GSS

Grundig SAT Systems

Head-End Digital Modulator

HDM 2370 P CI

KLASSE A CLASS **CE**

Contents

1   Safety regulations

⚠ Warning

- Assembly, installation and servicing should be carried out by authorised electricians.
- Switch off the operating voltage of the system before beginning with assembly or service work or pull out the mains plug.
- Do not perform installation and service work during thunderstorms.
- Install the system so it will not be able to vibrate…
  - in a dust-free, dry environment
  - in such a manner that it is protected from moisture, fumes, splashing water and dampness
  - somewhere protected from direct sunlight
  - not within the immediate vicinity of heat sources
  - in an ambient temperature of -20 °C to +50 °C.
- Ensure that the head-end station is adequately ventilated.
  Do not cover the ventilation slots.
- Beware of short circuits
- No liability is accepted for any damage caused by faulty connections or inappropriate handling.
- Observe the relevant standards, regulations and guidelines on the installation and operation of antenna systems.
- Earth the SAT receiver in accordance with DIN EN 50083-1 / EN 60728-11 and VDE 0855 (earthed, equipotential bonding rail).

Take action to prevent static discharge when working on the device.

2   General information

2.1 Packing contents

1 cassette HDM 2370 P CI
2 HF cables
1 CD (assembly instructions)
1 Brief assembly instructions

2.2 Meaning of the symbols used

⚠   Important note

—>   General note

•   Performing works

2.3 Technical data

The devices meet the following EU directives:

2006/95/EC, 2004/108/EC

The product fulfils the guidelines and standards for CE labelling.

HF input

Frequency range:	950 … 2150 MHz
Level range:	60 dBμV … 80 dBμV
Input norm:	QPSK
Symbol rate:	2 … 40 Msymb./s, SCPC/MCPC
FEC:	automatic

HF output

Channels:	C2 … C69 (incl. S2 … S41)
Frequency range:	48.25 MHz … 855.25 MHz
Standard:	CCIR PAL B/G
	PAL I (GB 6.0 FM)
Output level:	typ. 95 dBμV
Output impedance:	75 Ω
Frequency detuning of the output signal:	
	±4.00 MHz in 62.5 kHz increments

MPEG decoding

MPEG 2:	Main Level/Main Profile
Video output:	720 x 576 x 25 (Pixels x lines x Frames/sec)
Audio:	32 kHz, 44.1 kHz, 48 kHz
Picture format:	options for letterbox, 16:9
Teletext capable:	yes
VPS capable:	yes (teletext, EIT)

Connections

SAT inputs A and B:	2 F sockets
HF output (modulators):	1 IEC socket
Connection strip (10-pin):	for supply voltages and control circuits
Socket RS 232:	serial interface for software update
Conditional access:	2 channels can be decoded

2.4 Description

The twin transmodulator cassette is a QPSK-converter, which converts all stations modulated according to DVB-S[1] standard and QPSK[2] into two PAL-modulated cable signals. The cassette has two digital SAT IF inputs and an HF output. It is equipped with two channel strips ("**A**" and "**B**"). Each channel strip consists of a digital tuner, a digital signal preparation unit and a modulator.

The channel strip "**A**" can decode encoded channels via a corresponding CA module. Depending on the CA module and the smart card, two channels can be decoded simultaneously with one CA module, with the second one supplied via channel strip "**B**". The control of the cassette takes place via the control unit of the head-end station. By means of the "**a**" and "**b**" levels of the channel strips, channel selection according to a timer is possible. The cassette's channel strips are indicated by "**Bx A / Bx a**" or "**Bx B / Bx b**" ("**Bx a**" / "**Bx b**" – time controlled channel switch over) in the control unit display.

The prepared input signals reach the HF output collector of the head-end station via the HF output socket. The common output level of the channel strips can be set with the level regulator at the output collector of the head-end station.

When the head-end station is switched on, the two-line LC display briefly shows the software version of the control unit.

To operate this cassette the software version of the control unit must be "**V 37**" or higher. You can find the current operating software for the control unit and the cassette, the software "**BE-Flash**" and the current assembly instructions on the website "***www.gss.tv***".

The cassette is designed for use in the following head-end stations:

– STC 316
– STC 1200
– STR 19-8

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[1] DVB-S – Digital Video Broadcasting - Satellite
[2] QPSK – Quadrature Phase Shift Keying

2.5 Software query

Control unit

If necessary, you can activate the indication of the software version of the control unit manually:

- Press any two keys on the control unit of the head-end station simultaneously until the display goes dark and the software version, e.g. "**V 37**" appears.

3 Assembly

3.1 Installing the cassette

⚠️ Caution
- Ensure the head-end station is mounted so it will not be able to vibrate. Avoid, for example, mounting the head-end station onto a lift shaft or any other wall or floor construction that vibrates in a similar way.
- Before installing or changing a cassette unplug the power cable from the mains power socket.

- Remove the fastening screws ① of an unoccupied slot from the bracket of the head-end station.
- Insert the cassette in this slot and push it into the housing.
- Align the cassette and apply slight pressure to connect it to the connections of the board and the HF bus bar.
- Fasten the cassette with the ① screws.
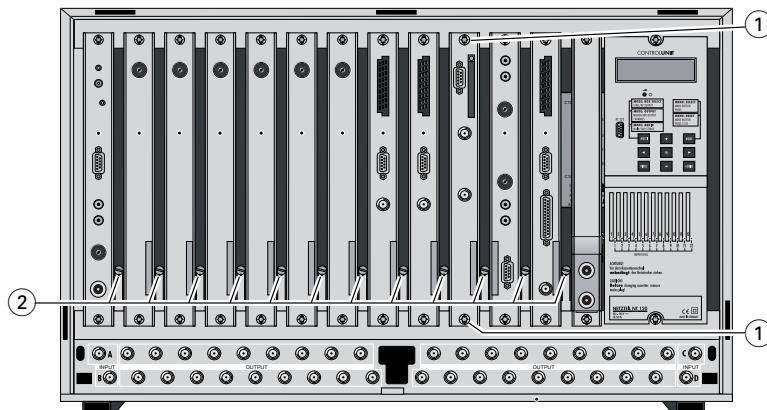
3.2 Installing the F terminals

⚠ **To comply with the current EMC regulations, it is necessary to connect the lines leading in and out of the head-end station using F terminals.**
When mounting the cassette in an STR 19-8 head-end station which is installed in a 19" cabinet, make sure the connections leading in and out for the 19" cabinet are made using F terminals.
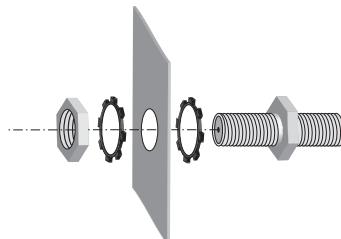
• Insert the required number of F terminals in the openings provided in the head-end station or in the 19" cabinet.
   —> F terminals are not included in the scope of delivery.

⚠ Tighten the nut on the F terminal until the teeth on the lock washer have penetrated the exterior coating and a good connection is made between the housing and F terminal.

3.3 Connecting the cassette

HF input "B"
①

HF input "A"
②

Slot for
CA module
③

Eject button
for CA module
④
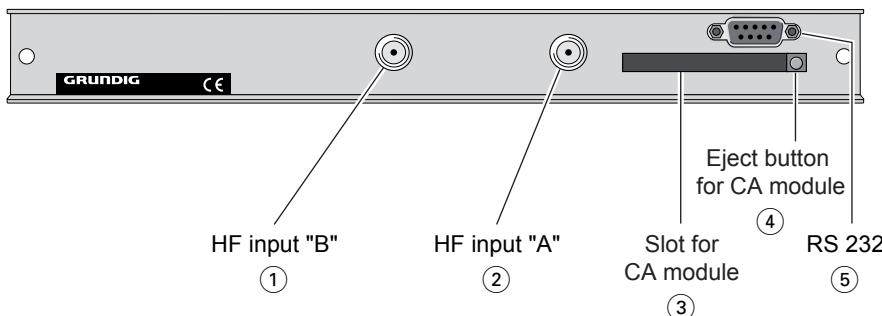
RS 232
⑤

• Plug the HF input cables into the HF input sockets "**HF input A**" ② (channel strip "A") and "**HF input B**" ① (channel strip "B").
• Connect the head-end station to the mains power supply.

Notes:

③ **Slot for CA module**
④ **Eject button for CA module**
⑤ **Socket "RS 232"**
   The operating software of the cassette can be updated via the 9-Pin D-DUB socket "RS 232" using a PC or notebook and the software "**BE-Flash**". You can find the current operating software on the website "***www.gss.tv***".

