ROHDE&SCHWARZ

Radio Communications Systems
Division

Operator Manual

VLF - HF RECEIVERS

EK 895

6057.8996.07

Software Version 3.xx

EK 896

6038.2509.17

Software Version 3.xx

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List of Abbreviations

A = address
A + D = automatic and digital gain control
A + M = automatic and manual gain control
ACT (actual) = BYPASS signal depends on scanning status
ADR = address
AF = audio frequency
AFSK = audio frequency shift keying, F1B
AGC = automatic gain control
AM = amplitude modulation, A3E
ASCII = American Standard Code for Information Interchange

B8D = amplitude modulation (LL, LU, LIL, LIU)
BCD = binary coded decimal
BFO = beat-frequency oscillator
BI = BIT status
BIT = built-in test
BW = bandwidth
BYP (bypass) = switching digital selection on or off

C = CM status
CH = channel
CHM = channel manipulation
CHP = channel program (channel scanning with freely programmable channel list
CHS = channel sequence (channel scanning with rising channel sequence)
CL = clear (clearing, disabling a channel)
CLa = clear all (clearing all channels)
CLCH = clear channel (clearing a particular channel)
CLR = clear
CM = continuous monitoring
CONT = continuous
CONV = converter
CR = carriage return (ASCII character)
CTRL = control
CW = continuous wave (Morse telegraphy, A1A)

DEF = default value
DEZ = decimal
DGC = digital gain control
DIG = digital

ENT = enter (completing the entry of numerals)
ERR = error status
F = frequency
F7B = diplex telegraphy
FAX = facsimile, F1C and F3C
FIB = filter bandwiths (IF)
FM = frequency modulation, F3E
FREQ = frequency
FRQ = frequency
FSK = frequency shift keying, F1B

HF = high frequency

I = modulation mode
IF = intermediate frequency
ILSB = ISB LSB, independent sideband (two independent sidebands, monitoring on lower sideband, B8E
IND = indicator (switchover level / tuning indication)
INTF = interface
ISB = independent sideband (two independent sidebands)
IUSB = ISB USB, independent sideband (two independent sidebands, monitoring on upper sideband, B8E

K = channel manipulations
Ks = activating a channel

L = receive level
L ISB LSB = LSB and USB signal, monitoring on lower sideband, B8D
L ISB USB = LSB and USB signal, monitoring on upper sideband, B8D
L LSB = LSB signal, monitoring on lower sideband, B8D
L USB = USB signal, monitoring on upper sideband, B8D
LCD = liquid-crystal display
LED = light-emitting diode
LEV = level line
LF = line feed (ASCII character)
LIL = data link ISB LSB (LSB and USB signal, monitoring on lower sideband, B8D)
LIU = data link ISB USB (LSB and USB signal, monitoring on upper sideband, B8D)
LL = data link LSB (LSB signal, monitoring on lower sideband, B8D)
LSB = lower sideband
LOC = local (receiver is locally controlled)
LU = data link USB (USB signal, monitoring on upper sideband, B8D)

M = mode (operating status)
M / S = master / slave operation
ME + = memory (storage into buffer)

ME- = memory (activating the buffer contents)
MEM = memory manipulation
MGC = manual gain control
MCU = microcontroller unit
MOD = modulation

NB = noise blanker
NF = notch filter
NTCH = notch filter

OP = option
OPT = option

P = level line status
PA = preamplifier
PAMP = preamplifier
PBT = passband tuning
PC = Personal Computer
PL = level line
PREAMP = preamplifier
PRO = programming (of scanning)
PROC = processor

RAM = random access memory
REM = remote (receiver is remotely controlled)
RF = radio frequency
RS = reactivating a channel

SA = signal BYPASS
SCA = scanning commands
SE = switching digital selection on or off
SER = serial interface
SHFT = shift (frequency offset)
SIG = signal BYPASS
SPEC = special functions
SQ = syllable squelch
ST = store
STCH = store channel (storing current operation settings in a particular channel)
STO = store (storing current operation settings in the next free channel with the lowest channel number)
SYNTH = synthesizer
SYS = system functions

THLD = threshold (digital threshold)
TTY = teletype

USB = upper sideband

V = version (software version)
VAR = variable stepwidth
VERS = version (software version)
VLF = very low frequency

ΔF = frequency offset

User Information

Purpose of the Manual

This Manual provides all information the operator needs for data link operation with VLF-HF Receivers EK 895 and EK 896.

All functions and commands marked with a crossreference to the User Manual 6045.6712.12.xx are possible in data link operation; however, they are not essential for the actual data link operation.

Not included in this Manual are the necessary information and instructions concerning the installation, putting into operation and control of the unit, and troubleshooting instructions down to module level. For this the User Manual 6045.6712.12.xx is required which is supplied as an accessory.

Definitions

BIT	In the BIT (built-in test) it is checked whether all modules of the basic unit are installed and operative. If required, error messages are output which may also inform on the operating status of the installed options. In addition, the Tx and Rx paths are checked. The BIT is initiated either through switch-on or on purpose during operation by pressing softkey BIT in the MAIN menu.
CM	In CM (continuous monitoring) all important equipment functions are permanently monitored. This check is automatic. Error messages are output following which the operator can initiate the BIT to localize the fault.

Operator Manual

VLF - HF RECEIVERS
EK 895 EK 896

Operation

Control Unit 'LOCAL' (EK 895) = Option 'Control Unit GB 890' or Control Unit (EK 896), Control Unit 'REMOTE' (EK 895), Control and Display Elements

Remote Control

Operating Modes, Basic Settings, Special Functions, System Functions, List of Commands

List of Contents

1. Operation

List of Figures

1. Operation

1.1 Control Unit 2 "LOCAL" (EK 895, = Option 'Control Unit GB 890') or Control Unit (EK 896)

(see Fig. 1.1 for EK 896 or Fig. 1.2 for EK 895)

1.1.1 General

Note:

In the text which follows only data link-relevant functions are described. All other functions are dealt with in the User Manual (6045.6712.12.xx).

Local control is carried out via

- Keys with a fix function (hardkeys),
- Multi-functional keys (softkeys),
- Switches,
- Controls and a
- Tuning knob.

All essential receiver settings can be entered directly:

- Frequency
- Channel
- Modulation mode

The technical data stated in the data sheet are guaranteed for frequencies as of 10 kHz.

For entries via the numeric keypad the following should be observed:

- Entries can be corrected at any time by actuation of key CLR.
- Entry of leading zeros is not required (0.04 = .04).
- Entry of zeros following the decimal point is not required (1 = 1.000).
- Complete entries are to be terminated by actuating key ENT or softkey ENT or NEXT.
- Entries outside the permitted entry range will not be accepted.
- If within approx. 2 s no entry is made for frequency or channel, the initial indication will be displayed again.

For EK 895 only:

The softkeys obtain their different functions either by selection from the menu (software) or via previous actuation of the ENT key (separate functions menu 1).

The LEDs assigned to keys FRQ and CH indicate which function the tuning knob and the numeric keypad currently have an effect upon. If the LED assigned to key FRQ is illuminated, the stepwidth of the tuning knob can be altered by means of the cursor control keys (→ and ←).

Once the maximum or minimum value is reached, turning the tuning knob further will have no effect on the indication (this does not apply to the channel number!).

For EK 896 only:

The softkeys obtain their different functions either by selection from the menu (software) or via key MENU 1 (separate functions menu 2).

The LEDs assigned to keys FRQ and CH indicate which function the tuning knob and the numeric keypad currently have an effect upon.

If the LED assigned to key FRQ is illuminated, the stepwidth of the tuning knob can be altered by means of the cursor control keys (→ and ←).

Once the minimum or maximum value is reached, turning the tuning knob further will have no effect on the frequency indication.

The key MORE only obtains a function if on the right-hand side on the display the character '>' appears.

Note:

The individual functions are called up via the main menu.

A description of how the operator gets from the individual sublevels back to the main menu is not provided. Unrestricted control of the receiver is still possible with a particular function being called up. If required, the main menu can be called up again by pressing the key MENU several times.

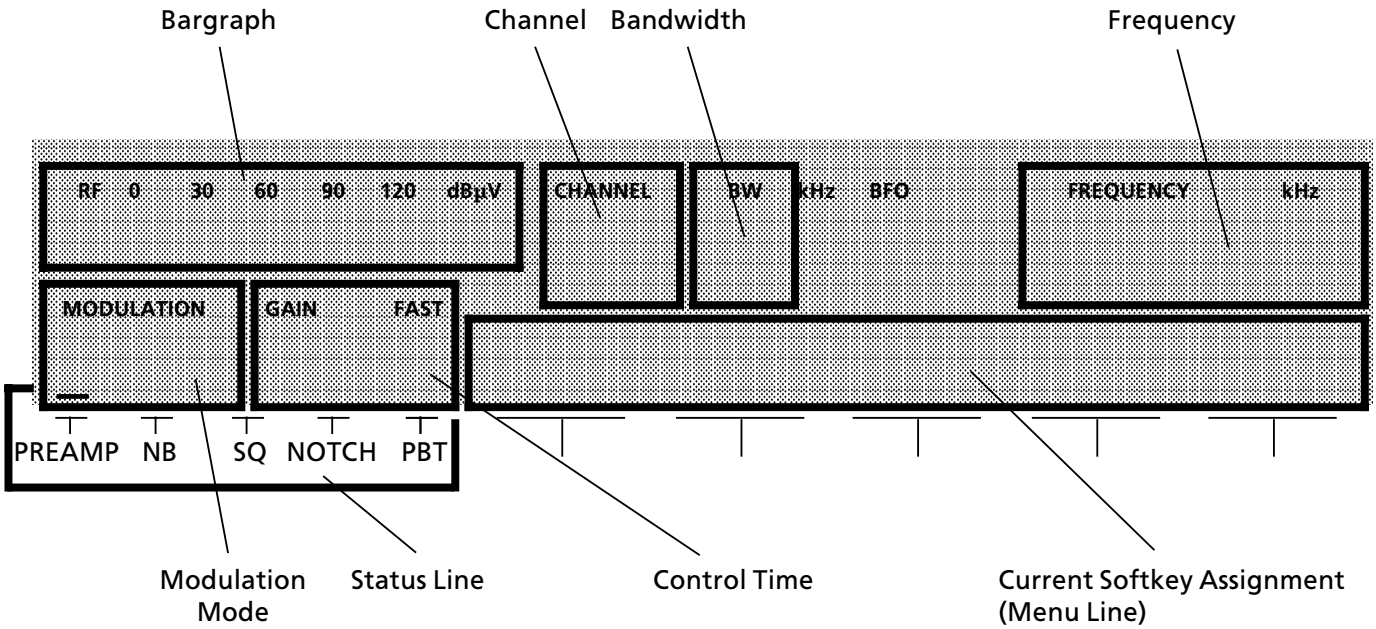
1.1.2 Display

In all operating modes the following receiver settings are continuously displayed:

- Receive level indicated by the bargraph with a resolution of 5 dBµV,
- Frequency with a resolution of 1 Hz
- Bandwidth: 3.1 kHz only
- Channel
- Status for preamplifier (PREAMP)

Except for entries, e.g. of a frequency, the following receiver settings are additionally indicated:

- Modulation mode
- Control time: FAST only
- Current softkey assignment (menu line)



1.1.3 Operating Modes

The receiver can be operated in the following two operating modes:

- MANUAL
- CHANNEL
  - FIXED CHANNEL

1.1.3.1 MANUAL

In the operating mode MANUAL no channel is set. In manual operation the following manipulations are possible:

- Entry or modification of frequency
- Selection of modulation mode
- Selection of special function
- Selection of system function
- Selection of separate function
- Storage into a channel
- Clearing a channel

In the MANUAL mode the different software levels may be called up without affecting the receive operation.

