Assembly Instructions

English

Grundig SAT Systems

PROFESSIONAL

Professional Analogue Digital HD Encoder

PADE 4000

KLASSE A CLASS

CE

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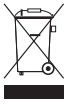
1 Safety regulations and notes

- 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 PADE 4000
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:
73/23/EWG, 89/336/EWG
The product fulfils the guidelines and standards for CE labelling (page 48).

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

HDMI Input

Tested Video Formats 1920x1080p24/i50/p50/i60, 1280x720p50/p60, 720x576i50/p50, 720x480i59/p59
Supported Audio Formats ..... Linear PCM

Component Video Input

Input level ..... Y 1 V_{ss}, Pb/Pr 0,7 V_{pp}
Input impedance ..... 75 Ω
Tested Video Formats 1920x1080i50, 1280x720p50, 720x576p50, 720x480p59
Supported standards ..... PAL

CVBS Video Input

Input level ..... 1 V_{pp}
Input impedance ..... 75 Ω
Frequency range ..... 20 Hz ... 5 MHz
Supported standards ..... PAL BG

Audio Input

Input level ..... 500 mV_{rms}
Frequency range ..... 20 Hz ... 15 kHz

MPEG4 Encoder

Transport stream ..... H.264/AVC High Profile Level 4.0
Setting range of total data rate (video + audio + tables) ..... 1 Mbit/s...30 Mbit/s
Video data rate:
1920x1080p ..... 6 Mbit/s...30 Mbit/s
1920x1080i ..... 6 Mbit/s...24 Mbit/s
1280x720p ..... 4 Mbit/s...24 Mbit/s
720x576i ..... 1 Mbit/s...10 Mbit/s
720x480i ..... 2 Mbit/s...10 Mbit/s
Audio data rate ..... 32 kb/s...384 kb/s

RF Output COFDM

Frequency range ..... 42.0 MHz ... 860.0 MHz
Channels ..... C5 ... C12, C21 ... C69
Transmission mode 2k
Kinds 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
Return loss ..... > 8 dB
Output level ..... 96 dBµV
Output impedance ..... 75 Ω

RF Output QAM

Frequency range ..... 42.0 MHz ... 860.0 MHz
Channels ..... S21 ... C69
Kinds of modulation ..... QAM 4, 16, 32, 64, 128, 256
Output level ..... 96 dBµV
Output impedance ..... 75 Ω

ASI Interfaces

Norm ..... DIN EN 50083-9
Format ..... MPEG ISO IEC 13818-1
Max. data rate ..... 108 Mbit/s
Impedance ..... 75 Ω
Level (input / output) ..... 800 mV_{pp} ± 10%
Return loss (input) ..... > 17 dB (5 ... 270 MHz)

LAN Interface

Standard ..... 10/100/1000 MB/s
Transport stream ..... MPTS (Multi Programme Transport Stream)
Protocols ..... UDP (User Data Protocol),
RTP (Real-Time Transport Protocol)

Connections

Video Inputs:

HDTV ..... 1 HDMI 1.4a (typ A, 19 Pin)

Component YPbPr ..... 3 Cinch sockets

CVBS ..... 1 Cinch socket

Audio Inputs:

PCM ..... 1 HDMI 1.4a

S/PDIF (PCM) ..... 1 TOSLINK

Analogous Stereo ..... 2 Cinch sockets

LAN ..... 1 RJ 45 socket

ASI input ..... 1 BNC socket, 75 Ω

ASI output ..... 1 BNC socket, 75 Ω

RF output ..... 1 IEC socket 75Ω

Connection strip (10-pin): ..... for supply voltages and control circuit

RS-232 socket: ..... serial update interface

Remote maintenance

Remotely controllable (via PSW 1000*): ..... yes

Remote update (via BEflash*): ..... yes

(* and a corresponding management unit)

2.4 Description

The MPEG4 Encoder Cassette converts a HD or SD video and audio signal into a MPEG4 data stream (transport stream) and outputs it via the ASI interface, the LAN interface and the RF output.

COFDM or QAM modulation can be selected for the RF output signal.

For the Video input it can be selected between HDMI (HDTV with PCM stereo sound), YPbPr (SD/HD) or CVBS (SD). All common HDTV formats up to a resolution of 1920 × 1080p @ 50/60Hz are supported. The stereo audio signal of a YPbPr resp. CVBS signal can be fed in via the cinch sockets (analogous) or the TOSLINK S/PDIF interface (PCM).

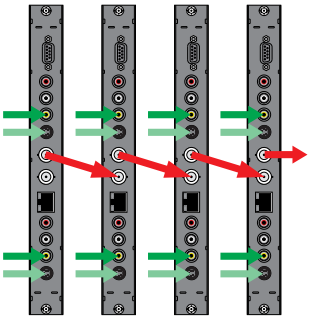
A status LED at the HDMI socket lights green, if the present signal is supported (suitable resolution, no copy protection), or red, if no or a not supported signal is present.
A status LED at the ASI input indicates, whether a input signal is present (green).

The MPEG4 encoder generates a transport stream according to H.264/AVC (Advanced Video Coding) High Profile Level 4.0 standard.

At the LAN socket a MPTS transport stream (Multi Programme Transportstreams, adjustable data rate) according to UDP or RTP protocol can be output.

—> Live Streaming/Multicast Streaming requires specially designed and configured networks. Minimum Requirements include: Layer-3 Switched Ethernet, Multicast Enabled, IGMPv2/3, Network and Multicast Routing Supported.

The transport stream can be cascaded via ASI.



The cassette is designed for use in head-end stations of the profi line.

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".

Signal runtime

Channel switching at a HD source, becomes effective only after a time delay (of up to 3 seconds) because of the signal runtime!

Software versions

Cassette

After activating the cassette the software version of the cassette is displayed (see page 17).

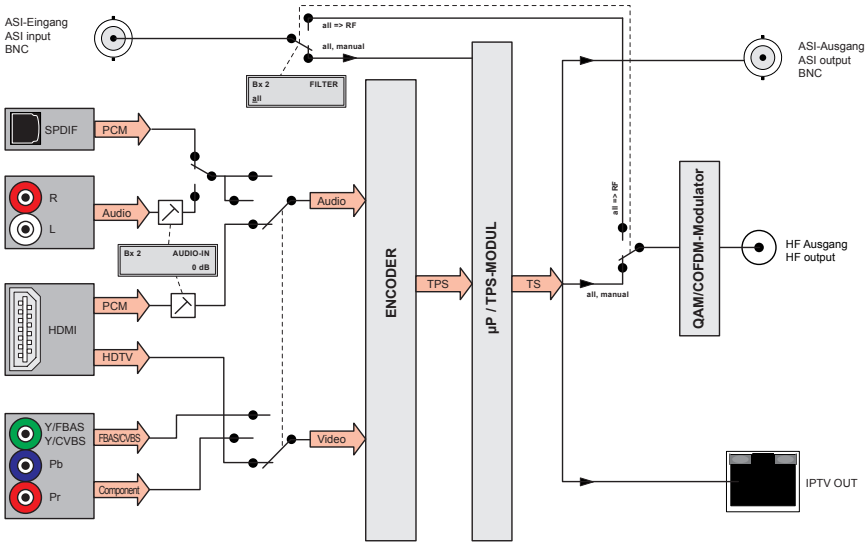
Control unit

To operate these cassettes the software version of the control unit must be "**V44**" or higher. Approximately 5 minutes after the last keypress the software version of the control unit is displayed.