3.4 Retrofitting a CA module

The cassette is equipped with a common interface. It allows you to connect a CA module for various encryption systems and service providers. Encoded channels can only be decoded with a CA module suitable for the encoding system and the corresponding smart card. The smart card contains all the information for authorisation, decoding and subscription.

⚠️ **Caution**
   – Check with the distributor or manufacturer of the CA module to be used to ensure that it is suitable for decoding 2 channels.
   – **The hardware and software of this cassette have been thoroughly prepared and tested.**
   – **Any changes made by program vendors to the structures in the program data might impair or even prevent this function.**
   – When working with the CA module, please read the corresponding operating manual from the respective provider.

- Insert the smart card into the CA module so that the chip on the smart card faces the thicker side (top) of the CA module.
- Insert the CA module into the slot ③ (s. chap. 3.3) with the top side of the CA module facing the top side of the cassette.
- Push the CA module without canting into the guide rails of the common interface slot and contact it to the common interface.
- To take out the CA module press the eject button ④.

4   The control panel at a glance

4.1   Menu items

Program the cassette using the buttons on the control unit of the head-end station. The two-line display of the control unit then shows the menus.

Use the **MODE** key to select the following main menu items:

– Cassette
– Channel strip, software
– Modulator settings
– TV standard
– Output channel / output frequency
– LNB oscillator frequency
– Input symbol rate
– Input frequency
– Channel selection
– TV station sound
– Volume
– Time zone and summer time
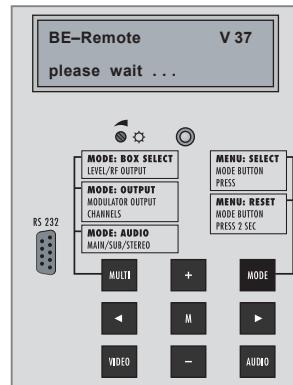
4.2   Control panel

The key pad on the head-end station is used to scroll through the menus and menu items one at a time:

MODE   scrolls forward through the menu.

◀/▶   select parameters in the menus.

+/−   set values, initiate actions

MULTI   selects sub-menus
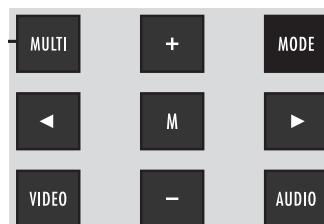
VIDEO   switches over between the "**Setting the input frequency**" and the "**Channel selection**" menus.

M   saves all entries.

5 Programming

5.1 Preparation

- Connect the test receiver to the HF output or the test output of the head-end station.
- Set the output channel / output frequency of the cassette (see page 20) and adjust the TV test receiver to this channel.
- Switch on the modulator if necessary.
- Balance the output levels of the channel strips "**A**" and "**B**" if the difference in level is ≥ 1 dB (see chapter "Modulator settings", page 19).
- Measure the output levels of the analogue cassettes and tune them to a uniform output level using the appropriate level controls ② (s. page 7).

5.2 Notes on the following programming procedure

- The parameters to be set are underlined (cursor).
- Connection Ⓒ :   Time-controlled channel selection
- Connection Ⓓ :   Decoding 2 stations with one CA module

5.3 Programming procedure

(Ein / On) →

BE–Remote   V 37
please wait …

t > 10 s

Bx 1A   TWIN-SAT
C5-12,S3-24   C07

[+]

Box 4   QPSK-PAL
C2-69,S2-41   – – –   [+] / [−] →   **Bx 5A   DVBT-DVBT**
BD3   C09

[MODE]

———————————————— Ⓐ   Page 14
———————————————— Ⓑ

A / B
[+] / [−]

Bx 4A   QPSK-PAL
Das Erste   S21   [MULTI] →   **Bx 4A   VERSION:**
← [MULTI]   **DVB-PAL   B   V.16**

[MODE]

[+] / [−]   **Bx 4B   QPSK-PAL**   [+] / [−] → Ⓒ   Page 16
SAT.1   S09   [MODE] → Ⓓ   Page 15

[MULTI]

Bx 4A   OUTPUT:
Modulator: on   [+] / [−]
on / off

Bx 4A   OUTPUT:
HF-Level: 0   [−] / [+]
0 … –7 dB

[MODE]

Bx 4A   NORM:
CCIR   5.5   FM   [+] / [−]
CCIR 5.5 FM / GB 6.0 FM

[MODE]

Bx 4A   OUTPUT:
S21   [▶] →   **Bx 4A   OUTPUT:**
← [◀]   **S21   Fine   0**   [−] / [+]
[+] / [−]   –64 … +63

[MODE]

[MULTI] →   **Bx 4A   VIDEO-OUT:**
Letter   [+] / [−]
Letter / 16:9

[MODE]

```
                              ↓

  ┌─────────────────────────────┐
  │ Bx 4A        WSS-OUT:       │   + / −
← MULTI                          │   on / off
  │ Signaling:            on    │
  └─────────────────────────────┘
              MODE
                ↓
  ┌─────────────────────────────┐
  │ Bx 4A        SERVICE:       │   + / −
← MULTI                          │   dynamic / fixed
  │ PIDs:            dynamic     │
  └─────────────────────────────┘
              MODE
                ↓
  ┌─────────────────────────────┐
  │ Bx 4A         OUTPUT:       │   + / −
← MULTI                          │   on / off
  │ Teletext:             on    │
  └─────────────────────────────┘
              MODE
                ↓
  ┌─────────────────────────────┐
  │ Bx 4A        SUBTITLE:      │   MULTI
  │                             │   off / 150
  │ TXT-Page:            150    │   ◄ / ►   + / −
  └─────────────────────────────┘   100 … n
              MODE
                ↓
  ┌─────────────────────────────┐
  │ Bx 4A        SUBTITLE:      │   + / −
  │                             │   West / East
  │ TXT-Norm:           West    │
  └─────────────────────────────┘
              MODE
                ↓
  ┌─────────────────────────────┐
  │ Bx 4A       AUDIO-OUT:      │   + / −
← MULTI                          │   normal / swap
  │ Dual normal                 │
  └─────────────────────────────┘
              MODE
                ↓
  ┌─────────────────────────────┐
  │ Bx 4A       AUDIO-OUT:      │   + / −
Page 16       MODE               │   MPEG / VPS
  │ MPEG => Audiomode           │
  └─────────────────────────────┘

  Ⓔ

◄ / ►  ┌─────────────────────────────┐
+ / −  │ Bx 4A        LNB-FREQ:      │
       │ f= 10600 MHz                │
       └─────────────────────────────┘
              MODE
                ↓
```

◄/►
+/−

| Bx 4A   INPUT: | ◄─ **MULTI** ─► | Bx 4A   MENU 1/6 |
| SR= 27500 | | Information |

Module Hauptmenü

→ Information
   Smartkarte
   Jugendschutz
   Einstellungen
   Zurück

Bitte wählen Sie mit OK
AlphaCrypt Light 1.01 (c) Mascom GmbH

MODE   **MODE**

TV-Bild
TV picture **◄/►** **+/−**

◄/►
+/−

| Bx 4A   FREQ-IN: | ◄─ **MULTI** ─► | Bx 4A   BER. C/N: |
| f= 11836 MHz   0 | | 0.0e - 8   12.0 dB |

Anzeige: Signalqualität
Display: Signal quality

VIDEO   **MODE**

Ⓕ Page 15

+/−

| Bx 4A   01/10+   TV | ◄─ **MULTI** ─► | Bx 4A   PROVIDER: |
| Das Erste | | ARD |

MODE   **MODE**

| Bx 4A   AUDIO-IN: | **+/−** |
| 01/02   "deu" |

MODE

| Bx 4A   AUDIO-OUT: | **−/+** |
| Volume: 0 dB | −24 … +6 |

MODE

| Bx 4A   OFFSET: | **+/−**   **MULTI** |
| 13:48:22 ?   +01 S | −12 … +12   S / - |

Page 12
Ⓑ   Ⓐ

M   **MODE**

5.3.1 Decoding 2 stations with one CA module (channel strip "B")

Page 12

Ⓓ

MULTI

Bx 4B OUTPUT:	**Bx 4B OUTPUT:**
Modulator: on	**HF-Level: 0**

+ / −
on / off

− / +
0 … −7 dB

MODE

MODE

Bx 4B   NORM:
CCIR   5.5   FM

+ / −
CCIR 5.5 FM / GB 6.0 FM

MODE

Bx 4B OUTPUT:	▶	**Bx 4B OUTPUT:**
S09	◀	**S09 Fine 0**

+ / −

− / +
−64 … +63

MODE ****)**
MODE
******)** With activated decoding

MODE

Bx 4B LNB-FREQ:	**Bx 4B LNB-FREQ:**
f = 10600 MHz	**Data Tuner A**

◀ / ▶
+ / −

MODE

MODE

Bx 4B INPUT:	**Bx 4B INPUT:**
SR= 22000	**CI at LINE A**

◀ / ▶
+ / −

MULTI
***)**
***)**   Switches the decoding on or off

MODE

MODE

Bx 4B FREQ IN:	**Bx 4A BER. C/N:**
f = 12544 MHz -0.3	**0.0e - 8 12.0 dB**

◀ / ▶
+ / −

MULTI

MODE

MODE

Bx 4B   FREQ-IN:
Data Tuner A

MODE

Ⓕ

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5.3.2 Time controlled switching

