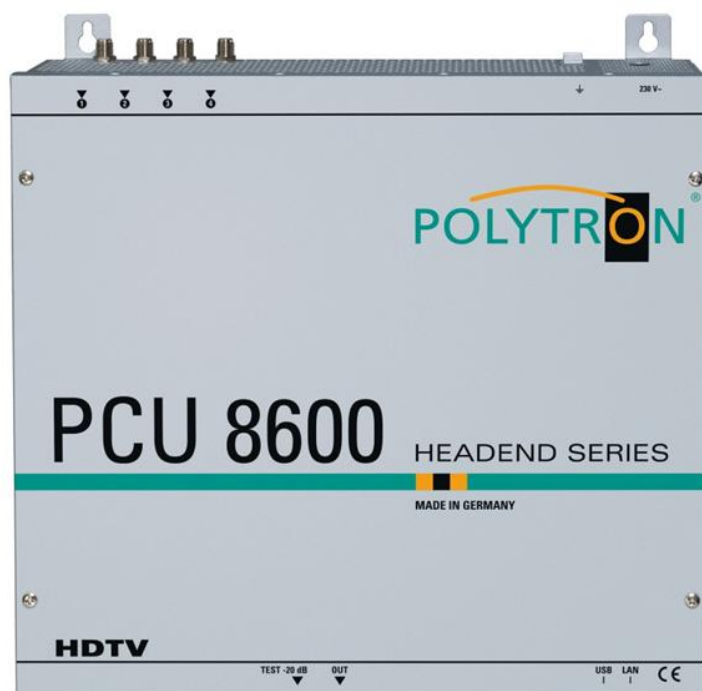


PCU 8610 / 8620



User manual

MADE IN GERMANY

0901885

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1. Mounting and safety instructions



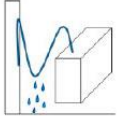
Attention

The rated voltage stated on the device must correspond with the mains voltage. The instructions for operating the device must be observed.



Grounding and potential equalization

Please establish grounding and perform potential equalization before initial startup.



Connection cable

Always install the connection cables with a loop so that no condensed water can penetrate along the cable.



Select installation site

Install only on a solid, plane and at most fire-resistant surface. Avoid strong magnetic fields in the surroundings. Too strong heat effect or accumulation of heat will have an adverse effect on the durability. Don't mount directly over or nearby heating systems, open fire sources or the like, where the device is exposed to heat radiation or oil vapours. Don't block the ventilation slots of devices fitted with fans or heatsinks, as this will cause heat to build up inside the devices and may cause fire. Free air circulation is absolutely necessary to permit the device to function properly. It's imperative to observe the mounting position!



Moisture

Protect the device from high humidity, dripping and splashing water. If there is condensation, wait until the device is completely dry. Operating environment according to the specified IP protection class.



Caution! Danger of life!

According to the currently valid version of EN 60728-11, coaxial receiving and distribution systems must meet the safety requirements regarding grounding, potential equalization, etc., otherwise damage to the product, fire or other hazards may occur. Electrical fuses may only be replaced by authorised specialist persons. For the replacement of electric fuses, only same type and amperage have to be used. In case of damage the device has to be taken out of service.



Mounting and service works

May be only done by authorized staff according to the rules of technology. Devices have to be switched off before starting any maintenance or service work. In order to guarantee interference immunity, all device covers must be screwed tight again after opening.



Ambient temperature

Operation and storage only within the specified temperature range.



Termination

Not used receiver and trunk line outputs have to be terminated with 75 Ohm-resistors.



Caution! Laser beam -> risk of accidents due to blinding!

Don't look into the laser beam or at direct reflexes of reflecting or polished surfaces. There is a danger of injury to the eyes.



Recycling

All of our packaging materials (packaging, identification sheet, plastic foil and bag) are fully recyclable.



ATTENTION

This module contains ESD components! (ESD = Electrostatic Sensitive Device). An electrostatic discharge is an electrical current pulse, which can flow also through an electrically insulated material, when triggered by large voltage difference.

To ensure the reliability of ESD components, it is necessary to consider their most important handling rules: Electrostatic sensitive components can be processed only on electrostatic protected area (EPA)!

- Pay attention permanently to potential equalization (equipotential bonding)!
- Use wrist straps, approved footwear for personnel grounding!
- Avoid electrostatically chargeable materials such as normal PE, PVC, polystyrene!
- Avoid electrostatic fields $>100 \text{ V/cm}$!
- Use only labeled and defined packing and transportation materials!

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

Waste disposal

Electronic equipment is not household waste but should be properly disposed on electrical and electronic equipment waste - in accordance with Directive 2002/96/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL.

Please take this device at the end of its use for proper disposal at the designated public collection points.



WEEE-Reg.-Nr. DE 51035844

2. General information

The new compact HDTV-headends from the PCU 8600-series are implementing signals from eight satellite transponders into eight DVB-C or DVB-T channels, optionally. With the built-in 4x8 switching matrix, four freely selectable SAT IF levels can be switched to the eight tuners.

An intervention in the transport stream is possible to delete such programs, to adapt NIT / ONID data or to implement a program assignment using the LCN function. The possibility of allocating new TS IDs or SIDs via the remapping function completes the practical functionality of the PCU 8600-series.

Special features of the Polytron compact headends are temperature-controlled fans as part of the Polytron long-life concept and the intuitive programming of devices using the standard built-in control options via USB and LAN. All models of the PCU compact headend series can be combined via a common NIT table.

The quality of every single "Made in Germany" headend of the PCU 8600-series is ensured by a 24 hours test run prior to delivery.

3. Description

The compact headend PCU 86x0 from POLYTRON converts eight input signals (DVB-S/S2) into DVB-C/DVB-T output signals. For example, it's conceivable to use the device as free-to-air basic supply in a small boarding house or hotel, because around 40 programmes of eight transponders are already available. The headend can easily and quickly be programmed via the USB interface. No knowledge whatsoever the assigning and administration of IP addresses is required for this. The selected settings can be printed and saved and also transferred to other devices with a USB-stick. Due to the integrated LAN connection, it is possible to remotely control all parameters. The headend works in the frequency range 112 to 860 MHz and converts the selected satellite transponders completely including the additional services Teletext, EPG etc. The output is also suitable for adjacent channels and has a level of 90 dBµV. The PCU 86x0 is equipped with an energy-saving switching power supply which also serves for the supply of the LNB (input SAT 1 and SAT 4).

PCU 8610 = integrated 4x8 switch board / output modulation ex works DVB-C

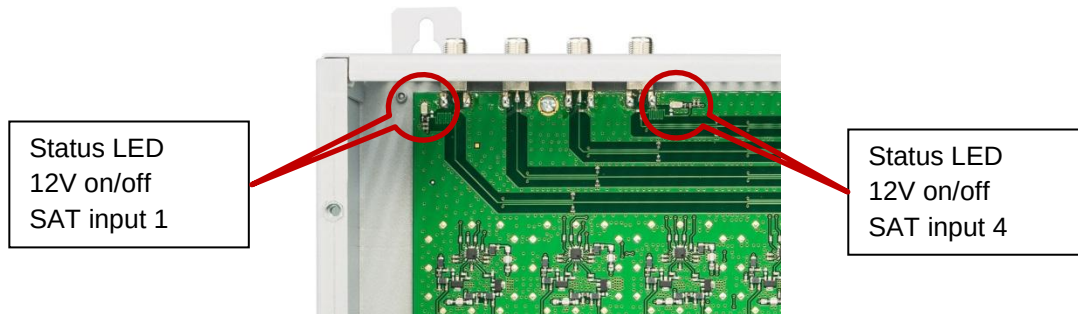
PCU 8620 = integrated 4x8 switch board / output modulation ex works DVB-T

4. Scope of delivery

- 1 x PCU 86x0
- 1 x Power cable
- 1 x USB-cable
- 1 x USB-Stick (Programming software)
- 1 x LAN patch cable
- 1 x Operating instructions
- 1 x Installation accessories

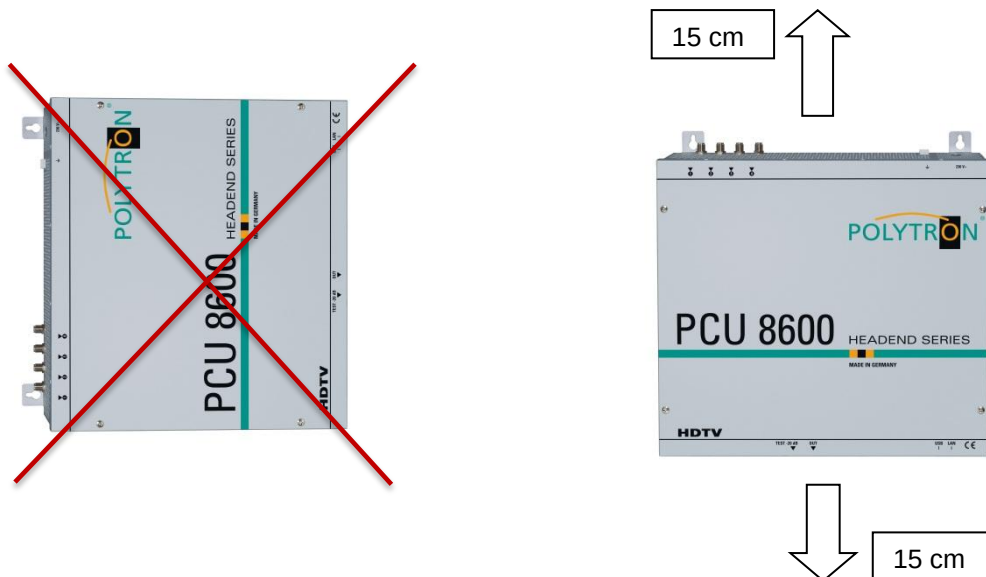
5. Input circuit

In the case of the PCU 86x0, the signals are fed to the tuners via an input switching matrix. There are four inputs for SAT signals. With the 4x8 matrix, four freely selectable SAT-IF levels can be switched to the eight tuners. Here, a transponder is selected and converted into a freely selectable output frequency between 112 - 860 MHz. As factory default, there is an additional 12V DC input for LNB supply on the input SAT 1 and SAT 4. If required, the SAT IF signals can also be fed directly to the input tuners (see point 9.1.). These are eight equal inputs each with 12V DC voltage for LNB supply. The operating states are indicated by LEDs.



6. Assembly

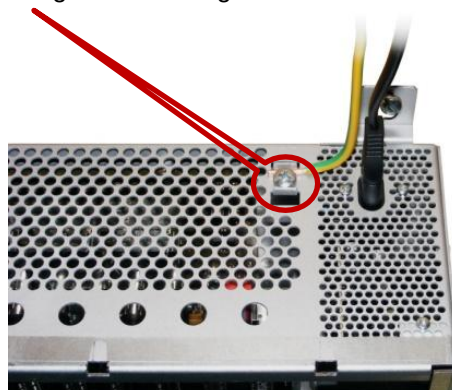
The installation of the compact headend must take place in a well ventilated room. The ambient temperature must not be more than 45°C. It must be ensured that the air can circulate through the ventilation holes. There must be at least 15 cm of space around the device, so that the air can circulate properly. The plug must be pulled from the socket before installation or work on the cabling.



6.1. Grounding

The device must be grounded in accordance with EN 60728-11.

- Strip approx. 15 mm of the cable insulation of the grounding cable (4mm²).
- Push stripped end under the grounding screw and tighten the screw.



7. Installation

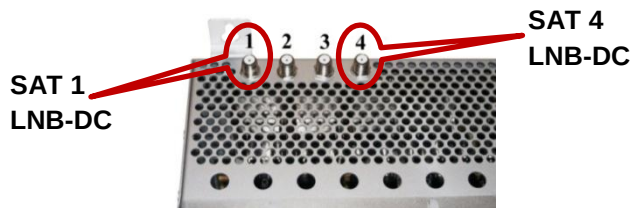
Connection of the Input Signals

Connect SAT signals directly or via splitter to the SAT tuner inputs.
At the input SAT 1 and SAT 4, a 12V DC voltage is applied for the LNB supply.



Please note that the consumption of each input must not exceed 250 mA.

Connect the various SAT levels to the four inputs (SAT 1, SAT 2, SAT 3, SAT 4) - see also point 9.ff.



It is also possible to connect SAT levels of different LNBs.

The LNB voltage is fixed to the inputs SAT 1 and SAT 4.

Please note that a Quattro LNB (e.g. Polytron OSP AP 95/96) is required.

If the LED for the LNB supply is not lit, the LNB supply is interrupted or disturbed.

7.1. Pre-programming

The inputs and outputs of the device are pre-programmed ex-factory with a German standard frequency allocation. A separate supplementary sheet with the pre-programming is enclosed with the device.

To receive the pre-programmed ASTRA transponders, the SAT inputs must be connected as follows:



Connection assignment for preprogramming

7.2. Input level

In order to ensure flawless reception, make sure that the level at the inputs is between **50** and **80 dBμV**.
If the input level is too high, an attenuator is to be used.

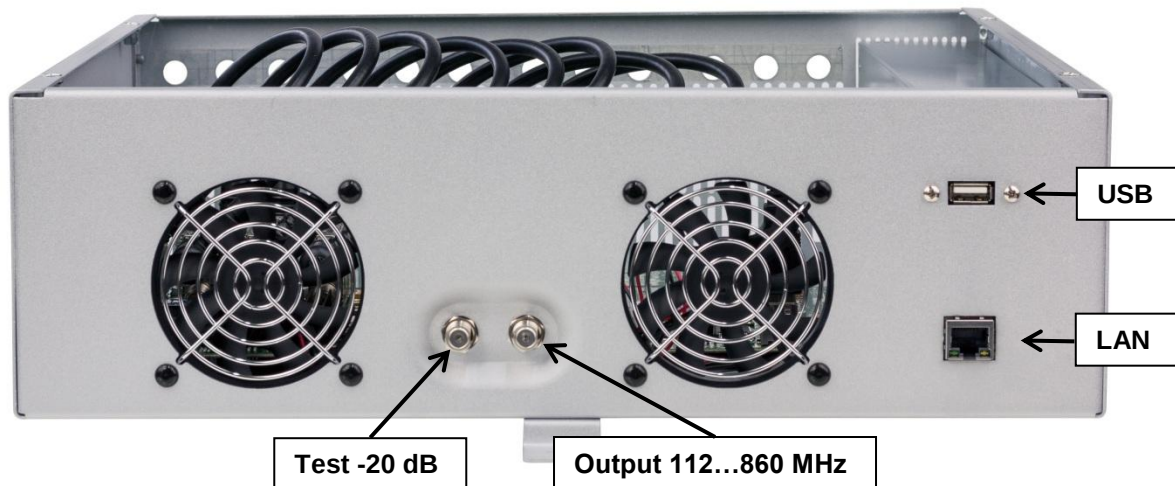


When receiving digital signals it is advantageous to have a lower input level instead of an excessively high one.

If the input level is too high, an attenuator is to be used.

7.3. Output level

Upon delivery, the output level is **90 dBμV**. This can be changed via the device programming. There is an output level reduced by 20 dB at the TEST socket.



8. General programming

After the mains cable is connected, the device runs through an internal routine and all 4 channels are set with the previously stored data. During this, the **status LED** next to the USB socket flashes green.

Only after the **status LED** is continuously green or orange, contact is possible between PCU 86x0 and PC/Laptop.

8.1. Software installation

Download the software package from the homepage www.polytron.de (satc12_Vxxx.zip) and unzip in the directory of your choice (e.g. C:\ PCU 86x0).

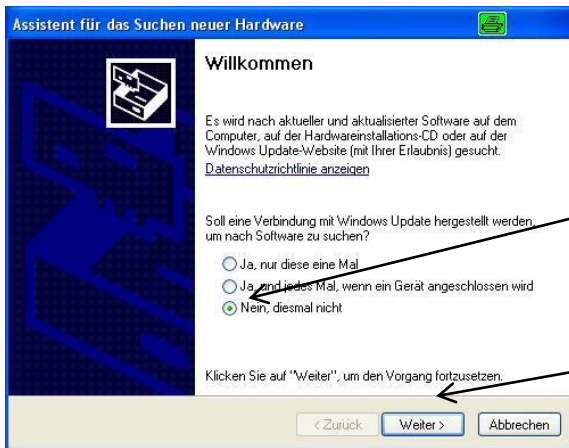
The software can also be loaded from the enclosed USB stick.