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 44**" appears.

Block diagram

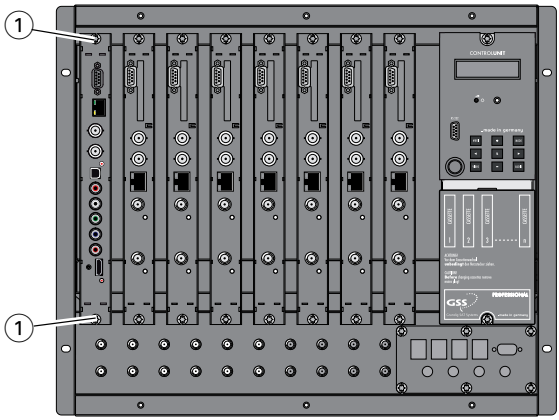


3 Assembly

3.1 Installing the cassette

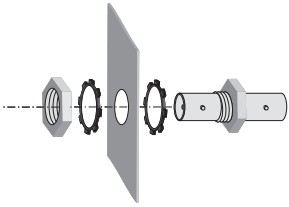
– Ensure the head-end station is mounted so it will not be able to vibrate. Avoid, for example, mounting the head-end station onto a lift shaft or any other wall or floor construction that vibrates in a similar way.
– Before installing or changing a cassette unplug the power cable from the mains power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

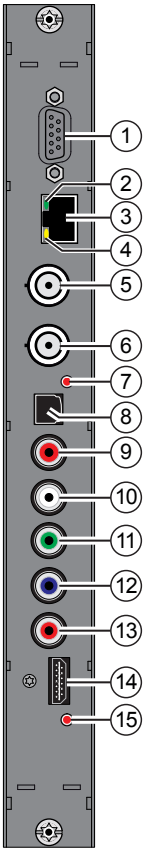


- Insert the required number of cable terminals in the openings provided in the head-end station or in the 19" cabinet.

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.

Whenever the HDMI socket is used, the player, which is connected to it, must be operated inside the station or connected via commercially available optical fibre, in order to fulfill the EMV regulation for head-end stations.

3.3 Cassette overview



(1) D-SUB socket "RS 232"
(2) Status LED network
(3) LAN socket
(4) Status LED data transfer
(5) ASI output
(6) ASI input
(7) Status LED ASI input
(8) OPTICAL S/PDIF PCM audio input TOSLINK
(9) Audio input R analogous
(10) Audio input L analogous
(11) Video input Y/CVBS
(12) Video input Pb
(13) Video input Pr
(14) HDMI input
(15) Status LED HDMI

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**".

3.4 Connecting the cassette

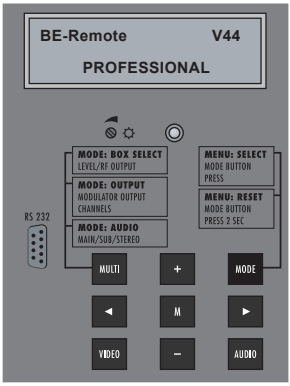
- Dependent on the input signal connect the source device via cable terminals to the input sockets "HDMI" (14), "Y/Pb/Pr" (11)/(12)/(13) or "CVBS" (11), "Audio R" (9), "Audio L" (10) or "OPTICAL" (8).
- If necessary connect the ASI input (6) and the ASI output (5) to the peripheral devices - and/or
- connect the LAN socket (3) to a LAN network.
- Connect the head-end station to the mains.

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
- Encoder
- RF Output
- Ethernet
- IPTV Output
- ASI Output
- ASI Input
- Data rate
- TS/ONID
- NIT
- Factory reset



4.2 Control panel

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

MODE scrolls forward through the menus.

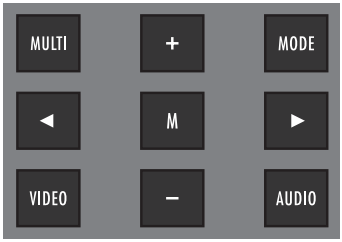
AUDIO scrolls backward through the menus.

◄/► select parameters in the menus

► selects sub-menus

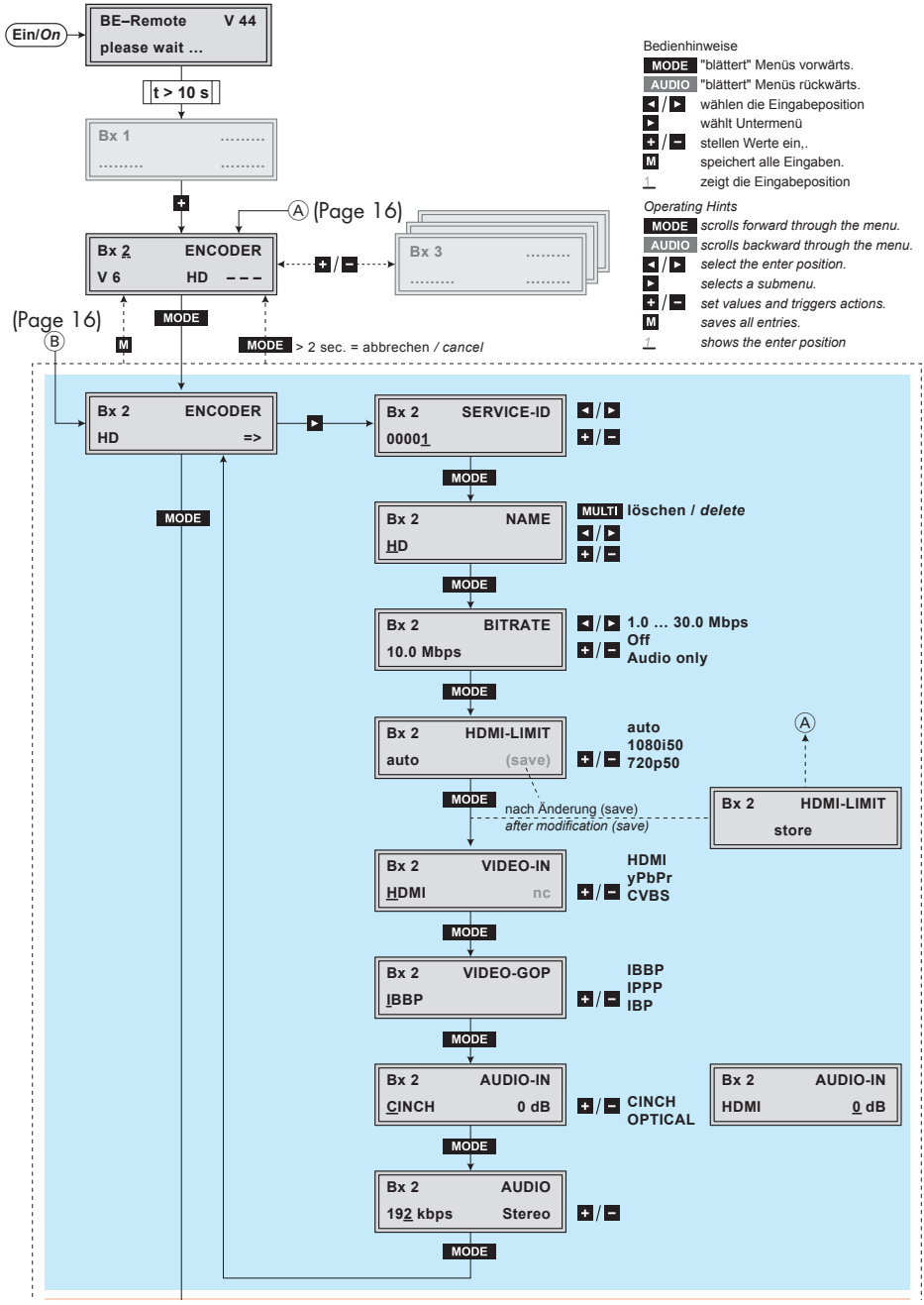
+/- set values,.