Ⓒ →

Bx 4a	QPSK-PAL
Das Erste	S21

+ / **−**

Bx 4b	QPSK-PAL
ZDF	S09

MODE   MODE

Bx 4a	TIMER:
On Time	20:00

on / −   ◄ / ►
MULTI   **+** / **−**

MODE

Bx 4a	TIMER:
Off Time	23:00

◄ / ►
+ / **−**

MODE

Bx 4a	TIMER:
Days	MTWTFSS

◄ / ►
+ / **−**

MODE

Ⓔ

5.4 Programming the cassette

—> Pressing the **MODE** button for longer than 2 seconds cancels the programming procedure. This takes you back to the program item "Selecting the cassette" from any menu. Any entries that have not been saved are reset to the previous settings.

—> Entries in the menus can be saved by pressing the **M** key. You are taken back to the "Selecting the cassette" menu item.

- Switch on the head-end station
  - —> The display shows the software version (e.g. V 37)
  - —> The processor reads the cassettes' data (approx. 10 seconds).

```
Ein / On  →  ┌──────────────────────┐
             │ BE–Remote      V 37  │
             │ please wait …        │
             └──────────────────────┘
                      │
                  ┌────────┐
                  │ t > 10 s │
                  └────────┘
                      ↓
```

Selecting the cassette

```
             ┌──────────────────────┐
             │ Bx 1A        TWIN-SAT │
             │ C5-12,S3-24      C07  │
             └──────────────────────┘
                      │
                    ┌───┐
                    │ + │
                    └───┘
                      ↓
┌──────────────────────┐   ┌─────┐   ┌──────────────────────┐
│ Box 4      QPSK-PAL  │ ←─│ + / − │─→ │ Bx 5A     DVBT-DVBT  │
│ C2-69,S2-41    – – – │   └─────┘   │ BD3            C09   │
└──────────────────────┘             └──────────────────────┘
         │
     ┌──────┐                                              (A)
     │ MODE │
     └──────┘
         ↓
```
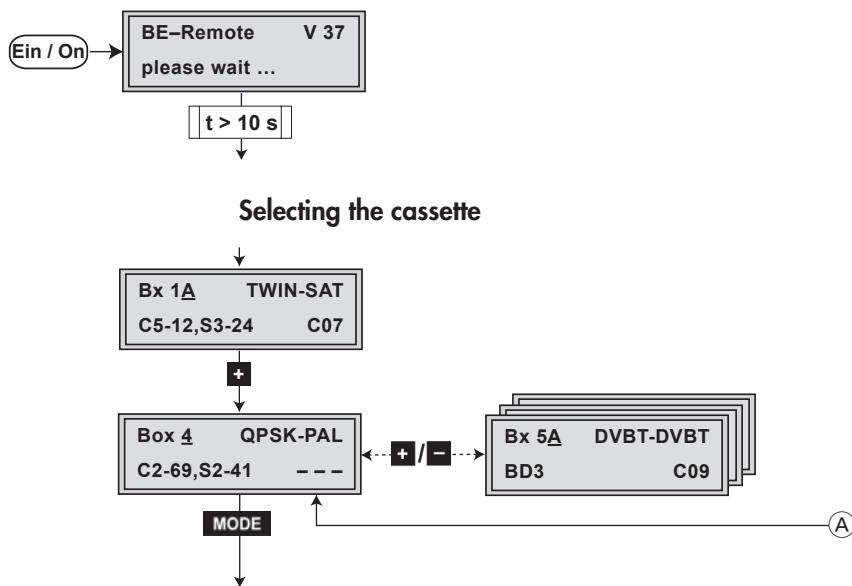
- Select the cassette you want to program (e.g. **Box 4**) by repeatedly pressing the button **+** .

- By pressing the **MODE** button, activate channel strip "**A**".

5.4.1 Programming the main menu of the cassette

Querying the software version
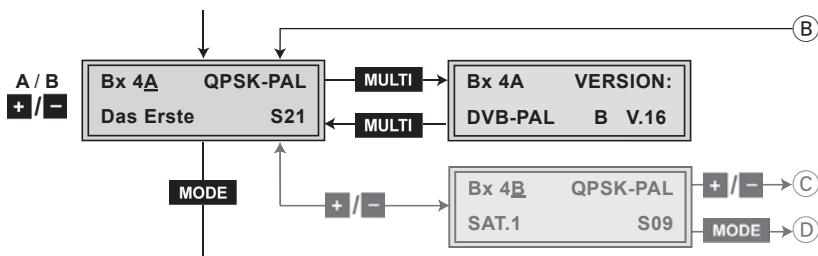
—> The display shows e.g. the menu "**Bx 4A QPSK-PAL**":
    "**Bx**"   stands for cassette (box),
    "**4**"   for slot 4
    "**A**"   for channel strip "**A**"
    "**QPSK-PAL**" Type of cassette
    "**S21**"   Channel set

• Press the **MULTI** button.
 —> The display shows e.g. the menu
    Bx 4A   VERSION:
    DVB-PAL B V.16

    "**B**"   2 programs can be simultaneously
               decoded with this hardware (page 34).
    "**V.16**"   Software version

• To return to the main menu press the **MULTI** button
again.

Selecting the channel strips "A"/"B" and "a"/"b"
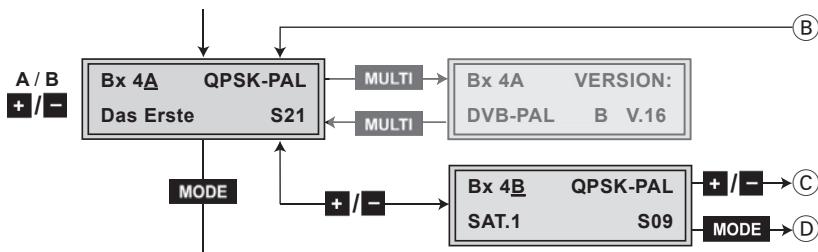
- By pressing **+**/**−**, select channel strip "**A**" / "**B**"
  or "**a**" / "**b**".
  —> The capital letters "**A**" and "**B**" indicate the channel
     strips of the main menu, the small letters "**a**" and "**b**"
     the channel strips of the time-controlled switching on
     and off of channels.

### Setting time-controlled, alternative channels

- By pressing **+**, call up channel strip "**B**".
- Press **+**, again:
  —> Call up timer "**a**"/"**b**" for time-controlled switch-
     ing on and off of channels Ⓒ (page 38).

Decoding of two channels with one CA module

- By pressing **+**, call up channel strip "**B**".
- By pressing the **MODE** button activate the decoding
  of two channel with one CA module Ⓓ (page 34).

- Press the **MODE** button.
  —> The "Modulator operating mode" –
     "**OUTPUT: Modulator**" menu is activated.

Modulator operating mode

In this menu, you can switch the modulator off and on.
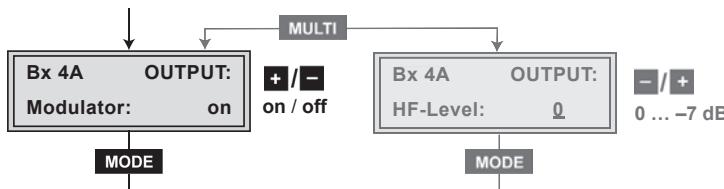
- By pressing **+**/**−**, switch the modulator (output channel)
 "**off**" or "**on**".

Adjusting the output levels of the channel strips

- Press the **MULTI** button.
  —> The menu "Adjusting the output levels of the
     channel strips" – "**OUTPUT: HF-Level**" is acti-
     vated (chapter 5.4.1.1, page 28).

- Press the **MODE** button.
  - —> The "Setting the TV standard of the output signal" – "**NORM**" menu is activated.

Setting the TV standard of the output signal

In this menu you can set the TV standard of the output signal.

```
Bx 4A        NORM:
CCIR   5.5   FM
```
+ / **–**
CCIR 5.5 FM / GB 6.0 FM
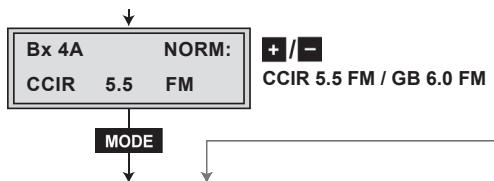
MODE

- Press **+** / **–** to set the TV standard of the output signal.

