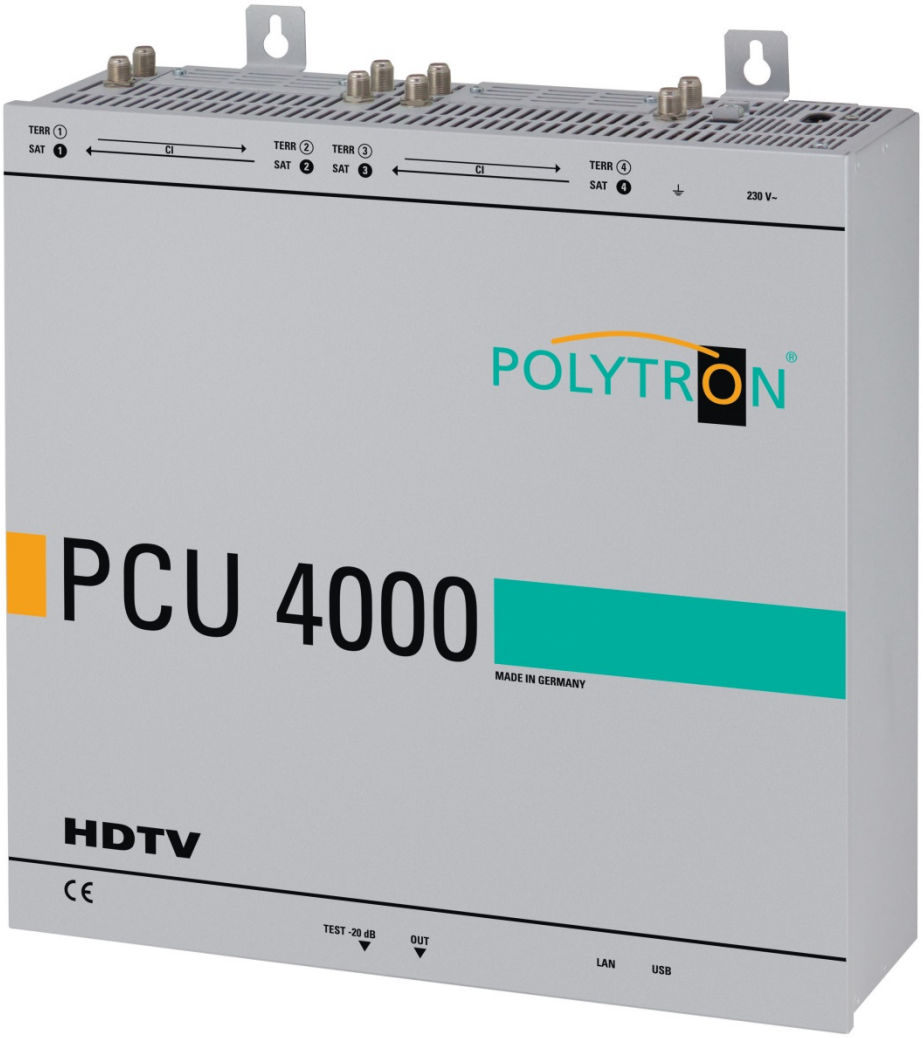
PCU 4111

PCU 4121



User manual

MADE IN GERMANY

0901677 V1

Inhaltsverzeichnis

1. Hazardsandsafetyinstructions

Before working on the PCU4111/4121please read the following safety precautions and the safety

Power supply and power cord

The device must be operated only at a power supply with a voltage of 230 V / 50 Hz.

Connection cable

Place the connection cable always trip proof !

Replace the power cord only with an original power cord.

Potential equalization / grounding

Proper grounding and installation of the device must be carried out according to EN 60728-11 / VDE 0855-1 regulations.

Operation without grounding or potential equalization of equipment is not allowed.

Humidity and placement location

The device must not be exposed to dripping or splashing water. If water condensation occurs, wait until the device is completely dry. The device must be installed on a vibration-free location.

Ambient temperature and heat effect

The maximum allowable ambient temperature is 45 ° C.

The ventilation holes of the device must **NOT**be covered under any circumstances. Too much heat or heat accumulation affect the life of the device and can be a source of danger.

To prevent heat buildup and to ensure good ventilation, the device must be mounted horizontally (eg. on a wall). The device must not be mounted above, on top,or near heat sources (e.g radiators, heating plants), where the device is exposed to heat radiation or oil vapors. The installation must be done **only** in rooms that ensure compliance with the permissible ambient temperature range, even under changing climatic conditions.

If the device exceeds the maximum operating temperature, it automatically switches to a reduced power consumption. The device is out of function during that time.

Once the temperature has reached again the allowable range, it automatically switches back on.

Warning:

When installed in rooms such as storage or attic one should pay particular attention on compliance with the ambient temperature. Because of the danger of fire due to overheating or lightning strike, it is recommendable to install the device on a noncombustible surface. Combustible surfaces are wood beams or bars, wood boards, plastic materials, etc.

Conditions to ensure electromagnetic compatibility (EMC)

All covers, screws and connectors must be securely mounted and tightened, contact springs must not be bent or oxidized.

Opening the case

ATTENTION Device's caseopening and repairs must be performed only by authorized personnel. First to be done is to pull the network plug.Replacingof fuses must be done only with fuses of same type, value and melting characteristics.

No maintenance work during storms

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 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 PCU 4111/4121 is a modern, compact transmodulatorthat converts 4 signals DVB-S/S2, DVB-T/T2 or DVB-C in 4 DVB-C/DVB-Tchannelsand can decode encoded programmes using a suitable CI module. Its simple and quick assembly, configuration and programming means that it can be commissioned without problems. Up to 4 transponders from up to 4 different signals can be transmitted. This makes it possible to transmit SD and HD programmes via all transponders, regardless of whether these are encoded or non-encoded.

3. Description

The compact headendPCU 4111/4121from POLYTRON converts four signals (DVB-S/S2, DVB-T/T2 or DVB-C) intoDVB-C/DVB-T signals. Thefour inputs are each provided witha CI interface for decoding encoded signals. With this, QAM communal installationscan be simply and cheaply supplemented with centrally decoded ranges. Alsoconceivable is use as free-to-air basic supply in asmall boarding houseor hotel, because around 20 programmes of 4 transponders are already made available. The headend can be simply and quickly programmed via the USB interface. No knowledge whatsoeverthe assigningand administration of IP addresses is required for this. The selectedsettings can be printed and saved and also transferred to other devices with a USB-stick. Dueto the integrated LAN connection, it is possible to remotely control all parameters. The headend works in the frequency range 112 to 862 MHz and converts the selected satellitetransponders completely including the additional services Teletext, EPG etc. Theoutput is also suitable for adjacent channelsand hasalevel of 90 dBµV. The PCU 4111/4121has an energy-saving switching power supplywhich alsotakes over the supplying for the LNB input 1 and input 2.

4. Scopeofdelivery

1 x PCU 4111/4121

1 x Power cable

1 x USB-cable

1 x USB-Stick (Programming software)

1 x Operating instructions

1 x Installation accessories

1 x Drilling template

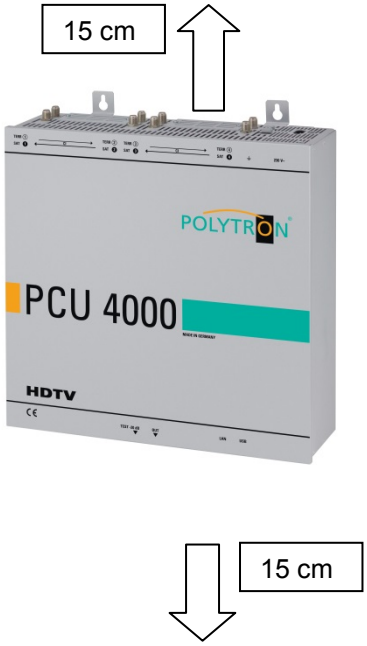
1 x LAN patch cable

5. Input Circuit

InthePCU 4111/4121, thesignals are directly fed toinput tuners. Here there are 4SAT and 4 Ter. inputs. Atinput 1 and input 2 there is in addition 12V DC voltage for LNB supplying.

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. Earthing

The device must be earthed in accordancewith EN 60728-11.