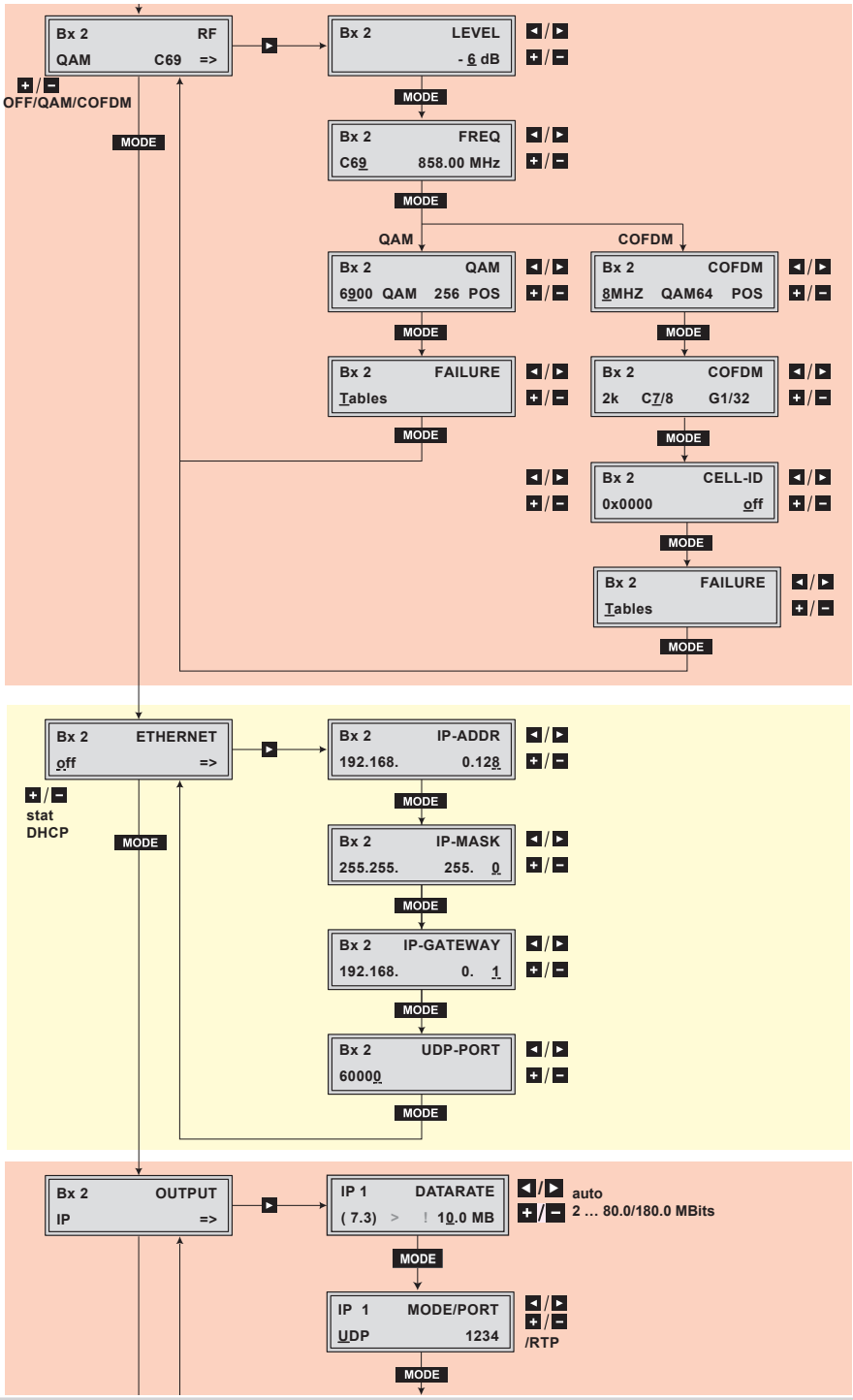
M saves all entries.

