digit	circuits where a FMS ID-code may be sent
		(binary sum of circuits = 0 - F)
	2^{nd} - 3^{rd} digit	digits 9 and 10 for ID-code (register 020)
	4^{th} - 5^{th} digit	digits 9 and 10 for FMS 1 (register 021)
	6^{th} - 7^{th} digit	digits 9 and 10 for FMS 2 (register 022)
	8^{th} digit	improved forerun and final bit 0 = 0
		improved forerun and final bit 1 = 1
		forerun according to standard procedure and final bit 0 = 2
		forerun according to standard procedure and final bit 1 = 3
031		Tone sequence 1 for CALL1-button
032		Tone sequence 2 for CALL2-button
	1^{st} - 5^{th} digit	5-tone sequence
041		Tone call decoder circuit 1
042		Tone call decoder circuit 2
043		Tone call decoder circuit 3
044		Tone call decoder circuit 4
	1^{st} digit	decode tone calls: none = 0, call1 = 1, call 2 = 2, both calls = 3
	2^{nd} digit	activation of circuit upon decoded call
		no activation = 0
		activate new circuit, if no TX and handset lies on Major = 1
		activate new circuit, if no TX = 2
		activate new circuit = 3
		no activation of additional circuit = 4
		activate additional circuit, if no TX and handset lies on Major = 5
		activate additional circuit, if no TX = 6
		activate additional circuit = 7
	3^{rd} digit	SQL-LED does not flash, no ring tone = 0
		SQL-LED does not flash, ring tone = 1
		SQL-LED flashes, no ring tone = 2
		SQL-LED flashes, ring tone = 3
051	1^{st} - 3^{rd} digit	Time limit for transmission (nnn * 1 s)
055		Configuration of forerun / overrun
	1^{st} - 2^{nd} digit	nn * 10 ms forerun time before tone sequence / FMS
	3^{rd} - 4^{th} digit	nn * 10 ms overrun time after tone sequence / FMS
	5^{th} - 6^{th} digit	nn * 10 ms time of advance PTT keying without AF
		(may be no larger than 1^{st} - 2^{nd} digit)
080		Reference for tone sequence decoder 1
	1^{st} - 3^{rd} digit	max. duration of 1^{st} tone = nnn * 5 ms
	4^{th} - 5^{th} digit	min. duration for all tones = nn * 5 ms
081		Reference for tone sequence decoder 2
	1^{st} - 3^{rd} digit	max. tone duration beginning with 2^{nd} tone = nnn * 5 ms
	5^{th} digit	tone call system : ZVEI = 0
		CCIR = 1
		ZVEI2 = 2
		EEA = 3
		ZVEI3 = 4

Register		Function
082		Reference for tone sequence encoder
	1st - 2nd digit	duration of 1st tone = nn * 10 ms
	3rd digit	duration of other tones = n * 10 ms
	4th - 5th digit	pause between call and ID-code = nn * 10 ms
083		Reference for group call decoder circuit 1
084		Reference for group call decoder circuit 2
085		Reference for group call decoder circuit 3
086		Reference for group call decoder circuit 4
	1st - 2nd digit	min. tone duration for single tone decoder = nn * 100 ms
	3rd - 4th digit	max. tone duration for single tone decoder = nn * 100 ms (00 = decode as soon as min. duration is reached)
	5th - 6th digit	min. tone duration for special tone decoder (Ruf 1 / 2) = nn * 100ms
	7th - 8th digit	max. tone duration for special tone decoder (Ruf 1 / 2) = nn * 100ms (00 = decode as soon as min. duration is reached)
089		Tone recognition
	4th - 8th digit	min. level for tone recognition from circuit 1 - 4 (0 - 32768)
210		noise suppression (AF mute) circuit 1
211		noise suppression (AF mute) circuit 2
212		noise suppression (AF mute) circuit 3
213		noise suppression (AF mute) circuit 4
	1st - 2nd digit	threshold value for activation of AF mute = nn * 0.9 mV
	3rd - 4th digit	threshold value for deactivation of AF mute = nn * 0.9 mV
214		AF squelch configuration circuit 1
215		AF squelch configuration circuit 2
216		AF squelch configuration circuit 3
217		AF squelch configuration circuit 4
	1st - 2nd digit	nn * 5 ms above threshold value until SQL
	3rd - 4th digit	threshold value (AF present) = approx. nn * 1.8 mV
	5th - 6th digit	nn * 5 ms below threshold value until SQL is gone
	7th - 8th digit	threshold value (AF gone) = approx. nn * 1,8 mV
220		Output level radio AF -> LS
221		Output level poti test tone -> LS
222		Output level call -> LS
223		Output level ringtone -> LS
230		Output level radio AF -> earpiece / headset
231		Output level poti test tone -> earpiece / headset
232		Output level call -> earpiece / headset
233		Output level ringtone -> earpiece / headset
240		Output level radio AF -> tape
241		Output level poti test tone -> tape
242		Output level call -> tape
243		Output level ringtone -> tape
250		Output level radio AF -> radio
251		Output level poti test tone -> radio
252		Output level call -> radio
253		Output level ringtone -> radio
	4th - 8th digit	00000 = off - 32768 = maximum

