

DH8 Twin

User manual



DigitalHeadend

Contents

1.0 General notes.....	3
2.0 Safety precautions.....	4
3.0 Description DH8Twin (generally).....	5
4.0 Module sets for DH8Twin	7
4.1 Description of the sets for DH8Twin	8
5.0 Modulator and converter for DH8Twin.....	14
5.1 Single modulator / converter	14
5.2 Twin modulator / converter	15
6.0 Overview DH8Twin	16
7.0 Start-up.....	17
7.1 Mounting of the modules	17
7.2 LNC - supply voltage	18
7.3 Headend ground connection	18
8.0 Programming of the modules	19
8.1 SET-UP switch.....	19
8.2 LED lights	19
8.3 Remote control	20
8.4 Programming Twin-Master modules (DHT-SAT/CI).....	21
8.5 Programming Full-Twin-Master modules (DHT-DVBS) with 2 tuner	24
8.6 Programming Single-Master modules (DHS-DVBS)	25
8.7 Programming Single-Master modules (DHS-SAT/CI).....	25
8.8 Programming Twin-Slave modules (DHT-Slave).....	26
8.9 Programming Single-Slave modules (DHS-Slave)	26
9.0 Set-up in the CA (contitional access) module - menu	27
10.0 MISC menu	30
11.0 Software update.....	31
12.0 Technical data.....	32
13.0 Channel setup table for DVB-T (CCIR - grid).....	37

1 General notes

Attention This unit contains ESD-components! (ESD = elektrostatical sensitive device)

An electrostatical discharge is an electrical impulse that result from high potential difference and can also normally flow over isolating material.

In order to ensure the reliability of ESD assemblies, it is necessary to consider the most important handling rule:

- All electrostatic sensitive components may only be processed on electrostatically protected area (EPA)!
- Make sure of always constant potential equalization!
- Ensure personnel grounding wrist over and footwear grounding!
- Avoid electrostatical fields over >100 V/cm!
- Use only labeled and defined materials for packaging and transport!

Damage caused by faulty connections and / or improper handling are excluded from any liability.

Notes on safety requirements on antenna systems

Your antenna system must comply with safety requirements of EN 50 083 / VD 0855 part 10, 11, 12

Remember:

To prevent fire caused by lightning strikes, it is advisable to mount all metal parts on a non-combustible base. Combustible are wooden beams, planks of wood, plastics, etc.

2 Safety precautions

Please read the following safety instructions carefully before working on the basic unit DH8Twin!

Attention: Opening the device should be performed only by authorized personnel. For removing and / or installing a module the basic unit must always be de-energized! (power supply not connected)

Power supply and power cord

The device may only be connected to a power system with an AC voltage of 190 to 250 VAC and (50/60 Hz).

Connection cable

Always install power cord without pose a tripping risk!

System grounding

According to EN 50 083 / VDE 0855, the satellite system must comply with the safety regulations such as grounding, equipotential bonding, etc.

Humidity and installation place

The unit must not be exposed to dripping or splashing. If condensation forms necessarily wait until the device is dry again and only then put into operation.

Ambient temperature, effect of heat

The ambient temperature must not exceed +50° C. The ventilation slits must not be covered under any circumstances. Excessive heat or heat accumulation affect the life of the appliance and can be a source of danger.

The unit must not be mounted directly above or near heat sources (eg radiators, heating systems, etc.) where the device heat radiation or vapor is exposed.

Because of the danger of overheating or lightning strike, it is recommended to mount the unit on a fireproof surface.

Attention: The unit must be mounted vertically (air vents top and bottom).

3.0 General description DH8 Twin

The DH8 Twin is a future-oriented modular headend for the processing of DVB-C, DVB-T and DVB-S / DVB-S2 signals. It is used in small and medium-sized community facilities and comes up with a variety of advantages, such as:

- compact design
- innovative master-slave technology
- suitable for adjacent channel stereo - modulators
- trendsetting OSD technology
- LNC voltage switch on each master module
- **Attention:** The maximum LNC power for the headend is 300mA (per plug-in card)!
- high output level 100 dBµV und test output (-20dB)
- continuous output frequency range (47-862 MHz)
- output coupler, amplifier and power supply integrated
- **For all SAT and DVB-T modules, use the service channel C69 for set-up! Programming is carried out via the remote control.**
- The built-in modules have the TV standard BG
- Modules for: DVB-T, DVB-S, DVB-S2, DVB-C, AV, terrestrial and FM

The base unit has eight module slots and supports the implementation of up to 16 analogue channels or 32 digital transponders. The headend TwinDH8 has integrated an output distribution field with amplifier and the power supply. All inputs of the modules have a switch for remote powering of LNC`s (maximum current 300mA).

There are **Single** and **TWIN** modules which can be used as master or slave.

There are **TWIN** master module with **one** or **two** tuners. On modules with one tuner, two programs from one transponder can be converted in AV. The module with **two** tuners allows you to convert **two** programs from different transponders. The input signal can be looped through at the master modules.

When receiving multiple programs from one transponder, Twin slave modules can be used. These are located to the right of the master module and use the MPEG data stream from him (channel A of the master module).

It is thus possible using only a **TWIN-Master** module and seven **TWIN-Slave** modules, to prepare sixteen programs from one transponder.

There are **Single** and **TWIN** modules as master or slave for DVB-S and DVB-T available. Only **TWIN** or **QUAD** modules with two or four tuners for DVB-S / DVB-S2 are used for QAM.

optional:

UVS42 FM amplifier with 6 wave traps, gain 42dB and level control.

Will installed in DH8Twin base unit (does not require a dedicated slot).