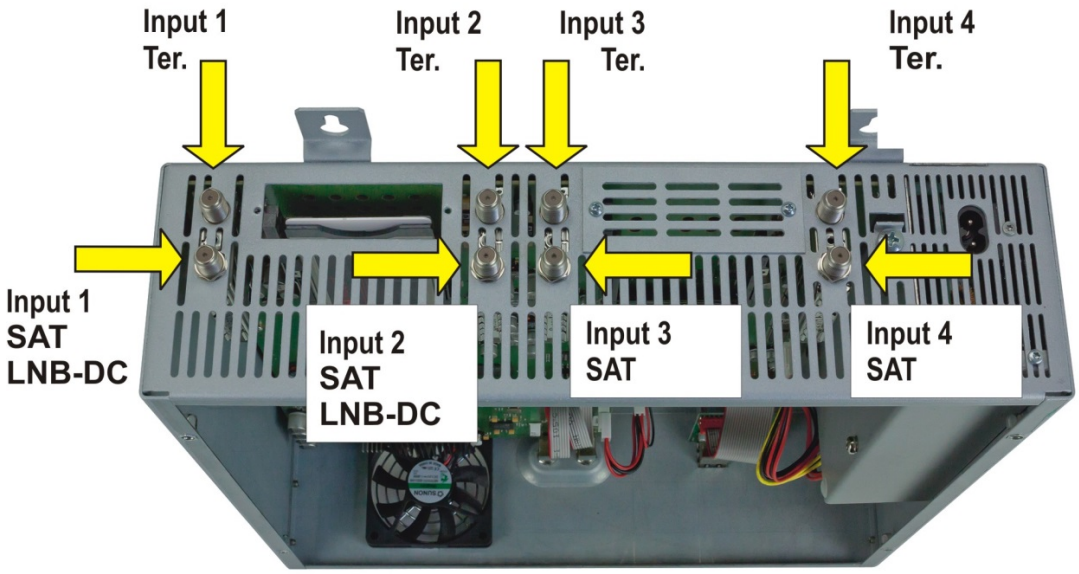
- Strip approx. 15 mm of the cable insulationof theearthing cable (4mm^2).
- Push stripped end under theearth screwand tighten the screw.

7. Installation

Connection of the SATSignals

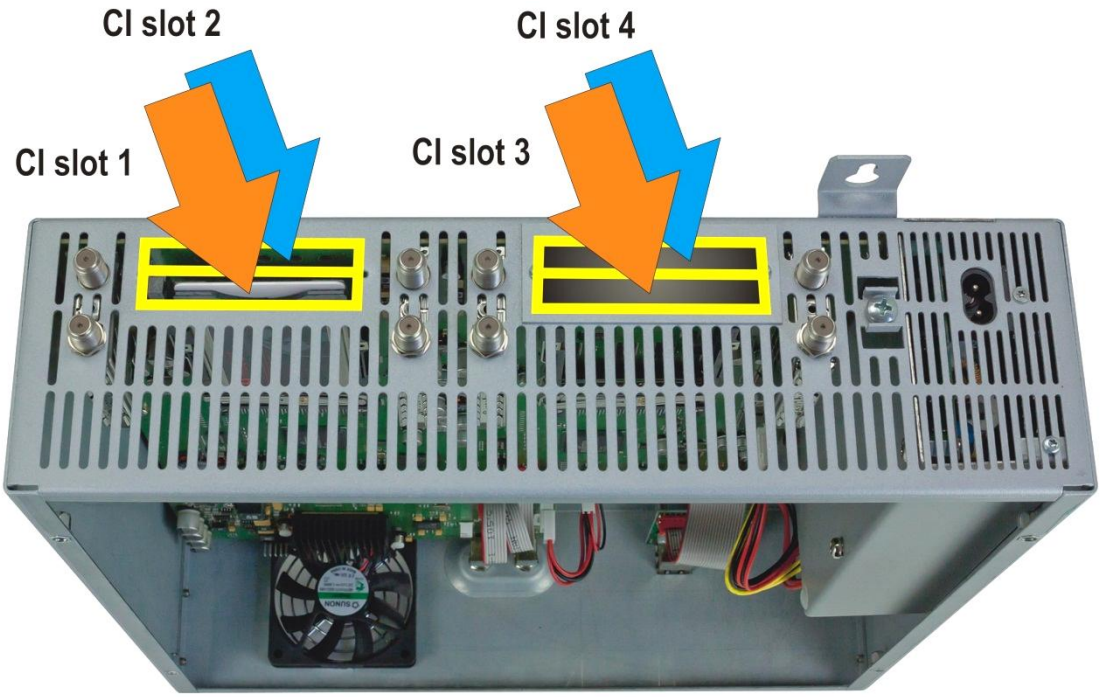
Connect SAT signals directly or viasplittertothe sat tuner inputs. Atinput 1 there are 12 V DC for the supplying of the LNB.

Pleasenote that the current consumption must not be more than 350 mA at the input.



Insertion of the CIModules

To insertthe CI modules, the covers must be removed. Use the picture to seehowthe CI slots are assignedto the SAT inputs. Always insert the modulewith the address facing forwards (in the direction of the lid).



7.1. Pre-programming

The inputsand outputsof thedeviceare pre-programmed ex-factory with a german standard frequency allocation. In order to receive the pre-programmed ASTRA transponder, the SAT inputs must be connectedwith the"horizontal high“ level in accordance with thefollowing picture.

Platz/ Slot	1	2	3	4
Transponder **Symbolrate**	**ARD Digital** HH 11836 27500 kSym	**ZDF Vision** HH 11954 27500 kSym	**SAT1 / Pro7** HH 12545 22000 kSym	**RTL World** HH 12188 27500 kSym
ASTRA	Das Erste BR FS Süd HR SWR BW WDR Köln BR FS Nord	ZDF 3 Sat Ki.Ka ZDF Info ZDF neo ZDF kultur	Sat. 1 Pro 7 Kabel 1 N24 Sat. 1 Gold **etc.**	RTL RTL 2 VOX Super RTL N-TV **etc.**
Ausgang/ Output	**306 MHz**	**314 MHz**	**322 MHz**	**330 MHz**

7.2. InputLevel

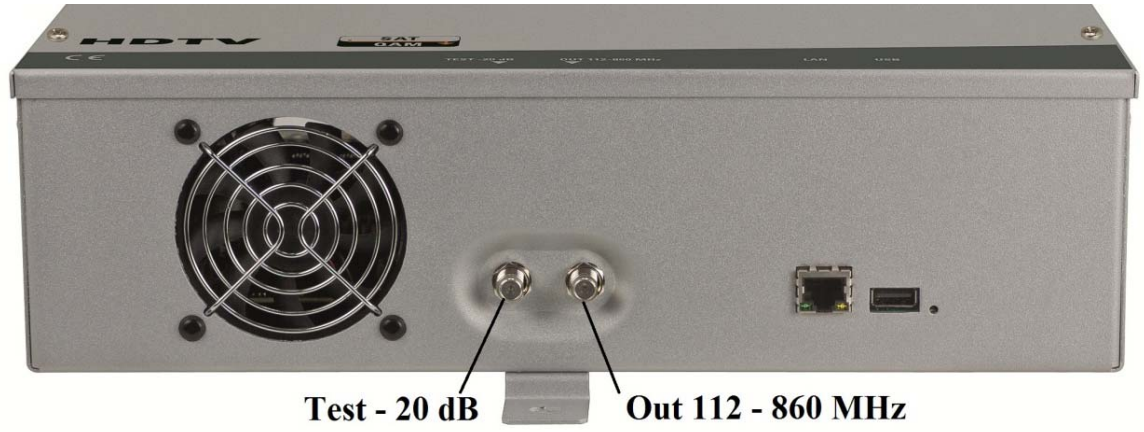
In order to ensure flawless reception,make sure that the level at theinputs is between **50** and **80 dBµV**.

When receiving digital signals it is advantageous to have a lower rather excessively high level.

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

7.3. Output Level

Upon delivery, the output level is**90 dBµV**. This can be changed via thedevice programming (see point 8.2.2). There is an output level reduced by 20 dB at the TEST socket.



8. Programming General

After the mains cable is connected, the device runs through aninternal routine and all 4 channelsare 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 possiblebetween PCU 4111/4121and Laptop/PC.

8.1. Software Installation

Download thesoftware package from thehomepage **www.polytron.de(satc12_Vxxx.zip)**and unzip in the directory of your choice **(e.g. C:\ PCU 4111)**.