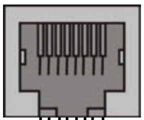
Register		Function
260		Input level adjustment and min. volume for circuit 1
261		Input level adjustment and min. volume for circuit 2
262		Input level adjustment and min. volume for circuit 3
263		Input level adjustment and min. volume for circuit 4
	1^{st} - 3^{rd} digit	input level -6,0 dB (000) ... 0dB (060) ... +19,5 dB (255)
	4^{th} - 8^{th} digit	min. volume level (00000 - 32768)
264	4^{th} - 8^{th} digit	Min. overall volume level (00000 - 32768)
270		TETRA function for circuit 1
271		TETRA function for circuit 2
272		TETRA function for circuit 3
273		TETRA function for circuit 4
	1^{st} digit	0 = if SH-PTT is keyed and handpiece is taken off, the LS status depends on register 016/2 1 = if SH-PTT is keyed and handpiece is taken off, the LS is always active
	4^{th} - 8^{th} digit	max. volume for SH-PTT: 00000 (LS aus) to 32767 (max. volume) Here, the listening volume for the circuit is set, the total volume depends on the overall volume settings

Sockets Pinout

ST14 ST5 ST6 ST11 ST10 ST4 ST3 ST2 ST1

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

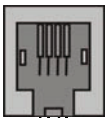
Pinout FK 1-4 (radio circuits)
ST1 - 4



RX-AF input (earpiece +)	1
RX-AF input (earpiece –)	2
squelch input (carrier)	3
GND (ground)	4
busy-line (**do not connect to radio!**)	5
PTT output (open collector **max. 100mA to +12V**)	6
TX-AF output (mod. +)	7
TX-AF output (mod. –)	8

AF in/outputs are equipped with transformers and thus potential-free.

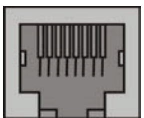
Pinout TB (Tape)
ST5



tape switch contact	1
tape switch contact	2
AF output A (mod. +)	3
AF output B (mod. –)	4

AF output A-B is equipped with a transformer and thus potential-free.
The switch contact of the tape is an electronic relay output.

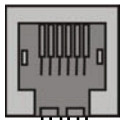
Pinout RS 232
ST6



TXD (RS232)	1
RXD (RS232)	2
GND	3
PTT keying input ext.signalling device (PTT3, to GND)	4
free	5
free	6
AF input ext. sign. device **Ext_NF** (mod +)	7
AF input ext. sign. device **Ext_NF** (mod –)	8

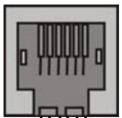
There are two sockets intended for headset use. The headset itself is connected to ST10. An ext. PTT switch (e.g. foot switch) can be connected to ST11.

