

# Assembly Instructions

English



Grundig SAT Systems

## PROFESSIONAL 2 x DVB-C2/T2 Digital QAM

PCT2T 8000



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## 1 SAFETY REGULATIONS AND NOTES



- 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 0 °C to +50 °C. In case of the formation of condensation wait until the system is completely dried.
- 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.
- The standards EN/DIN EN 50083 resp. IEC/EN/DIN EN 60728 must be observed.
- **For further information please read the assembly instructions for the head-end station used.**
- **Test the software versions of the head-end station and the cassette and update them if necessary. The current software versions can be found at "www.gss.de/en".**



**Take action to prevent static discharge when working on the device!**



**Electronic devices should never be disposed of in the household rubbish. In accordance with directive 2002/96/EC of the European Parliament and the European Council from January 27, 2003 which addresses old electronic and electrical devices, such devices must be disposed of at a designated collection facility. At the end of its service life, please take your device to one of these public collection facilities for proper disposal.**

## 2 GENERAL INFORMATION

### 2.1 PACKING CONTENTS

- 1 Cassette PCT2T 8000
- 2 HF cables
- 1 Brief assembly instructions
- 1 Measuring log

### 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 (page 42).

Unless otherwise noted all values are specified as "typical".

#### **RF input**

Frequency range: ..... 42 ... 862 MHz

Channel range: ..... C 05 ... C 12, S 21 ... S 41, C 21 ... C 69

Input level: ..... 60 dB $\mu$ V ... 80 dB $\mu$ V

Input impedance: ..... 75  $\Omega$

#### **COFDM modulator**

Signal processing: ..... DIN EN 300744

Transmission modes: ..... 2k

Types of modulation: ..... QPSK, 16 QAM, 64 QAM

Code rates: .....  $1/2$ ,  $2/3$ ,  $3/4$ ,  $5/6$ ,  $7/8$

Guard intervals: .....  $1/4$ ,  $1/8$ ,  $1/16$ ,  $1/32$

#### **RF output**

Frequency range: ..... 42.0 MHz ... 860.0 MHz

Channels: ..... C5 ... C12, C21 ... C69

Types of modulation: ..... QPSK, 16 QAM, 64 QAM

**Connections:**

RF inputs: ..... 2 F sockets  
RF output: ..... 1 IEC socket  
Connection strip (10-pin): .....for supply voltages and control circuits  
RS-232 socket: ..... serial interface for software update  
Common Interface: .....2 (several channels can be descrambled).

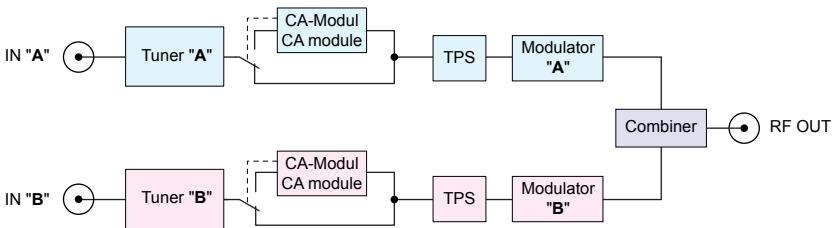
**Remote maintenance**

Remotely controllable (via PSW 1000\*): .....yes  
Remote update (via BEflash\*): .....yes  
(\* and a corresponding management unit)

**2.4 DESCRIPTION**

The twin transmodulator cassette is a converter, which converts signals modulated according to DVB-C/C2/T/T2 standard into two COFDM modulated signals for feeding into a cable network. The cassette has two digital RF inputs and one RF output.  
Two common interfaces are present to descramble scrambled channels.

**BLOCK DIAGRAM**



**GENERAL**

The cassette is equipped with two channel strips ("A" and "B"). Using adequate CA modules scrambled channels can be descrambled via tuner "A" and "B".  
LEDs provide an indication of the input signal quality based on their colour and indicate if the respective channel strip is switched on (LED illuminates) or off (see Fig. on page 11).

LED indicator	Indication
Green	Signal quality is good
Orange	Signal quality is poor
Red	No signal
Red<-->Green	Data rate overflow (output)
Off	Channel strip (modulator) off

The integrated TPS module (Transport Stream Processing) processes the data of the transport streams.

Channel as well as frequency setting is possible for modulators.

The COFDM modulated RF output signals are sent through the RF output of the cassette to the output collector. The common output level of the channel strips can be set at the output collector.

The control of the cassette takes place via the control unit of the head-end station. When the head-end station is switched on, the two-line LC display shows the software version of the control unit. To operate this cassette the software version of the control unit must be **"V 45"** 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.de/en](http://www.gss.de/en)"**.

The cassette is intended for use in the PROFI-LINE head-end stations.

## 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 45"** appears.

### Cassette

The software version of the cassette is shown in the display after activating the cassette (see page 18).

## 2.6 HOW THE TPS MODULE WORKS

After decoding the input signals, the demodulated data streams can be accessed via the integrated TPS module. These data streams, also called transport streams, contain several stations in all their components (video, audio, data and service information), which can be changed using the TPS module.

### STATION FILTER

Individual stations can be deleted. This reduces the data rate and, consequently, the output symbol rate.

### CHANGING THE TRANSPORT STREAM AND ORGNET-ID

The transport stream ID can be changed. If the stations of a transponder are split into the transport streams of different channel strips, a new identification must be allocated to the "new" transport streams to realise the channel search of the settop boxes connected without mistakes.

If the ORGNET-ID is changed a new NIT must be generated.

### CHANGING THE NIT

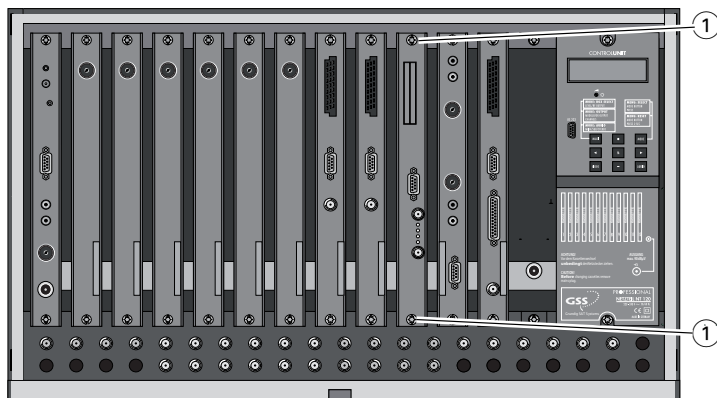
The transport stream contains data in the form of tables which the receivers evaluate and require for convenient use. The TPS module can adjust the "Network Information Table" (NIT) to accommodate the new station data. The "NIT" contains data which is required by the set-top boxes connected to the cable network for the automatic search feature.



## 3 ASSEMBLY

### 3.1 INSTALLING THE CASSETTE

- 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 screws ①.



## 3.2 EMC REGULATIONS

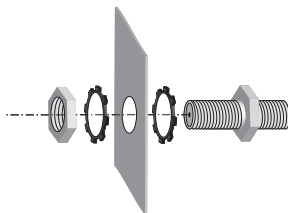


To comply with the current EMC regulations, it is necessary to connect the lines leading in and out of the head-end station using cable terminals.