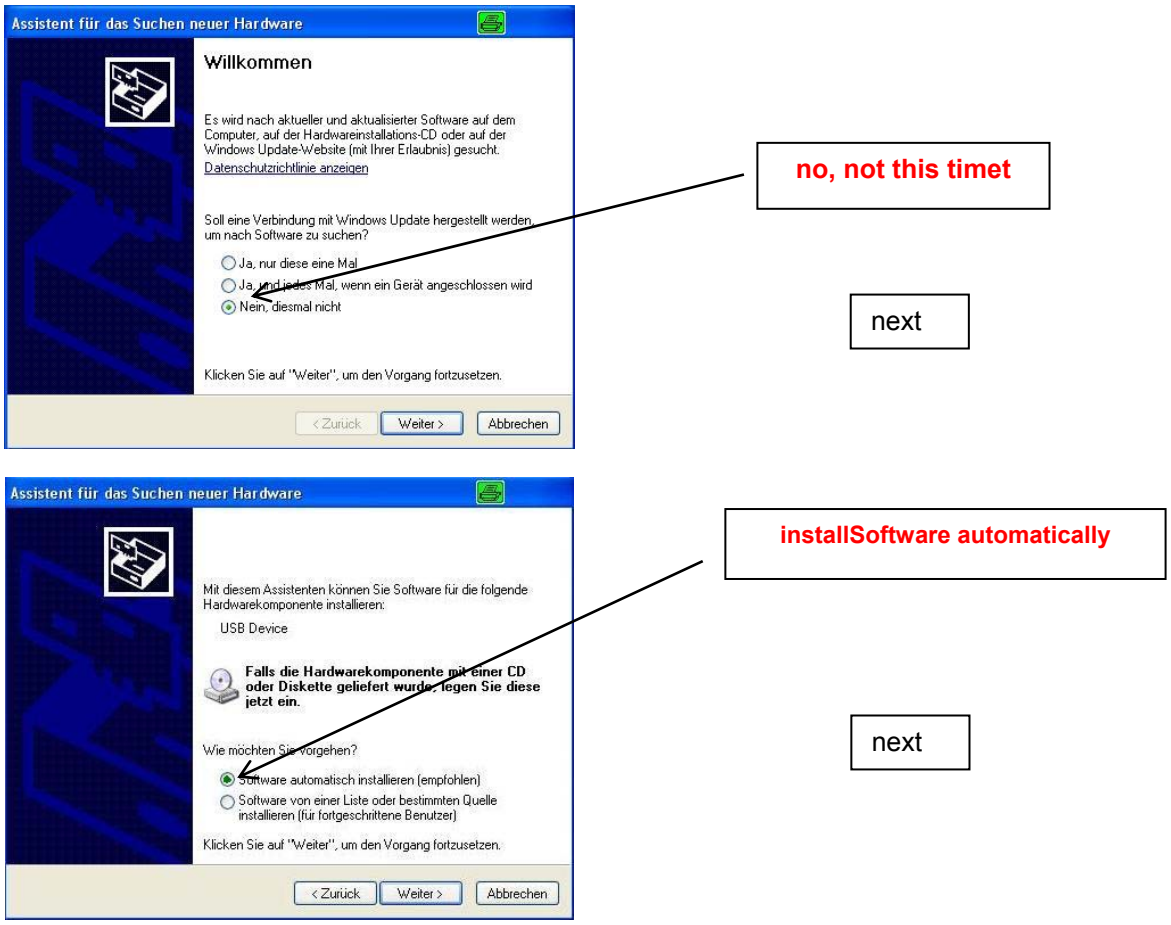
The software can also be loadedfrom the enclosed USB stick.

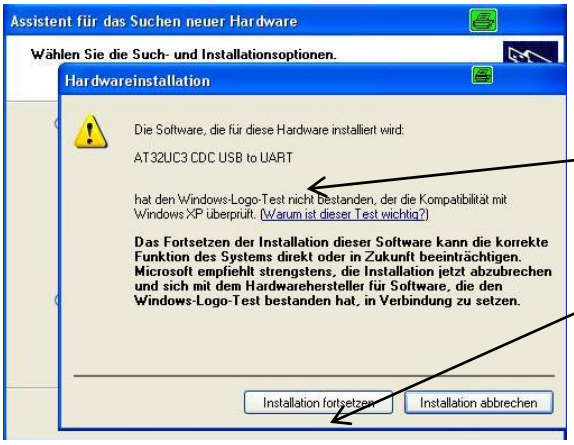
8.1.1. Installation of theDriver

Start**Instal_driver.cmd**

Follow theinstructions on the screen.

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





If this notice is displayed:

Continue the installation

The software was installed for the following hardware

finish

The installation of thedriver software is now complete.

8.1.2. Installation of the Programming Software

Install thesoftware by starting the**"Setup.exe"**program in thedesired 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 4111/4121 can be connected to the PC with the USB cable.

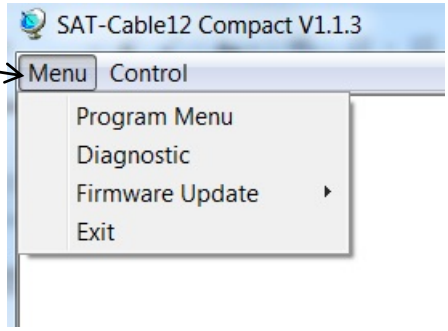
Only connect thedeviceto the PC once the software installation has been completed.

USB

8.2. Programming of the Device Parameters

Start the program – **SATC12** –

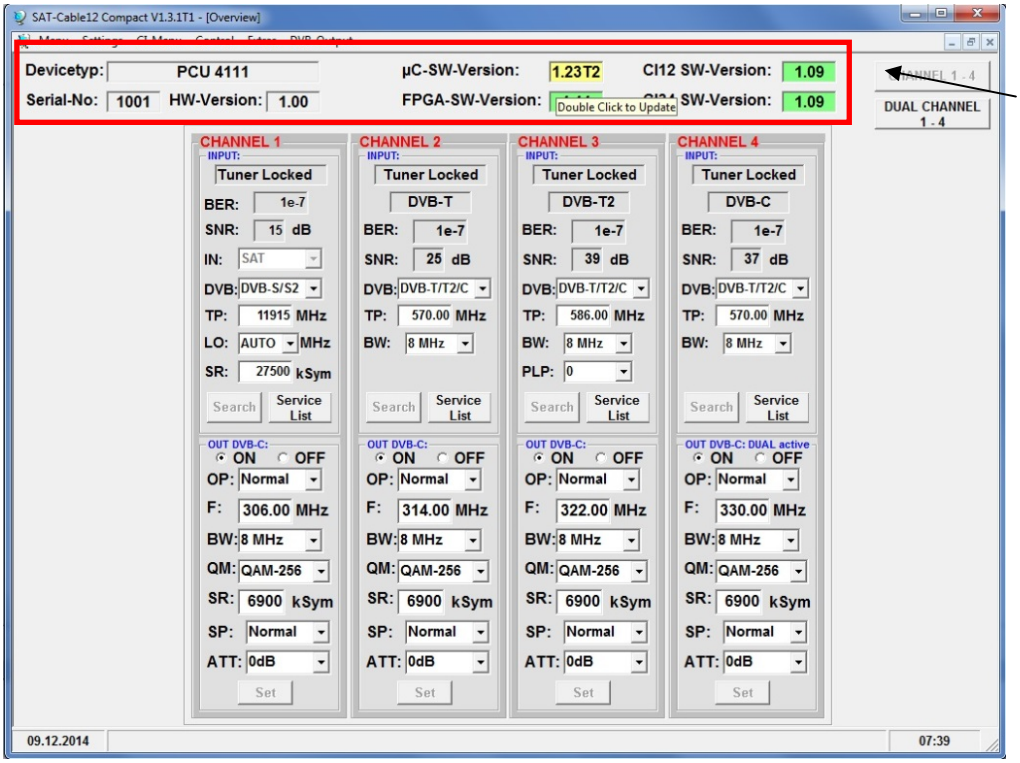
Click on **Menu** at the top left



The following menu points areavailable:

- **ProgramMenu**
- **Diagnostic**
- **FirmwareUpdate**
- **Exit**

Select **ProgramMenu**: alladjustments of theinput and output parameters are carried out here. After thecalling of the menu, all 4 channels areand the respective*adjustedparametersare displayed.*



In the top part of themenu, thedevice data is displayed, such astype, serial number, hardwareversion and the softwarestatuses for CPU and FPGA.

8.2.1. Input parameters SATreception

DVB >Input signal

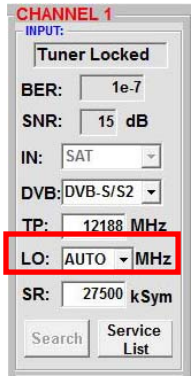
Chosse the kind of signal

If DVB-T/T2 or
DVB-C is choosen, go furtherin the passage TER. reception

TP > Transponderfrequency

Enter transponderfrequency

Auto > LO. -frequency



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

SR >Symbolrate

Enter symbolrate

Search >

After the button **Search** has been activated, the data is acceptedand thedesiredtransponder is set.

Tuner Locked

If thetuner findsthetrans-ponder **Tuner Locked** is displayed in the upper field.

Receiving Conditions

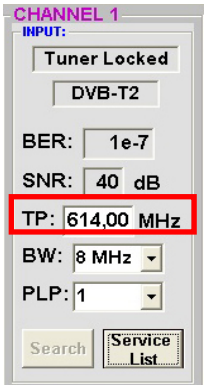
The quality of the input signal can be evaluated using thebit error ratio **BER** andthesignal-to-noise ratio **SNR**.

The guidelines shown apply to the signal-to-noise ratio SNR. The corresponding values of the FEC (forward error correction) areto be taken from thetablesof the satellite operators.Ife.g. thetransponder has an FEC of 5/6, the SNR display must beat least 9 dB to guarantee good signals.

FEC	gut	sehr gut
1/2	5-7dB	8-11dB
2/3	7-9dB	10-13dB
3/4	8-10dB	11-14dB
5/6	9-11dB	12-15dB
7/8	10-12dB	13-16dB

8.2.2. Input parametersfor Ter. range

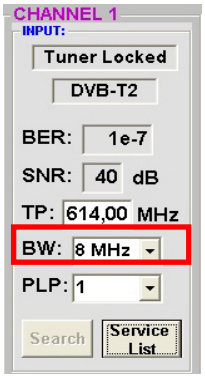
TP >Input Frequency



The kind of input signal will be identified automaticly.