Pinout Headset ST10



PTT keying input HS	(PTT2, to GND)	1
AF input HS	(microphone +)	2
AF output HS	(earpiece +)	3
GND AF output HS	(earpiece –)	4
GND AF input HS	(microphone –)	5
GND	(PTT2-GND)	6

Pinout PTT (headset switching)
ST11

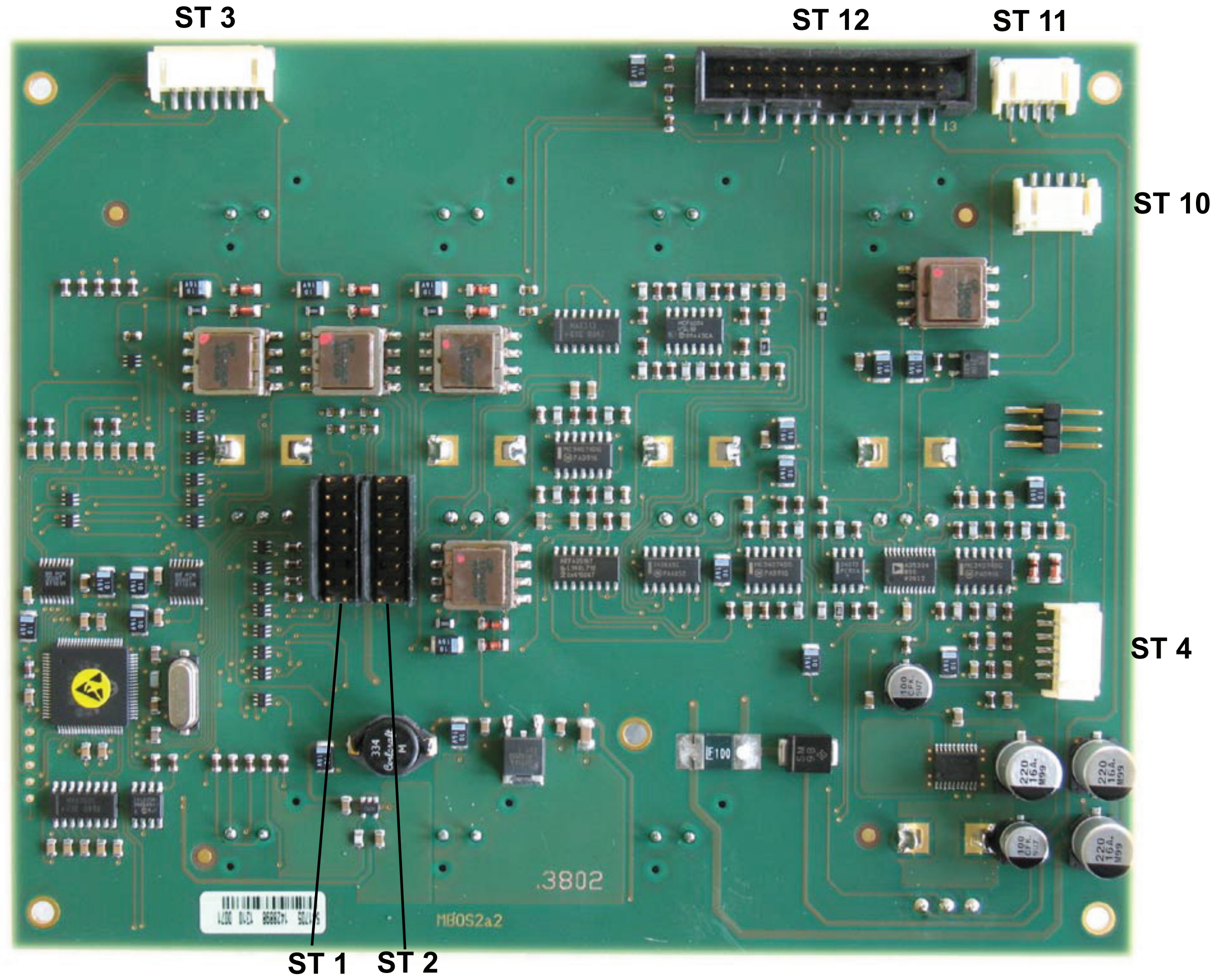


PTT keying input, HS (PTT2, to GND)	1
+battery output power supply voltage for headset adapter	2
control line for headset adapter	3
optocoupler input (anode +)	4
optocoupler input (cathode –)	5
GND (PTT2-GND)	6