For all manipulations with the exception of system reset, store and clear, the stored channel contents remain unchanged.

Complete receiver settings, consisting of frequency and modulation mode, can be stored in a single channel.

1.1.3.2 CHANNEL

In the operating mode CHANNEL there is a channel set. In channel operation, the following manipulations are possible:

- Channel call-up and scanning
- Editing the channel data

As soon as one of the basic settings (frequency or modulation mode) is altered, the receiver is automatically in the operating mode MANUAL (see 1.1.3.1). That is, no channel will be indicated.

Cleared (inhibited) channels cannot be called up.

Only those channels are permitted to be called up where one of the following modulation modes is stored:

LL LU LIL LIU

1.1.3.2.1 FIXED CHANNEL

In the operating mode FIXED CHANNEL it is possible to call up only those channels which were previously stored. All other operating functions are blocked. However, this does not apply to remote operation.

The operating mode FIXED CHANNEL can only be activated and deactivated by entering a password.

1.1.4 Software

(see Fig. 1.4 for EK 895 or Fig. 1.5 for EK 896)

The software offers various individual menus which are arranged on different levels (1 to 6).

By softkey actuation, the operator moves from the highest to the lowest level. In order to move from a lower to the next higher level, only the key MENU must be pressed.

On the first level there are the following menus:

EK 895

- Main menu

EK 896

- Main menu *

The actuation of key MORE or one of the softkeys calls up the second level.

On the second level there are the following menus:

EK 895

- Main menu 2
- Mod. mode menu [1)]
- Mod. mode menu 2 [1)]
- Mod. mode menu 3 [1)]
- Mod. mode menu 4 [1)]
- **Mod. mode menu 5**
- Control type menu [1)]
- Control time menu [1)]
- Bandwidth selection menu [1)]
- Scanning menu [1)]

EK 896

- Mod. mode menu 2* [1)]
- Mod. mode menu 3* [1)]
- Mod. mode menu 4* [1)]
- **Mod. mode menu 5***
- Channel editor menu *
- Storage menu
- System functions menu *
- Special functions menu
- Scanning menu [1)]

The actuation of one of the softkeys calls up the third level.

The first level is automatically reached again by pressing key MENU.

On the third level there are the following menus:

EK 895

- Demodulation parameter menu [1)]
- Programming menu [1)]
- Master / slave menu [1)]
- System functions menu
- Special functions menu
- Channel editor menu
- Storage menu

EK 896

- Demodulation parameter menu [1)]
- Programming menu [1)]
- CHM:
  - Mod. mode menu 2 * [1)]
  - Mod. mode menu 3 * [1)]
  - Mod. mode menu 4 * [1)]
  - **Mod. mode menu 5 ***
- System functions menu 2
- Signal BYPASS menu
- IF menu
- Tuning knob menu
- Level line menu
- LOCAL / REMOTE menu
- Default value menu [1)]

The actuation of one of the softkeys calls up the fourth level.

The first level is automatically reached again by pressing key MENU twice.

On the fourth level there are the following menus:

EK 895

- Freq. deviation menu [1)]
- Baud rate menu [1)]
- TTY status menu [1)]
- System functions menu 2
- Signal BYPASS menu
- IF menu
- Tuning knob menu
- Level line menu
- LOCAL / REMOTE menu
- Default value menu [1)]
- CHM:
  - Modulation mode menu [1)]
  - Modulation mode menu 2 [1)]
  - Modulation mode menu 3 [1)]
  - Modulation mode menu 4 [1)]
  - **Modulation mode menu 5**
  - Control type menu [1)]
  - Control time menu [1)]
  - Bandwidth selection menu [1)]

EK 896

- Freq. deviation menu [1)]
- Baud rate menu [1)]
- TTY status menu [1)]
- LOC / fixed-channel menu
- Control type menu
- Frequency type menu
- CHM:
  - Demodulation parameter menu [1)]

The actuation of one of the softkeys calls up the fifth level.

The first level is automatically reached again by pressing key MENU three times.

On the fifth level there are the following menus:

EK 895

- LOC / fixed-channel menu
- Control type menu
- Frequency type menu

EK 896

- CHM:
  - Frequency deviation menu [1)]
  - Baud rate menu [1)]
  - TTY status menu [1)]

The actuation of one of the softkeys calls up the sixth level.

The first level is automatically reached again by pressing key MENU four times.

On the sixth level there are the following menus:

EK 895

- CHM:
  - Demodulation parameter menu [1)]
  - Frequency deviation menu [1)]
  - Baud rate menu [1)]
  - TTY status menu [1)]

EK 896

The first level is automatically reached again by pressing key MENU five times.

* With these menus of EK 896 the character '>' appears on the right-hand side on the display to indicate that the MORE key is now activated.

[1)] These menu functions must not be activated in data link operation, since they are ignored in this application or data link operation is terminated automatically.

1.1.5 Switching On

(see also User Manual 6045.6712.12.xx)

Actuate switch POWER.

Through receiver switch-on the primary circuit is closed. The LED POWER is illuminated to indicate that the power supply is working perfectly (→ CM display).

After switch-on the RAM contents are automatically checked (→ initialization). Unpermitted settings are overwritten with a default value. If overwriting with a default value takes place in a channel, this channel is additionally inhibited.

In the operating modes CHANNEL and FIXED CHANNEL call-up of inhibited channels is not possible. Via the channel editing menu, inhibited channels can be reactivated. In the case that inhibited channels are called up in the channel editing menu, the display UNUSED appears.

Following initialization the LCD illumination is switched on.

In the LED test the function of LEDs FRQ, BFO, CH and NOTCH / PBT is checked.

In the LCD test all segments are switched on for approx. 2 s and then switched off again. This allows a visual check of the LCD.

In the built-in equipment test (BIT) it is first checked whether the modules synthesizer, HF unit and IF / AF processor are installed.

Subsequently a 100-kHz test signal is fed into the receive path instead of the antenna signal, and the receiver is set to a receive frequency of 100 kHz.

The processor evaluates the BIT messages (BIT criterion) from the HF unit as well as the CM messages from the synthesizer and the IF / AF processor.

As soon as one of the following messages is displayed, carry out troubleshooting acc. to 4.2 (see User Manual (6045.6712.12.xx).

- RF UNIT MISSING
- IF / AF MISSING
- SYNTH MISSING
- RF UNIT NOGO
- IF / AF NOGO
- SYNTH NOGO
- PROC UNIT NOGO
- IF CONV NOGO

If the message BIT FAILED appears, actuate key MENU and switch receiver over to local operation acc. to 3.1.19.7 (see User Manual (6045.6712.12.xx). Switch receiver off and on again.

Once the BIT is terminated successfully, the last receiver setting is reactivated and the main menu is displayed. In the FIXED CHANNEL mode the display CHANNEL MODE EXIT is indicated instead of the main menu.

1.1.6 Switching Off

Actuate switch POWER.

1.1.7 Frequency

If the LED assigned to key FRQ is illuminated, the frequency can be altered by means of the tuning knob or via the numeric keypad. The currently effective frequency is indicated in the frequency field.

Shifting the cursor by means of the cursor control keys alters the stepwidth of the tuning knob.

Cursor position	Stepwidth
12345.678	freely programmable (1 Hz to 1000 kHz)
12345.67<u>8</u>	0.001
12345.6<u>7</u>8	0.01
12345.<u>6</u>78	0.1
1234<u>5</u>.678	1
123<u>4</u>5.678	10
12<u>3</u>45.678	100
1<u>2</u>345.678	1000

1.1.7.1 Entering a Frequency

If the LED FRQ is not illuminated, actuate key FRQ. Upon actuation of key FRQ the following display appears:

FREQUENCY _ KHZ

The flashing cursor (_) indicates that an entry is expected. Enter new frequency via the numeric keypad.

Range of entry: . . . . . 0 Hz to 30.000 MHz
Resolution: . . . . . 1 Hz
Entry: . . . . . in kHz

1.1.7.2 Altering the Frequency with the Tuning Knob

If the LED FRQ is not illuminated, actuate key FRQ. Upon actuation of key FRQ the following display appears:

FREQUENCY _ KHZ

In order to increase the frequency (≤ 30 MHz) turn tuning knob clockwise.

In order to decrease the frequency (≥ 0) turn tuning knob counter-clockwise.

1.1.7.3 Altering the Tuning Knob Stepwidth with the Cursor Control Keys

If the LED FRQ is not illuminated, actuate key FRQ. Upon actuation of key FRQ it appears the following display:

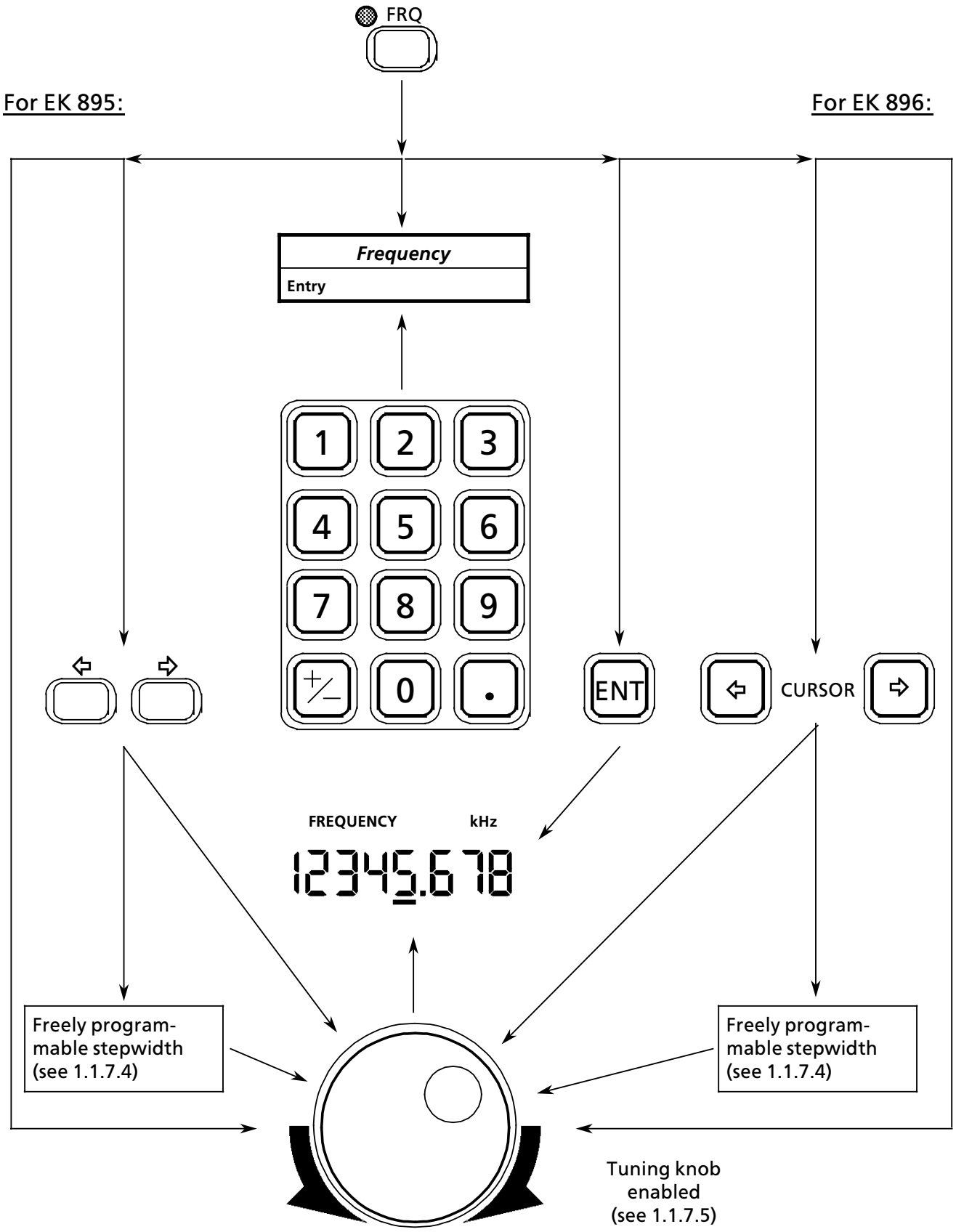
FREQUENCY _ KHZ

In order to reduce the stepwidth (≥ 0.001) actuate key → (EK 895) or CURSOR → (EK 896).

In order to activate the freely programmed stepwidth (see 1.1.7.4) actuate key → (EK 895) or key CURSOR → (EK 896) several times, as necessary, until the cursor is no longer indicated.

In order to increase the stepwidth (≤ 1000) actuate key ← (EK 895) or key CURSOR ← (EK 896).

Once the minimum or maximum value is reached, the display does not change any more when actuating key ← (EK 895) or key CURSOR ← (EK 896) respectively.


FRQ
For EK 895:
For EK 896:
Frequency
Entry
1
2
3
4
5
6
7
8
9
+/−
0
.
ENT
CURSOR
FREQUENCY
kHz
12345.678
Freely program-
mable stepwidth
(see 1.1.7.4)
Freely program-
mable stepwidth
(see 1.1.7.4)
Tuning knob
enabled
(see 1.1.7.5)

1.1.7.4 Entering the Tuning Knob Stepwidth

Upon actuation of softkeys MORE and SPEC (EK 895) or of key MORE (EK 896) as well as softkeys KNOB and STEP the following display appears:

VAR STEP xxxx _KHZ ENT

(xxxx = last stored stepdwidth)

The flashing cursor (_) indicates that an entry is being expected. Enter new stepdwidth via the numeric keypad.

Range of entry: . . . . . 1 Hz to 1000 kHz
Resolution: . . . . . 1 Hz

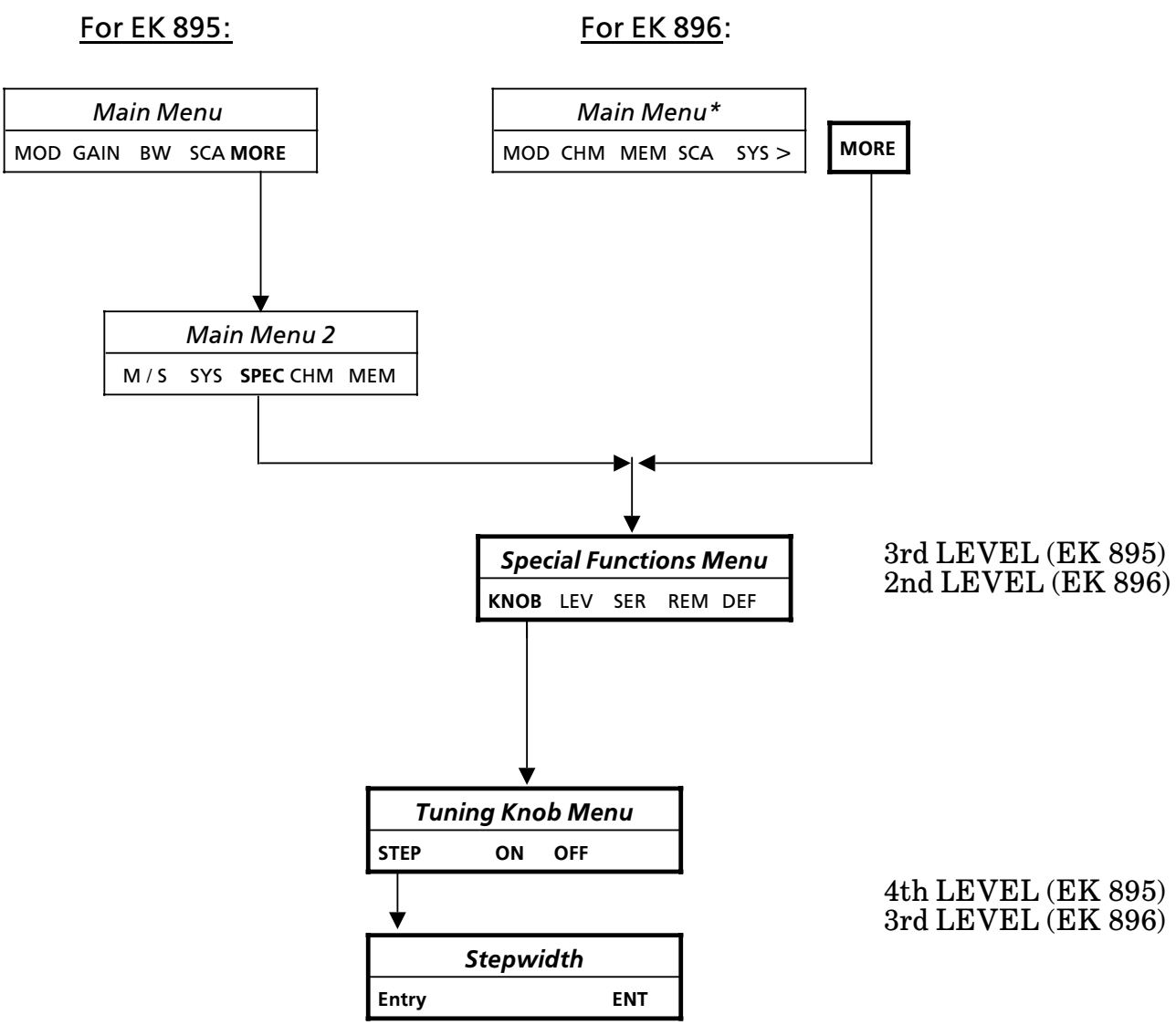
The programmed stepwidth for the tuning knob takes effect as soon as, in the FREQUENCY mode, the cursor is shifted to the right-hand side and out of the frequency field by using the cursor control keys.

1.1.7.5 Enabling the Tuning Knob

Actuate softkeys MORE and SPEC (EK 895) or key MORE (EK 896) as well as softkeys KNOB and ON. In the display now ON is underlined.

1.1.7.6 Disabling the Tuning Knob

Actuate softkeys MORE and SPEC (EK 895) or key MORE (EK 896) as well as softkeys KNOB and OFF. In the display now OFF is underlined.


For EK 895:
For EK 896:
Main Menu
MOD GAIN BW SCA MORE
Main Menu*
MOD CHM MEM SCA SYS >
MORE
Main Menu 2
M / S SYS SPEC CHM MEM
Special Functions Menu
KNOB LEV SER REM DEF
3rd LEVEL (EK 895)
2nd LEVEL (EK 896)
Tuning Knob Menu
STEP ON OFF
4th LEVEL (EK 895)
3rd LEVEL (EK 896)
Stepwidth
Entry ENT

1.1.8 Modulation Mode

The modulation mode can be selected by softkey actuation in the modulation menu. The currently effective modulation mode is indicated in the modulation mode field.

The following modulation modes are available:

- LL (B8D, amplitude modulation, monitoring sideband = lower sideband, no USB signal)
- LU (B8D, amplitude modulation, monitoring sideband = upper sideband, no LSB signal)
- LIL (B8D, amplitude modulation, monitoring sideband = lower sideband, LSB and USB signal)
- LIU (B8D, amplitude modulation, monitoring sideband = upper sideband, LSB and USB signal)

For EK 895:

Upon actuation of softkeys MOD, MORE, MORE, MORE and MORE, the modulation mode menu 5 is called up. By actuation of

softkey LL or
softkey LU or
softkey LIL or
softkey LIU

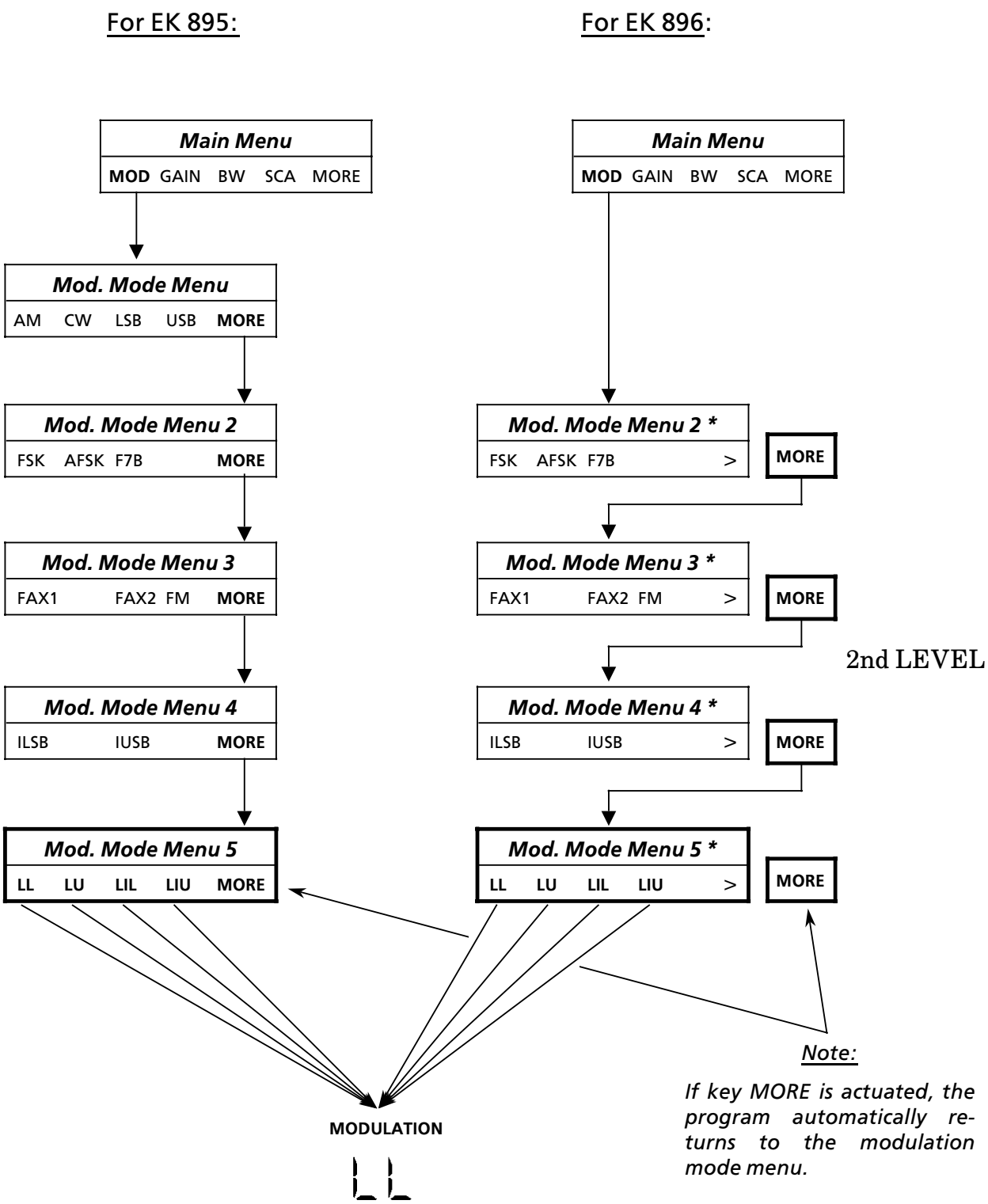
the respective modulation mode is set.

