HDC-5016 … 5064

IP to 16, 32, 48 or 64 QAM Modulator

EDGE-QAM User Manual

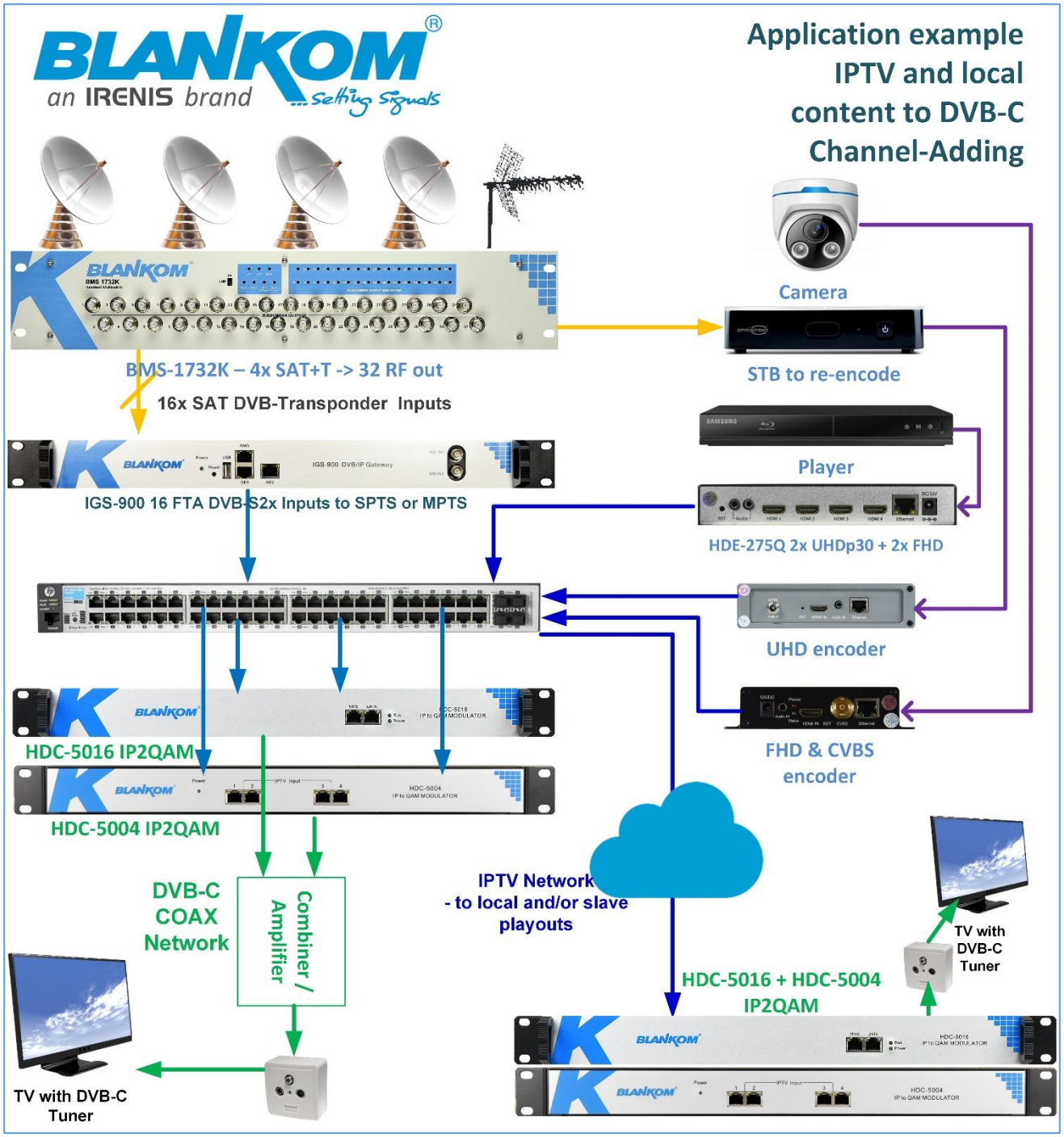
Software Version:
09.02.34 Build 272.00 Jul 10 2022
Hardware Version:
02.41.04
Web Version:
1.51

Note: All data in this manual are subject to change w/o any notification

Table of Content

Application Example

Master- Slave System:



This Product is manufactured in PRC (China), HS-Code: 85176200

Anmerkung:

Alle von uns veröffentlichten Betriebsanleitungen richten sich an den Antennen- und IT-Fachmann, der über grundlegende Kenntnisse der Empfangs-, Netzwerk- und Anlagentechnik verfügt. Die Einhaltung aller relevanten Vorschriften und Richtlinien für den Aufbau und Betrieb von solchen Anlagen obliegt dem Installateur und/oder dem Betreiber. Insbesondere sind die in den jeweiligen Ländern geltenden Vorschriften und Richtlinien für die Inbetriebnahme speziell für den Stromanschluß und alle mit den Produkten in Zusammenhang stehenden und geltenden Normen und Gesetze einzuhalten.

Remark:

All operating instructions published by us are intended for the antenna and IT specialist who has basic knowledge of reception, network and system technology. Compliance with all relevant regulations and guidelines for the installation and operation of such systems is the responsibility of the installer and/or the operator. In particular, the regulations and guidelines applicable in the respective countries for commissioning, especially for the power connection, and all standards and laws related to the products must be complied with.

Annotation :

Tous les modes d'emploi que nous publions sont destinés aux professionnels de l'antenne et d tique qui ont des connaissances de base en matière de réception, de mise en réseau et de technologie des équipements. Le respect de toutes les réglementations et directives pertinentes pour l'installation et l'exploitation de ces systèmes relève de la responsabilité de l'installateur et/ou de l'exploitant. En particulier, il convient de respecter les réglementations et directives applicables dans les pays respectifs pour la mise en service, notamment pour le raccordement électrique, ainsi que toutes les normes et lois relatives aux produits.

Annotazione:

Tutte le istruzioni per l'uso da noi pubblicate sono destinate al professionista dell'antenna e dell' a che ha una conoscenza di base della tecnologia di ricezione, di rete e delle apparecchiature. Il rispetto di tutti i regolamenti e le linee guida pertinenti per l'installazione e il funzionamento di tali sistemi è responsabilità dell'installatore e/o dell'operatore. In particolare, devono essere rispettati i regolamenti e le linee guida applicabili nei rispettivi paesi per la messa in funzione, soprattutto per il collegamento alla rete elettrica e tutte le norme e le leggi relative ai prodotti.

Anotación:

Todas las instrucciones de uso publicadas por nosotros se dirigen al profesional de la antena y de la informática que tiene conocimientos básicos de recepción, de redes y de tecnología de equipos. El cumplimiento de todos los reglamentos y directrices pertinentes para la instalación y el funcionamiento de dichos sistemas es responsabilidad del instalador y/o del operador. En particular, deben cumplirse los reglamentos y directrices aplicables en los respectivos países para la puesta en marcha, especialmente para la conexión de la energía y todas las normas y leyes relacionadas con los productos.

Anotação:

Todas as instruções de operação publicadas por nós são destinadas ao profissional de antena e TI que possui conhecimentos básicos de recepção, rede e tecnologia de equipamentos. O cumprimento de todos os regulamentos e diretrizes relevantes para a instalação e operação de tais sistemas é de responsabilidade do instalador e/ou do operador. Em particular, os regulamentos e diretrizes aplicáveis nos respectivos países para comissionamento, especialmente para a conexão de energia e todas as normas e leis relacionadas aos produtos devem ser obedecidas.

Chapter 1 Product Overview

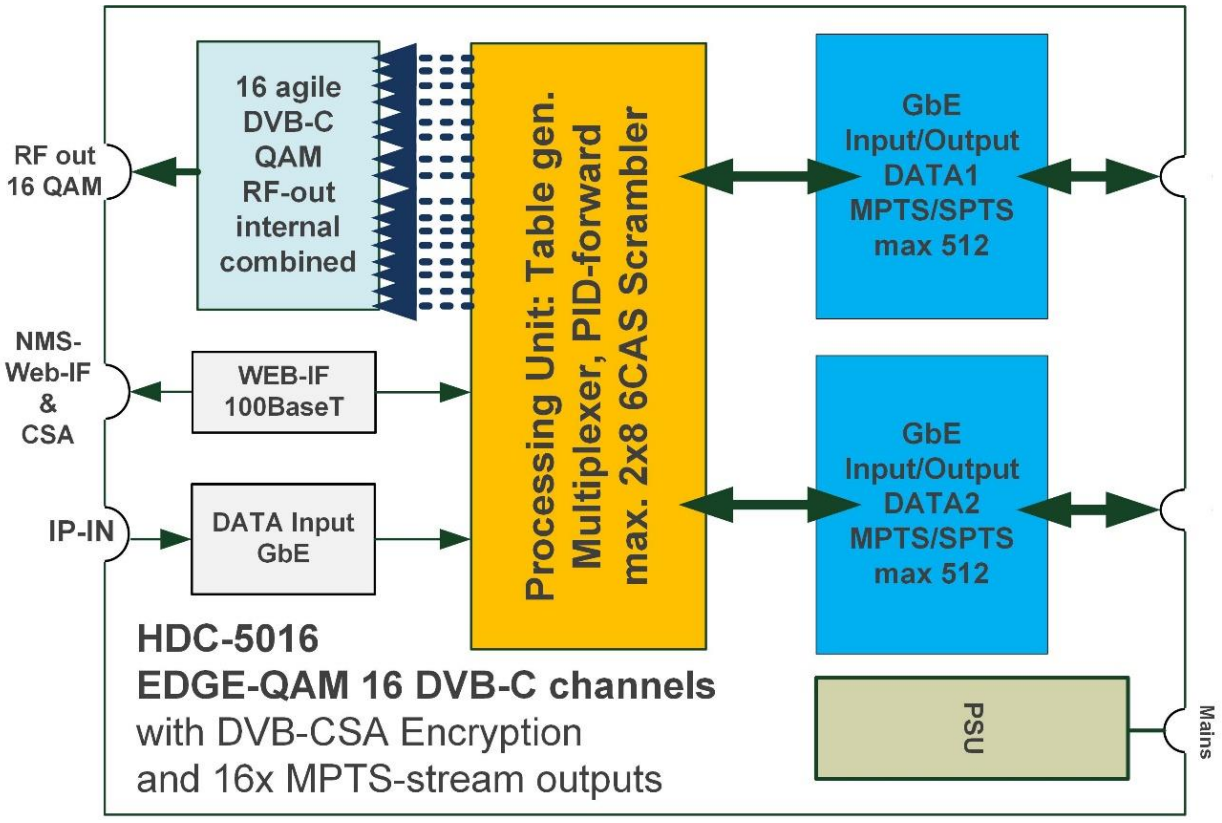
1.1 Outline

The BLANKOM HDC-5016---5064 IP to QAM Modulator is the 5th generation Mux-scrambling-modulating all-in-one device. With 16 multiplexing channels, 16 scrambling channels and 16 QAM (DVB-C) modulator channels, it supports a maximum of 1024 IP input streams through the GbE ports and output 16-64 non-adjacent DVB-C QAM channels (50MHz...960MHz) through the combined RF output. The device is also characterized with high integration level, high performance and a reasonable price.

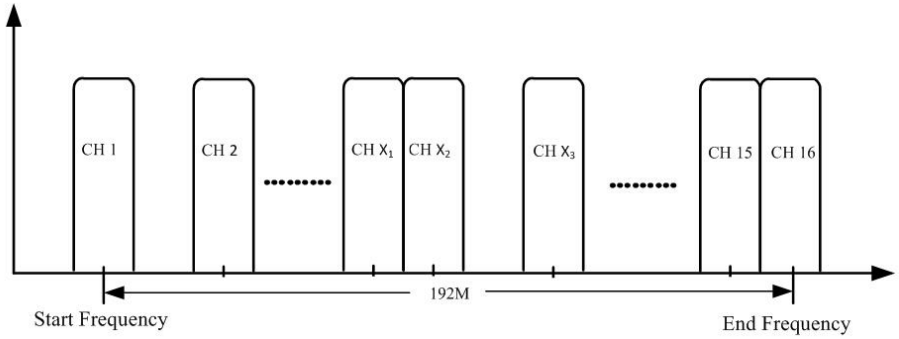
1.2 Key Features

- 2+1 GE input, RJ45
- Input up to 512 (1024*) channels TS over UDP/RTP multicast (RTSP-Unicast), IGMP v2/v3 selectable
- Max. 840 Mbps for each of the 2 GbE inputs (the front DATA-port* can handle only 120Mb/s)
- Accurate PCR adjusting
- CA & PID filtering, remapping and PSI/SI editing
- Up to 180 PIDS remapping per channel
- DVB CA scrambling system (ETR289), simulcrypt standards ETSI 101 197 and ETSI 103 197
- Max. 16-64* multiplexed or scrambled TS over UDP/RTP output in parallel
- 16-64* non-adjacent QAM carriers' output, compliant to DVB-C (EN 300 429) & ITU-T J.83 A/B
- Web-based Network management

1.3 Block Diagram (for the 16 QAM channel version)

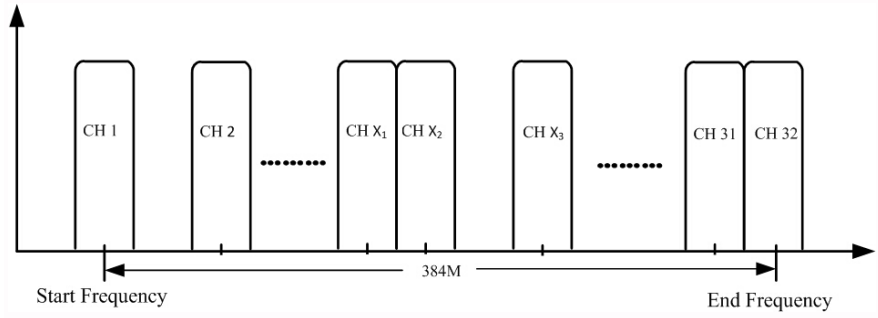


1.4 Agile Channel Setting Example

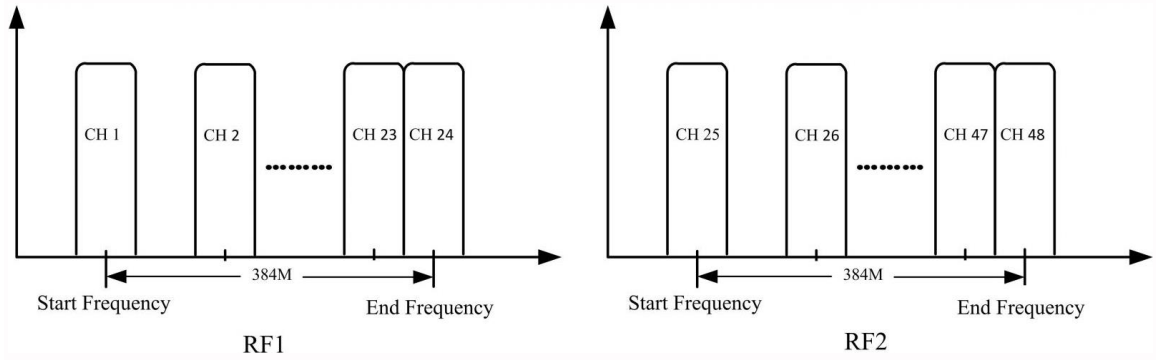


This EDGE QAM can be used with agile independent channel settings

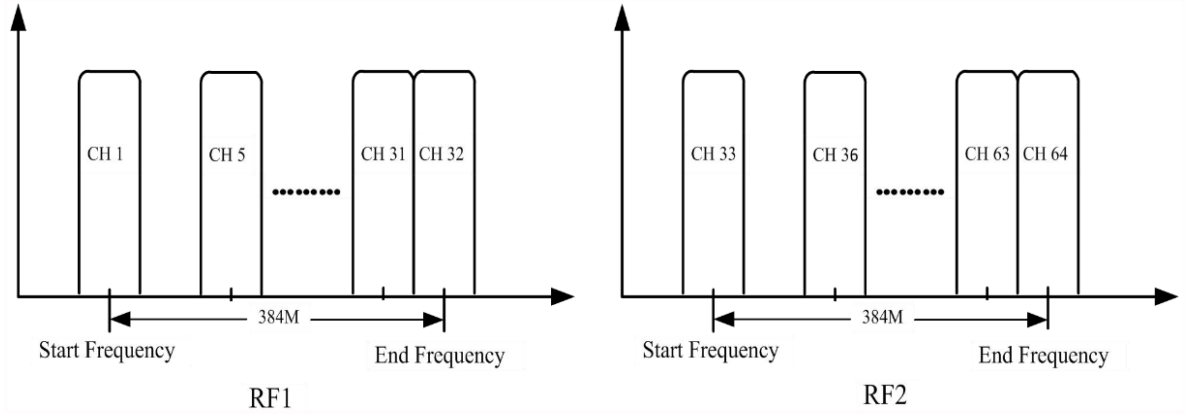
HDC-5032:



HDC-5048 comes with 2 RF outputs:



HDC-5064 also comes with 2 RF outputs and can use 6 GE inputs (4*RJ45, 2*SFP)



1.5 Specifications

Function	**IP to QAM Modulator with up to 2x* 512 IPTV input, 16…64 DVB-C and 16…64 IPTV MPTS output**
INPUT	
IP input	**2x 512* from 3 IP input: 3 Gigabit Ethernet Port (Max 840 Mbps for each GigE input)**
Transport protocol	**TS over UDP/RTP, unicast and multicast, IGMP V2/V3**
MULTIPLEXING	**NIT generation, PID passing, ..., CA filter, PID remapping**
Input IP streams	**In Total 2x 512 (DATA1+2 +128 max DATA Front) depending on Model**
Output channel quantity	**16…64*, agile**
Max PIDs	**180 per channel**
Functions	**PID remapping (auto/manually optional), PCR accurate adjusting, PSI/SI table automatically generating**
Scrambling parameters	**Max simulcrypt CA: 6, Standard: ETR289, ETSI 101 197, ETSI 103 197, Local/remote connection**
MODULATION	**DVB-C Annex A/C** and US-Norm Annex-B selectable
QAM channels	**16…64* non-adjacent carriers,**
Modulation Standard	**EN300 429/ITU-T J.83A/B (DVB-C Annex A/C and US-B)**
Symbol Rate	**5.0...7.0Msps, 1ksps stepping**
Constellation	**16, 32, 64, 128, 256QAM**
FEC	**RS (204, 188)**
RF OUTPUT	**1 F type** output port for 16-64* carriers (int. Comb.), 75Ω impedance
RF Range	**50...960MHz, 1kHz stepping**
Output Level	**-20dBm...+10dBm (87...117dBµV), 0.1dB stepping**
MER	**≥ 40dB, ACLR: -60 dBc**
TS OUTPUT	**16…64 IP output over UDP/RTP/RTSP multicast, 2 GigE Ethernet Ports (DATA 1+2)**
SYSTEM	
Control	**Network management (WEB-IF), English menu, Ethernet software upgrade**
GENERAL	
Dimensions, Weight	**420mm × 440mm × 44.5mm (WxLxH) , 19” 1U, 3 kg… depending on Model**
Power	**AC 110V ±10%, 50/60Hz or AC 220V ±10%, 50/60Hz, Consumption: appr. 15.4 W**
Temperature	**0...45℃ (operation), -20...80℃ (storage)**

Chapter 2: Connection Description

2.1 Front & Rear panel

Front:	NMS/CAS: Network management port and CAS data port + separate DATA-IN-Port
Rear left	Grounding
	Power switch, Fuse
…	AC IEC Power Socket
…	RF output port
…	Link/Act Indicators in RJ45 connectors
Rear right	DATA 1/2 GbE Input/Output

Chapter 3 Installation Guide

3.1 Acquisition Check

When you open the package of the device, it is necessary to check items according to packing list. Normally it should include the following items:

- HDC-5016...64 IP QAM Modulator
- User's Manual (online download from www.blankom.de)
- Power Cord and grounding wire (depending on country)

3.2 Installation Preparation

When you install the device, please follow the steps below. The details of installation will be described after this chapter. Users can also refer to the rear panel chart during the installation.
The main steps of the installation include:

- Checking the possible device missing or damage during the transportation
- Preparing relevant environment for installation
- Installing the IP Mux-Scrambling QAM Modulator
- Connecting signal cables
- Connecting communication port for WEB-IF

3.2.1 Environmental Conditions

Item	Requirement
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1x10^{7}$...$1x10^{10\Omega}$, Grounding current limiting resistance: 1m (Floor bearing should be greater than 450kg/m^2)
Environment Temperature	5...40℃ (sustainable), 0...45℃ (short time) installing air-conditioning is recommended
Relative Humidity	20%...80% sustainable 10%...90% short time
Pressure	86...105kpa
Door & Window	Installing rubber strip for sealing door-gaps and dual level glasses for window
Wall	It can be covered with wallpaper, or brightness less paint.
Fire Protection	Fire alarm system and extinguisher
Power	Requiring device power, air-conditioning power and lighting power are independent to each other. Device power requires AC power 220V ±10% 50/60Hz or 110V ±10% 50/60Hz. Please carefully check before running.

3.2.2 Grounding Requirement

- All function modules' good grounding is the basis of reliability and stability of devices. Also, they are the most important guarantee of lightning arresting and interference rejection. Therefore, the system must follow this rule.
- Coaxial cables' outer conductor and isolation layer should keep proper electric conducting with the metal housing of device.
- Grounding conductor must adopt copper conductor in order to reduce high frequency impedance, and the grounding wire must be as thick and short as possible.
- Users should make sure the 2 ends of grounding wire well electric conducted and be antirust.
- It is prohibited to use any other device as part of grounding electric circuit
- The area of the conduction between grounding wire and device's frame should be no less than 25mm^2.

3.2.3 Frame Grounding

All the machine frames should be connected with protective copper strip. The grounding wire should be as short as possible and avoid circling. The area of the conduction between grounding wire and grounding strip should be no less than 25mm^2.

3.2.4 Device Grounding

Connecting the device's grounding rod to frame's grounding pole with copper wire.

3.3 Wire Connections

3.3.1 Power cord connection

The power socket is located on the right of rear panel, and the power switch is on the left of front panel. User can plug one end of the power cord to the socket and insert the other end to AC power. When the device

solely connects to protective ground, it should adopt independent way, say, share the same ground with other devices. When the device adopts united way, the grounding resistance should be smaller than 1Ω.

☞**Caution:** Before connecting power cord to the IP QAM Modulator, user should set the power switch to "OFF".

3.3.2 Signal and Network Management (NMS) Cable Connection

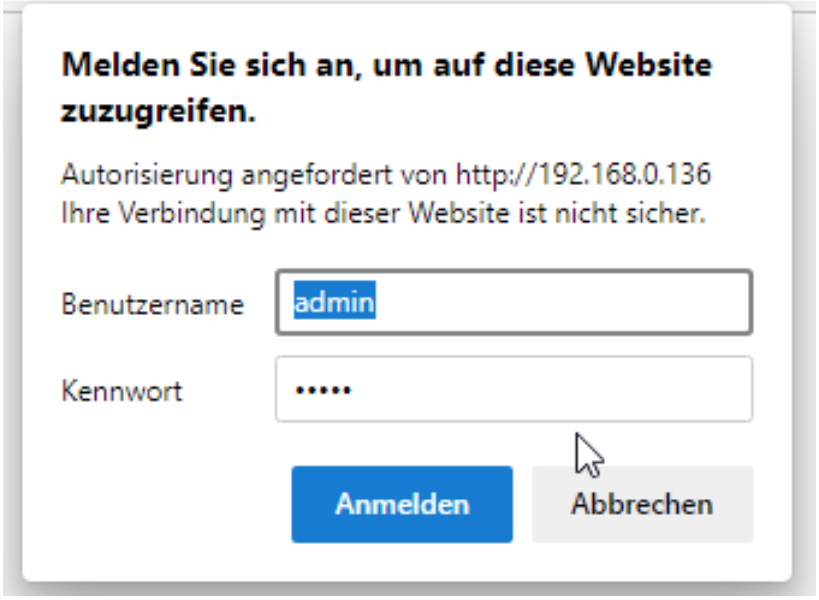
The signal connections include the connection of input signal cable and the connection of output signal cable. Please use at least CAT 6 STP RJ45 LAN Cable for the management port and CAT 6 DSTP for the streaming data ports to avoid electromagnetic influences. For RF cable we recommend double shielded Coax.

Chapter 4: Web NMS Management

This device does not support an LCD operation, and the modification can only be operated with Web NMS by using a standard web-browser. We recommend to use Firefox – latest version.

4.1 Login

The factory default IP address is **192.168.0.136** and users can connect the device and web NMS through this IP address.
Connect the PC (Personal Computer) and the device with a network cable, and use ping command to confirm they are on the same network segment. For instance, the PC IP address is 192.168.99.252, we then change the device IP to 192.168.0.xxx (xxx can be 0 to 254 except 136 to avoid IP conflict).
Launch the web browser an input the device IP address in the browser's address bar and press Enter. ***We recommend to use the latest Mozilla Firefox browser.***
It will display the Login interface. Input the Username and Password (Both the default Username and Password are "**admin**"). And then click "Login" to start the device setting.