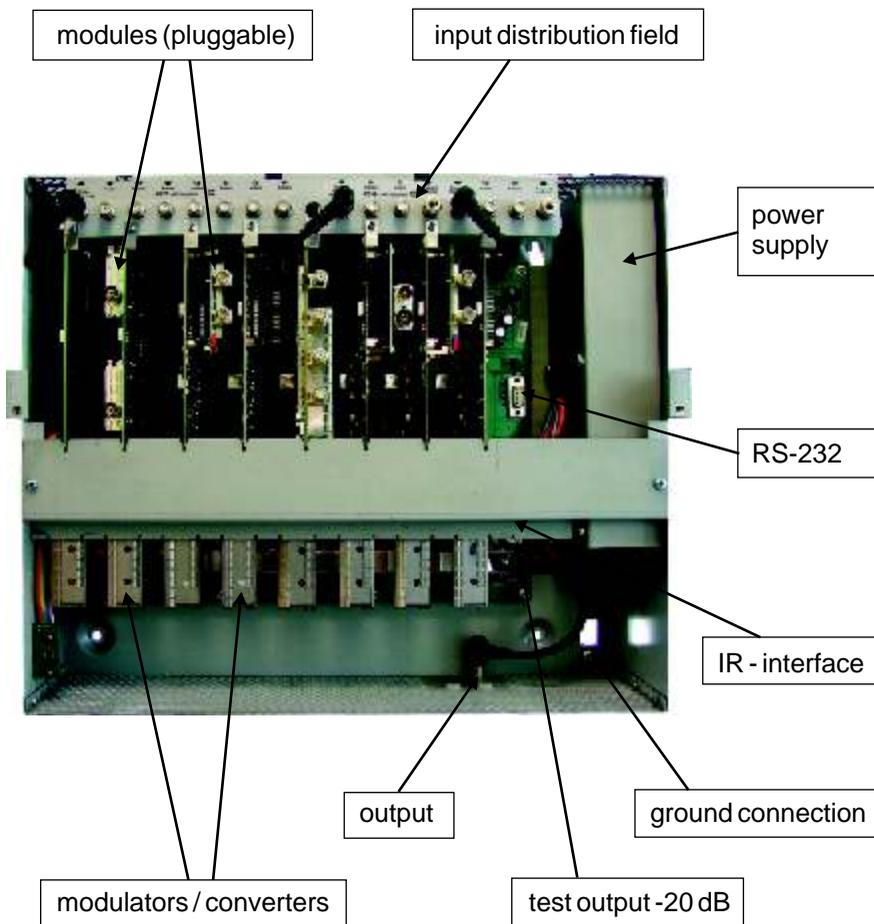
All modules have a switch to activate the programming mode (set-up). The PAL modules will be programmed via OnScreen (with remote control) or via the programming software "DH8TwinProgrammer" (RS-232 interface).

Firmware updates for DVB-T and DVB-S modules will be done with the software (DH8TwinUpdater) via the RS-232 interface.

Remark:

For backplane version lower **V10**, only one module can be in the **"setup mode"**!

From backplane version **V10**, the **"setup mode"** can be selected by the **update programm**. (all setup switches in **"normal"** position)



4.0 Module SET`s for DH8TWIN

No.	SET description	Module description	Modulator	Programming
1	DHT-QAM	DH-QAMTwin	MTM-QAM	DH8TwinProgrammer
2	DHT-HDTV	DHT-S2QAM	MTM-S2	DH8TwinProgrammer
3	DHQ-HDTV	DHQ-S2QAM	MTM-S2	DH8TwinProgrammer
4	DHT-HDCOFDM	DHT-S2COFDM	MTM-S2	DH8TwinProgrammer
5	DHT1-DVBS	DHT-SAT	MTM2A	OnScreen
6	DHT-DVBS	DHT1-SAT	MTM1A	OnScreen
7	DHT2-DVBS	DHT1-SAT	MTM2A	OnScreen
8	DHS-DVBS	DHS-SAT	MRM2	OnScreen
9	DHT1-DVBT	DHT-Terr	MTM2A	OnScreen
10	DHT-DVBT	DHT-Terr	MTM1A	OnScreen
11	DHS-DVBT	DHT-Terr	MRM2A	OnScreen
12	DHT1-Slave	DHT1-SL	MTM2A	OnScreen
13	DHT-Slave	DHT-SL	MTM1A	OnScreen
14	DHS-Slave	DHS-SL	MRM2A	OnScreen
15	DHT-AV	DH-AV-Twin	MTM2A	DH8TwinProgrammer
16	DHS-AV	DH-AV-Single	MRM2A	DH8TwinProgrammer
17	DHT-TKU	DH-TKU-Twin	MTM2ZF	DH8TwinProgrammer
18	DHS-TKU	DH-TKU-Single	MRMZ	DH8TwinProgrammer
19	DHT-FMTV	DH-FMTV (Twin)	MTM2A	DH8TwinProgrammer
20	DHS-FMTV	DH-FMTV (Single)	MRM2A	DH8TwinProgrammer

(4) DHT-HDCOFDM (HDTV Twin module in COFDM(DVB-T))

Module to convert **DVB-S** to **COFDM (DVB-T)**

The module has **two** tuners and converts with the **MTM-S2** converter from **two** different **DVB-S** transponders up to **four** programs in **two COFDM (DVB-T)** signals.

The selection of programs will be done by software.

The module has a COMMON INTERFACE (Multicrypt).

The modulator is freely programmable.

The **DVB-S** signals can be converted into **QAM 16** or **64**.

The input level on the module can be between 50 and 80 dB μ V.

Programming: Software ---> **DH8TwinProgrammer** (RS232 interface)

(5) DHT1-DVBS (SAT Master TWIN-module)

The **SAT Master TWIN**-module has one **DVB-S** tuner and converts with one **MTM2A** modulator two **DVB-S** signals in **PAL**.

The module can thus be used for reception of **two** programs from **one DVB-S** transponder. The **SAT** signal will be connected to the **input** of the module and can be fed through the **loop-through** output to the next **master** module.

remark: max. two times of loop-trough possible

The module has a COMMON INTERFACE (Multicrypt).

The modulator is freely programmable.

The input level on the module can be between 50 and 75 dB μ V.

Programming: with IR-remote control over OSD (OnScreenDisplay)

remark:

The module can also be used with the MTM1A modulator.

Output channel n+1 or n+2 possible

(6) DHT-DVBS (SAT Master Full-Twin module)

The **SAT Master Full-Twin** module has **two** DVB-S tuners and converts with a **MTM1A** modulator **two** DVB-S signals in PAL.

The module can thus be used for reception of **two** DVB-S programs from **two different** transponders. The **SAT** signal will be connected to the **input** of the module and can be fed through the **loop-through** output to the next **master** module.

remark: max. two times of loop-through possible (only at tuner A possible)

The module has a COMMON INTERFACE (Multicrypt).

The modulator (output: 47 - 862MHz) has forced adjacent channel at output.

This means:

The first channel is freely programmable, the second channel is **n+1**.

(e.g. C1 = C23; C2 = C24)

The input level on the module can be between 50 and 75 dB μ V.

Programming:

with IR-remote control over OSD (OnScreenDisplay).

From software version 1.2f in additional with the "DH8Twin Programmer".

(7) DHT2-DVBS (SAT Master Full Twin module)

The same like nr. (6) but only with **MTM2A** modulator (both output channels freely programmable)

(8) DHS-DVBS (SAT Master Single module)

The **SAT Master Single** module has **one** DVB-S tuner and converts with a **MRM2** modulator **one** DVB-S signal in PAL.

The module can thus be used for reception of **one** DVB-S program from **one** transponder. The **SAT** signal will be connected to the **input** of the module and can be fed through the **loop-through** output to the next **master** module.

The module has a COMMON INTERFACE (Multicrypt).

The input level on the module can be between 50 and 75 dB μ V.

Programmierung: with IR-remote control over OSD (OnScreenDisplay)

(9) DHT1-DVBT (Terr Master Twin module)

The **Terr Master Twin** module has **one** DVB-T tuner and converts with a **MTM2** modulator **two** DVB-T signals in PAL.

The module can thus be used for reception of **two** DVB-T programs from **one** transponder. The **DVB-T** signal will be connected to the **input** of the module and can be fed through the **loop-through** output to the next **master** module.