For EK 896:

Upon actuation of softkeys MOD, MORE, MORE and MORE, the modulation mode menu 5* is called up. By actuation of

softkey LL or
softkey LU or
softkey LIL or
softkey LIU

the respective modulation mode is set.


For EK 895:
For EK 896:
Main Menu
MOD GAIN BW SCA MORE
Mod. Mode Menu
AM CW LSB USB MORE
Mod. Mode Menu 2
FSK AFSK F7B MORE
Mod. Mode Menu 3
FAX1 FAX2 FM MORE
Mod. Mode Menu 4
ILSB IUSB MORE
Mod. Mode Menu 5
LL LU LIL LIU MORE
Mod. Mode Menu 2 *
FSK AFSK F7B >
MORE
Mod. Mode Menu 3 *
FAX1 FAX2 FM >
MORE
2nd LEVEL
Mod. Mode Menu 4 *
ILSB IUSB >
MORE
Mod. Mode Menu 5 *
LL LU LIL LIU >
MORE
MODULATION
LL
Note:
If key MORE is actuated, the program automatically returns to the modulation mode menu.

1.1.9 Channel

If the LED assigned to the key CH is illuminated, each channel stored and not cleared (inhibited) can be called up via the tuning knob or the numeric keypad.

The currently effective channel is indicated in the channel field.

Only those channels are permitted to be called up where one of the following modulation modes is stored:

LL LU LIL LIU

1.1.9.1 Calling Up a Channel

If the LED is not illuminated, actuate key CH. Upon actuation of key CH the following display appears:

CHANNEL _

The flashing cursor (_) indicates that an entry is expected.

Enter the new channel number via the numeric keypad.

Range of entry: . . . . . 0 to 999

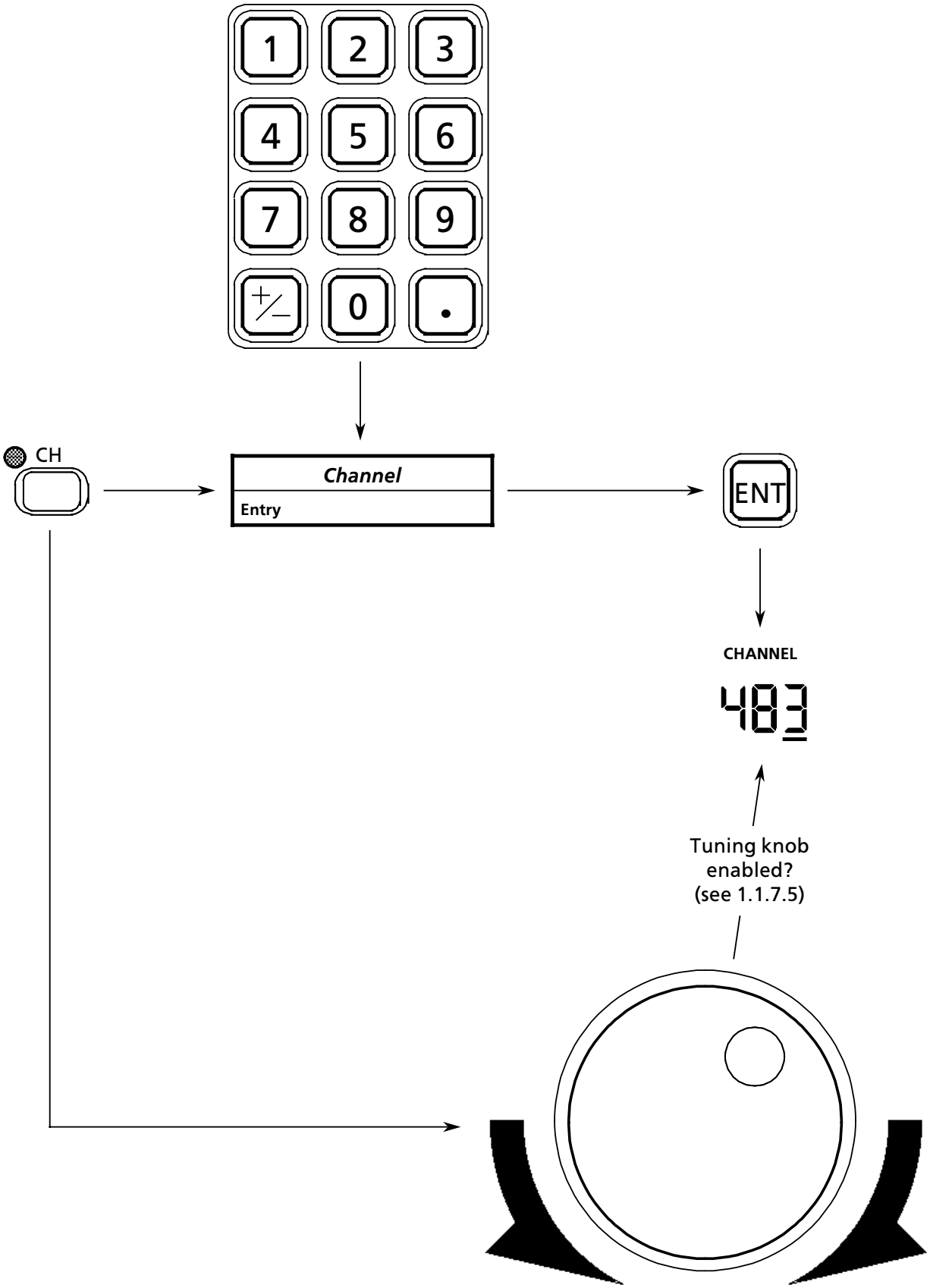
1.1.9.2 Channel Scanning by Using the Tuning Knob

If the LED is not illuminated, actuate key CH. Upon actuation of key CH it appears the following display:

CHANNEL _

In order to call up the next higher channel number (≤ 999) turn the tuning knob clockwise.

In order to call up the next lower channel number (≥ 0) turn the tuning knob counterclockwise.


1
2
3
4
5
6
7
8
9
+/-
0
.
CH
Channel
Entry
ENT
CHANNEL
483
Tuning knob
enabled?
(see 1.1.7.5)

1.1.10 Separate Functions 1

By actuating the key ENT the separate functions menu 1 is called up. The menu offers the following functions:

- IND [1)]
- PAMP (switch preamplifier on or off)
- NB [1)]
- SQ [1)]
- NTCH [1)]

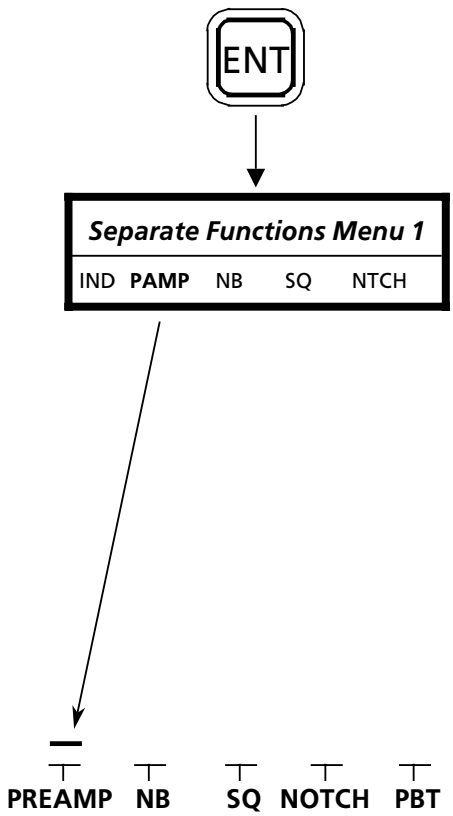
The currently effective status for the functions PAMP, NB, SQ and NTCH is displayed in the status line. Activation of a function is indicated by a black bar.

[1)] It is of no use trying to activate this function in data link operation since in this case the function will be ignored.

1.1.10.1 Switching the Preamplifier On or Off

By actuating key ENT and softkey PAMP the preamplifier is switched on or off.

Once the preamplifier is activated, a black bar will appear above PAMP in the status line.



1.1.11 Separate Functions 2 (EK 896)

By actuating key MENU 1 the separate functions menu 2 is called up. The menu offers the following functions:

- ME+ (storage into the buffer)
- ME- (activation of buffer contents)
- S / C [1)]
- BYP (activating or deactivating Digital Selection FK 896)

Note:

The function BYP is only displayed if the optional Digital Selection FK 896 is installed.

1) It is of no use trying to activate this function in data link operation since in this case the function will be ignored.

1.1.11.1 Storage into the Buffer

Actuate key MENU 1 and softkey ME+.

Now the entire receiver setting is stored in the buffer.

1.1.11.2 Calling up the Buffer Contents

Actuate key MENU 1 and softkey ME-.

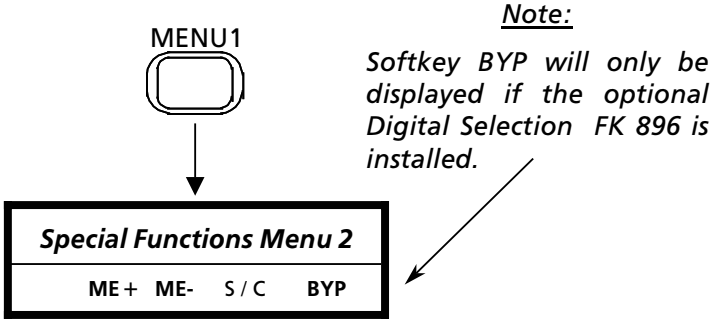
The receiver settings stored in the buffer are now activated.