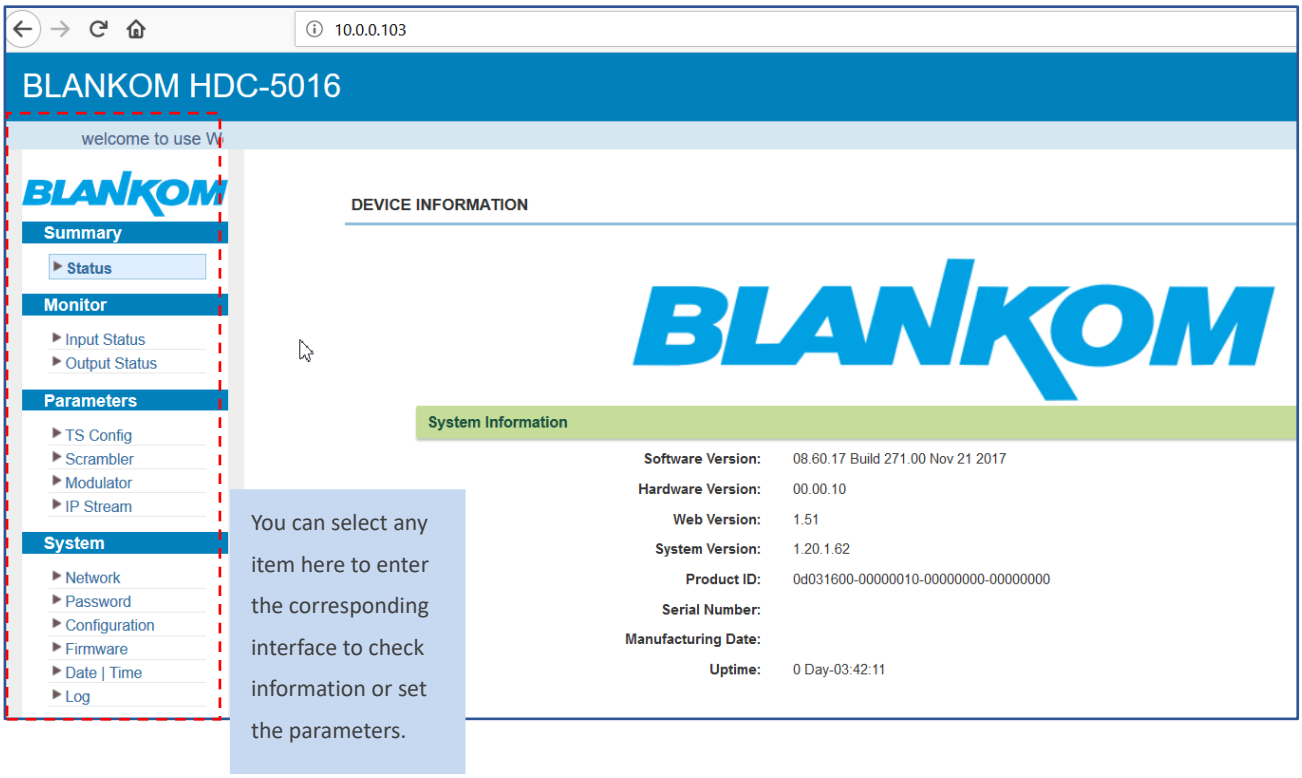


4.2 Operation

Remark: The user should be familiar with DVB-MPEG and PSI/SI information and its PID and Table construction and norms. Many tables are cross referencing to other tables (example: EIT and SDT, PMT, …).
Information can be grabbed from: https://www.dvb.org/standards

4.2.1 Summary

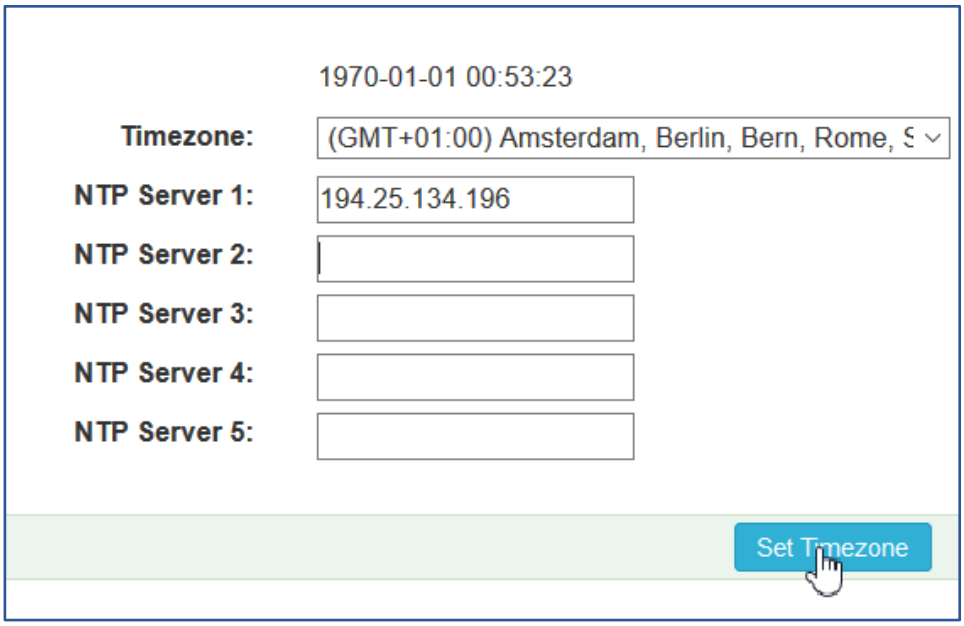
When the login has been confirmed, it displays the summary status as in Figure-2:



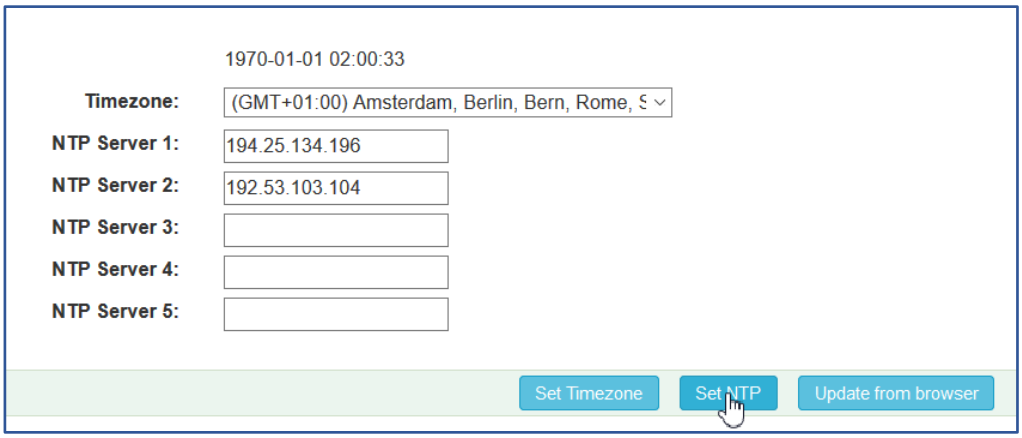
4.2.1.1 Setting Date | Time

The device supports setting of Date and Time by a) browser you are using to the web-IF – so your computer. But for the correct Time and Date it is almost better to configure time zone + NTP servers:

Example for European NTP-Server addresses… But first set the time zone please:



Please **first set time zone than config NTP-Server!**

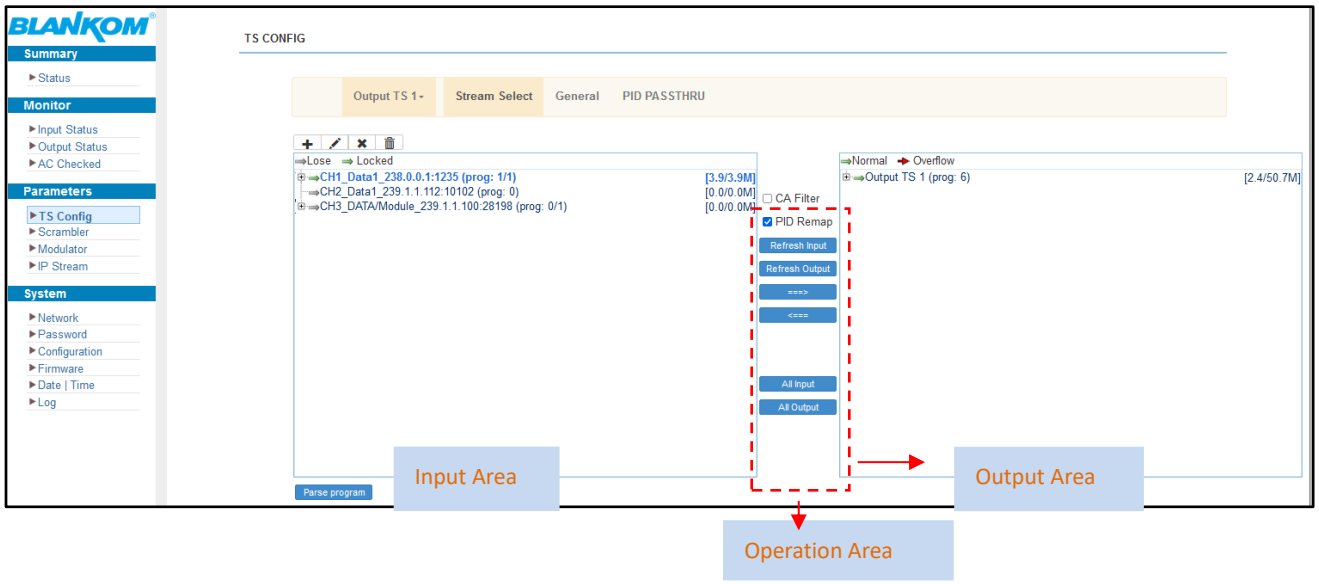


And you are done – but your Device need a connection to these NTP addresses. -> Local Gateway settings should fit as well to asure the connection to external NTP servers.

4.2.2 Parameters "TS Config" - Menu

- **Stream Select Basics**

  From the menu on up side of the webpage, clicking "Stream Select", it displays the interface where users can choose the programs to Mux out:



Configure 'Input Area' and 'Output Area' with buttons in 'Operation Area'. Instructions are as below:

☑ CA Filter ： Enable/disable the CA Filter function. Clicking this box, you can filter out the input CA-PIDs to avoid disturbing with the device scrambling function.

☑ PID Remap: To enable/disable the PID remapping (disabled recommended for pass through)

Refresh Input To refresh the input program information

Refresh Output To refresh the output program information

===> Select one input program first and click this button to transfer the selected program to the right box to be processed to the output.

<=== Similarly, you can remove TV Services from the multiplex in the right box.

All Input To select all the input programs

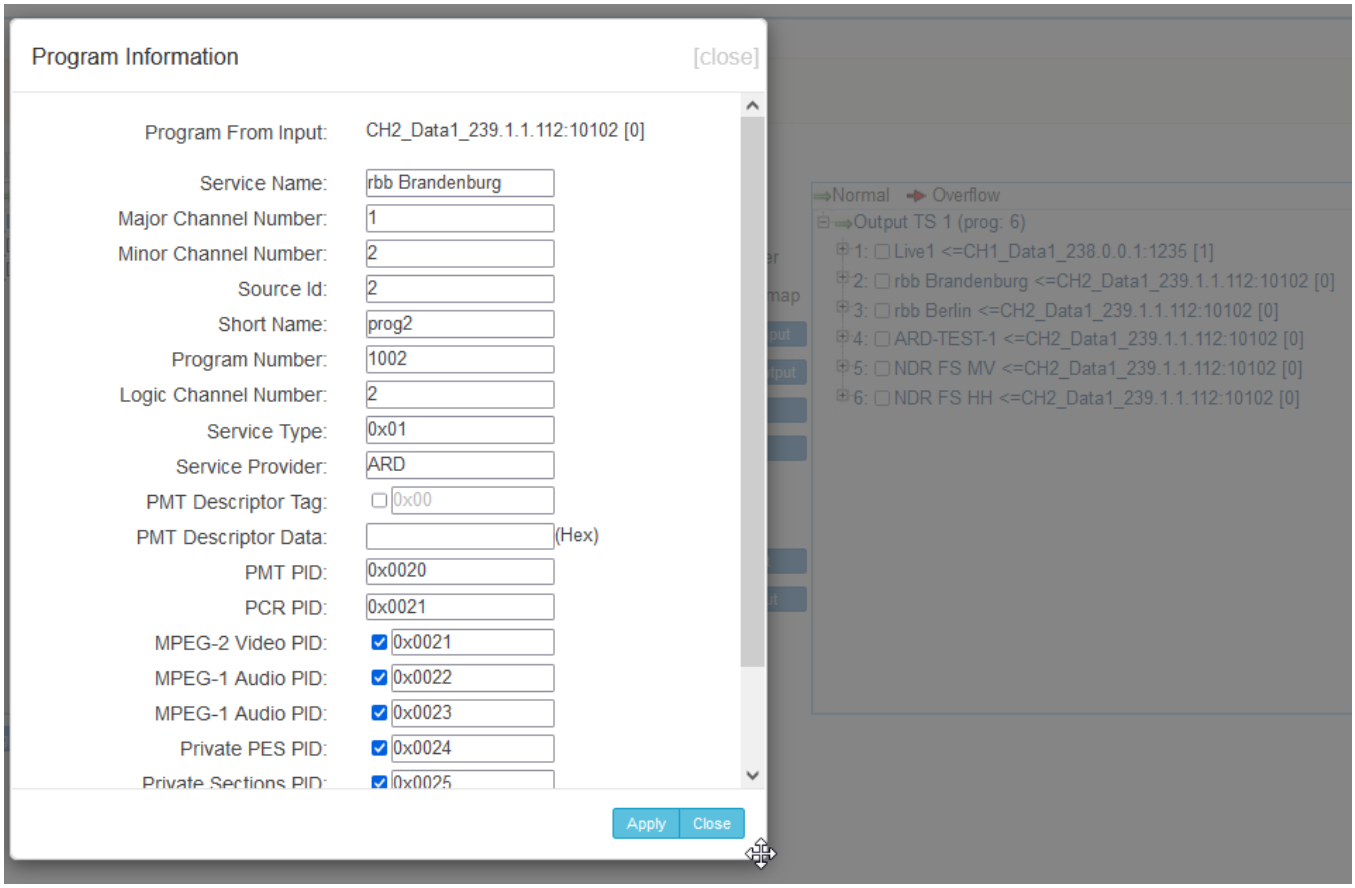
All Output To select all the output programs

Parse program To parse programs time out: 60 seconds time limitation of parsing input programs from TS

This PARSING is almost important to read the content from the input streams….

Program Modification:

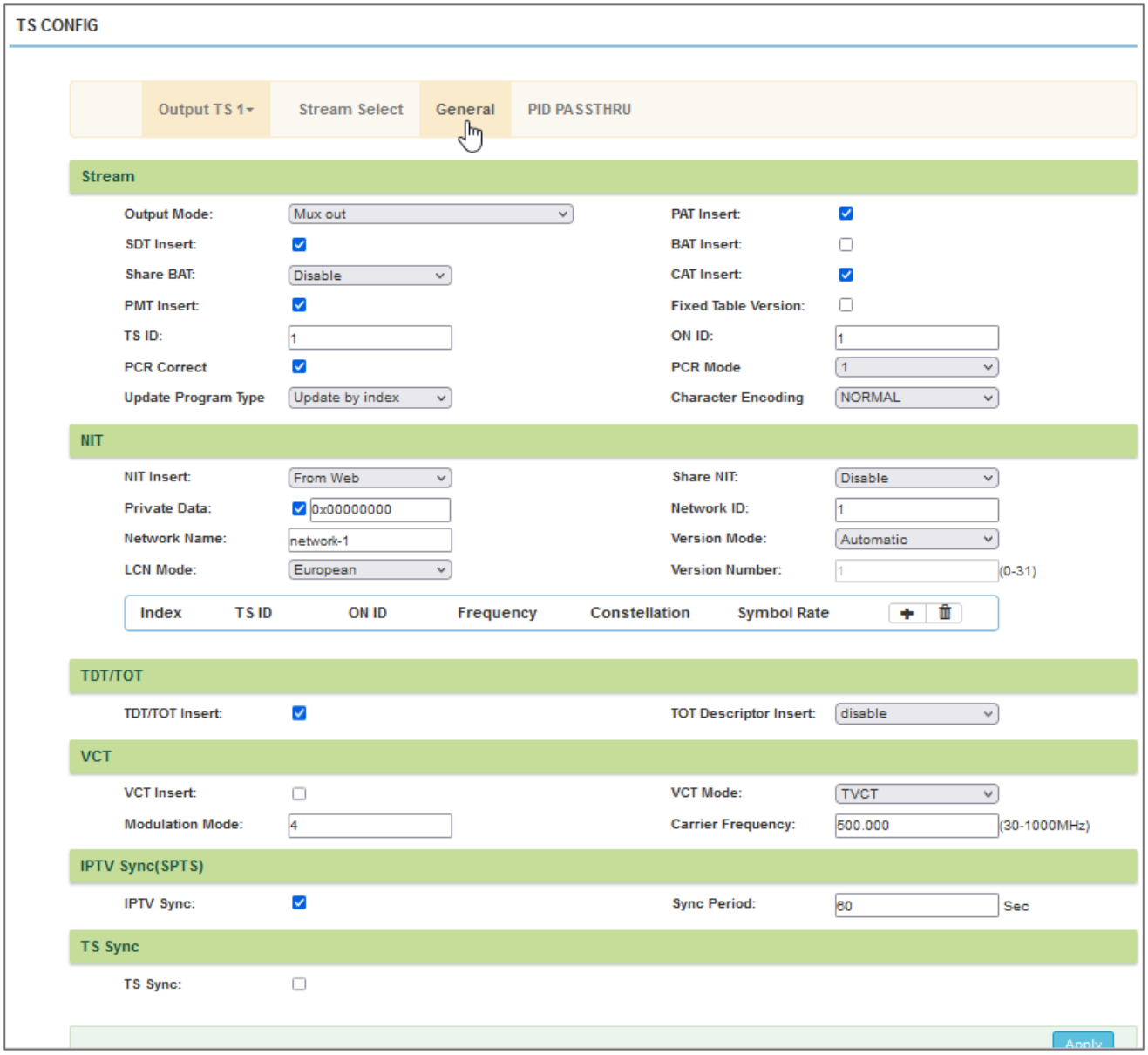
The multiplexed program information can be modified by selecting the program in the 'output' area. For example, when clicking on a service, it opens a popup as dialog box (Figure 6) where you can change or insert new data or even rename the service.



- **General**

From the menu-bar on the upper side of the web-frame, selecting "General", displays the interface where you can set parameters for each selected output channel (TS1…TSn).

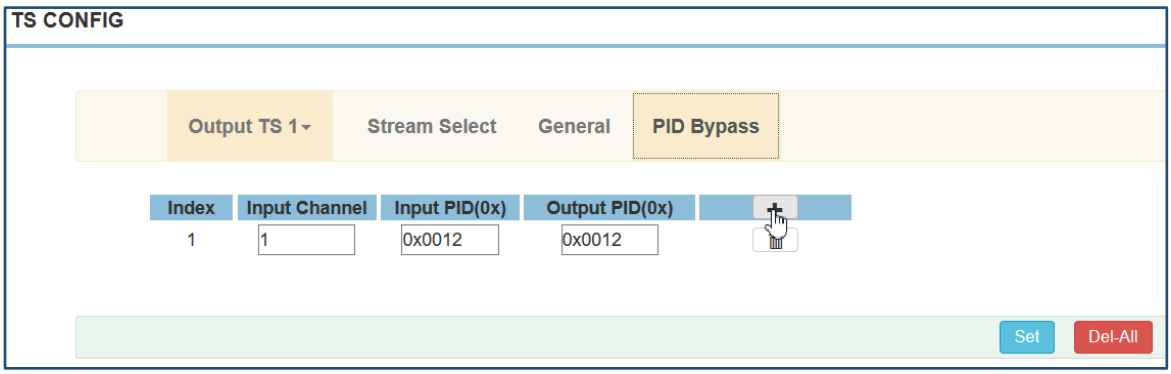
NOTE: (Model release dependent) Please do not use the DATA-RJ45 Port at the front, it is only a spare port for the IP-streams but the rear-ports are the ones to be preferred.



Several parameters can be modified and added in this GENERAL settings menu. Examples will follow later. **VCT is for American DVB-C/ATSC** norms only and can be skipped in normal DVB-C Annex A/C -rest-of-the-world-modes.

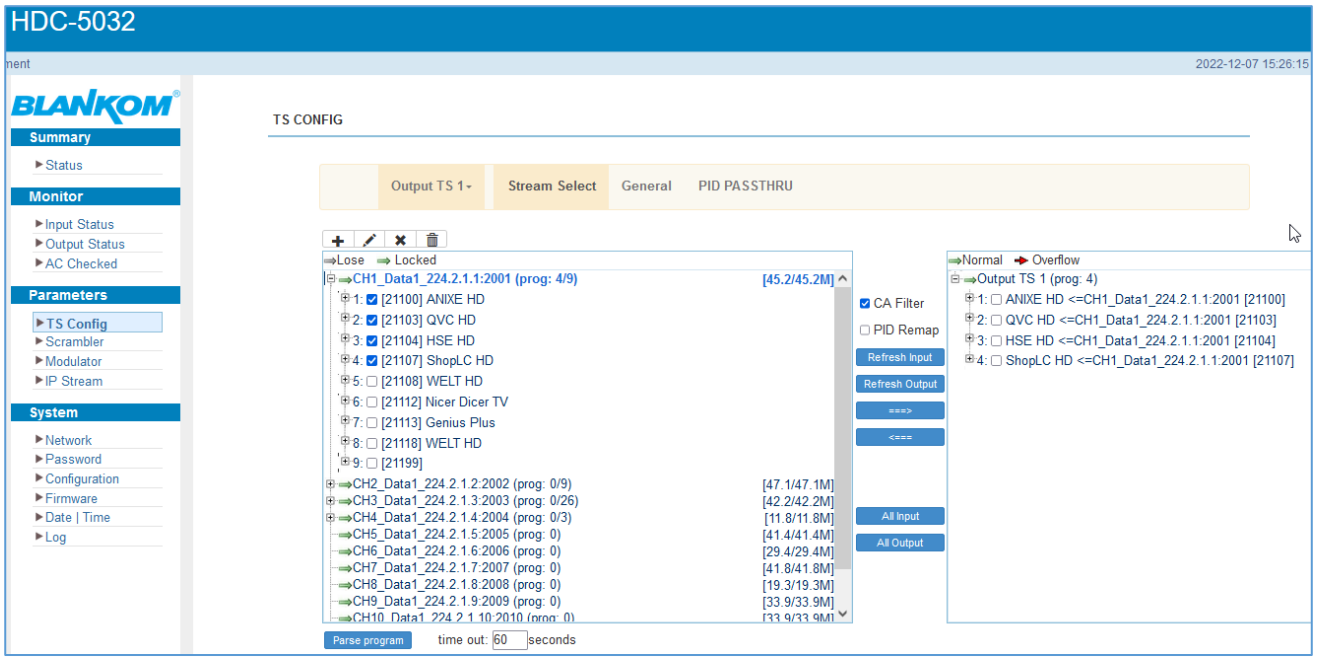
➢ PID Bypass

From the menu on up side of the web frame, selecting "PID Bypass", opens the menu to add the PIDs which need to pass through. An example will be explained later. Here EIT is PID12hex:



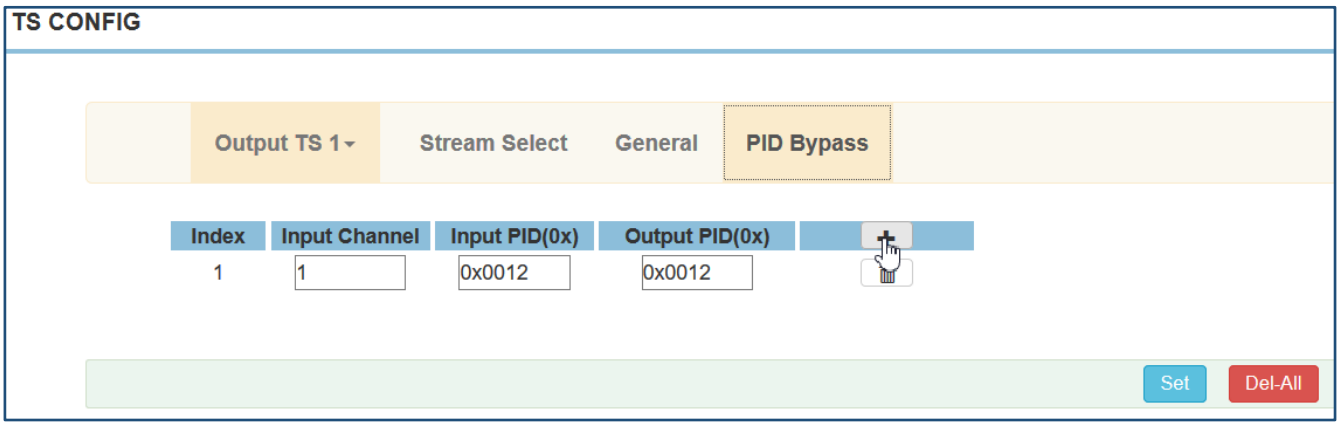
Example: Injection from an MPTS into its DVB-C output:

We are passing just 4 TV Services from the Input DVB-S2 MPTS to the Output in QAM:

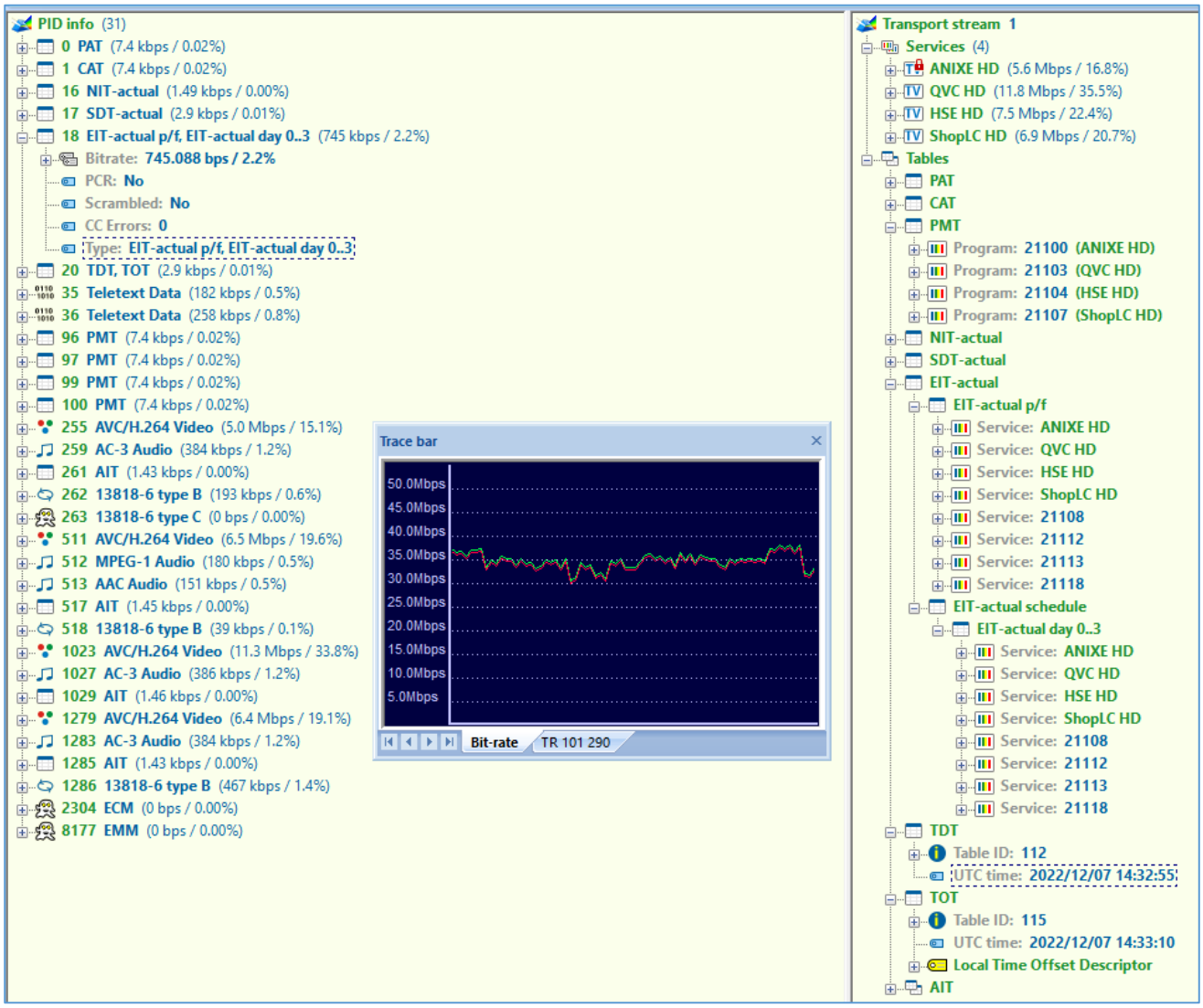


We add the PID 12hex (= EIT table for EPG) to the output. REMARK: Please do not perform a PID remap- just to be sure 😉 nothing will mismatch later. TS1 (CH1) is the Input-stream:

So, we need to say Input Channel 1 under Index 1:

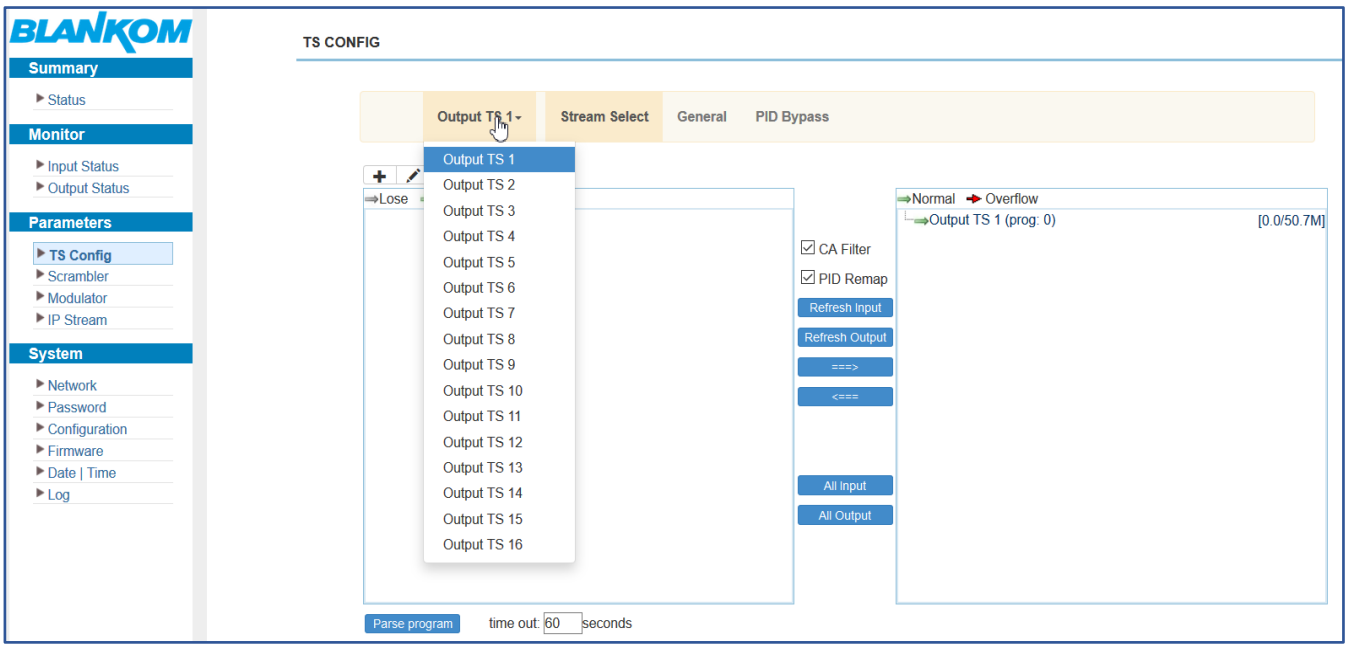


The EIT is PID 18dec or 12hex (we operate in Hexadecimal here) so entering a 12 is fair enough, the machine does 0x0012 from it. No, there is no AI inside 😉.
Then set and here we go:



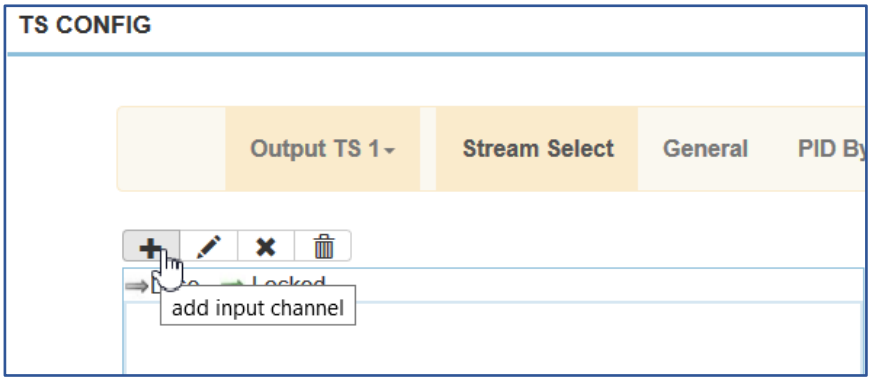
Parameters → TS Config:

Select “TS Config”, to display the menu where you can configure the output and also the IP-Input parameters in this interface. (Figure-3):

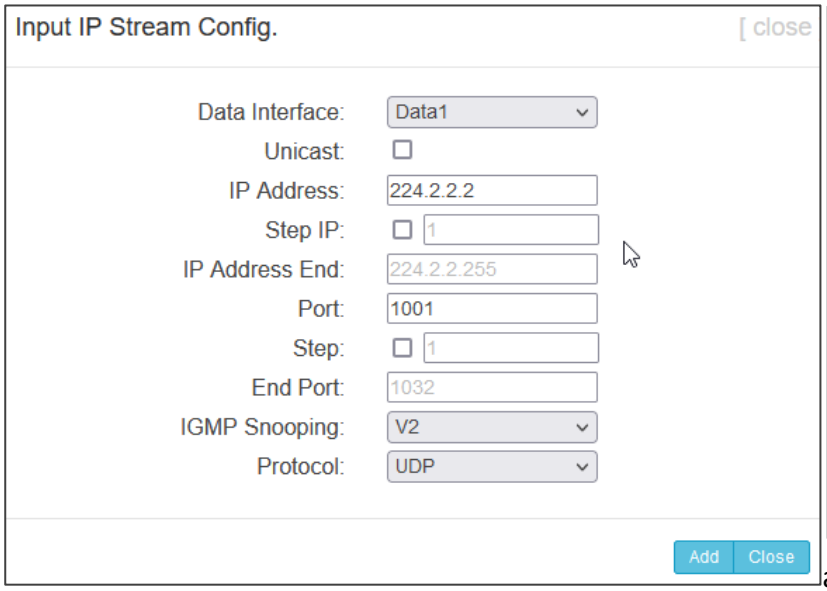


If you know, that your input streams are NOT using the same PID-numbers in their SPTS/MPTS streams Tables (DVB-PSI/SI) you can uncheck PID-remapping which is for avoiding conflicts.
(Like as you are using different devices in a network with same IP addresses = Conflict)
If you know you are not having/passing CA-PIDs in your input streams, you can check CA-Filter.
But if you want to save bitrates and have unnecessary EMM/ECM-PIDs in your source streams, you can filter them out.