The module has a COMMON INTERFACE (Multicrypt).

The modulator is freely programmable.

The input level on the module can be between 50 and 80 dB μ V.

Programming: with IR-remote control over OSD (OnScreenDisplay)

(10) DHT-DVBT (Terr Master Twin module)

Function and programming is the same like nr. (9) but only with **modulator MTM1**.

The modulator (output: 47 - 862MHz) has forced adjacent channel at output.

This means:

The first channel is freely programmable, the second channel is **n+1** respectively **n+2**.

n+1 = e.g. C1 = C21 and C2 = C22

n+2 = e.g. C1 = C21 and C2 = C23

(11) DHS-DVBT (Terr Master Single module)

The **Terr Master Single** module has **one** DVB-T tuner and converts with a **MRM2** modulator **two** DVB-T signals in PAL.

The module can thus be used for reception of **one** DVB-T program from **one** transponder. The **DVB-T** signal will be connected to the **input** of the module and can be fed through the **loop-through** output to the next **master** module.

The module has a COMMON INTERFACE (Multicrypt).

The modulator is freely programmable.

The input level on the module can be between 50 and 80 dB μ V.

Programming: with IR-remote control over OSD (OnScreenDisplay)

12) DHT1-SLAVE (Slave Twin module)

Slave TWIN modules receive the data stream from **channel A** of the previously plugged master module and therefore they do not need an own tuner.

From this data stream two programmes will be selected and then converted in analog AV signals.

The module has a COMMON INTERFACE (Multicrypt).

Modulator: **MTM2** free programmable.

Programming: with IR-remote control over OSD (OnScreenDisplay)

(13) DHT-SLAVE (Slave Twin module)

Function and programming is the same like nr. (12) but only with **modulator MTM1**.

The modulator (output: 47 - 862MHz) has forced adjacent channel at output.

This means:

The first channel is freely programmable, the second channel is **n+1**.

(e.g. C1 = C23; C2 = C24)

(14) DHS-SLAVE (Slave Single module)

Slave Single modules receive the data stream from **channel A** of the master module and therefore they do not need an own tuner.

From this data stream one programme will be selected and then converted in analog AV signals.

The module has a COMMON INTERFACE (Multicrypt).

Modulator **MRM1** (output: 47 - 862MHz)

Programming: with IR-remote control over OSD (OnScreenDisplay)

(15) DHT-AV (AV-Twin module)

Converting from AV to RF-channel

The **AV-Twin** modules receive their signal via a D-SUB socket (to screw laterally into the housing) from **external AV** sources (DVD, CD, computers, etc) via the supplied adapter cable **D-SUB to RCA** plug.

The setting of the output channels is carried out via the **RS-232** interface with the software (**DH8TwinProgrammer**) of the base unit.

remark:

Can only be used with MTM2 modulator !!!

(16) DHS-AV (AV-Single module)

Converting from AV to RF-channel

The **AV-Single** modules receive their signal via a D-SUB socket (to screw laterally into the housing) from **external AV** sources (DVD, CD, computers, etc) via the supplied adapter cable **D-SUB to RCA** plug.

The setting of the output channel is carried out via the **RS-232** interface with the software (**DH8TwinProgrammer**) of the base unit.

remark:

Can only be used with MRM2 modulator !!!

(17) DHT-TKU (TKU Twin channel converter)

Digital terrestrial converter (**TKU-TWIN**)

The **TKU-Twin** module with **MTM2ZF** - converter, enables the converting of two different signals (COFDM, QAM or analog RF-signals) into two independent output channels.

The conversion will be done over the IF-level (38.9MHz analog; 36.13 MHz digital).

remark:

The bandwidth of the input channel will be retained.

example:

converter 1: C65 in C05 (bandwidth 8 MHz)

converter 2: C12 in C21 (bandwidth 7 MHz)

The minimum input level is 67dB μ V, the output level of about 80-100dB μ V, adjustable via the level control.

(18) DHS-TKU (TKU Single channel converter)

Digital terrestrial converter (**TKU-Single**)

The **TKU-Single** module with **MRM2ZF** - converter, enables the converting of one signal (COFDM, QAM or analog RF-signal) into one output channel.

The conversion will be done over the IF-level (38.9MHz analog; 36.13 MHz digital).

The signal will be converted from e.g. C65 in C24.

The minimum input level is 67dB μ V, the output level of about 80-100dB μ V, adjustable via the level control.

(19) DHT-FMTV (FMTV-Twin module)

FMTV Twin modules (DHT-FM) with black screen and text insertion.

FMTV Twin modules receive their signal via an input jack from a FM antenna for 2 FM tuner. **Two** programs will be selected and then converted into analog audio signals. The video signal consists of a black screen with up to 2 x 12 digit TEXT, programmable via software (**DH8TwinProgrammer**).

About the loop-through output of the tuner, the terrestrial signal can be passed.

Remark:

Can only be used with MTM2 modulator !!!

(20) DHS-FMTV (FMTV-Single module)

FMTV Single modules (DHT-FM) with black screen and text insertion.

FMTV Single modules receive their signal via an input jack from a FM antenna for 1 FM tuner. **One** program will be selected and then converted into one analog audio signal. The video signal consists of a black screen with up to 2 x 12 digit TEXT, programmable via software (**DH8TwinProgrammer**).

About the loop-through output of the tuner, the terrestrial signal can be passed.
remark:

Can only be used with MRM2A modulator !!!

5.0 Modulator and converter for DH8TWIN

5.1 Single modulator / converter

MRM2A

The single modulator of DH8-Twin-series allows the modulation of a AV-signal of the **master** or **slave** modules in a free programmable TV channel (C2 - C69).

The output level can be adjusted via the level control in the range of 84-104dB μ V.

MRM-ZF

The conversion of the input channel into the output channel will be done over the IF-level (38.9MHz analog; 36.13 MHz digital).

The output level can be adjusted via the level control in the range of 80-100dB μ V.

5.2 Twin modulator / converter

MTM1A

The Twin modulator allows the modulation of two AV-signals into two TV-channels. The first output channel of the modulator is freely selectable (C2 - C69).

The second output channel is n+1 or n+2, dependent on the receiver module.
e.g. channel A = C23 then channel B = C24 or C25 or OFF.

remark: channel B can be disabled.

The output level can be set for both channels via an adjustable level control (80-100dB μ V).

MTM2A

The Twin modulator allows the modulation of two AV-signals into two independent TV-channels.

The output level can be set for each channel via an adjustable level control (80-100dB μ V).

remark: channel B can be disabled.

MTM2-ZF

The conversion of the input channels into the independent selectable output channels will be done over the IF-level (38.9MHz analog; 36.13 MHz digital).

The output level can be adjusted via the level control in the range of 80-100dB μ V.

MTM-S2

The Twin-converter allows the conversion of two DVB-C / DVB-T transponder into two independent output channels.