When mounting the cassette in a 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 cable terminals.



The attenuation of shielding of the connection lines for ASI and antenna must meet the requirements for "Class A".

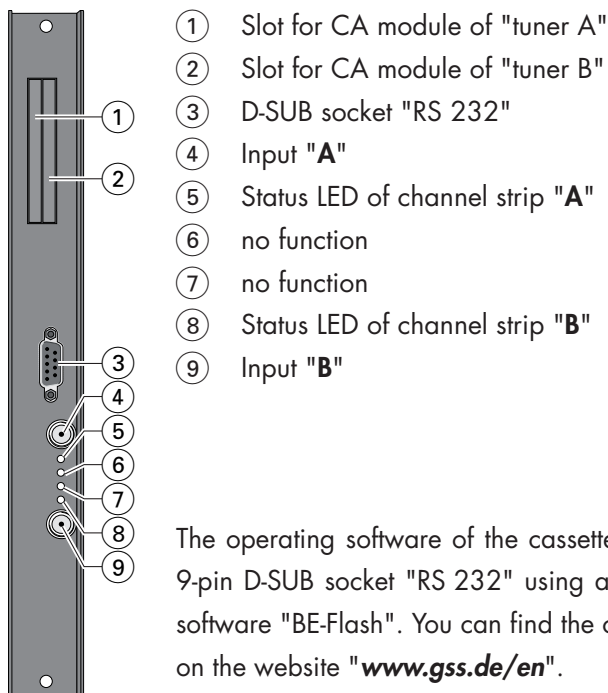


- Insert the required number of cable terminals in the openings provided in the head-end station or in the 19" cabinet.



Tighten the nuts on the cable terminals until the teeth on the lock washer have penetrated the exterior coating and a good connection is made between the housing and cable terminals.

### 3.3 CASSETTE OVERVIEW



The operating software of the cassette can be updated via the 9-pin D-SUB 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.de/en](http://www.gss.de/en)".

### 3.4 CONNECTING THE CASSETTE

- Connect "input A" ④ and "input B" ⑨ to corresponding signal sources.

—> Avoid wide differences in level at the inputs!

- Connect the head-end station to the mains power supply.

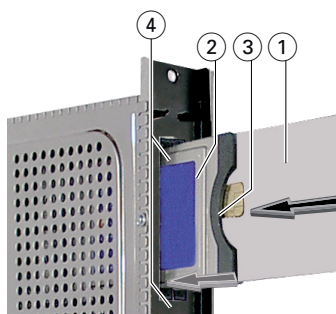
### 3.5 RETROFITTING A CA MODULE

The cassette is equipped with two common interfaces. This allows you to connect two CA modules for various scrambling systems and service providers. Scrambled channels can only be descrambled with a CA module suitable for the scrambling system and the corresponding smart card. The smart card contains all the information for authorisation, descrambling and subscription.



#### Caution

- Check with the distributor or manufacturer of the CA modules to be used to ensure that they are suitable for descrambling several channels.
  - **The hardware and software of this cassette have been thoroughly prepared and tested.**
  - **Any changes made by programme provider to the structures in the programme data might impair or even prevent this function.**
  - When working with the CA modules, please read the corresponding operating manuals from the respective providers.
- 
- Insert the smart cards into the CA modules so that the chip ③ on the smart card ① faces the thicker side (top) of the CA module ②.
  - Insert the CA modules into the slots ④ with the top sides of the CA modules in left direction.
  - Push the CA modules without canting into the guide rails of the CA slots ④ and contact them to the common interfaces.



—> If the cassette is inserted in the head-end station, the left common interface is assigned to tuner A, the right one to tuner B.

## 4 THE CONTROL PANEL AT A GLANCE

### 4.1 MENU ITEMS

Programme 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.

The parameters and functions to be set are underlined.

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

- Output signal settings:
  - Modulator on/off, level
  - Output channel / Output frequency
  - Transmission parameters
  - Substitute signal
- Input signal settings:
  - Kind of modulation
  - Physical Layer Pipes / Slices
  - Input channel / frequency
  - Station filter
  - CA module
  - Economize descrambling capacity
- Options:
  - Transport stream and ORGNET-ID
  - BAT, STD-other
  - Deleting a PID
  - Renaming a PID
- Data rate
- Network Information Table (NIT)
- Factory reset



### 4.2 CONTROL PANEL

The key pad on the head-end station is used to scroll through the menus step-by-step:

- |              |                                     |
|--------------|-------------------------------------|
| <b>MODE</b>  | scrolls forward through the menus.  |
| <b>◀ / ▶</b> | select parameters in the menus.     |
| <b>+ / -</b> | set values, initiate actions.       |
| <b>MULTI</b> | selects sub-menus.                  |
| <b>AUDIO</b> | scrolls backward through the menus. |
| <b>M</b>     | saves all entries.                  |



## 5 PROGRAMMING

### 5.1 PREPARATION

- Test the software versions of the head-end station and the cassette and update them if necessary.  
The current software versions can be found on the website "[www.gss.de/en](http://www.gss.de/en)".
- Connect the test receiver to the RF output or the test output of the head-end station.
- Set the output channel / output frequency of the cassette (page 19) and adjust the TV test receiver to this channel / frequency.
- Switch on the channel strip (modulator) if necessary (page 19). For each channel strip, there is a status LED which indicates if the channel strip is switched on (⑤, ⑧ page 11).
- Balance the output levels of the channel strips "A" and "B" if the difference in level is  $\geq 1$  dB (page 19).