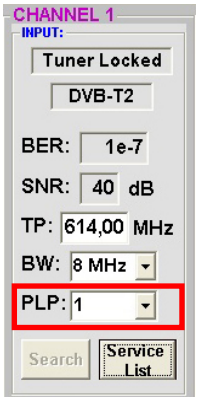
Select input frequency

BW >Channel Bandwidth



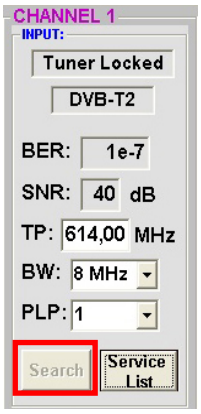
7 or 8 MHz

PLP >Select Service (DVB-T2)



Select PLP

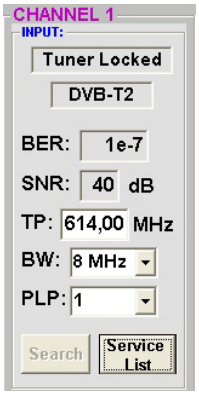
Search >Searching



After the button **Search** has been activated, the data is acceptedand thedesiredchannelis set.

If thetuner findsthechannel **Tuner Locked** is displayed in the upper field.

Receiving Conditions

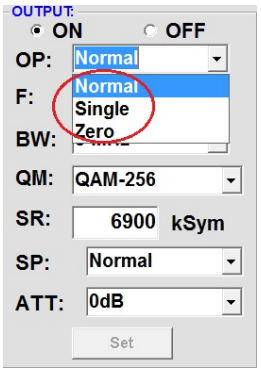


The quality of the input signal can be evaluated using thebit error ratio **BER** and thesignal-to-noise ratio **SNR**.
Recommendation: bit error ratio **BER** should be ≤1e-6

The guidelines shown apply to the signal-to-noise ratio SNR. DVB-T should have a min.
SNR of 26 dB and DVB-T2 of 32 dB.

8.2.3. Output Parameters

OP > Operating Mode

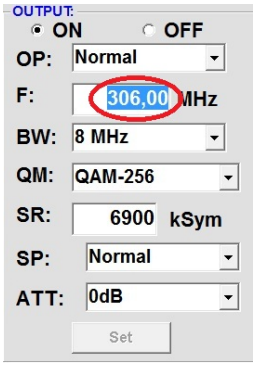


Normal>normal mode

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

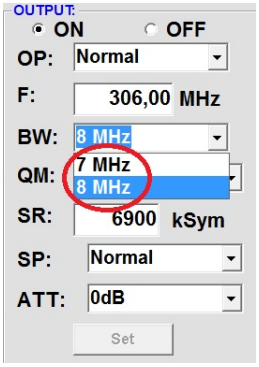
Zero > digital channelwith content 0 (constant levelwithout fluctuations)

F >Output Frequency



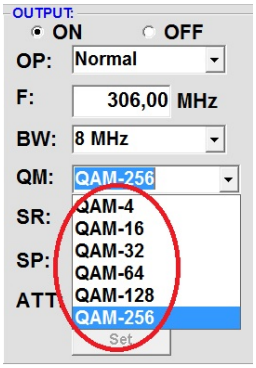
Frequency freelyselectable. It is recommended to stick to the corresponding TV standard channel spacing. The frequencyof thechannel middle is set. (e.g. channel 21, 410- 478 MHz, set 474 MHz)

BW > Bandwidth



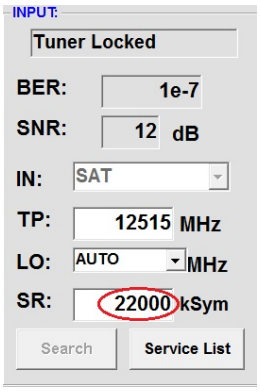
Choose bandwidth depending on output frequency between 7 MHz and8 MHz

QM > QAMMode



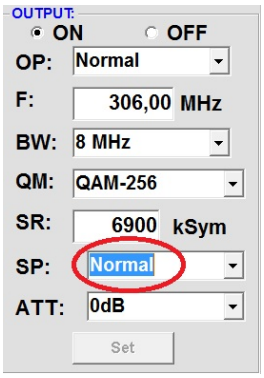
Setting of the possible QAM mode (16, 32, 64, 128, 256) dependent on thedata rate of theinput transponder. Only the QAM mode that is possible is displayed

SR > Symbol Rate



up to 7,200 **kilosym**bols/ sec. is dependent on theselected QAM mode(used setting incable networks: 256 QAM / SR 6.900). Only thesymbol rates that are possible are accepted.

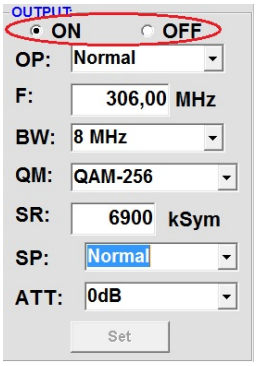
SP > Spectrum



Normal>normal mode

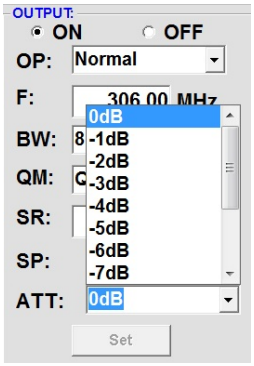
Inverted>Useful signal can be inverted in itsspectral position. Inversion is only necessary in exceptional cases.

On OFF > **Switching Off Output Channel**



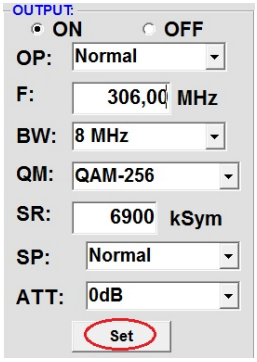
If not all 4 output channels are to be assigned, eachchannel can be switched offindividually with **OFF**.

ATT >Output Level



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

Set >Accept Programming

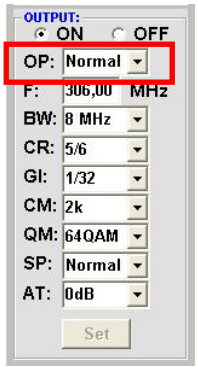


After the setting of all parameters press the **Set** button. With this, theadjusted data is accepted. Repeat steps for other channels.

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

8.2.4. Output Parameters DVB-T

OP > Operating Mode

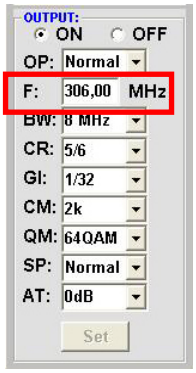


Normal>normal mode

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

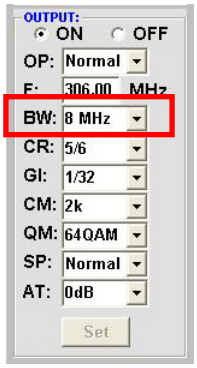
Zero > digital channelwith content 0 (constant levelwithout fluctuations)

F >Output Frequency



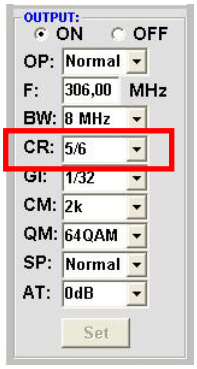
Frequency freelyselectable.
It is recommended to stick to the corresponding TV standard channel spacing.
The frequencyof thechannel middle is set.
(e.g. channel 21, 410- 478 MHz, set 474 MHz)

BW > Bandwidth



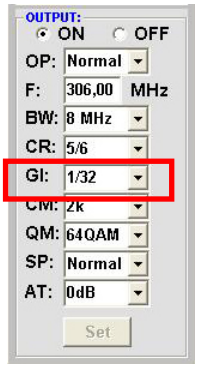
Choose bandwidth depending on output frequency between 7 MHz and8 MHz

CR >Code Rate



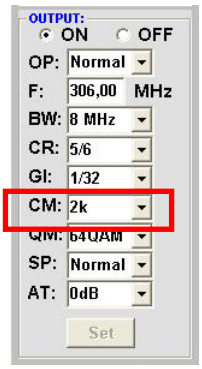
Setting of the possible Code rate (1/2, 2/3, 3/4, 5/6, 7/8)

GI >Guard Intervall



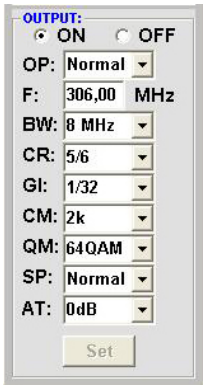
Setting of the possible Guard intervall (1/4, 1/8, 1/16, 1/32)

CM >Carrier Modulation



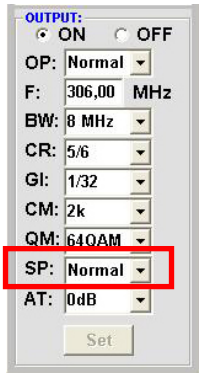
Setting of the possible carrier (2k, 8k)

QM>QAM Mode



Setting QAM mode (16, 32, 64)

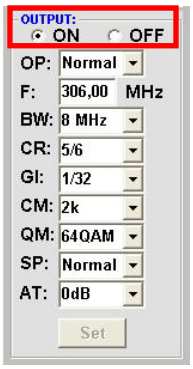
SP > Spectrum



Normal>normal mode

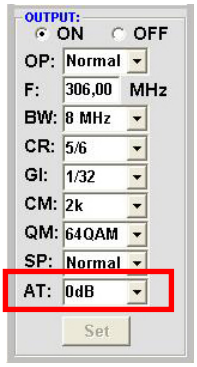
Inverted>Useful signal can be inverted in itsspectral position. Inversion is only necessary in exceptional cases.