Add Input by pressing the '+':



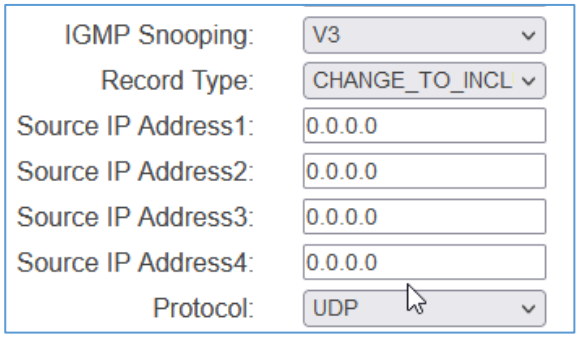
a popup pops up ;-):

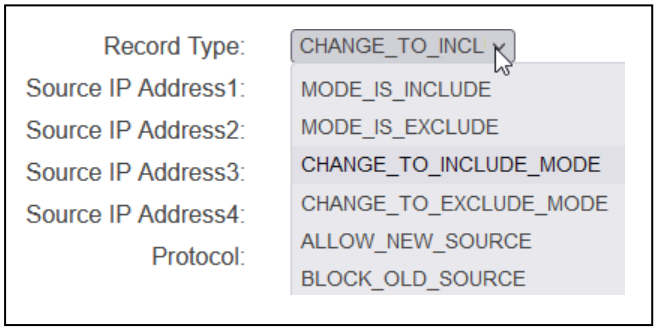


3 Inputs to select: DATA front, DATA1/2. Unicast: Within here means for UDP/RTP inputs only, no "TCP" based input: If your source is UDP unicast transmitting to DATA1 (192.168.1.136), then the Source output address should be like this format: udp://192.168.1.136:xxxx (192.168.1.136 is DATA1 interface IP, xxxx is the port number).

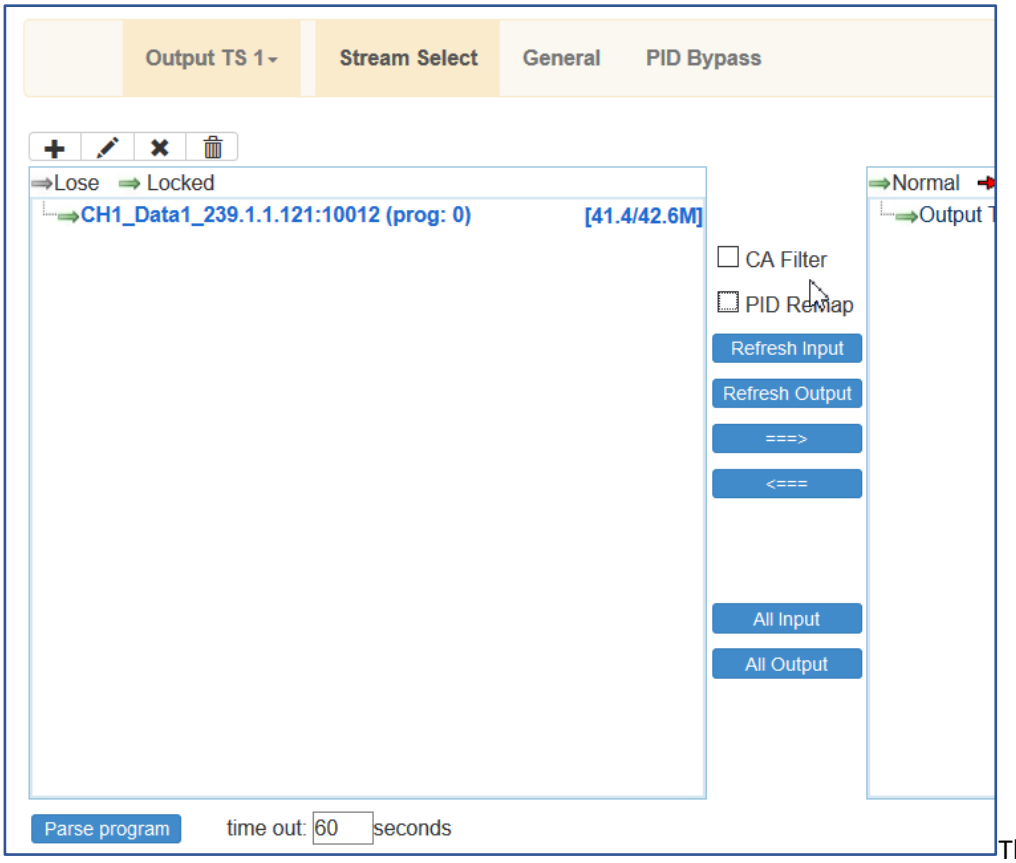
add it and after a few sec.

IGMP V3 'snooping' (is not equal full IGMP support like in a L3 Switch) has a lot of more options:



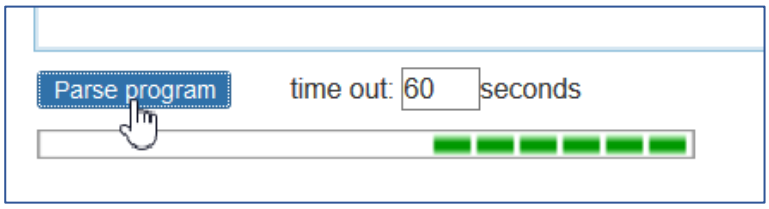


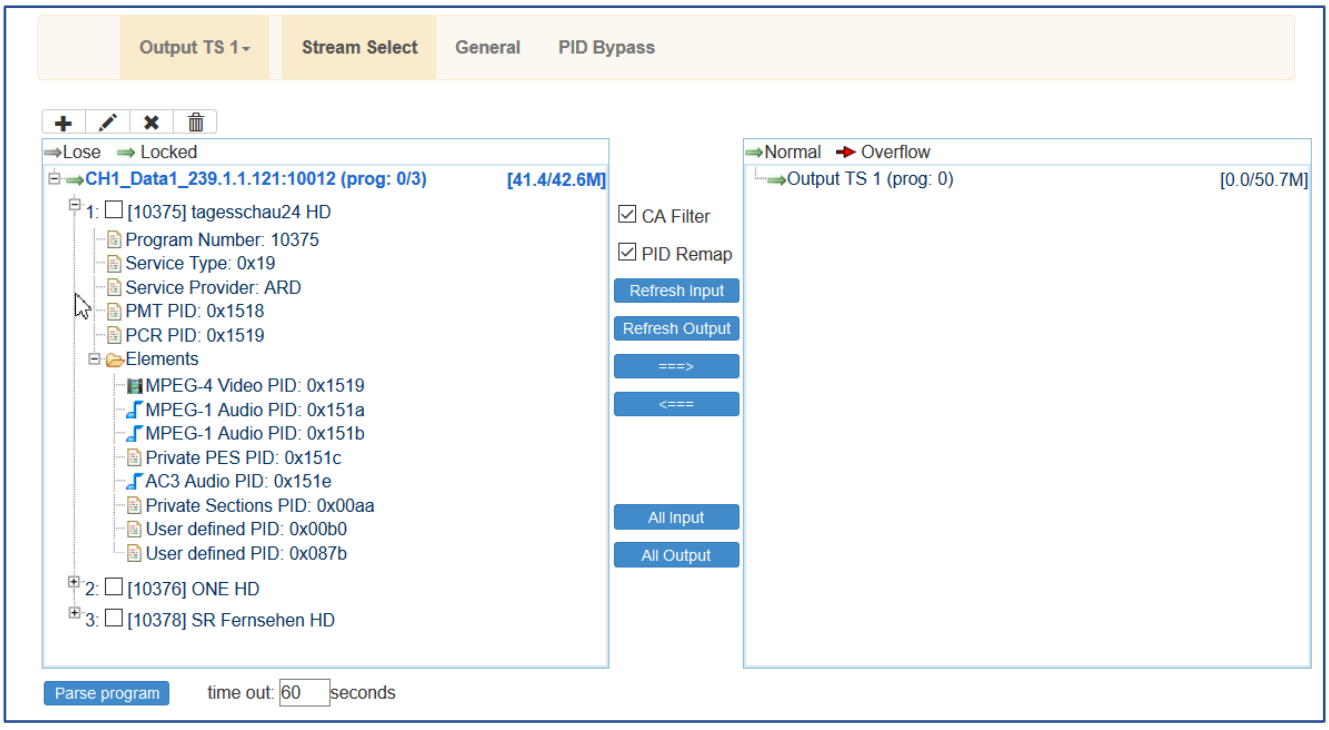
However, that's for experts 😉



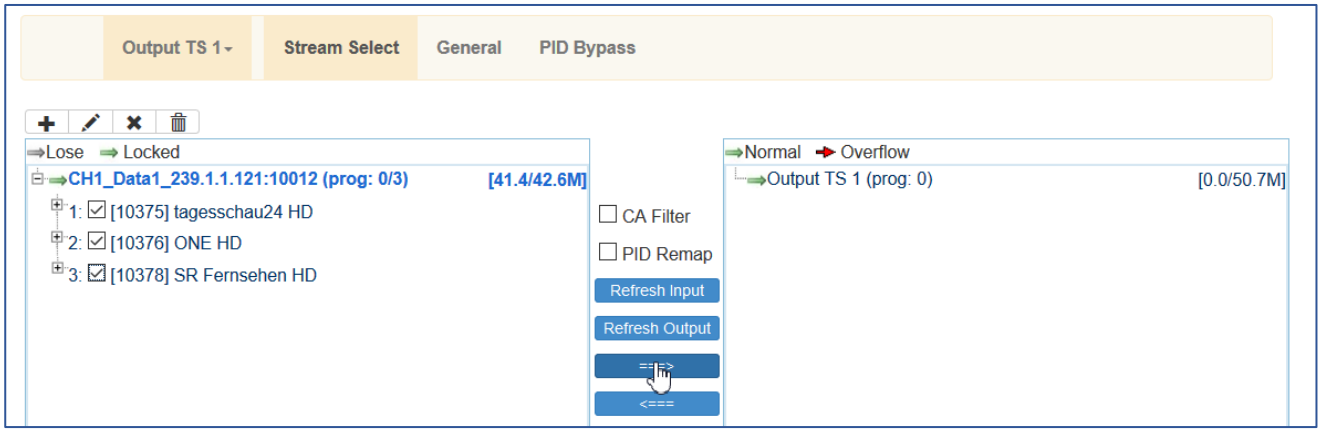
The data rate is shown

And **PARSE** the content to see the Services containing in that stream:



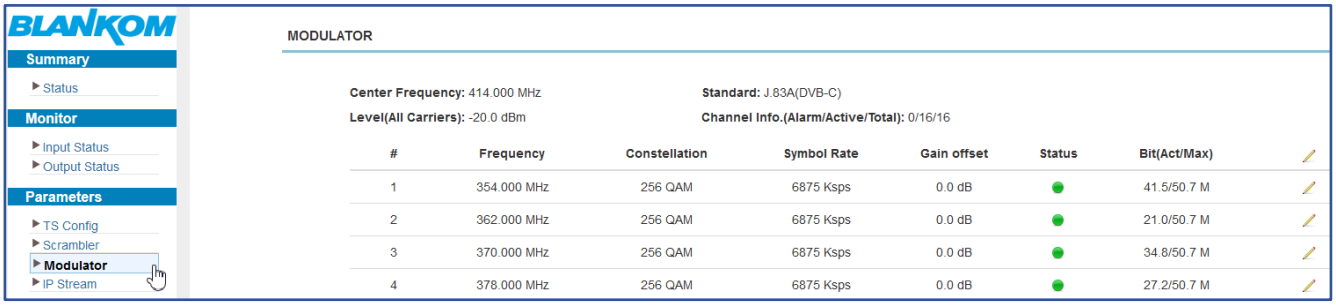


Uncheck PID remap and CA filter to keep the original stream for pass through mode.

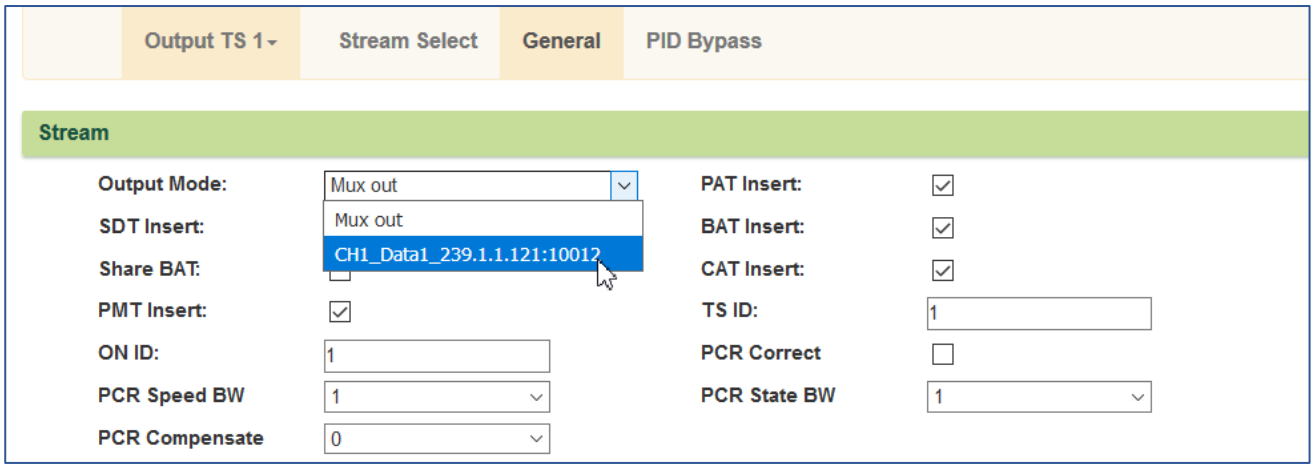


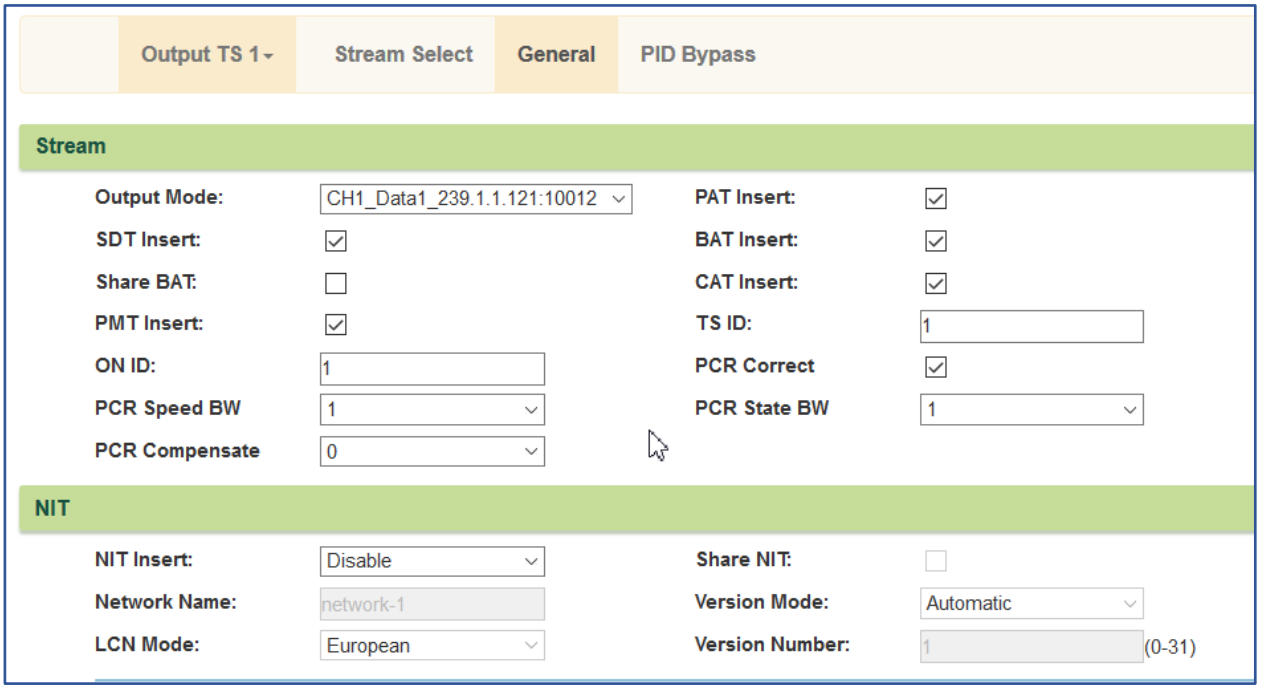
Remark: The Output max Data rate depends on the modulator output settings of this QAM channel: 256QAM, SR=7000 = > 51Mb/s.

These settings can be well prepared before you configure the Input-TS in the Modulator section to avoid TS overflows because the modulator outputs were set to low values like 64QAM and low SR.



After we have configured an Input STREAM, change to GENERAL first to stream the complete TS to the first output if you simply want to pass it w/o any modification to the TS-QAM output:

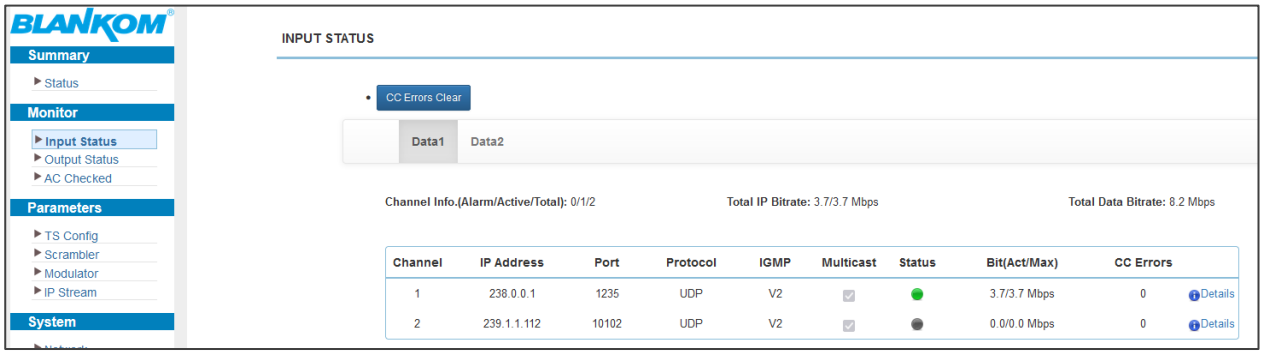




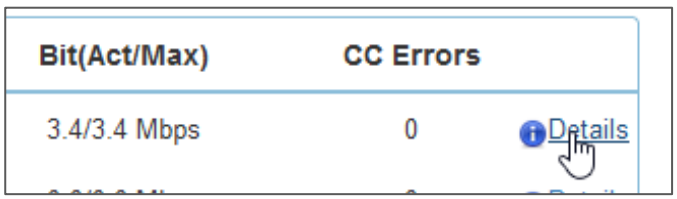
This would pass the whole content to the output (QAM + IP MPTS out). TSID and ONID should be already well pre-prepared and set according to your needs in the Master-Headend-Streamer device.

MONITOR:

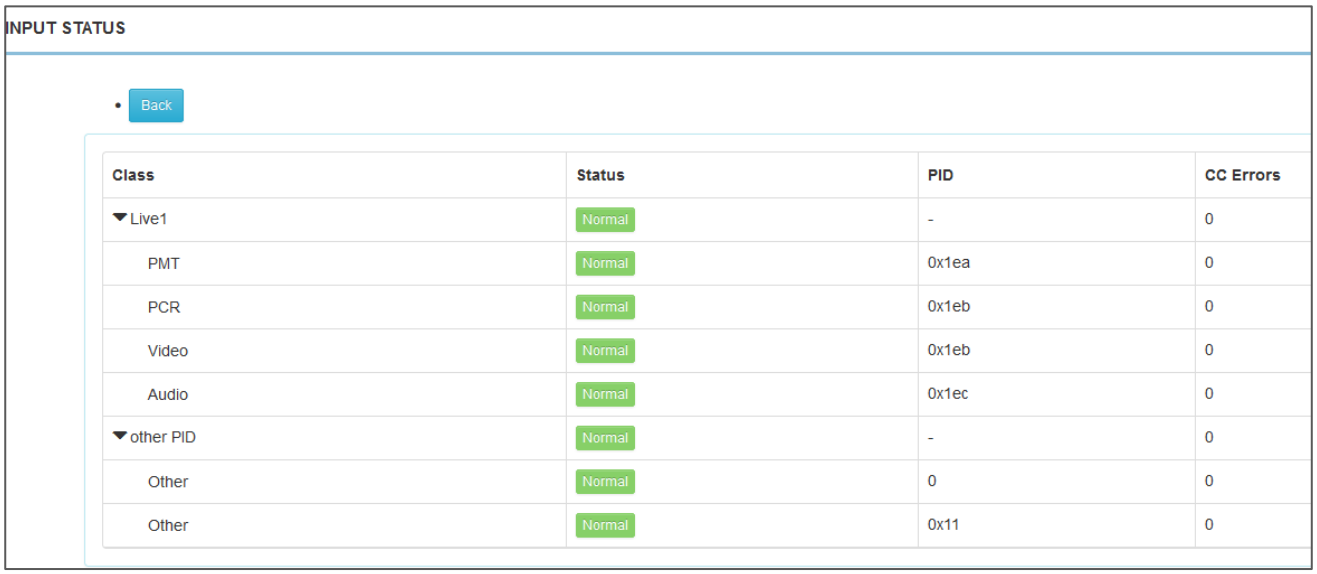
The Input STATUS will show the overview about the incoming streams:



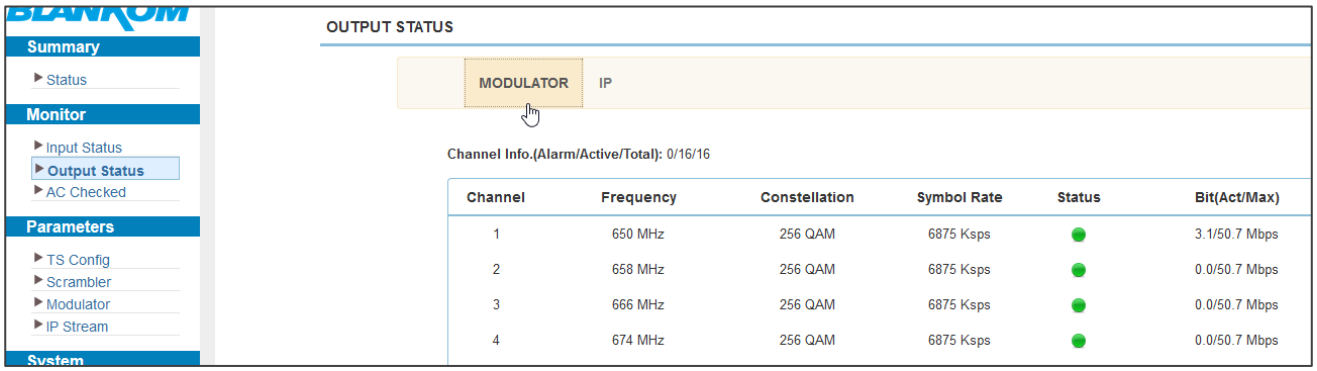
You can clear the CC errors from the input – which is a quality sign…

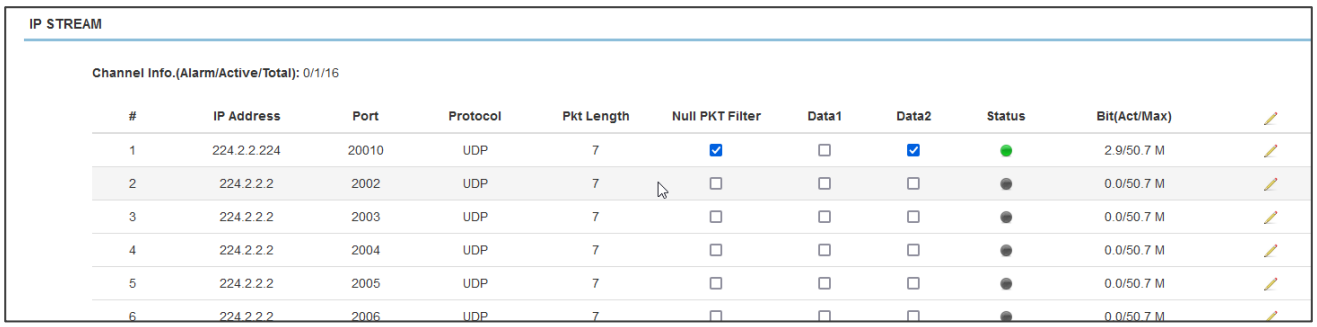


Details will show you content information's:



While the output status shows the 2 different ones: Modulator and IP (as copy of the TS 1-16* Multiplexes)



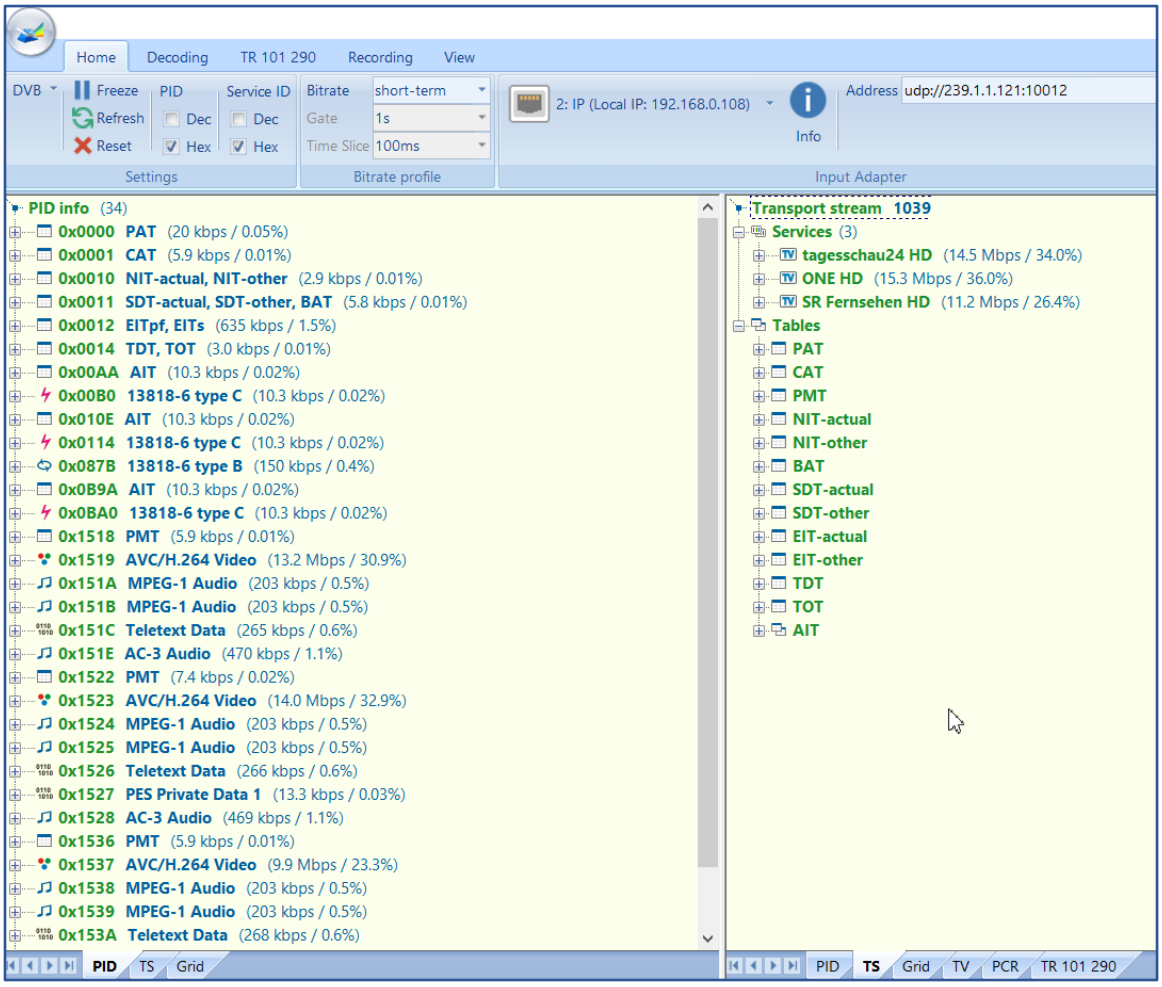


The advantage of pass-through mode is simple to understand:

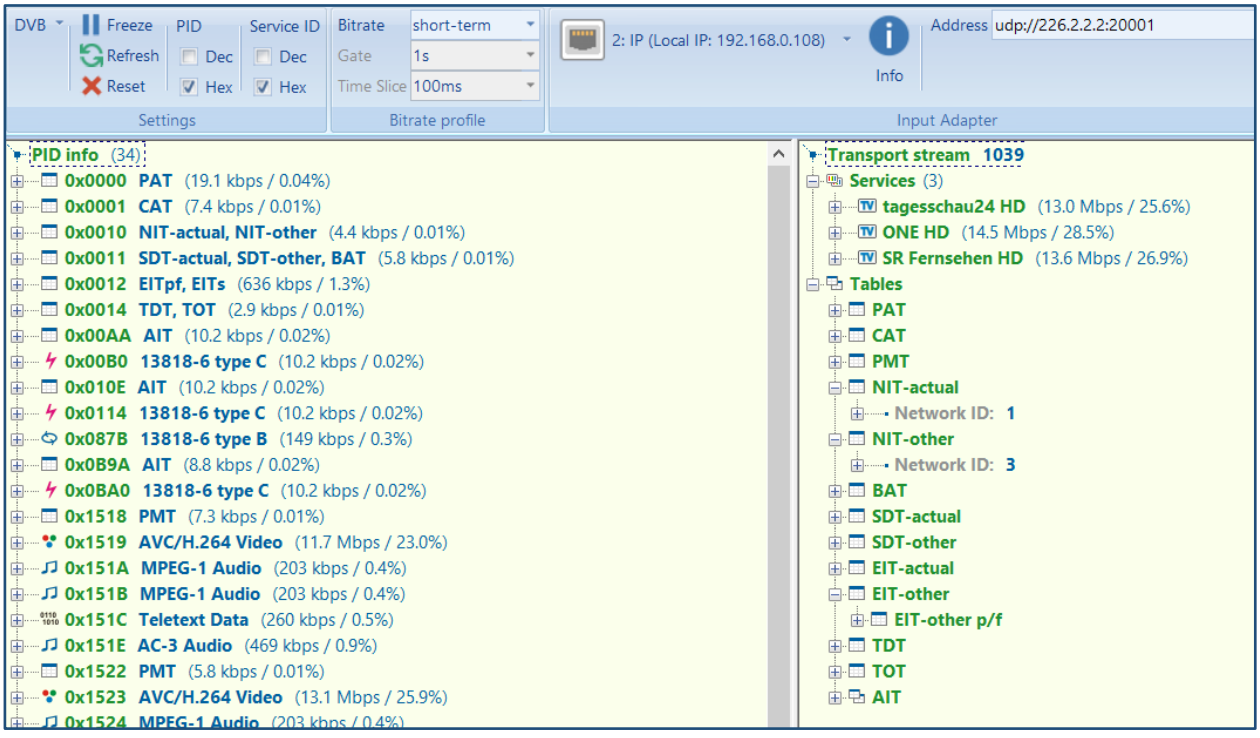
- The EPG information will be kept in the TS. The TDT/TOT and other tables will be passed as well.
- The NIT will be passed as well (if containing) but: It might be a wrong one from a SAT-frequency which is of course not valid for a cable TV network.
  - "Other" Tables might also not been valid anymore because the stream does not harmonize with the original source PMT/PAT/SDT/… The BAT might not be a good idea to pass

This can and should be controlled by an analyser like we are selling as well: DekTec DTU 245 or similar…:
and next…
EIT is missing.
We can add it manually see also description below…

We compare IN- and OUTput streams as an example now:



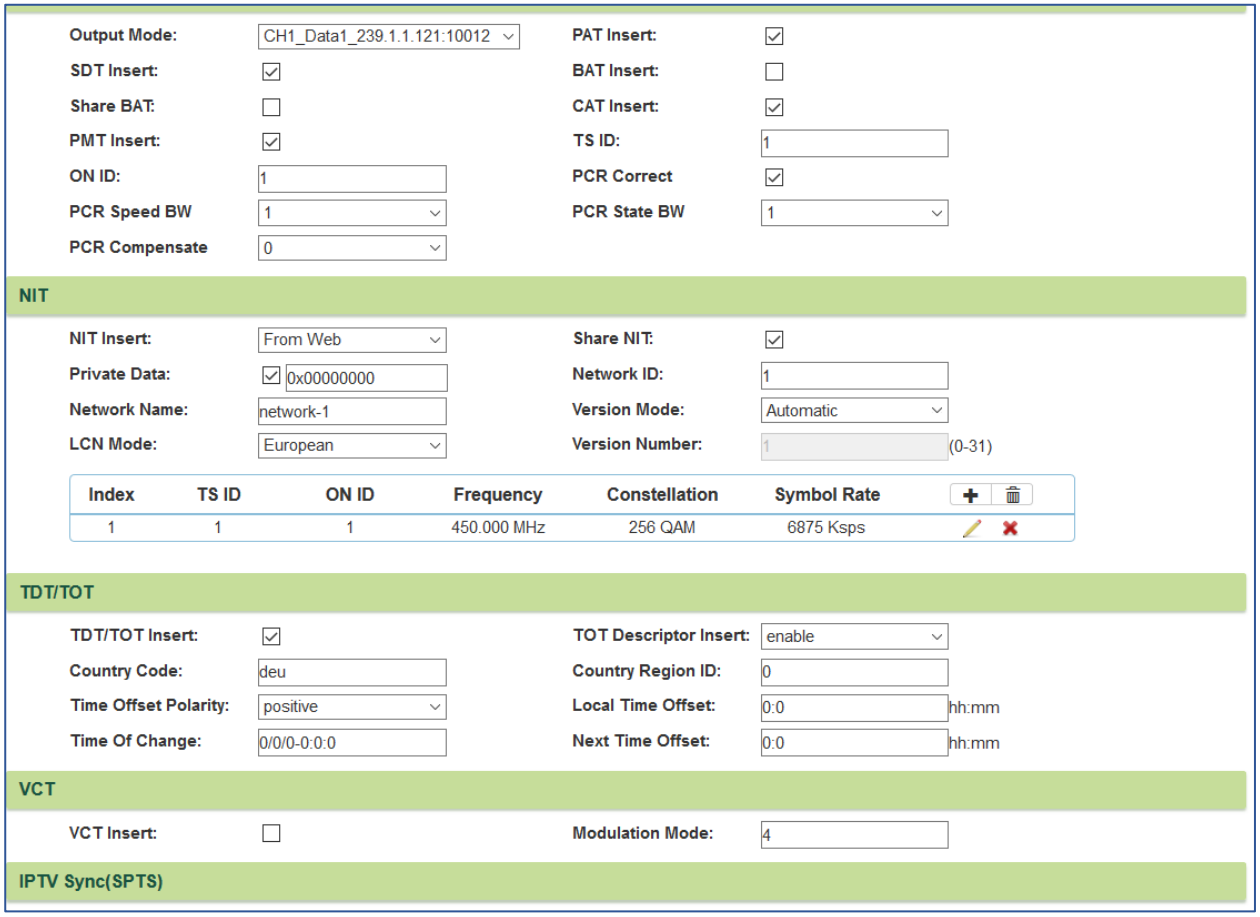
OUT:



We partly must filter out the invalid NIT but this is not possible when full pass through is selected.

Also, EIT 'others' should be erased as well as the invalid BAT and CAT…

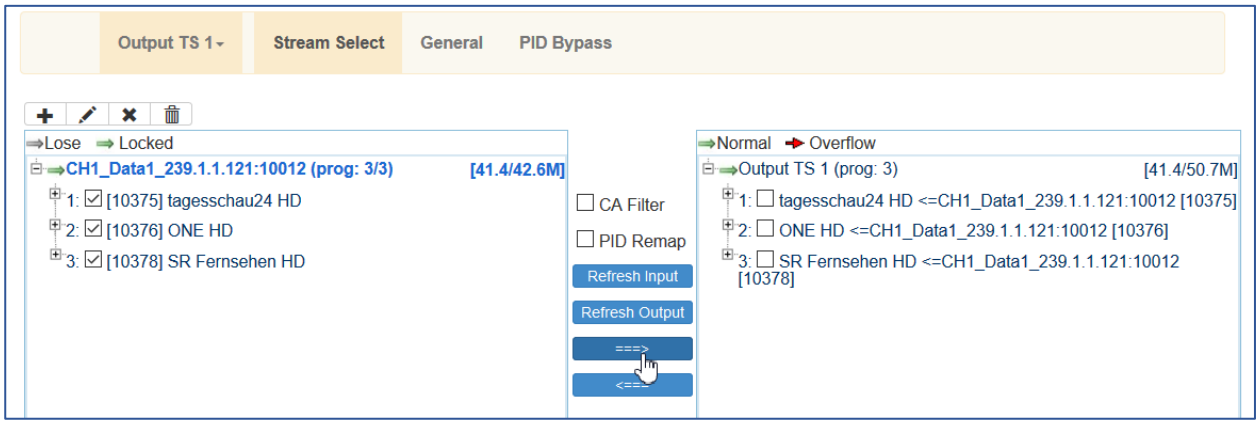
Even trying to manually insert an own designed WEB-NIT:



Doesn't do anything when we operate in the pass through mode.

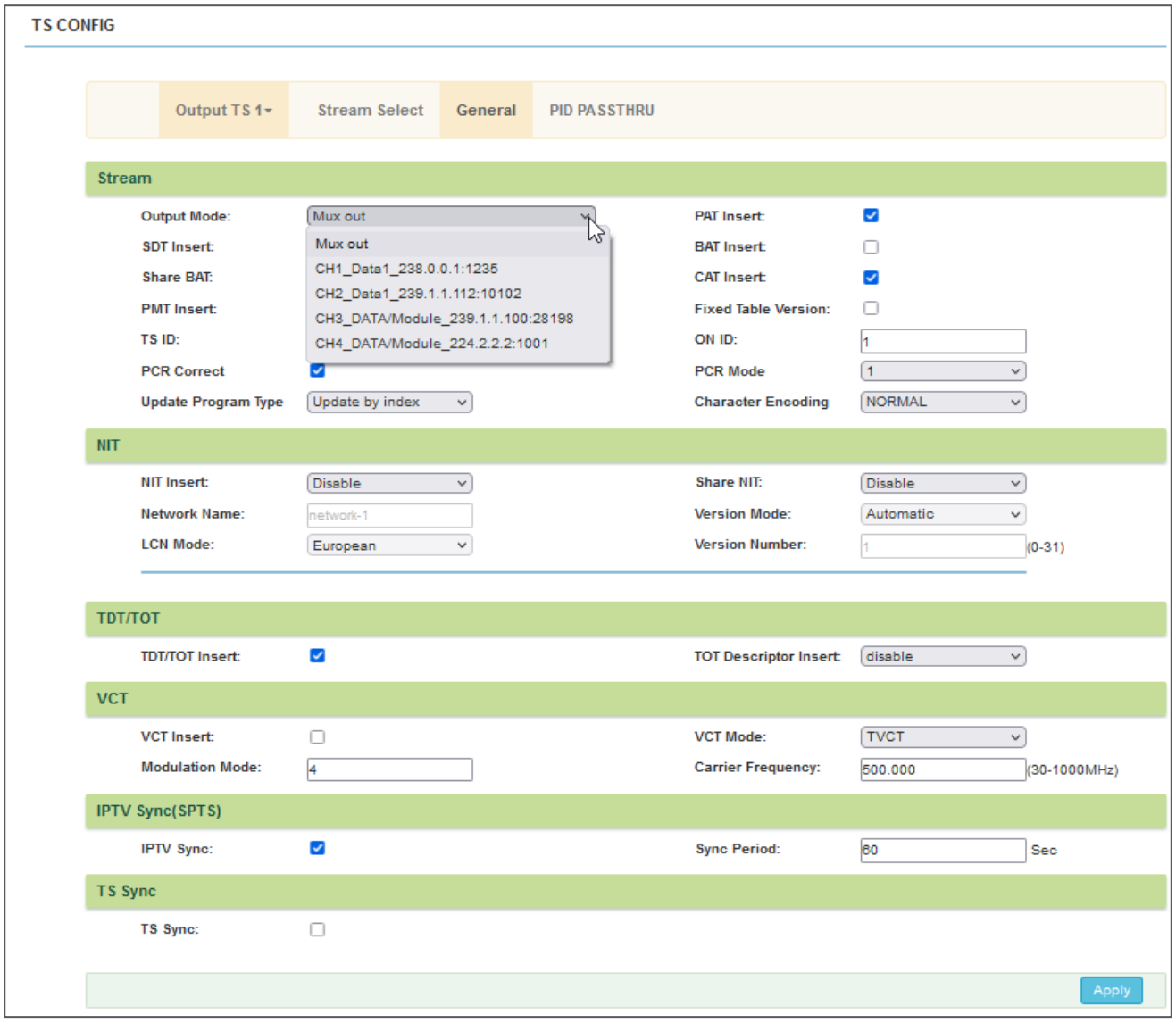
So the pass through is only worth for Master- Slave HE-designs like shown on page 2 : To be used in SUB Headends.

Even manually add the services does not change anything:

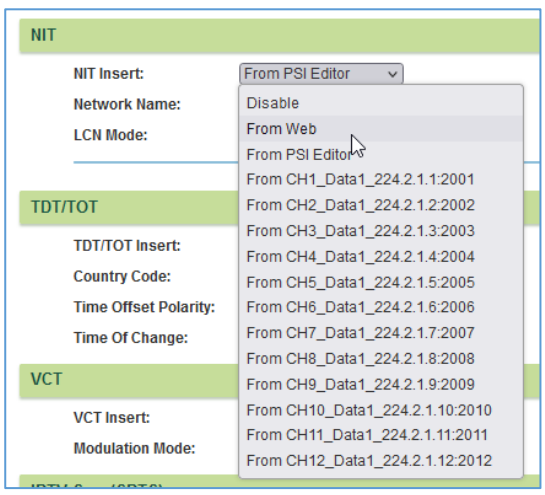


Multiplex-Mode

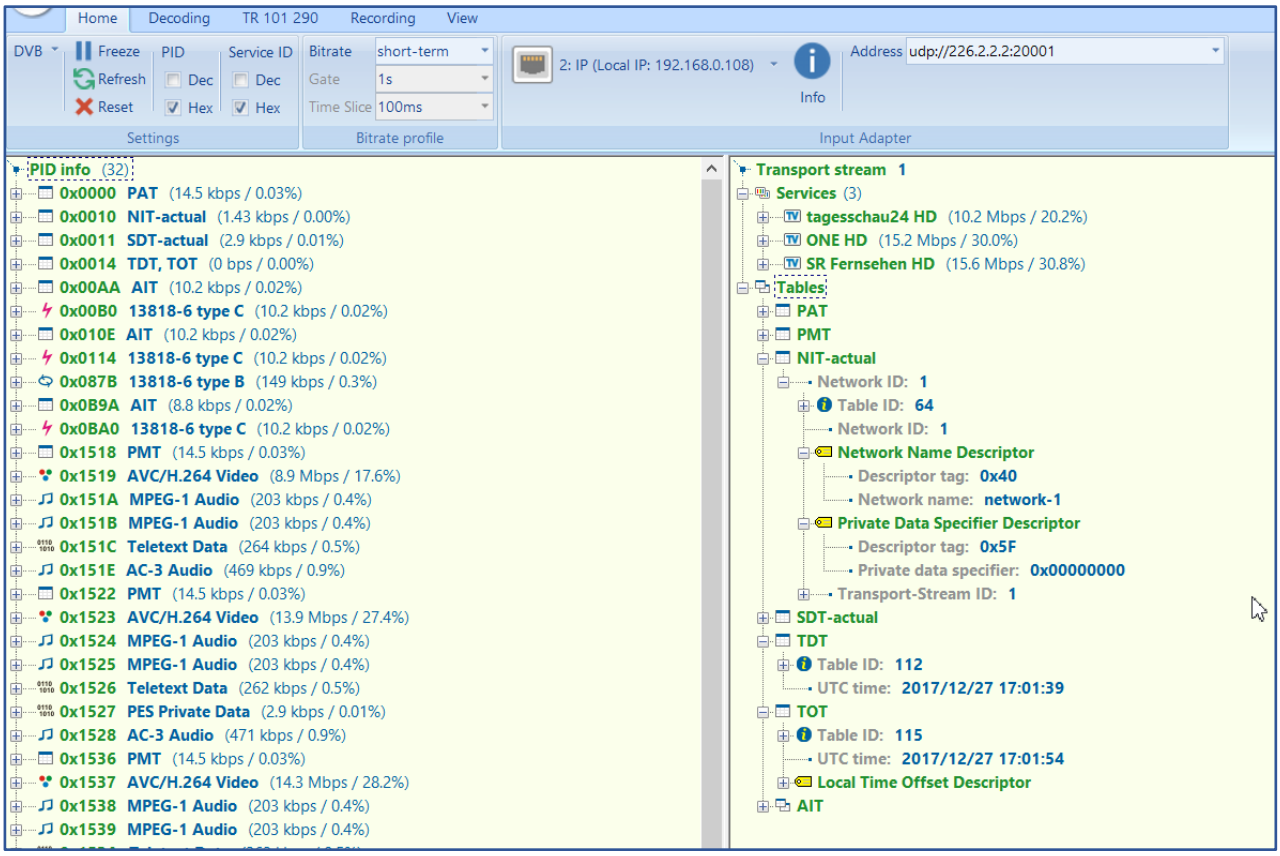
So, we really **need to go for MUX**: multiplex, and add relevant PIDs:



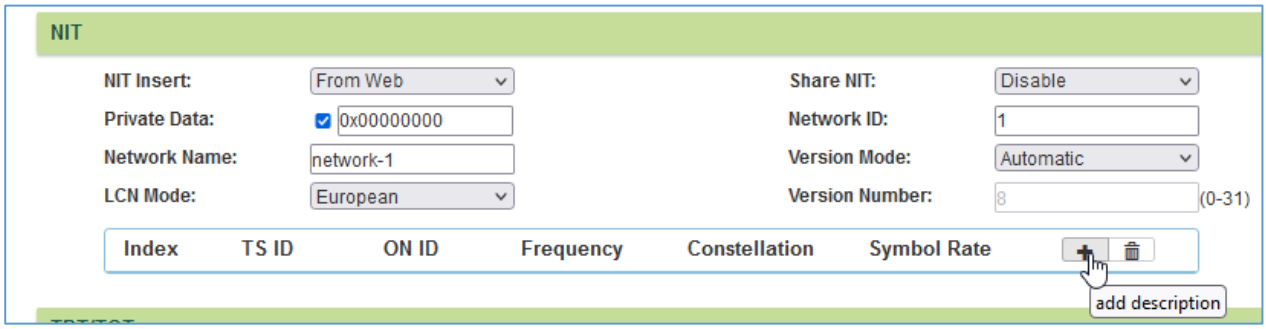
The NIT should be filtered out to the QAMs by default, because if the source is a Stream TS from original might be a Satellite Transponder, the NIT is not valid for a CATV Network.
You need to create your new NIT:

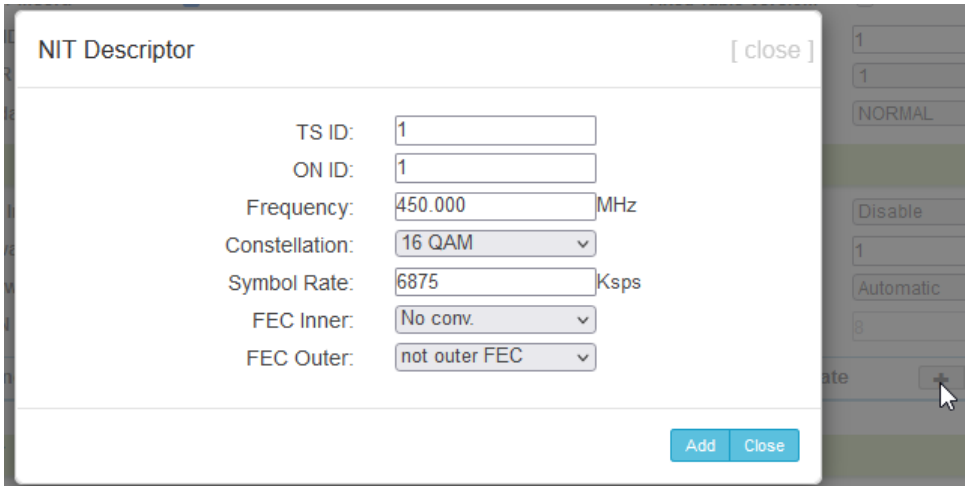


Either do not insert any NIT, use this Web-IF to create a new or pass from the Input streams (not recommended).
Also the external PSI editor … needs a file and than insert from external… we do not support that …

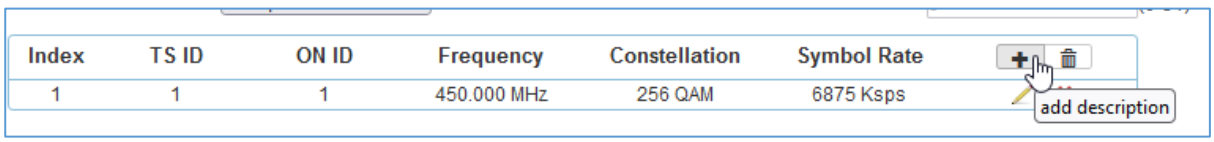


We see, the empty NIT has been added from our settings as well as TDT/TOT.
But it needs to be filled with the local DATA of each QAM-Frequency you are pushing out.

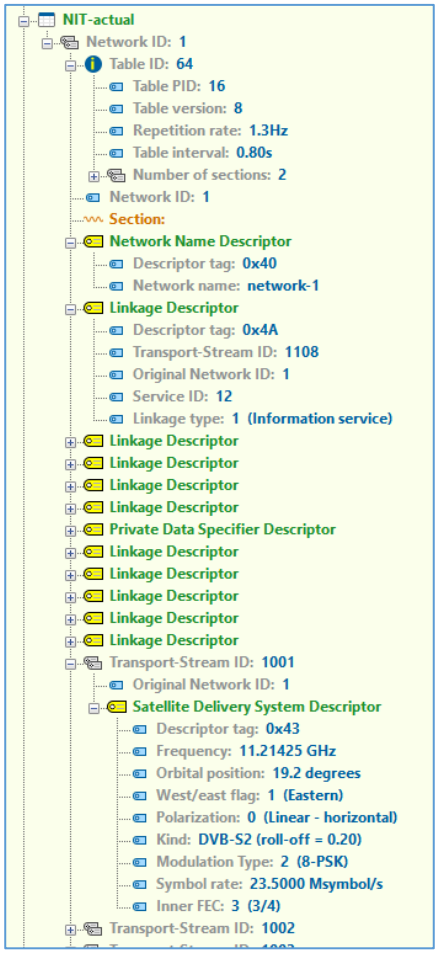




Of course, it's work …



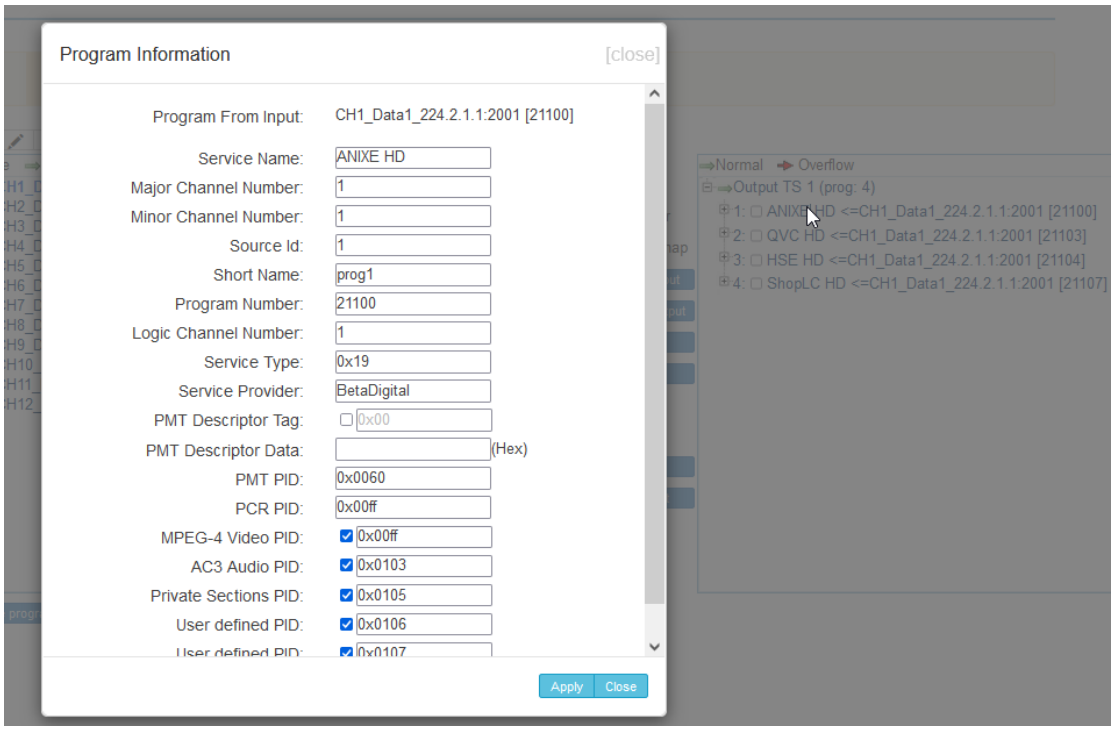
Example if you pass the SAT-NIT from the input CH1 which is wrong (because from SAT):



so better don't do that and create an own (See above).

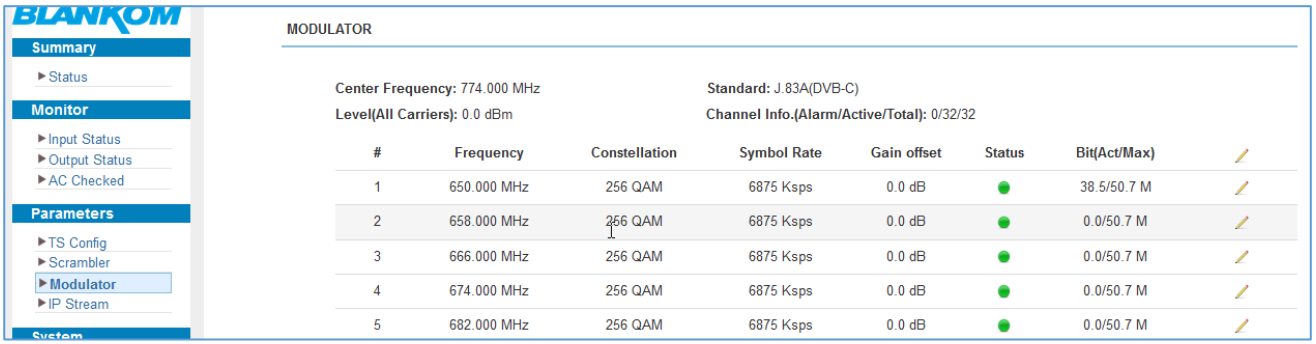
Maybe worth to mention:

The Logical channel numbers for each TV/Radio Channel for the STB's or TV sets as DVB-C receivers in the CATV network to sort their Channel list – order as a pre-setup from the TS is done in the OUT-TS muxer:

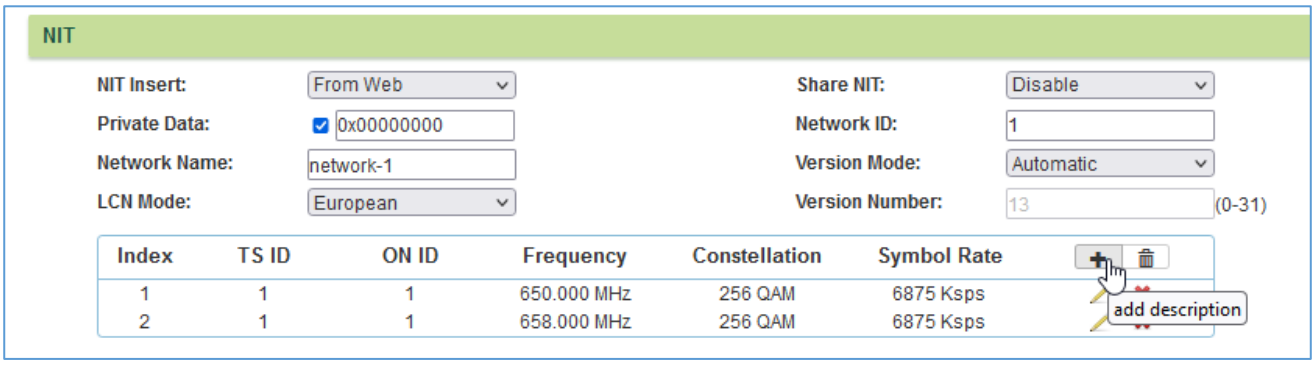


Which is related to the ATSC US standard maybe. So we might need to change the software.