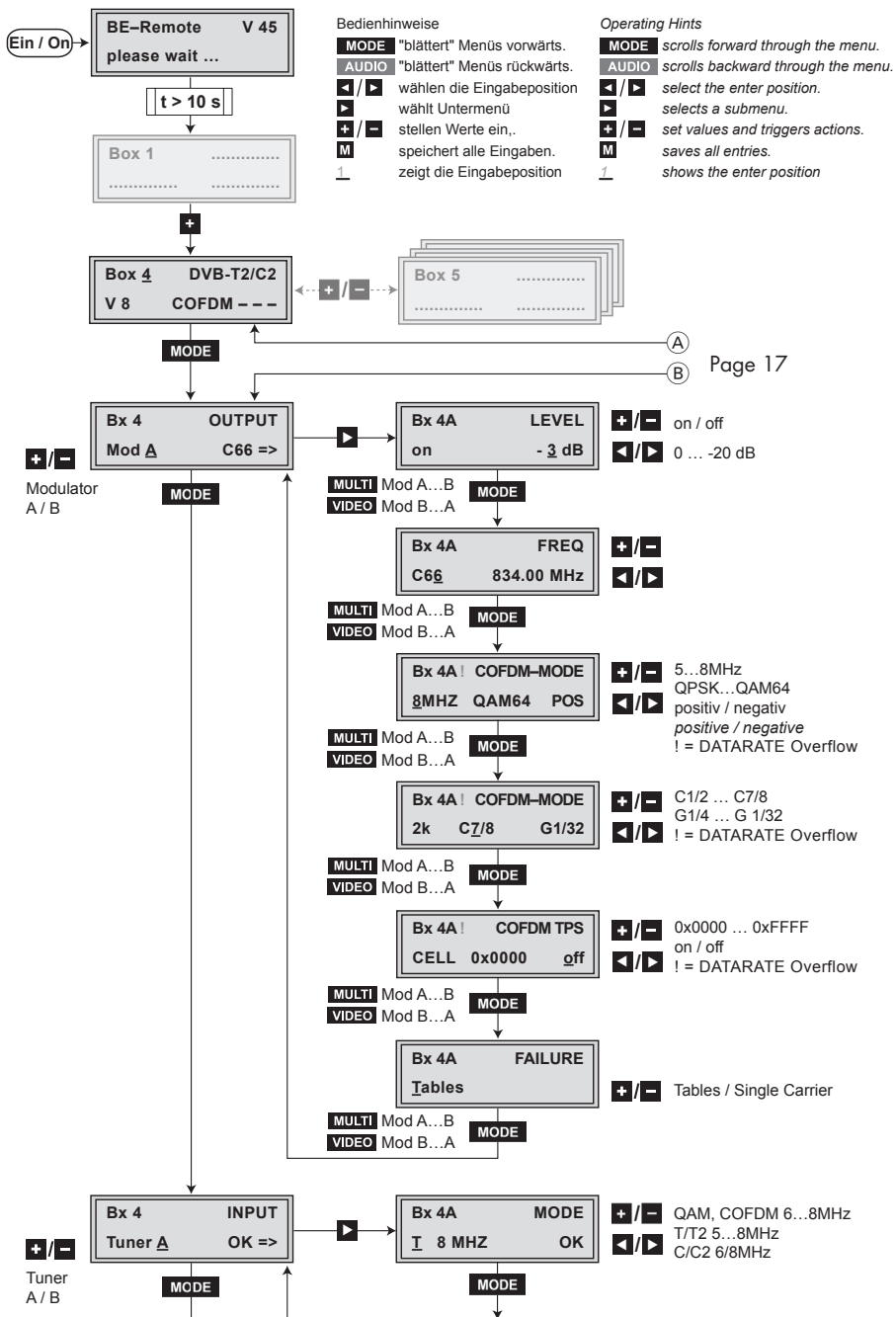
### 5.2 NOTES ON LEVEL SETTING

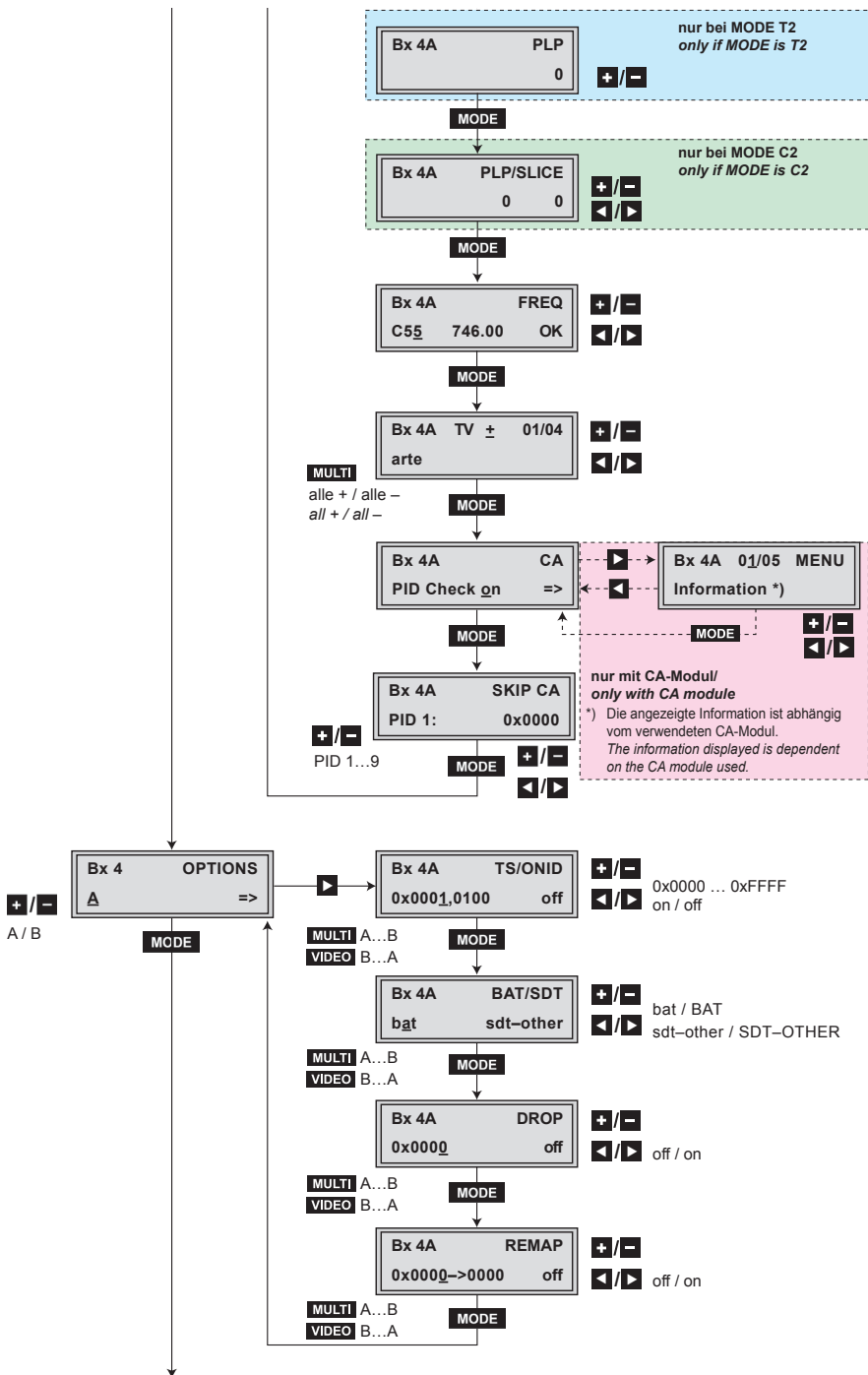
In order to prevent interference within the head-end station and the cable system, the output level of the cassette must be decreased by 4 dB compared to analogue cassettes.

- Measure the output levels of the other cassettes and tune them to a uniform output level using the appropriate level controls or software dependent on the head-end station used. Please regard the assembly instructions of the respective head-end station.

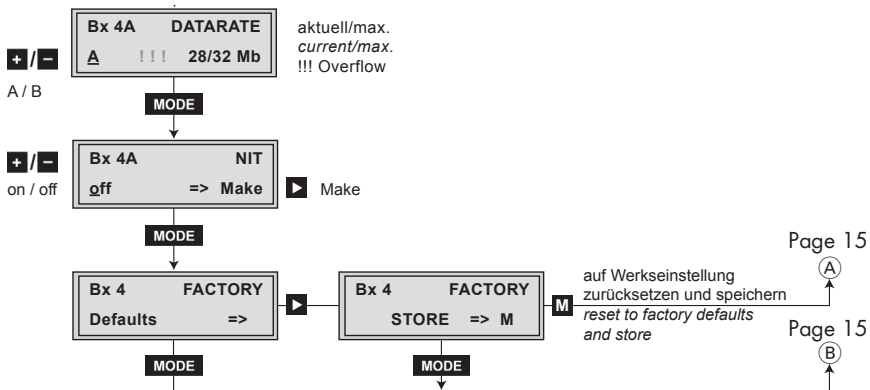
—> Avoid wide differences in level at the inputs!