- Press the **MODE** button.
  - —> The "Setting the output channel / output frequency" – "**OUTPUT:**" menu is activated.

Setting the output channel / output frequency

In this menu you can set the desired output channel (CCIR) or dependent on the TV standard set, the output frequency.

+ / **–**
```
Bx 4A        OUTPUT:
S21
```
MODE

```
Bx 4A        OUTPUT:
S21     Fine      0
```
– / **+**
–64 … +63

MULTI

```
Bx 4A     VIDEO-OUT:
Letter
```
+ / **–**
Letter / 16:9

MODE
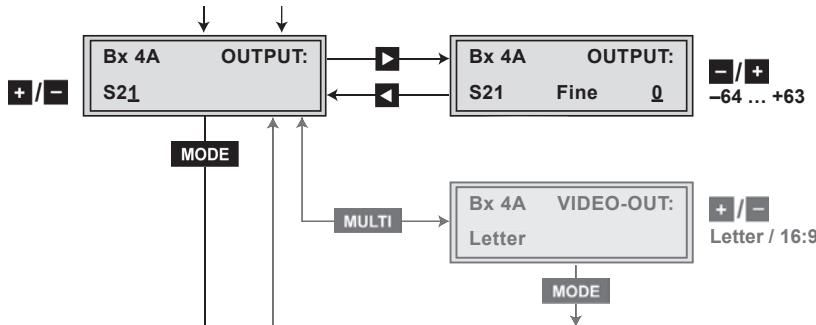
- By pressing **+** / **–** set the output channel / output frequency.

Setting the fine-tuning

Only change the fine-tuning in exceptional circumstances, since once you change it, all connected television sets of the cable system must be adjusted to match it by means of corresponding fine-tuning corrections.

- Press the ▶ button.
  - —> "**FIN**E   **0**" appears in the display.
- Set the fine-tuning using the ➕/➖ buttons.
- Press ◀ to return to the main menu.

Settings for TV stations

- Press the **MULTI** button
  - —> The "Automatic picture format conversion" – "**VIDEO-OUT:**" menu is activated (chapter 5.4.1.2, page 29).

- Press the **MODE** button.
  - —> The "Setting the LNB oscillator frequency" – "**LNB-FREQ:**" menu is activated.

Setting the LNB oscillator frequency

Set the oscillator frequency of the LNB used in this menu.
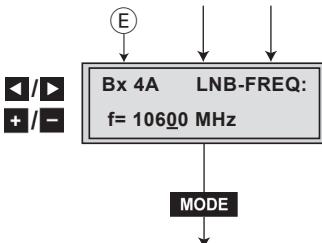
- Use ◀/▶ to position the cursor under the digit of the frequency displayed to be set.

- Press ➕/➖ to enter the oscillator frequency of the LNB used.

- Press the **MODE** button.

—> The "Setting the input symbol rate" –
"**INPUT:** "and e.g. "**SR=27500**" menu is activated.

Setting the input symbol rate

The symbol rates of the satellite transponders can be found in the current channel table of the satellite operator, in various satellite magazines and in the Internet.

◀ / ▶
＋ / ─

| Bx 4A   INPUT: |
| SR= 2750**0** |

MODE

MULTI ↔

| Bx 4A   MENU 1/6 |
| Information |

MODE

Module Hauptmenü
—> Information
Smartkarte
Jugendschutz
Einstellungen
Zurück

Bitte wählen Sie mit OK
AlphaCrypt Light 1.01 (c) Mascom GmbH

TV-Bild
TV picture ◀ / ▶ ＋ / ─
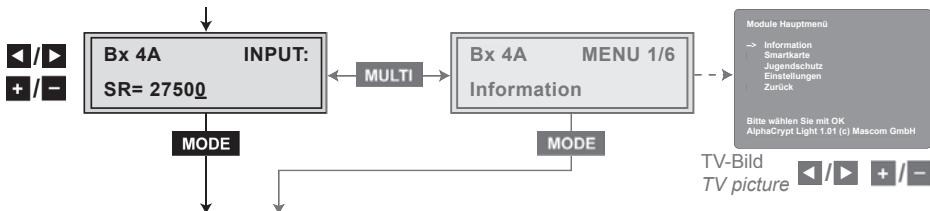
- Use ◀ / ▶ to position the cursor under the digit of the symbol rate displayed to be set.
- Press ＋ / ─ to enter the values of the symbol rate.

Configuring the CA module

- Press the **MULTI** button

—> The "Configuring the CA module" – "**MENU:**" menu is activated (chapter 5.4.1.3, page 33).

- Press the **MODE** button.

—> The "Setting the input frequency" – "**FREQ-IN:**" menu is activated.

Setting the input frequency

If three dots " **…** " appear in the second line of the display, the cassette is in the "**station search**" mode. Please wait until the process has finished.
Once the HF receiver has synchronised to the input signal, any offset to the target frequency is displayed in MHz, e.g. "**– 1.8**".
If a question mark "**?**" appears in the second line of the display, there is no input signal present. Check the configuration

of the antenna system and head-end station as well as the preceding settings of the cassette.

◀/▶
+/−
Bx 4A	FREQ-IN:
f= 1183**6** MHz	0

← MULTI →

Bx 4A	BER. C/N:
0.0e - 8	12.0 dB

VIDEO **MODE**
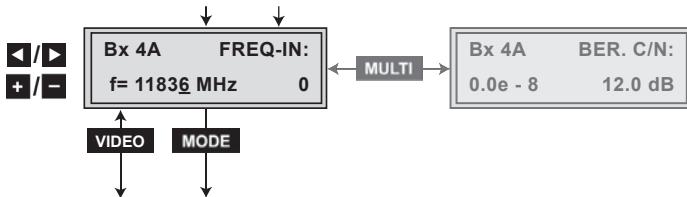
- Use ◀/▶ to position the cursor under the digit of the frequency displayed to be set.
- Press +/− to set the input frequency.
- After setting the input frequency set the frequency offset shown in the display to less than 1 MHz using the +/− buttons.

- Press the **MULTI** button.
  —> The "Reception quality" – "**BER. C/N:**" menu is activated.

Reception quality

In this menu the reception quality (BER = Bit Error Rate) and the signal to noise ratio (C/N) of the signal received is displayed (example):

"**0.0e -8**": Bit Error Rate
"**12.0 dB**": signal to noise ratio

◀/▶
+/−
Bx 4A	FREQ-IN:
f= 1183**6** MHz	0

← MULTI →

Bx 4A	BER. C/N:
0.0e - 8	12.0 dB

VIDEO **MODE**
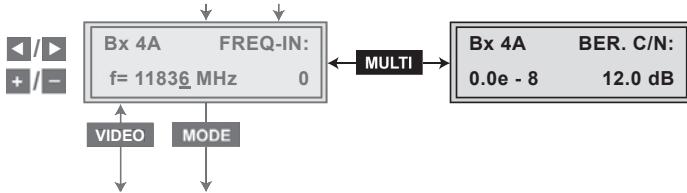
- To return to the main menu press the **MULTI** button.

- Press the **MODE** button.
  —> The "Channel selection" – e.g. "**Bx 4A   01/10+   TV**" menu is activated.

Channel selection

As soon as the automatic station search has found all of the TV or radio channels, the corresponding data appears in the display of the head-end station.
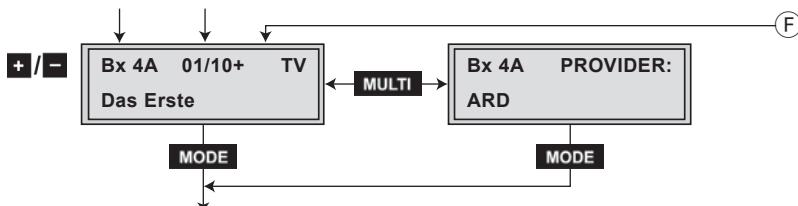
Meaning of the terms displayed in this example:

"**Bx 4A**"   Cassette 4, channel strip "A".

"**01/09**"   The 1st of 9 channels is displayed

" **+** "   means that the sound of the TV programme currently being shown is being broadcast in several languages.

"**TV**"   TV channel type

"**Das Erste**"   Channel name

Further possible terms displayed:

"**RA**"   Radio channel type
    For radio stations, the background of the screen of the connected TV or test receiver is darkened. A menu appears on the screen informing you about the radio station currently selected, the name of the broadcaster, the current time, the title of the current programme along with what time it started and finishes, as well as the title of the following programme.