8.1.1. Installation of the driver

Start **Instal_driver.cmd**

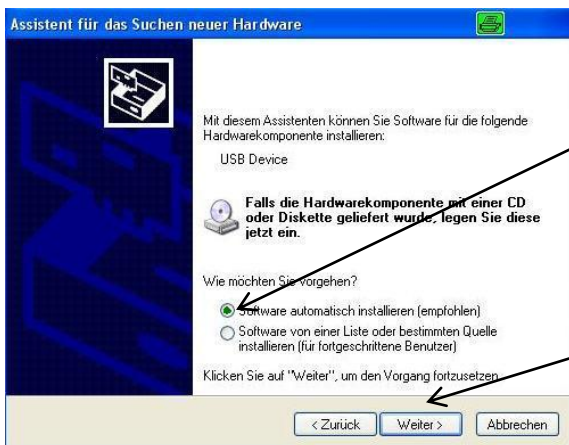
Follow the instructions on the screen.

In some first installations the following dialog can appear. This depends on the operating system. Carry out the following instructions and select the selection fields:



no, not this time

next



install Software automatically

next



If this notice is displayed:

Continue the installation



The software was installed for the following hardware

finish

→ The installation of the driver software is now complete.

8.1.2. Installation of the programming software

Install the software by starting the "Setup.exe" program in the desired folder.

Follow the instructions on the screen.

Close the screen displays once the installation has ended.



After the installation of the programming software on the PC, the PCU 86x0 can be connected to the PC with an USB cable.

Only connect the device to the PC once the software installation has been completed.



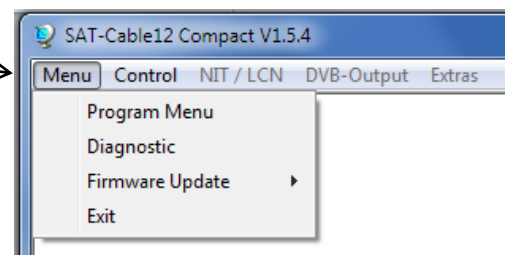
USB socket

8.2. Programming of the device parameters

Start the program – SATC12 –



Click on **Menu** at the top left

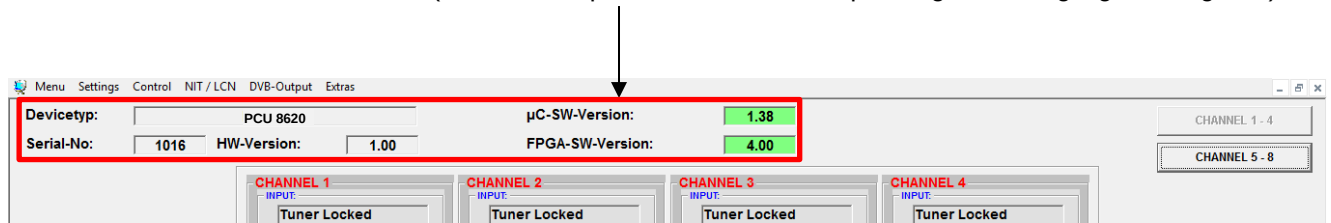


The following menu points are available:

- Program Menu
- Diagnostic
- Firmware Update
- Exit

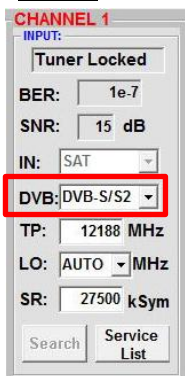
Select **Program Menu**: all adjustments of the input and output parameters are carried out here. After calling on the menu, all 8 channels and the respective *adjusted parameters are displayed*.

In the top part of the menu, the device data is displayed, such as type, serial number, hardware version and the software states for CPU and FPGA (software is up-to-date, if the corresponding field is highlighted in green).



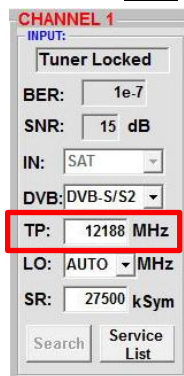
8.2.1. Input parameters SAT reception

DVB > Input signal



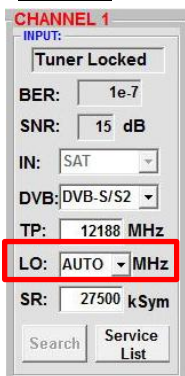
Input signal indication

TP > Transponder frequency



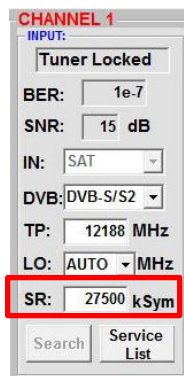
Enter transponder frequency

Auto > LO. -frequency



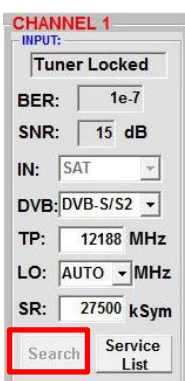
AUTO sets the required frequency automatically. Can however be set to **09750**, **10600** or another **OTHER** frequency.

SR > Symbolrate



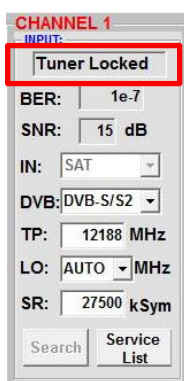
Enter symbol rate

Search >



After the button **Search** has been activated, the data is accepted and the desired transponder is set.

Tuner Locked



If the tuner finds the transponder **Tuner Locked** is displayed in the upper field.

Receiving Conditions

CHANNEL 1
INPUT:
Tuner Locked
BER: 1e-7
SNR: 15 dB
IN: SAT
DVB: DVB-S/S2
TP: 12188 MHz
LO: AUTO MHz
SR: 27500 kSym
Search Service List

The quality of the input signal can be evaluated using the bit error ratio

BER and the signal-to-noise ratio **SNR**.

8.2.2. Output parameters DVB-C

OP > Operating Mode

OUTPUT:
ON OFF
OP: Normal
F: Normal
BW: Single
QM: QAM-256
SR: 6900 kSym
SP: Normal
ATT: 0dB
Set

Normal> normal mode

Single> single carrier for level measurement with an analog antenna measuring device

Zero > digital channel with content 0 (constant level without fluctuations)

F > Output Frequency

OUTPUT:
ON OFF
OP: Normal
F: 306,00 MHz
BW: 8 MHz
QM: QAM-256
SR: 6900 kSym
SP: Normal
ATT: 0dB
Set

Frequency freely selectable.

It is recommended to stick to the corresponding TV standard channel spacing.

The frequency of the channel middle is set. (e.g. channel 21, 410- 478 MHz, set 474 MHz)

BW > Bandwidth

OUTPUT:
ON OFF
OP: Normal
F: 306,00 MHz
BW: 8 MHz
QM: 7 MHz
8 MHz
SR: 6900 kSym
SP: Normal
ATT: 0dB
Set

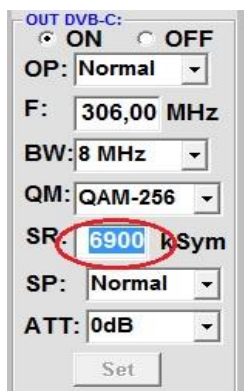
Choose bandwidth depending on output frequency between 7 MHz and 8 MHz

QM > QAM Mode

OUTPUT:
ON OFF
OP: Normal
F: 306,00 MHz
BW: 8 MHz
QM: QAM-256
SR: QAM-4
QAM-16
QAM-32
QAM-64
QAM-128
QAM-256
SP: Normal
ATT: 0dB
Set

Setting of the possible QAM mode (16, 32, 64, 128, 256) dependent on the data rate of the input transponder.

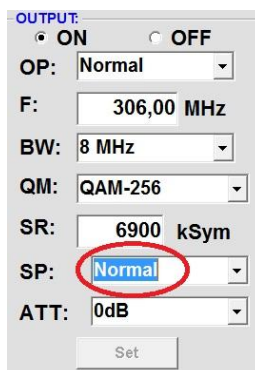
SR > Symbol Rate



OUT DVB-C:
☒ ON ☐ OFF
 OP: Normal
 F: 306,00 MHz
 BW: 8 MHz
 QM: QAM-256
 SR: 6900 kSym
 SP: Normal
 ATT: 0dB
 Set

Up to 7.200 kilo symbols/ sec.
 (used setting in cable networks:
 256 QAM / SR 6.900).

SP > Spectrum

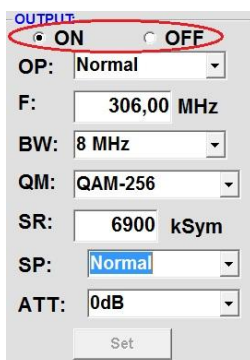


OUTPUT:
☒ ON ☐ OFF
 OP: Normal
 F: 306,00 MHz
 BW: 8 MHz
 QM: QAM-256
 SR: 6900 kSym
 SP: Normal
 ATT: 0dB
 Set

Normal > normal mode

Inverted > Useful signal can be
 inverted in its spectral position.
 Inversion is only necessary in
 exceptional cases.

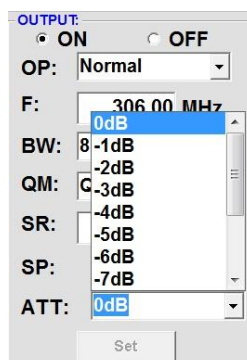
On OFF > Switching Off Output Channel



OUTPUT:
☒ ON ☐ OFF
 OP: Normal
 F: 306,00 MHz
 BW: 8 MHz
 QM: QAM-256
 SR: 6900 kSym
 SP: Normal
 ATT: 0dB
 Set

If not all 4 output channels are
 to be assigned, each channel can
 be switched off individually with
 OFF.

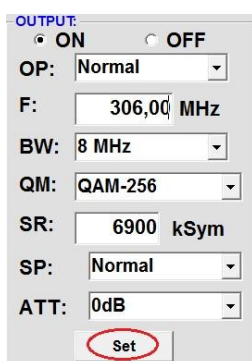
ATT > Output Level



OUTPUT:
☒ ON ☐ OFF
 OP: Normal
 F: 306,00 MHz
 BW: 8 MHz
 QM: QAM-256
 SR: 6900 kSym
 SP: Normal
 ATT: 0dB
 Set

The output level at the output is
 90dBμV and can be weakened in
 each channel by up to 12 dB in
 1dB steps.

Set > Accept Programming



OUTPUT:
☒ ON ☐ OFF
 OP: Normal
 F: 306,00 MHz
 BW: 8 MHz
 QM: QAM-256
 SR: 6900 kSym
 SP: Normal
 ATT: 0dB
 Set

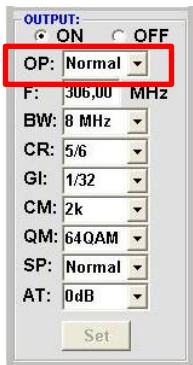
After the setting of all parameters press the Set button. With this, the adjusted data is accepted.
 Repeat steps for other channels.



N.B.: The DVB-C / QAM receivers must be programmed in
 accordance with the set parameters (search).

8.2.3. Output parameters DVB-T

OP > Operating Mode

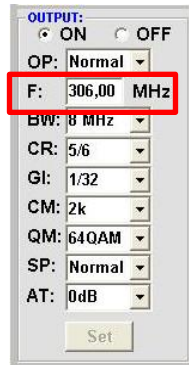


Normal > normal mode

Single > single carrier for level measurement with an analog antenna measuring device

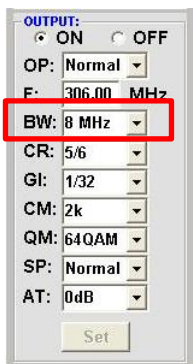
Zero > digital channel with content 0 (constant level without fluctuations)

F > Output Frequency



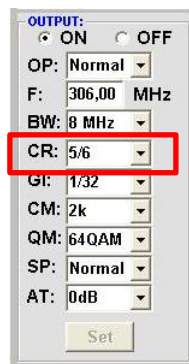
Frequency freely selectable. It is recommended to stick to the corresponding TV standard channel spacing. The frequency of the channel middle is set. (e.g. channel 21, 410- 478 MHz, set 474 MHz)

BW > Bandwidth



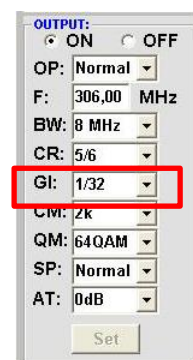
Choose bandwidth depending on output frequency between 7 MHz and 8 MHz

CR > Code Rate



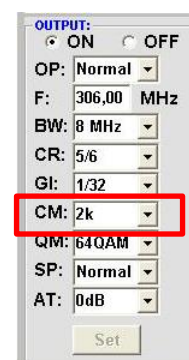
Setting of the possible Code rate (1/2, 2/3, 3/4, 5/6, 7/8)

GI > Guard Interval



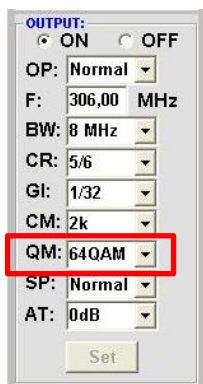
Setting of the possible Guard interval (1/4, 1/8, 1/16, 1/32)

CM > Carrier Modulation



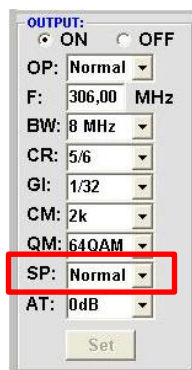
Setting of the possible carrier (2k, 8k)

QM > QAM Mode



Setting QAM mode
(16, 32, 64)

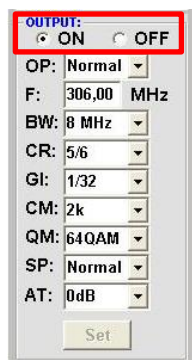
SP > Spectrum



Normal > normal mode

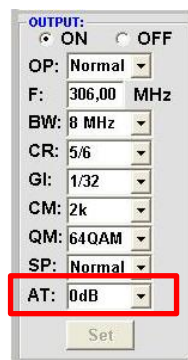
Inverted > Useful signal can be inverted in its spectral position. Inversion is only necessary in exceptional cases.

On OFF > Switching Off Output Channel



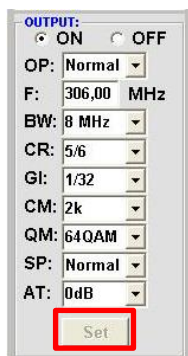
If not all 4 output channels are to be assigned, each channel can be switched off individually with **OFF**.

ATT > Output Level



The output level at the output is 90dBμV and can be weakened in each channel by up to 12 dB in 1dB steps.

Set > Accept Programming



After the setting of all parameters press the **Set** button. With this, the adjusted data is accepted. Repeat steps for other channels.



N.B.: The DVB-T / COF receivers must be programmed in accordance with the set parameters (search).

8.3. Function >Service List<

If certain services within a transponder are not desired at the output, they can be removed.

8.3.1. Delete and add services (programs)

CHANNEL 2
INPUT:

Tuner Locked

BER: 1e-7

SNR: 17 dB

IN: SAT 1

TP: 11954 MHz

LO: AUTO MHz

SR: 27500 kSym

Search Service List



The button **Service List** is only active if the tuner is locked.

CHANNEL 1
INPUT:

Tuner Locked

BER: 1e-7

SNR: 16 dB

IN: SAT 1

TP: 11836 MHz

LO: AUTO MHz

SR: 27500 kSym

Search Service List



If the data rate at the input is higher than the data rate that is possible at the output due to the set parameters an error message appears and the button for the **Service List** turns red. In this case, a reduced selection of the desired services must be made.

Clicking on this button opens the following window. The list of services available at the input is shown on the left. On the right, one can see the services contained in the output signal.

Edit Servicelist CHANNEL 1

Input Servicelist: Save / Back

Output Servicelist:

TV-Das Erste
TV-BR Fernsehen Süd
TV-hr-fernsehen
TV-BR Fernsehen Nord
TV-WDR Köln
TV-SWR Fernsehen BW

< Remove
<< Remove All
Add All >>
Add >

6 Services found

6 Services found

Check Rem. Bitrate: **Overflow** kbit



If the data rate at the output is too high, the word "**Overflow**" appears in the field "**Rem. Bitrate**". This means that the data rate is too high for the set parameters, and services must be removed. Undesired services can of course also be deleted if there is no overflow.