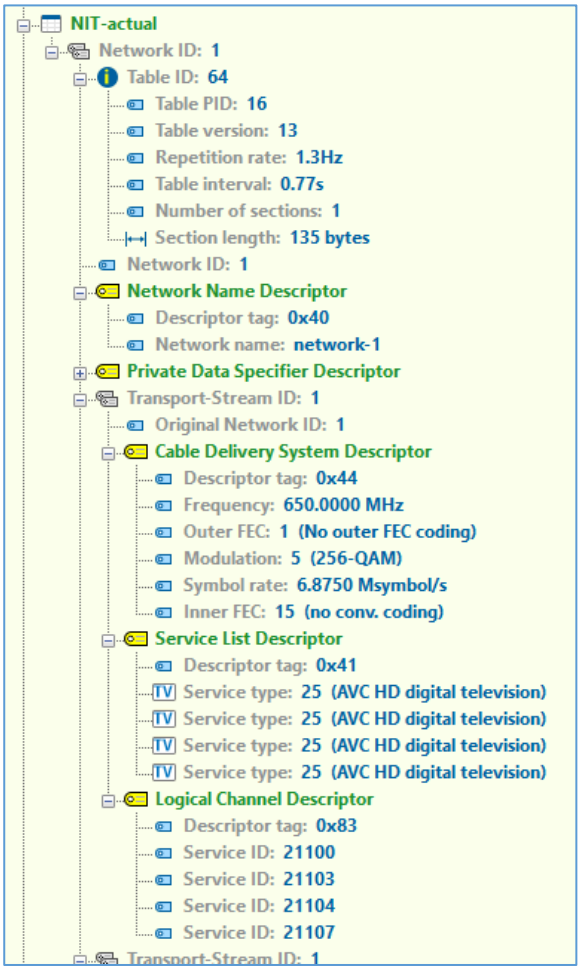
So, we should be careful adding the real channels into the NIT:
From here:

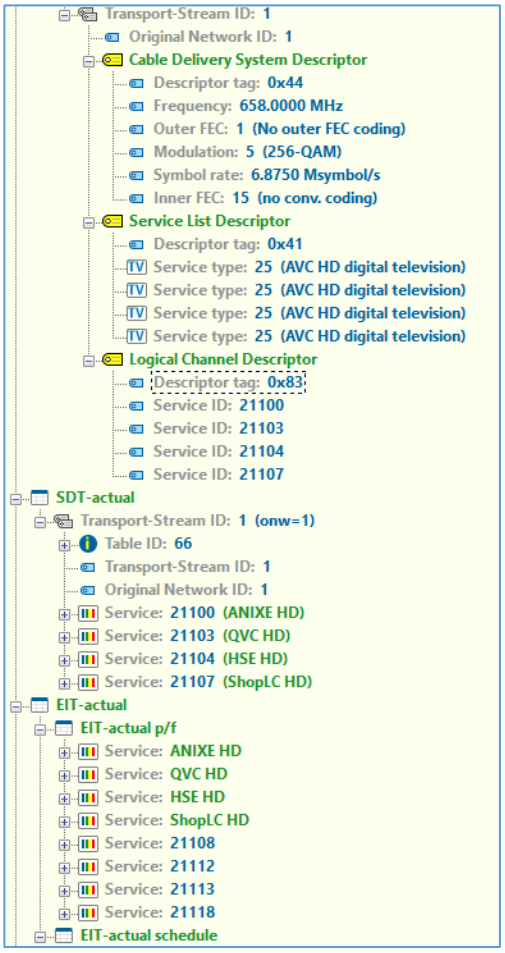


To:



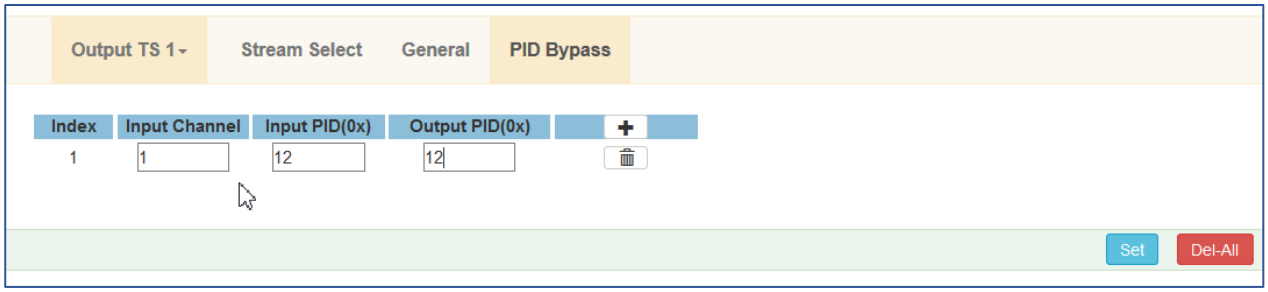
After APPLY button:





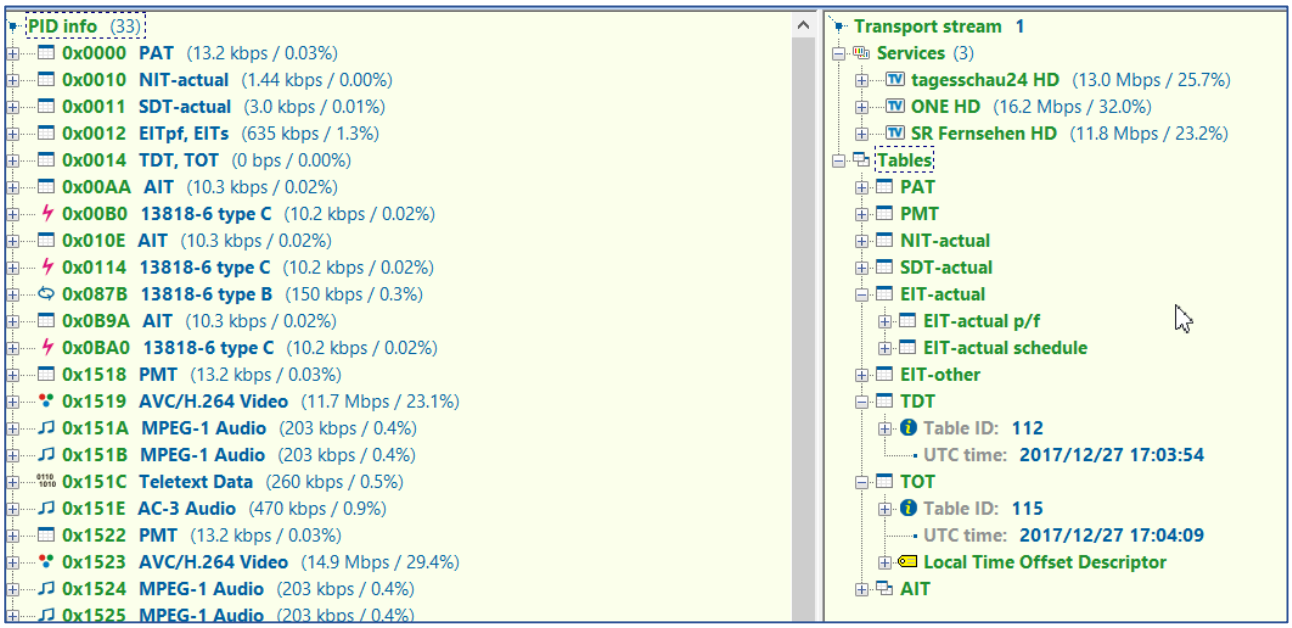
It's always a good Idea to SAFE your config…

Back to EIT:

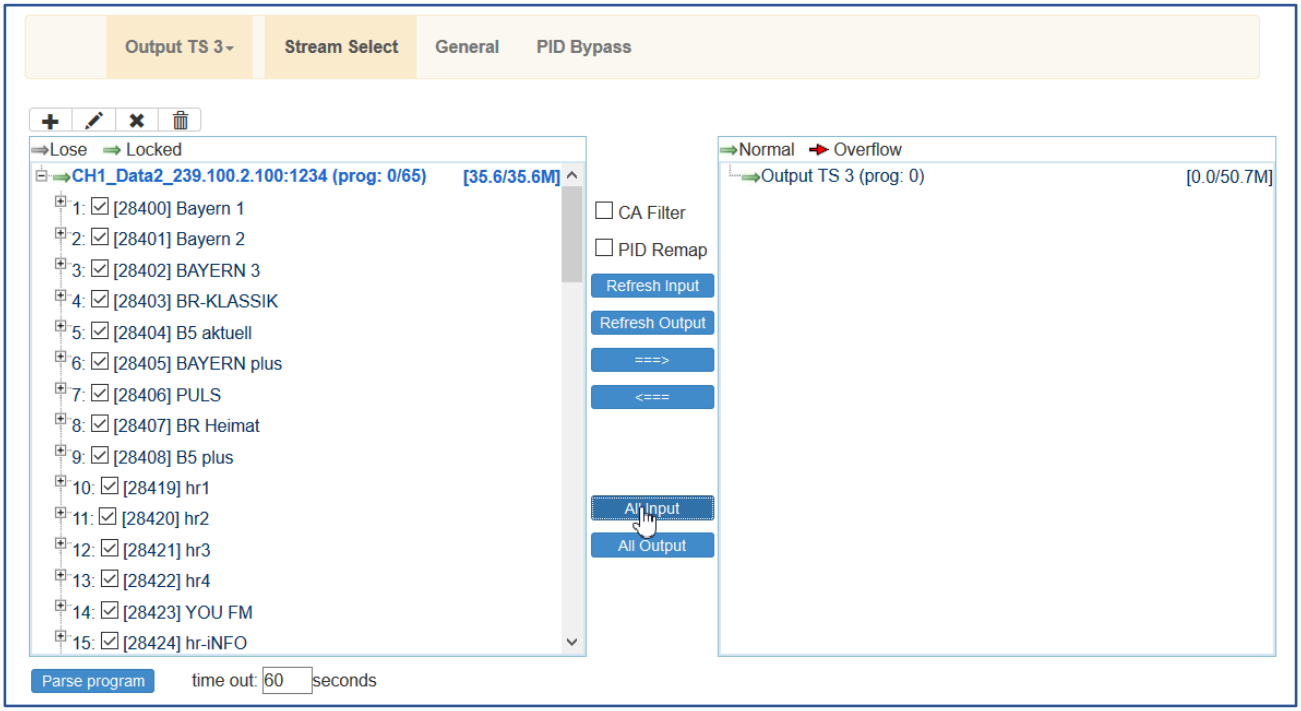


And the EIT is here BUT if not processed… also, the EIT ***Other*** table which probably will not be conform with our ***other*** channel's which we are creating here and do not take from SAT or from the IP.

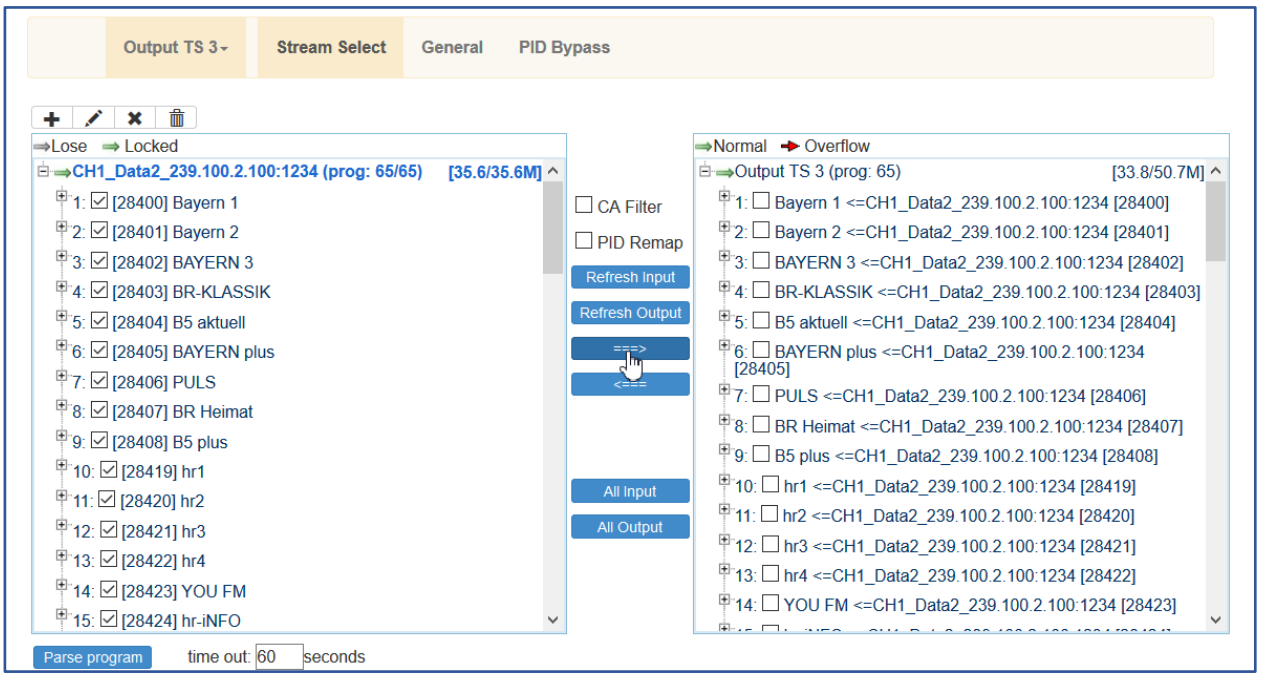
Anyway, the SID's of our 3 TV Services hasn't changed, so the EIT actual p/f and schedule should be valid.



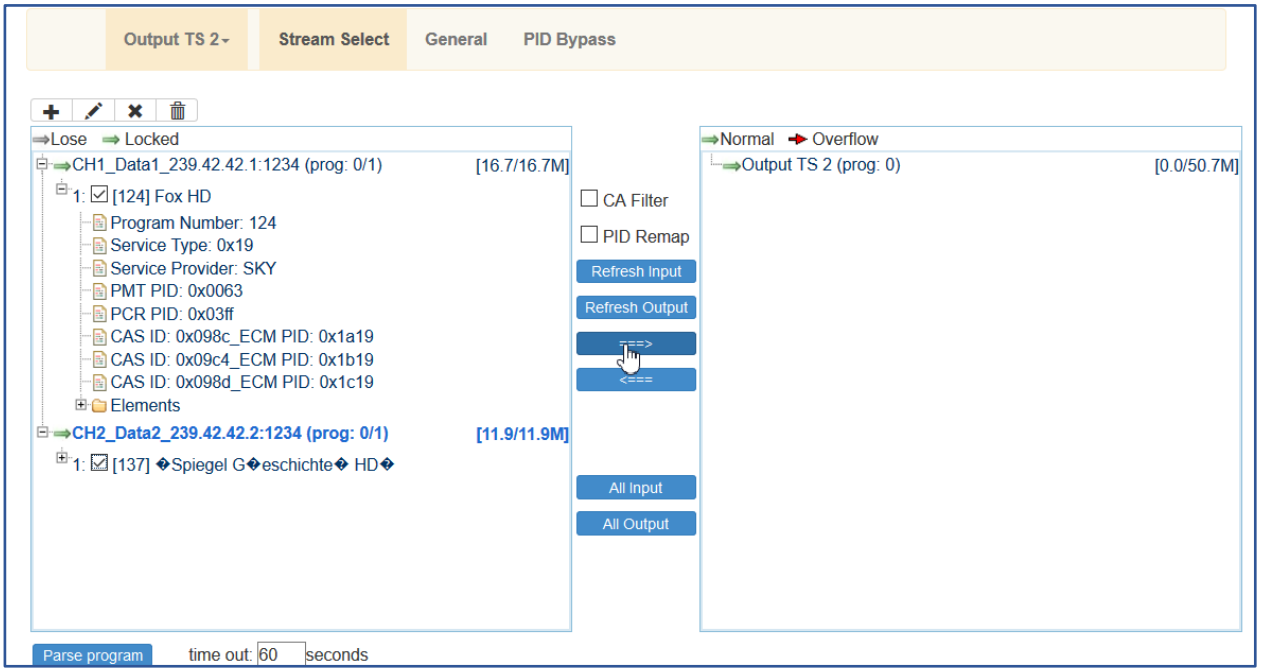
So we add streams from the network for every TS like here and adding all services can be done by pressing ALL Input button:



Then transfer it to the output window right:

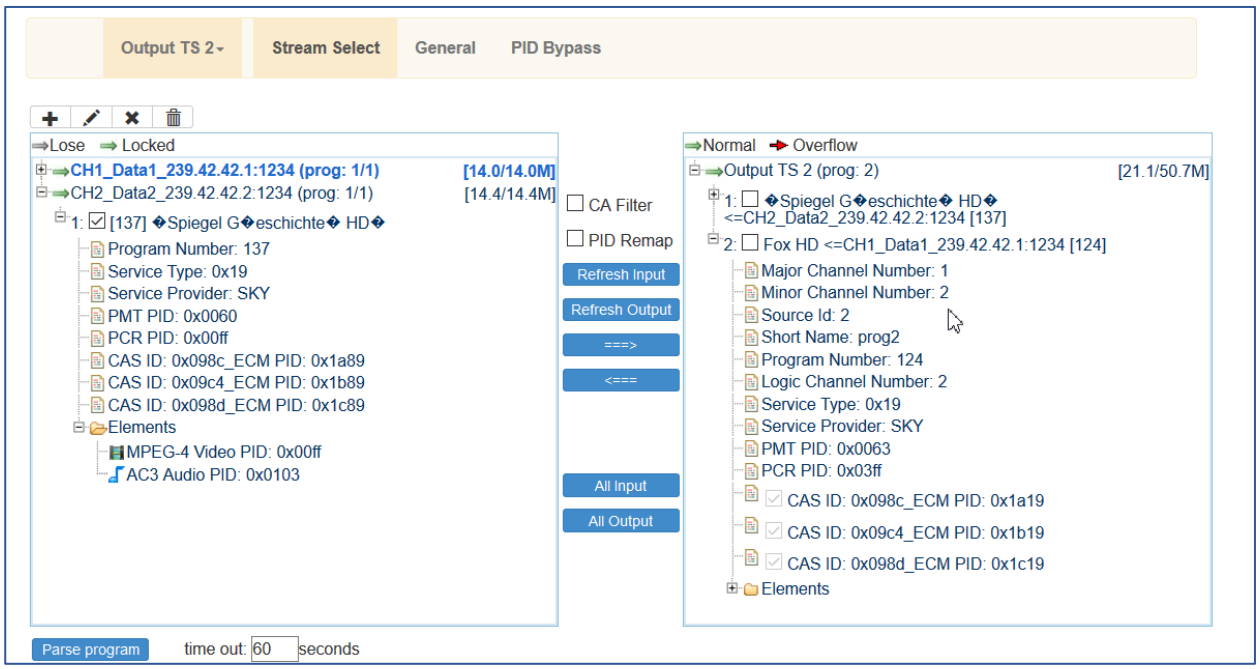


Single streams can be added to a TS like:

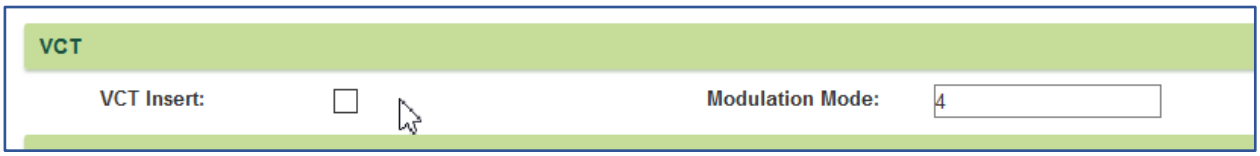


REMARK:

Single streams often do not contain EIT / EPG PID's -> So an EIT passing isn't possible anyway. For mux operation EIT cannot be processed but passed only from a selected Input stream.

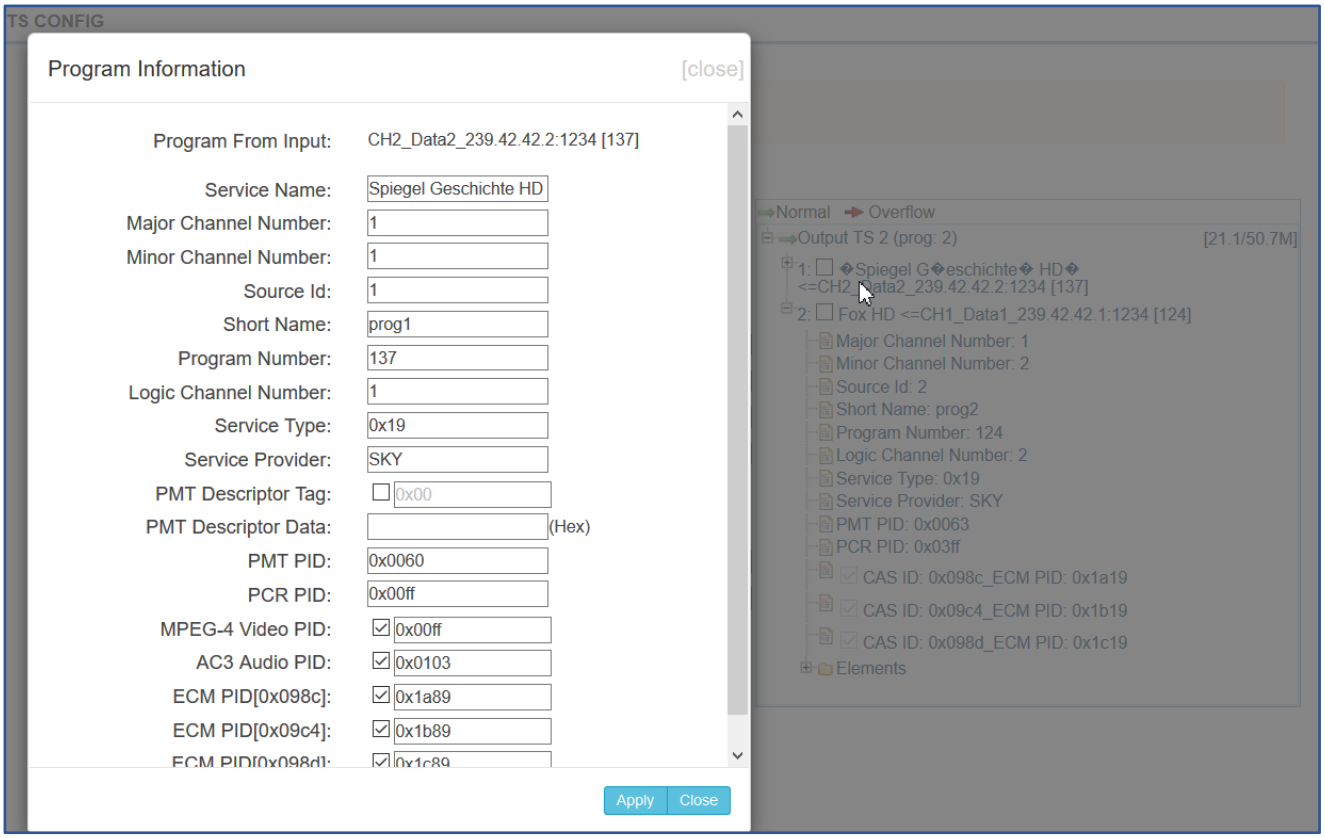


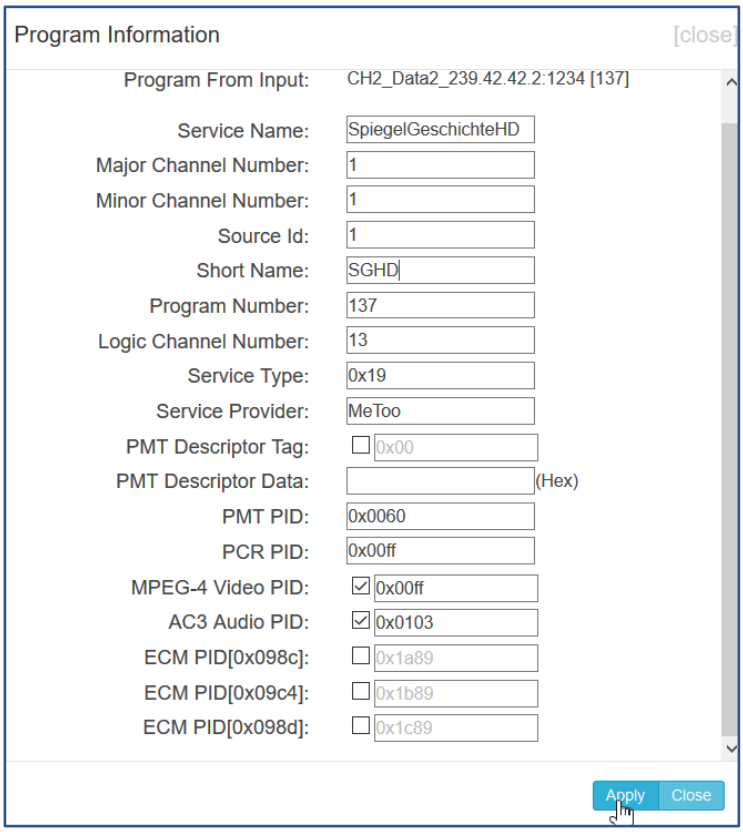
Mayor channel number and minor channel numbers are used in the ***ATSC DVB-C Annex B ITU-J*** standard and should be ignored by the 'normal DVB Annex A/C' receivers. Same for the 'General' item VCT:



LCN's in the NIT and other values should be set after all content and all muxes/QAM channels have been already configured.