On OFF > Switching Off Output Channel



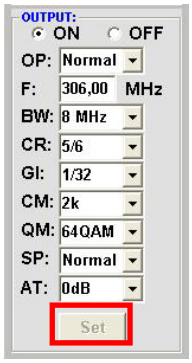
If not all 4 output channels are to be assigned, eachchannel can be switched offindividually with **OFF**.

ATT >Output Level



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

Set >Accept Programming



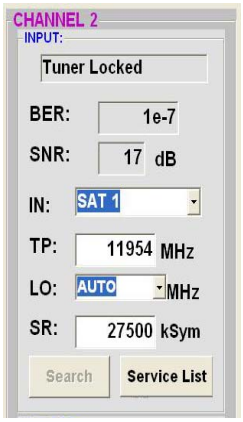
After the setting of all parameters press the **Set** button. With this, theadjusted data is accepted. Repeat steps for other channels.

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

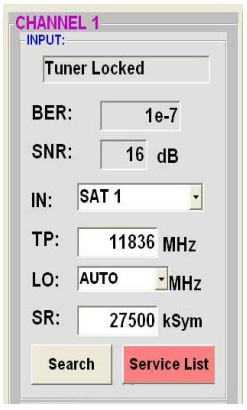
8.3. Function "Service List"

If certain services within a transponder are not desired at the output, they can be removed. Encoded services can still be selected for decoding via this function.

8.3.1. Deletion and Addition of Services



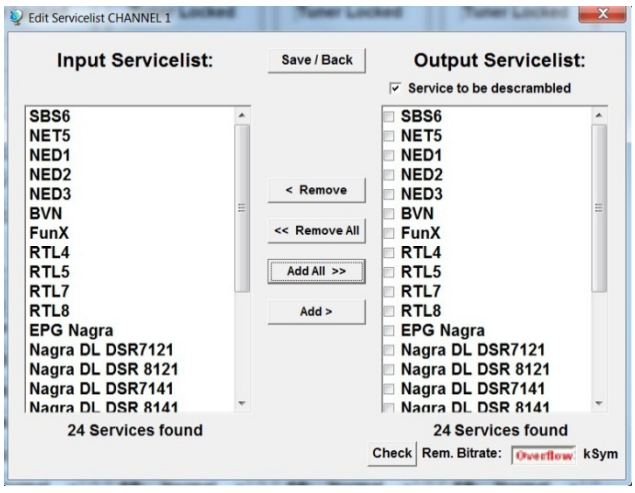
In addition to the"SearchButton“ anotherbutton -"Service List“ - is displayed. This is only active if the tuner is locked.



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 thebutton for the Service List turns red.
In this case, a reduced selection of the desired services must be made.

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 remain bitrate is less than 5000 kSym.
Overflow mean: The datarate is to big for the adjusted DVB-C parameters.

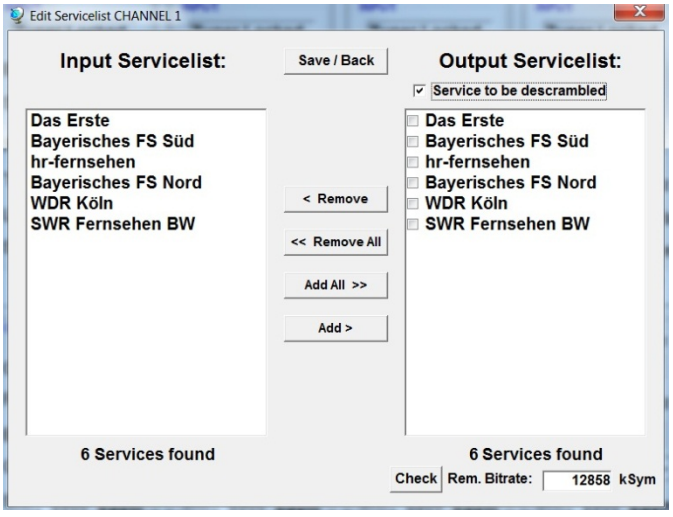
Clicking on thisbutton opens the followingwindow. The list of services available at the input is shown on the left. On the right, one can see the services contained in theoutput signal. The standard setting after scanning is always "Transparent“ i.e. everything that is there at the input also appears at the output.



Ifthe 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.

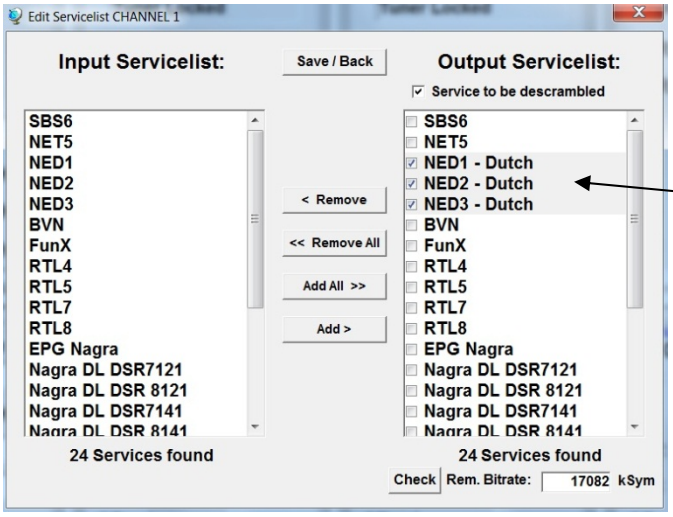
By clicking on a service in the input list and clicking on thecommand"Add“, thisservice is added to the output list. (Double-clicking on a service in theinput list automatically adds it to the output list).
Clickingon a service in theoutput list and clicking on the command "Remove“ removes this service from the output list. (Double-clicking on a service in the output list removes the service automatically).
By single-clickingon the"Save/Back“ button, the output list is saved and thewindow is automatically closed.
If you only want to accept a few services from a transponder that has many, you can first click on"Remove ALL“ and then select therequiredservices.



The data rate still available is shown in the field Rem. Bitrate.
This should be at least5.000kSym.

8.3.2. Selection of the TV Channelsto be Decoded

After the CAM modulewith the appropriate smart card has been inserted in the CI slot, press the Service List button. All available services are displayed in theinputand output list. In theoutput list, now select the desired services to be decoded by placing a tick.



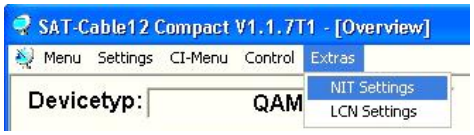
In theoutput list, now select the desired servicesby placing a tick.

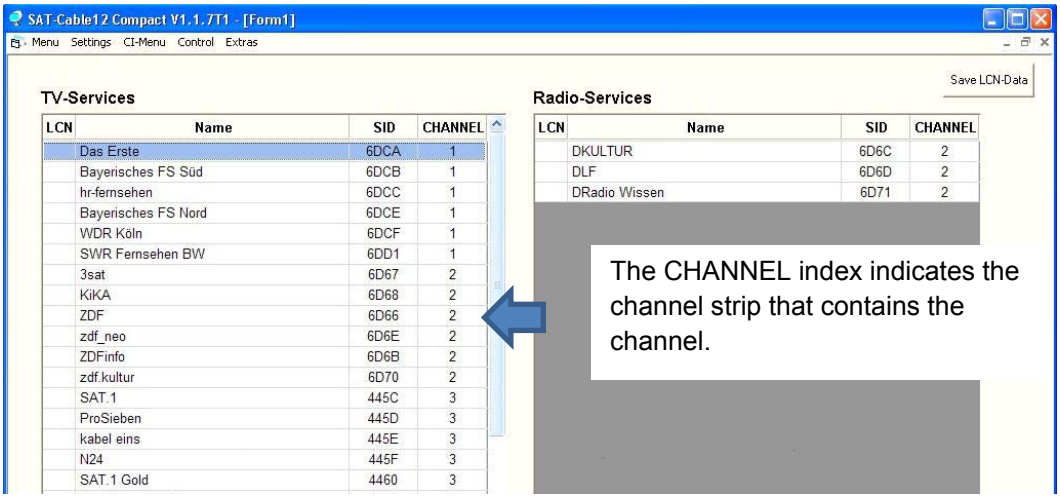
Encoded and non-encoded services can be output together. With a click on the"Save/Back“ buttontheoutput list is saved and the window is automatically closed.