Both output channels can freely and independently from each other from C2 to C69 be adjusted. (preferred range S21 to C69)

The output bandwidth depends on the selected output symbol rate.

The output level can be set for each channel via an adjustable level control (80-100dB μ V).

MTM-QAM

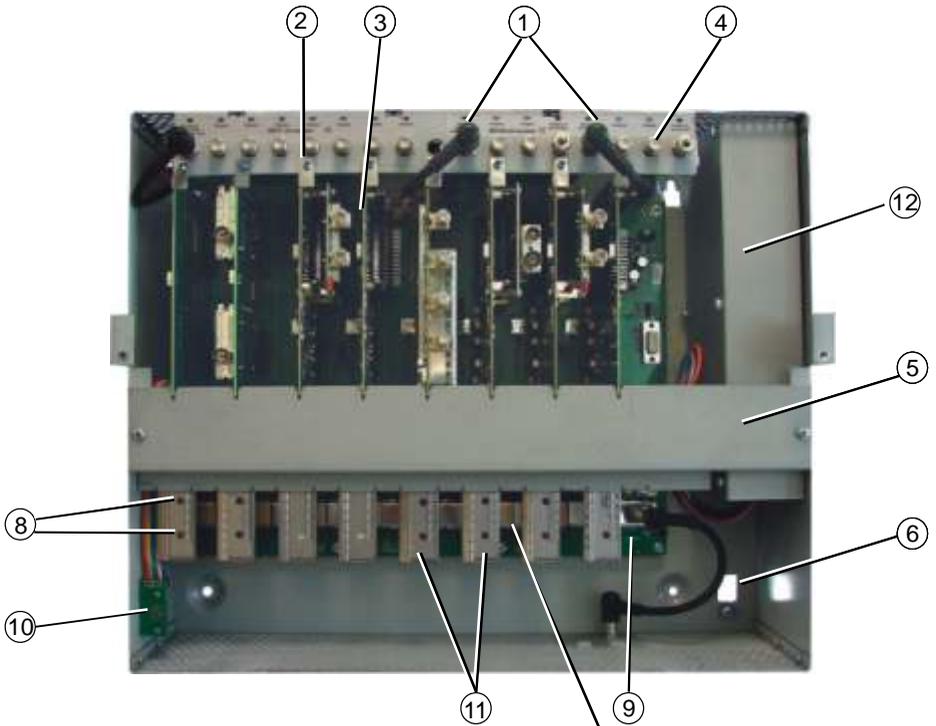
The Twin-converter allows the conversion of two DVB-C / DVB-T transponder into two output channels.

The converter (output: 47 - 862MHz) has forced adjacent channel at output.

The output bandwidth depends on the selected output symbol rate.

The output level can be set for both channels via an adjustable level control (75-95dB μ V).

6.0 Overview DH8Twin



- ① HF input cable
- ② mounting bracket
- ③ modules
- ④ SAT input distribution field
- ⑤ ground bar
- ⑥ ground connection
- ⑦ output collector field
- ⑧ level adjuster modulator
- ⑨ entire level adjuster
- ⑩ SUB-D for AV-modulator
- ⑪ modulators / converters
- ⑫ power supply

7.0 Start-up

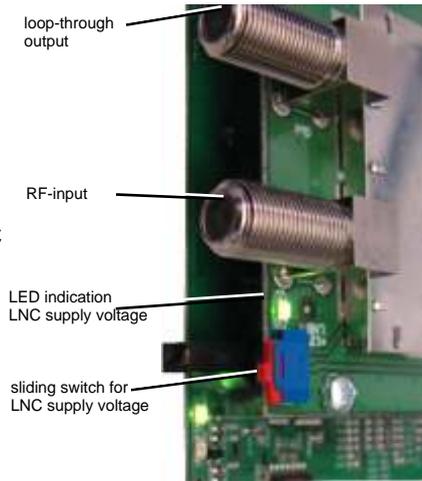
7.1 Mounting of the modules

- Unscrew the two crosshead screws from the ground bar (5) and remove them.
- Insert the first master module in the first slot (left) and screw down the mounting bracket (2) on the bar.
- Connect the corresponding RF cable to the module and to the SAT input distribution (4).
- Then insert the desired modules (3) and screw down the mounting bracket (4) on the bar.
- Now insert the **modulators / converters** (11) into the underlying slots.
- In doing so, align the modules so, that they are held by the slots in the ground bar.
- Attach device into the prepared bolts (on the wall) and screw the lower screw.
- Screw down the ground wire to the ground connection (6) of the housing.
- Connect the RF inputs of distribution fields with the relevant levels of the selected satellite.
- Connect the base unit to the mains power supply.
- Program the modules according to instructions.
- Attach the housing cover and screw it.

7.2 LNC supply voltage

On the front end input of the master modules can by the sliding switch a supply voltage of 12V / 300mA max. for LNC, be made available.

The green LED indicates the activated LNC supply voltage.

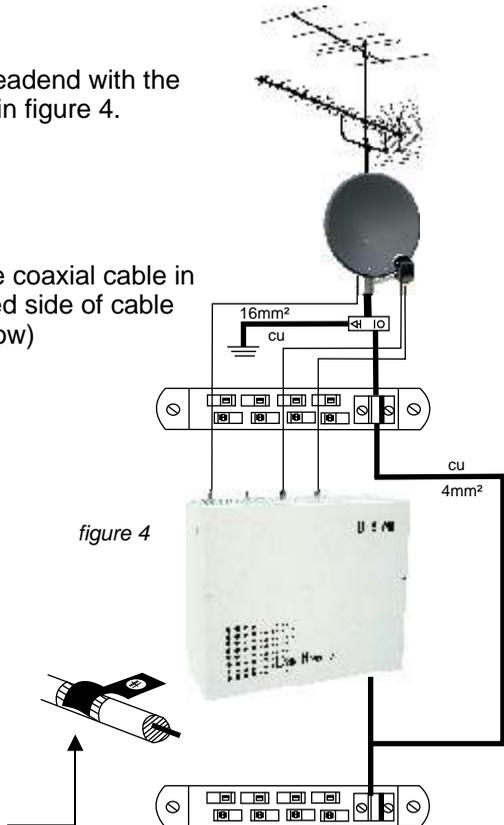


7.3 Headend ground connection

Connect the ground terminal from headend with the potential equalization bar as shown in figure 4.

connect coaxial cable to ground

Remove the PVC outer casing of the coaxial cable in the area of clamp. Clamp the stripped side of cable into the ground strip. (see figure below)



8.0 Programming of the modules

The programming of modules is done either through an "OnScreen Menu" (with remote control) or over the program "DH8Twin Programmer" see therefore list on page 7

8.1 SET-UP switch

switch position at SAT-Master-Twin module

middle normal mode

up service mode channel 69 (service-menu **blue**)
update mode channel A

down update mode channel B (no picture)