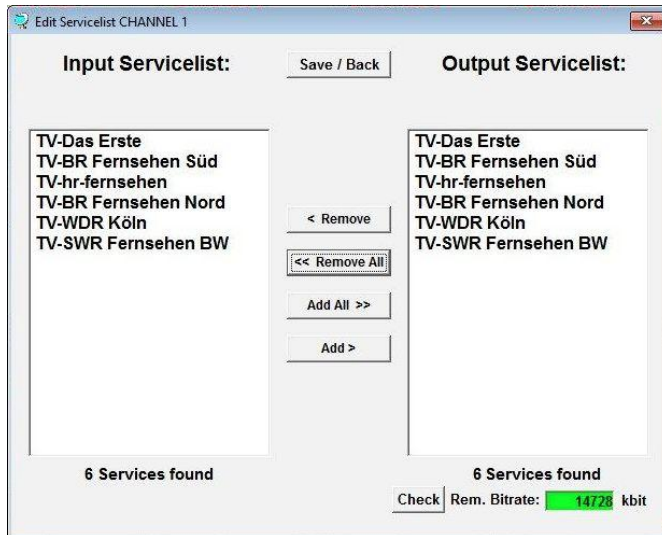
The field Bitrate is marked by colors.
Green means: The remaining bitrate is higher than 10000 kSym.
Yellow means: The remaining bitrate is less than 10000 kSym.
Red means: The remaining bitrate is less than 5000 kSym.
Overflow means: The data rate is too high in accordance to the adjusted DVB-C or DVB-T parameters.

By clicking on a service in the input list and clicking on the command **Add**, this service is added to the output list (also double-clicking on a service in the input list automatically adds it to the output list).

Clicking on a service in the output list and clicking on the command **Remove** removes this service from the output list (also double-clicking on a service in the output list removes the service automatically).

By single-clicking on the **Save/Back** button, the output list is saved and the window is automatically closed.

If you want to choose only a few services from a transponder containing many services, you can first click on **Remove ALL** and then select the required services.

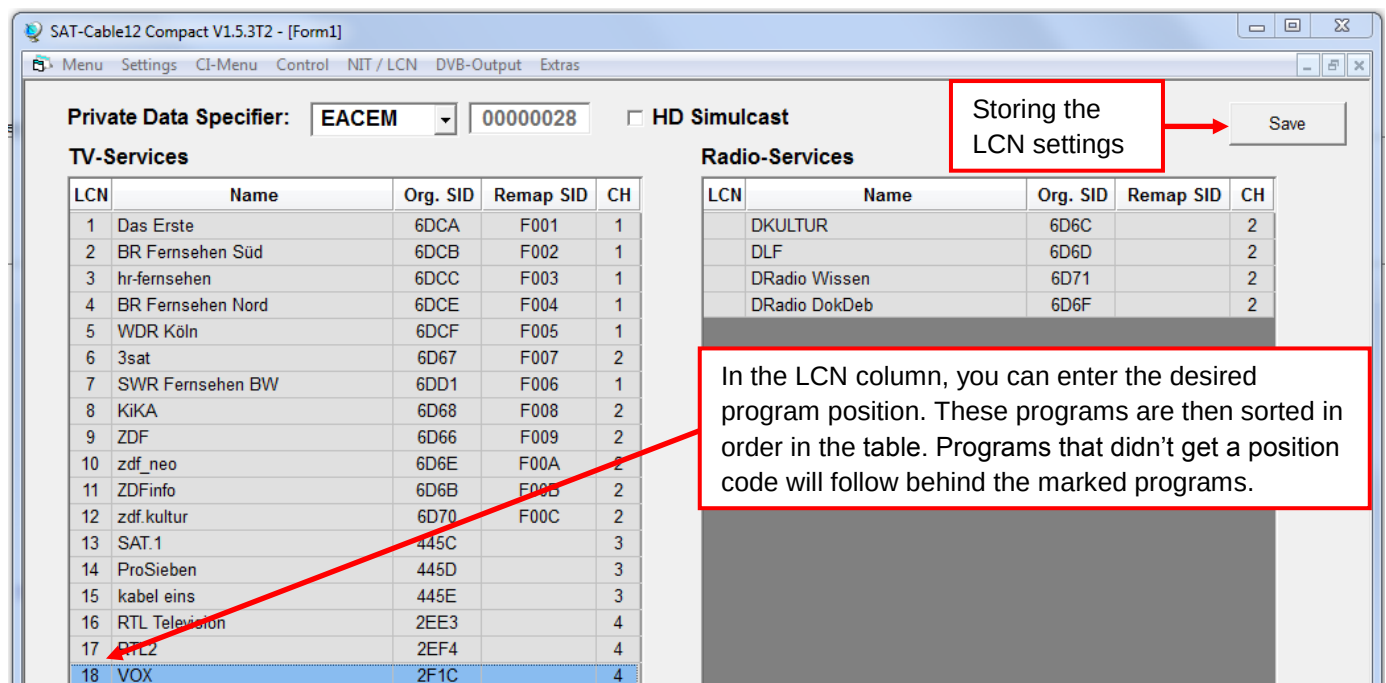
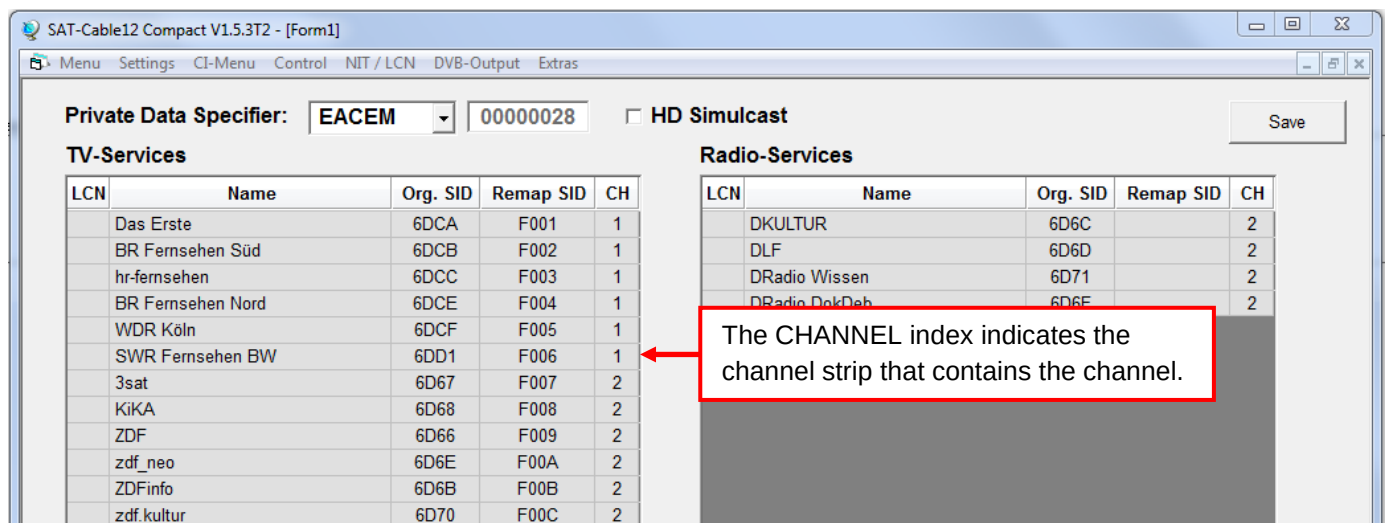
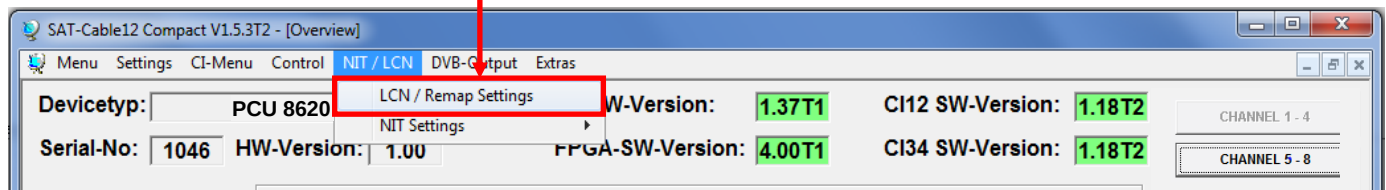


The still available data rate is shown in the field "Rem. Bitrate". This should be at least 5.000 kSym.

8.3.2. LCN function for the allocation of program positions

 **Precondition is that the TVs/receivers support LCN.**

→ Click on LCN / Remap Settings.

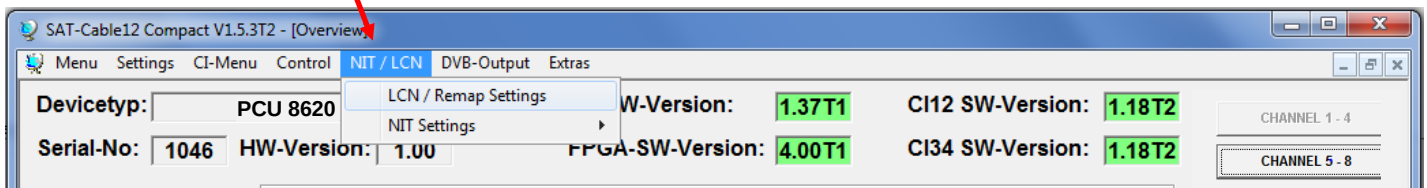


8.3.3. SID-Remapping – manual assignment of Service-IDs

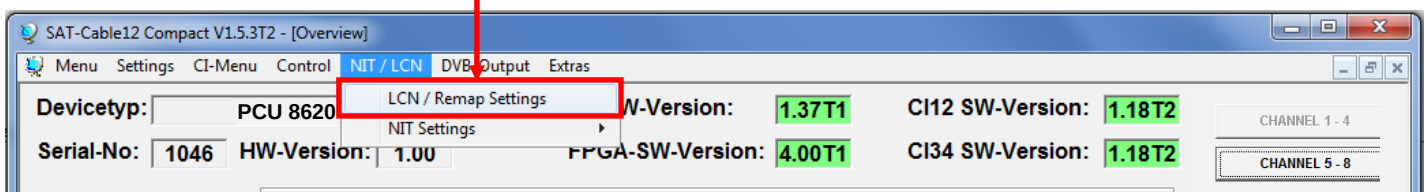
- With the functionality SID-remapping new programs can be transmitted without retuning the receivers.
- Selected services are assigned with a new Service ID = (SID).
- **Important:** Please ensure that a unique SID is assigned to the programs which are changed.
- The max. number of programs to be remapped must be assigned and scanned at first installation (some may be used as „placeholder“).
 - changes to less numbers of programs -> no new channel search is needed
 - changes to higher numbers of programs -> new channel search is required
- **Important:** If service-remapping should be applied, this adjustment has to be done **before** creating the combined NIT.

Settings:

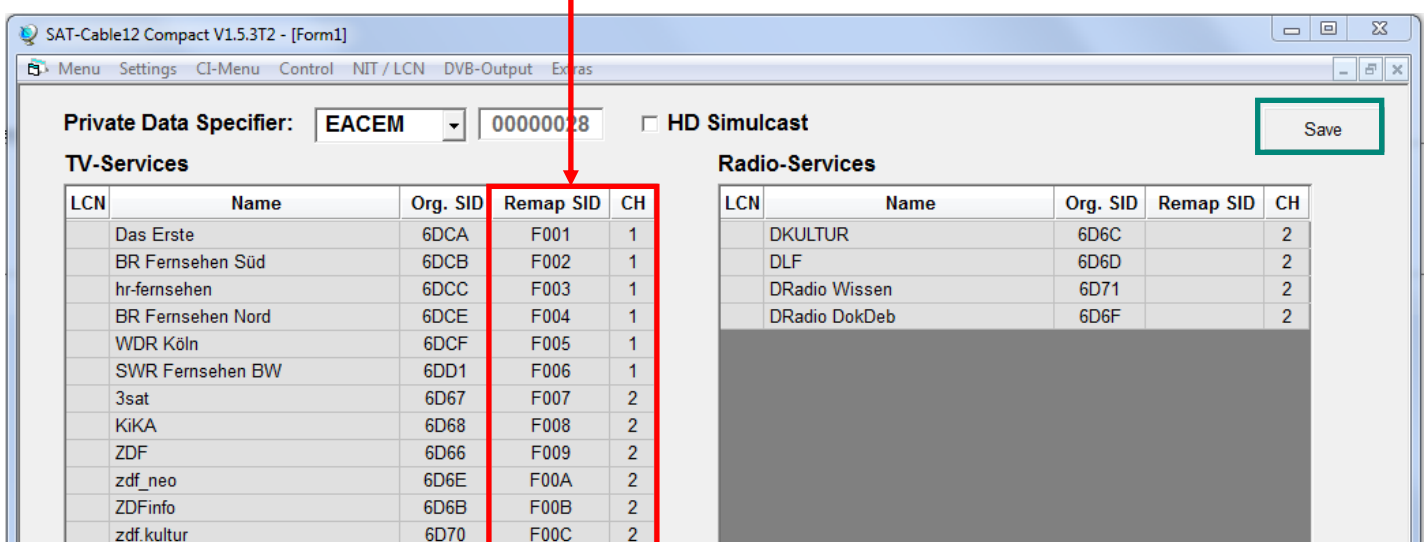
➔ Click on the tab **NIT / LCN**.



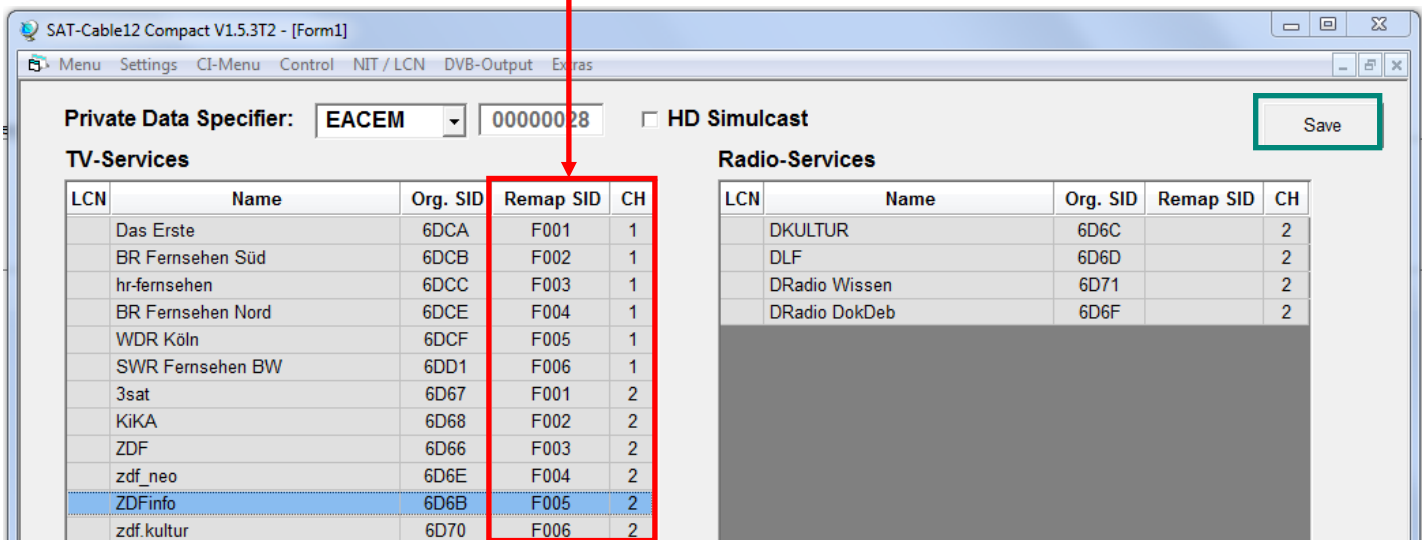
➔ Afterwards click on **LCN / Remap Settings**.



➔ Example 1 (continuous allocation of Service IDs over all transponders):



→ Example 2 (continuous allocation of Service IDs for every transponder):



Private Data Specifier: **EACEM** ☐ HD Simulcast Save

LCN	Name	Org. SID	Remap SID	CH
Das Erste		6DCA	F001	1
BR Fernsehen Süd		6DCB	F002	1
hr-fernsehen		6DCC	F003	1
BR Fernsehen Nord		6DCE	F004	1
WDR Köln		6DCF	F005	1
SWR Fernsehen BW		6DD1	F006	1
3sat		6D67	F001	2
KiKA		6D68	F002	2
ZDF		6D66	F003	2
zdf_neo		6D6E	F004	2
ZDFinfo		6D6B	F005	2
zdf.kultur		6D70	F006	2

LCN	Name	Org. SID	Remap SID	CH
DKULTUR		6D6C		2
DLF		6D6D		2
DRadio Wissen		6D71		2
DRadio DokDeb		6D6F		2

Service IDs are entered manually. We recommend to use hexadecimal values within the range of F001 and FFFE.