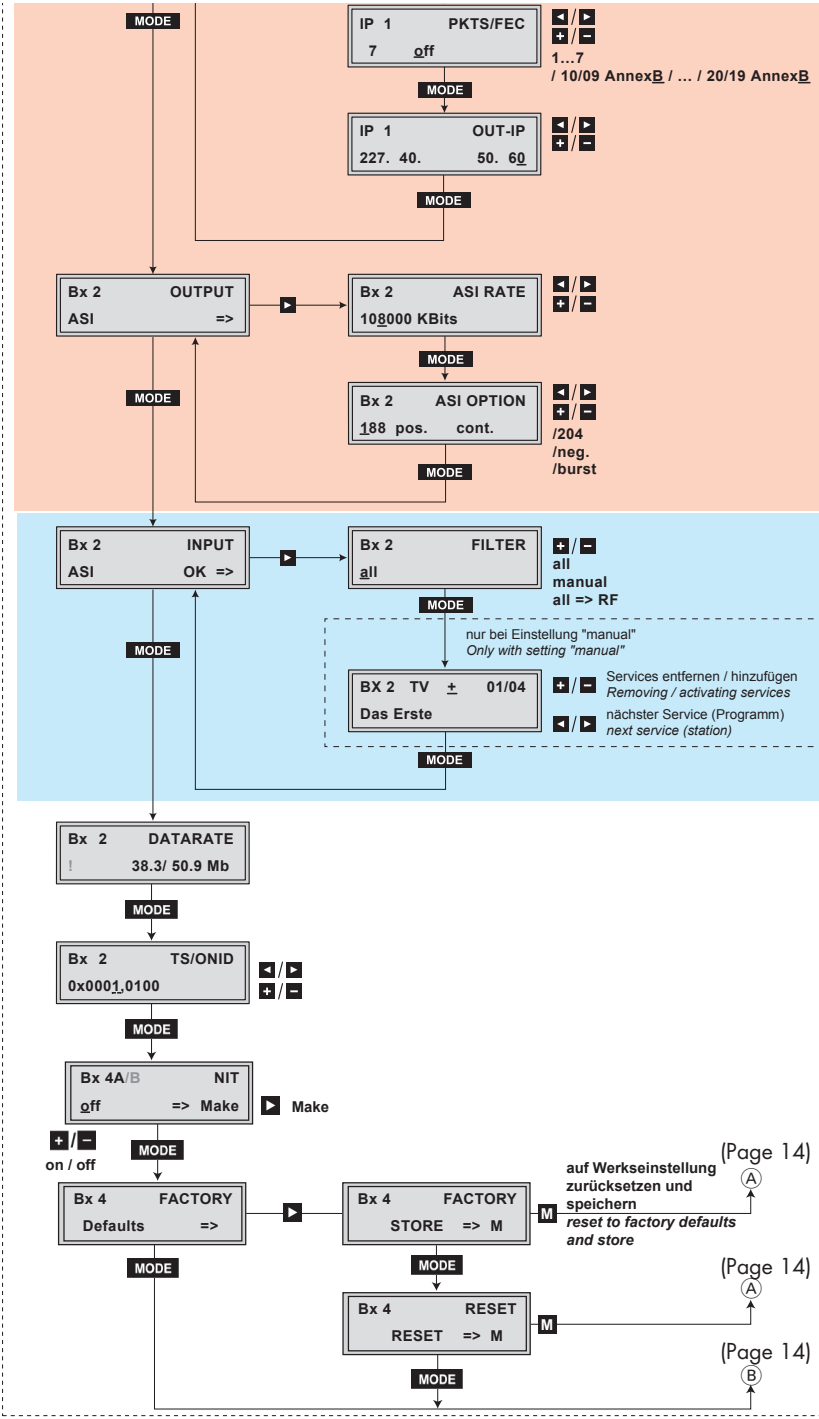


5 Programming

5.1 Programming procedure



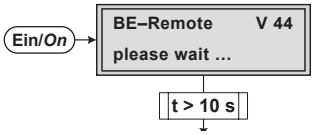

Bx 2 RF
QAM C69 =>
+/− OFF/QAM/COFDM
MODE
Bx 2 LEVEL
- 6 dB
MODE
Bx 2 FREQ
C69 858.00 MHz
MODE
QAM
COFDM
Bx 2 QAM
6900 QAM 256 POS
MODE
Bx 2 FAILURE
Tables
MODE
Bx 2 COFDM
8MHZ QAM64 POS
MODE
Bx 2 COFDM
2k C7/8 G1/32
MODE
Bx 2 CELL-ID
0x0000 off
MODE
Bx 2 FAILURE
Tables
MODE
Bx 2 ETHERNET
off =>
+/− stat DHCP
MODE
Bx 2 IP-ADDR
192.168. 0.128
MODE
Bx 2 IP-MASK
255.255. 255. 0
MODE
Bx 2 IP-GATEWAY
192.168. 0. 1
MODE
Bx 2 UDP-PORT
60000
MODE
Bx 2 OUTPUT
IP =>
IP 1 DATARATE
(7.3) > ! 10.0 MB
auto
2 … 80.0/180.0 MBits
MODE
IP 1 MODE/PORT
UDP 1234
/RTP
MODE


MODE
IP 1 PKTS/FEC
7 off
1...7
/ 10/09 AnnexB / ... / 20/19 AnnexB
IP 1 OUT-IP
227. 40. 50. 60
Bx 2 OUTPUT
ASI =>
Bx 2 ASI RATE
108000 KBits
Bx 2 ASI OPTION
188 pos. cont.
/204
/neg.
/burst
Bx 2 INPUT
ASI OK =>
Bx 2 FILTER
all
all
manual
all => RF
nur bei Einstellung "manual"
Only with setting "manual"
BX 2 TV ± 01/04
Das Erste
Services entfernen / hinzufügen
Removing / activating services
nächster Service (Programm)
next service (station)
Bx 2 DATARATE
38.3/ 50.9 Mb
Bx 2 TS/ONID
0x0001.0100
Bx 4A/B NIT
off => Make
Make
on / off
Bx 4 FACTORY
Defaults =>
Bx 4 FACTORY
STORE => M
auf Werkseinstellung zurücksetzen und speichern
reset to factory defaults and store
(Page 14)
A
Bx 4 RESET
RESET => M
(Page 14)
A
(Page 14)
B

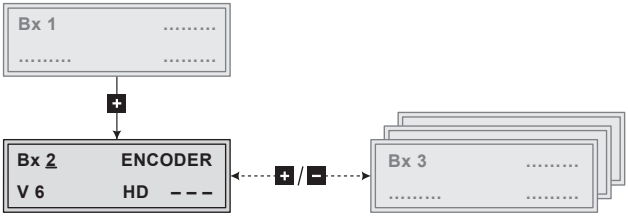
—> Pressing the **MODE** button for longer than 2 seconds cancels the programming procedure. This takes you back to the programme item "Selecting the cassette" from any menu. Any entries that have not been saved are reset to the previous settings.
—> Entries in the menus can be saved by pressing the **M** key. You are taken back to the "Selecting the cassette" menu item.
—> The parameters and functions to be set are underlined (Cursor).

- Switch on the head-end station.

—> The display shows the software version (e.g. V 44)
—> The processor reads the cassettes' data (approximately 10 seconds).



SELECTING THE CASSETTE



- If necessary select the cassette to be programmed by repeatedly pressing the **+** button (e.g. **Box 2**).

—> The display shows e.g. the menu "**Bx 2 ENCODER**":
"**Bx 2**" stands for slot 2
"**ENCODER HD**" type of cassette
"**V 6**" software version of the cassette

- Press the **MODE** button.

—> The "Encoder settings" – "**ENCODER**" main menu is activated.

Encoder

Via this menu you get access to the submenus in order to do the encoder settings and to select the desired input.

—> If no encoder settings should be done, press button **MODE**.
The "RF output" – "**RF**" main menu is activated (page 22).

- Press button ▶.

—> The "**SERVICE-ID**" submenu is activated.

Service ID (SID)

In this menu you can assign a Service ID for the signal which is to be encoded.

- Use the ◀/▶ buttons to select the digit of the SID to be set and use **+**/**-** buttons to set the desired SID.

—> Take care, not to assign the same SID twice.

- Press the **MODE** button.

—> The "Channel name" – "**NAME**" submenu is activated.

Programme name

In this menu, a programme name for the signal which is to be encoded, can be set.

- Use the ◀/▶ buttons to select the digit of the channel name to be set and use **+**/**-** buttons to set the desired character .

—> Press button **MULTI** to delete the complete name.

- Press the **MODE** button.

—> The "Total data rate" – "**BITRATE**" submenu is activated.

TOTAL DATA RATE

In this menu you set the total data rate (video + audio + tables), with which the input signal shall be encoded.

—> The higher the resolution of the input video signal, the higher the data rate must be set:

1920x1080p	6,3 Mbit/s...30 Mbit/s
1920x1080i	6,3 Mbit/s...24 Mbit/s
1280x720p	4,3 Mbit/s...24 Mbit/s
720x576i	1,3 Mbit/s...10 Mbit/s
720x480i	2,3 Mbit/s...10 Mbit/s

- Use the **+**/**-** buttons to set the data rate of the video signal (**1.0**...**30.0** Mbit/sec). If only audio signals are to be encoded, set the data rate to "**Audio only**". In setting "**Off**" the encoder is switched off.

- Press the **MODE** button.

—> The "HDMI Video Format" – "**HDMI-LIMIT**" submenu is activated.

HDMI VIDEO FORMAT

In this menu you can limit the HDMI video format from "automatic" to a fixed maximum value if e.g. the communication with a DVD player fails.