1.1.11.3 Activating the Digital Selection FK 896 (Option)

By actuation of key MENU 1 and softkey BYP the Digital Selection FK 896 is activated. The HF signal is routed via the digital selection to the HF unit.

1.1.11.4 Deactivating the Digital Selection FK 896 (Option)

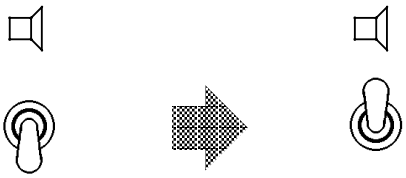
By actuation of key MENU 1 and softkey BYP the Digital Selection FK 896 is deactivated. The HF signal is routed directly to the HF unit. In the display now BYP is underlined.



1.1.12 Loudspeaker (EK 896)

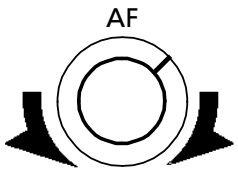
1.1.12.1 Switching the Loudspeaker On

Actuate switch as shown by the figure below.



1.1.12.2 Adjusting the Volume

When the toggle switch is in the upper position (see 1.1.12.1), it is possible to adjust the volume with the aid of the AF control.



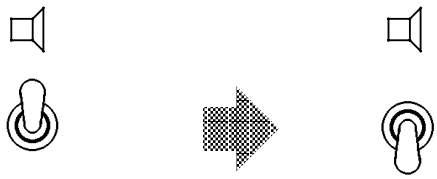
Here the direction of rotation signifies the following:

Control turned fully counter-clockwise: low volume

Control turned fully clockwise: high volume

1.1.12.3 Switching the Loudspeaker Off

Actuate switch as shown by the figure below.



1.2 Control Unit 1 "REMOTE" (EK 895)

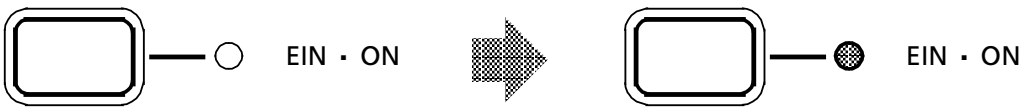
(see Fig. 1.2)

1.2.1 General

The VLF-HF Receiver EK 895 with control unit 1 'REMOTE' does not contain any control elements other than the power switch. Its control is carried out with the aid of a computer with control program, Control Unit GB 899 or another receiver (EK 895 with control unit 2 'LOCAL' or Control Unit GB 890, EK 896). In the event that there is no control program for the computer available or such a program is to be established, the remote control commands in compliance with Section 2 of this Operator Manual and Appendix A3 of the User Manual (6045.6712.12.xx) are required.

1.2.2 Switching On

Actuate switch ON.



→ LED ON is illuminated.
→ A POWER reset (LED test and BIT) is initiated.

LED Test

- HF-TEIL • RF UNIT
- ZF / NF PROZESSOR • IF / AF PROCESSOR
- SYNTHESIZER
- OPTION 1
- OPTION 2

→ All LEDs must be illuminated.

BIT

→ Module check

→ After the BIT none of the yellow LEDs is allowed to be illuminated.

- ○ HF-TEIL · RF UNIT
- ○ ZF / NF PROZESSOR · IF / AF PROCESSOR
- ○ SYNTHESIZER
- ○ OPTION 1
- ○ OPTION 2

→ NoGo message as result of the BIT

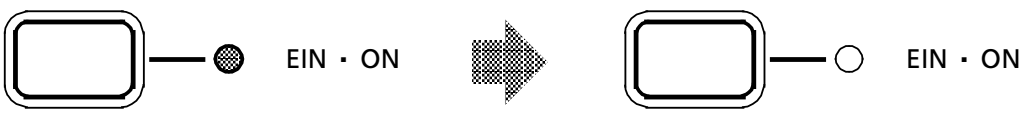
As soon as one of the LEDs RF UNIT, IF / AF PROCESSOR, SYNTHESIZER, OPTION 1 or OPTION 2 is illuminated, carry out troubleshooting acc. to 4.2 (see User Manual 6045.6712.12.xx).

Example: synthesizer defective

- ○ HF-TEIL · RF UNIT
- ○ ZF / NF PROZESSOR · IF / AF PROCESSOR
- ◍ SYNTHESIZER
- ○ OPTION 1
- ○ OPTION 2

1.2.3 Switching Off

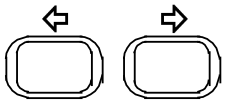
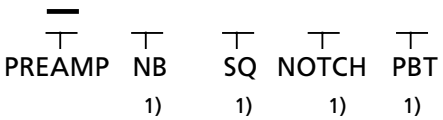
Actuate switch ON.



→ LED ON is dark.

1.3 Control and Display Elements of Control Unit 2 "LOCAL" (EK 895, = Option 'Control Unit GB 890') or Control Unit (EK 896)

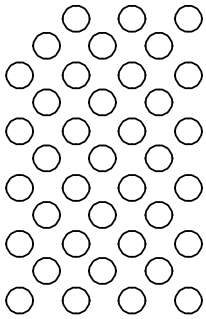
(see Fig. 1.1 for EK 896 or Fig. 1.2 for EK 895)

No.	Control or display element	Design	Description
1	EK 896:  EK 895: 	Two push-buttons with protective caps (10.5×10.5 mm) Two push-buttons with protective caps (6 × 10.5 mm)	If the LED assigned to key FRQ (32) is illuminated, the cursor (10) can be positioned by means of the cursor control keys within the frequency field (9) below any of the displayed figures. This does not apply to the 10-MHz place! In addition the cursor (10) can be shifted to the right and out of the frequency field (9), as a consequence the freely programmed stepwidth (see 1.1.7.3 and 1.1.7.4) for the tuning knob will become effective.
2	 		A black bar in the status line indicates that ● the preamplifier is active. If necessary, activate the PREAMP function via the separate functions menu 1 (see 1.1.10). 1) This display can be ignored since in data link operation the associated function is ignored, too.

No.	Control or display element	Design	Description
3	MODULATION LL	Modulation mode field consisting of the display MODULATION and three 14-segment display elements	In the modulation mode field the currently effective modulation mode (e.g. LL) is displayed. Possible displays: LL LU LIL LIU Via the modulation mode menu (see 1.1.8) the modulation mode can be altered.
4	RF 0 30 60 90 120 dBµV 	Bargraph consisting of 25 individual bars	The bargraph indicates the current receive level. Display range: 0 to 120 dBµV Resolution: 5 dB
5	GAIN FAST	Control type field consisting of the display GAIN SLOW FAST and three 14-segment display elements	In the control type field the control time FAST (= 25 ms) is displayed. In data link operation, the control time cannot be altered.
6	CHANNEL 483	Channel field consisting of the display CHANNEL and three 7-segment display elements	The channel number (e.g. 483) indicates the currently active channel. Display range: 0 to 999 The cursor (10) in the channel field indicates, that key CH (31) was actuated → operating mode CHANNEL (see 1.1.3.2) or FIXED CHANNEL (see 1.1.3.2.1). In the operating mode CHANNEL the tuning knob (34) and the numeric keypad (27) act upon the channel field. In the operating mode FIXED CHANNEL only the tuning knob (27) acts upon the channel field.

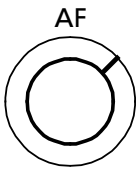
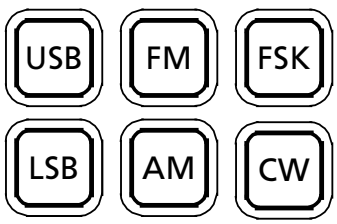
No.	Control or display element	Design	Description
6			--- continued When the channel number (e.g 483) is flashing, the function CHM (channel editing menu, see 3.1.16 in the User Manual 6045.6712.12.xx) was called up.
7	BW kHz 3.1	Bandwidth field consisting of the display BW kHz and two 7-segment display elements	In data link operation, the bandwidth field shows a fixed value of 3.1 kHz.
8	kHz BFO	BFO field consisting of the display kHz BFO and four 7-segment display elemen	No display in data link operation
9	FREQUENCY kHz 12345.678 Frequency field consisting of the display FREQUENCY kHz and eight 7-segment display elements		In the frequency field the currently effective frequency (e.g. 12345.678 kHz) is displayed. The cursor (10) in the frequency field indicates, that the key FRQ (32) was actuated → operating mode MANUAL (see 1.1.3.1). The tuning knob (34) as well as the cursor control keys (1) and the numeric keypad (27) act upon the frequency field. If the cursor (10) is not in the frequency field, for the tuning knob (34) a freely programmed stepwidth is activated. Display range: 0 to 30 MHz Resolution: 1 Hz

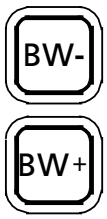
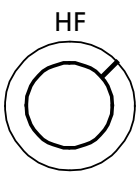
No.	Control or display element	Design	Description
10	—		The cursor indicates which of the 7-segment display elements the tuning knob (34) directly acts upon. The cursor can be shifted in the frequency field by means of the cursor control keys (1). If the cursor fails to appear in the frequency field (9), for the tuning knob the freely programmed stepwidth is activated.
11	MENU1 	Pushbutton with protective cap (6 × 10.5 mm)	By actuation of key MENU 1 the following functions are assigned to the softkeys (16): ME+ Storage into the buffer (see 1.1.11.1) ME- Calling up the buffer contents (see 1.1.11.2) S / C [1] BYP[2] Activating or deactivating Digital Selection FK 896 (see 1.1.11.3 and .4) [1] It is of no use trying to activate this function since it is ignored in data link operation. [2] The function BYP is only displayed if the optional FK 896 is installed.
12	MORE 	Pushbutton with protective cap (6 × 10.5 mm)	The key MORE is only effective if the symbol '>' appears on the right in the softkey assignment field (14). By actuating key MORE another menu (14) or another display (36) is called up.