Important: The allocation of the Service ID can be continuously (example 1).

A service is referenced inside of a transponder by the unique pairing of ONID/TSID/SID.

That's why the same SID can be used again in another transponder (example 2).

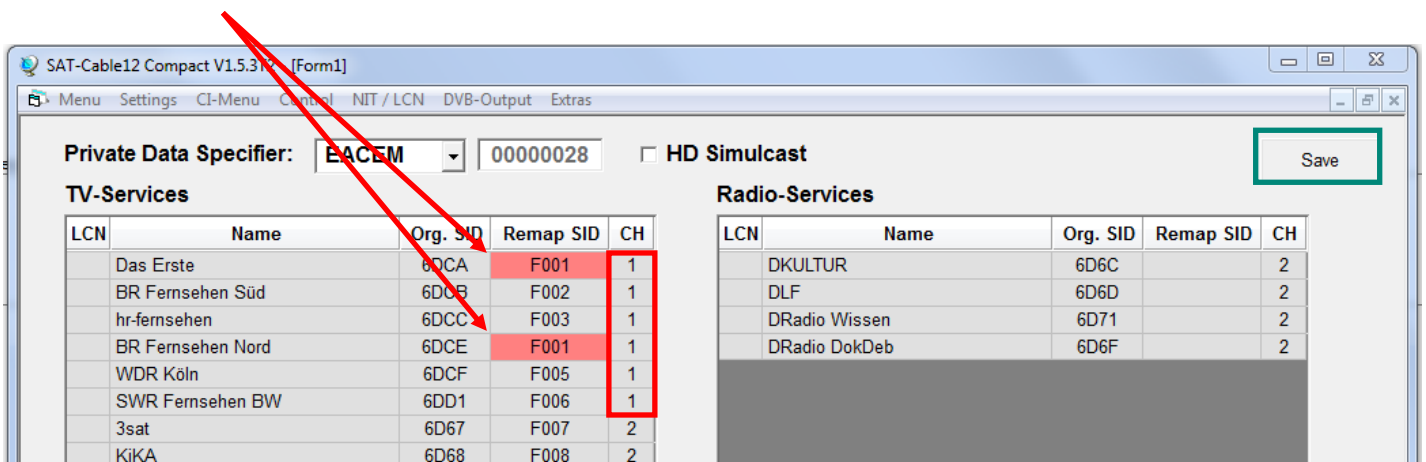
Within one transponder the same SID must not be used twice.



Click **Save** to apply the changes.



Indication of fault case (the same SID is used twice for transponder 1):



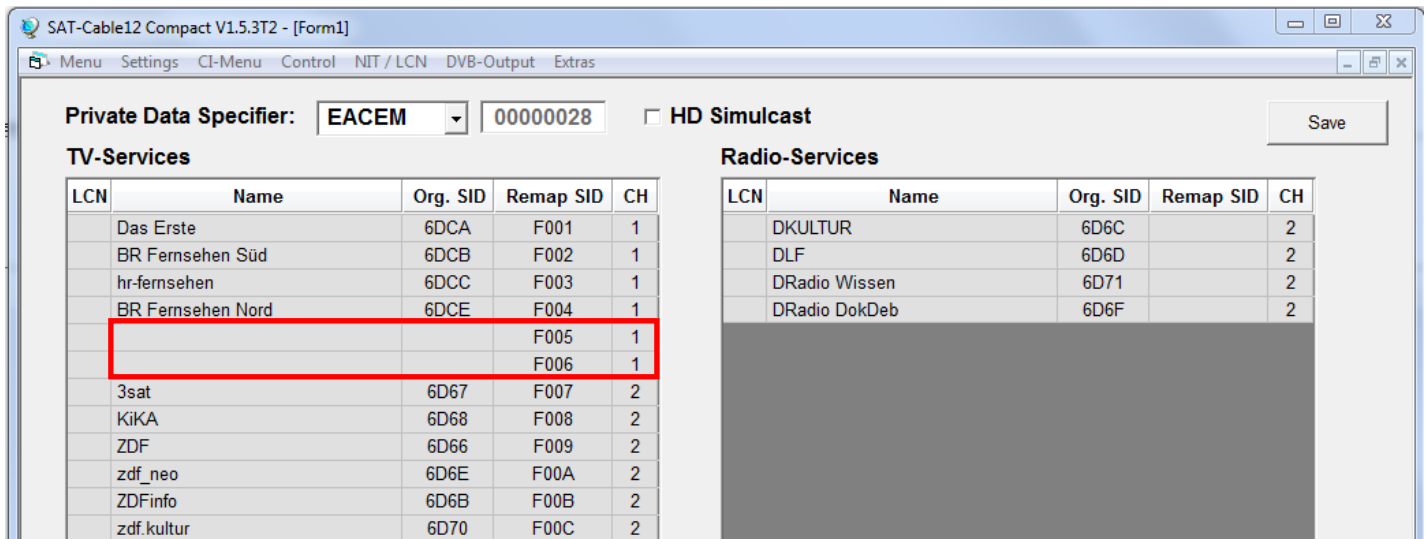
Private Data Specifier: **EACEM** ☐ HD Simulcast Save

LCN	Name	Org. SID	Remap SID	CH
Das Erste		6DCA	F001	1
BR Fernsehen Süd		6DCB	F002	1
hr-fernsehen		6DCC	F003	1
BR Fernsehen Nord		6DCE	F001	1
WDR Köln		6DCF	F005	1
SWR Fernsehen BW		6DD1	F006	1
3sat		6D67	F007	2
KiKA		6D68	F008	2

LCN	Name	Org. SID	Remap SID	CH
DKULTUR		6D6C		2
DLF		6D6D		2
DRadio Wissen		6D71		2
DRadio DokDeb		6D6F		2

Error correction: By manually change of the SID and **Save**.

➔ Indication for the case, that instead of originally 6 programs of transponder 1 only 4 programs were fed into after changing:



Private Data Specifier: **EACEM** ☐ HD Simulcast Save

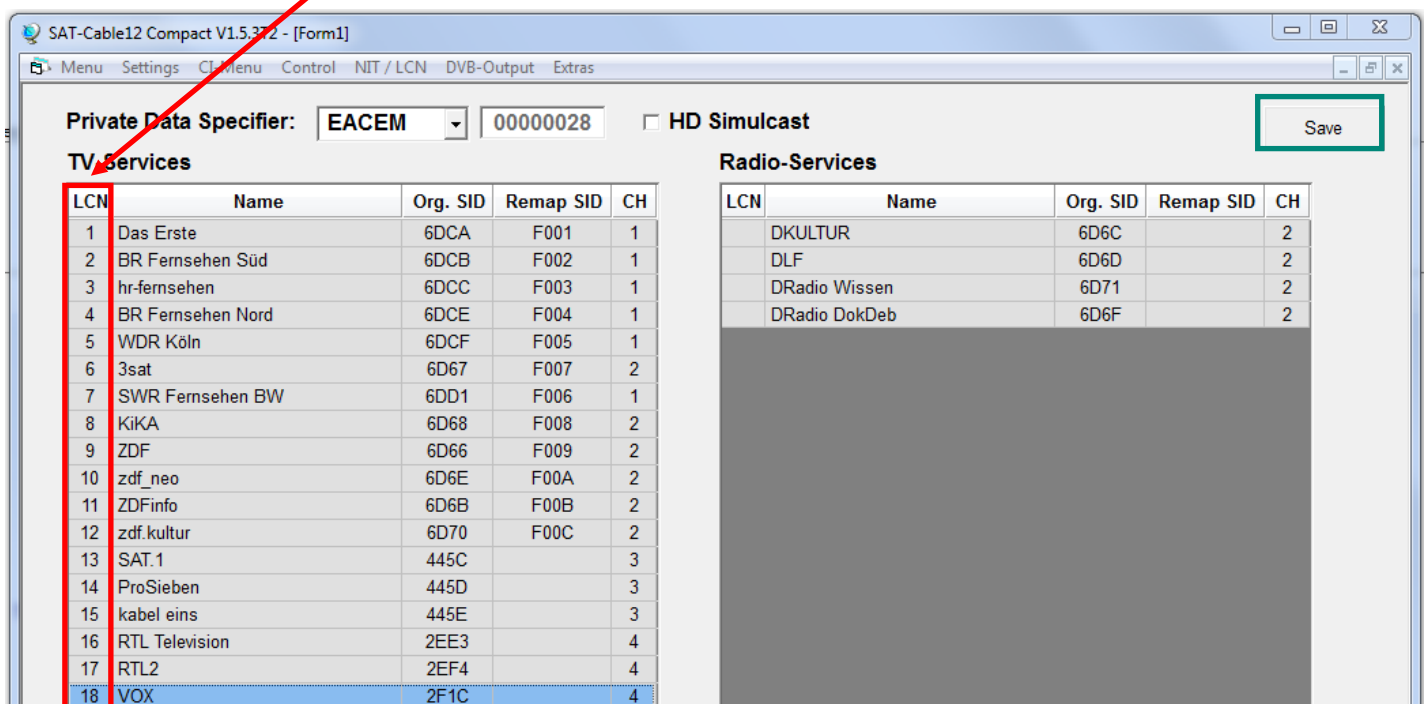
LCN	Name	Org. SID	Remap SID	CH
	Das Erste	6DCA	F001	1
	BR Fernsehen Süd	6DCB	F002	1
	hr-fernsehen	6DCC	F003	1
	BR Fernsehen Nord	6DCE	F004	1
			F005	1
			F006	1
	3sat	6D67	F007	2
	KiKA	6D68	F008	2
	ZDF	6D66	F009	2
	zdf_neo	6D6E	F00A	2
	ZDFinfo	6D6B	F00B	2
	zdf.kultur	6D70	F00C	2

LCN	Name	Org. SID	Remap SID	CH
	DKULTUR	6D6C		2
	DLF	6D6D		2
	DRadio Wissen	6D71		2
	DRadio DokDeb	6D6F		2

Important: A new channel search is not required for this example but the picture on the receivers site will remain „black“ for the 2 services with the SID F005 and F006.

Add LCN numbers:

Enter the corresponding LCN numbers manually.



Private Data Specifier: **EACEM** ☐ HD Simulcast Save

LCN	Name	Org. SID	Remap SID	CH
1	Das Erste	6DCA	F001	1
2	BR Fernsehen Süd	6DCB	F002	1
3	hr-fernsehen	6DCC	F003	1
4	BR Fernsehen Nord	6DCE	F004	1
5	WDR Köln	6DCF	F005	1
6	3sat	6D67	F007	2
7	SWR Fernsehen BW	6DD1	F006	1
8	KiKA	6D68	F008	2
9	ZDF	6D66	F009	2
10	zdf_neo	6D6E	F00A	2
11	ZDFinfo	6D6B	F00B	2
12	zdf.kultur	6D70	F00C	2
13	SAT.1	445C		3
14	ProSieben	445D		3
15	kabel eins	445E		3
16	RTL Television	2EE3		4
17	RTL2	2EF4		4
18	VOX	2F1C		4

LCN	Name	Org. SID	Remap SID	CH
	DKULTUR	6D6C		2
	DLF	6D6D		2
	DRadio Wissen	6D71		2
	DRadio DokDeb	6D6F		2



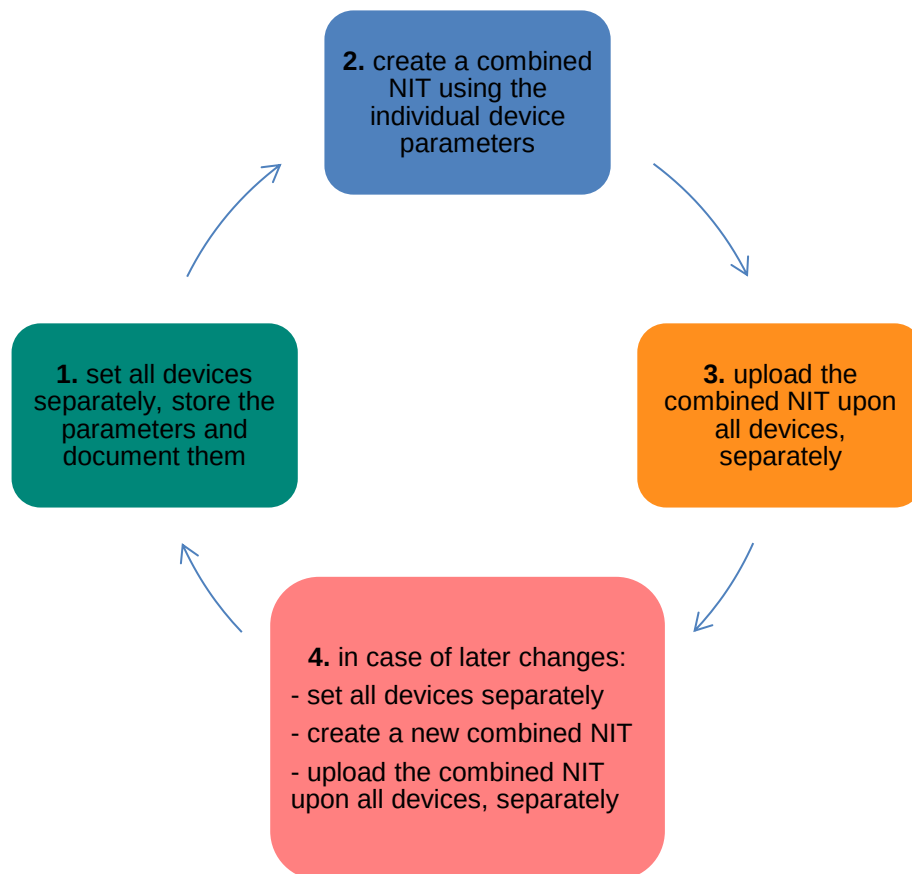
Click **Save** to apply the changes.



8.3.4. NIT-processing (Network Information Table)

- NIT stands for a transponder table which includes information for direct reception of digital programmes.
- NIT-processing requires advanced skills of DVB-standards!
- The combined NIT includes all relevant data of all connected devices and contains information about all receivable programmes in the network.
- **Important:** Place output channels within a combined NIT onto the lower frequency range, if possible. Many receivers start scanning at the lower end of the band ensuring that the combined NIT is found at first. This is particularly the case if existing systems with devices from other manufacturers will be upgraded and the combined NIT is missing.
- **Important:** The skilled employee should create a precise system and programming plan **before** installation/programming.
- **Important:** If service-remapping should be applied, this adjustment has to be done **before** creating the combined NIT.

Process scheme:



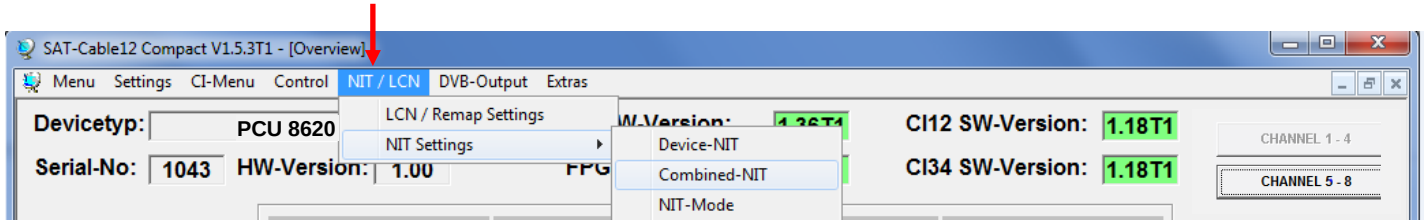
Changes to the NIT table(s) first become effective after closing the PC software.