- Use the **+**/**-** buttons to limit the HDMI video format of the video signal:
  – "auto": one of the available video formats 480i/p, 576i/p, 720p, 1080i/p will be set automatically.

– "1080i/50": A maximum HDMI video format of 1080i/50Hz will be communicated to the source player.
– "720p/50": A maximum HDMI video format of 720p/50Hz will be communicated to the source player.

- Press the **MODE** button.

—> The "Video signal type/input" – "**INPUT**" submenu is activated.

VIDEO SIGNAL TYPE/INPUT

In this menu you select whether you would like to feed in a HD video signal "**HDMI**" via the HDMI socket, a Composite video signal "**YPbPr**" via the green/blue/red cinch sockets or a CVBS video signal "**CVBS**" via the green cinch socket.

- Use the **+**/**-** buttons to select the desired type of video signal / input.

—> If HDMI is selected, a missing input signal is indicated by"**nc**".

- Press the **MODE** button.

—> The "Group of Picture" – "**VIDEO-GOP**" submenu is activated.

GROUP OF PICTURE – GOP

The GoP describes the order of reference and difference pictures of the data stream. This influences the compression.

- Use the **+**/**-** buttons to select the desired "Group of Picture" (GoP).

—> IBBP – high compression – HDTV at low data rate for "normal picture contents" at higher channel switching delay.
IBP – medium compression – HDTV at medium data rate for "fast moving contents" (e.g. sport) at medium channel switching delay.

IPPP - minor compression – HDTV at high data rate for "fast conversion" at short channel switching delay.

—> At a resolution of 1080p the setting "IPPP" is not available.

- Press the **MODE** button.

—> The "Audio input/Audio level" – "**AUDIO-IN**" submenu is activated.

AUDIO INPUT / AUDIO LEVEL

If the "yPbPr" or " CVBS" video input is selected in menu "VIDEO-IN", herein you can select the audio input, via which the corresponding sound signal shall be fed. The audio level can be set for the HDMI and the cinch input.

Bx 2	AUDIO-IN
CINCH	0 dB

—> An analogous audio signal can be fed via the cinch sockets and a digital PCM audio signal can be fed via the "Toslink" socket (optical S/PDIF interface). The level of the analogous audio signal can be adjusted.

—> If the "HDMI" video input is selected, **only** level adjustment is possible, because exclusively the sound signal of the HDMI interface is used.

Audio input (only "yPbPr" and "CVBS"):

- Use the **+** / **-** buttons to select the desired audio input.

Audio level (only HDMI and Cinch):

- Press button **►**, to get to the level setting (only cinch).
- Use the **+** / **-** buttons to enter the desired audio level (-24dB…+24dB).

- Press the **MODE** button.

—> The "Audio data rate" – "**AUDIO**" submenu is activated.

AUDIO DATA RATE

In this menu you set the data rate with which the audio signal shall be encoded.

Bx 2	AUDIO
192 kbps	Stereo

- Use the **+** / **-** buttons to enter the desired audio data rate.

—> Some data rates are selectable for mono as well as stereo signals.

- Press the **MODE** button.

—> Return to the main menu "Encoder settings".

- Press the **MODE** button.

—> The "RF output" –"**RF**" main menu is activated.

RF OUTPUT

Herein you can select the kind of modulation (COFDM or QAM) of the RF output signal or, if not needed, you can switch off the RF output. You also get access to the submenus of the RF output signal settings.

—> If no RF output settings should be done, press button **MODE**.
The "Ethernet parameter" – "**ETHERNET**" main menu is activated (page 32).

Bx 2	RF
QAM C69	=>

DEACTIVATE THE RF OUTPUT

- Use the **+** / **-** buttons to select "OFF".

Bx 2	RF
OFF	

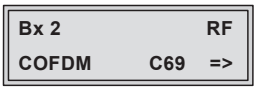
—> If, despite activated RF output, the encoded input signal is not output, the bypass function of the ASI input my be active (page 40).

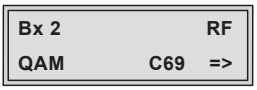
- Press the **MODE** button.

—> The "Ethernet parameter" – "**ETHERNET**" main menu is activated (page 32).

KIND OF MODULATION

- Use the **+**/**-** buttons to select "COFDM" or "QAM".





- Press button **►**.

—> The "RF output level" – "**LEVEL**" submenu is activated.

RF OUTPUT LEVEL

Herein you can match the output level to the output levels of the other cassettes.

In order to prevent interference within the head-end station and the cable system, the output level of the cassette must be decreased by 10 dB at QAM modulation 64QAM, by 4 dB at QAM modulation 256QAM and by 8 dB at COFDM modulation compared to the system level.

- 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.

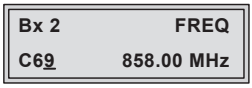
- Use the **+**/**-** buttons to adjust the desired level.

- Press the **MODE** button.

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

Channel / Frequency

In this menu you adjust the output channel or the output frequency of the modulator.



—> The 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…S41 and C21…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 QAM 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 47). Please note thereby that many receivers cannot receive the channel ranges S21 … S41 (306 … 466 MHz).

- Use buttons ◄/► to select the cursor position for channel resp. frequency setting.
- Use buttons +/- to adjust the desired channel resp. frequency.

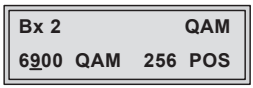
- Press the **MODE** button.

If COFDM modulation is selected in menu "RF output" (page 22):
—> Continue with "COFDM output signal" – "**COFDM-MODE**" (Page 29). Please take note of the tables from page 26 on before setting the COFDM parameters.

If QAM modulation is selected in menu "RF output" (page 22):
—> The "Output symbol rate, QAM modulation" – "**QAM-MODE**" submenu is activated.

—> This menu is only displayed if "QAM modulation" is selected in menu "RF output" (page 22)!

In this menu you can set the output symbole rate, the QAM modulation and invert the user signal.



Output symbole rate:
In this menu item you can set the output symbole rate.

- Use the ◄/► buttons to place the cursor under the number to be changed of e.g. "6900" and set the symbol rate with the buttons +/- .

QAM-Modulation:
In this menu item you can set the QAM modulation.

—> For higher QAM modulation, the output symbol rate is lowered. An output QAM modulation of > 64 QAM places a large burden on the cable network. Due to noise, delay and frequency response problems, reception of the converted output signal can be affected.

- Use the ◄/► buttons to place the cursor under "**QAM...**".
- Use +/- to set the QAM modulation ("**4**" ... "**256**").

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

- Use ◄/► to place the cursor under "**POS**".
- Use +/- to set the spectral position to "**NEG**".

- Press the **MODE** button.

—> The "Substitute signal in the case of an incorrect input signal" – "**FAILURE**" submenu is activated (page 32).

—> This parameters must only be observed if "COFDM modulation" is selected in menu "RF output" (page 22)!
If "QAM modulation" is selected please continue with submenu "Substitute signal in the case of an incorrect input signal" – "**FAILURE**" (Page 32).

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 (factual data rate), displayed in the "Output data rate" menu (page 42), into the gross data rate 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. $^1/_8$.