No.	Control or display element	Design	Description
13		Miniature loudspeaker	Whether the loudspeaker emits an AF signal, depends on the position of the toggle switch (17). The volume of the emitted AF signal depends on the direction of rotation of the AF control (18).
14	<u>*Note:*</u> *In data link operation, only the functions in bold type are allowed to be activated. All other functions are either ignored or will automatically terminate data link operation.* * Display for EK 896 1) For EK 896 the symbol '>' is displayed instead of MORE.	Softkey assignment field consisting of 20 14-segment display elements	In the softkey assignment field the currently active menu is indicated. To the softkey assignment field belongs the softkey block (16). Possible displays: Main menu ***MOD*** *GAIN BW SCA* ***MORE*** Main menu * ***MOD CHM MEM*** *SCA* ***SYS*** *>* Modulation mode menu *AM CW LSB USB* ***MORE*** Modulation mode menu 2 *FSK AFSK F7B* ***MORE*** *1)* Modulation mode menu 3 *FAX1 FAX2 FM* ***MORE*** *1)* Modulation mode menu 4 *ILSB IUSB* ***MORE*** *1)* Modulation mode menu 5 ***LL LU LIL LIU MORE*** *1)* Control type menu *AGC MGC A+M A+D MORE* Control time menu *25 150 500 1s 3s* Bandwidth selection *BW↘ BW↗* VAR *3)* Scanning menu *FRQ CHP CHS S/C PRO*

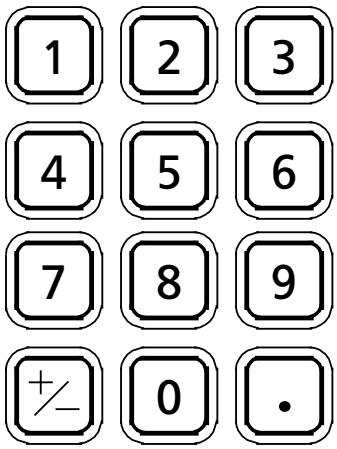
No.	Control or display element	Design	Description
14	*Note:* *In data link operation, only the functions in bold type are allowed to be activated. All other functions are either ignored or will automatically terminate data link operation.* 1) For EK 896 the symbol '>' is displayed instead of MORE. 2) For modulation mode AFSK only. 3) For EK 896 and EK 895 with option EK 895S7 only * Display for EK 896		---continued Main menu 2 *M / S* ***SYS*** ***SPEC*** ***CHM*** ***MEM*** Demodulation parameter menu *SHFT* *Bd* *POL* *STOP* Programming menu *FRQ* *CHP* *CHS* *CLR* Master / slave menu *ADR* *GET* *PUT* System functions menu ***VERS*** ***OPT*** ***CM*** ***BIT*** ***MORE*** 1) Special functions menu ***KNOB*** ***LEV*** ***SER*** ***REM*** *DEF* Channel editing menu ***MOD*** *GAIN* *BW* *THLD* Channel editing menu * ***MOD*** *THLD* Storage ***CLA*** ***CLCH*** ***STCH*** ***STO*** Frequency deviation menu *42* *85* *225* *425* *ΔF* 2) Baud rate menu *50* *75* *150* *300* *600* TTY status menu *STOP* *RUN* System functions menu 2 ***RAM*** ***LOCK*** ***SIG*** ***IF*** Signal BYPASS menu ***OFF*** ***ON*** ***ACT*** IF menu ***FRQ*** ***GAIN*** ***SET*** Control type menu ***OFF*** ***ON*** Modulation mode menu ***OFF*** ***VAR*** ***OPT*** 4) Tuning knob menu ***STEP*** ***ON*** ***OFF***

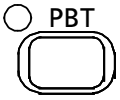
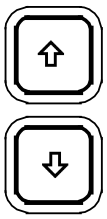
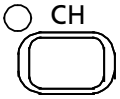
No.	Control or display element	Design	Description
14	4) Only if the optional IF Converter UX 895 is installed 5) Only if the optional Digital Selection FK 896 is installed		---continued Level line menu ***ON*** ***OFF*** LOC / REM menu ***LOC*** Default value menu *ON* *OFF* LOC / fixed-channel menu ***EXIT*** Separate functions menu 1 *IND* ***PAMP*** *NB* *SQ* *NTCH* Separate functions menu 2 ***ME+*** ***ME-*** *S/C* ***BYP*** 5) Selection menu (e.g.) *11* *23* *56* *67* *98* >` Programming menu (e.g.) *11* *23* *56* *67* *98* 11, 23, 56, 67 and 98 are the last stored slave addresses.
15	MENU	Pushbutton with protective cap (6 × 10.5 mm)	By actuating key MENU either a programming process is terminated or the program returns to the next higher level (see 1.1.4). If e.g. in the softkey assignment field (14) the programming menu is displayed, the program returns to the scanning menu by actuation of the MENU key. Pressing the MENU key once more calls up the main menu.
16		Five pushbuttons with protective caps (6 × 10.5 mm)	The softkeys receive their respective functions via the softkey assignment field (14). Via the softkeys the operator moves from the highest (see 1.1.4) to the lowest level. In order to move from a lower to the next higher level, the operator has only to actuate key MENU (15).

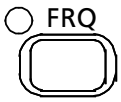
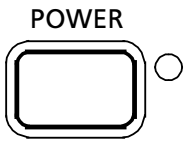
No.	Control or display element	Design	Description
17		1-way toggle switch	If the toggle switch is in the upper position, the AF signal is fed from the output of the AF amplifier in the control unit to the loudspeaker (13). By means of the AF control (18) the volume can be adjusted, as required.
18		Variable resistor with rotary knob control span 270°	By means of the AF control the volume of a loudspeaker or headphones to be connected at the interface can be adjusted. Control turned fully counter-clockwise: low volume Control turned fully clockwise: high volume <u>For EK 896 only:</u> Via the AF control the volume of that AF signal is set, that is emitted by the loudspeaker (13) depending on the position of the toggle switch (17).
19	 Six pushbuttons with protective caps (10.5×10.5 mm)		In data link operation, these keys must not be actuated, otherwise data link operation will be terminated automatically.

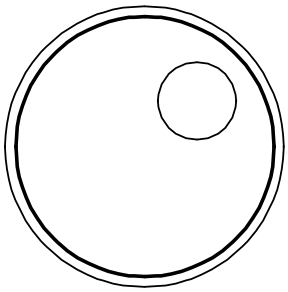
No.	Control or display element	Design	Description
20		Six pushbuttons with protective caps (10.5×10.5 mm)	It is of no use actuating these keys in data link operation since the associated functions are ignored. The control time FAST (= 25 ms) is displayed in the control type field (5).
21		Two push-buttons with protective caps (10.5×10.5 mm	It is of no use actuating these keys in data link operation since the associated functions are ignored.
22		Variable resistor with rotary knob control span 270°	It is of no use actuating this knob in data link operation since the associated function is ignored.
23		Pushbutton with protective cap (10.5×10.5 mm)	It is of no use actuating this key in data link operation since the associated function is ignored.
24		Pushbutton with protective cap (10.5×10.5 mm)	By actuating key CLR numerical entries in the display field (36) are cleared. By actuating key CLR in the channel editing menu the channel indicated in the channel field (6) is cleared (disabled, see chapter 3.1.16.2 in the User Manual 6045.6712.12.xx).

No.	Control or display element	Design	Description
25	ENT	Pushbutton with protective cap (10.5×10.5 mm)	By actuation of key ENT the numerical displays in the display field (36) are stored. By actuating key ENT in the channel editing menu the channel indicated in the channel field (6) is reactivated (see chapter 3.1.16.3 in the User Manual 6045.6712.12.xx). Except for entries, e.g. frequency, and in the channel editing menu, actuation of the ENT key assigns to the softkeys (16) the following functions: IND [1)] PAMP Switching the preamplifier on or off (see 1.1.10.1) NB [1)] SQ [1)] NTCH [1)] The status for the individual functions is indicated in the status line (2). Activation of a function is indicated by a black bar. [1)] It is of no use trying to activate these functions in data link operation since they are ignored.
26	GET	Pushbutton with protective cap (10.5×10.5 mm)	It is of no use actuating this key in data link operation since the associated function is ignored.

No.	Control or display element	Design	Description
27		Twelve push-buttons with protective caps (10.5×10.5 mm)	Entries via the numeric keypad are indicated above the flashing cursor (35) in the display field (36). The entry can be modified at any time by actuating key CLR (24). The entry can be disrupted by actuating key MENU (15). Complete entry by actuating key ENT (25). Leading zeros are not required (example: 0.05 = .05). Zeros which may be required after the decimal point are automatically inserted (example: 100.2 = 100.200). Unpermissible entries are replaced by a default value after actuating key ENT (25). ● If the LED assigned to key FRQ (32) is illuminated, the frequency can be entered via the numeric keypad. ● If the LED assigned to key CH (31) is illuminated, the channel number can be entered via the numeric keypad. In addition the operator may be prompted via the menus (see display field [36]) to enter via the numeric keypad a ● stepwidth, ● channel, ● IF frequency or a ● password. All other entry requests can be disregarded since in data link operation such an entry will be ignored.

No.	Control or display element	Design	Description
28	○ BFO 	Pushbutton with protective cap (6 × 10.5 mm) and green LED	It is of no use actuating this key in data link operation since the associated function is ignored.
29	NOTCH ○ PBT 	Pushbutton with protective cap (6 × 10.5 mm) and green LED	It is of no use actuating this key in data link operation since the associated function is ignored.
30		Two push-buttons with protective caps (10.5×10.5 mm)	It is of no use actuating these keys in data link operation since the associated functions are ignored.
31	○ CH 	Pushbutton with protective cap (6 × 10.5 mm) and green LED	After actuating key CH in the display field (36) the indication CHANNEL _ appears and the LED assigned to the push-button is illuminated → operating mode CHANNEL (see 1.1.3.2) or FIXED CHANNEL (see 1.1.3.2.1). At the same time the cursor (10) is located in the channel field (6). The display is replaced by the initial value, if no entry is made within approx 2 s. By means of the tuning knob (34) all channels which are not cleared (inhibited) can be called up. Not in FIXED CHANNEL operation! Clockwise rotation (≤ 999) Counter-clockwise rotation (≥ 0) It is also possible to call up a channel via the numeric keypad (27) acc. to 1.1.9.1. The currently effective channel is indicated in the channel field (5).

No.	Control or display element	Design	Description
32		Pushbutton with protective cap (6 × 10.5 mm) and green LED	After actuating key FRQ in the display field (36) the indication FREQUENCY _ KHZ appears and the LED assigned to the push-button is illuminated → operating mode MANUAL (see 1.1.3.1). At the same time the cursor (10) is located in the frequency field (9). If the cursor is not in the frequency field, the freely programmed stepwidth is activated. The display is replaced by the initial value, if no entry is made within approx 2 s. By means of the tuning knob (34) and the cursor control keys (1) the frequency can be altered. Clockwise rotation (≤ 30 MHz) Counter-clockwise rotation (≥ 0) It is also possible to enter the frequency via the numeric keypad (27) acc. to 1.1.7.1. The currently effective frequency is indicated in the frequency field (9).
33		Power switch, with rod and protective cap and green LED	By actuating the power switch (see also 1.1.5) the primary circuit of the power supply module is closed. After actuating the power switch the LED POWER is illuminated to indicate that the power supply is working properly (→ CM message for the power supply module). Subsequently the display illumination is switched on and the POWER reset, consisting of LED test and BIT, is initiated. Once the BIT is terminated successfully, the last basic receiver setting is reactivated and the main menu is displayed. In the operating mode FIXED CHANNEL the display CHANNEL MODE EXIT appears instead of the main menu.

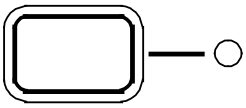
No.	Control or display element	Design	Description
33			---continued In the case of a failure the defective or missing module(s) is (are) indicated in the display field (36). In the FIXED CHANNEL mode the display BIT FAILED appears. Carry out troubleshooting acc. to 4.2 in the User Manual 6045.6712.12.xx, if necessary.
34		Rotary knob 24 steps / turn	The tuning knob can be disabled acc. to 1.1.7.6 or enabled acc. to 1.1.7.5. The blocked state of the tuning knob is automatically cancelled when the receiver is switched off. In addition the stepwidth of the tuning knob can be freely programmed acc. to 1.1.7.4 or can be altered via the cursor control keys (1). ● If the LED assigned to key FRQ (32) is illuminated, the tuning knob can be used to alter the frequency. ● If the LED assigned to key CH (31) is illuminated, the tuning knob can be used to alter the channel number. Once the minimum or maximum value is reached, the display does not change any further when turning the tuning knob.
35	_		The flashing cursor indicates that an entry via the numeric keypad (27) is expected. After an entry the respective character (numeral, sign or decimal point) is indicated and the cursor is dislocated to the right by one digit (maximally by one digit beyond the permitted entry format).