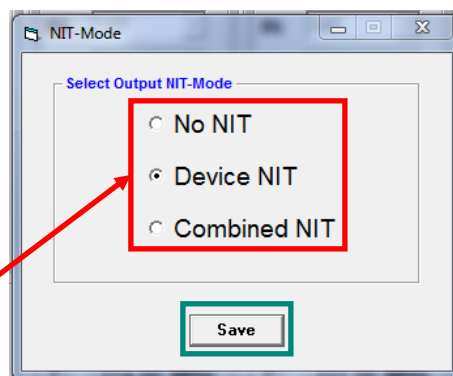
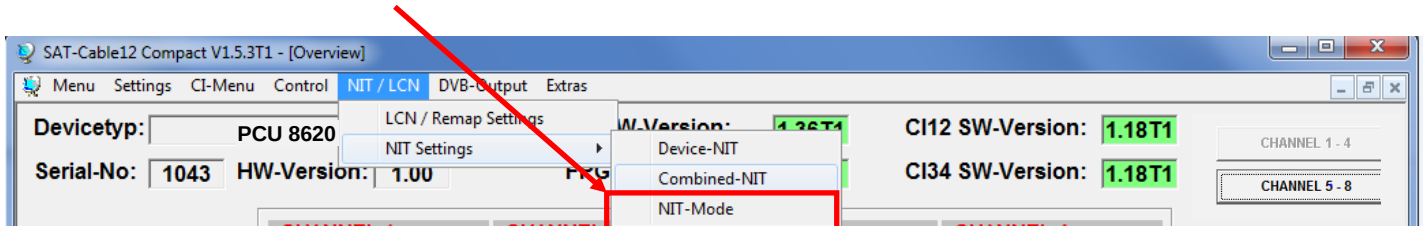
Please wait approx. 1 min. after closing the PC software until the changes become effective in all relevant systems.

Settings:

→ Click on the tab **NIT / LCN**.



→ Afterwards click on **NIT Mode** to determine which NIT should be used.



No NIT: No NIT will be sent (for special applications, not according to DVB-standard).

Device NIT: A valid NIT will be sent automatically for the actual device (factory setting).

Combined NIT: A cross-device NIT will be sent. Assumed, that the user has created and stored a cross-device NIT onto the device.

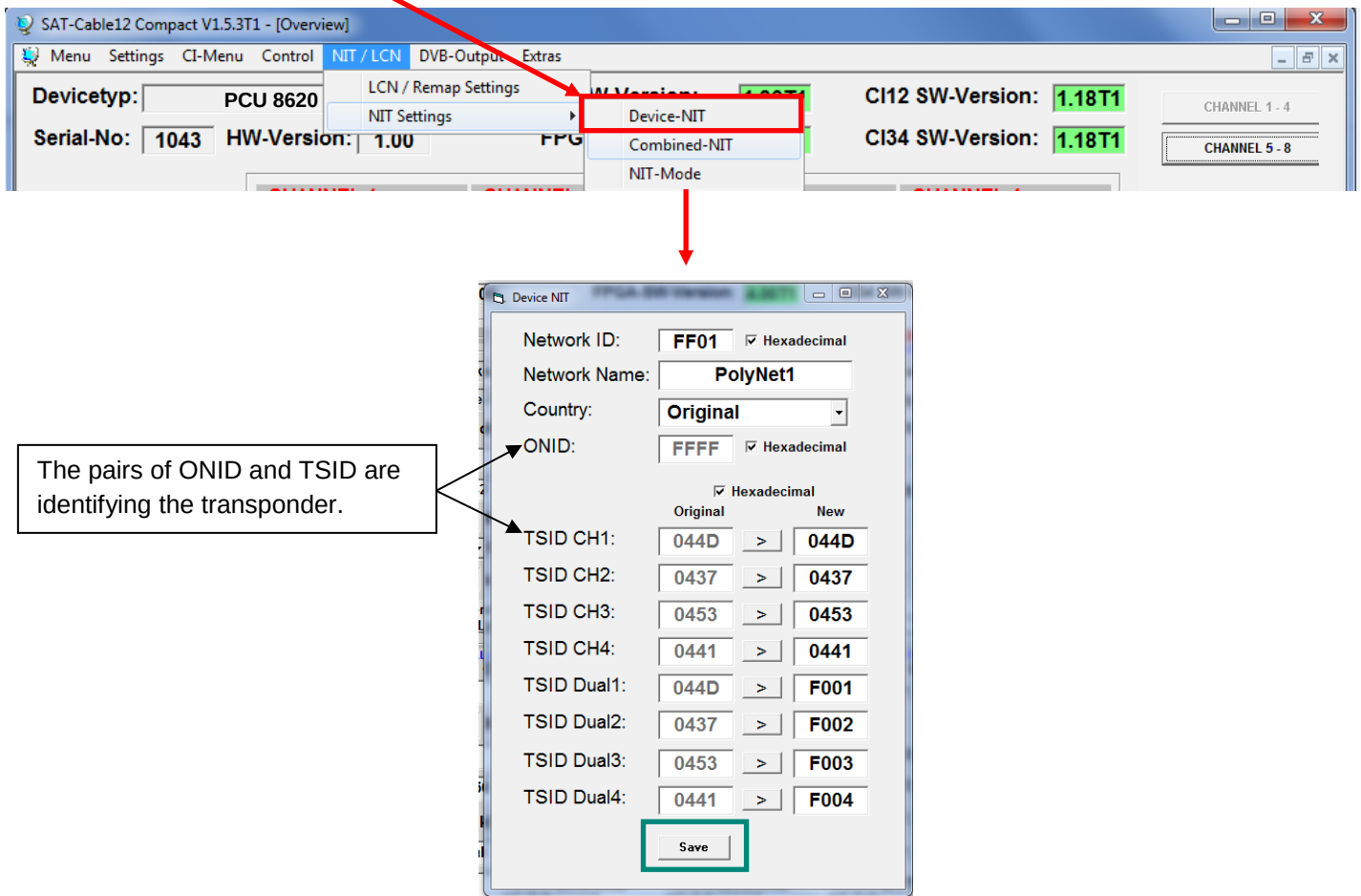


Click **Save** to apply the change.



Device NIT:

→ After clicking on **Device NIT** following screen window appears:



The pairs of ONID and TSID are identifying the transponder.

Field	Original	New
Network ID	FF01	
Network Name	PolyNet1	
Country	Original	
ONID	FFFF	
TSID CH1	044D	044D
TSID CH2	0437	0437
TSID CH3	0453	0453
TSID CH4	0441	0441
TSID Dual1	044D	F001
TSID Dual2	0437	F002
TSID Dual3	0453	F003
TSID Dual4	0441	F004

Note: Be aware of the plausibility and/or overlaps of the data before being entered!

Network ID: DVB-C at the output -> factory setting **FF01** (modification possible)
DVB-T at the output -> factory setting **3002** (modification possible)

Network Name: Can be defined by the user.

Country: DVB-C at the output -> factory setting **Original** (modification possible, by choosing **Original** the received ONID from the satellite will be used)
DVB-T at the output -> factory setting **Germany** (modification possible)
The country setting should be the same as the receiver settings.

TSID New: If using the dual modulators, the original TSID is assigned twice. Therefore a new TSID has to be created in this box. We recommend to use hexadecimal values within the range of F001 and FFEE.



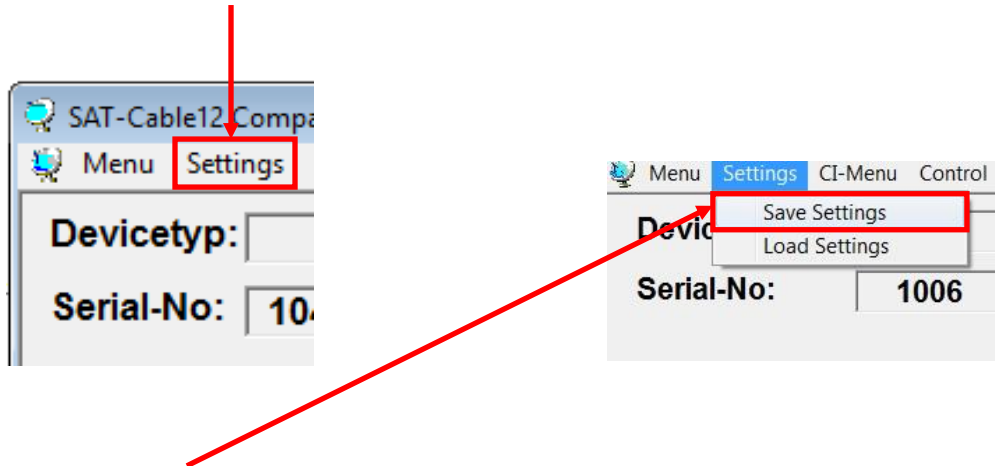
Click **Save** to apply the changes.



Combined NIT:

The settings of the individual devices must be stored before creating the combined NIT.

By choosing the menu point **Settings** it is possible to save existing settings on a PC/Laptop or to load it from a PC/Laptop.



With the menu point **Save Settings** it is possible to save the programming onto the PC/Laptop.

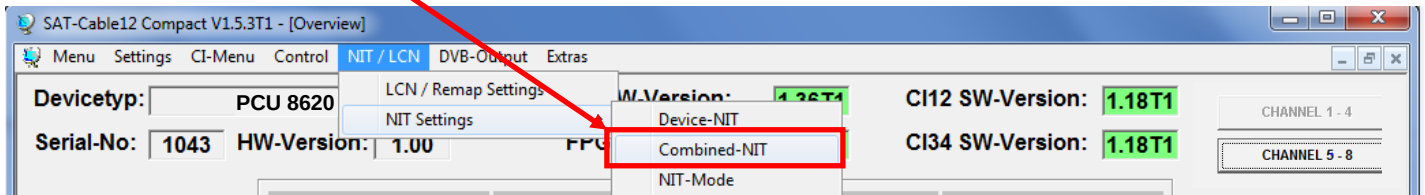
A folder and a file name (e.g. object) has to be entered. The file name must retain the ending .c12!!

The settings are also saved to an *.rtf-file. This file format can be opened, edited and printed with e.g. Microsoft Word, Open Office or WordPad.

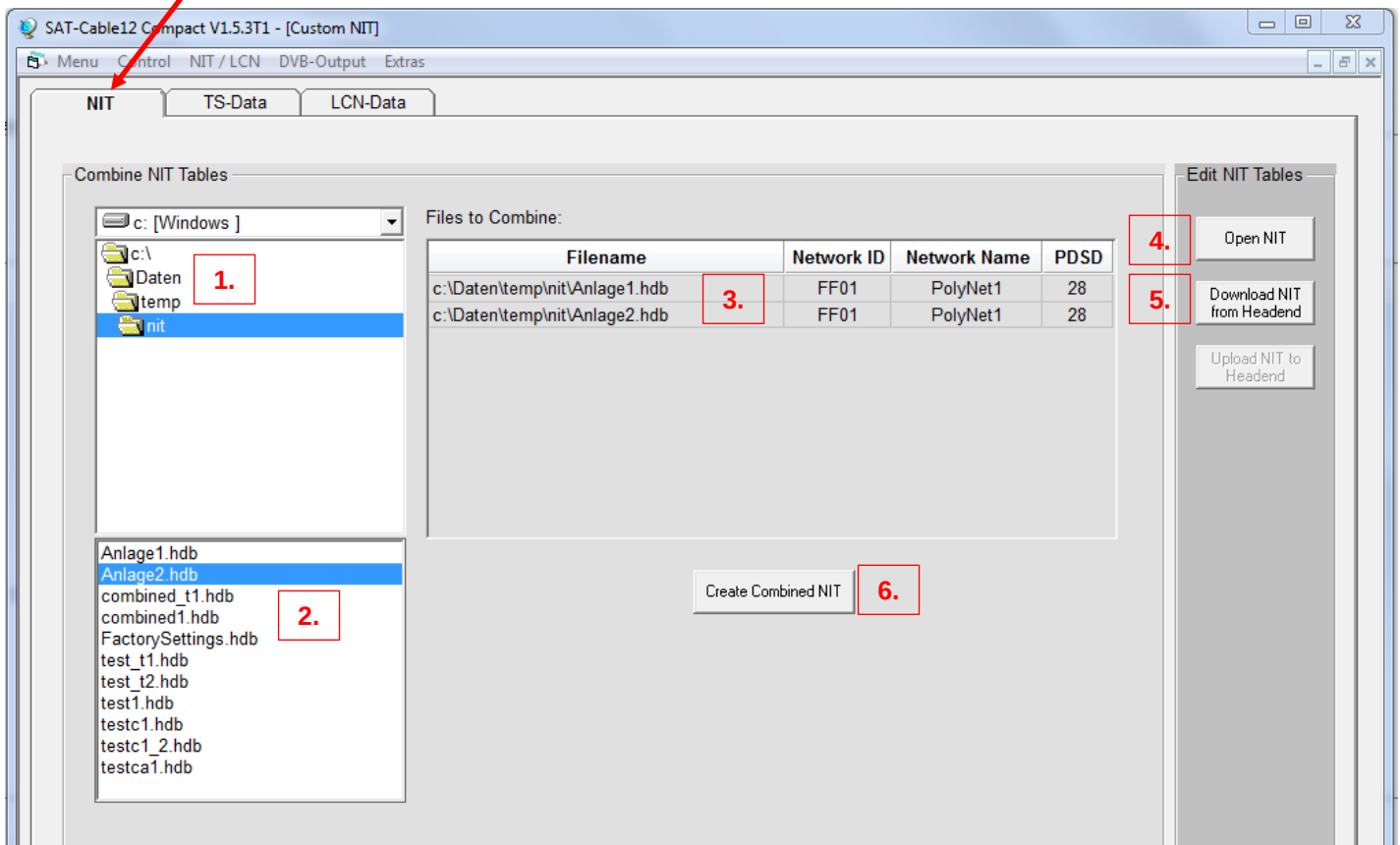
Additionally to that a *.hdb-file is created, which is needed to create a combined NIT.

All three files are located in the predetermined directory.

➔ After selecting **Combined NIT** the screen window below appears:

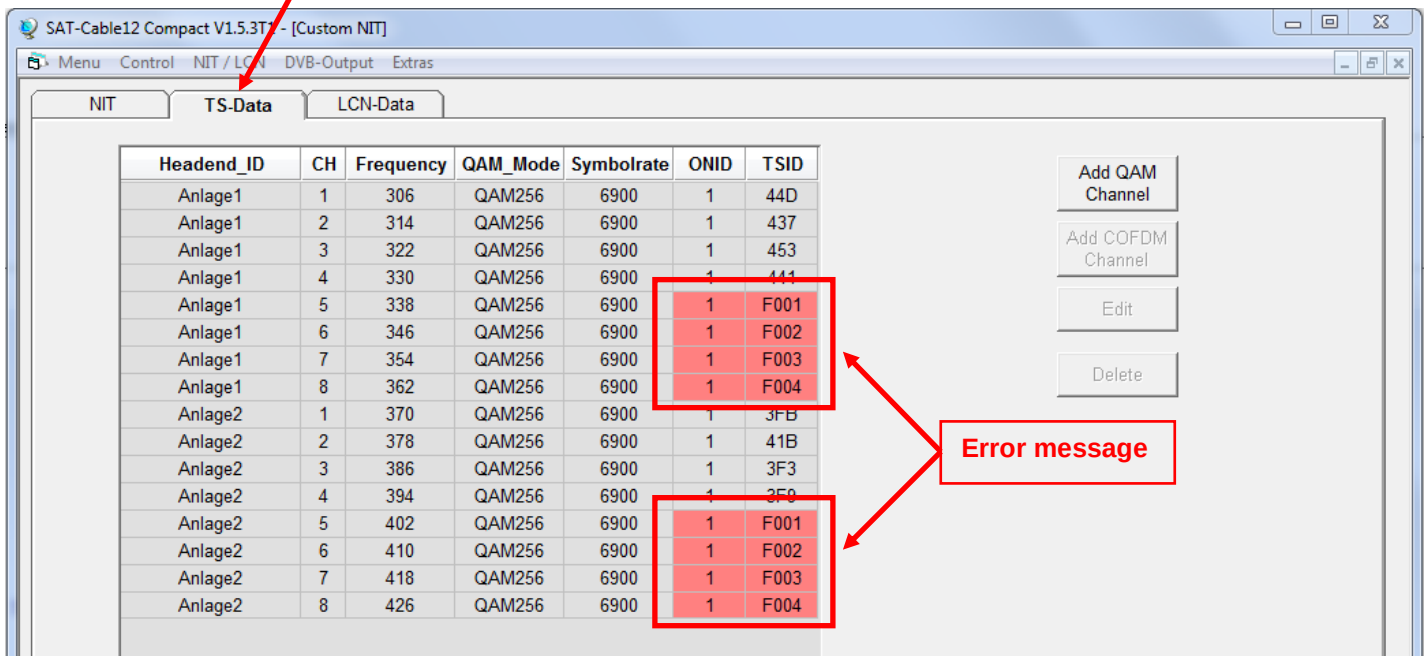


➔ By the **NIT** tab the individually devices could be combined.