## 5.3 PROGRAMMING PROCEDURE







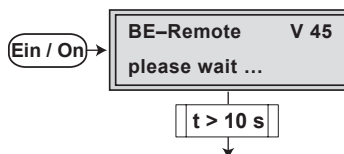


## 5.4 PROGRAMMING THE CASSETTE

- Pressing the **MODE** button for longer than 2 seconds cancels the programming procedure. This takes you back to the programme 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.
- The cursor position for settings is shown by "\_".

- Switch on the head-end station

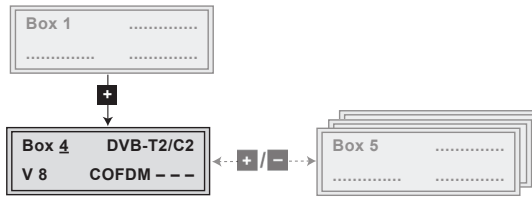
- The display shows the software version (e.g. V 45).
- The processor reads the cassettes' data (approximately 10 seconds).



- Press the **MODE** button.

- The "Selecting the cassette" – "**Box x ...**" menu is activated.

## SELECTING THE CASSETTE



- Select the cassette you want to programme (e.g. **Box 4**) by repeatedly pressing the button **+** if necessary.

→ The display shows e.g. the menu : **Box 4 DVB-T2/C2**  
**V8 COFDM**

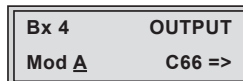
"Box 4" stands for slot 4  
 "DVB-T2/C2 COFDM" Type of cassette  
 "V 8" Software version of the cassette

- Press the **MODE** button.

→ The "Output settings" – **"OUTPUT"** main menu is activated.

## OUTPUT SETTINGS

In this menu you select the modulator for which you would like to do the output settings in the related submenus.



→ In order to skip the "Output settings", press button **MODE**.

→ For example an indicated "C66" shows the current channel set. If "C –" is displayed a frequency which does not correspond to the DVB-T channel/frequency grid was set.

→ It is possible to rotate through the submenus of the modulators using the buttons **MULTI** and **VIDEO**.

- Using buttons **+**/**-** select the desired modulator.
- Press the **▶** button.

→ The "Modulator on/off, Level" – **"LEVEL"** submenu is activated.

## MODULATOR ON/OFF, LEVEL

This menu item is used to set the output levels of the four modulators to the same value and to switch the modulators on or off.

Bx 4A/B	LEVEL
on	- 3 dB

- Measure and note down the output level of each modulator.

—> To adjust the output levels to the output levels of the other cassettes please pay attention to chapter "Final procedures" (page 40).

- Using the buttons **MULTI** (ascending) or **VIDEO** (descending) activate the "LEVEL" menu of all the modulators with higher output levels.
- By pressing **+/ -** adjust the higher output levels to the output level of the modulator with the lowest output level incrementally.
- Use the **◀** button to place the cursor under "on" resp. "off".
- Use the **+/ -** buttons to switch each modulator on or off.
- Press the **MODE** button.

—> The "Channel / Frequency" – "**FREQ**" submenu is activated.

## CHANNEL / FREQUENCY





In this menu you adjust the output channel (only at modulator A + C) or the output frequency of the respective modulator.

—> The COFDM signal is normally transmitted with a bandwidth of 8 MHz. This means that you can only use the channel centre frequency of the existing channel grid in the range of channels S21...C69 (frequency grid 8 MHz). The CCIR channel grid is 7 MHz in the range of the lower frequency bands (channels C5 ... C12). If 8 MHz COFDM signal packages are transmitted in these channel ranges, this will result in interference (overlapping) and transmission problems.

For programming in these channel ranges and in the frequency ranges below them, we recommend starting with frequency 306 MHz going back in steps of 8 MHz (see frequency table on page 41). Please note thereby that many receivers cannot receive the channel ranges S21 ... S41 (306 ... 466 MHz).





### Channel setting:

Bx 4A/B	FREQ
C66	834.00 MHz

- Use buttons  /  to select the cursor position for channel setting.
- Use buttons  /  to adjust the desired channel.

### Frequency setting (42,0 MHz ... 860,0 MHz):

Bx 4A/B	FREQ
C66	834.00 MHz

- Use buttons  /  to select the cursor position for frequency setting.
- Use buttons  /  to adjust the desired frequency.

- Press the **MODE** button.

—> The "Output signal" – "**COFDM-MODE**" submenu is activated.  
Please take note of the tables below before setting the COFDM parameters.

## COFDM PARAMETERS

The tables below show the dependence of the transmittable net data rate on the settings of the COFDM parameters.

The conversion of the net data rate into the gross data rate displayed in the "Output data rate" menu (page 37) is made according to the following formula:

$$\text{Gross data rate} = \frac{204 \times \text{net data rate}}{188}$$

		Net data rate [kbit/s] at a bandwidth of 8 MHz			
		Guard interval			
Modulation	Code rate	1/4	1/8	1/16	1/32
QPSK	1/2	4976	5529	5855	6032
	2/3	6635	7373	7806	8043
	3/4	7465	8294	8782	9048
	5/6	8294	9216	9758	10053
	7/8	8709	9676	10246	10556
16 QAM	1/2	9953	11059	11709	12064
	2/3	13271	14745	15612	16086
	3/4	14929	16588	17564	18096
	5/6	16588	18431	19516	20107
	7/8	17418	19353	20491	21112
64 QAM	1/2	14929	16588	17564	18096
	2/3	19906	22118	23419	24128
	3/4	22394	24882	26346	27144
	5/6	24882	27647	29273	30160
	7/8	26126	29029	30737	31668

If the bandwidth is decreased by 1 MHz the transmittable data rate is decreased by approx.  $\frac{1}{8}$ .

		Net data rate [kbit/s] at a bandwidth of 7 MHz			
		Guard interval			
Modulation	Code rate	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$
QPSK	$\frac{1}{2}$	4354	4838	5123	5278
	$\frac{2}{3}$	5806	6451	6830	7037
	$\frac{3}{4}$	6532	7257	7684	7917
	$\frac{5}{6}$	7257	8064	8538	8797
	$\frac{7}{8}$	7620	8467	8965	9237
16 QAM	$\frac{1}{2}$	8709	9676	10246	10556
	$\frac{2}{3}$	11612	12902	13661	14075
	$\frac{3}{4}$	13063	14515	15369	15834
	$\frac{5}{6}$	14515	16127	17076	17594
	$\frac{7}{8}$	15240	16934	17930	18473
64 QAM	$\frac{1}{2}$	13063	14515	15369	15834
	$\frac{2}{3}$	17418	19353	20491	21112
	$\frac{3}{4}$	19595	21772	23053	23751
	$\frac{5}{6}$	21772	24191	25614	26390
	$\frac{7}{8}$	22861	25401	26895	27710