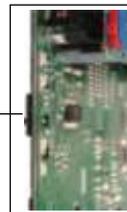
switch position at SAT-Master-Full-Twin module

middle normal operation mode

up service mode channel 69 (service-menu **blue**)
update mode channel A

down service mode channel 69 (service-menu **green**)
update mode channel B

set-up switch
(position: down)



8.2 LED lights

upper red LED flashes
= tuner A not logged

upper red LED lights
= module in service mode (K69)
= update mode channel A

lower red LED flashes
= tuner B not logged

lower red LED lights
= module in service mode (K69) at Full-TWIN
= update mode channel B

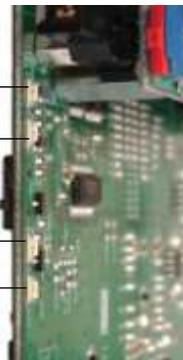
upper and lower green LED lights
= normal operation mode

upper **green** LED

upper **red** LED

lower **green** LED

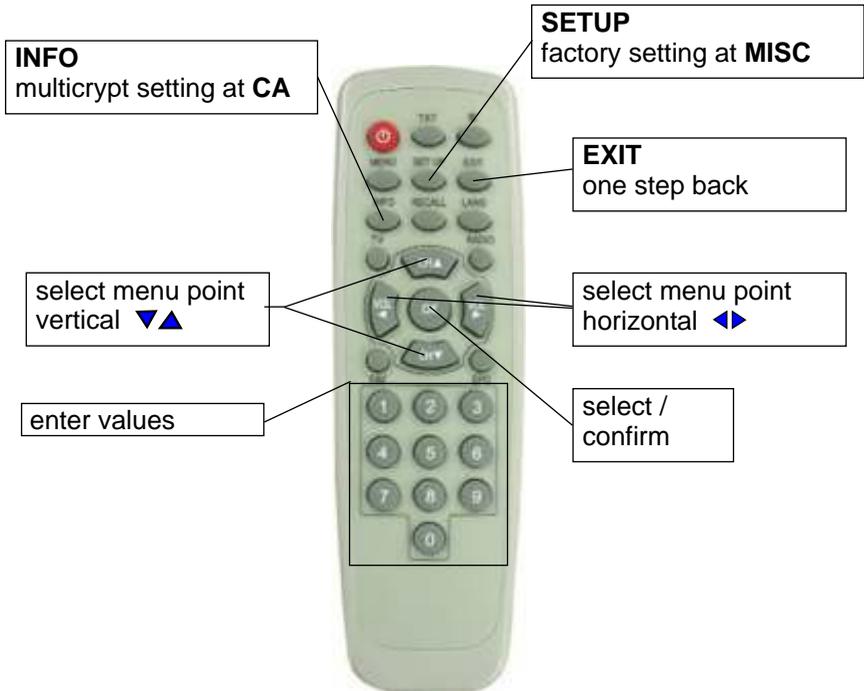
lower **red** LED



remark: Only one module is always allowed to be in service mode position.

remark: The key functions of the remote control are also displayed at the bottom of the screen!

8.3 Remote control



Because of IR-transmission the remote control must target the IR port in the base unit during programming.

8.4 Programming Twin-Master modules (DHT-SAT/CI)

8.4.1 Connect TV or measuring instrument on output, turn it on and set on channel 69.

= **SERVICE-CHANNEL** = from the headend

8.4.2 Turn on headend DH8Twin.

8.4.3 switch the setup-switch in the upper position **SETUP** (upper LED lights red).(channel A)

8.4.4 The monitor program appears as shown below.

remark: The field that is to be set is marked with black arrows.

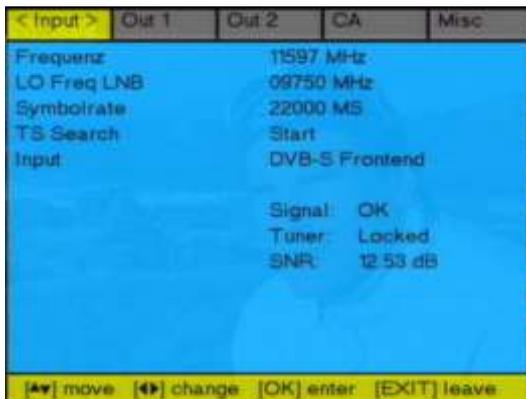
8.4.5 menu item **<Input>**

To get into the setting, press the remote control button ▼, the frequency field will be marked. After pressing the OK button, the desired frequency (5-digit) can be entered using the number on the remote control.

(Depending from the input frequency, the **LO frequency** will be set automatically (**from SW 2.43**). But it can also be changed manually).

8.4.6 Go with the button ▼ on **LO Freq LNB** and then jump on **Symbol Rate** und enter the respective values how explains under point 8.4.5.

8.4.7 Jump with the button **CH ▼** on **TS Search** (search transponder) and confirm the entries with the menu item "START" and activate it with the OK button. It appears **TS Search <Running>**



8.4.8 If an input value is incorrect or transponder cannot be found, then appears "unlocked" in the field **Tuner**. The required parameters must then be new edited!

8.4.8. After successful channel search (**Status Finish**) the following screen appears:

Input	Out 1	Out 2	CA	Misc
New Channels:Page 1/1		Transponder search at:		
▼DW-TV	Frequenz 11597 MHz			
CNBC Europe	Symbolrate 22000 MS			
BBC World	LO Frequenz 09750 MHz			
Sky News				
TV5MONDE EUROPE	Input Signal: OK			
Best of shopping	Tuner: Locked			
M6 BOUTIQUE LA C	SNR: 12.48 dB			
	Status:			
	Finish			
[▲▼] move [◀▶] change [OK] enter [EXIT] leave				

To the left are listed all programs which are be sent over the transponder. Per page can up to 10 programs be displayed. The eventual number of pages can be seen at top left. Here e.g. page 1/1. To see all the pages (if more exists), use the control buttons ▼▲ of the remote control.

8.4.9. To leave the menu and to set a program on the output channel, press the **EXIT** button and select the output channel OUT1 (channel A) with the buttons ◀▶.