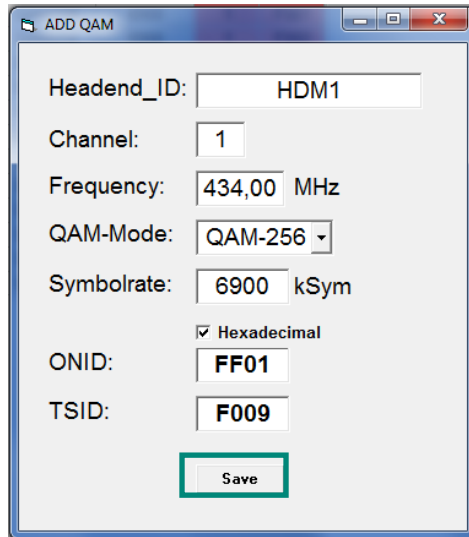
1. Search the folder containing the setting files of the individual devices and select it.
2. Double-click on the required *.hdb-files.
3. The selected files will be listed under Files to Combine and can be deselected by double-click, if desired.
4. If a combined NIT already exists, press button **Open NIT** to load it from the PC/Laptop.
5. Download of a stored NIT-table from the headend.
6. Click on **Create Combined NIT** after entering and checking **all** data to create the combined NIT. This NIT will be stored in a folder on the PC/Laptop.

→ Click on the **TS-Data** tab for showing the transport stream-data of the combined NIT.



- This user interface allows to check the programming data and to add an external output channel (DVB-C = QAM or DVB-T = COFDM) to the list.
- The plausibility check of the pre-programmed data runs automatically.
- Existing plausibility problems and overlaps will be highlighted with coloured background (see example above). A few combinations ONID/TSID of the device 1 and 2 (Anlage1 / 2) in the example above are the same, which must be avoided within a network.
- **Important:** Set all devices separately first. Afterwards create a new combined NIT and upload the combined NIT upon all devices, separately!
- **Note:** At the user interface only manual added entries can be modified!

- ➔ Adding of an external output channel (e.g. additional modulator) via the TS-Data tab. Click on the tab **Add QAM Channel** (DVB-C) or **Add COFDM Channel** (DVB-T). Following menu appears:



Note: Be aware of the plausibility and/or overlaps of the data before being entered!

Headend ID: Can be defined by the user. Should be documented for later reference.

Channel: Set the individual playback channel.

Frequency: Enter the frequency of the output channel.

QAM-Mode: Select the relevant QAM-Mode.

Symbolrate: Define the required symbol rate.

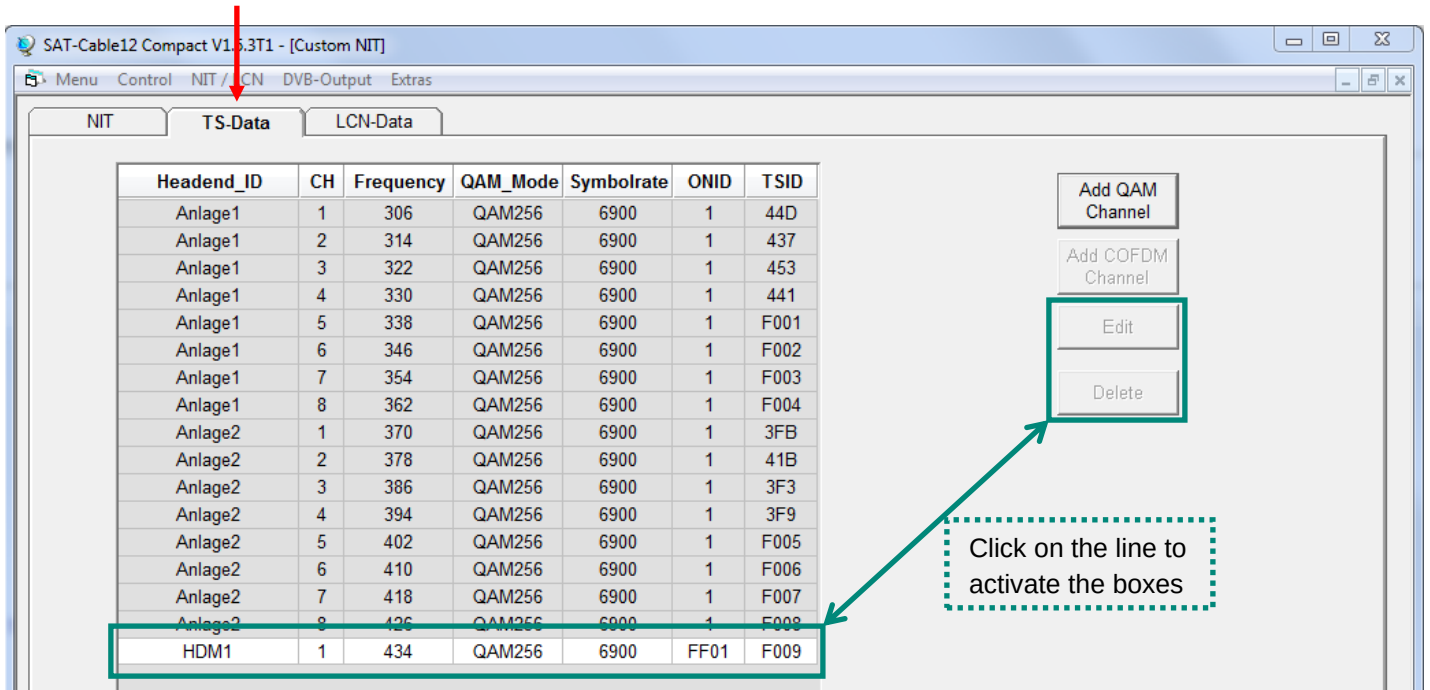
ONID / TSID: Enter the ONID and the TSID. We recommend to use hexadecimal values within the range of F001 and FFFE.



Click **Save** to apply the changes.



→ The data of the added output channel will be shown after storing and after the plausibility and overlaps checks have been done:

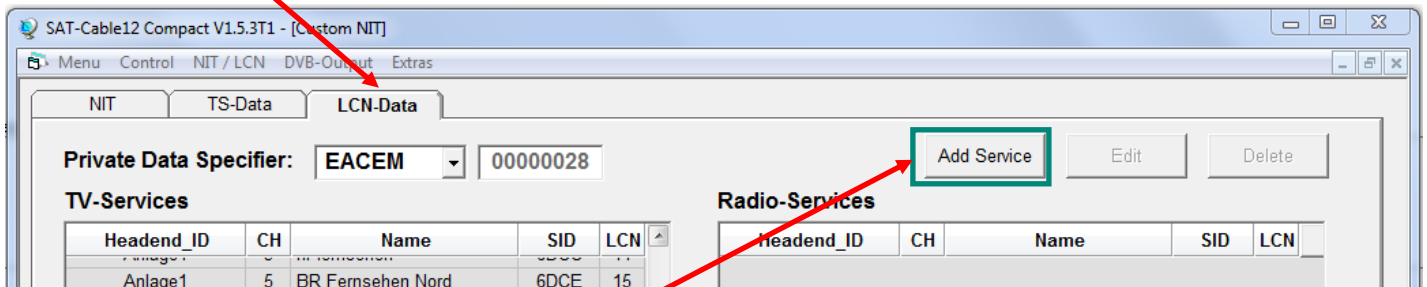


The screenshot shows the 'TS-Data' tab in the SAT-Cable12 Compact V1.5.3T1 - [Custom NIT] application. A table lists output channels with columns: Headend_ID, CH, Frequency, QAM_Mode, Symbolrate, ONID, and TSID. The last row, 'HDM1', is highlighted with a green box. To the right of the table are three buttons: 'Add QAM Channel', 'Add COFDM Channel', and a box containing 'Edit' and 'Delete' buttons. A green arrow points from the 'HDM1' row to the 'Edit' and 'Delete' buttons. A dashed green box around the arrow contains the text 'Click on the line to activate the boxes'.

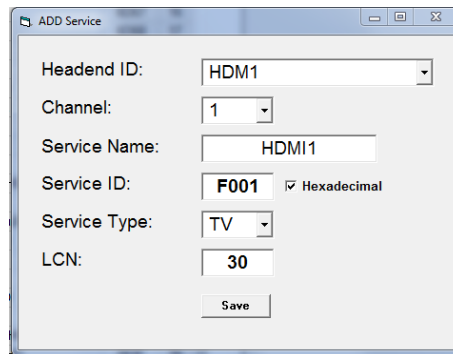
Headend_ID	CH	Frequency	QAM_Mode	Symbolrate	ONID	TSID
Anlage1	1	306	QAM256	6900	1	44D
Anlage1	2	314	QAM256	6900	1	437
Anlage1	3	322	QAM256	6900	1	453
Anlage1	4	330	QAM256	6900	1	441
Anlage1	5	338	QAM256	6900	1	F001
Anlage1	6	346	QAM256	6900	1	F002
Anlage1	7	354	QAM256	6900	1	F003
Anlage1	8	362	QAM256	6900	1	F004
Anlage2	1	370	QAM256	6900	1	3FB
Anlage2	2	378	QAM256	6900	1	41B
Anlage2	3	386	QAM256	6900	1	3F3
Anlage2	4	394	QAM256	6900	1	3F9
Anlage2	5	402	QAM256	6900	1	F005
Anlage2	6	410	QAM256	6900	1	F006
Anlage2	7	418	QAM256	6900	1	F007
Anlage2	8	426	QAM256	6900	1	F008
HDM1	1	434	QAM256	6900	FF01	F009

Note: Manually added output channels will be displayed with a white background.
The functions **Edit** and **Delete** are only available for manually added output channels.
Click on the corresponding line to activate the boxes.

→ By the **LCN-Data** tab the corresponding data of the combined NIT will be shown.



Click on **Add Service** to add LCN to the “manually added” channels.
Following input mask appears:



Note: Be aware of the plausibility and/or overlaps of the data before being entered!

Headend ID: Select the added device.

Channel: Set the individual playback channel.

Service Name: Can be defined by the user.

Service ID: Enter a Service ID. We recommend to use hexadecimal values within the range of F001 and FFFE.

Service Type: Choice between the options TV and Radio.

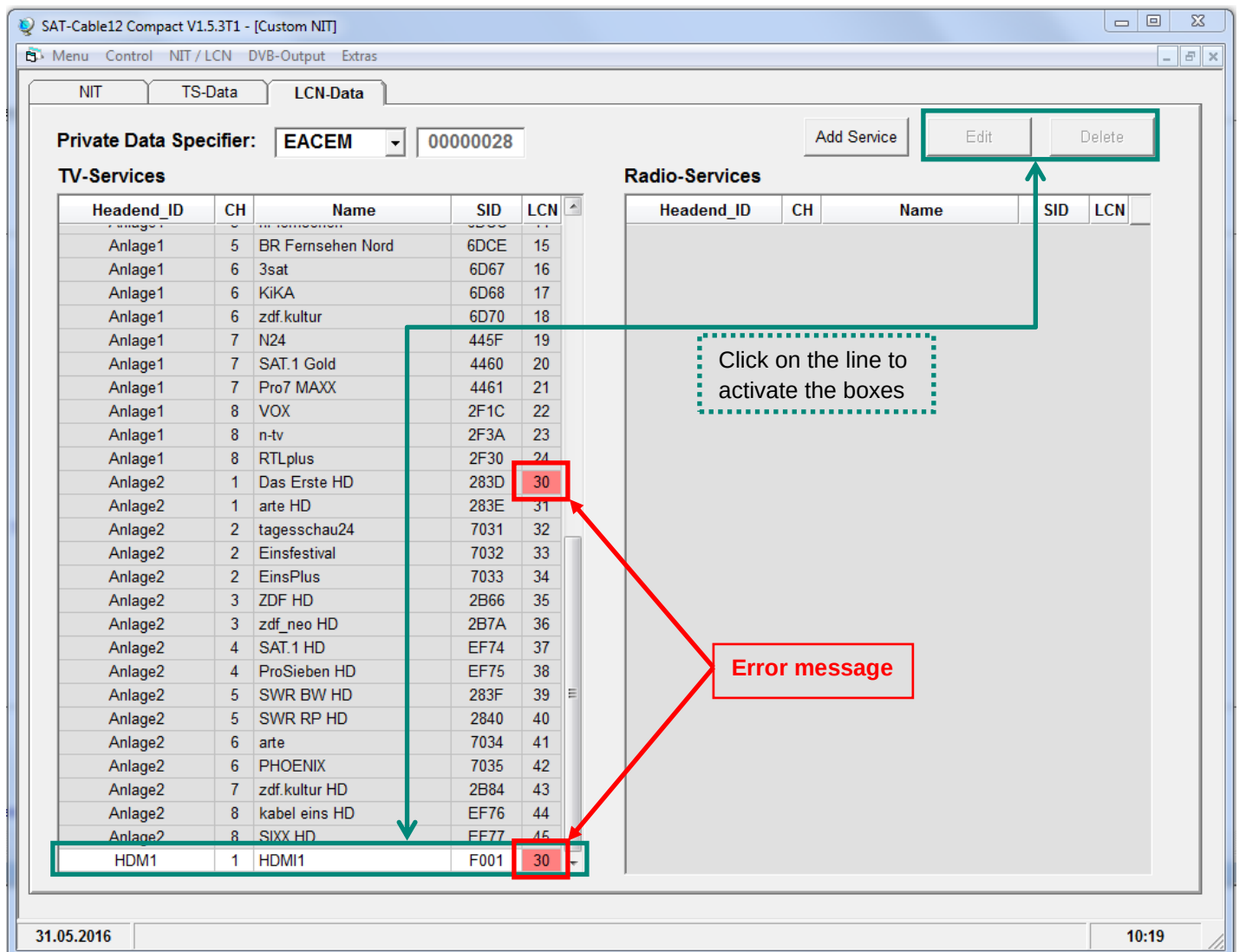
LCN: Determination of the program number in the LCN-system.



Click **Save** to apply the changes.



Note: Manually added output channels will be displayed with a white background.
The functions **Edit** and **Delete** are only available for manually added output channels.
Click on the corresponding line to activate the boxes.

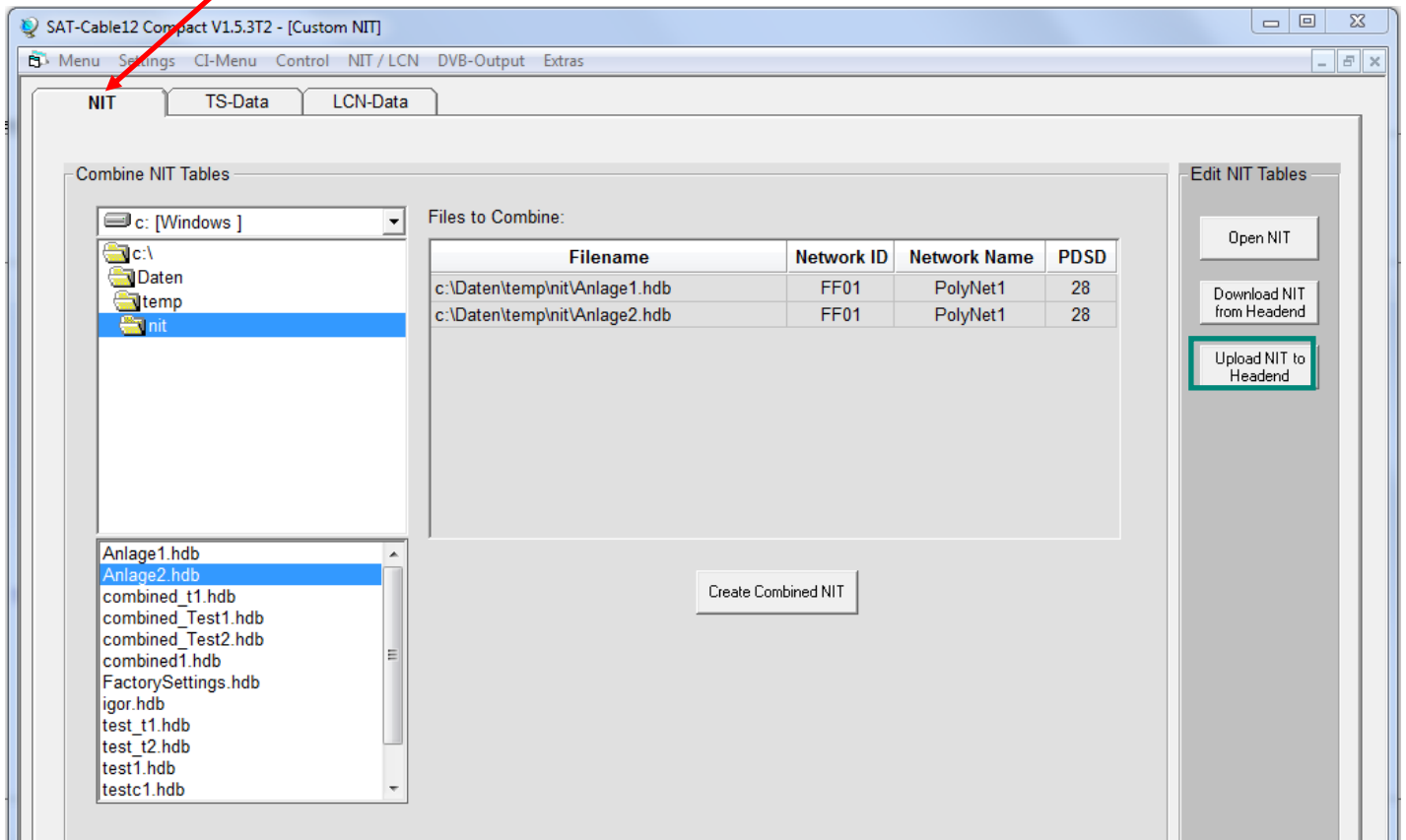


- The plausibility check of the pre-programmed data runs automatically.
- Existing plausibility problems and overlaps will be highlighted in coloured background (see example above). In the example above two program numbers in the LCN-system are the same, which must be avoided within a network.
- Error correction for the example above: Click on the LCN-program number of the line with the white background (HDMI1) and then click on **Edit**. Change the LCN-program number in the input mask accordingly and store the setting by click on **Save**.