		Net data rate [kbit/s] at a bandwidth of 6 MHz			
		Guard interval			
Modulation	Code rate	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$
QPSK	$\frac{1}{2}$	3732	4147	4391	4524
	$\frac{2}{3}$	4976	5529	5855	6032
	$\frac{3}{4}$	5599	6221	6587	6786
	$\frac{5}{6}$	6221	6912	7318	7540
	$\frac{7}{8}$	6532	7257	7684	7917
16 QAM	$\frac{1}{2}$	7465	8294	8782	9048
	$\frac{2}{3}$	9953	11059	11709	12064
	$\frac{3}{4}$	11197	12441	13173	13572
	$\frac{5}{6}$	12441	13824	14637	15080
	$\frac{7}{8}$	13063	14515	15369	15834
64 QAM	$\frac{1}{2}$	11197	12441	13173	13572
	$\frac{2}{3}$	14929	16588	17564	18096
	$\frac{3}{4}$	16796	18662	19760	20358
	$\frac{5}{6}$	18662	20735	21995	22620
	$\frac{7}{8}$	19595	21772	23053	23751

	Transmission parameters for DVB-T at a bandwidth of 8 MHz											
Transmission mode	2k				4k				8k			
Symbol duration $T_S$ [ $\mu$ s]	224				448				896			
Carrier space $\Delta f$ [kHz]	4.4643				2.232				1.116			
$(n_{\text{carrier}})_{\text{theoretical}}$	2048				4096				8192			
$(n_{\text{carrier}})_{\text{real}}$	1705				3410				6817			
Used bandwidth [MHz]	7.61				7.61				7.61			
Total symbol duration $T_{GS}$ [ $\mu$ s]	280	262	238	231	560	504	476	462	1120	1008	952	924
Guard interval $T_G$ [ $\mu$ s]	56	28	14	7	112	56	28	14	224	112	56	28
$T_G / T_S$	$1/4$	$1/8$	$1/16$	$1/32$	$1/4$	$1/8$	$1/16$	$1/32$	$1/4$	$1/8$	$1/16$	$1/32$

	Transmission parameters for DVB-T at a bandwidth of 7 MHz											
Transmission mode	2k				4k				8k			
Symbol duration $T_S$ [ $\mu$ s]	224				448				896			
Carrier space $\Delta f$ [kHz]	4.4643				2.232				1.116			
$(n_{\text{carrier}})_{\text{theoretical}}$	2048				4096				8192			
$(n_{\text{carrier}})_{\text{real}}$	1705				3410				6817			
Used bandwidth [MHz]	6.66				6.66				6.66			
Total symbol duration $T_{GS}$ [ $\mu$ s]	320	288	272	264	620	576	544	528	1280	1152	1088	1056
Guard interval $T_G$ [ $\mu$ s]	64	32	16	8	128	64	32	16	256	128	64	32
$T_G / T_S$	$1/4$	$1/8$	$1/16$	$1/32$	$1/4$	$1/8$	$1/16$	$1/32$	$1/4$	$1/8$	$1/16$	$1/32$

	Transmission parameters for DVB-T at a bandwidth of 6 MHz											
Transmission mode	2k				4k				8k			
Symbol duration $T_S$ [ $\mu$ s]	224				448				896			
Carrier space $\Delta f$ [kHz]	4.4643				2.232				1.116			
$(n_{\text{carrier}})_{\text{theoretical}}$	2048				4096				8192			
$(n_{\text{carrier}})_{\text{real}}$	1705				3410				6817			
Used bandwidth [MHz]	5.71				5.71				5.71			
Total symbol duration $T_{GS}$ [ $\mu$ s]	373	336	317	308	767	672	634	616	1493	1344	1269	1232
Guard interval $T_G$ [ $\mu$ s]	74.7	37.3	18.7	9.3	149	75	37.4	18.6	298.7	149.3	74.6	37.3
$T_G / T_S$	$1/4$	$1/8$	$1/16$	$1/32$	$1/4$	$1/8$	$1/16$	$1/32$	$1/4$	$1/8$	$1/16$	$1/32$

## OUTPUT SIGNAL

In this menu, you can set the bandwidth, the carrier modulation and the spectral position of the output signal.



### Bandwidth of the output signal

To transmit the output signal in the channel range of S21 to C69 a bandwidth of 8 MHz can be used.

In the channel range of C5 to C12 a bandwidth of  $\leq 7$  MHz must be set.

If frequency setting is selected you can set the bandwidth dependent on the frequency of the adjacent channel.



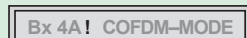
- Use **+**/**-** to set the bandwidth of the output signal ("5 MHz" ... "8 MHz").

### Carrier modulation

In this menu item the carrier modulation is set. At this the setting "QPSK" corresponds to the lowest and the setting "QAM64" to the highest output data rate.

- Use the **◀**/**▶** buttons to place the cursor under "QPSK / QAM...".
- Set the carrier modulation of the output signal using the **+**/**-** buttons ("QPSK", "QAM16", "QAM64").

—> A displayed "!" indicates an output data rate overflow (page 37).



### Spectral position – inverting the user signal

For exceptional cases and "older" digital cable receivers, the spectral position of the user signal can be inverted "NEG". The default setting is "POS".

- Use **◀**/**▶** to place the cursor under "POS".
- Use **+**/**-** to set the spectral position to "NEG".
- Press the **MODE** button.



—> The "Transmission parameters" – "**COFDM-MODE**" submenu is activated.

## TRANSMISSION PARAMETERS

In this menu you can set the code rate and the guard interval.

Bx 4A! COFDM-MODE		
2k	C7/8	G1/32

—> The 2k transmission mode is fixed.

2k mode: 1512 carrier for user data (total 1705 carriers)

—> A displayed "!" indicates an output data rate overflow (page 37).

Bx 4A! COFDM-MODE		
-------------------	--	--

### Code rate

During a transmission data can be lost or changed. To recover this data redundancy is added to the signal to be transmitted (forward error correction). The factor of the quantity of redundancy contained in the bits transmitted is called code rate.

Using the setting "**C7/8**" you can get the highest output data rate at lowest redundancy.

- Use the ◀/▶ buttons to place the cursor under "**C...**".
- Set the code rate required using the +/– buttons ("**C1/2**", "**C2/3**", "**C3/4**", "**C5/6**", "**C7/8**").

### Guard interval

In this menu item you set the relation of the duration of the user symbols to the duration of the guard intervals to be transmitted. A high guard interval, e.g. "**G1/4**" causes a low output data rate. For cable networks the setting "**G1/32**" is adequate.

- Use the ◀/▶ buttons to place the cursor under "**G...**".
- Set the guard interval required using the +/– buttons ("**G1/4**", "**G1/8**", "**G1/16**", "**G1/32**").
- Press the **MODE** button.








—> The "Transmitter identification" – "**COFDM TPS**" menu is activated.


## TRANSMITTER IDENTIFICATION

At terrestrial transmission an identification is referred to each COFDM modulated transmitter. When COFDM modulated signals are fed into cable networks this identification is not necessary usually. If receiving problems should occur you must refer a transmitter identification (CELL ID) to each output channel and switch "**on**" the transmitter identification.

Bx 4A!	COFDM TPS
CELL 0x0000	<u>off</u>

—> A displayed "!" indicates an output data rate overflow (page 37).

- Use the / buttons to position the cursor under the digit of the hexadecimal number to be set.
- Press / to set the respective digit of the hexadecimal number.
- Repeat the procedure by the quantity of the digits to be set.
- Using the  button place the cursor under "**off**" and switch "**on**" the transmitter identification using the / buttons.