Pinout Power
ST14

12V-DC, max 1.5 A,
inside: positive pole, outside: GND

Layout - Main Board



Socket ST1, ST2, ST10, ST12 --> Connection Board

Socket ST5 to ST8 --> option for UGA modules

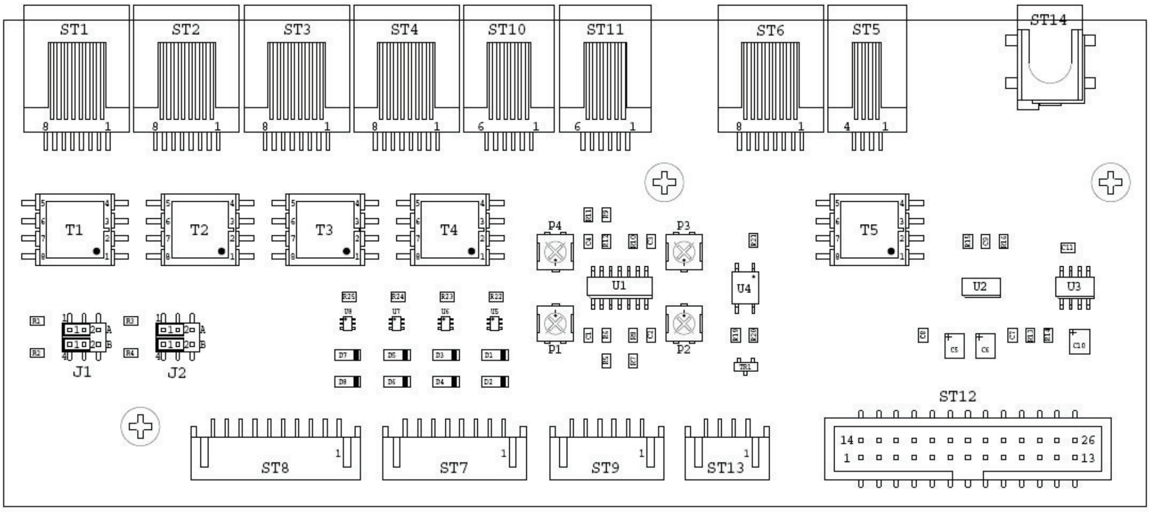
ST	5	UGA module radio circuit 4
ST	6	UGA module radio circuit 3
ST	7	UGA module radio circuit 2
ST	8	UGA module radio circuit 1

Stecker ST3 --> display
Stecker ST4 --> handset
Stecker ST9 --> gooseneck microphone

Stecker ST11 --> hook and loudspeaker

pin	1	tuning fork contact (hook)
pin	2	GND
pin	3	AF output loudspeaker
pin	4	GND

Layout - Connection Board



Jumpers and Potentiometers

Jumper	Position	Function
J1A	1-2	RX-AF input circuit 1 is **600ohm/20kohm** (1 / 2)
J1B	4-5	RX-AF input circuit 2 is **600ohm/20kohm** (1 / 2)
J2A	1-2	RX-AF input circuit 3 is **600ohm/20kohm** (1 / 2)
J2B	4-5	RX-AF input circuit 4 is **600ohm/20kohm** (1 / 2)

Poti	Function/Level
P1	RX-AF circuit 1
P2	RX-AF circuit 2
P3	RX-AF circuit 3
P4	RX-AF circuit 4

Connection Cable to PC (RS232, Ord.No: 635090)

ST6	Function	9pin COM at PC
1	TxD	2
2	RxD	3
3	GND	5

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
GERMANY

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

February 2nd , 2006

Subject to change, Errors excepted

Order Information

Order No.	Description
631020	Major BOS 2b
635090	Programming cable for RS232
900011	Puwer supply unit for Major BOS 1a, 2b, 4a, 8a

Release Notes

06.09.12 - German version of Major BOS 2b2 manual translated into English.

13.03.14 - Order Information (RS232 cable) added