The 'ADD Service' dialog box is shown with the following fields:

- Headend ID: HDM1
- Channel: 1
- Service Name: HDMI1
- Service ID: F001 (Hexadecimal checked)
- Service Type: TV
- LCN: 30
- Save button highlighted with a green box.

→ Using the **NIT** tab, finally upload the combined NIT to the headends.



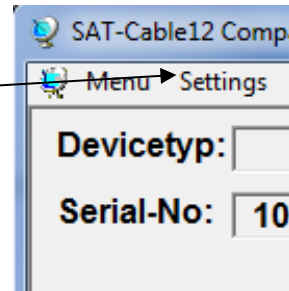
The button **Upload NIT to Headend** is now active. After clicking on this button the created „Combined NIT“ is transferred to the device and transmitted to the output channels.

8.4. Storage of the programming

It is possible to save existing programming on a PC and/or to load it from a PC.
Program combinations can thus be archived.

The main program is opened
with the menu point

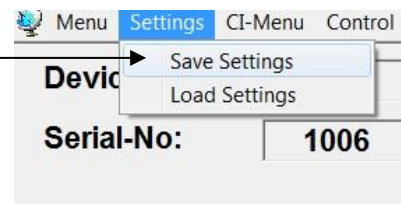
Settings



8.4.1. Storage of settings

With the menu point

Save Settings



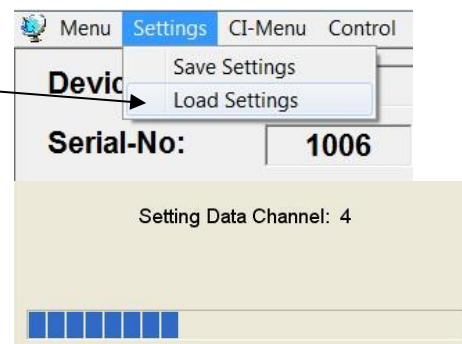
it is possible to save the programming onto the
PC. A directory and file name
(e.g. object) are to be entered for this.
The file name must retain the ending .c12!!

The settings are also saved in an rtf-file. This file format can be opened, edited and printed with e.g.
Microsoft Word, Open Office or WordPad.

8.4.2. Loading of settings

With the menu point

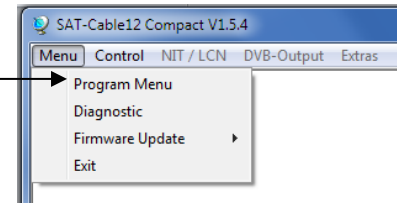
Load Settings



it is possible to load existing programming
from the PC onto a PCU 86x0.
For this, the desired file name is to be
selected and opened in the register.
The date is automatically loaded.

8.5. LAN function

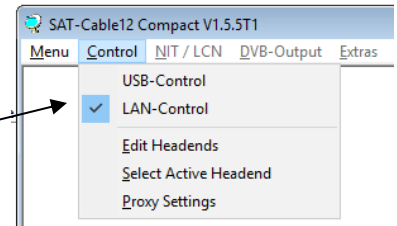
Click on **Program Menu** to open the programming environment. The basic settings are loaded and the user interface is started.



The PCU 86x0 possesses the IP address: 192.168.1.227 as a standard setting.

If the system is used in a network with a different network address, the IP address of the PCU 86x0 must be accordingly altered.

This change is carried out under the menu point **LAN-Control**.



Example:

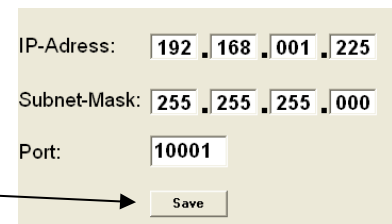
The PC operated in the network has the following settings:

IP address: 192.168.010.068
 network share host share

The IP address of the PCU 86x0 must only differ in the last block (host share) compared with that of the connected PC. The figures 0, 255 and all figures already used are not permitted!

Example IP address: 192.168.010.100

All changes are saved with **Save**.

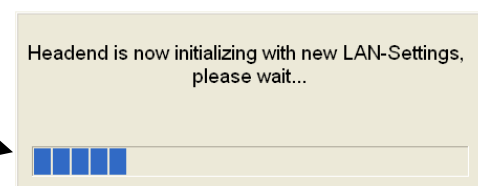


Please note:



The listed IP addresses are intended as examples.
 All addresses must be adapted to the network at the location.
 If this information is not known, the responsible IT specialist should be contacted!

The progress of saving is displayed on the bar diagram.
 This process can last up to a minute.



8.6. Diagnostics

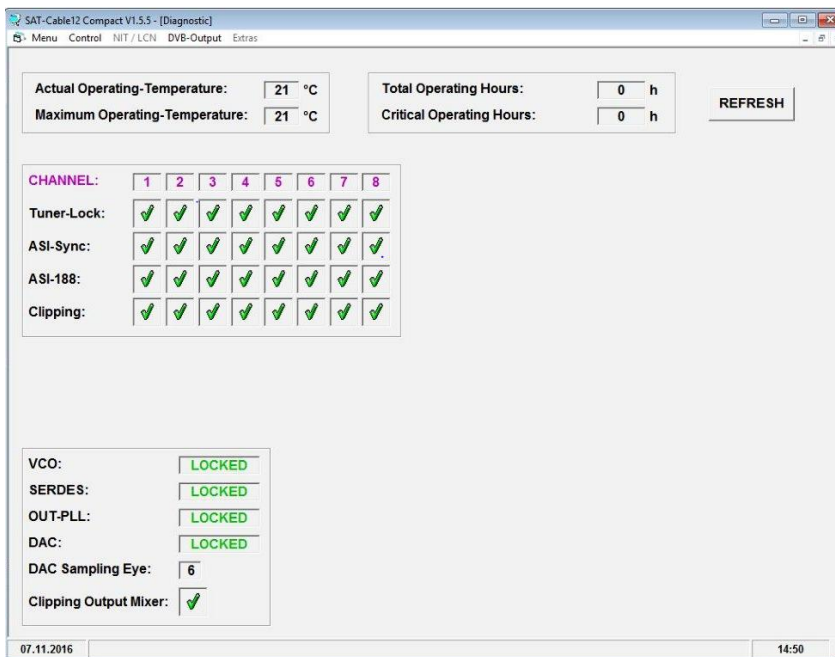
The "Diagnostic" menu is for service purposes and can be helpful during error analysis by telephone on the **Hotline +49 (0)7081 1702-0**. The displayed data can be updated with **REFRESH**.

Menu Header Display:

Actual Operating Temperature: approx. current ambient temperature
Total Operating Hours: operating hours

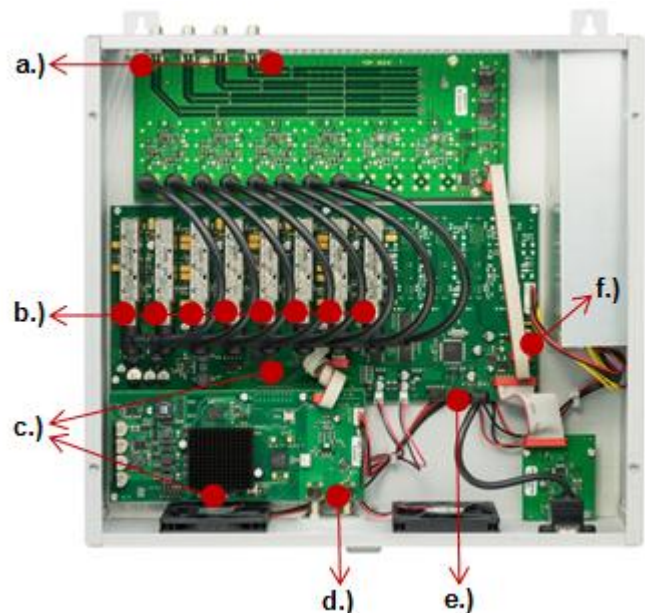
Maximum Operating Temperature: maximum measured ambient temperature
Critical Operating Hours: operating hours at ambient temperature of over 45°C

The temperatures shown only correspond to the actual values in the case of correct, vertical installation with a closed housing cover.



8.7. LED key

- a.) LNB green: 12V output voltage
off: no output voltage
- b.) Tuner green continuous: tuner logged
green flashing: tuner not logged
- c.) FPGA / ASI green: configured, ready to operate
off: error
- d.) RF green: output OK
off: error
- e.) Status green: all tuners logged, ready for use
orange: different functions in programming
- f.) 12 V green: 12 V power adaptor OK
off: power adaptor error



8.8. Firmware-update

The menu “firmware update” is used to refresh the firmware of the device. In this way, the basic software of the device will be updated.

The programming of the input and output parameters carried out under 8.2 is not influenced by this.

8.8.1. Firmware version overview

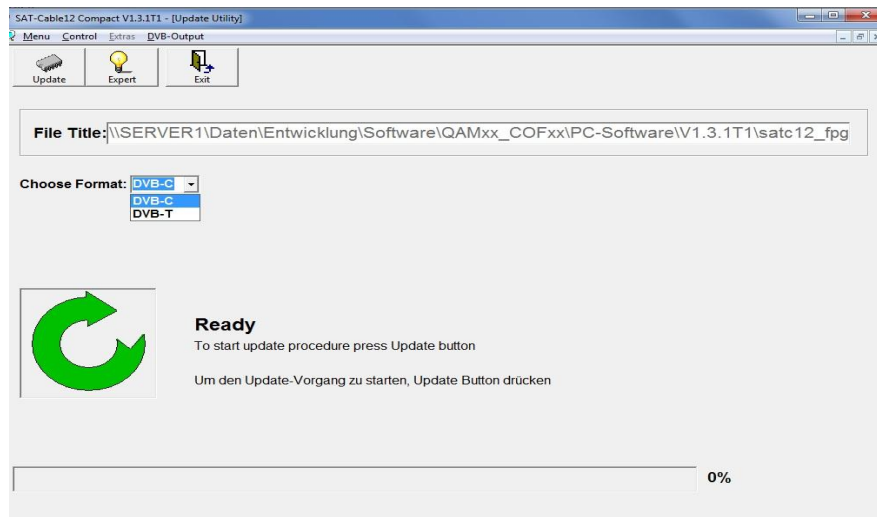
The appropriate display boxes of the firmware overview are highlighted in coloured background.

Green indicates that the firmware is up to date.

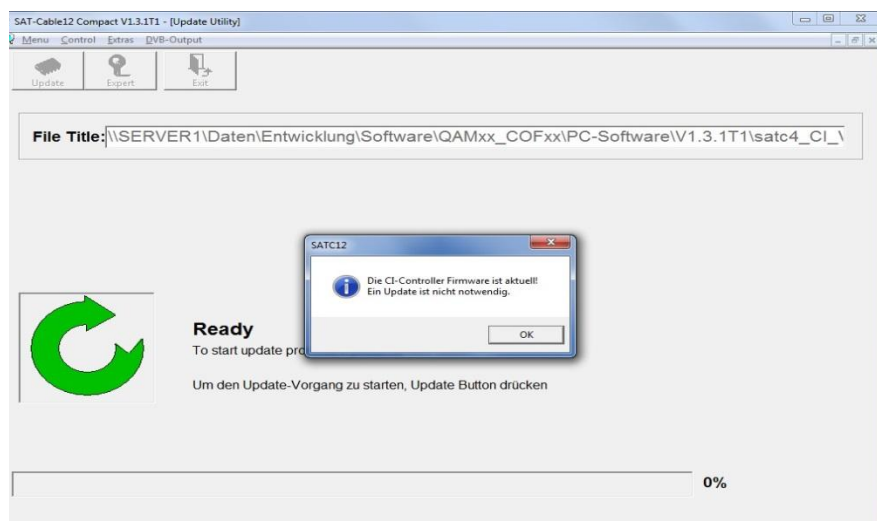
Yellow indicates that a new firmware is available.



Double click on the display box which shows the firmware, opens automatically the update menu.



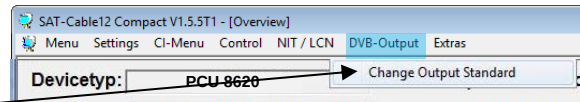
If the firmware is up-to-date, following picture appears:



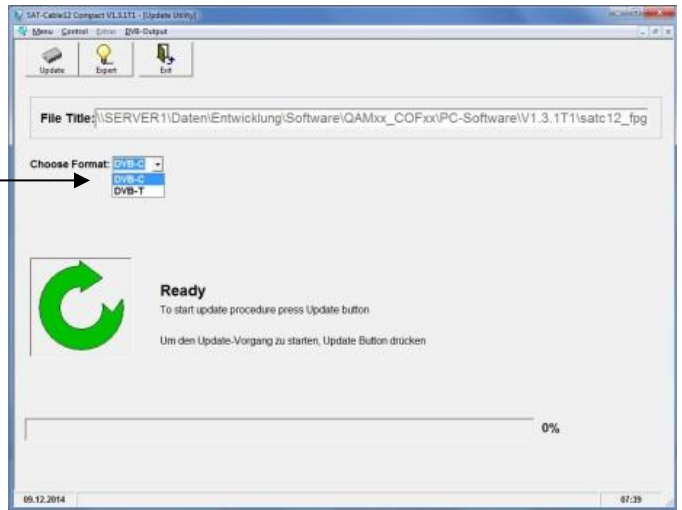
8.8.2. Changing the output signal

Update by Laptop/PC:

- Select menu item **DVB-Output**
- Select menu item **Change Output Standard**



Choose DVB-T or DVB-C



After clicking on the **Update** button the new FPGA- Software will be loaded.



The FPGA update takes about 15 minutes and should under no circumstances be interrupted before!

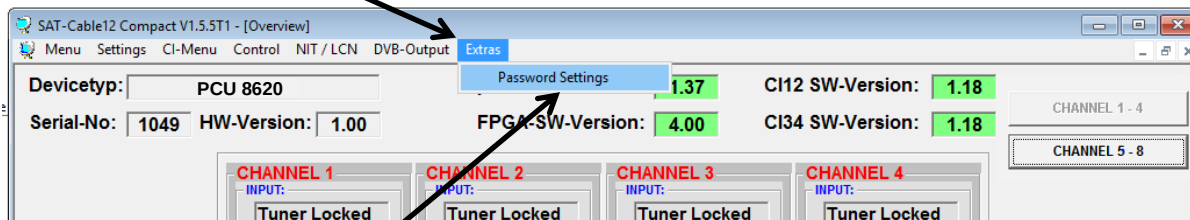
Important: Please follow the update instructions carefully. Do not switch off the power and unplug the power cord from the outlet. Both disregarding the instructions and interrupting the power supply during the firmware / FPGA update installation may interrupt the update process and cause the unit to stop responding or repair.

8.8.3. Password function

➔ Protection against unauthorized access to the Program-Menu.

The password function isn't activated in the factory settings and can be switched on from µC-SW-Version 1.31 on, like described as follows:

- Start program [SATC12] ➔ 
- Klick on **Extras** in the upper row.



- Klick on **Password Settings**. It appears following pop-up window, please urgently note the serial no. because this will be needed to reset the password, if required.