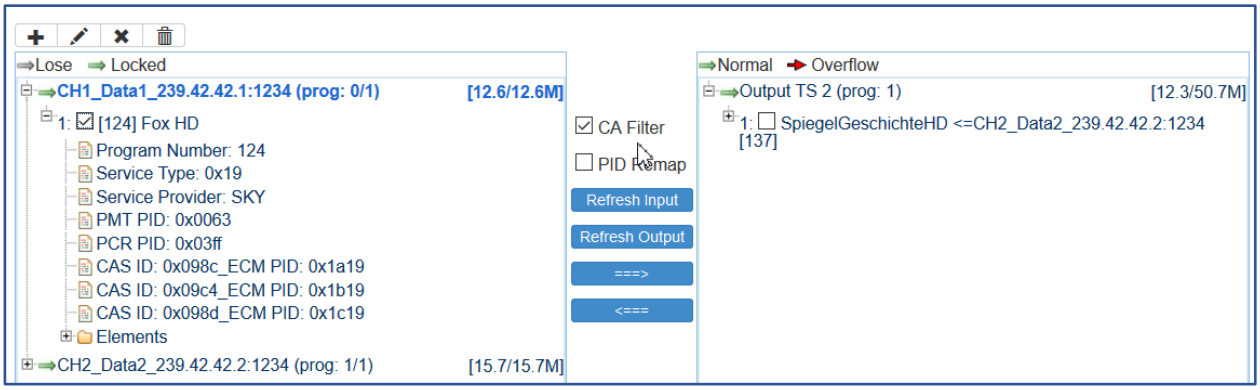
After selecting and clicking on a service on the right side you can modify its single table parts:



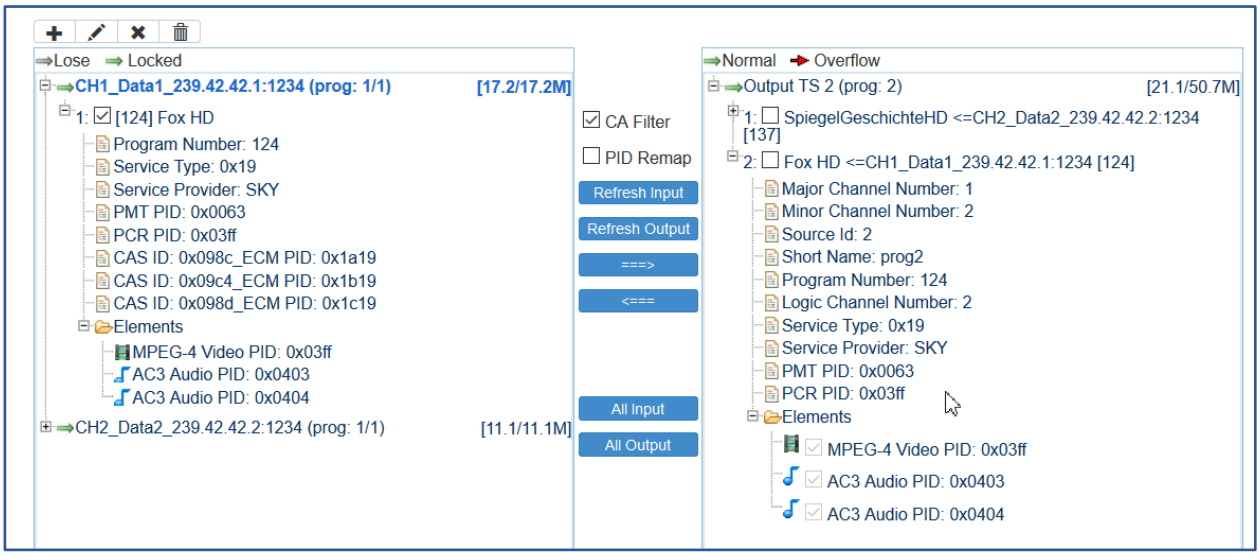


Minor & Mayor channel Numbers are an extension in the ATSC tables and not relevant for normal DVB-operating – so will be ignored.
Service name and other values can be simply been edited and finally taken by pressing Apply;
Unnecessary ECM-PID's can be unchecked here as well

Using the CA Filter will remove ECM PID's as well:

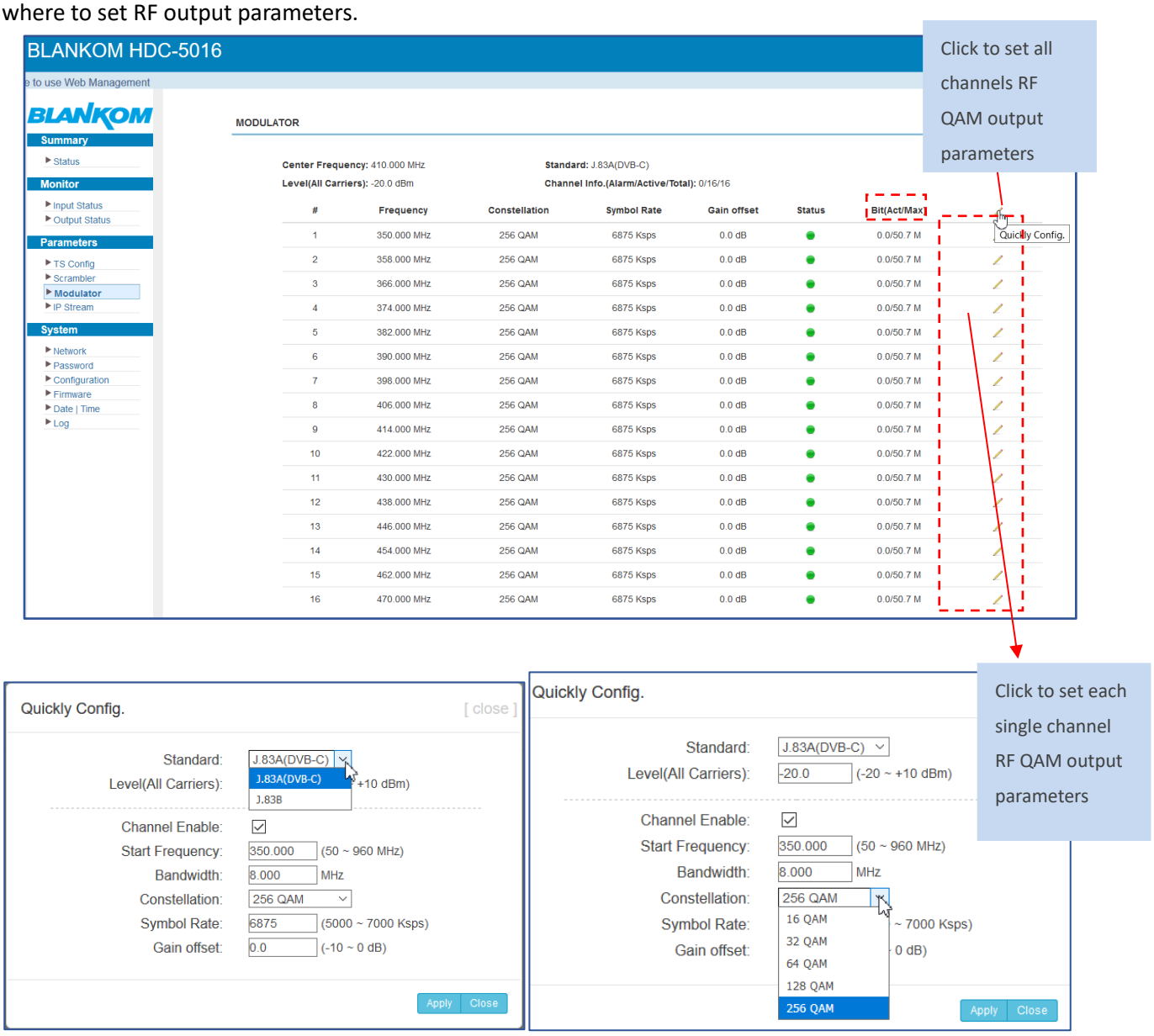


Yes:



Parameters → Modulator:

From the menu on left side of the webpage, clicking 'Modulator', it will display the interface as Figure-11 where to set RF output parameters.



Set QAM Mode (Annex A/C = Normal DVB, Annex B = US Norm), mode 16…256 QAM and other values. This Quick setup configures adjacent channel from a start frequency.
To individually configure the other 63 channels set them accordingly in every single config mode.

The CENELEC Channel-Plan would be very helpful.

See following hints.
Consider the center/middle frequencies for setup the QAM channels please.

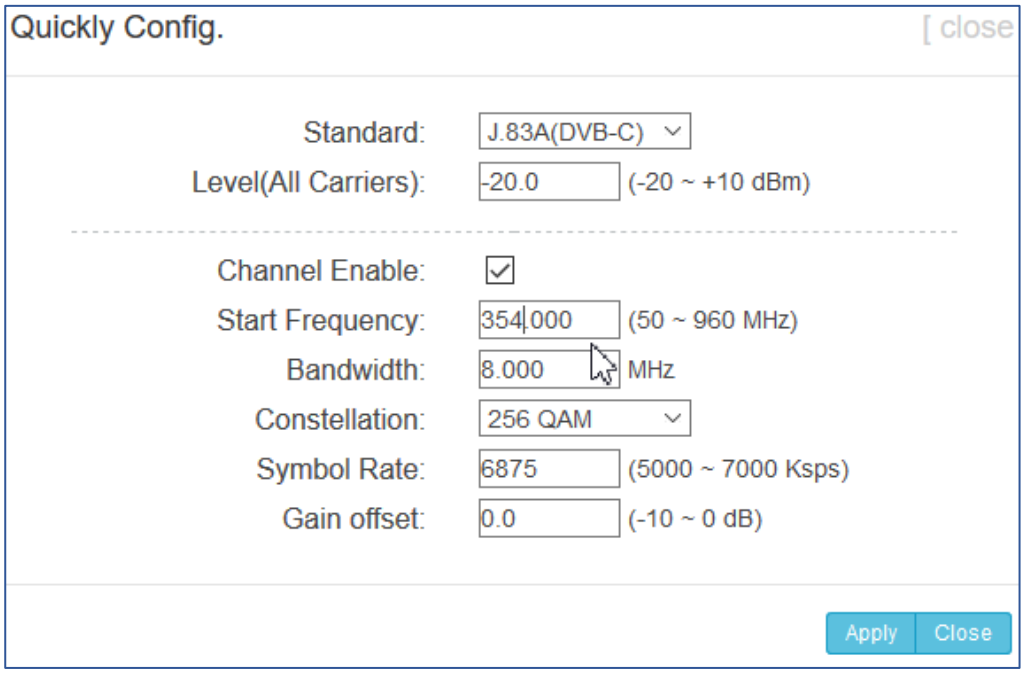
Bereich Bands	Kanal Channel	Kanal... frequenzen Channel frequency (MHz)	Mitten... frequenz Middle frequency (MHz)	Bild... träger Picture carrier (MHz)	Ton... träger Sound carrier (MHz)
B I	2	47 ... 54	50,50	48,25	53,75
	3	54 ... 61	57,50	55,25	60,75
	4	61 ... 68	64,50	62,25	67,75
USB	S 02	111 ... 118	114,50	112,25	117,75
Unterer	S 03	118 ... 125	121,50	119,25	124,75
Sonder-	S 04	125 ... 132	128,50	126,25	131,75
kanal-	S 05	132 ... 139	135,50	133,25	138,75
bereich	S 06	139 ... 146	142,50	140,25	145,75
Midband	S 07	146 ... 153	149,50	147,25	152,75
channels	S 08	153 ... 160	156,50	154,25	159,75
	S 09	160 ... 167	163,50	161,25	166,75
	S 10	167 ... 174	170,50	168,25	173,75
B III	5	174 ... 181	177,50	175,25	180,75
	6	181 ... 188	184,50	182,25	187,75
	7	188 ... 195	191,50	189,25	194,75
	8	195 ... 202	198,50	196,25	201,75
	9	202 ... 209	205,50	203 25	208,75
	10	209 ... 216	212,50	210,25	215,75
	11	216 ... 223	218,50	217,25	222,75
	12	223 ... 230	226,50	224,25	229,75
OSB	S 11	230 ... 237	233,50	231,25	236,75
Oberer	S 12	237 ... 244	240,50	238,25	243,75
Sonder-	S 13	244 ... 251	247,50	245,25	250,75
kanal-	S 14	251 ... 258	254,50	252,25	257,75
bereich	S 15	258 ... 265	261,50	259,25	264,75
Superband	S 16	265 ... 272	268,50	266,25	271,75
channels	S 17	272 ... 279	275,50	273,25	278,75
	S 18	279 ... 286	282,50	280,25	285,75
	S 19	286 ... 293	289,50	287,25	292,75
	S 20	293 ... 300	296,50	294,25	299,75
ESB	S 21	302 ... 310	306,00	303,25	308,75
Erweiterter	S 22	310 ... 318	314,00	311,25	316,75
Sonder-	S 23	318 ... 326	322,00	319,25	324,75
kanal-	S 24	326 ... 334	330,00	327,25	332,75
bereich	S 25	334 ... 342	338,00	335,25	340,75
Specialband	S 26	342 ... 350	346,00	343,25	348,75
channels	S 27	350 ... 358	354,00	351,25	356,75
	S 28	358 ... 366	362,00	359,25	364,75
	S 29	366 ... 374	370,00	367,25	372,75
	S 30	374 ... 382	378,00	375,25	380,75
	S 31	382 ... 390	386,00	383,25	388,75
	S 32	390 ... 398	394,00	391,25	396,75
	S 33	398 ... 406	402,00	399,25	404,75
	S 34	406 ... 414	410,00	407,25	412,75
	S 35	414 ... 422	418,00	415,25	420, 75
	S 36	422 ... 430	426,00	423,25	428,75
	S 37	430 ... 438	434,00	431,25	436,75
	S 38	438 ... 446	442,00	439,25	444,75
	S 39	446 ... 454	450,00	447,25	452,75
	S 40	454 ... 462	458,00	455,25	460,75
	S 41	462 ... 470	466,00	463,25	468,75

Bereich Bands	Kanal Channel	Kanal... frequenzen Channel frequency (MHz)	Mitten... frequenz Middle frequency (MHz)	Bild... träger Picture carrier (MHz)	Ton... träger Sound carrier (MHz)
B IV	21	470 ... 478	474,00	471,25	476,75
	22	478 ... 486	482,00	479.25	484,75
	23	486 ... 494	490,00	487,25	492,75
	24	494 ... 502	498,00	495,25	500,75
	25	502 ... 510	506,00	503,25	508,75
	26	510 ... 518	514,00	511,25	516,75
	27	518 ... 526	522,00	519,25	524,75
	28	526 ... 534	530,00	527,25	532,75
	29	534 ... 542	538,00	535,25	540,75
	30	542 ... 550	546,00	543,25	548,75
	31	550 ... 558	558,00	551,25	556,75
	32	558 ... 566	562,00	559,25	564,75
	33	566 ... 574	570,00	567,25	572,75
	34	574 ... 582	578,00	575,25	580,75
	35	582 ... 590	586,00	583,25	588,75
	36	590 ... 598	594,00	591,25	596,75
	37	598 ... 606	602,00	599,25	604,75
B V	38	606 ... 614	610,00	607,25	612,75
	39	614 ... 622	618,00	615,25	620,75
	40	622 ... 630	626,00	623,25	628,75
	41	630 ... 638	634,00	631,25	636,75
	42	638 ... 646	642,00	639,25	644,75
	43	646 ... 654	650,00	647,25	652,75
	44	654 ... 662	658,00	655,25	660,75
	45	662 ... 670	666,00	663,25	668,75
	46	670 ... 678	674,00	671,26	676,75
	47	678 ... 686	682,00	679,25	684,75
	48	686 ... 694	690,00	687,25	692,75
	49	694 ... 702	698,00	695,25	700,75
	50	702 ... 710	706,00	703,25	708,75
	51	710 ... 718	714,00	711,25	716,75
	52	718 ... 726	722,00	719,25	724,75
	53	726 ... 734	730,00	727,25	732,75
	54	734 ... 742	738,00	735,25	740,75
	55	742 ... 750	746,00	743,25	748,75
	56	750 ... 758	754,00	751,25	756,75
	57	758 ... 766	762,00	759,25	764,75
	58	766 ... 774	770,00	767,25	772,75
	59	774 ... 782	778,00	775,25	780,75
	60	782 ... 790	786,00	783,25	788,75
	61	790 ... 798	794,00	791,25	796,75
	62	798 ... 806	802,00	799,25	804,75
	63	806 ... 814	810,00	807,25	812,75
	64	814 ... 822	818,00	815,25	820,75
	65	822 ... 830	826,00	823,25	828,75
	66	830 ... 838	834,00	831,25	836,75
	67	838 ... 846	842,00	839,25	844,75
	68	846 ... 854	850,00	847,25	852,75
	69	854 ... 862	858,00	855,25	860,75

DVB-T2 channels OTA would might interfere or we can integrate them into our network. So we should exactly skip these in our DVB-C channels: Example Region northern Germany:

ARD-Mux	ch23	490 MHz
ZDF-Mux	ch36	594 MHz
NDR-Mux	ch40	626 MHz
freenet TV 1	ch44	658 MHz
freenet TV 2	ch24	498 MHz
freenet TV 3	ch47	682 MHz

So first we correct the quick start frequency to 354 MHz as centre frequency:

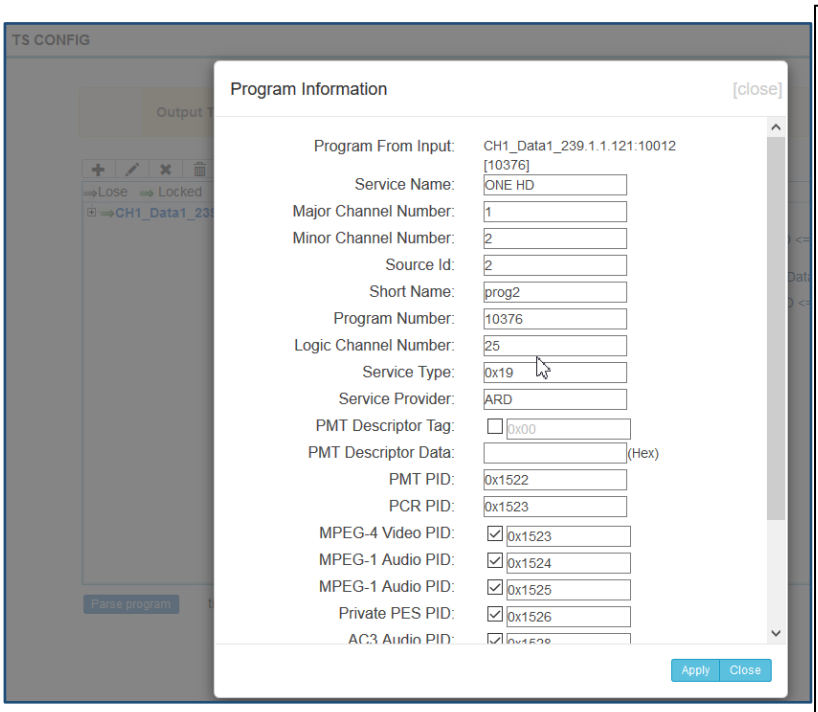


And we are sure to not interfere to DVB-T2:

Center Frequency: 414.000 MHz **Standard:** J.83A(DVB-C)
Level(All Carriers): -20.0 dBm **Channel Info.(Alarm/Active/Total):** 0/16/16

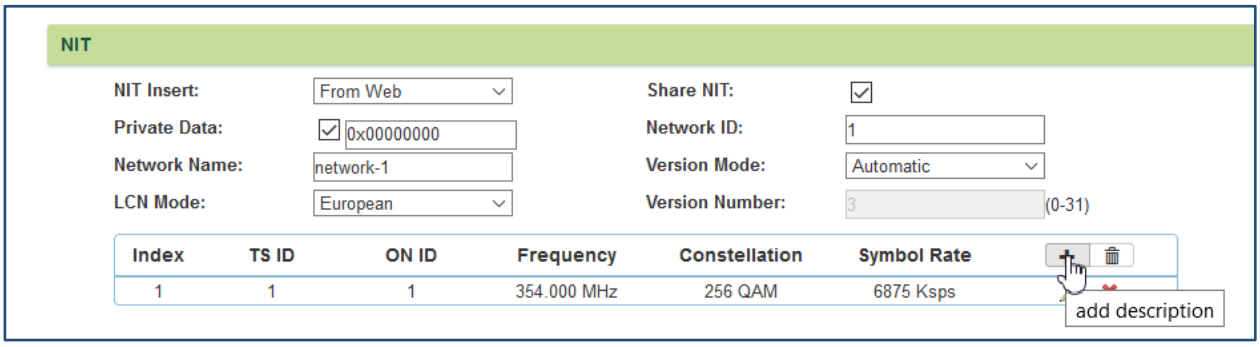
#	Frequency	Constellation	Symbol Rate	Gain offset	Status	Bit(Act/Max)
1	354.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
2	362.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
3	370.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
4	378.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
5	386.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
6	394.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
7	402.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
8	410.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
9	418.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
10	426.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
11	434.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
12	442.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
13	450.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
14	458.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
15	466.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M
16	474.000 MHz	256 QAM	6875 Ksps	0.0 dB		0.0/50.7 M

After all IN and Outputs have been configured, your LCN design should be configured:



The LCN's (Logical Channel Numbering) are processed and transferred along and within the NIT (Network Information Table), so this should be done before you create the NIT –
Which is the mayor Table for tuning your DVB-Receivers in a fast manner:
The Tuner will extract the NIT on the first channel it will find and can fast tune to the center frequencies which are stored here. Finally the Receiver can sort all received and stored channels in the network according to the LCN- values: No1 comes first, so we recommend i.e. to put the HD channels to front in order.

Finally, we recommend to use the Web-NIT generator for every TS to finally inject the NIT in every output:



Add each channel step by step and you can also add channels of other QAM Modulators here (but not there LCN's) to have a complete Lineup for the Receivers.

Now after we have set the DVB-C Output channels, we can arrange all the MPTS outputs we want to send to Sub-head ends or simply use them to analyze the QAM outputs by a DekTec Stream analyzer (which we are selling as well):

Parameters → IP Stream:

This device supports TS to output in IP (16*MPTS) format through the DATA port(s).
Selecting left the 'IP Stream', it will open this setting overview shown as Figure-12 to set/change the IP out parameters.

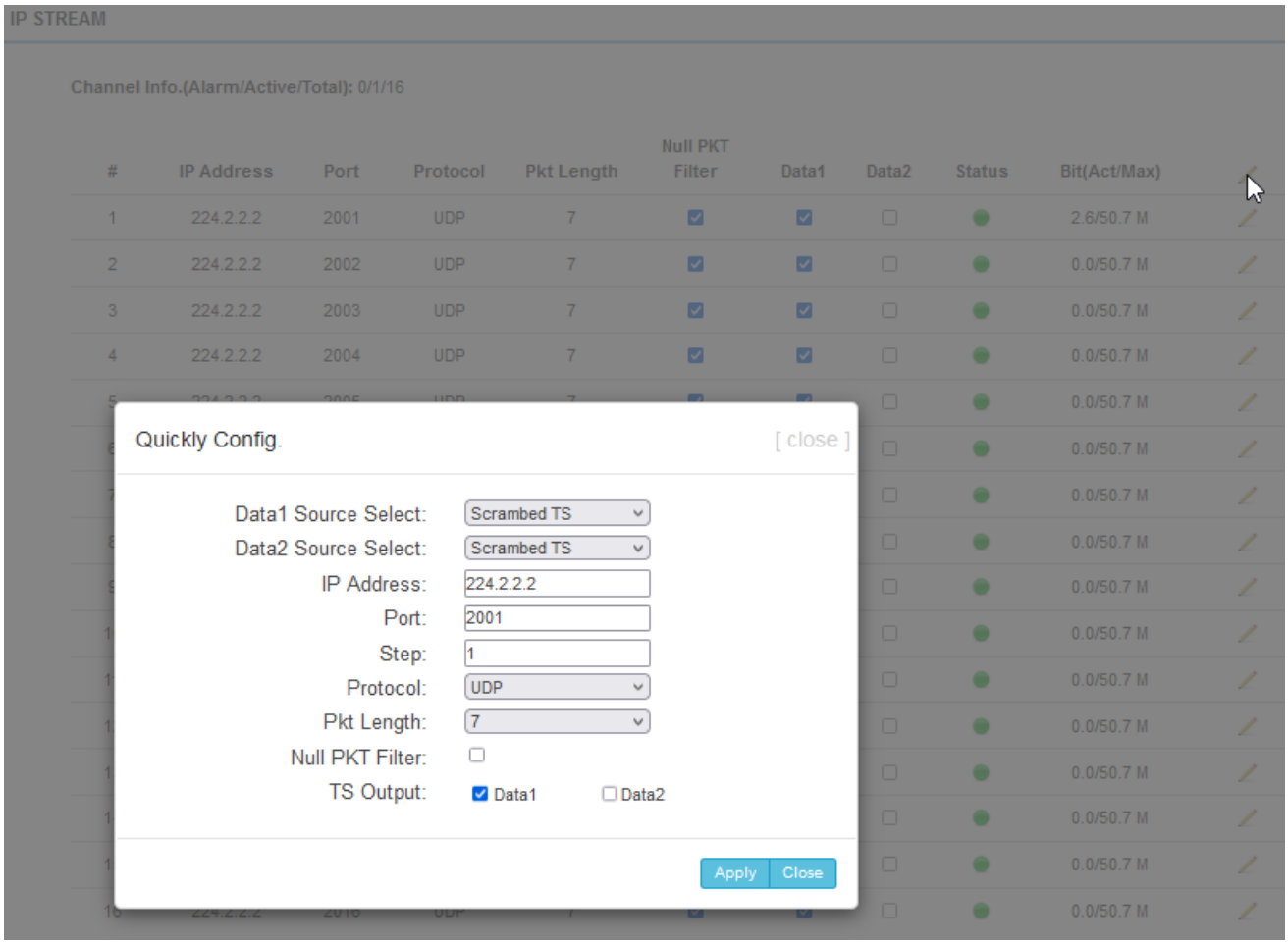
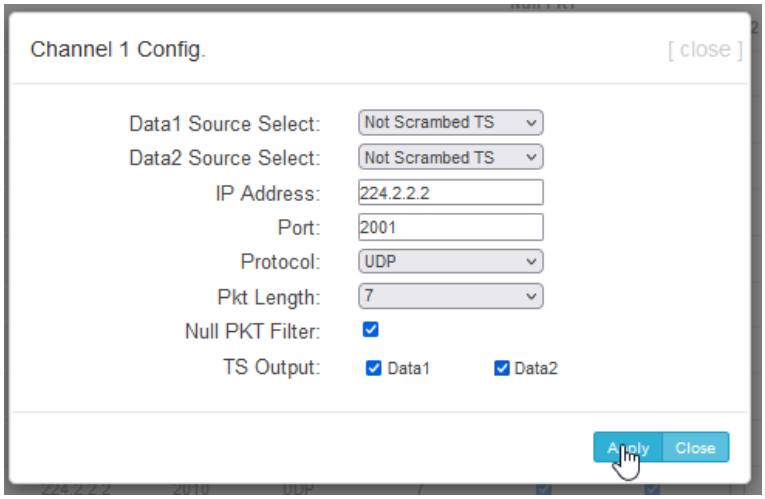


Figure-12 config all and selected streams…



Modify it to your needs:
Quick setup also configs an automatic counting and increasing of +Port's.
RTP is more reliable for longer distances.
Pkt-Length should stay @ 7, Nullpacket filter can be used to send the streams as VBR instead of CBR (incl. PID 8192 = Zero-packets)

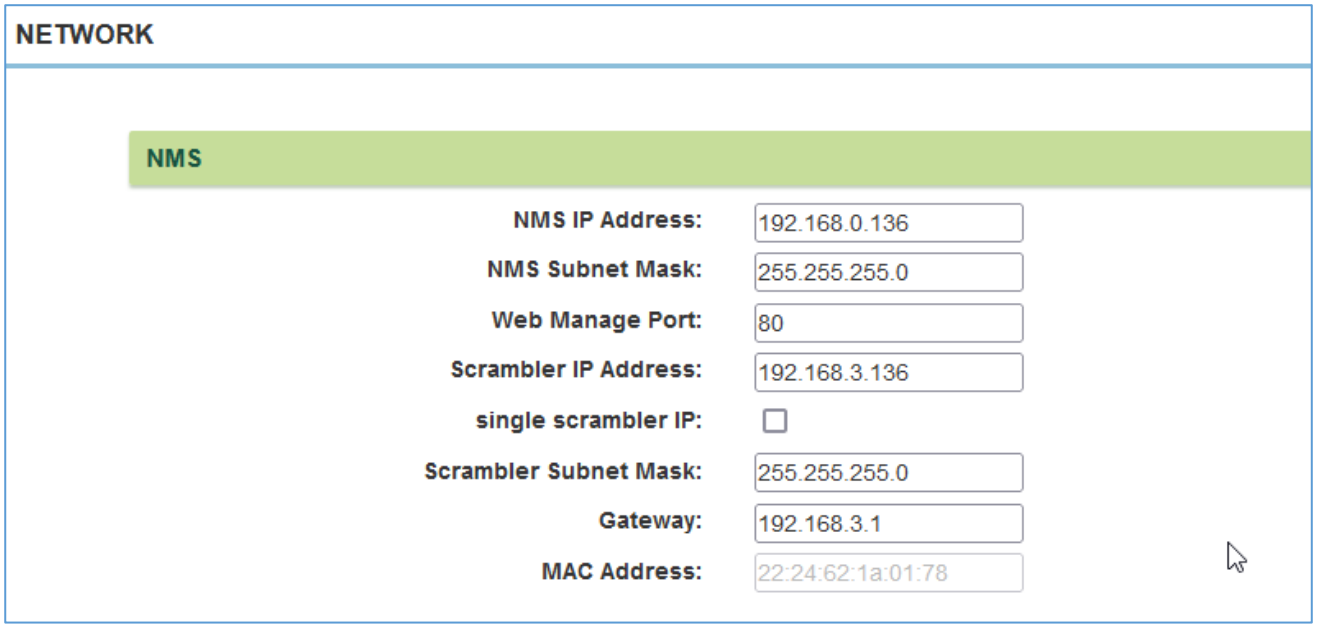
You can set both DATA ports as outputs if you like maybe for mirroring the MPTS streams to i.e. 2 different physical IP-Ring directions.

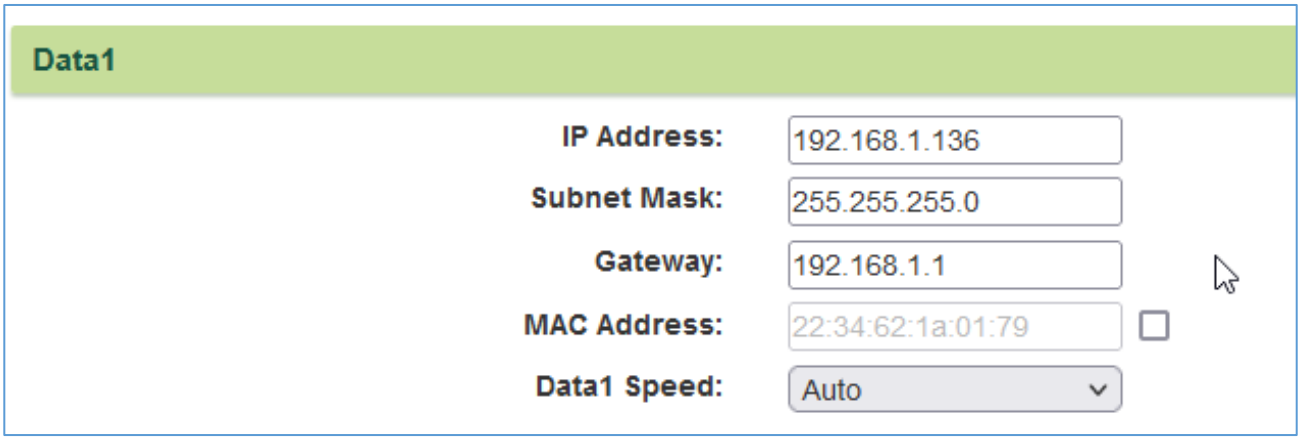
You should mix and balance them to both outputs to avoid accidently overloading of GbE devices/ Interfaces.