" ***** "   The star means that the TV or radio station selected is encoded. To enable the stations, the CA module and the appropriate smart card of the station provider are required.

—>   If a service number (e.g. "131") appears instead of "**TV**" or "**RA**", this indicates that an unnamed station or an undefined data stream is being received.

- To select the TV and radio stations of this broadcaster, use the **+** / **–** buttons.

- By pressing **MULTI**, you can call up various station information about the current TV or radio station in the "**PROVIDER:**" menu. To return to the main menu press the **MULTI** button again.

- By pressing the **VIDEO** button, you switch between the "**Setting the input frequency**" and the "**Channel selection**" menu.

```
Bx 4A        FREQ-IN:
f= 11836 MHz        0
```

VIDEO **MODE**

```
Bx 4A   01/10+    TV
Das Erste
```
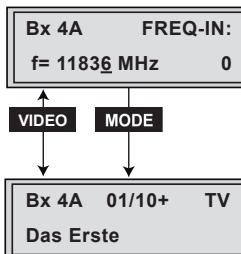
- Press the **MODE** button.
  —> The "Selecting the TV station sound" – "**AUDIO-IN:**" menu is activated.

Selecting the TV station sound

If two sound options in different languages or Dual sound ("**2ch**") are broadcast for a TV station, you can select the desired audio stream from the transport stream in this menu.

```
Bx 4A        AUDIO-IN:
01/02            "deu"
```
+ / **–**
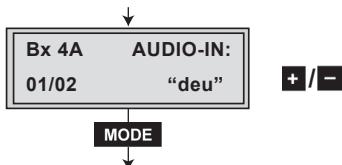
MODE

- Press **+** / **–** to select the desired sound option.

- Press the **MODE** button.
  —> The "Setting the volume level" –
      "**AUDIO-OUT: Volume:**" menu is activated.

Setting the volume level

In this menu, you can balance unequal volume levels of TV and radio stations in the various channel strips.

```
Bx 4A    AUDIO-OUT:        ▬ / ＋
Volume:        0 dB        –24 … +6
```

```
MODE
```
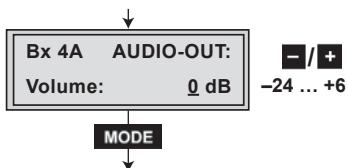
- Set the volume level to the same level as the levels of the other output channels using the ＋ / ▬ buttons (+**6 dB** … **-24 dB**), if necessary.

- Press the **MODE** button.
  —> The "Setting the time zone and summer time" – "**OFFSET:**" menu is activated.

Setting the time zone and summer time

This setting is necessary for "Radio display" and time-controlled channel switching. The internal clock of the cassette synchronises automatically to Greenwich Mean Time, longitude "0" (GMT). So that the programmes can be correctly displayed, the time zone (offset) that your location is in relation to GMT should be entered.

```
Bx 4A      OFFSET:       ＋ / ▬        MULTI            Ⓑ    Ⓐ
13:48:22 ?     +01 S      –12 … +12     S / -

M                   MODE
```
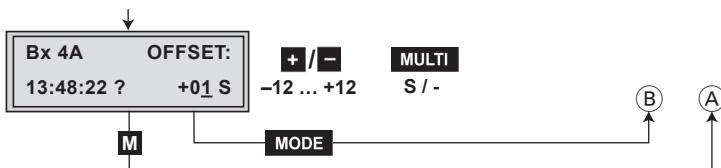
"**13:48:22 ?**"   Time (GMT)
                The current time is displayed when the
                question mark "**?**" disappears.
"**+01**"   + 1 hour (offset to GMT) is set.
"**S**"   Summer time support is switched on.

Example:

Summertime support for the time zone of Germany (GMT + 1 hour) is in:

If "**S**" is switched on, one hour is added in addition to offset (+01) during summer time.

- Press **+** / **−** to set the time zone you live in (offset from -12 hours to +12 hours).
- Press the **MULTI** button to switch summer time support on ("**S**") or off ("**S**" disappears).

Saving settings

- Press the **M** button.
  - —> Back to "Selecting the cassette" (A) (page 17).
  - —> The "new" settings are saved permanently.

  - —> Going back to "Selecting the channel strips **A/B** and **a/b**" (B) (page 18) via **MODE** and selecting another channel strip cancels all settings that have not been saved.

5.4.1.1 Adjusting the output levels of the channel strips

In this menu you can set the output levels of the modulators of the channel strips "**A**" and "**B**" to the same value.

```
                            ┌──────── MULTI ────────┐
                            │                       │
                            ▼                       ▼
   ┌─────────────────────┐      ┌───┐ ┌───┐    ┌─────────────────────┐    ┌───┐ ┌───┐
   │ Bx 4A      OUTPUT:  │      │ + │/│ − │    │ Bx 4A      OUTPUT:  │    │ − │/│ + │
   │ Modulator:      on  │      └───┘ └───┘    │ HF-Level:        0  │    └───┘ └───┘
   └─────────────────────┘      on / off       └─────────────────────┘    0 … −7 dB
              │                                           │
           ┌──────┐                                    ┌──────┐
           │ MODE │                                    │ MODE │
           └──────┘                                    └──────┘
              │                                           │
              ▼                                           │
   ┌─────────────────────┐      ┌───┐ ┌───┐              │
   │ Bx 4A        NORM:  │      │ + │/│ − │              │
   │ CCIR   5.5    FM    │      └───┘ └───┘              │
   └─────────────────────┘  CCIR 5.5 FM / GB 6.0 FM     │
              │                                           │
           ┌──────┐                                      │
           │ MODE │                                      │
           └──────┘                                      │
              │    ┌─────────────────────────────────────┘
              ▼    ▼
   ┌─────────────────────┐   ▶   ┌─────────────────────┐    ┌───┐ ┌───┐
   │ Bx 4A      OUTPUT:  │ ───→  │ Bx 4A      OUTPUT:  │    │ − │/│ + │
┌───┐┌───┐               │       │                     │    └───┘ └───┘
│ + ││ − │  S21          │ ←───  │ S21     Fine     0  │    −64 … +63
└───┘└───┘               │   ◀   └─────────────────────┘
   └─────────────────────┘
```
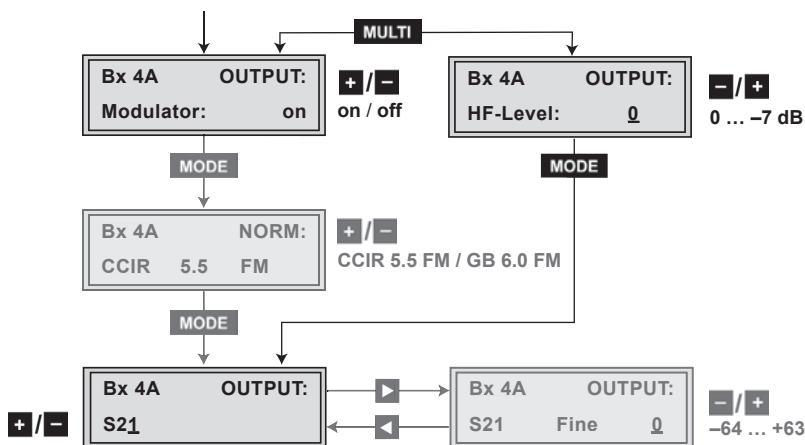
- Measure and note down the output level of the channel strip.
- Save the settings by pressing the **M** button.
- Select the other channel strip (page 18), measure and note down its output level.
- Activate the "**OUTPUT: HF-Level**" menu.
- By pressing '**−** adjust the higher output level of one channel strip to the lower output level of the other channel strip incrementally from "**0**" to "**−7**" dB.
  —> To return to the "**OUTPUT: Modulator:**" main menu, press the **MULTI** button.

- Press the **MODE** button.
  —> The "Setting the output channel/output frequency" – "**OUTPUT:**" menu is activated (page 20).

5.4.1.2 Settings for TV stations

The following settings "Automatic picture format conversion", "Teletext mode" and "Teletext subtitle page" are only relevant for TV stations.

Automatic picture format conversion

TV programmes are transmitted in DVB Standard in picture format 4:3 or 16:9. The cassette recognises these picture formats and prepares them automatically for all of the connected television sets (letterbox).

The "**16:9**" setting should only be selected if all of the television sets connected to the head-end station has the 16:9 format. The factory setting "**Letter**" should be retained in normal circumstances, as 4:3 television sets are also supported in this case. The settings are only effective with TV programmes with the picture format "16:9".