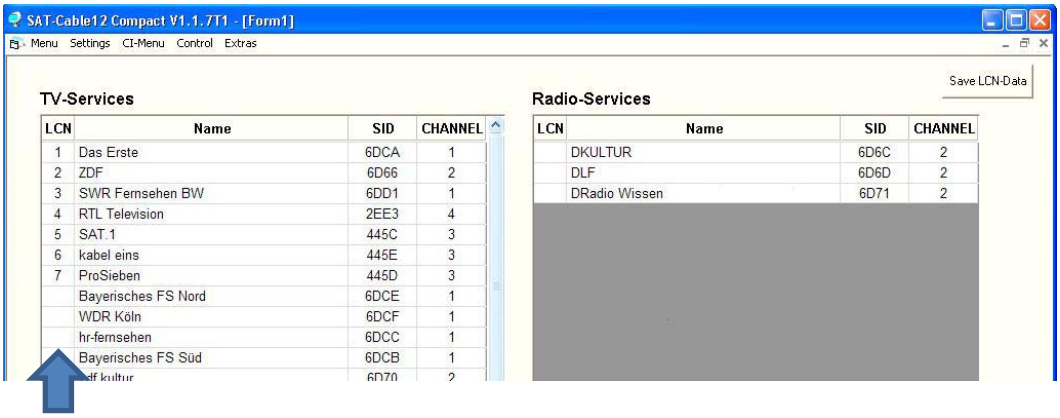
The CAM modules should always be in a switched-off state when inserted.

LCN function for the allocation of program positions

It is located under the menu item "Extras / LCN settings"







Storing the LCN settings

In the LCN column, you can enter the desired program position. These programs are then sorted in order in the table. Programs that did't get a posittion code will follow behind the marked programs.

Premise is that the receivers support LCN

8.4. Saving of the Programming

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

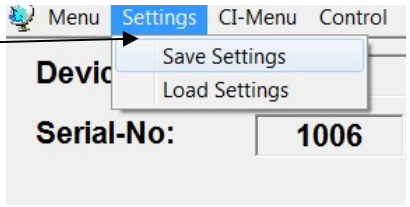
Themain program is opened withthemenu point

Settings

8.4.1. Saving of Settings

Withthemenu point

Save Settings



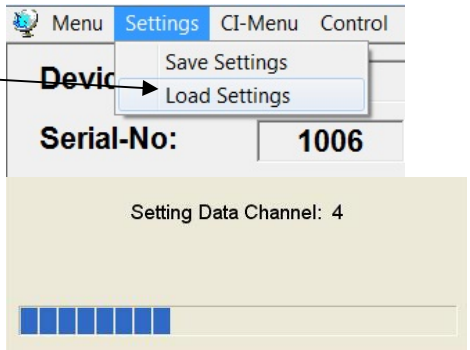
it is possible to save theprogramming ontothe PC.A directory and file name (e.g. object) are to be entered for this. Thefile name must retain the ending .c12!!

The the settings are also saved in an rft file. This is located in the same folder as the PCU 4111software. This file format can be opened, edited and printed withe.g. Microsoft Word, Open Office or wordpad.

8.4.2. Loading ofSettings

With themenu point

Load Settings



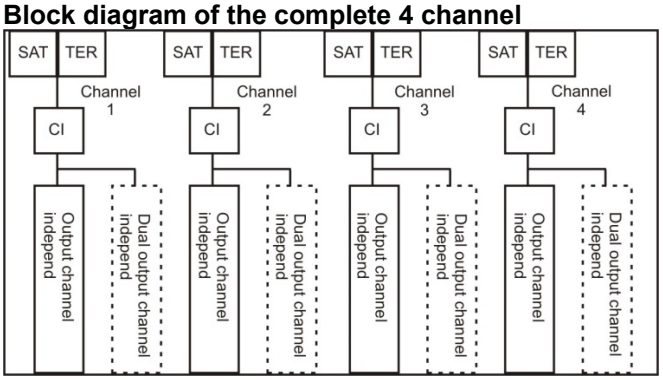
it is possible to load existing programming fromthe PC onto a PCU 4111/4121. For this, the desired file name is to be selected and opened in the register. The date is automaticallyloaded.

Dual Channel Function

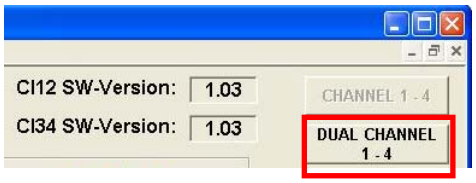
For headend PCU 4111/4121

Application:
The data rate of a transponder is to high to place the TV programs in one 7 or 8 MHz DVB-C channel.
With the Dual channel function it´s possible to split ainput signal into two DVB-C output channel.

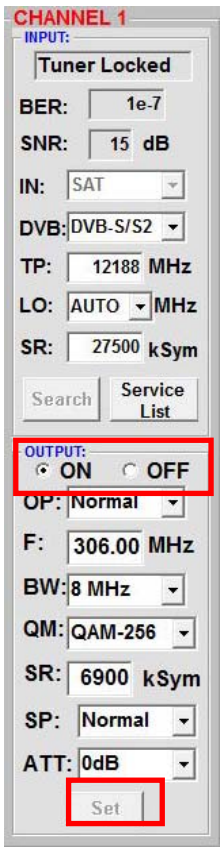
Block diagram of the complete 4 channel



If the Dual Channel Function is needed please click on following Button.



The button is top right.



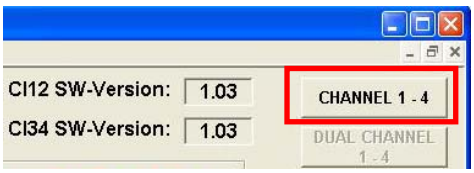
It´s not possible to change the input parameter .
It show the transponder, where the paramter could be changed.

To activate the Dual Channel switch from OFF to ON.

Now the output frequency and other parameters, for the second channel could be changed.

The second output channel is totalyindepent from the first output channel.

To save the parametersplease click „Set“.

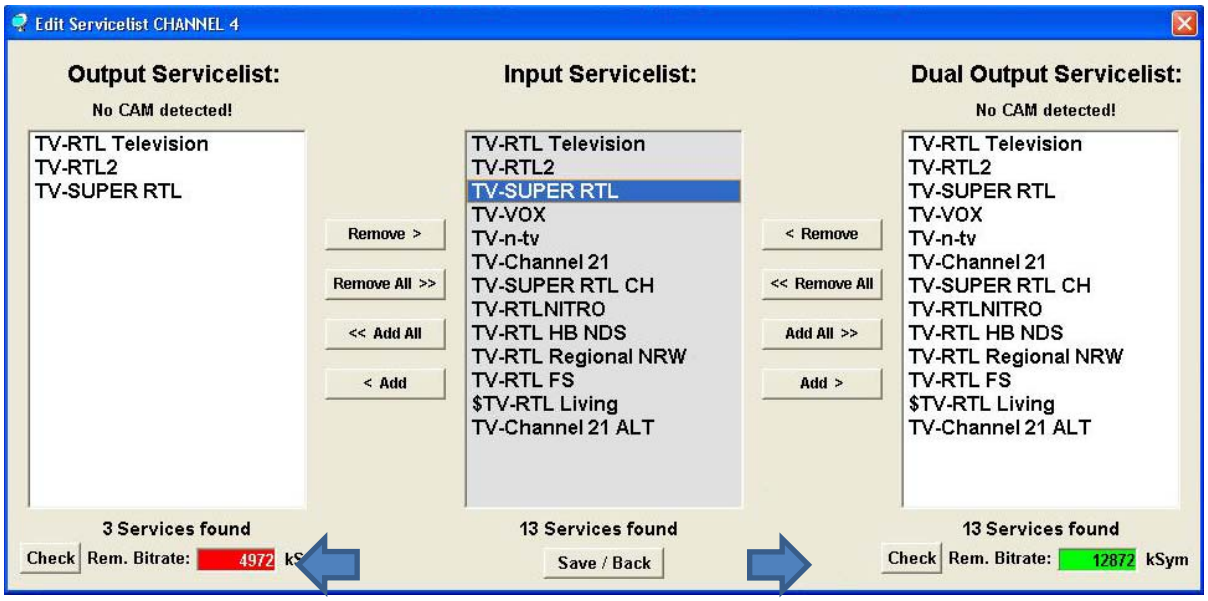


Back to the main menu.

To split the TV programs to both of the output channel,

please click the Button „Service List“.

If the second DVB-C output channel is switched on, then a blue script appear„DUAL active“.