		Net data rate [kbit/s] at a bandwidth of 7 MHz			
		Guard interval			
Modulation	Code rate	$^1/_4$	$^1/_8$	$^1/_{16}$	$^1/_{32}$
QPSK	$^1/_2$	4354	4838	5123	5278
	$^2/_3$	5806	6451	6830	7037
	$^3/_4$	6532	7257	7684	7917
	$^5/_6$	7257	8064	8538	8797
	$^7/_8$	7620	8467	8965	9237
16 QAM	$^1/_2$	8709	9676	10246	10556
	$^2/_3$	11612	12902	13661	14075
	$^3/_4$	13063	14515	15369	15834
	$^5/_6$	14515	16127	17076	17594
	$^7/_8$	15240	16934	17930	18473
64 QAM	$^1/_2$	13063	14515	15369	15834
	$^2/_3$	17418	19353	20491	21112
	$^3/_4$	19595	21772	23053	23751
	$^5/_6$	21772	24191	25614	26390
	$^7/_8$	22861	25401	26895	27710

		Net data rate [kbit/s] at a bandwidth of 6 MHz			
		Guard interval			
Modulation	Code rate	$^1/_4$	$^1/_8$	$^1/_{16}$	$^1/_{32}$
QPSK	$^1/_2$	3732	4147	4391	4524
	$^2/_3$	4976	5529	5855	6032
	$^3/_4$	5599	6221	6587	6786
	$^5/_6$	6221	6912	7318	7540
	$^7/_8$	6532	7257	7684	7917
16 QAM	$^1/_2$	7465	8294	8782	9048
	$^2/_3$	9953	11059	11709	12064
	$^3/_4$	11197	12441	13173	13572
	$^5/_6$	12441	13824	14637	15080
	$^7/_8$	13063	14515	15369	15834
64 QAM	$^1/_2$	11197	12441	13173	13572
	$^2/_3$	14929	16588	17564	18096
	$^3/_4$	16796	18662	19760	20358
	$^5/_6$	18662	20735	21995	22620
	$^7/_8$	19595	21772	23053	23751

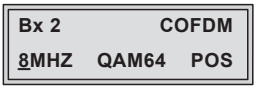
	Transmission parameters for DVB-T at a bandwidth of 8 MHz											
Transmission mode	**2k**				**4k**				**8k**			
Symbol duration T_S [µs]	224				448				896			
Carrier space Δ f [kHz]	4.4643				2.232				1.116			
$(n_{carrier})_{theoretical}$	2048				4096				8192			
$(n_{carrier})_{real}$	1705				3410				6817			
Used bandwidth [MHz]	7.61				7.61				7.61			
Total symbol duration T_{GS} [µs]	280	262	238	231	560	504	476	462	1120	1008	952	924
Guard interval T_G [µs]	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 [µs]	224				448				896			
Carrier space Δ f [kHz]	4.4643				2.232				1.116			
$(n_{carrier})_{theoretical}$	2048				4096				8192			
$(n_{carrier})_{real}$	1705				3410				6817			
Used bandwidth [MHz]	6.66				6.66				6.66			
Total symbol duration T_{GS} [µs]	320	288	272	264	620	576	544	528	1280	1152	1088	1056
Guard interval T_G [µs]	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 [µs]	224				448				896			
Carrier space Δ f [kHz]	4.4643				2.232				1.116			
$(n_{carrier})_{theoretical}$	2048				4096				8192			
$(n_{carrier})_{real}$	1705				3410				6817			
Used bandwidth [MHz]	5.71				5.71				5.71			
Total symbol duration T_{GS} [µs]	373	336	317	308	767	672	634	616	1493	1344	1269	1232
Guard interval T_G [µs]	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	$^1/_4$	$^1/_8$	$^1/_{16}$	$^1/_{32}$	$^1/_4$	$^1/_8$	$^1/_{16}$	$^1/_{32}$	$^1/_4$	$^1/_8$	$^1/_{16}$	$^1/_{32}$

—> This menu is only be displayed if "COFDM modulation" is selected in menu "RF output" (page 22)!
If "QAM modulation" is selected please continue with submenu "Substitute signal in the case of an incorrect input signal" – "**FAILURE**" (Page 32).

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 C21 to C69 a bandwidth of 8 MHz can be used.
In the channel range of C5 to C12 a bandwidth of ≤ 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**").

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**".

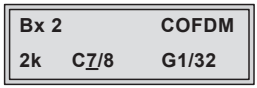
- Press the **MODE** button.

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

TRANSMISSION PARAMETERS

—> This menu is only be displayed if "COFDM modulation" is selected in menu "RF output" (page 22)!
If "QAM modulation" is selected please continue with submenu "Substitute signal in the case of an incorrect input signal" – "**FAILURE**" (Page 32).

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



—> The 2k transmission mode is fixed.
2k mode: 1512 carrier for user data (total 1705 carriers)

Code rate

During a transmission data can be lost or changed. To recover this data, a redundancy is added to the signal which is 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

—> This menu is only be displayed if "COFDM modulation" is selected in menu "RF output" (page 22)!
If "QAM modulation" is selected please continue with submenu "Substitute signal in the case of an incorrect input signal" – "**FAILURE**" (Page 32).

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 2	CELL-ID
0x0000	off

- 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 COFDM signal filled with null packets and self-made tables "**Tables**" or a "**Single Carrier**" signal should be provided as an output signal whenever an incorrect input signal occurs. Self-made tables are transmitted furthermore.

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

—> Returning to "RF output" – "**RF**"main menu.

- Press the **MODE** button.

—> The "Ethernet settings" – "**ETHERNET**" main menu is activated.

Ethernet parameters

In this menu you specify whether the Ethernet parameters for the prospectively intended control of the cassette are entered …
– automatically by a connected server ("**DHCP**"),
– manually via the menu ("**stat**")
– or whether you will not use the Ethernet output ("**off**").
To assign the cassette uniquely, each IPTV cassette must be allocated its own IP address.

—> If no Ethernet settings should be done, press button **MODE**.
The "IP output signal" – "**OUTPUT**" main menu is activated (page 35).

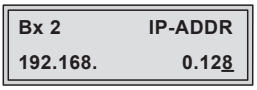
- Press the **+**/**-** buttons to select …
  – manual setting ("**stat**") of the Ethernet parameter,
  – automatic setting ("**DHCP**") of the Ethernet parameter or
  – to deaktivate Ethernet ("**off**").

- Press the **►** button to activate the setting options ("Options").

—> The "IP address of the cassette" – "**IP-ADDR**" submenu is activated.

IP address of the cassette

If you choose to enter the Ethernet parameters manually, set the IP address of the cassette in this menu. If "**DHCP**" is selected, the "**IP-ADDR**", "**IP-MASK**" and "**IP-GATEWAY**" sub-menus display the parameters that were assigned automatically by a connected server. If a server is not connected, " 0. 0. 0. 0*" appears in the corresponding menu. The star " * " in the display means that the data is provided by a DHCP server.



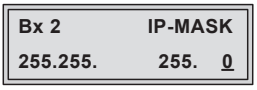
- Use the **◄**/**►** buttons to select the digits of the IP address displayed to be set and use **+**/**-** to set the IP address wished.

- Press the **MODE** button.

—> The "Address range (subnet mask)" – "**IP-MASK**" submenu is activated.