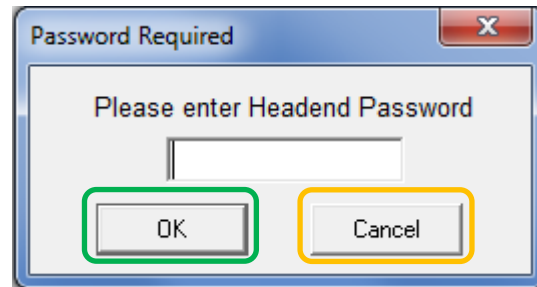


- Place a tick in the check-box to select **Use Password**.
- Enter the password (min.6 / max.10 digits) in the input field **Password** (consisting of letters, numbers or special characters in random sequence) and retype the password in the input field **Retype Password**.
- By clicking on **Change Password** a new password can be created.

➔ Klick on **Save** to store the password-settings. ➔

- Exit the program [SATC12] or go on with the settings, if necessary.

After next time starting the program [SATC12] please enter the password in the input field and then click on **OK** to confirm the password or click on **Cancel** to correct the password, if required.



➔ Please note: **In this pop-up window is no change of the password possible.**

Should the password get lost or has fallen into oblivion we willingly help you relating to the generally password-reset. For this purpose we urgently need the serial-number of the device, as already mentioned on page 1. The serial-number you can also find on the label which is affixed on the outer side of the housing.

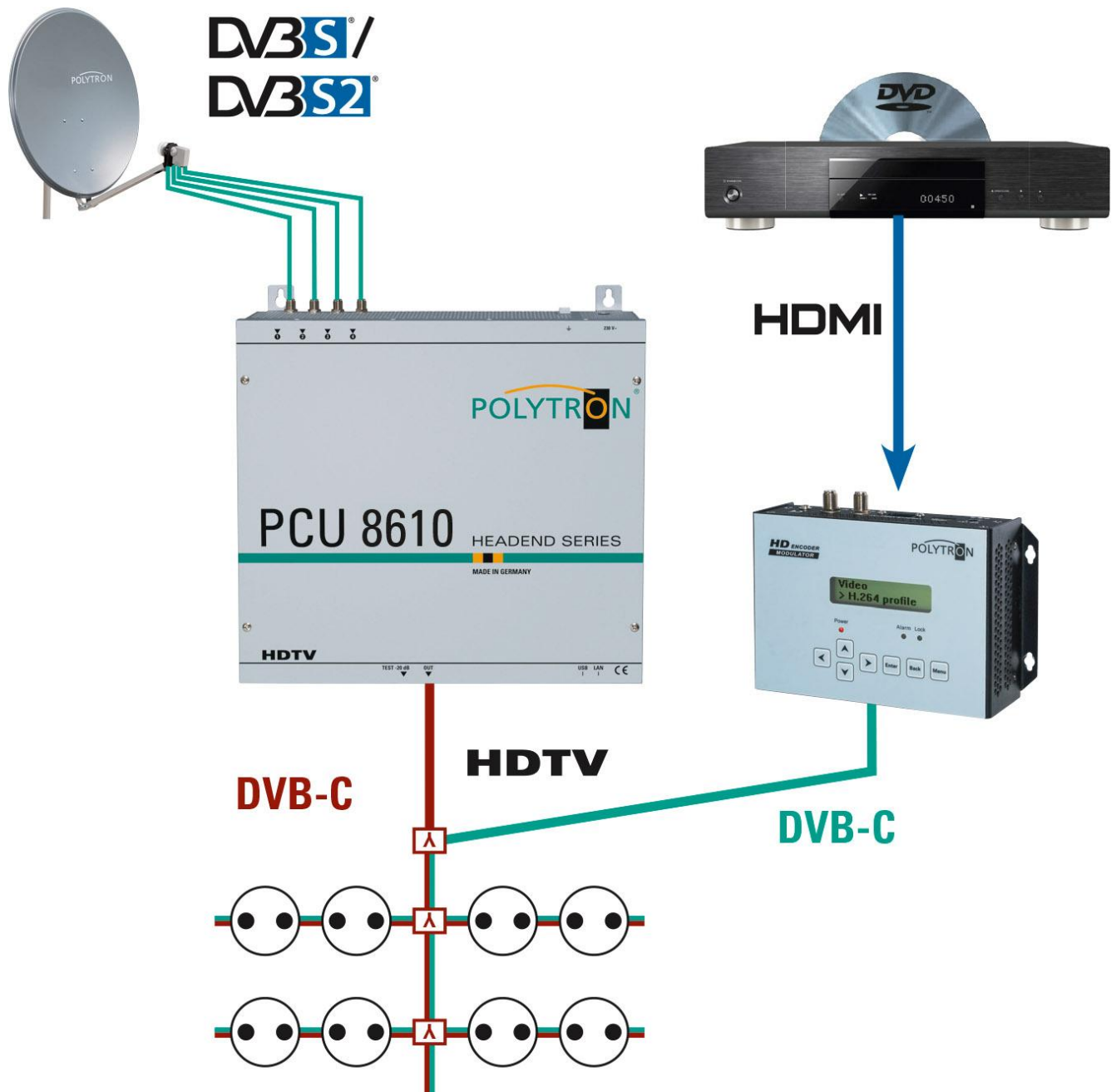
The generally password-reset can only be applied by POLYTRON, for this procedure you will get a new password to reactivate the access to the device again.

By removing the tick in the check-box **Use Password** you can certainly also deactivate the password function, but you will need the password to log on before.

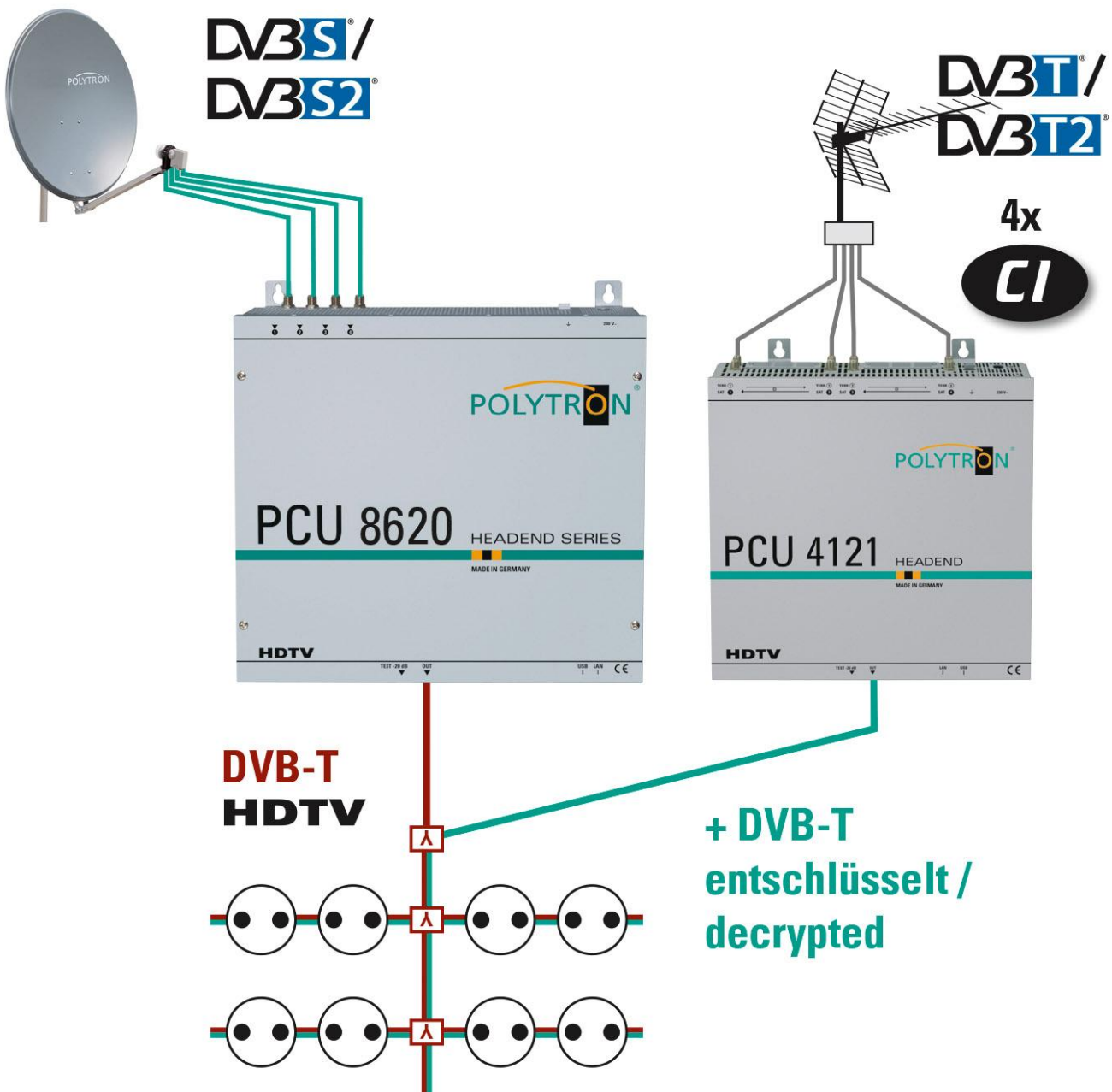


9. Application examples

One satellite, all four polarization planes at input 1-4
in conjunction with HDMI signal feed:

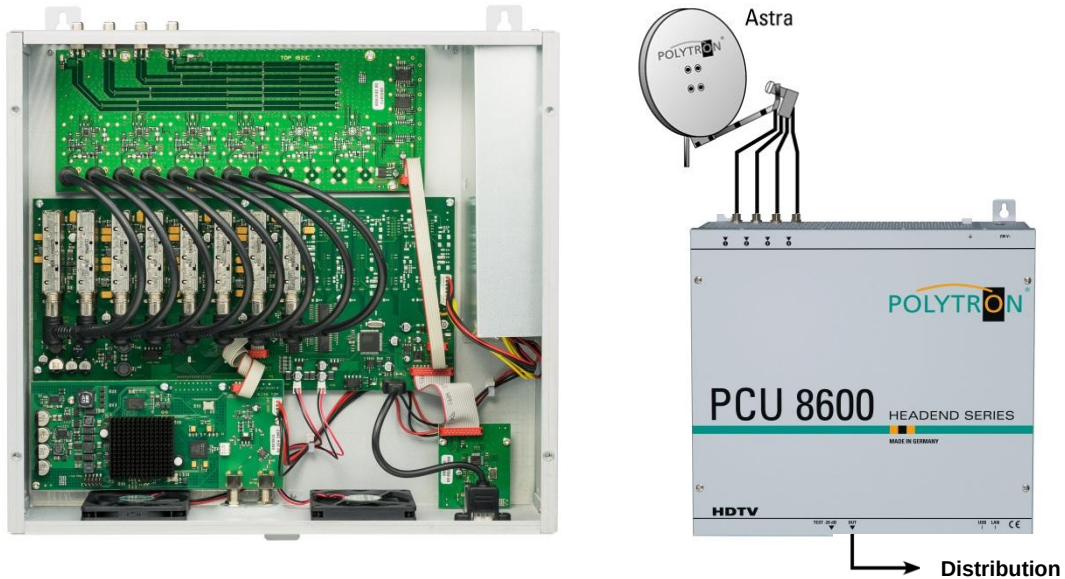


One satellite, all four polarization planes at input 1-4
in conjunction with decrypted DVB-T/T2 programs:



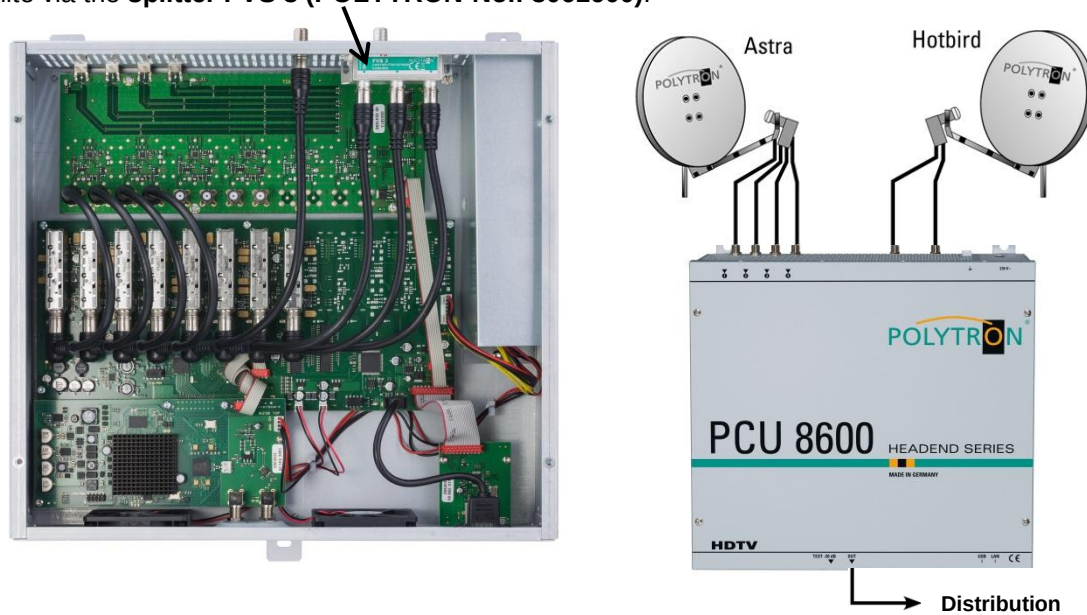
9.1. Application examples with reference to the input circuit

Example 1: All tuner inputs are connected via the SAT input matrix (as supplied).



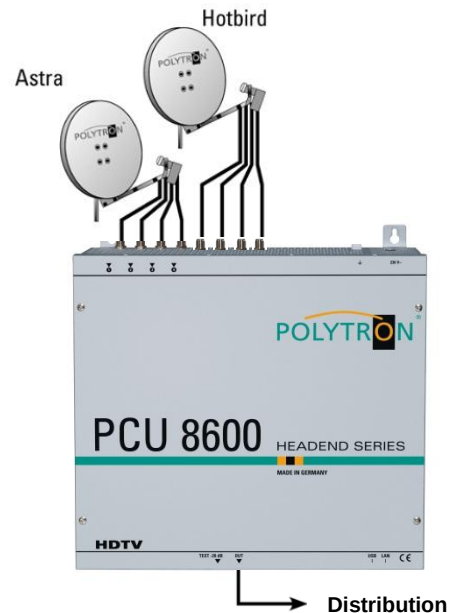
Example 2:

The tuner inputs are connected via the SAT input matrix and two additional polarization planes of another satellite via the **splitter FVS 3 (POLYTRON-No.: 3061600)**.



Example 3:

Up to eight SAT signals are connected directly to the SAT tuners.



10. Technical data

Typ / Type	PCU 8610	PCU 8620
Artikel-Nr. / Article no.	5552260	5552265
Eingänge / Inputs	8 (eingebaute 4x8-Schaltmatrix / built-in 4x8 switching matrix)	
Eingangspegel / Input level	50...80 dBµV	
Demodulator		
DVB-S2/S		
SR DVB-S / QPSK	1...45 MS/s	
SR DVB-S2 / QPSK	1...45 MS/s	
SR DVB-S2 / 8PSK	1...45 MS/s	
Modulation	8PSK / QPSK	
CR DVB-S / QPSK	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10	
CR DVB-S2 / 8PSK	3/5, 2/3, 3/4, 5/6, 8/9, 9/10	
Roll off	0.35, 0.20	
Ausgangsmodulation im Auslieferungszustand	DVB-C	DVB-T
Output modulation ex works	umprogrammierbar auf / programmable to DVB-T	umprogrammierbar auf / programmable to DVB-C
Ausgangskanäle / Output channels	8	
Frequenzbereich / Frequency range	112...860 MHz	
Signalkonstellation / Signal constellation	16, 32, 64, 128, 256 QAM	QPSK, 16, 32, 64 QAM
Symbolrate / Symbol rate	1...7,2 MS/s	/
FEC	/	1/2, 2/3, 3/4, 5/6, 7/8
Bandbreite / Bandwidth	7 / 8 MHz	
Anzahl der Träger / Number of carriers	/	2K
Ausgangspegel / Output level	90 dBµV	
Regelbare Dämpfung je Kanal / Channel attenuation	0...12 dB	
MER	40 dB	
Leistungsaufnahme / Power consumption	49 W typ.	
Spannungsversorgung / Operating voltage	180...265 V, 50/60 Hz	
Maße (B x H x T) / Dimensions (W x H x D)	380 x 360 x 125 mm	

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