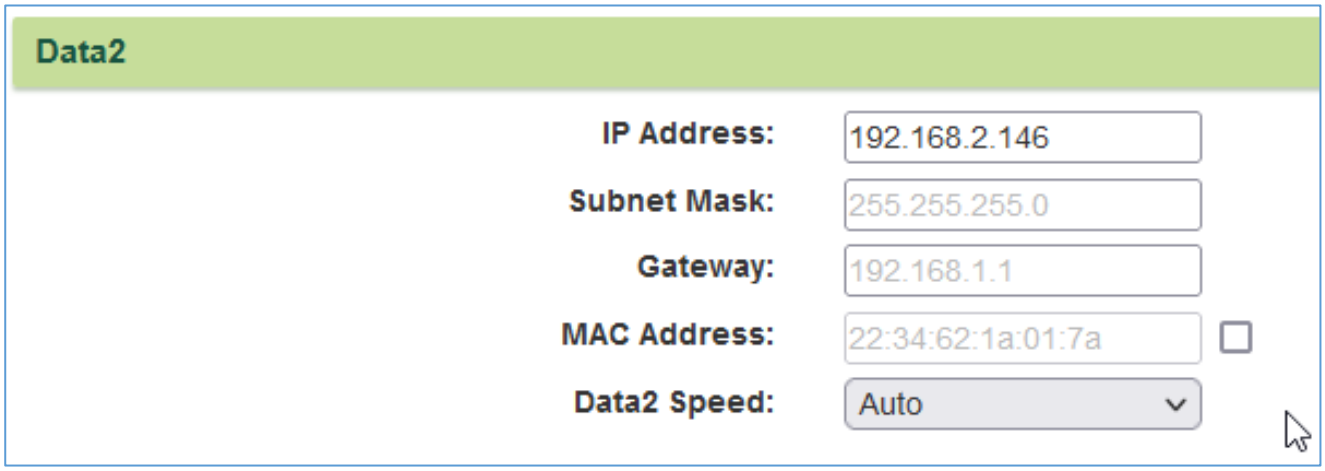
NullPkt Filter will make VBR-streams out of the CBR which contains the PID 8192dec to safe some IP bandwidth. Which might be not a good idea if you transfer this stream to a sub-headend where a more or less stupid IP2QAM Modulator is installed which expects a DVB conform MPTS as CBR.

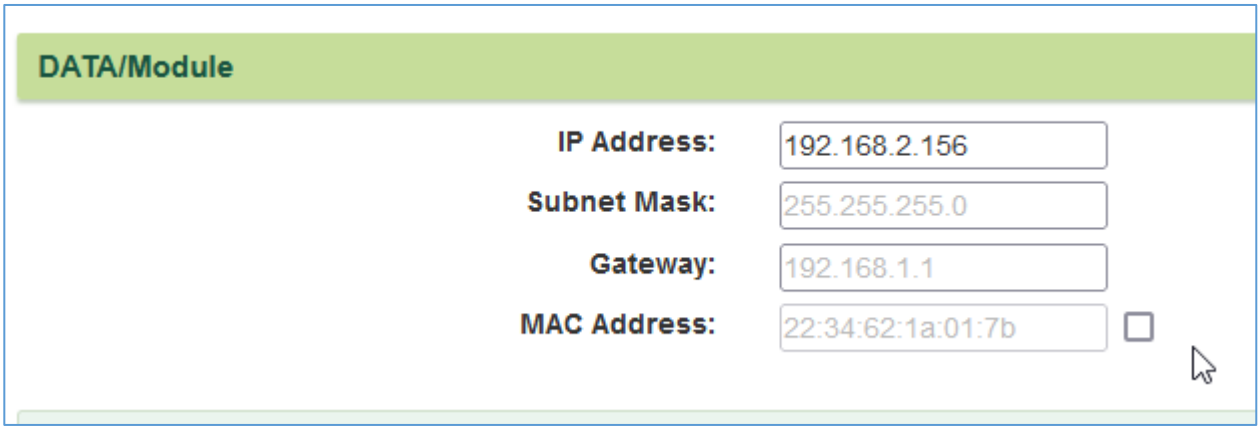
System → Network:

Selecting 'Network', will enter the menu as shown in following where you can set/change network parameters.

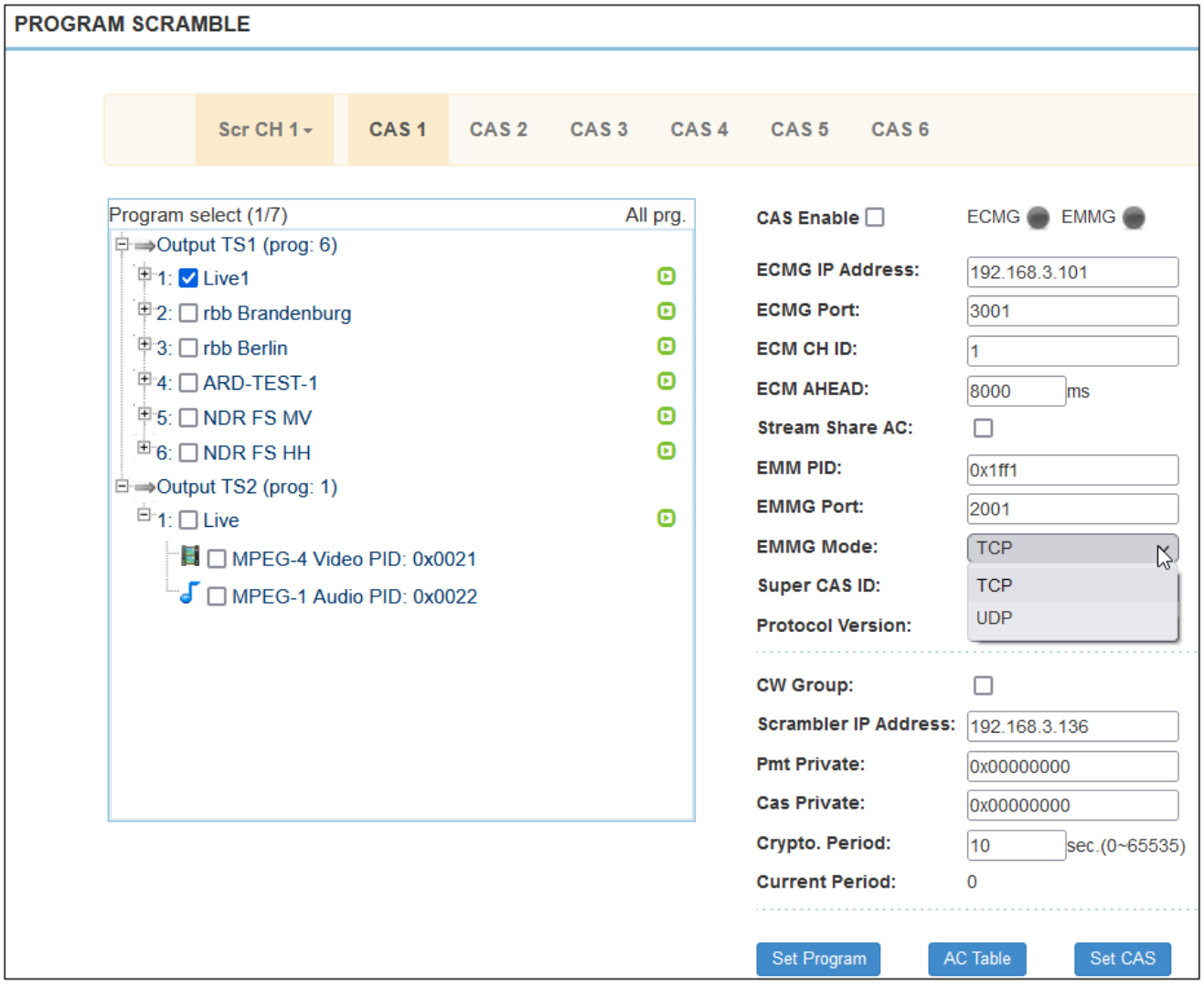






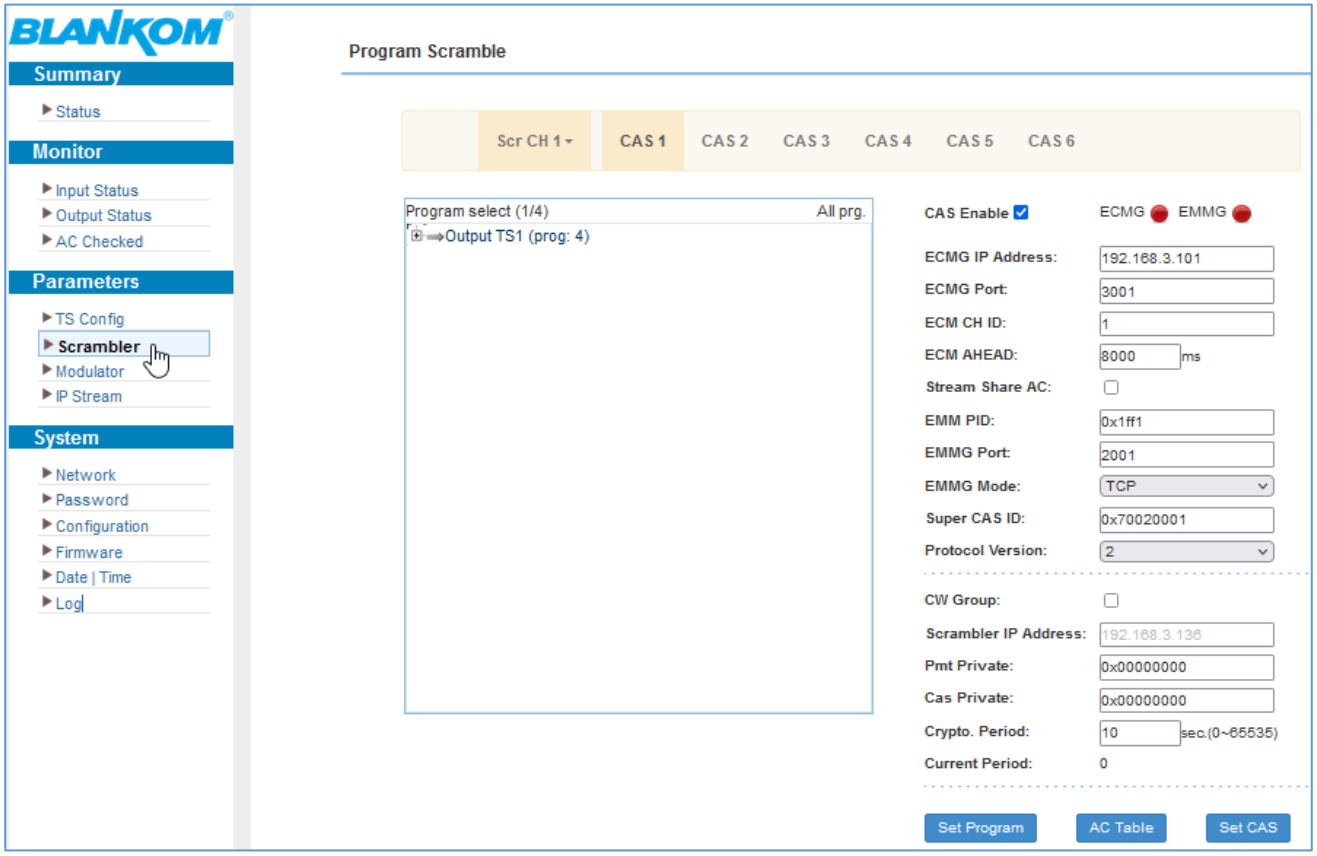


Remark: The 2x RJ45 Data-Ports 1+2 (and DATA-front*) almost share the same RJ45 chip and so the NM/Gateway IP addresses depending on HW/SW versions. A Scrambler connection can be set here as well which needs to correspond with the external CA-Server and its IP address as well: Remember the CAS settings menu:



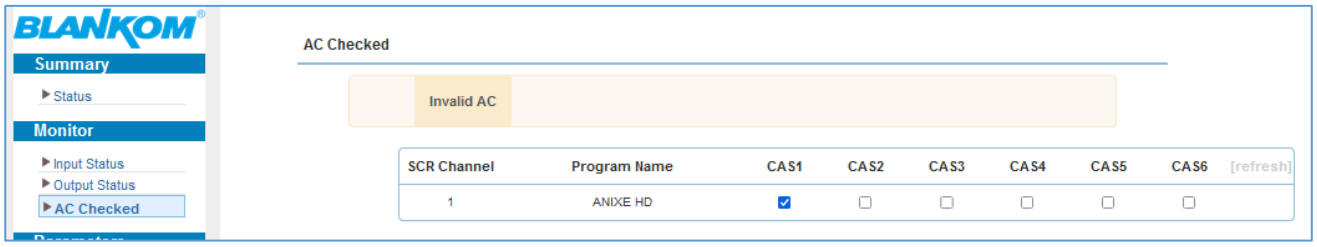
Parameters → Scrambler:

Main menu:



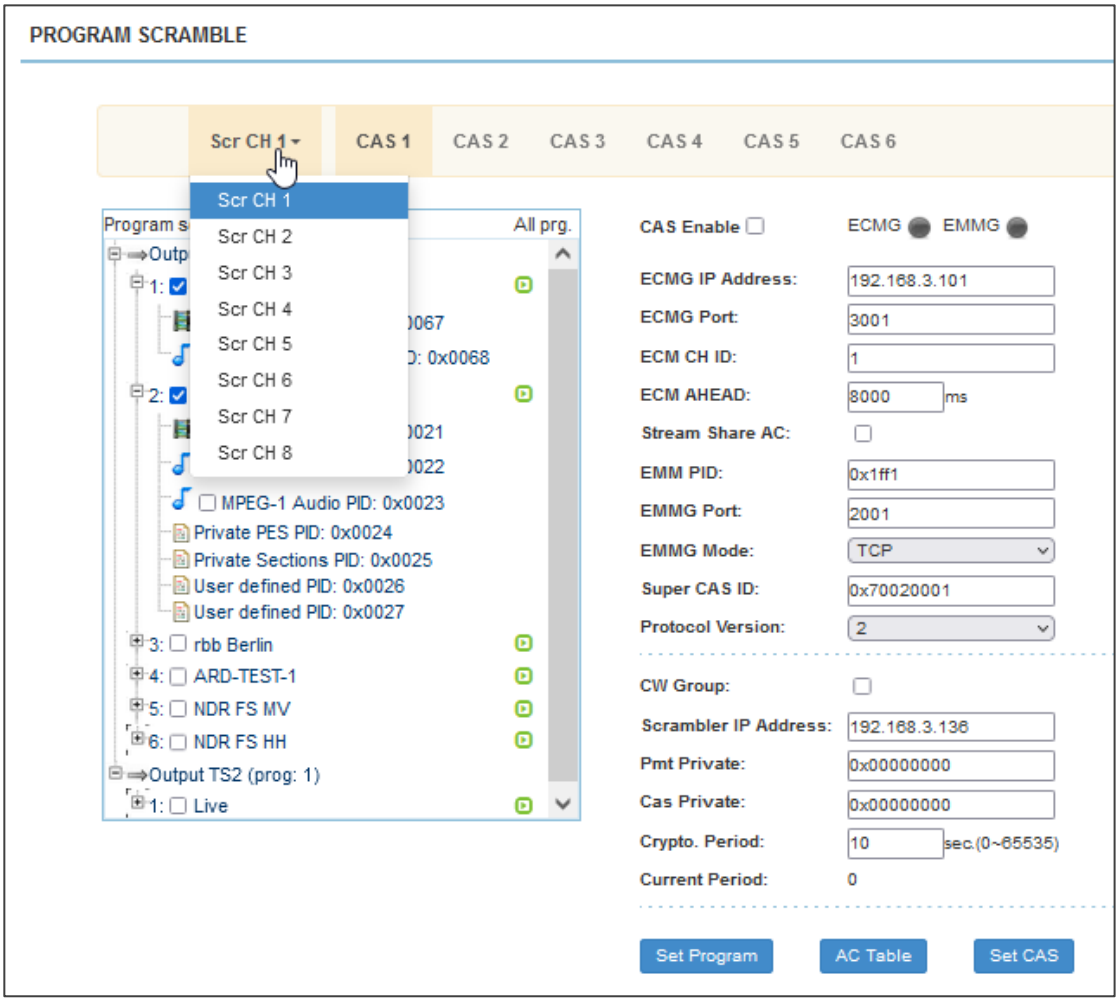
From the menu on left side of the webpage, clicking “Scrambler”, it displays the interface where users can choose the programs to scramble.

A new CA function is the AC-mode*:

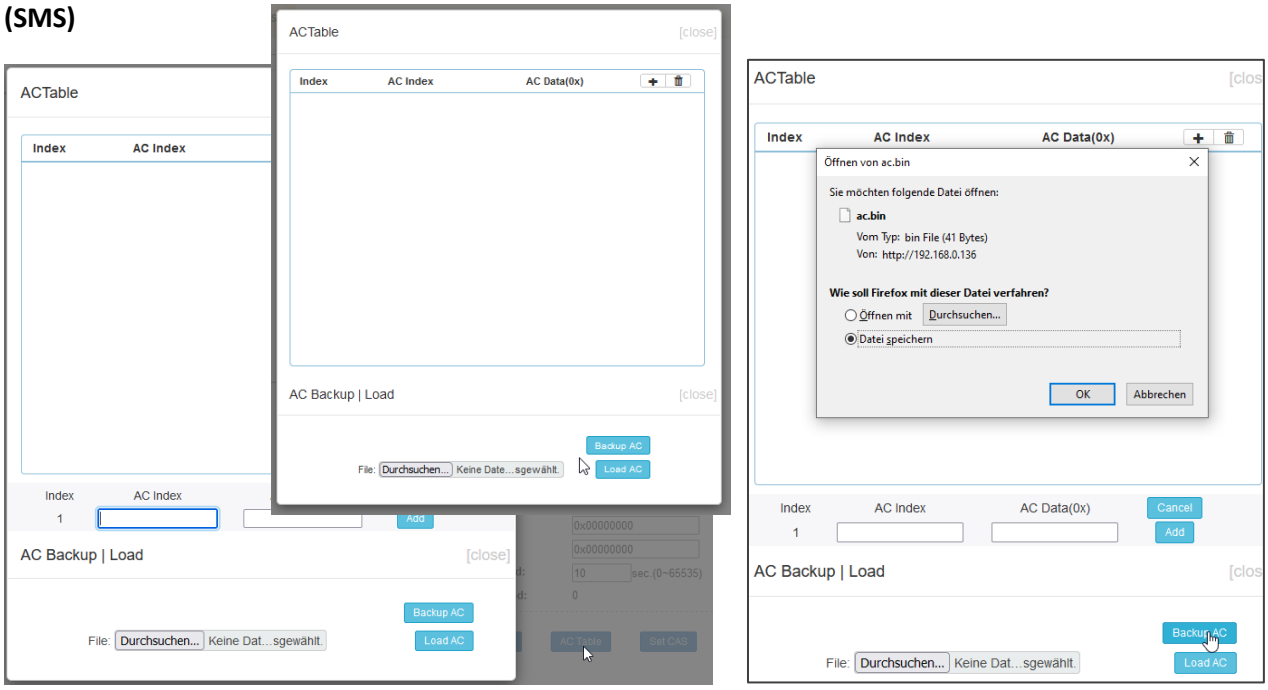


In combination with a Subscriber management System and the CAS you can create packages for Groups of PAYTV customers also time limited for hiring the content:

We will not explain here what a CAS is and how Conditional Access PAYTV is working, that would exceed this manual enormous and the user should be familiar with CA, Crypto-Words and exchange them as well as the Subscriber Management Systems behind them are almost different in their operations and handling.



The AC Table can be edited externally with the corresponding scramblers Subscriber Management System (SMS)



And backup as file as well as loaded from PC or copied from another QAM Modulator/scrambler.

Single PID's can be chosen for scrambling with up to 6 different CAS as simulcrypt usage. Of course, you'll need these CA-Servers and their connection to the device by the NMS-Ethernet port to exchange the common Control Word(s) and need all data from it to start the encryption process (Advanced experts will know…).

AC table:

it's a table with AC data, for programs to selecting when editing programs on "Scrambler" page.

AC Checked:

it's only not-exact info for telling maybe the AC data is wrong while ECMG connection has been failed.

Because AC data belong to CAS companies, we cannot judge it exactly to know if the used AC data is wrong or correct.

Please note that the example AC data (2bytes, 0001 or 00A0 etc.) is depending on the CAS in use.

For other CAS-types, you may need to use different bytes.

AC is a code for managing the charging of STBs (by working with CAS&SMS&STBs). -

To understand the relation of program & AC & product:

This is an example of a 10 programs case:

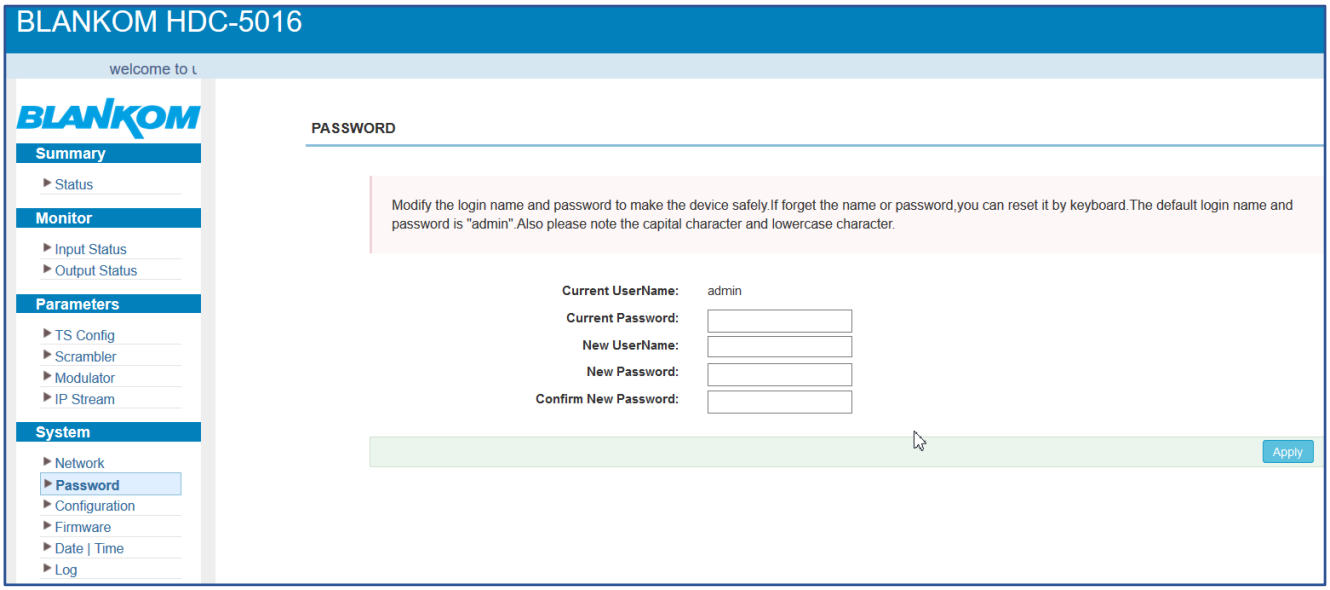
Suppose you have 10x AC 0001 to 000A, inject them into product 1 (with 0001 to 0005) as 2 €/month, product 2 (with all AC 0001 to 000A) as 5 €/month.

If the PAYTV customer pays you 2 €, he can watch the programs with AC 0001 and 0005 for 1 month. If customer pays you 5 €, he can watch the all 10 programs with AC 0001 to 000A for 1 month.

StreamShareAC: tick this option, then you can put some programs to a virtual group, all of programs in this group will use same AC for encrypting. You need to configure them with same ECM PID value.

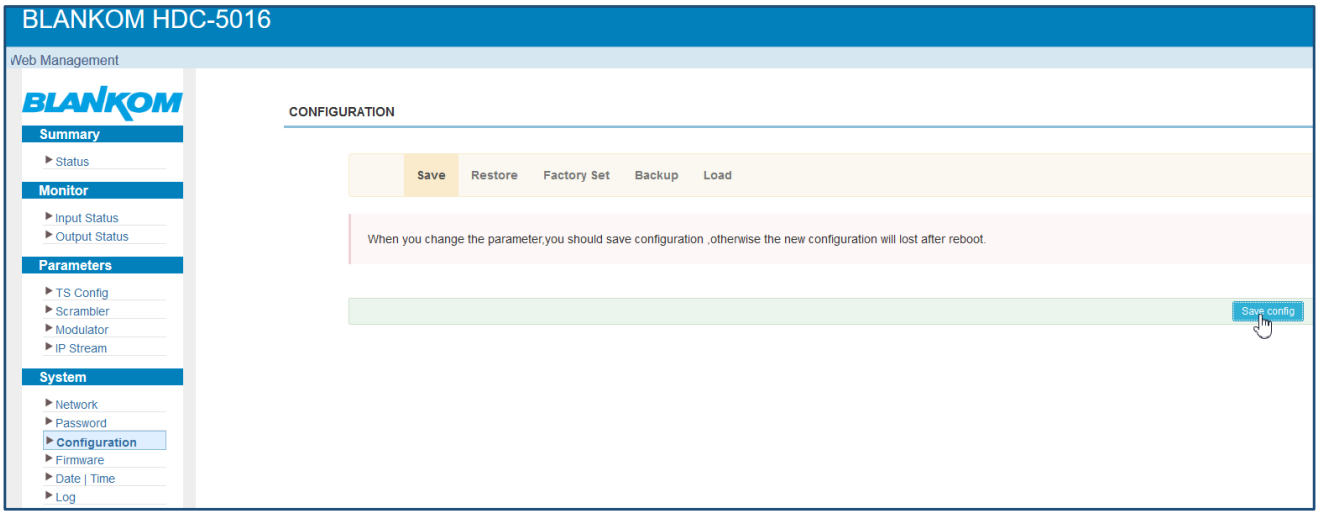
System → Password:

From the left side menu of the webpage, selecting “Password”, will display the screen where you are able to set/change the login account and password for the web access by the NMS-Port:



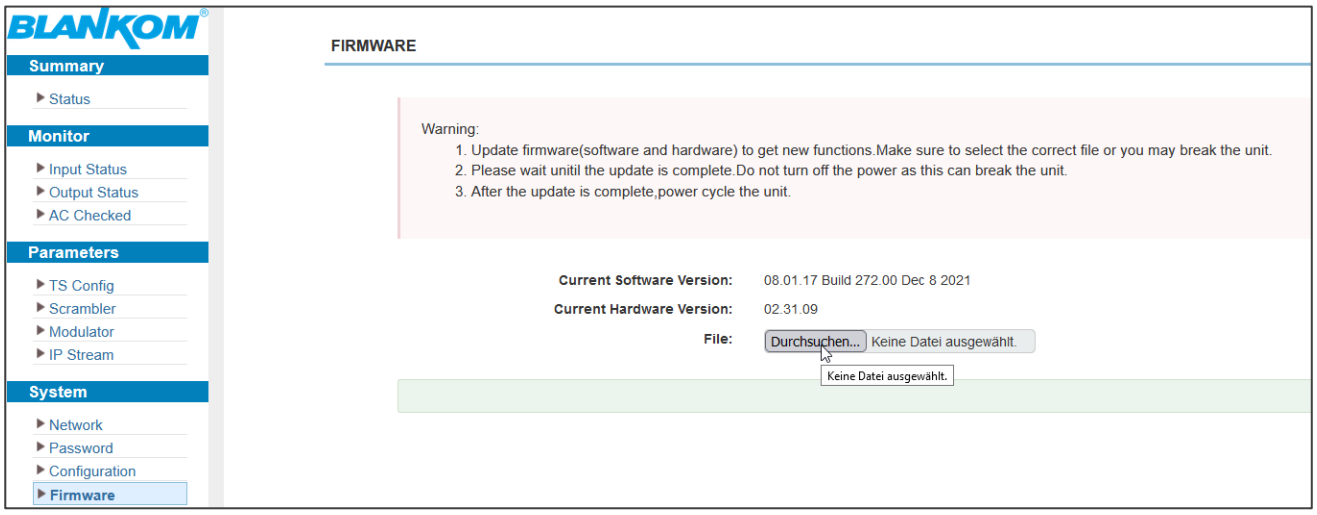
System → Configuration:

From the menu on left side of the webpage, clicking “Configuration”, you will enter the screen as Figure-15 where to set your configurations for the device:



System → Firmware:

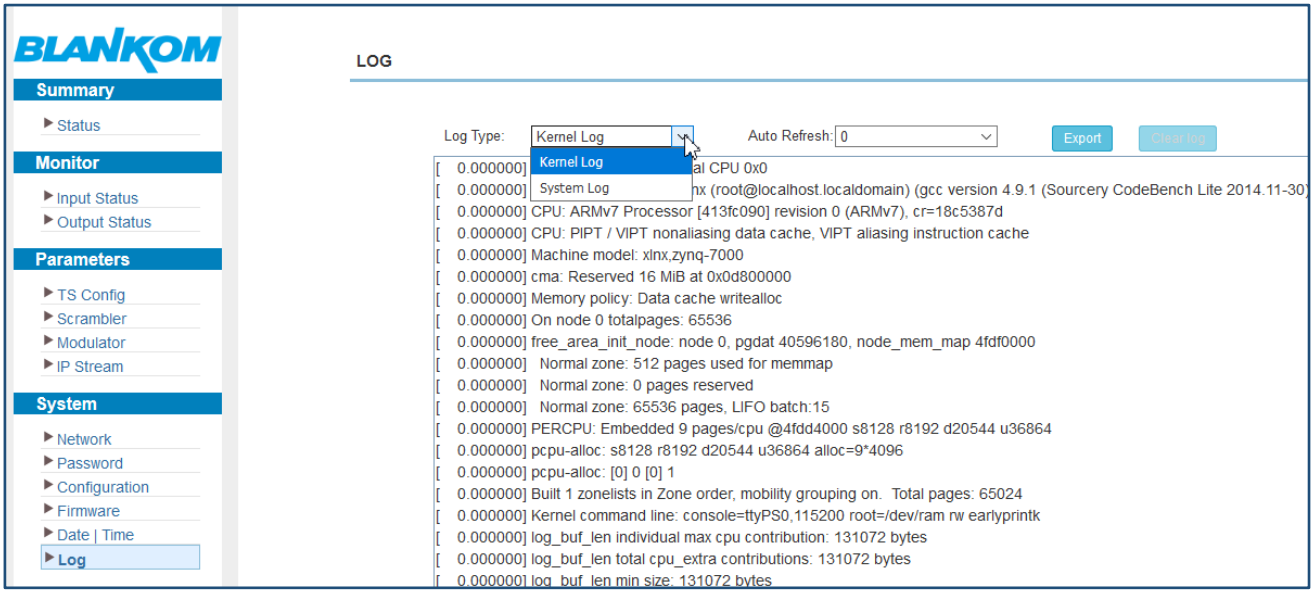
From the menu on left side of the webpage, selecting “Firmware”, you’ll enter the screen as in Figure-16 where to update firmware for the device:



Please note, during the development of the HDC-5016 the HW/FPGA and Soft- and Firmware was necessary to change (Chipset availabilities etc.…) so there might be incompatible Version's from one generation to the next and e.g. The config-files cannot be copied and uploaded from one older to the newer ones.