No.	Control or display element	Design	Description
36		Display field consisting of 30 14-segment display elements	The display field shows the operator, which quantity can be entered via the numeric keypad (27) or altered by means of the tuning knob (34) or the step keys (30). Possible displays: FREQUENCY _ KHZ CHANNEL _ STORE CH _ CLEAR CH _ VAR STEP _ KHZ ENT PASSWORD _ IF FREQ _ KHZ ENT Changing the other quantities is of no use since in data link operation these changes are ignored. Also via the display field the operator may be prompted to actuate a softkey. Possible displays: CLEAR ALL YES NO RAM CLEAR YES NO Also via the display field status messages may be displayed to the operator. Possible displays: NO OPTION PRESELECTOR MORE 1) BCD INTERF MORE 1) IF CONV 100 KHZ MORE 1) IF CONV 455 KHZ MORE 1) QUASI CONT BW MORE 1) DIG SELECTION MORE 1) WIDEBAND MORE 1) DATA LINK MORE 1) SYNTH NOGO MORE 1) SYNTH MISSING MORE 1) RF UNIT NOGO MORE 1) RF UNIT MISSING MORE 1) IF / AF NOGO MORE 1)
	1) For EK 896 the symbol '>' is displayed instead of MORE.		

No.	Control or display element	Design	Description
36			---continued IF / AF MISSING MORE 1) PROC UNIT NOGO MORE 1) IF CONV NOGO MORE 1) UNUSED SCANNING PROGRAMME SELECT ADR --- REMOTE ONLY --- ------ REMOTE ------ LOC CHANNEL MODE EXIT CM GO CM SYNTH NOGO CM IF AF NOGO CM SYNTH + IF AF NOGO BIT GO BIT FAILED ---------- SYSTEM RESET ---------- The display MORE or > appears only if more than one error has occurred and / or more than one option is installed.
	1) For EK 896 the symbol '>' is displayed instead of MORE.		

1.4 Control and Display Elements of Control Unit 1 "REMOTE" (EK 895)

(see Fig. 1.3)

No.	Control or display element	Design	Description
1	 EIN · ON	Power switch, rods with protective cap and green LED	By actuating the power switch the primary circuit of the power supply module is closed. Upon actuation of the power switch the LED ON is illuminated to indicate that the power supply is working properly (→ CM message for the power supply module). Subsequently the POWER reset, consisting of LED test and BIT, is initiated. Once the BIT is terminated successfully, none of the LEDs OPTION 2 (2), OPTION 1 (3), SYNTHESIZER (4), IF / AF PROCESSOR (5) and RF UNIT (6) is illuminated. Carry out troubleshooting acc. to 4.2 in the User Manual 6045.6712.12.xx, if necessary.
2	◯ OPTION 2	yellow LED	Upon actuation of the power switch (1) the LED OPTION 2 is illuminated during the LED test. Once the BIT is terminated successfully, the LED goes out (→ CM message for the option 2). If an error occurs after release of the command BIT or RESET, the LED will be illuminated (see Appendix A3). For illumination of LED OPTION 2 carry out troubleshooting acc. to 4.2 in the User Manual 6045.6712.12.xx.
3	◯ OPTION 1	yellow LED	Upon actuation of the power switch (1) the LED OPTION 1 is illuminated during the LED test. Once the BIT is terminated successfully, the LED goes out (→ CM message for the option 1). If an error occurs after release of the command BIT or RESET, the LED will be illuminated (see Appendix A3). For illumination of LED OPTION 1 carry out troubleshooting acc. to 4.2 in the User Manual 6045.6712.12.xx.

No.	Control or display element	Design	Description
4	◯ SYNTHESIZER	yellow LED	Upon actuation of the power switch (1) the LED SYNTHESIZER is illuminated during the LED test. Once the BIT is terminated successfully, the LED goes out (→ CM message for the synthesizer module). If an error occurs after release of the command BIT, CM or RESET, the LED will be illuminated. For illumination of LED SYNTHESIZER carry out troubleshooting acc. to 4.2 in the User Manual 6045.6712.12.xx.
5	◯ ZF/NF PROZESSOR · IF/AF PROCESSOR	yellow LED	Upon actuation of the power switch (1) the LED IF/AF PROCESSOR is illuminated during the LED test. Once the BIT is terminated successfully, the LED goes out (→ CM message for the IF/AF processor module). If an error occurs after release of the command BIT or RESET, the LED will be illuminated. For illumination of LED IF/AF PROCESSOR carry out troubleshooting acc. to 4.2 in the User Manual 6045.6712.12.xx.
6	◯ HF-TEIL · RF UNIT	yellow LED	Upon actuation of the power switch (1) the LED RF UNIT is illuminated during the LED test. Once the BIT is terminated successfully, the LED goes out (→ CM message for the HF unit). If an error occurs after release of the command BIT or RESET, the LED will be illuminated. For illumination of LED RF UNIT carry out troubleshooting acc. to 4.2 in the User Manual 6045.6712.12.xx.

Legend for Fig. 1.1 (for Data Link Operation)

No.	Designation	No.	Designation
1	Cursor control keys	19	Modulation mode keys (do not actuate!!)
2	Status line	20	Control type keys (no function)
3	Modulation mode field	21	BW keys (no function)
4	Bargraph	22	HF control (no function)
5	Control type field (no control type, only control time, display: FAST)	23	Key PUT (no function)
6	Channel field	24	Key CLR
7	Bandwidth field (display: 3.1 kHz)	25	Key ENT
8	BFO field (no function)	26	Key GET (no function)
9	Frequency field	27	Numeric keypad
10	Cursor	28	Key BFO (no function)
11	Key MENU 1	29	Key NOTCH / PBT (no function)
12	Key MORE	30	STEP keys (no function)
13	Loudspeaker	31	Key CH
14	Softkey assignment field	32	Key FRQ
15	Key MENU	33	Key POWER
16	Softkeys	34	Tuning knob
17	Toggle switch	35	Cursor, flashing
18	AF control	36	Display field

Fig. 1.1 Control and Display Elements of VLF-HF Receiver EK 896

Legend for Fig. 1.2 (for Data Link Operation)

No.	Designation	No.	Designation
1	Cursor control keys	19	with EK 896 only
2	Status line	20	with EK 896 only
3	Modulation mode field	21	with EK 896 only
4	Bargraph	22	HF control (no function)
5	Control type field (no control type, only control time, display: FAST)	23	with EK 896 only
6	Channel field	24	Key CLR
7	Bandwidth field (display: 3.1 kHz)	25	Key ENT
8	BFO field (no function)	26	with EK 896 only
9	Frequency field	27	Numeric keypad
10	Cursor	28	Key BFO (no function)
11	with EK 896 only	29	Key NOTCH / PBT (no function)
12	with EK 896 only	30	with EK 896 only
13	with EK 896 only	31	Key CH
14	Softkey assignment field	32	Key FRQ
15	Key MENU	33	Key POWER
16	Softkeys	34	Tuning knob
17	with EK 896 only	35	Cursor, flashing
18	AF control	36	Display field

Fig. 1.2 Control and Display Elements of VLF-HF Receiver EK 895

Legend for Fig. 1.3

No.	Designation
1	Switch POWER
2	LED OPTION 2
3	LED OPTION 1
4	LED SYNTHESIZER
5	LED IF / AF PROCESSOR
6	LED RF UNIT

Fig. 1.3 Control and Display Elements of VLF-HF Receiver EK 895 (Control Unit 1)

Fig. 1.4 Structure of Software for VLF-HF Receiver EK 895 (page 1 of 2)

Fig. 1.4 Structure of Software for VLF-HF Receiver EK 895 (page 2 of 2)

Fig. 1.5 Structure of Software for VLF-HF Receiver EK 896 (page 1 of 2)

Fig. 1.5 Structure of Software for VLF-HF Receiver EK 896 (page 2 of 2)

List of Contents

2. Remote Control

2. Remote Control

Note:

In the text which follows only the data link-relevant commands are described. All other commands are dealt with in the User Manual (6045.6712.12.xx).

2.1 General

The commands entered on the computer have to be in a specific format. The format or the command block consists of up to 150 characters. Each command block begins with the ASCII character LF (= line feed, 10_{dec}, in the following represented by ≡) and ends with the ASCII character CR (= carriage return, 13_{dec}, in the following represented by ↙).

≡<command block>↙

The ASCII character LF is followed by the equipment address in addressed operation or the first command in unaddressed operation. Addresses from A01 to A99 are admissible. In addressed operation the equipment address is followed by the first command.

Addressed operation

≡<address><command 1><command 2> ... <command x>↙

Command blocks beginning with the address A00 are accepted by all receivers, regardless of the set receiver address.

Unaddressed operation

≡<command 1><command 2> ... <command x>↙

The command itself consists of a code and up to 21 parameters. Consecutive parameters have to be separated by a comma. For parameter entry guiding zeros and the plus sign can be omitted.

<code><parameter 1>,<parameter 2> ... <parameter 21>

The code consists of up to five capital letters. The parameters may come as numerical parameter (numbers and the minus sign), character (small letter) and the question mark. The question mark (?) signals that a reply is requested.

The reply consists of the code followed by the question mark and the setting value(s). The reply(ies) is (are) inserted into a reply block, the sequence is not required to be the same as for the command block. The reply block begins with the ASCII character F (≡) and ends with the ASCII character CR (↙). In addressed operation LF is followed by the equipment address. Leading zeros are not integrated into the reply.

Consecutive commands without parameters are to be separated by a blank (in the following represented by ␣).

e.g.: ≡<command 1>␣<command 2>↙

2.2 Operating Modes

The receiver can be operated in the following two operating modes:

- MANUAL
- CHANNEL

2.2.1 MANUAL

In the MANUAL mode no channel is set.

For the basic settings of the VLF-HF receiver the following codes are possible:

- F (frequency)
- I (modulation mode)

The possible special functions are characterized by the following codes:

- L (receive level)
- PL (level line)
- P (level line status)
- C (CM status)
- BI (BIT status)
- ST (storage into channel)
- K, CL, RS (editing of channel contents)
- PA (preamplifier)
- SE (switching digital selection on or off, with FK 896 only)

The possible system functions are characterized by the following codes:

- A (address)
- V (software version)
- FIB (IF filter)
- OP (options)
- SA (signal BYPASS)
- IF (IF signal)
- M (operating status)
- ERR (error status)
- RESET (software reset)
- REM (local control)
- IDENT (software type and Ident. No.)

Via the command Ks<parameter> a channel can be called up, and the receiver is automatically in the CHANNEL mode (see 2.2.2).