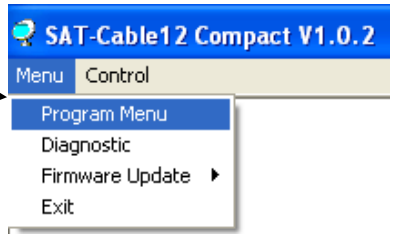
The table in the middle „Input Servicelist“ shows all channels of the transponder.
With the button Add and Remove the TV programs can be allocate to the both outputs.
To control the Bitrate please click the button “Check”
The field Bitrate is marked by colors.
Green means: The remaining bitrate is higher than 10000 kSym.
Yellow means: The remaining bitrate is less than 10000 kSym.
Red means: The remain bitrate is less than 5000 kSym.
Overflow mean: The datarate is to big for the adjusted DVB-C parameters.

To decode the favored TV programs a hook must be placed in front of the TV program name

The Button „Save / Back“ the parameters will be saved and the main menu appears.

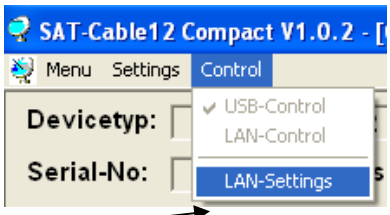
8.5. LAN Function

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



The PCU 4111/4121possessesthe 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 thePCU 4111/4121must be accordingly altered.
This change is carried out under themenu point **LAN-Settings**.



Example:

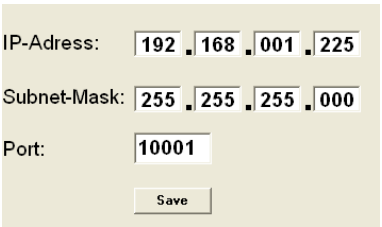
ThePC operated in the network has the following settings:

IP address: 192.168.010.068

network sharehost share

The IP address of thePCU 4111must only differ in the last block (host share) compared with that of the connected PC. Thefigures 0, 255 and all figures already used are not permitted!
Example IP address: 192.168.010.100

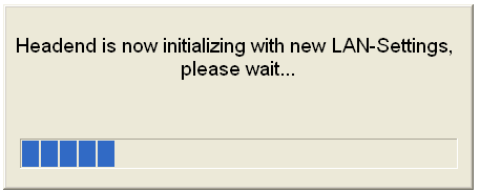
All changes are saved with**Save**.



N.B.!!

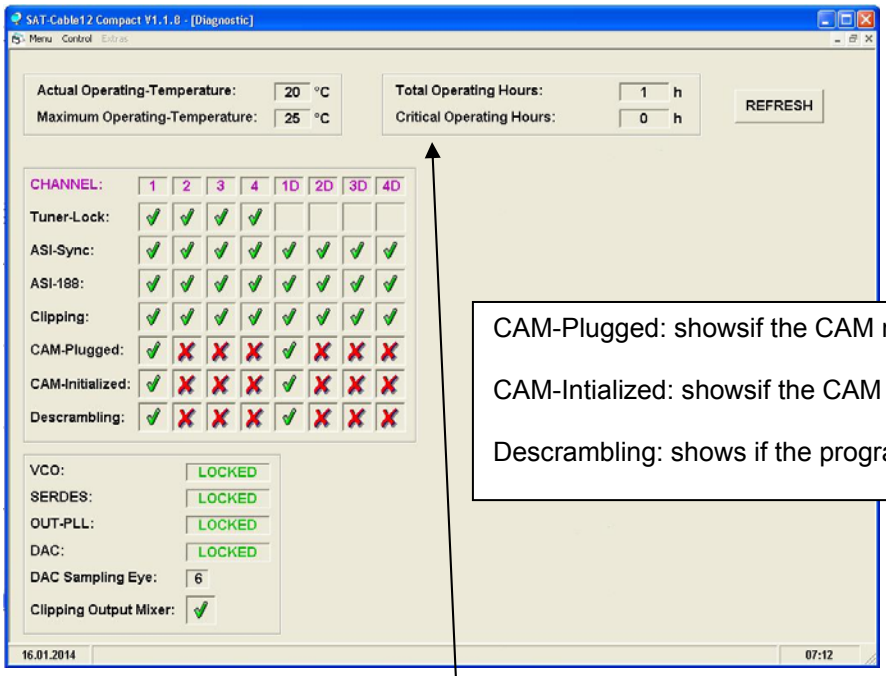
The listed IP addresses are intended as examples.
All addresses must be adapted to the network at the location.
If this information is not known, the responsible
IT specialist should be contacted!

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



8.6. Diagnostics

The"Diagnosis“ menu is forservice purposes and can be helpful during error analysis by telephone on the **Hotline+49(0)7081-1702-12**. The displayed data can be updated with**REFRESH**.



CAM-Plugged: showsif the CAM moduleis pluged.

CAM-Intialized: showsif the CAM moduleis recognize

Descrambling: shows if the program is decrypt

Menu HeaderDisplay:

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

LNB green: 12V LNB voltage
off: no LNB voltage (short-circuit?)

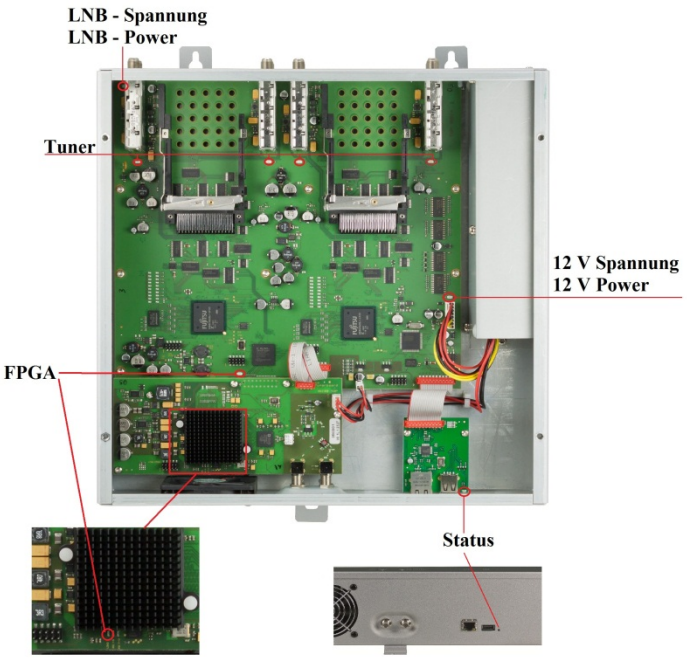
Tuner green continuous: tuner logged
greenflashing: tuner not logged

FPGA green: configured, ready to operate
off: fault

12 V green: 12 V power adaptor O.K.
off: power adaptor fault

RF green: output O.K.
off: fault

Status green: all tunerslogged, ready for use
orange: different functionsin programming



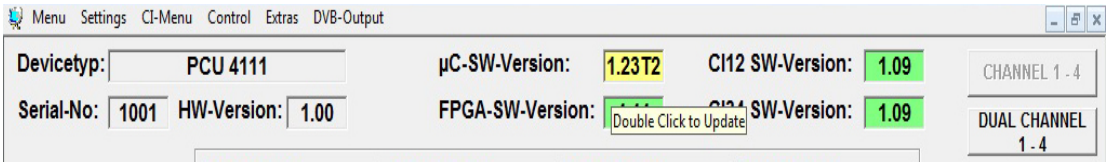
8.8. Firmware- Update

Themenufirmware update is used to update the firmware of the device. This way, the devices basic software is brought up to date.

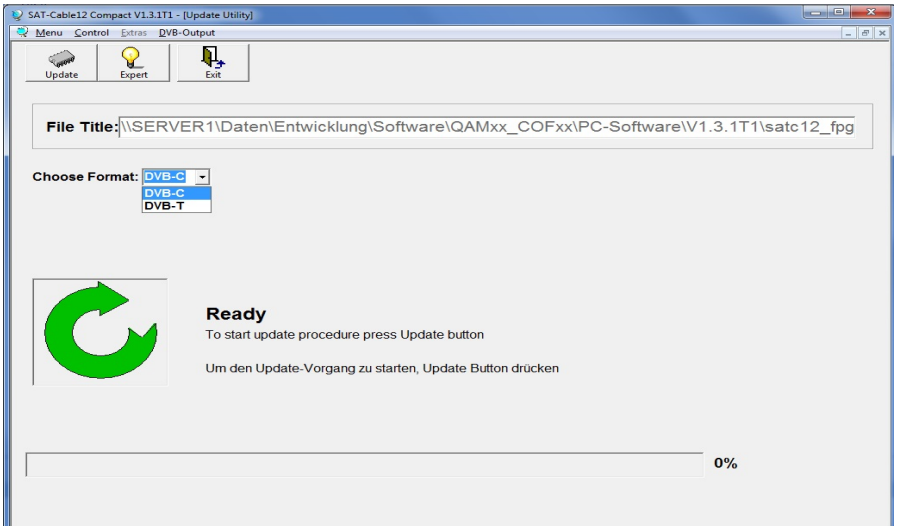
The programming of the input and output parameters carried out under8.2 is not influenced by this.