—> By pressing the  button you return to the hexadecimal number setting.

- Press the **MODE** button.

—> The "Substitute signal in the case of an incorrect input signal" – "**FAILURE**" submenu is activated.

## SUBSTITUTE SIGNAL IN THE CASE OF AN INCORRECT INPUT SIGNAL

You use this menu to set whether a "**Single Carrier**" signal should be provided or the self-made tables "**Tables**" should transmitted furthermore whenever an incorrect input signal occurs.

Bx 4A/B	FAILURE
<u>Tables</u>	

- Use the **+**/**-** buttons to set the required output signal.
- Press the **MODE** button.

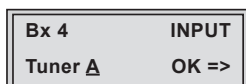
—> Returning to "Output settings" main menu (page 18).  
 —> If necessary set a further modulator.

- Press the **MODE** button.

—> The "Input parameter" – "**INPUT**" main menu is activated.

## INPUT PARAMETER

In this menu you select the tuner for which you would like to do the input parameter in the related submenus.



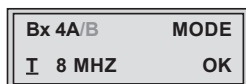
—> In order to skip the "Input parameter setting", press button **MODE**.  
 —> "OK" indicates a present input signal.

- Using the buttons **+**/**-** select the desired tuner.
- Press button **▶**.

—> The "Kind of modulation" – "**MODE**" submenu is activated.

## KIND OF MODULATION

In this menu set the kind of modulation and the symbol rate (only QAM) of the input signal.



- Select the kind of modulation of the transponder (T 6/7/8 MHz, T2 5/6/7/8 MHz, C2 6/8 MHz, C) using buttons **+**/**-**.

- Press the **MODE** button.

If T/C is selected:

→ The "Input channel / frequency" – **"FREQ"** submenu is activated (page 29).

If T2/C2 is selected:

→ The "Physical Layer Pipes" – **"PLP"** submenu is activated

## PHYSICAL LAYER PIPES / SLICES

→ This menu is only displayed if you have selected "T2" or "C2" for the kind of modulation.

In this menu, you enter the parameter(s) **PLP** (DVB-T2) or **PLP** and **SLICE** (for DVB-C2), which are required for the selection of the data stream.

### DVB-T2

Bx 4A	PLP
	0

### DVB-C2

Bx 4A	PLP/SLICE
	0 0

→ For the reception of DVB-T2 / C2 transponders operating in **"Mode B" (Multiple Input Streams)**, the **Physical Layer Pipe ID** is needed to select a data stream. If the data streams of a DVB-C2 transponder are also bundled into slices, additionally you need the **Slice ID** to select a data stream.

→ If you can not receive the desired data stream with the default IDs "0" (e.g. also used at **"Mode A" – Single Input Stream**), ask your service provider for the corresponding IDs!

- Use buttons ◀/▶ to position the cursor under the digit of the parameters to be set.
- Press buttons +/– to set the desired parameter.
- Press the **MODE** button.

→ The "Input channel / frequency" – **"FREQ"** submenu is activated.

## INPUT CHANNEL / FREQUENCY

In this menu you set the input channel / input frequency of the transponder you would like to receive.

<b>Bx 4A/B</b>	<b>FREQ</b>
<b>C55</b>	<b>746.00 OK</b>

- Use buttons **◀**/**▶** to position the cursor under the digit of the frequency resp. channel displayed to be set.
- Press buttons **+**/**-** to set the desired channel/frequency.

- > Once the RF receiver has synchronised to the input signal, "OK" is displayed.
- > If "–" appears in the second line of the display, there is no input signal present. Check the configuration of the antenna system and the head-end station as well as the preceding settings of the module.
- > The quality of the received transport stream is indicated by a status LED:

LED indicator	Indication
Green	Signal quality is good
Yellow	Signal quality is insufficient
Red	No signal
Blinking red/green	Data overflow of the output data rate
Off	The channel strip (modulator) is switched off

- Press the **MODE** button.

- > The "Station filter" – e.g. "01/06" submenu is activated.

In order to descramble scrambled channels a corresponding smart card is needed.

The channels to be descrambled are set in submenu "station filter".

### STATION FILTER

In this menu stations (services) of a transponder can be switched off.

Herein you select which scrambled station should be descrambled using an adequate CA module.



—> All stations from the channel strip will be read, and then displayed with name and station type.

—> If no station is found, the following error message will appear in the display: **"FILTER no Service"**.

In this case, check the configuration of the antenna system and head-end station, as well as the previously adjusted settings for the cassette.

—> The display shows e.g.: **Bx 4A TV + 01/04**  
**arte**

#### Meaning of the indicators in the example:

"Bx 4A"	Slot 4, channel strip "A"
"TV"	TV channel type
" + "	The currently selected station is switched on.
"01/04"	The 1st of 4 stations is being displayed.
"arte"	Station 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.
" - "	The currently selected station is switched off.
" * "	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.

- Use the ◀/▶ buttons to call up the stations in sequential order, then use +/– to activate (indicated by " + ") or to deactivate them (indicated by " – ").

—> Using button **MULTI** all station can be activated/deactivated.  
—> If a station is scrambled (indication "\*"), in this menu you select whether it should be descrambled using an adequate CA module.

- Press button **+** twice to descramble a station (indication "X").

Bx 4A/B TV *X	01/04
---------------	-------

- Press the **MODE** button.

—> The "PID monitoring" – "CA" submenu is activated.

## PID MONITORING

In this menu you can switch off the PID monitoring and call up a menu for the settings of the CA module (dependent on the CA module).

Bx 4A	CA
PID Check on	=>

### PID monitoring:

—> The factory default of the PID monitoring is switched on.  
If particular PIDs are not descrambled the CA module is reset. Additionally dropouts may occur if several stations are decrypted. To prevent this the PID monitoring can be switched off.

- Use the +/– buttons to switch "off" or "on" the PID monitoring.

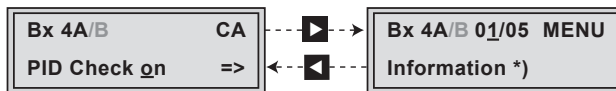
### Menu of the CA module:

- Use the  button to activate the menu of the CA module.

—> Access to this menu is only possible with installed **CA module** and inserted smart card.

## CA MODULE

The menu varies according to which CA module you are using. For this reason, please refer to the operating manual of your particular CA module. The relevant information is shown in the display of the head-end station. This may appear as a fixed display or as scrolling text according to display capabilities.












—> The display shows e.g.: **Bx 4A 01/05 MENU**

### Meaning of the indicators:

"Bx 4A"	Slot 4, channel strip "A"
"01/05"	The first of five menu items is activated.
"MENU"	The menu of the CA module is activated.

For the explanation of further details please use the operating instructions of the CA module used.

- Use the  /  buttons to activate the menu desired.
- Press the  button to activate the menu.
- Use the  /  buttons to select the function desired.
- To set the CA module use the  /  and  /  buttons.

—> By pressing the **MODE** button you can cancel the settings in the menu of the CA module and are returned to the "PID monitoring" – "CA PID-Check" menu.

- All settings are saved by pressing the **M** button.