- "**Letter**": black bars at the top and bottom edge of the screen
- "**16:9**": In the case of television sets with the picture format 4:3, the picture content is vertically "stretched" (e.g. faces appear longer).
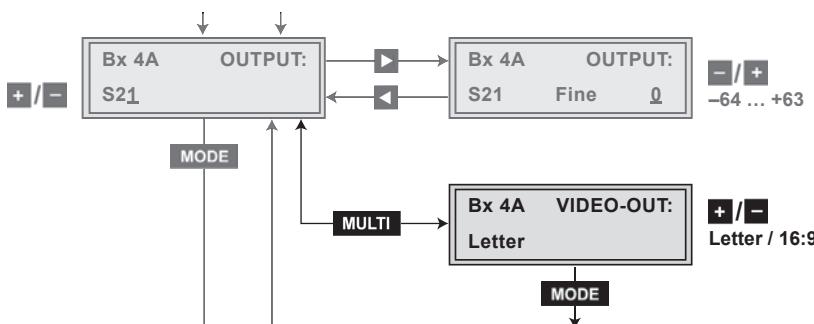
- Press the **+** / **−** buttons to select the desired picture format "**Letter**" or "**16:9**".
  - —> Pressing the **MULTI** button you return to the main menu (Setting the output channel/output frequency) (page 20).

- Press the **MODE** button.
  - —> The "Adjusting the picture format" – "**WSS-OUT: Signaling:**" menu is activated.

Adjusting the picture format

If problems with the automatic picture format switchover (e.g. 4:3, 16:9, Letterbox) arise with the connected devices, you can switch "**off**" the Wide-Screen-Signaling (WSS) in this menu.

```
            ↓
      ┌─────────────────────┐
MULTI │ Bx 4A      WSS-OUT: │  + / −
←─────│                     │  on / off
      │ Signaling:       on │
      └─────────────────────┘
             MODE
              ↓
```
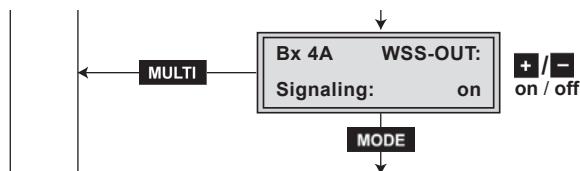
- Press **+ / −** to switch Wide-Screen-Signaling "**on**" or "**off**".
  - —> Pressing the **MULTI** button you return to the main menu (Setting the output channel/output frequency) (page 20).
- Press the **MODE** button.
  - —> The "Locking the regional window" – "**SERVICE: PIDs:**" menu is activated.

Locking the regional window

In this menu the dynamic switch over between the main channel and the associated regional channels can be de-activated.

```
            ↓
      ┌─────────────────────┐
MULTI │ Bx 4A      SERVICE: │  + / −
←─────│                     │  dynamic / fixed
      │ PIDs:      dynamic  │
      └─────────────────────┘
             MODE
              ↓
```
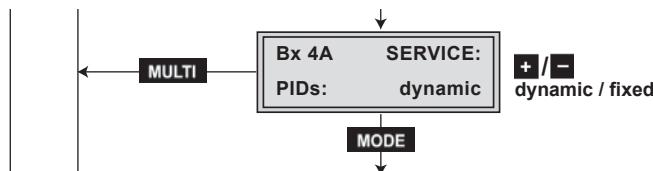
- Press **+ / −** to switch on the dynamic regional switch over ("**dynamic**") or off ("**fixed**").
  - —> Pressing the **MULTI** button you return to the main menu (Setting the output channel/output frequency) (page 20).
- Press the **MODE** button.
  - —> The "Switching teletext mode off/on" – "**OUTPUT: Teletext:**" menu is activated.

Switching teletext mode off/on

In this menu you can define whether the teletext of the channel set is transmitted or not.

```
                    ↓
          ┌─────────────────────┐
  ┌─MULTI─┤ Bx 4A     OUTPUT:   │  [+]/[−]
  │       │                     │  on / off
  │       │ Teletext:       on  │
  │       └─────────────────────┘
  │              [MODE]
  │                 ↓
```
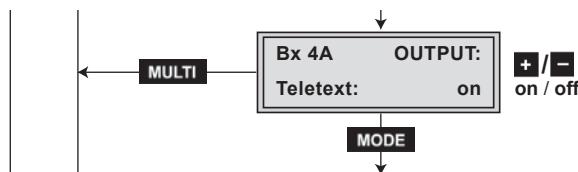
- By pressing [+]/[−] the teletext mode can be switched "**on**" or "**off**".
  - —> Pressing the **MULTI** button you return to the main menu (Setting the output channel/output frequency) (page 20).

- Press the **MODE** button.
  - —> The "Activating and entering teletext subtitle pages" – "**SUBTITLE: TXT-Page:**" menu is activated.

## Activating and entering teletext subtitle pages

This menu allows subtitles transmitted in teletext to be displayed directly in the station.

```
                    ↓
          ┌─────────────────────┐
  │       │ Bx 4A    SUBTITLE:  │  [MULTI]
  │       │                     │  off / 150
  │       │ TXT-Page:      150  │  [◄]/[►]  [+]/[−]
  │       └─────────────────────┘  100 … n
  │              [MODE]
  │                 ↓
```
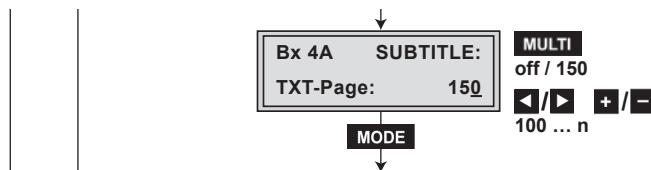
- Press **MULTI** to switch on ("**150**") or off ("**off**") the displaying of teletext subtitles.
- If necessary, press [◄]/[►] to select the 100th, 10th and 1st digit positions of the teletext subtitle page displayed and enter the numbers of the teletext subtitle page wished with the [+]/[−] buttons.

- Press the **MODE** button.
  - —> The "Setting the teletext standard" – "**SUBTITLE: TXT-Norm:**" menu is activated.

Setting the teletext standard

In this menu you define the characters to display the languages. For the Western European languages set "**West**"; for Eastern European languages set "**East**".

```
          ↓
┌─────────────────────┐
│ Bx 4A     SUBTITLE: │   + / −
│ TXT-Norm:     West  │   West / East
└─────────────────────┘
        MODE
          ↓
```
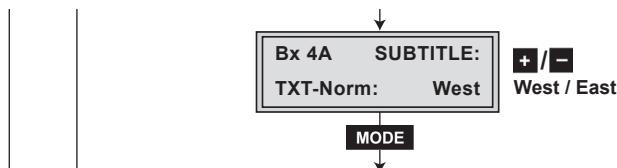
- • Press **+** / **−** to set teletext standard "**West**" or "**East**".

- • Press the **MODE** button.
  - —> The "Setting audio output" –
    "**AUDIO-OUT: Dual ...**" menu is activated.

Setting audio output

In this menu you can swap the languages for TV channels with dual tone.

```
                         ↓
      ┌───────  ┌─────────────────────┐
  MULTI│        │ Bx 4A    AUDIO-OUT: │   + / −
  ←────┘        │ Dual normal         │   normal / swap
               └─────────────────────┘
                       MODE
                         ↓
```
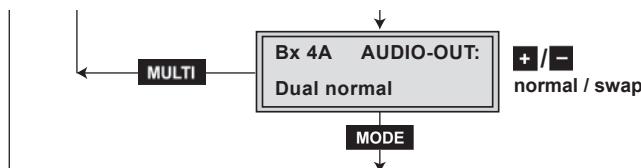
- • Press **+** / **−** to swap languages ("**Dual normal**" /
  "**Dual swap**").
  - —> Pressing the **MULTI** button you return to the main menu (Setting the output channel/output frequency) (page 20).

- • Press the **MODE** button.
  - —> The "Setting the audio mode" –
    "**AUDIO-OUT:**" and e.g. "**MPEG => Audiomode**" menu is activated.

Setting the audio mode

In this menu you can define whether the **Mono**, **Stereo** or **Dual Tone** signal from the MPEG data stream or the VPS Signaling (if available) is to be used.
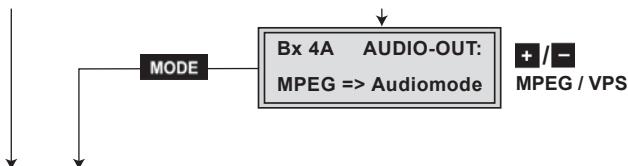
- Press **+** / **−** to switch over the data stream ("**MPEG**" / "**VPS**").

- Press the **MODE** button.
  —> The "Setting the LNB oscillator frequency" – "**LNB-FREQ:**" menu is activated (page 21).