Address range (subnet mask)

In this menu you define the address range for the cassettes connected to the LAN network.



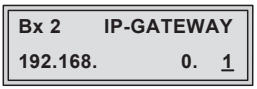
- Use the **◄**/**►** buttons to select the digit of the subnet mask displayed to be set and use **+**/**-** to set the subnet mask wished.

- Press the **MODE** button.

—> The "Address of the gateway" – "**IP-GATEWAY**" submenu is activated

ADDRESS OF THE GATEWAY

The address of a gateway (server) can be set in this menu. If no gateway is used you can skip this setting.



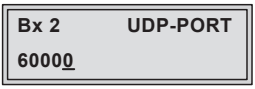
- Use the ◄/► buttons to select the digit of the IP address displayed to be set and use + / - to set the IP address wished.

- Press the MODE button.

—> The "UDP port" – "**UDP-PORT**" submenu is activated.

UDP PORT

The UDP port setting is required if the cassette needs to be reached externally for remote maintenance.



- Use the ◄/► buttons to select the digit of the port number displayed to be set and use + / - to set the port number wished ("**0**" … "**65535**").

- Press the MODE button.

—> Return to the main menu "Ethernet parameters"

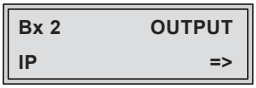
- Press the MODE button.

—> The "IP Output" – "**OUTPUT IP**" main menu is activated.

IP OUTPUT SIGNAL

Herein you get access to the submenus for IP output settings.

—> If no IP output settings should be done, press button **MODE**.
The "ASI output" – "**OUTPUT ASI**" main menu is activated (page 40).

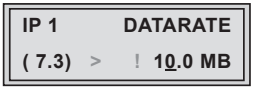


- Press button ▶.

—> The "Setting the output data rate" – "**DATARATE**" menu is activated.

SETTING THE OUTPUT DATA RATE

In this menu you can set the output data rate of each IP output optionally to automatic (auto) or to a fixed value.



—> Dependent on the network, the sum of the output data rates of all IP outputs must not exceed 80 Mbps (100-BASE-T interface) resp. 180 Mbps (1000-BASE-T interface).

The current needed data rate is shown on the left side in parentheses (e.g. 7.3 MBits). This indication is dropped at setting "auto".

- Use the ◀/▶ buttons to position the cursor under the digit of the data rate displayed to be set.
- Using the + / - buttons set the desired data rate.

—> **Indication ">"**: Current needed data rate of this IP output is higher than the data rate set (overflow).
Indication "!": The sum of all output data rates set is higher than 80/180 MBits.

- Press the **MODE** button.

—> The "Transmission protocol / Port number" – "**MODE / PORT**" submenu is activated.

Transmission protocol / Port number

In this menu you can define the transmission protocol and the port number.

Selecting the transmission protocol

- Press the ► button to select "**UPD**".
- Using the + / - buttons to select the transmission protocol wished:

—> "**UDP**" – The "User Datagram Protocol" is for the connectionless (without handshake) transmission of data to a certain application. The port number of the service is also sent which the data should obtain.

—> "**RTP**" – The "Real-time Transport Protocol" is for continuously transmitting multimedia data streams in an IP network. Unlike UDP, the header is transmitted which makes the data transmission more robust.

Setting the port number

- Using the ◄ / ► buttons select the digit of the port number displayed to be set.
- Using the + / - buttons set the port number wished.

- Press the **MODE** button.

—> The "Quantity of data packets, Forward error correction, Transmission channel" – "**PKTS / FEC**" submenu is activated.

QUANTITY OF DATA PACKETS

FORWARD ERROR CORRECTION / TRANSMISSION CHANNEL

In this menu you set the quantity of the data packets to be transmitted, the forward error correction FEC and the transmission channel. If the forward error correction is used the data to be transmitted is encoded in a redundant way so that the addressee can correct transmission errors.

Defining the quantity of data packets

- Press the ◄ button to select the data packet digit.
- Using the + / - buttons define the quantity of MPEG data packets in one IP data packet ("**1**" … "**7**").

Setting the forward error correction

- Press the ► button to select the forward error correction.

—> In position "**off**" the forward error correction (FEC) is switched off.

- Using the + / - buttons set the value of the FEC wished ("**off**", "**10/9**" … "**20/19**").

Setting the transmission channel

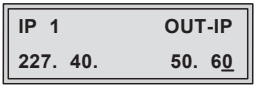
- Press the ► button to select"**Annex...**".
- Use the + / - buttons to set the transmission channel wished ("**AnnexA**" / "**AnnexB**").

- Press the MODE button.

—> The "Output IP address" – "**OUT-IP**" submenu is activated.

OUTPUT IP ADDRESS

In this menu you set the output IP address for the selected transport stream.



—> **"IPTV" IP addresses, which are used to send and receive the IPTV channels (e.g. 227.40.50.60) must be within the "multicast" range from 224.5.0.0 to 231.255.255.255.**

- Press the ◄/► buttons to select the digit of the IP address to be set.
- Using the + / - buttons set the IP address wished.

- Press the **MODE** button.

—> Return to the main menu "IP output signal"

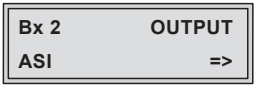
- Press the **MODE** button.

—> The "ASI output" – "**OUTPUT ASI**" main menu is activated.

ASI OUTPUT

Herein you get access to the submenus for ASI output settings.

—> If no ASI output settings should be done, press button **MODE**.
The "ASI station filter" – "**ASI**" main menu is activated (page 40)



- Press the ► button.

—> The "ASI transfer rate" – "**ASI RATE**" submenu is activated.

ASI TRANSFER RATE

In this menu you set the transfer rate for the ASI component connected (incl. stuffing - filled up user data rate).
For this setting please take the required information from the documentation (technical data) of the ASI component to be connected.

- Use the ◄/► buttons to select the digits to be set for the transfer rate then use the +/- buttons to set the transfer rate wished.

- Press the **MODE** button.

—> The "ASI options" – "**ASI OPTION**" submenu is activated.

ASI OPTIONS

In this menu you define the size of the data packets, their polarity and the type of transmission.
For this setting please take the required information from the documentation (technical data) of the ASI component to be connected.

- Press the +/- buttons to set the size of the data packets ("**188**" or "**204**" bits).

- If the polarity of the data to be transmitted has to be changed, press the ◄/► to select "**pos.**" (positive – standard) and using the +/- buttons set to "**neg.**" (negative).

- To change the type of transmission press the ◄/► buttons to select "**cont.**" (continuous – standard) and using the +/- buttons set to "**burst**".

—> Setting "**cont.**"
The data packets of the user data are spaced out evenly in the transport stream.

—> Setting "**burst**"
The data packets of the user data are collected to a great data packet in the transport stream.

- Press the **MODE** button.

—> Return to the main menu "ASI output"

- Press the **MODE** button.

—> The "ASI Input station filter" – "**INPUT**" main menu is activated.

ASI Input station filter; Bypass ASI => RF

Herein you get access to the submenus for ASI input filter settings.