8.8.1. Firmware version overview

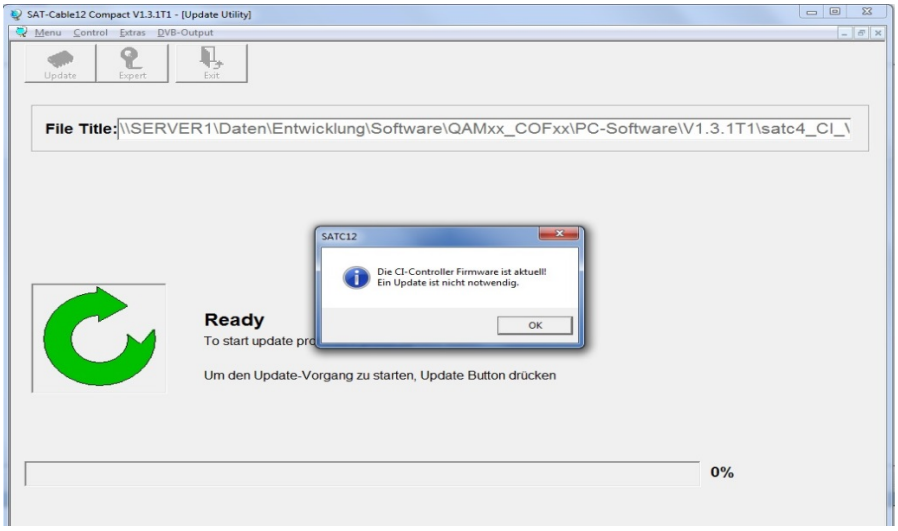
The field of the firmware overview are colored.
Greensignify the firmware is up to date.
Yellow signifythereis a newfirmwareavailable.



Double click on the field whitch shows the firmware,
open automaticly the Update menu.

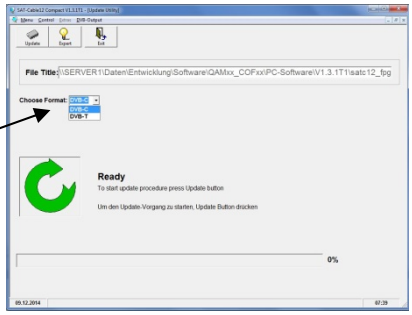


If the firmware is up todate, following picture appears:



8.8.2. Ausgangssignal ändern

Software: SATC12_QAMxxx.RBF



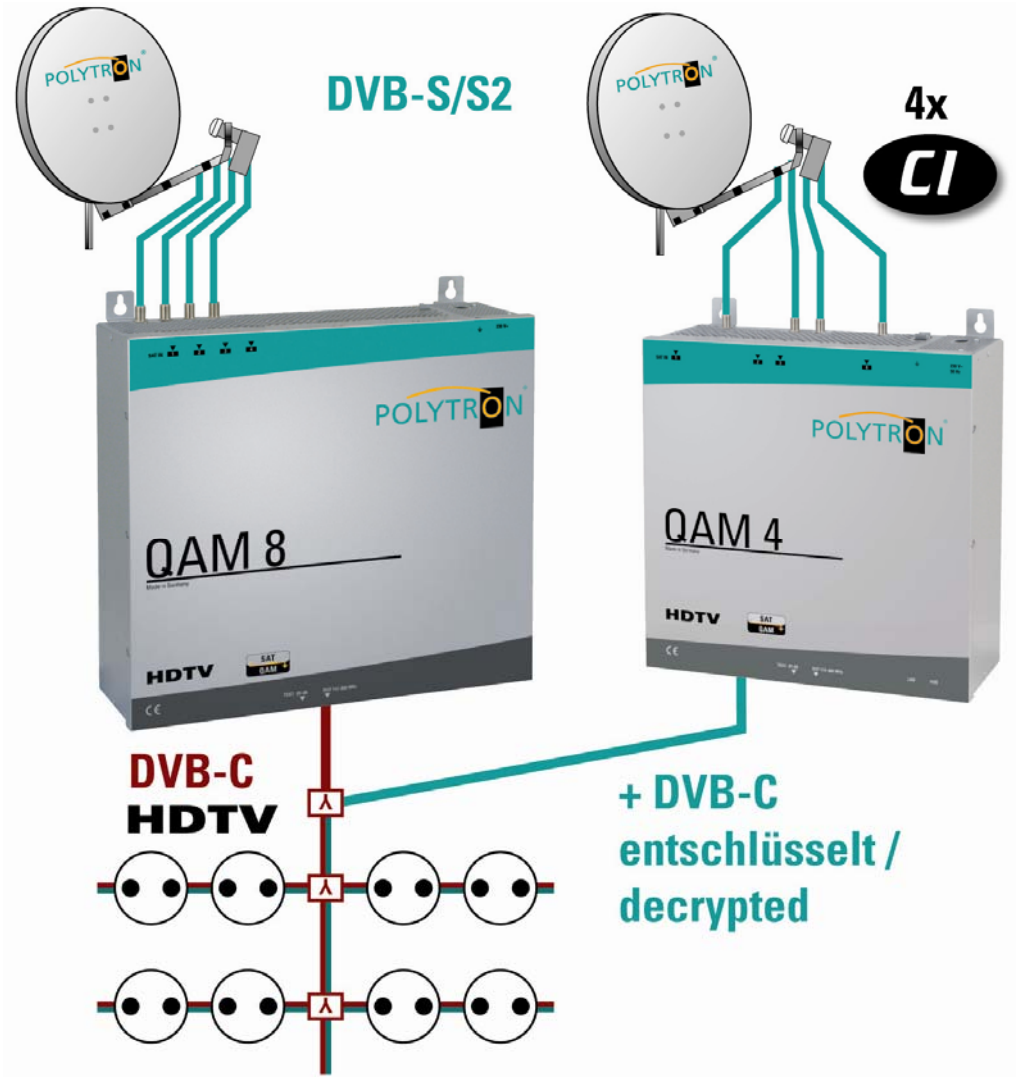
Update über Laptop/PC:

- Menüpunkt **Firmware Update** aufrufen
- Menüpunkt **QAM- FPGA** auswählen

Auswahl DVB-T oder DVB-C

Anklicken des **Update** Buttons,
neue FPGA- Softwarewird geladen

9. Applicationexample



10. Technical data

Typ / Type	PCU 4111	PCU 4121
Artikel-Nr. / Article no.	5552150	5552160
Eingänge / Inputs	**4**	
CI-Schnittstellen / CI slots	4	
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, 0.25, 0.20	
DVB-T		
Modulation	QPSK, 16QAM, 64QAM	
FFT	2K, 8K	
Channel bandwidth	7, 8 MHz	
Code rate	1/2, 2/3, 3/4, 5/6, 7/8	
Guard interval	1/4, 1/8, 1/16, 1/32	
DVB-T2		
Modulation	QPSK, 16QAM, 64QAM, 256QAM	
FFT	1K, 2K, 4K, 8K, 16K, 32K	
Channel bandwidth	7, 8 MHz	
Code rate	1/2, 3/5, 2/3, 3/4, 4/5, 5/6	
Guard interval	1/4, 5/32, 1/8, 5/64, 1/16, 1/32, 1/64, 1/128	
DVB-C		
Modulation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM	
Symbol rate	7.2 Msps	
Channel bandwidth	6, 7, 8 MHz	
Ausgang / Output	**DVB-C**	**DVB-T**
Ausgangskanäle / Output channels	4 + 4	4 + 2
Frequenzbereich / Frequency range	112–862 MHz	112-862 MHz
Signal constellation	16, 32, 64, 128, 256 QAM	QPSK, 16, 32, 64 QAM
Symbol rate	1–7,2 MS/s	/
FEC	/	1/2, 2/3, 3/4, 5/6, 7/8
Bandbreite / Bandwidth	7 / 8 MHz	7 / 8 MHz
Anzahl der Träger / Number of carriers	/	2K, 8K
Ausgangspegel / Output level	90 dBµV	
Regelbare Dämpfung je Kanal / Channel attenuation	0...12 dB	
MER	≥ 40 dB	typ. 38 dB
Leistungsaufnahme / Power consumption	45 W	40 W
Spannungsversorgung / Operating voltage	180-265 V, 50/60 Hz	
Maße (B x H x T) / Dimensions (W x H x D)	331 x 328 x 103 mm	

11. Declarationofconformity

POLYTRON®
Broadband Systems

CE - Declaration of Conformity

In accordance with Low Voltage Directive 2006/95/EG
In accordance with EMC Directive 2004/108/EG
In accordance with RoHS Directive 2011/65/EU

The manufacturer

Polytron-Vertrieb GmbH
Langwiesenweg 64-71
75323 Bad Wildbad
Germany

hereby declares that the following product

Product designation: PCU 4111

conforms with the requirements of the above directives including any amendments.

Following standards and regulations were used:

- **EN 60728-11:2011**
- **EN 60065:2011**
- **EN 50083-2:2012**
- **EN 50581:2012**

Bad Wildbad, 24.11.2014

Wolfgang Schlüter
Managing Director

Polytron-Vertrieb GmbH
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75313 Bad Wildbad
Germany

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Technische Änderungen vorbehalten
Subject to change without prior notice