5.4.1.3   Configuring the CA module

This setting supports a menu, which is displayed on the television screen. This menu is dependent on the CA module used. Please observe the operating instructions of the CA module used.
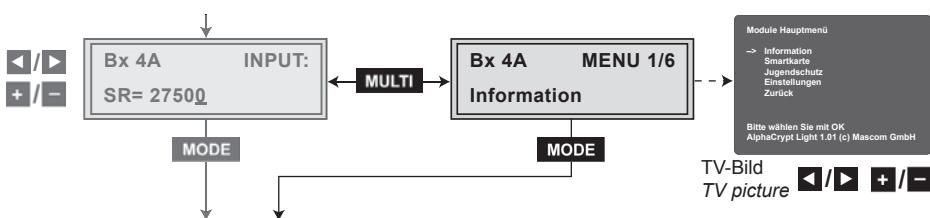
- Press **+** / **−** to select the menu item on the screen.
- Activate menu item with ▶ .
- Select the required function with the **+** / **−** buttons.
- Save the settings with the **M** button.
  —> To return to the "Setting the input symbol rate" – "**INPUT:**" menu, press the **MULTI** button.

- Press the **MODE** button.
  —> The "Setting the input frequency" – "**FREQ.-IN:**" menu is activated (page 22).

5.4.2 Decoding 2 stations with one CA module

⚠ – This feature is only possible via channel strip "**B**".
– The settings not described below are the settings pertaining to channel strip "**A**".

Ⓓ ──── MULTI ────

| `+` / `−`
on / off | **Bx 4B   OUTPUT:**
Modulator: on | | **Bx 4B   OUTPUT:**
HF-Level: 0 | `−` / `+`
0 … −7 dB |

MODE   MODE

Bx 4B   NORM:
CCIR   5.5   FM   `+` / `−`   CCIR 5.5 FM / GB 6.0 FM

MODE

| `+` / `−` | **Bx 4B   OUTPUT:**
S09 | ▶ ◀ | **Bx 4B   OUTPUT:**
S09   Fine   0 | `−` / `+`
−64 … +63 |

MODE   MODE ****)**

| ◀ / ▶
`+` / `−` | **Bx 4B   LNB-FREQ:**
f = 10600 MHz | | **Bx 4B   LNB-FREQ:**
Data Tuner A |

MODE   MODE

| ◀ / ▶
`+` / `−` | **Bx 4B   INPUT:**
SR= 22000 | ← MULTI → ***)** | **Bx 4B   INPUT:**
CI at LINE A |

MODE   MODE

| ◀ / ▶
`+` / `−` | **Bx 4B   FREQ IN:**
f = 12544 MHz   -0.3 | ← MULTI → | **Bx 4A   BER. C/N:**
0.0e - 8   12.0 dB |

MODE

Bx 4B   FREQ-IN:
Data Tuner A   ← MODE

Ⓕ
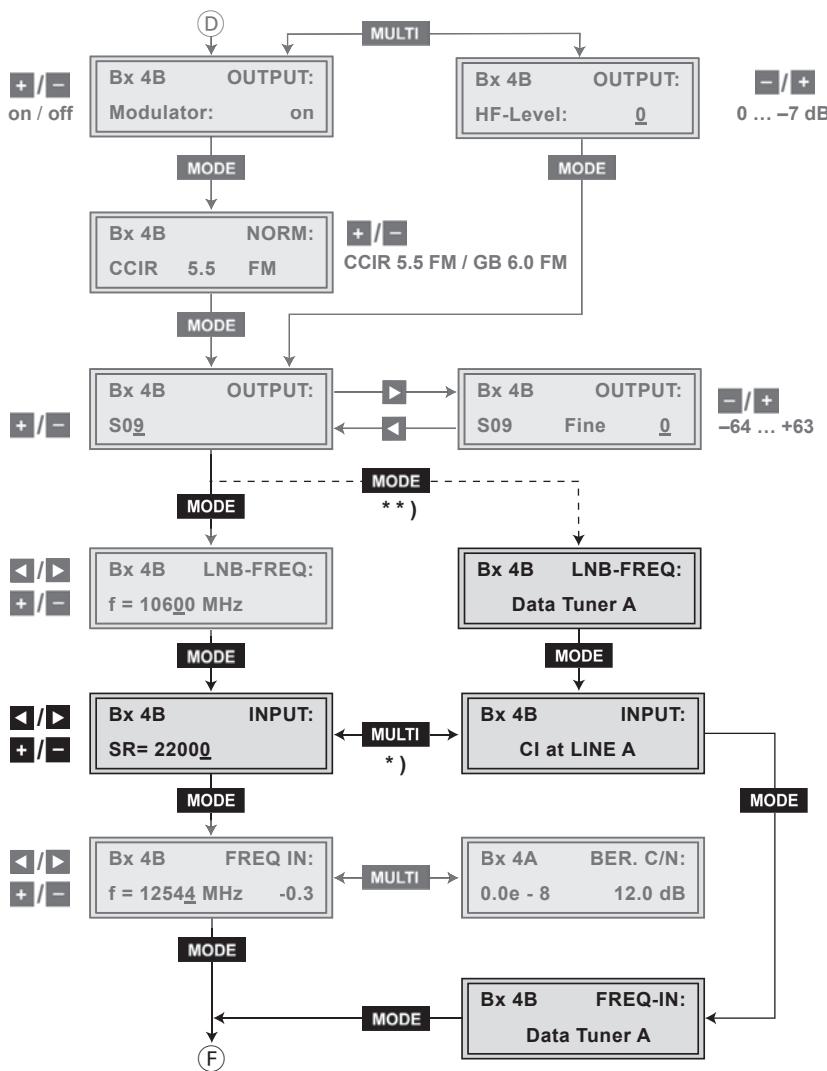
Selecting the channel strip

- Select channel strip "**B**" (page 18).

### Modulator operating mode

—> Setting see page 19.

Setting the TV standard of the output signal

—> Setting see page 20.

Setting the output channel / output frequency

—> Setting see page 20.
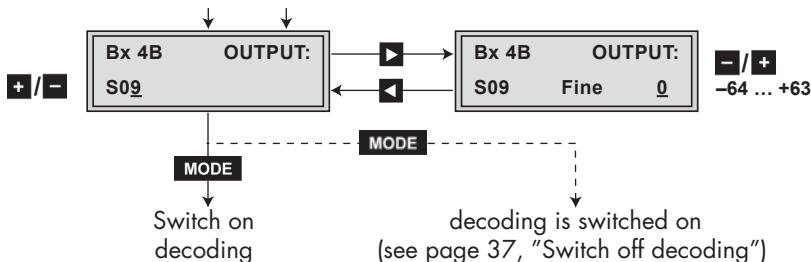
Setting the LNB oscillator frequency

The LNB oscillator frequency is not to be set if decoding is activated.

- Press the **MODE** button.
 —> Setting see page 21.

Switching on decoding / Setting the input symbol rate

⚠️ The input symbol rate is not to be set if decoding is activated.
—> Setting the input symbol rate see page 22.

◀/▶
+/−

| Bx 4B   LNB-FREQ: |
| f = 10600 MHz |

MODE

| Bx 4B   LNB-FREQ: |
| Data Tuner A |

MODE

◀/▶
+/−

| Bx 4B   INPUT: |
| SR= 22000 |

◀—**MULTI**—▶

| Bx 4B   INPUT: |
| CI at LINE A |
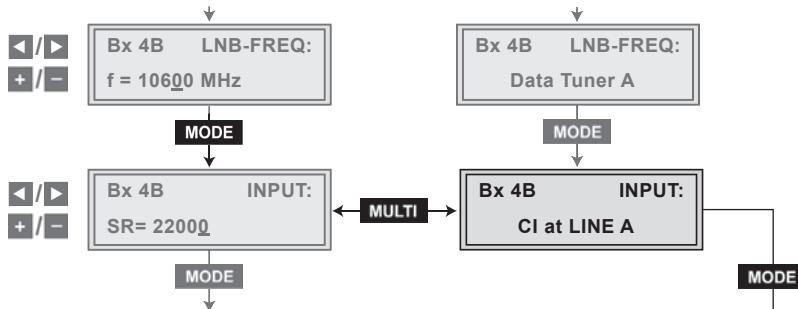
MODE

MODE

- To switch on the decoding press the **MULTI** button in the "Setting the input symbol rate" menu.
  —> The display shows "**INPUT:**"   "**CI at LINE A**".
      The common interface of channel strip "**A**" is used for the decoding.

- Press the **MODE** button.
  —> The display shows "**FREQ-IN: Data Tuner A**" to indicate that the input data of channel strip "**A**" is used as the output data for the modulator of channel strip "**B**".