—> If no ASI input filter settings should be done, press button **MODE**.
The "Output data rate" – "**DATARATE**" main menu is activated (page 42)

Bx 2	INPUT
ASI	OK =>

—> If no ASI input signal is present, "– –" is displayed instead of "OK".

Bx 2	INPUT
ASI	– – =>

- Press the ▶ button.

Bx 2	FILTER
all	

Using buttons **+**/**-** you can select, whether all services (**"all"**) or only selected services (**"manual"**) are passed through.
The selection **"all => RF"** activates a bypass (page 9), which passes all services from the ASI input directly to the modulator.

—> The encoded input signal of the video/audio sockets will then be output only via the ASI output and the LAN socket, can processed externally (e.g. scrambled) and via the ASI input forwarded to the modulator.

- Activate the filter function by selecting "**manual**".

- Press the **MODE** button.

—> All services from the ASI input will be read, and then displayed with name and type of the service..

—> If no services is found, the following message will appear in the display: "**no Service**". In this case, check previously adjusted settings for the cassette and the components connected to the ASI input.

—> The display shows e.g.:

Meaning of the indicators in the example:

"**TV**"	"Television" (type of service)
" **+** "	The currently selected service is passed through
"**01/04**"	The 1st of 4 services is being displayed.
"**Das Erste**"	Name of the service

Further possible terms displayed:

"**ASI**"	ASI station filter
"**RA**"	"Radio" (type of service) For radio stations, the background of the screen of the connected TV or test receiver is darkened.
" **–** "	The currently selected service is blocked.
" * "	The star means that the service selected is scrambled.

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

- Use the ◄/► buttons to call up the services in sequential order, then use **+**/**-** buttons to pass through (indicated by " **+** ") or to block them (" **–** ").

—> If the filter function is activated (setting "manual"), only services which are marked by "+" will be passed.

If the services at the ASI input are changed, new services (which are not marked by "+") will be blocked.

—> Pressing the **MULTI** button all services can be passed through or blocked.

- Press the **MODE** button.

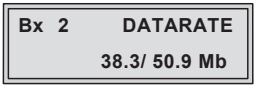
—> Return to the main menu "ASI input station filter"

- Press the **MODE** button.

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

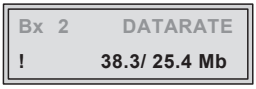
OUTPUT DATA RATE

Herein the current needed and the maximum data rate is displayed.



—> The maximum data rate is dependent on the settings of the modulator and the ASI data rate. As the output data stream is present at all outputs, the lowermost set output data rate is used for the maximum value. The value 50.9Mb results from a QAM setting of QAM256 and symbol rate 6900.

If the current needed data rate is higher than the maximum possible data rate, a "!" is indicated.



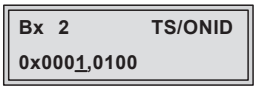
—> The value 25.4Mb results from a QAM setting of QAM256 and symbol rate 6900.
In this case correct the corresponding settings.

- Press the **MODE** button.

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

Transport stream ID and ORGNET ID

If the input signals are encoded to a separate transport stream (if no transport stream with ORGNET-ID is present at the ASI input), a new ORGNET-ID must be assigned to the transport stream.



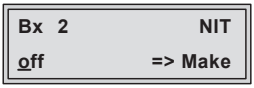
- Use the ◄/► buttons to select the digit of the hexadecimal number to be set and use the + / - buttons to set the desired character.

—> The combination of TS and ON ID must be unique at the plant.
—> If the TS/ONID was changed a new NIT must be generated.

- Press the **MODE** button.

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

Network Information Table (NIT)



- Use the + / - buttons to switch off or on the NIT.
- 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 NITs 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.

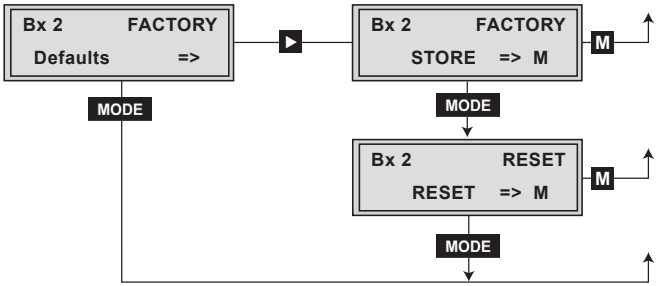
—> The NITs of the other "NIT cassettes" will stay switched on. When the NIT of the cassette is switched on again ("**on**") by pressing the **-** button, the previously generated NIT is added again. If you have changed parameters in the meantime, you must first select "**Make**" to generate a new, up-to-date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

- Press the **MODE** button.

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

Factory reset / Soft reset

Via this menu you get access to the submenus to reset all settings to the factory defaults or to perform a soft reset (cassette restart).



Factory reset

- Press the **▶** button.

—> The "Factory Store" submenu is activated.

- In order to perform a factory reset press the **M** button.

—> The cassette is reset to factory defaults. The display shows "STORE"
—> Back to "Selecting the cassette" (page 17).

- In order to perform a soft reset (cassette restart) or to return to the main menu "Factory Default" press the **MODE** button.

—> The "Reset" submenu is activated.

SOFT RESET

In this submenu you can perform a soft reset (cassette restart).

- In order to perform a soft reset (cassette restart) press the **M** button

—> The cassette is restarted.
—> By pressing the **MODE** button, you will be returned to the main menu "Encoder" **without** saving the factory defaults (page 18).

SAVING SETTINGS

- Press the **M** button.

—> Return to "Selecting the cassette" (page 17).
—> The settings are saved.

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 bolted connections using an appropriate open-ended spanner.
- Mount the front cover (see assembly instructions of the head-end station).

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

Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [MHz]	Frequenzraster Frequency grid [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

CCIR – Hyperband (Frequency grid 8 MHz)

Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz Channel centre frequency [MHz]	Kanal Channel	Kanalmittenfrequenz 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		

Declaration of CE conformity

GSS	Konformitätserklärung Declaration of Conformity 079/ 13	CE

Der Hersteller/Importeur
The manufacturer/importer **GSS Grundig SAT Systems GmbH**

Anschrift / Address / Adresse **Beuthener Straße 43, D-90471 Nürnberg, Germany**

erklärt hiermit eigenverantwortlich, daß das Produkt:
declare under their sole responsibility that the product:

Bezeichnung / Name / Description **Head-End Digital Encoder**

Type / Model / Type **GSS PADE 4000**

Bestell-Nr. / Order-No. **GAP 4900**

folgenden Normen entspricht:
is in accordance with the following specifications:

EN 50083-2:	*2012*	*EN 60065:*	*2002*
ETSI EN 300386 :	*2010*	*EN 60065 + A1:*	*2006*
EN 50581 :	*2012*	*EN 60065 + A11:*	*2008*
		EN 60065 + A2:	*2010*
		EN 60065+ A12:	*2011*

Das Produkt erfüllt somit die Forderungen folgender EG-Richtlinien:
Therefore the product fulfils the demands of the following EC-Directives:

2006/95/EG	**Richtlinie betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen Directive relating to electrical equipment designed for use within certain voltage limits**
2004/108/EG	**Richtlinie über die elektromagnetische Verträglichkeit Directive relating to electromagnetic compatibility**
2011/65/EG	**Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronik Altgeräten Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment**

Nürnberg, 11. Juni 2013

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