—> You will be returned to the "PID monitoring" – "CA PID-Check" menu.

- Press the **MODE** button.

—> The "Economize descrambling capacity" – "SKIP CA" is activated.



## ECONOMIZE DESCRAMBLING CAPACITY

In this menu up to 9 not needed PIDs (e.g. audio PIDs of foreign language versions) can be excluded from the descrambling in order to economize descrambling capacity.

Bx 4A/B	SKIP CA
PID 1:	0x0000

- Using buttons **+**/**-** select the desired memory location (PID 1...9) .
- Use **◀**/**▶** to position the cursor under the digit of PID to be set.
- Press **+**/**-** to set the respective digit of the PID needed.
- Repeat the procedure by the quantity of the digits to be set.

—> If required select another memory location and enter the next PID which shall **not** descrambled.  
—> To delete a stored PID, overwrite it by "0000".

- Press the **MODE** button.

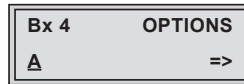
—> Returning to "Input parameter" - "**INPUT**" main menu (page 27).  
—> If required set further channel strips.

- Press the **MODE** button.

—> The "Option settings" – "**OPTIONS**" main menu is activated.

## OPTIONS

In this menu you select the channel strip for which you would like to do the option settings in the related submenus.



- > In order to skip the "Option settings", press button **MODE**.
- > It is possible to rotate through the channel strips within the submenus using the buttons **MULTI** and **VIDEO**.

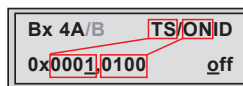
- Using the buttons **+**/**-** select the desired channel strip.
- Press button **▶**.

—> The "Transport stream ID and ORGNET-ID" – **TS/ONID** menu is activated.

## TRANSPORT STREAM ID AND ORGNET-ID

If the stations of a transponder are split into the transport streams of several channel strips, a new identification must be allocated to the further transport streams to realise the channel search of the settop boxes connected without mistakes.

If the ORGNET-ID is changed also a new NIT must be generated (page 37).



- Use the **◀**/**▶** buttons to position the cursor under the digit of the hexadecimal number to be set.
- Press **+**/**-** to set the respective digit of the hexadecimal number.
- Repeat the procedure by the quantity of the digits to be set.
- Using the **▶** button place the cursor under "off" and switch "on" the transmitter identification using the **+**/**-** buttons.

—> By pressing the **◀** button you return to the hexadecimal number setting.

- Press the **MODE** button.

—> The "BAT/SDT-OTHER tables" – "**BAT/SDT**" submenu is activated.

## BAT/SDT-OTHER TABLES

In this menu you can switch on resp. off the BAT- and SDT-OTHER tables.







—> **BAT** = **B**ouquet **A**ssociation **T**able:

Information in the data stream about the affiliation of station packets to a specific bouquet.

—> **SDT-OTHER** = **S**ervice **D**escription **T**able – **OTHER** data streams:

Information in the data stream about service parameter of other data streams.

Bx 4A/B	BAT/SDT
bat	sdt-other

- Using the  button place the cursor under "**bat**" and switch "on" ("**BAT**") or "off" ("**bat**") the bouquet association table using the  /  buttons.
- Using the  button place the cursor under "**sdt-other**" and switch "on" ("**SDT-OTHER**") or "off" ("**sdt-other**") the service description table using the  /  buttons.

—> Capital letters: Function activated

Lower case letters: Function deactivated (factory default)



- Press the **MODE** button.

—> The "Deleting a PID" – "**DROP**" submenu is activated.

## DELETING A PID

In this menu a PID of the transport stream can be deleted.

Bx 4A/B	DROP
0x0000	off

- Use the  /  buttons to place the cursor under the respective digit of the

hexadecimal number of the PID to be deleted ("0x0000") and set the hexadecimal number using **+**/**-**.

- Use the **▶** button to set the cursor under "off" and delete the PID using the **+**/**-** buttons ("on").
- Press the **MODE** button.

—> The "Renaming a PID" – "REMAP" submenu is activated (page 36).

## RENAMING A PID

In this menu you can allocate a new address to a PID retaining the complete data content.

Bx 4A/B	REMAP
0x0000->0000	off

- Use the **◀**/**▶** buttons to place the cursor under the respective digit of the hexadecimal number of the PID to be changed ("0x0000") and set the hexadecimal number using **+**/**-**.
- Use the **◀**/**▶** buttons to place the cursor under the respective digit of the hexadecimal number of the new PID ("-> 0000").
- Set the hexadecimal number using **+**/**-**.
- Use the **▶** button to set the cursor to "off" and rename the PID using the **+**/**-** buttons ("on").
- Press the **MODE** button.

—> Returning to "Option settings" main menu (page 34).

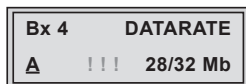
—> If necessary set further channel strips.

- Press the **MODE** button.

—> The "Output data rate" – "DATARATE" main menu is activated.

## OUTPUT DATA RATE

This menu shows the output data rate defined using the COFDM settings and the current output data rate.

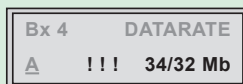


**28:** The current measured gross output data rate.

**32:** Maximum gross output data rate

If the station filter is set correctly, current data rate is lower than the maximum data rate. The value fluctuates, since the data rates of individual stations are dynamically modified by the broadcasters.

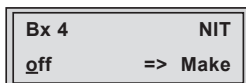
—> Is the current data rate higher than the maximum data rate exclamation marks "!!!" appear in the display. In this case correct the COFDM settings (pages 24 ...) or the settings of the station filter (page 30).



- Press the **MODE** button.

—> The "Network Information Table" – "NIT" main menu is activated.

## NETWORK INFORMATION TABLE (NIT)





- To switch NIT on/off ("on"/"off") press the **+** / **-** buttons.
- Press the **▶** button to activate NIT ("Make").



All active cassettes which are able to output a NIT ("NIT cassettes") must be set and ready for reception.

—> The NIT of all "NIT cassettes" are switched on.  
—> The cassette fetches all the information (output frequencies, output data rates, etc.) it needs from all the "NIT cassettes" in order to generate the NIT. This process may take a few seconds.  
Then the NIT is generated, added and sent to all "NIT cassettes".  
The other "NIT cassettes" also add this new NIT. The status of all "NIT cassettes" in the NIT menu changes to **"on"**.  
The display shows: **"read ... / copy ..."**.

- To switch off the new NIT (**"off"**) press the  button.

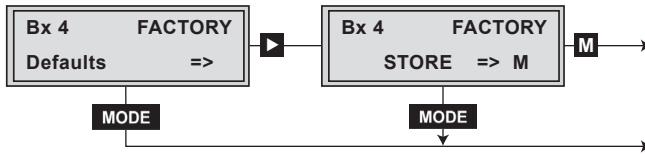
—>  The NITs of the other "NIT cassettes" will stay switched on. When the NIT of the cassette is switched on again (**"on"**) by pressing the  button, the previously generated NIT is added again. If you have changed parameters in the meantime, you must first select **"Make"** to generate a new, up-to-date NIT.

- Press the **MODE** button.

—> The "Factory reset" – **"FACTORY Defaults"** menu is activated.

## FACTORY RESET

In this menu you can reset all settings to the factory defaults.