MODE

Ⓕ

| Bx 4B   FREQ-IN: |
| Data Tuner A |
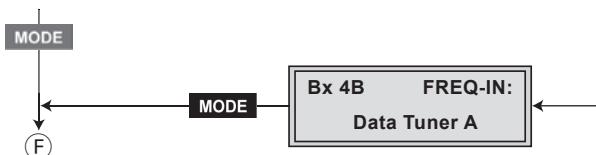
◀—**MODE**—

- Press the **MODE** button.

  —> Return to the main menu ("Channel selection" menu) via connection Ⓕ (page 24).

Ⓕ

+/−

| Bx 4A   01/10+   TV |
| Das Erste |

◀—**MULTI**—▶

| Bx 4A   PROVIDER: |
| ARD |

MODE

MODE

Switch off decoding

◀/▶ +/−	**Bx 4B LNB-FREQ:** **f = 10600 MHz**		**Bx 4B LNB-FREQ:** **Data Tuner A**	

MODE

MODE

◀/▶ +/−	**Bx 4B INPUT:** **SR= 22000**	◀ **MULTI** ▶	**Bx 4B INPUT:** **CI at LINE A**	

MODE

**MODE**
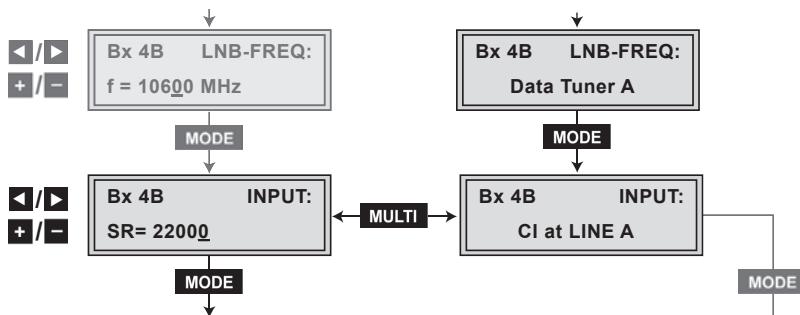
- Press the **MULTI** button.
  - —> The display shows "**INPUT:** and e.g. **SR= 22000**".
    Continue with "**Setting the input symbol rate**"
    (page 22).

### 5.4.3 Setting time-controlled, alternative channels

Channels can be switched on and off by means of a timer in this menu. Here, for the set "**On Time**", a switch over occurs from channel strip "**A**" (or "**B**") to channel strip "**a**" (or "**b**"); for the "**Off Time**", from channel strip "**a**" (or "**b**") to channel strip "**A**" (or "**B**").)

Bx 4a	QPSK-PAL
Das Erste	S21

C →

+ / **−**

Bx 4b	QPSK-PAL
ZDF	S09
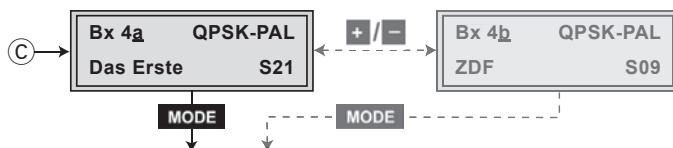
MODE   **MODE**

- Press the **MODE** button.
  - —> The "Setting the switch-on time" –
    "**TIMER: On Time**" menu is activated.

Switching the timer on and off

Setting the switch-on time

Bx 4a	TIMER:
On Time	20:00

MODE

on / −   ◀ / ▶
MULTI   **+** / **−**
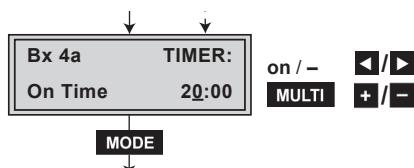
- Press **MULTI** to switch the timer on.
  - —> "**On Time   20:00**", e.g., appears in the display.

  - —> To switch off the timer press **MULTI** .
    "**On Time   —**", appears in the display.

- Use ◀ / ▶ to position the cursor under the digit (hours / minutes) to be set.
- Press **+** / **−** to set the desired switch-on time.

- Press the **MODE** button.
  - —> The "Setting the switch-off time" –
    "**TIMER: Off Time**" menu is activated.
  - —> "**Off Time   23:00**", e.g., appears in the display.

Setting the switch-off time
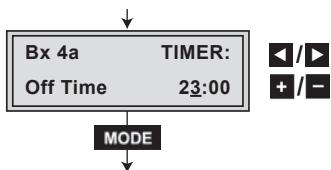
Bx 4a **TIMER:**	◄ / ►
Off Time **23:00**	**+** / **−**

MODE

- Use ◄ / ► to position the cursor under the digit (hours / minutes) to be set.
- Press **+** / **−** to set the desired switch-off time.
- Press the **MODE** button.
  - —> The "Setting the days of the week" –"**TIMER: Days**" and e.g. "**MTWTFSS**" menu is activated.

Setting the days of the week

Bx 4a **TIMER:**	◄ / ►
Days **MTWTFSS**	**+** / **−**

MODE

Ⓔ
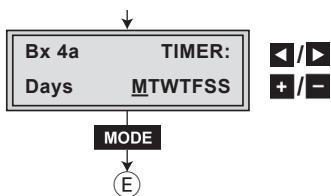
The letters "**MTWTFSS**" mean:
  M – Monday
  T – Tuesday
  W – Wednesday
  T – Thursday
  F – Friday
  S – Saturday
  S – Sunday

- Use ◄ / ► to position the cursor under the day to be set.
- Press **+** / **−** to switch on or off (**−**) the day on which the timer should and should not be active
  (e.g. "**TIMER: Days   MTWTF − −**"
  —> Saturday and Sunday are switched off).

- Press the **MODE** button.
  - —> Return to main menu Ⓔ (page 21).

6   Channel and frequency tables

CCIR – Band I/III (Frequency raster 7 MHz)

Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]
C 2	48.25	S 5	133.25	C 5	175.25	C 11	217.25	S 15	259.25
C 3	55.25	S 6	140.25	C 6	182.25	C 12	224.25	S 16	266.25
C 4	62.25	S 7	147.25	C 7	189.25	S 11	231.25	S 17	273.25
S 2	112.25	S 8	154.25	C 8	196.25	S 12	238.25	S 18	280.25
S 3	119.25	S 9	161.25	C 9	203.25	S 13	245.25	S 19	287.25
S 4	126.25	S 10	168.25	C 10	210.25	S 14	252.25	S 20	294.25

CCIR – Hyperband (Frequency raster 8 MHz)

Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Bildträgerfrequenz Picture carrier frequency [MHz]	Kanalmittenfrequenz Channel centre frequency [MHz]
S 21	303.25	306.00	S 27	351.25	354.00	S 33	399.25	402.00	S 39	447.25	450.00
S 22	311.25	314.00	S 28	359.25	362.00	S 34	407.25	410.00	S 40	455.25	458.00
S 23	319.25	322.00	S 29	367.25	370.00	S 35	415.25	418.00	S 41	463.25	466.00
S 24	327.25	330.00	S 30	375.25	378.00	S 36	423.25	426.00			
S 25	335.25	338.00	S 31	383.25	386.00	S 37	431.25	434.00			
S 26	343.25	346.00	S 32	391.25	394.00	S 38	439.25	442.00			

CCIR – Band IV/V (Frequency raster 8 MHz)

C 21	471.25	474.00	C 35	583.25	586.00	C 49	695.25	698.00	C 63	807.25	810.00
C 22	479.25	482.00	C 36	591.25	594.00	C 50	703.25	706.00	C 64	815.25	818.00
C 23	487.25	490.00	C 37	599.25	602.00	C 51	711.25	714.00	C 65	823.25	826.00
C 24	495.25	498.00	C 38	607.25	610.00	C 52	719.25	722.00	C 66	831.25	834.00
C 25	503.25	506.00	C 39	615.25	618.00	C 53	727.25	730.00	C 67	839.25	842.00
C 26	511.25	514.00	C 40	623.25	626.00	C 54	735.25	738.00	C 68	847.25	850.00
C 27	519.25	522.00	C 41	631.25	634.00	C 55	743.25	746.00	C 69	855.25	858.00
C 28	527.25	530.00	C 42	639.25	642.00	C 56	751.25	754.00			
C 29	535.25	538.00	C 43	647.25	650.00	C 57	759.25	762.00			
C 30	543.25	546.00	C 44	655.25	658.00	C 58	767.25	770.00			
C 31	551.25	554.00	C 45	663.25	666.00	C 59	775.25	778.00			
C 32	559.25	562.00	C 46	671.25	674.00	C 60	783.25	786.00			
C 33	567.25	570.00	C 47	679.25	682.00	C 61	791.25	794.00			
C 34	575.25	578.00	C 48	687.25	690.00	C 62	799.25	802.00			

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