Input	< Out 1 >	Out 2	CA	Misc
TV Standard	B/G			
Channel	K21			
Frequenz	471.25 MHz			
Audio Mode	Auto			
Audio Level	0			
Testmode	Test off			
Screen Type	Off			
P/S Ratio	16dB			
CH Name	TV: DW-TV			
Language	Select			
Save Settings	Start			
[▲▼] move [◀▶] change [OK] enter [EXIT] leave				

- 8.4.10 Go to the "Channel" with the buttons ▼▲ to set the output channel. Set the desired output channel with ◀▶ or direct channel input with the remote control (from SW 2.43). Press OK button and enter the numbers. Under "frequency", the frequency can be adjusted of +/- 4 MHz. A deviation of the channel grid is represented by a + or - sign appears ahead the selected channel.
- 8.4.11 **Audio Mode**
Select the desired mode (**Auto**, **Stereo**, **Mono** or **Dual**) with ◀▶
In **Auto** mode, the output converter takes that from the broadcaster transmitted dynamic audio mode - **recommended setting!**
- 8.4.12 **Audio Level**
Changing audio level to + / - **3dB** is possible
- 8.4.13 **Testmode**
Activation of a test screen and test tone (sine wave) on the selected output channel.
- 8.4.14 **Screen Type**
Set the desired screen type (Off, 4:3, 16:9 and Auto) with ◀▶
- | | |
|-------------|--|
| Off | The received image format will be forwarded to the output channel - <u>recommended setting!</u> |
| 4:3 | screen display 4:3 |
| 16:9 | screen display 16:9 |
| Auto | The output image is always displayed in full format. |
- 8.4.15 **P/S Ratio**
Switchover of the picture carrier reduction / tone carrier reduction between 12dB and 16dB (standard 16dB).
- 8.4.16 **CH Name**
Set the desired program (service) with ◀▶
- The **program names** are marked with the following explanations:
- | | |
|-------------|------------------------|
| TV | for TV programs |
| R | for radio programs |
| Data | for data channel |
| \$ | for encrypted services |
- 8.4.17 **Language**
Select of language if multiple languages are broadcast.
- 8.4.18 **Save Settings**
Field "Start". Press OK to store the parameters, which you have entered under OUT1.
After successful saving (**Save**) appears **Done**.
Over the **EXIT** button you return to the main menu.

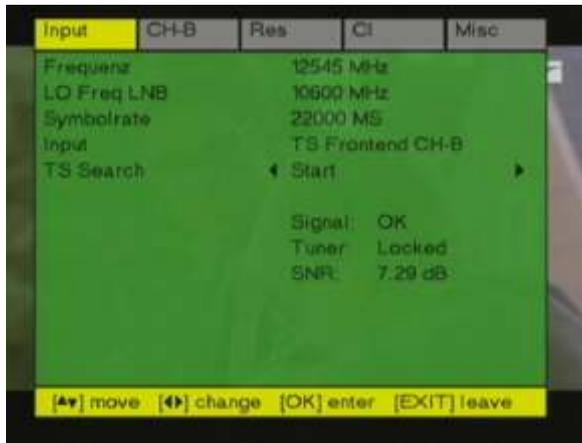
8.5 Programmig Full-Twin-Master modules (DHT-DVBS) with 2 tuner

For better distinguish between the two types of modules **TWIN** and **Full-TWIN**, the programming menus are different in colors.

Channel **A** is at both types **BLUE**. At channel **B** is the **Full-TWIN** menu with a **GREEN** background.

The programming of the channel **A** is the same as the **Twin-master**. When selecting the "Res" tab, is displayed "This is a **Full-TWIN**".

For programming of the channel **B**, set the **setup-switch** of module into the lowest position. After a short time the programming menu is displayed.



As input signal you have the following available options:

TS Frontend CH-B

TS Frontend CH-A

TS from backplane (this means from channel **A** of the left master)

Programming of **TS-Frontend CH-B** is the same as at a master module. At **TS frontend CH-A** and **TS from backplane**, the programming is like a slave module.

8.5.1 Programming output channel **B**
Select **CH-B** with the button ◀▶

The output channel **CH-B** can be programmed as follows:

<u>Twin-modulator MTM 1</u>	<u>Twin-modulator MTM 2</u>
CH-A +1	CH-A K2 - K 69
CH-A +2	CH-B K2 - K 69
CH-B off (optional)	CH-B off (optional)

e.g. **CH-A** = K23 then **CH-B** = K24 or K25

The rest of the programming will performed as at Twin-Master modules (see from point 8.4.11 to 8.4.18)

8.6 Programming Single-Master modules (DHS-DVBS)

The programming will performed according to the programming of the TWIN modules.

The menu can be left with the **EXIT** button.

8.6.1 Put the **setup-switch** back in the middle position of the module you want to program = **normal operation**

If programming of both channels is successful, the upper green LED lights for channel A (Out 1) and the lower green LED lights for the channel B (Out 2).

Attention: It can always be operated only one module in the setup mode (K69).

8.7 Programming Single-Master modules (DHS-SAT/CI)

8.7.1 The programming will performed according to the programming of the TWIN modules.

8.8 Programming Twin-Slave modules (DHT-SLAVE)

- 8.8.1 The settings of the slave module correspond to the settings of the associated (previous) master module. The slave module can receive only programs of the transponder that have been selected for the master module (**channel A**).
- 8.8.2 Perform the steps 8.4.1 - 8.4.4 of the programming of the master module.
- 8.8.3 The **frequency**, the **LO Freq LNC** and the **symbol rate** can not be set, because it is specified by the associated master module.
- 8.8.4 Jump with the button CH ▼ on **TS Search** (search transponder) and activate the acquired inputs with the **OK** button.
It appears **TS Search <Running>**
- 8.8.5 After successful channel search (**Status Finish**) the following screen appears:



- 8.8.6 The programs which were found over the transponder are listed to the left side. Per page can up to 10 programs be displayed. The eventual number of pages can be seen at top left. Here e.g. page 1/1. To see all the pages (if more exists), use the control buttons ▼▲ of the remote control. To leave this info page and to program the output channel of the desired program, use the **EXIT** button.
- 8.8.7 For the remaining programming steps, see programming the master module from point 8.4.10 to 8.4.18.

8.9 Programming Single-Slave modules (DHS-SLAVE)

The programming will be performed according to the programming of the TWIN-Slave modules.

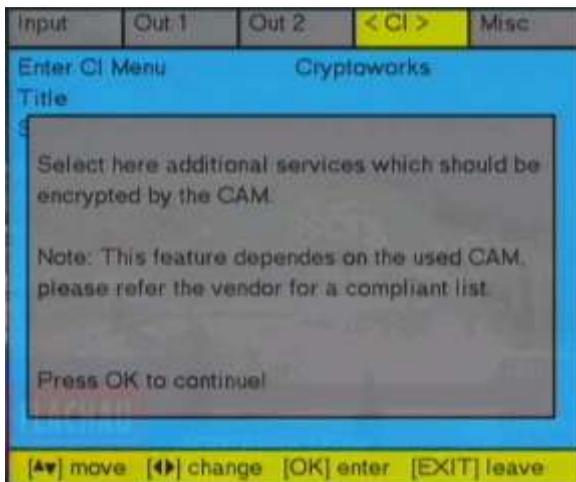
9.0 Set-up in the CA (contitional access) module - menu

Settings of **CA**-menus are possible only in the module "A".
Select in the menu the register "**CI**".

By pressing the **Info** button you reach to an info menu.
For further inputs or to leave the menu, press the **OK** button.

remark:

In this case the **EXIT** button has no function, because you are in the CA menu and not in the module menu.