- Press the **▶** button.

—> The factory defaults are invoked ("FACTORY STORE").  
—> By pressing the **MODE** button, you will be returned to the menu item "Output settings" **without** invoking the factory defaults (page 18).

- Press the **M** button.

—> The factory defaults are saved.  
The display shows "STORE"  
—> Back to "Selecting the cassette" (page 18).  
—> By pressing the **MODE** button, you will be returned to the menu item "Output settings" **without** saving the factory defaults (page 18).  
—> If necessary set another channel strip.

## SAVING SETTINGS

- Press the **M** button.

—> Returning to "Selecting the cassette" menu (page 18).  
—> The settings are saved.  
—> If necessary set another channel strip.



**After installing the head-end station, upgrading accessories or installing cassettes it is necessary to tighten all cable connections, cable terminals and cover screws in order to maintain compliance with current EMC regulations securely.**

- Securely tighten the cable connections using an appropriate open-ended spanner.
- Measure the output levels of the other cassettes and tune them to a uniform output level using the appropriate level controls or software dependent on the head-end station used. Please regard the assembly instructions of the respective head-end station.
- Mount the front cover (see assembly instructions of the head-end station).



## 7 CHANNEL AND FREQUENCY TABLES

Advice for a frequency grid (8 MHz) in the band I/III

Frequenz Frequency [MHz]	Frequenz Frequency [MHz]	Frequenz Frequency [MHz]	Frequenz Frequency [MHz]	Frequenz Frequency [MHz]	Frequenz Frequency [MHz]
42.00	82.00	146.00	186.00	226.00	266.00
50.00	114.00	154.00	194.00	234.00	274.00
58.00	122.00	162.00	202.00	242.00	282.00
66.00	130.00	170.00	210.00	250.00	290.00
74.00	138.00	178.00	218.00	258.00	298.00

Channel / frequency assignment for DVB-T (band III, frequency grid 7 MHz)




Kanal Channel	Frequenz Frequency [MHz]	Kanal Channel	Frequenz Frequency [MHz]	Kanal Channel	Frequenz Frequency [MHz]
C 5	177.5	C 8	198.5	C 11	219.5
C 6	184.5	C 9	205.5	C 12	226.5
C 7	191.5	C 10	212.5		

CCIR – Hyperband (frequency grid 8 MHz)

Kanal Channel	Kanalmittefrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittefrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittefrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittefrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittefrequenz Channel centre frequency [MHz]
S 21	306.00	S 26	346.00	S 30	378.00	S 34	410.00	S 38	442.00
S 22	314.00	S 27	354.00	S 31	386.00	S 35	418.00	S 39	450.00
S 23	322.00	S 28	362.00	S 32	394.00	S 36	426.00	S 40	458.00
S 24	330.00	S 29	370.00	S 33	402.00	S 37	434.00	S 41	466.00
S 25	338.00								

CCIR – Band IV/V (frequency grid 8 MHz)

C 21	474.00	C 31	554.00	C 41	634.00	C 51	714.00	C 61	794.00
C 22	482.00	C 32	562.00	C 42	642.00	C 52	722.00	C 62	802.00
C 23	490.00	C 33	570.00	C 43	650.00	C 53	730.00	C 63	810.00
C 24	498.00	C 34	578.00	C 44	658.00	C 54	738.00	C 64	818.00
C 25	506.00	C 35	586.00	C 45	666.00	C 55	746.00	C 65	826.00
C 26	514.00	C 36	594.00	C 46	674.00	C 56	754.00	C 66	834.00
C 27	522.00	C 37	602.00	C 47	682.00	C 57	762.00	C 67	842.00
C 28	530.00	C 38	610.00	C 48	690.00	C 58	770.00	C 68	850.00
C 29	538.00	C 39	618.00	C 49	698.00	C 59	778.00	C 69	858.00
C 30	546.00	C 40	626.00	C 50	706.00	C 60	786.00		

	<b>Konformitätserklärung</b> <b>Declaration of Conformity</b> <b>003/ 14</b>																											
<p>Der Hersteller/Importeur      <b>GSS Grundig SAT Systems GmbH</b>  The manufacturer/importer</p> <p>Anschrift / Address / Adresse      <b>Beuthener Straße 43, D-90471 Nürnberg, Germany</b></p> <p>erklärt hiermit eigenverantwortlich, daß das Produkt:  declare under their sole responsibility that the product:</p> <p>Bezeichnung / Name / Description      <b>Head-End Digital Transmodulator  2x DVB-C2/T2 - COFDM</b></p> <p>Type / Model / Type      <b>GSS PCT2T 8000</b></p> <p>Bestell-Nr. / Order-No.      <b>GAP 5300</b></p> <p>folgenden Normen entspricht:  is in accordance with the following specifications:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><b>EN 50083-2:</b></td> <td style="width: 16.5%;"><b>2012</b></td> <td style="width: 33%;"><b>EN 60065:</b></td> <td style="width: 16.5%;"><b>2002</b></td> </tr> <tr> <td><b>EN 50581:</b></td> <td><b>2012</b></td> <td><b>EN 60065 + A1:</b></td> <td><b>2006</b></td> </tr> <tr> <td></td> <td></td> <td><b>EN 60065 + A11:</b></td> <td><b>2008</b></td> </tr> <tr> <td></td> <td></td> <td><b>EN 60065 + A2:</b></td> <td><b>2010</b></td> </tr> <tr> <td></td> <td></td> <td><b>EN 60065+ A12:</b></td> <td><b>2011</b></td> </tr> </table> <p>Das Produkt erfüllt somit die Forderungen folgender EG-Richtlinien:  Therefore the product fulfils the demands of the following EC-Directives:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 15%; vertical-align: top;"><b>2006/95/EG</b></td> <td><b>Richtlinie betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen</b>  Directive relating to electrical equipment designed for use within certain voltage limits</td> </tr> <tr> <td style="vertical-align: top;"><b>2004/108/EG</b></td> <td><b>Richtlinie über die elektromagnetische Verträglichkeit</b>  Directive relating to electromagnetic compatibility</td> </tr> <tr> <td style="vertical-align: top;"><b>2011/65/EG</b></td> <td><b>Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronik Altgeräten</b>  Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment</td> </tr> </table> <p>Nürnberg, 10. Februar 2014</p> <div style="text-align: right; margin-top: 20px;">   Michael Bierschneider  Leiter Entwicklung  Manager Development / Directeur Développement </div>			<b>EN 50083-2:</b>	<b>2012</b>	<b>EN 60065:</b>	<b>2002</b>	<b>EN 50581:</b>	<b>2012</b>	<b>EN 60065 + A1:</b>	<b>2006</b>			<b>EN 60065 + A11:</b>	<b>2008</b>			<b>EN 60065 + A2:</b>	<b>2010</b>			<b>EN 60065+ A12:</b>	<b>2011</b>	<b>2006/95/EG</b>	<b>Richtlinie betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen</b> Directive relating to electrical equipment designed for use within certain voltage limits	<b>2004/108/EG</b>	<b>Richtlinie über die elektromagnetische Verträglichkeit</b> Directive relating to electromagnetic compatibility	<b>2011/65/EG</b>	<b>Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronik Altgeräten</b> Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment
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**Service:**

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