System → Log:

From the menu on left side of the webpage, selecting "Log", will display the screen as in Figure-17 where to check the "Log" which is practically only helpful for developers for debugging



Installation pre-conditions

- Installing the device at the place in which environment temperature between 0 to 45 °C
- Making sure good ventilation for the heat-sink on the rear panel and other heat-sink bores if necessary
- Checking the input AC voltage within the power supply working range and the connection is correct before switching on device
- Checking the RF output level varies within tolerant range if it is necessary
- Checking all signal cables have been properly connected
- Frequently switching on/off device is prohibited; the interval between every switching on/off must greater than 10 seconds.

Conditions where you need to unplug the power cord

- Power cord or socket damaged
- Any liquid flowed into device
- Any stuff causes circuit short
- Device in damp environment
- Device was suffered from physical damage
- Long-time idle
- After switching on and restoring to factory setting, device still cannot work properly.
- Maintenance needed

Packing list

- HDC-5016…64 IP QAM Modulator 1 pc
- User's Manual 1 pc
- Power Cord, dep. on country 1 pc

Appendix Important Notes!

This manual is for use by qualified personnel only. Handling this device or system requires special electronic technical knowledge. To reduce the risk of electrical shock or damage to the equipment, do not perform any servicing other than the installation and operating instructions contained in this manual unless you are qualified to do so. This device operates in the given voltage and frequency range without requiring manual adjustment.

Do not open the top case w/o unplugged power source because serious injury or death may be the result! Inside are components under risk from electrostatic discharge. To avoid equipment damages do not touch these components or, observe the respective handling rules!

For continued protection against fire, the fuses may only be replaced by identical fuses with the same electrical specifications which are designed for the corresponding fuse positions.

Installation Notes

All types of the IRENIS-BLANKOM family are 19“devices with 1 RU height designed for installation in 19” racks. In addition to the front panel screws an internal module support is required at the rack.

Depending on the Frontend used and the operating adjustments, the SAT-RF-input ports carrying DC Voltage (13V /18V, max. 400 mA).

By connecting a mains cable, the device can become functional without any auxiliary appliances. The power supply units are designed for the wide range of 100-230V AC; a manual adjustment of the voltage is not necessary.

For some models the second power connector is feeding another independent power supply for internal redundancy. For a maximum of redundancy both power supplies should use different circuits.

All the outputs are decoupled from one another. Thus, the circuit does not have any effect on the functioning of the device. Connections that are not required need not to be terminated.

Suggestion: CAT 6E Ethernet cable for GbEthernet, DSTP (double shielded twisted pair) for the streaming ports

Note:

IPv4 global scope sessions use multicast addresses in the range 224.2.128.0 - 224.2.255.255 with SAP Announcements being sent to 224.2.127.254 Port 9875 (note that 224.2.127.255 is used by the obsolete SAPv0 and MUST NOT be used).

IPv4 administrative scope sessions using administratively scoped IP multicast. The multicast address to be used for announcements is the highest multicast address in the relevant administrative scope zone.

For example, if the scope range is 239.16.32.0 - 239.16.33.255, then 239.16.33.255 is used for SAP Announcements.

Sources:

http://www.etsi.org/deliver/etsi_en/300400_300499/300468/01.15.01_60/en_300468v011501p.pdf

https://www.dvb.org/standards

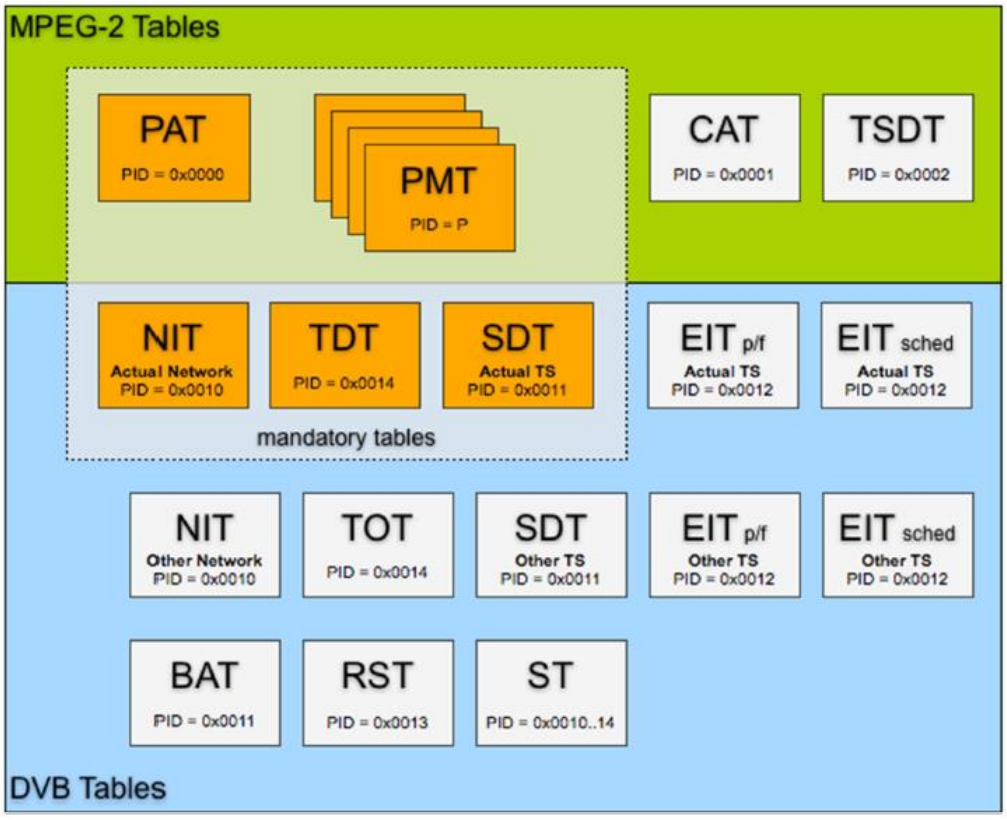


Table 1: PID allocation for SI

Table	PID value
PAT	0x0000
CAT	0x0001
TSDT	0x0002
reserved	0x0003 to 0x000F
NIT, ST	0x0010
SDT, BAT, ST	0x0011
EIT, ST, CIT (ETSI TS 102 323 [13])	0x0012
RST, ST	0x0013
TDT, TOT, ST	0x0014
network synchronization	0x0015
RNT (ETSI TS 102 323 [13])	0x0016
reserved for future use	0x0017 to 0x001B
link-local inband signalling	0x001C
measurement	0x001D
DIT	0x001E
SIT	0x001F

We assume, that the user is familiar with all abbreviations mentioned in this manual.

Appendix DB

Conversions of Power @ 75Ω / *Umrechnungstabelle* dBµV <-> dBm

dBmV	dBµV	dBm 75Ω	mV_{RMS}	mW 75Ω
8	68	-40.75	2.51	8.4E-05
9	69	-39.75	2.82	1.1E-04
10	70	-38.75	3.16	1.3E-04
11	71	-37.75	3.55	1.7E-04
12	72	-36.75	3.98	2.1E-04
13	73	-35.75	4.47	2.7E-04
14	74	-34.75	5.01	3.3E-04
15	75	-33.75	5.62	4.2E-04
16	76	-32.75	6.31	5.3E-04
17	77	-31.75	7.08	6.7E-04
18	78	-30.75	7.94	8.4E-04
19	79	-29.75	8.91	1.1E-03
20	80	-28.75	10.00	1.3E-03
21	81	-27.75	11.22	1.7E-03
22	82	-26.75	12.59	2.1E-03
23	83	-25.75	14.13	2.7E-03
24	84	-24.75	15.85	3.3E-03
25	85	-23.75	17.78	4.2E-03
26	86	-22.75	19.95	5.3E-03
27	87	-21.75	22.39	6.7E-03
28	88	-20.75	25.12	8.4E-03
29	89	-19.75	28.18	0.011
30	90	-18.75	31.62	0.013
31	91	-17.75	35.48	0.017
32	92	-16.75	39.81	0.021
33	93	-15.75	44.67	0.027
34	94	-14.75	50.12	0.033
35	95	-13.75	56.23	0.042
36	96	-12.75	63.10	0.053

dBmV	dBµV	dBm 75Ω	mV_{RMS}	mW 75Ω
37	97	-11.75	70.79	0.067
38	98	-10.75	79.43	0.084
39	99	-9.75	89.13	0.106
40	100	-8.75	100.00	0.133
41	101	-7.75	112.20	0.168
42	102	-6.75	125.89	0.211
43	103	-5.75	141.25	0.266
44	104	-4.75	158.49	0.335
45	105	-3.75	177.83	0.422
46	106	-2.75	199.53	0.531
47	107	-1.75	223.87	0.668
48	108	-0.75	251.19	0.841
49	109	0.25	281.84	1.059
50	110	1.25	316.23	1.333
51	111	2.25	354.81	1.679
52	112	3.25	398.11	2.113
53	113	4.25	446.68	2.660
54	114	5.25	501.19	3.349
55	115	6.25	562.34	4.216
56	116	7.25	630.96	5.308
57	117	8.25	707.95	6.683
58	118	9.25	794.33	8.413
59	119	10.25	891.25	10.591
60	120	11.25	1000.00	13.333
61	121	12.25	1122.02	16.786
62	122	13.25	1258.93	21.132
63	123	14.25	1412.54	26.604
64	124	15.25	1584.89	33.492
65	125	16.25	1778.28	42.164
66	126	17.25	1995.26	53.081
67	127	18.25	2238.72	66.825
68	128	19.25	2511.89	84.128

Appendix A

Product Disposal

Warning! Ultimate disposal of this product should be handled according to all national laws and regulations.

製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

Safety instructions (ENG)

Read the safety instructions carefully before assembling or commissioning the device and ensure that you comply with them

1. **Installation**

- **Danger:** The device may **only** be installed and started up by competent people **(see EN 60065)**.
- **Danger:** The device and the peripheral distribution devices must be earthed properly (potential equalization) in accordance with **EN 60728-11 before Commissioning** and remain earthed even when the device is dismantled.
- **Danger:** The device may not be installed on a flammable base **(risk of fire)**.
- **Danger:** Only connect the device to a socket that is installed correctly and connected to devices that has an earth conductor
  (Depending on Model andUsage).
- **Danger:** Plan the assembly or installation location to ensure that children cannot play with the device and its connections.
  There is a risk of electric shock **(Danger of death)**.
- **Danger:** Select an assembly or installation location in which fluids or objects cannot get into the device under any circumstances (e.g. condensation, water for watering plants, etc.).
- **Danger:** Ventilation slots and refrigeration units are important function elements on the devices. If devices have refrigeration units or ventilation slots, you must ensure that they are never covered or built over. Also ensure that there is sufficient air circulation around the device. This prevents possible damage to the device and the **risk of fire due** to overheating. Ensure a minimum of **clearance of 20cm** between the device and other objects.
- **Danger:** The assembly or installation location must allow all connected cables to be laid safely. Cables and power supply cables must not be damaged or crushed by any objects. Furthermore, ensure that cables are not laid in the immediate vicinity of sources of heat (e.g. radiators, other electrical devices, fireplaces, etc.) **(Risk of fire)**, **(risk of electric shock danger of death)**
- **Danger:** In order to prevent damage to the device, as well as possible subsequent damage **(risk of fire)**, devices intended for installation on the wall are only permitted to be installed on a level surface and not **above head height**.

- **Warning:** (Only for optical transmitters and their peripheral distribution devices) Never look directly o indirectly into the laser beam. Only connect the device to the power supply once all optical lines are connected securely.
- **Warning:** The safety regulations in the relevant current standards **EN 60728-11** and **EN 60065** must be complied with.
- **Warning:** Comply with all applicable national safety regulations and standards.
- **Warning:** The device's mains plug must be easily accessible at all times.
- **Warning:** Follow all instructions in the device-specific operating manual

2. **Operation**

- **Danger:** The device is only permitted to be operated in dry rooms in a non-tropical climate. In damp rooms or outdoors, there is the risk of short circuits **(risk of fire)** or electric shock **(danger of death)**.

- **Danger:** Do not insert any objects through the ventilation slot. Risk of electric shock **(danger of death)**.
- **Danger:** Do not put any containers filled with liquid (e.g. vases) on the device. There is a risk of electric shock **(danger of death)** or **(risk of fire)**.
- **Danger:** No open sources of fire such as burning candles are permitted to be placed on the device **(risk of fire)**.

- **Danger:** Ensure that there is a clearance of at least **20cm** around the device. The device ventilation is not permitted to be impaired by covering the
- Ventilation openings with objects such as newspapers, tablecloths, curtains, etc. **(risk of fire)**.
- **Warning:** Follow all instructions in the device-specific operating manual.

3. Maintenance

- **Danger:** Maintenance tasks must always be carried out by competent people **(see EN 60065)**.
- **Danger:** Do not carry out servicing work during thunderstorms. There is a risk of electric shock **(danger of death)**.
- **Warning:** (Only for devices with batteries): **Risk of explosion if** the battery is replaced improperly. Only replace with the same type!
- **Warning:** Batteries must not be subjected to excessive heat such as sunlight, fire or similar **(risk of explosion)**.
- **Warning:** Only use the manufacturer's accessories or accessories with identical technical properties.
- **Warning:** (For optical transmitters and their peripheral distribution devices) unplug the mains plug before dismantling the device.

4. Repairs

- **Danger:** The device may only be opened by competent people (see EN 60065). Before opening the device, unplug the mains plug or disconnect the power supply; otherwise there is a danger of death! The device is only permitted to be connected to the power and operated when the mains adaptor cover is installed.
  This also applies when you clean the device or work on the connections.

- **Danger:** Repairs on the device may only be carried out by a specialist **(see EN 60065)** observing **the applicable VDE (German Association for Electrical, Electronic & Information Technologies) guidelines**.
- **Danger:** Only use components of the same type and with identical technical properties for the repair. Otherwise, there is a risk of electric shock **(danger of death)** and **risk of fire**.
- **Warning:** (For optical transmitters and their peripheral distribution devices) unplug the mains plug before dismantling the device.

If you have any queries regarding repairs, please contact our company service: E-mail: info@blankom.de contact: www.blankom.de

5. Sale

- **Caution:** If the device is sold, these safety instructions and the operating manual for the relevant device must be handed over to the purchaser.

6. Disposal

- **Caution:** Dispose of the device in accordance with the applicable environmental regulations.
- **Caution:** Dispose of batteries (if present) in accordance with the applicable environmental regulations.
- Cartons and all pcs. of the packaging can be sent back to us for recycling for sustainable environment protection.

Sicherheitshinweise (GER)

Sicherheitshinweise bitte vor Montage bzw. Inbetriebnahme des Gerätes sorgfältig lesen und befolgen.

1. Installation

Gefahr: Das Gerät darf ausschließlich von sachverständigen Personen (siehe EN 60065), installiert und in Betrieb genommen werden.

Gefahr: Das Gerät und/oder die Verteilperipherie muß vor Inbetriebnahme gemäß EN 60728-11 vorschriftsmäßig geerdet sein (Potentialausgleich) und bleiben, auch wenn das Gerät ausgebaut wird.

Gefahr: Das Gerät darf nicht auf brennbarem Untergrund montiert werden (Brandgefahr).

Gefahr: Schließen Sie das Gerät nur an eine vorschriftsmäßig installierte Steckdose mit Schutzleiter an.

Gefahr: Planen Sie den Montage - bzw. Aufstellungsort so, daß Kinder nicht am Gerät und dessen Anschlüssen spielen können.
Es droht Gefahr durch elektrischen Schlag (Lebensgefahr).

Gefahr: Wählen Sie einen Montage - bzw. Aufstellungsort, an dem unter keinen Umständen Flüssigkeiten oder Gegenstände in das Gerät gelangen können (z.B.
Kondenswasser, Gießwasser etc.).

Gefahr: Lüftungsschlitze und Kühlkörper sind wichtige Funktionselemente an den Geräten. Bei Geräten, die Kühlkörper oder Lüftungsschlitze haben, muß daher unbedingt darauf geachtet werden, daß diese keinesfalls abgedeckt oder zugebaut werden. Sorgen Sie außerdem für eine großzügig bemessene Luftzirkulation um das Gerät. Damit verhindern Sie mögliche Schäden am Gerät sowie Brandgefahr durch Überhitzung. Gewährleisten Sie einen Mindestabstand von 20cm um das Gerät zu anderen Gegenständen.

Gefahr: Der Montage- bzw. Aufstellort muß eine sichere Verlegung aller angeschlossenen Kabel zulassen. Stromversorgungskabel sowie Zuführungskabel dürfen nicht durch irgendwelche Gegenstände beschädigt oder gequetscht werden. Es ist darüber hinaus unbedingt darauf zu achten, daß Kabel nicht in die direkte Nähe von Wärmequellen verlegt werden (z.B. Heizkörper, andere Elektrogeräte, Kamin etc.) (Brandgefahr), (Gefahr durch elektrischen Schlag).

Gefahr: Um sowohl Beschädigungen am Gerät als auch mögliche Folgeschäden (Brandgefahr) zu vermeiden, dürfen für Wandmontage vorgesehene Geräte nur auf einer ebenen Grundfläche montiert werden und nicht über Kopf.

Warnung: (Nur für optische Sender sowie deren Verteilperipherie) Blicken Sie auf keinen Fall direkt oder indirekt in den Laserstrahl. Schließen Sie das Gerät erst an die Stromversorgung an, wenn alle elektrischen und optischen Leitungen sicher verbunden sind.

Warnung: Die Sicherheitsbestimmungen der jeweils aktuellen Normen EN 60728-11 und EN 60065 sind zwingend einzuhalten.

Warnung: Befolgen Sie auch alle anwendbaren nationalen Sicherheitsvorschriften und Normen.

Warnung: Der Netzstecker des Gerätes muß jederzeit leicht erreichbar sein.

Warnung: Befolgen Sie alle Instruktionen in den gerätespezifischen Bedienungsanleitungen

2. Betrieb

Gefahr: Das Gerät darf nur in trockenen Räumen bei nicht tropischem Klima betrieben werden. In feuchten Räumen oder im Freien besteht die Gefahr von
Kurzschluß (Brandgefahr) oder elektrischen Schlag (Lebensgefahr).

Gefahr: Stecken Sie keine Gegenstände durch die Lüftungsschlitze. Gefahr durch elektrischen Schlag (Lebensgefahr).

Gefahr: Stellen Sie keine mit Flüssigkeit gefüllten Gefäße (wie z. B. Vasen) auf das Gerät. Es droht Gefahr durch elektrischen Schlag (Lebensgefahr) oder

(Brandgefahr).

Gefahr: Es dürfen keine offenen Brandquellen, wie z. B. brennende Kerzen, auf das Gerät gestellt werden (Brandgefahr).

Gefahr: Sorgen Sie für einen Freiraum von mindestens 20cm um das Gerät. Die Belüftung des Gerätes darf nicht durch Abdecken der Belüftungsöffnungen mit
Gegenständen wie z. B. Zeitungen, Tischdecken, Gardinen usw. behindert werden (Brandgefahr).

Warnung: Befolgen Sie alle Instruktionen in der gerätespezifischen Bedienungsanleitung.

4. Wartung

Gefahr: Wartungsarbeiten sind stets von sachverständigen Personen (siehe EN 60065) vorzunehmen.

Gefahr: Keine Servicearbeiten bei Gewitter. Es droht Gefahr eines elektrischen Schlags (Lebensgefahr).

Warnung: (nur für Geräte mit Batterie): Explosionsgefahr bei unsachgemäßem Auswechseln der Batterie. Ersatz nur durch den gleichen Typ!

Warnung: Batterien dürfen nicht übermäßiger Wärme wie Sonnenschein, Feuer oder dergleichen ausgesetzt werden (Explosionsgefahr).

Warnung: Verwenden Sie nur das Zubehör des Herstellers oder Zubehör mit identischen technischen Eigenschaften.

Warnung: (Bei optischen Sendern sowie deren Verteilperipherie) ziehen Sie den Netzstecker bevor das Gerät ausgebaut wird.

5. Reparatur

Gefahr: Das Gerät darf nur durch sachverständige Personen (siehe EN 60065) geöffnet werden. Vor Öffnen des Gerätes Netzstecker ziehen
bzw. Stromzuführung entfernen, andernfalls besteht Lebensgefahr! Das Gerät darf nur mit montierter Netzteilabdeckung an Spannung angeschlossen und betrieben werden. Dies gilt auch, wenn Sie das Gerät reinigen oder an den Anschlüssen arbeiten.

Gefahr: Reparaturen am Gerät sind ausschließlich vom Fachmann (siehe EN 60065) unter Beachtung der geltenden VDE-Richtlinien durchzuführen.

Gefahr: Verwenden Sie nur Bauteile des gleichen Typs und mit identischen technischen Eigenschaften für die Reparatur, andernfalls droht Gefahr eines elektrischen Schlags (Lebensgefahr) und Brandgefahr.

Warnung: (Bei optischen Sendern sowie deren Verteilperipherie) ziehen Sie den Netzstecker bevor das Gerät ausgebaut wird.

Bei Fragen zur Reparatur wenden Sie sich an den IRENIS-Service:

E-Mail: info@blankom.de , Kontakt: www.blankom.de

6. Verkauf

Vorsicht: Im Falle eines Verkaufs müssen diese Sicherheitshinweise und die Bedienungsanleitung des entsprechenden Geräts dem Käufer ausgehändigt werden.

7. Entsorgung

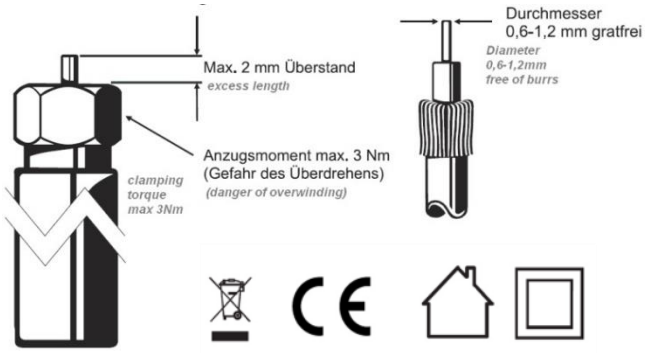
Vorsicht: Entsorgen Sie das Gerät entsprechend den geltenden umweltrechtlichen Bestimmungen. Elektrische und elektronische Geräte dürfen nicht in den Hausmüll!

Vorsicht: Entsorgen Sie Batterien (falls vorhanden), entsprechend den geltenden umweltrechtlichen Bestimmungen.

Verpackungen können an uns zurückgeschickt werden. Wir kümmern uns um Recycling und/oder fachgerechte Entsorgung.

Installation guide for F-connectors:

/ Installationshinweis für den F-Anschluß:



Die LNB-Anschlüsse sind meist entsprechend gekennzeichnet

The LNC –connectors at Multiswitches are almost marked as:

HH= Horizontal High-Band

HL = Horizontal Low-Band = LH

VL = Vertical Low-Band = LV

VH= Vertical High-Band = HV

Elektronische Geräte gehören nicht in den Hausmüll, sondern müssen - gemäß Richtlinie 2002/96/EG DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 27. Januar 2003 über Elektro- und Elektronik-Altgeräte fachgerecht entsorgt werden.
Bitte geben Sie dieses Gerät am Ende seiner Verwendung zur Entsorgung an den dafür vorgesehenen öffentlichen Sammelstellen ab.

Electronic equipment is not household waste - in accordance with directive 2002/96/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL dated 27th January 2003 on used electrical and electronic equipment, it must be disposed of properly.
At the end of its service life, take this unit for disposal to an appropriate official collection point

Zur Beachtung / ***Important notes:***

- Auf das Netzgerät dürfen keine mit Flüssigkeit gefüllten Gegenstände gestellt werden.
- *No liquid-filled items may be placed on top of the power supply unit.*
- Das Netzgerät darf nicht Tropf- oder Spritzwasser ausgesetzt sein.
- *The power supply unit must not be exposed to dripping or splashing water.*
- Der Netzstecker muss ohne Schwierigkeiten zugänglich und benutzbar sein.
- *The mains plug must be easily accessible and operable.*
- Das Gerät kann nur durch Ziehen des Netzsteckers vom Netz getrennt werden.
- *The only reliable method of disconnecting the unit from the mains is to unplug it.*
- Bei größerem Durchmesser des Kabel- Innenleiters als 1,2 mm bzw. Grat können die Gerätebuchsen zerstört werden.
- *If the inner cable conductor diameter is greater than 1.2 mm or in case of burr, the device sockets may be destroyed.*

Bitte installieren Sie die Anschlüsse gemäß dem Aufdruck
Please install according to the sticker on the Multiswitch
Hinweis: Elektrische Installationen sollten nur durch geschultes Fachpersonal vorgenommen werden!
Note: Electrical installations should only be done by well-educated and skilled technicians!

Contact:

IRENIS GmbH
Hauptstr. 29
31171 Nordstemmen- Germany
Phone: +49 5069 4809781
Managing Director: Dipl.Ing. Murad Önol
Commercial Register: HRB 206370 / District Court Hildesheim
Web: www.blankom.de **E-Mail:** info@blankom.de

Conversion Table

Level (dBµV) / Voltages (mV)

Level (dBµV)	0	1	2	3	4	5	6	7	8	9
40	0,10	0,11	0,13	0,14	0,16	0,18	0,20	0,22	0,25	0,28
50	0,32	0,36	0,40	0,45	0,50	0,56	0,63	0,71	0,79	0,89
60	1	1,1	1,3	1,4	1,6	1,8	2	2,2	2,5	2,8
70	3,2	3,6	4	4,5	5	5,6	6	7	8	9
80	10	11	13	14	16	18	20	22	25	28
90	32	36	40	45	50	56	63	71	79	89
100	100	112	126	141	158	178	200	224	251	281
110	316	355	398	447	501	562	631	708	794	891
120	1000	1122	1259	1413	1585	1778	2000	2239	2512	2818

Max. Levels/Min. Levels for Antenna Sockets accord. DIN EN50083-7

Range	Level Min. dBµV	max.
FM (Mono)	40	70
FM (Stereo)	50	70
B I, Midband, B III, Superband, Ext. Superband, B IV/V	60	80*)

*) 77 dBµV for systems distributing more than 20 channels.