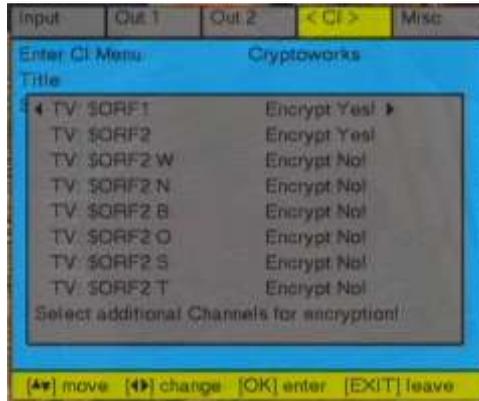


By pressing the **OK** button on the remote control, you reach the **multicrypt menu**.

Here you can select what programs are to be decrypted.

The number of programs that can be decrypted, depends from the CA module that is being used.

Navigate to the desired program with the arrow buttons ▼▲.



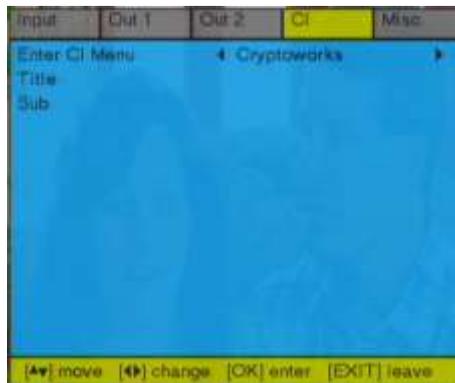
Activate the program with the arrow buttons ◀▶.

After that confirm the selection with the **OK** button.

In the menu appears: **Please wait, saving**

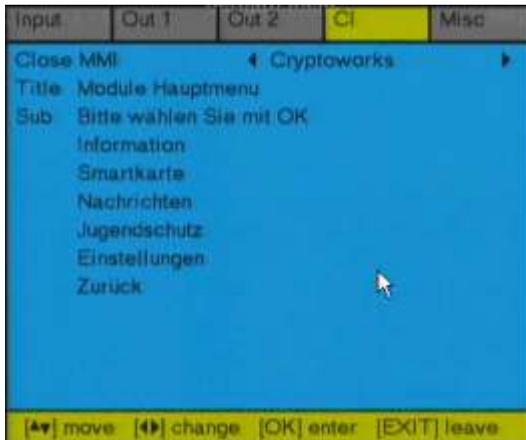
Decryption for channel **A** and channel **B** possible.

With the arrow button ▼, you come into the CA menu.



Confirm selection with **OK** button.

The following menu will be displayed:



Information: Contains information about CAM

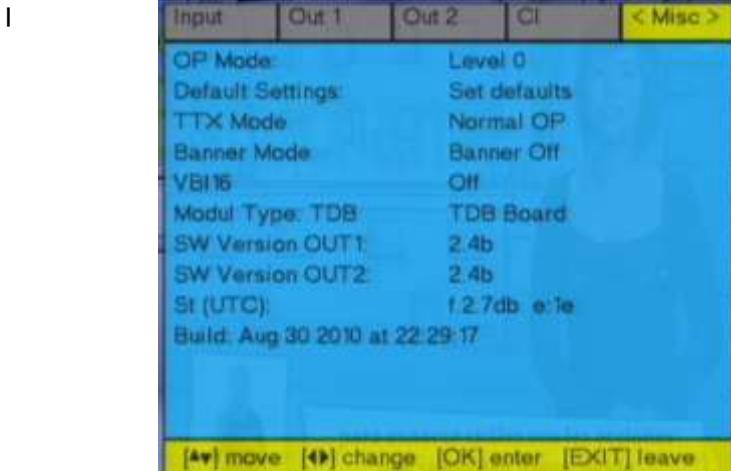
Smartcard: Contains the information about the smart card and permissions

Messages: view / delete messages

Youth protection: Entering the PIN for youth protection

Settings: Setting options for the CA module as e.g. language, CA -mode etc.

10.0 MISC menu



Special functions

Select the **Misc** menu with the buttons ◀▶.
To access the submenu, the **setup** button must be pressed.
Then select the desired menu with the buttons ▼▲.
The following menu options are available:

Default Settings

Set defaults ---> Module will be set to the **factory setting**.

Confirm with **OK** and it appears: **"wait"**

After about half a minute the reset is complete and the input menu appears.

Perform now a new search and store the programs.

Normal OP ---> videotext ON

TTX off ---> videotext OFF

Banner Mode

Banner off ---> bar display off (bottom of screen)

5 ... 250 ---> bar width (number of lines)

VBI16

On **VPS Info enabled**

Off **VPS Info disabled**

remark: The remaining menu items are for information only.

11.0 Software-update

At digital modules for DH8Twin can a software update over the RS232 interface be performed.

For this purpose the following tools are required:

- PC with COM1 (RS232) - interface
- common RS232 cable (1/1)
- update programm „**DH8Twin Updater**“
- download from www.satmueller.de

see: Help-Menü!

Type headend	DH8TWIN
input	
slots	8
LNC power supply	+12 VDC / max. 500 mA
base unit power supply	180 - 265 VAC / 50/60 Hz
power consumption	max. 150 W
output	
frequency range	47 - 862 MHz
output level (16 channels)	105 dB μ V
level adjuster	0 - 10 dB (adjustable)
return loss	> 10 dB
test output	-20 dB
interfaces	
remote control	IR
update / programming	RS-232
environmental conditions	
ambient temperature	-10 - +50 °C
storage temperature	-20 - +70 °C
other	
dimensions (W x H x D)	440 x 365 x 170 mm
weight	6,2 kg

Type TWIN-stereo-modulator	MTM 1	MTM 2
input		
connection	edge connector (plug)	
video level	1 V _{pp} / 75 Ohm	
video bandwidth	20 Hz - 5 MHz	
audio level	1 V _{pp} / 10 kOhm	
audio bandwidth	40 Hz - 15 kHz	
output		
connection	F-socket, 75 Ohm	
frequency range	C2 - C69 (47 - 862 MHz)	
operation mode	adjacent channel n+1, n+2	independent channels
audio mode	stereo / dual / mono	
TV standard	B/G	
output level	95 dB μ V	
video S/N ratio	> 56 dB	
return loss	> 10 dB	
spurious frequency distance	> 60 dB	
attenuation	-20 dB adjustable	
environmental conditions		
operating temperature	-10 - +50 °C	
storage temperature	-20 - +70 °C	
humidity	20 - 80 %	
other		
dimensions (L x W x H)	105 x 100 x 25 mm	
weight	0,14 kg	

Type stereo-modulator	Single modulator MRM 2A
input	
connection	edge connector (plug)
video level	1 V _{pp} / 75 Ohm
video bandwidth	20 Hz - 5 Mhz
audio level	1 V _{pp} / 10 kOhm
audio bandwidth	40 Hz - 15 kHz
output	
connection	F-socket, 75 Ohm
frequency range	C2 - C69 (47 - 862 MHz)
operation mode	adjacent channel
audio mode	stereo / dual / mono
TV standard	B/G
output level	95 dB μ V
video S/N ratio	> 56 dB
return loss	> 10 dB
spurious frequency distance	> 60 dB
attenuation	-20 dB adjustable
environmental conditions	
operating temperature	-10 - +50 °C
storage temperatur	-20 - +70 °C
humidity	20 - 80 %
other	
dimensions (L x W x H)	105 x 100 x 25 mm
weight	0,14 kg