2.2.2 CHANNEL

In the CHANNEL mode there is a channel set.

In channel operation, as in the MANUAL mode (see 2.2.1), it is possible to execute

- Special functions and
- System functions.

If one of the basic settings (frequency or modulation mode) is altered, the receiver automatically operates in the MANUAL mode (see 2.2.1).

2.3 Basic Settings

In the MANUAL mode the following values can be entered or altered:

- F (frequency)
- I (modulation mode)

2.3.1 Frequency

Command syntax:

Code: F	
Parameter:	a
Possible entries / replies	
Range:	0 to 30000000
Stepwidth:	1 Hz
Entry:	in Hz

Note:

The technical data stated in the data sheet are guaranteed for frequencies as of 10 kHz.

Example 1:

Setting a receive frequency of 21.5 MHz

Command = ≡AxxF21500000↙

Example 2:

Inquiry of the set receive frequency

Command = ≡AxxF?↙
→ Reply = ≡AxxF21500000↙

The VLF-HF receiver is set to a frequency of 21.5 MHz.

2.3.2 Modulation Mode

Command syntax:

Code: I	
Parameter:	a
Possible entries / replies	
15 = L USB	
16 = L LSB	
17 = L ISB USB	
18 = L ISB LSB	

The abbreviations for the modulation modes signify the following:

L USB (B8D, amplitude modulation, monitoring sideband = lower sideband, no USB signal)

L LSB (B8D, amplitude modulation, monitoring sideband = upper sideband, no LSB signal)

L ISB USB (B8D, amplitude modulation, monitoring sideband = lower sideband, LSB and USB signal)

L ISB LSB (B8D, amplitude modulation, monitoring sideband = upper sideband, LSB and USB signal)

Example 1:

Inquiry of the currently active modulation mode

Command = ≡AxxI?↙
→ Reply = ≡AxxI18↙

The modulation mode L ISB LSB is now active.

Example 2:

Activating modulation mode L USB

Command = ≡AxxI15↙

2.3.3 Programming Examples

Example 1:

The unaddressed VLF-HF receiver is to be set as follows:

- Frequency: 801 kHz = F801000
- Modulation mode: L USB = I15

At the same time these settings are to be confirmed.

Command: ≡F801000,?I15,?↙
→ Reply: ≡F801000I15↙

Example 2:

The VLF-HF receiver with the address 15 is to be set as follows:

- Frequency: 6.1 MHz = F6100000
- Modulation mode: L ISB LSB = I18

At the same time these settings are to be confirmed.

Command: ≡A15F6100000,?I18,?↙
→ Reply: ≡A15F6100000I18↙

2.4 Special Functions

The following special functions are possible:

- Inhibiting or enabling the level line [1)]
- Inquiry of level line status [1)]
- Initiation of BIT and/or inquiry of BIT status [1)]
- Inquiry of CM status [1)]
- Inquiry of receive level [1)]
- Storage into a channel [1)]
- Channel call-up
- Editing the channel contents [1)]
- Switching the digital selection on or off (with FK 896 only) [1)]
- Switching the preamplifier on or off

[1)] These commands are described in the User Manual 6045.6712.12.xx.

2.4.1 Channel Call-up

Command syntax:

Code: K	
Parameter:	a,b
z:	s (set)
Possible entry	
Range:	0 to 999

Note:

Inhibited channels (K<parameter>,e; see A3.7.11 in the User Manual 6045.6712.12.xx) are automatically reactivated upon command Ks,<parameter>, that is, the flag 'e' is cancelled.

Only those channels are permitted to be called up where one of the following modulation modes is stored:

LL LU LIL LIU

Example:

Calling up channel 873

Command = ≡AxxKs,873↙
→ Operating mode CHANNEL

2.4.2 Inquiry of Channel Contents

Command syntax:

Code: K	
Parameter:	a
Possible entries	
Range:	0 to 999

Example:

Inquiry of current receiver setting

Command = ≡AxxK?↙
→ Reply = ≡AxxK␣␣F801000I15↙

Note:

The blank '␣␣' following the letter K means, that there is no channel set.

The following settings are effective at the moment:

- Operating mode: K␣␣ = MANUAL
- Frequency: F801000 = 801 kHz
- Modulation mode: I15 = L USB

2.4.3 Switching the Preamplifier On or Off

Command syntax:

Code: PA

Parameter: ..... a

Possible entries / replies

0 = switch off (OFF)
1 = switch on (ON)

Example 1:

Inquiry of preamplifier status

Command = ≡*AxxPA?*↙
→ Reply = ≡AxxPA0↙

The preamplifier is switched off.

Example 2:

Switching the preamplifier on

Command = ≡*AxxPA1*↙

2.5 System Functions

The following system functions are possible:

- Addressed operation [1)]
- Inquiry of software version [1)]
- Inquiry of IF filter bandwidths [1)]
- Inquiry of options
- Signal BYPASS [1)]
- Activating command IF[1)]
- Inquiry of operating status [1)]
- Inquiry of error status [1)]
- Initiating a reset [1)]
- Enabling or disabling local control [1)]
- Inquiry of software type and Ident. No. [1)]

[1)] These commands are described in the User Manual 6045.6712.12.xx.

2.5.1 Inquiry of Options

Command syntax:

Code: OP

Reply

Parameter: ..... a

0 = no option
1 = Control Unit GB 890
8 = BCD Interface GC 890
9 = Preselector FK 890H1
11 = VLF-HF Receiver EK 895
12 = VLF-HF Receiver EK 896
13 = IF Converter (100 kHz)
14 = IF Converter UX 895 (455 kHz)
15 = EK 895S7 (quasi-continuous bandwidth for EK 895)
16 = EK 896S7 (quasi-continuous bandwidth for EK 896)
17 = Digital Selection FK 896 (EK 896 only)
18 = IF Processor GM 893, Mod. 03
19 = Data Link

Example 1:

Inquiry of options

Command = ≡*AxxOP?*↙
→ Reply = ≡AxxOP1,11↙

In VLF-HF Receiver EK 895 the option 'Control Unit GB 890' is installed.

Example 2:

Inquiry of options

Command = ≡*AxxOP?*↙
→ Reply = ≡AxxOP12,19↙

In VLF-HF Receiver EK 896 the software option Data Link is implemented.

2.6 List of Commands

Code	Function (entry in)	Entry	Output (requested with ?)	Remark
A	Address	00 to 99	01 to 99	see A3.8.1 [1]
BI	Initiate BIT Inquire BIT status	s	0 = no fault 10 = synthesizer missing 1 = synthesizer defective 20 = HF unit missing 2 = HF unit defective 5 = module bus defective 60 = IF / AF processor missing 6 = IF / AF processor defective 7 = IF Converter UX 895 defective	see A3.7.4 [1]
C	Inquire CM status		0 = no fault 1 = synthesizer defective 4 = IF / AF processor defective 5 = synthesizer and IF / AF processor defective	see A3.7.5 [1]
CL	Inhibit channel	0 to 999		see A3.7.11 [1]
CLa	Inhibit all channels			see A3.7.11 [1]
ERR	Error status		0,0 = no fault	see A3.8.8 [1]
F	Frequency (Hz)	0 to 30000000	0 to 30000000	see 2.3.1
FIB	Inquire IF filter bandwidths		1 = 150 Hz 3 = 300 Hz 6 = 600 Hz 10 = 1000 Hz 15 = 1500 Hz 21 = 2100 Hz	see A3.8.3 [1]

[1] These commands are described in the User Manual 6045.6712.12.xx.

Code	Function (entry in)	Entry	Output (requested with ?)	Remark
FIB1			24 = 2400 Hz 27 = 2700 Hz 31 = 3100 Hz 40 = 4000 Hz 48 = 4800 Hz 60 = 6000 Hz 80 = 8000 Hz	see A3.8.3 1)
I	Modulation mode	15 to 18	15 = L USB 16 = L LSB 17 = L ISB USB 18 = L ISB LSB	see 2.3.2
IDENT	Software type Ident. No.		e.g. ek896, 6038297302	see A3.8.12 1)
IF	IF signal Parameter a Type of frequency Parameter b Control type Parameter c Frequency (Hz)	 0 to 2, 0 to 1, 0 to 40000	 0 = no signal 1 = signal with variable frequency 2 = signal with fixed frequency (option) 0 = off 1 = on 0 to 40000	see A3.8.10 1)
K	Edit channel contents Inquire current receiver setting	0 to 999	0 to 999 ␣␣ = MANUAL 0 to 999 = CHANNEL 0,e to 999,e = channel inhibited	see A3.7.9 1) see 2.4.2
Ks,	Call up a channel	0 to 999		see 2.4.1
L	Inquire receive level (dBµV)		0 to 120	see A3.7.6 1)
M	Inquire operating status		0 = MANUAL 2 = CHANNEL	see A3.8.6 1)
OP	Inquire options		0 = none 1 = Control Unit GB 890	see 2.5.1

1) These commands are described in the User Manual 6045.6712.12.xx.

Code	Function (entry in)	Entry	Output (requested with ?)	Remark
OP1	Inquire options		8 = BCD Interface GC 890 9 = Preselector FK 890H1 11 = VLF-HF Receiver EK 895 12 = VLF-HF Receiver EK 896 13 = IF Converter (100 kHz) 14 = IF Converter UX 895 (455 kHz) 15 = EK 895S7 (quasi-continuous bandwidth) 16 = EK 896S7 (quasi-continuous bandwidth 17 = Digital Selection FK 896 18 = IF Processor GM 893, Mod. 03 19 = Data Link	see 2.5.1
P	Inquire level line status		0 = OFF 1 = ON	see A3.7.3 1)
PA	Switch preamplifier on or off	0 to 1	0 = OFF 1 = ON	see 2.4.3
PL	Level line	0 to 1	0 = disable 1 = enable	see A3.7.2 1)
REM	Local control	0 to 1	0 = enable 1 = disable	see A3.8.11 1)
RESET	Reset	0 = software reset 1 = software reset, RAM test and RAM clear		see A3.8.9 1)
RS	Reactivate channel	0 to 999		see A3.7.12 1)

1) These commands are described in the User Manual 6045.6712.12.xx.

Code	Function (entry in)	Entry	Output (requested with ?)	Remark
SA	Signal BYPASS	0 to 2	0 = high (OFF) 1 = low (ON) 2 = active	see A3.8.5 [1)]
SE	Switch digital selection on or off (with FK 896 only)	0 to 1	0 = ON 1 = OFF	see A3.7.17 [1)]
ST	Store into a channel	0 to 999		see A3.7.7 [1)]
V	Software version processor IF / AF processor		e.g. 310, 136	see A3.8.2 [1)]
W	Bandwidth (basic unit)	1 3 6 10 15 21 24 27 31 40 48 60 80	1 = 150 Hz 3 = 300 Hz 6 = 600 Hz 10 = 1000 Hz 15 = 1500 Hz 21 = 2100 Hz 24 = 2400 Hz 27 = 2700 Hz 31 = 3100 Hz 40 = 4000 Hz 48 = 4800 Hz 60 = 6000 Hz 80 = 8000 Hz	see A3.3.4 [1)]

1) These commands are described in the User Manual 6045.6712.12.xx.