Type converter	converter MTM-QAM and MTM2-ZF
input	
connection	F-socket, 75 Ohm
frequency range	C2 - C69 (47 - 862 MHz)
operation mode	adjacent channel n+1 freely programmable
return loss	> 10 dB
spurious frequency distance	> 60 dB
attenuation	-20 dB adjustable
environmental conditions	
operating temperature	-10 - +50 °C
storage temperatur	-20 - +70 °C
humidity	20 - 80 %
other	
dimensions (L x W x H)	105 x 100 x 25 mm
weight	0,14 kg

Type converter	Twin converter MTM-S2
input	
connection	F-socket, 75 Ohm
frequency range	C2 - C69 (47 - 862 MHz)
operation mode	two freely programmable output channels
MER (equalizer 65 QAM)	typ. 42 dB at QAM-HD
	typ. 35 dB at COFDM
signal-to-noise ratio	> 60 dB discret interferer
	56 dB noise-similar interferer
attenuation	-20 dB adjustable
environmental conditions	
operating temperature	-10 - +50 °C
storage temperatur	-20 - +70 °C
humidity	20 - 80 %
other	
dimensions (L x W x H)	105 x 100 x 25 mm
weight	0,14 kg

Typ	DHT-TERR / DHS-TERR module COFDM/PAL	DDHT-SAT/CI / DHS-SAT-CI module QPSK/PAL
input		
input connection	IEC-socket	F-socket
loop-through connection	IEC-plug	F-socket
LNC power supply		12VDC / max. 300mA, switchable
frequency range	47 - 862 MHz	950 - 2150 MHz
input level	50 - 75 dB μ V	45 - 75 dB μ V
modulation	COFDM 2k + 8k	QPSK
bandwidth	7/8 MHz	36 MHz
tuning over frequency	250-kHz - steps	1-MHz - steps
FEC	according to DVB	
Code Rate (auto)	1/2, 2/3, 3/4, 5/6, 7/8	
guard interval	1/4, 1/8, 1/16, 1/32	
modulation	QPSK, 16 - 64 QAM	2 - 35 MBit/s (MCPC + SCPC)
MPEG		
demux	DVB standard	
video decoding	according to ISO/IEC 13818-2	
audio decoding	according to ISO/IEC 13818-3	
AV-output		
connection	edge connector (plug)	
video level	1 V _{ss} / 75 Ohm	
video bandwidth	20 Hz - 5 MHz	
video S/N	> 60 dB	
audio level	1 V _{ss} / 10 kOhm (1-dB-steps, -6 dB ... +6 dB)	
audio bandwidth	40 Hz - 15 kHz	
audio S/N	> 50 dB	
interface		
output transport stream	plug bar (socket) according to DVB	
environmental conditions		
operating temperatur	-10 - +50 °C	
storage temperatur	-20 - +70 °C	
humidity	20 - 80 %	
other		
dimensions (L x W x H)	140 x 120 x 25 mm	
weight	0,15 kg	
other features		
teletext		
VPS (video programming system, if supported by the provider)		
WSS (wide screen signalling)		
dynamic switching on regional program		

Typ	DHT-S2 COFDM module	DHT-S2 QAM HD module
input		
input connection	3 x F-socket	3 x F-socket
loop-through connection	F-socket	F-socket
LNC power supply	12VDC / max. 300mA, switchable	12VDC / max. 300mA, switchable
frequency range	950 - 2150 MHz	950 - 2150 MHz
input level	50 - 80 dB μ V	50 - 80 dB μ V
input symbol rate	max. 30 MS/s	max. 30 MS/s
DVB-S2 modulation	QPSK, 8PSK	QPSK, 8PSK
bandwidth	6 / 7 / 8 MHz	36 MHz
output		
modulation	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 32QAM 64QAM 128QAM, 256QAM
data rates - adaptation	yes	yes
PCR correction	yes	yes
PID filtering	yes	drop PID pass o. drop service
output data rates	1.0 - 7.5 MSym	
output	freely programmable	
power consumption	about 11 W	
environmental conditions		
operating temperature	-10 - +50 °C	
storage temperature	-20 - +70 °C	
humidity	20 - 80 %	
other		
dimensions (L x W x H)	140 x 120 x 25 mm	
weight	0,15 kg	
other features		

13.0 Channel setup table for DVB-T (CCIR - grid)

Kanal	Mittelfrequenz DVB-T	Kanal - Bandbreite	Kanal	Mittelfrequenz DVB-T	Kanal - Bandbreite
K 2	50.5	7 MHz	K 21	474.0	8 MHz
K 3	57.5		K 22	482.0	
K 4	64.5		K 23	490.0	
			K 24	498.0	
S 2	114.5		K 25	506.0	
S 3	121.5		K 26	514.0	
S 4	128.5		K 27	522.0	
S 5	135.5		K 28	530.0	
S 6	142.5		K 29	538.0	
S 7	149.5		K 30	546.0	
S 8	156.5		K 31	554.0	
S 9	163.5		K 32	562.0	
S 10	170.5		K 33	570.0	
			K 34	578.0	
K 5	177.5		K 35	586.0	
K 6	184.5	K 36	594.0		
K 7	191.5	K 37	602.0		
K 8	198.5	K 38	610.0		
K 9	205.5	K 39	618.0		
K 10	212.5	K 40	626.0		
K 11	219.5	K 41	634.0		
K 12	226.5	K 42	642.0		
		K 43	650.0		
S 11	233.5	K 44	658.0		
S 12	240.5	K 45	666.0		
S 13	247.5	K 46	674.0		
S 14	254.5	K 47	682.0		
S 15	261.5	K 48	690.0		
S 16	268.5	K 49	698.0		
S 17	275.5	K 50	706.0		
S 18	282.5	K 51	714.0		
S 19	289.5	K 52	722.0		
S 20	296.5	K 53	730.0		
		K 54	738.0		
S 21	304.0	K 55	746.0		
S 22	314.0	K 56	754.0		
S 23	322.0	K 57	762.0		
S 24	330.0	K 58	770.0		
S 25	338.0	K 59	778.0		
S 26	346.0	K 60	786.0		
S 27	354.0	K 61	794.0		
S 28	362.0	K 62	802.0		
S 29	370.0	K 63	810.0		
S 30	378.0	K 64	818.0		
S 31	386.0	K 65	826.0		
S 32	394.0	K 66	834.0		
S 33	402.0	K 67	842.0		
S 34	410.0	K 68	850.0		
S 35	418.0	K 69	858.0		
S 36	426.0				
S 37	434.0				
S 38	442.0				
S 39	450.0				
S 40	458.0				
S 41	464.0				