HDC 5004 / 5008

IP to 8 QAM or DVB-T Modulator

EDGE-QAM/COFDM User Manual

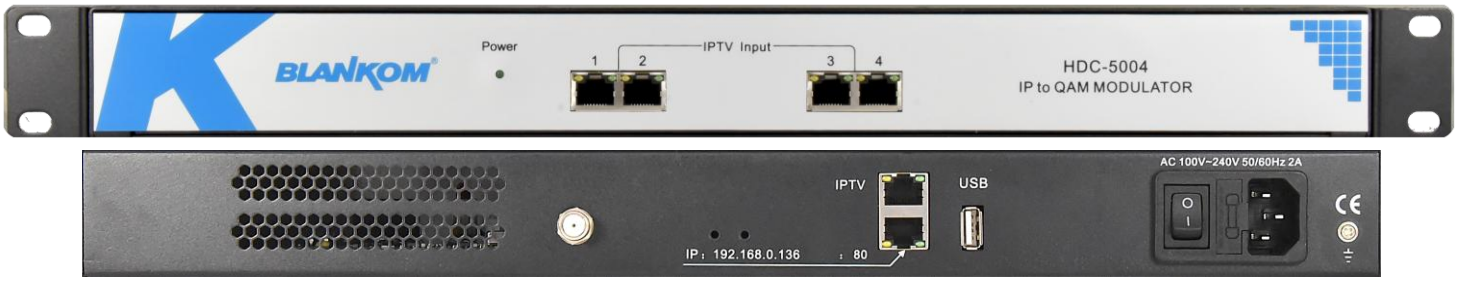


Table of Content

Chapter 1 Product Overview

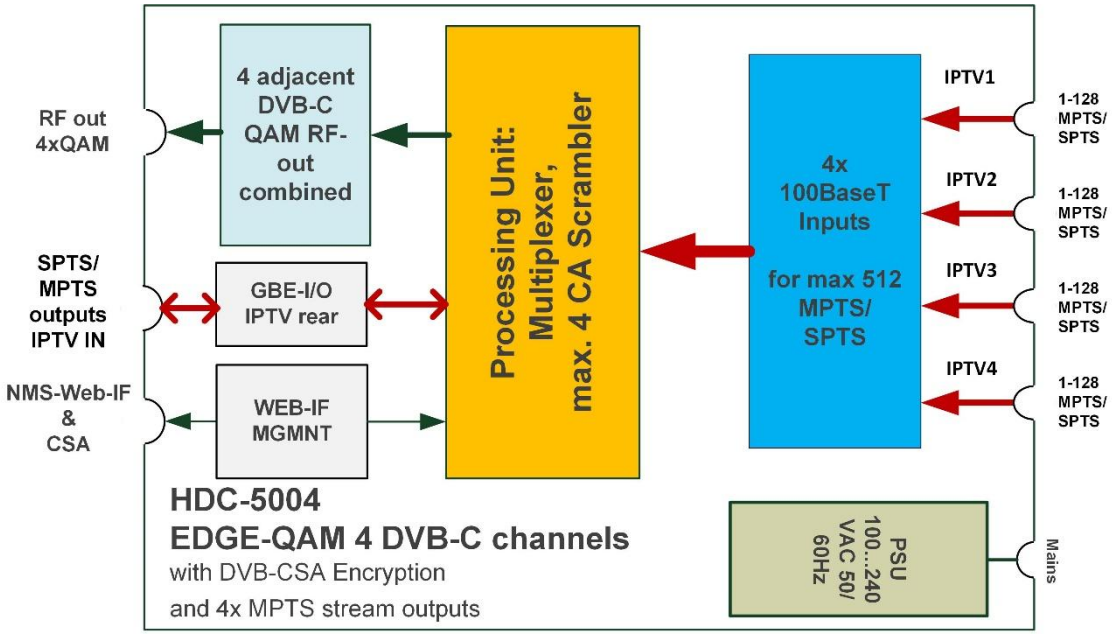
1.1 Outline

This HDM-5004 IP to QAM modulator is an all-in-one device integrated with multiplexing, scrambling and modulation in 1RU. It has 512 IP (SPTS/MPTS) input over UDP/RTP with 4 (5) Ethernet ports. After multiplexing, scrambling and modulating process, it gives 4 DVB-C adjacent carriers (30MHz…1000MHz) output through the RF output. To meet various requirements, this device is also equipped with 1 Data-Out port for 4x IP (SPTS/MPTS) output over UDP protocol. With the features of low cost and high performance, HDM-5004 is very adaptable to IPTV systems.

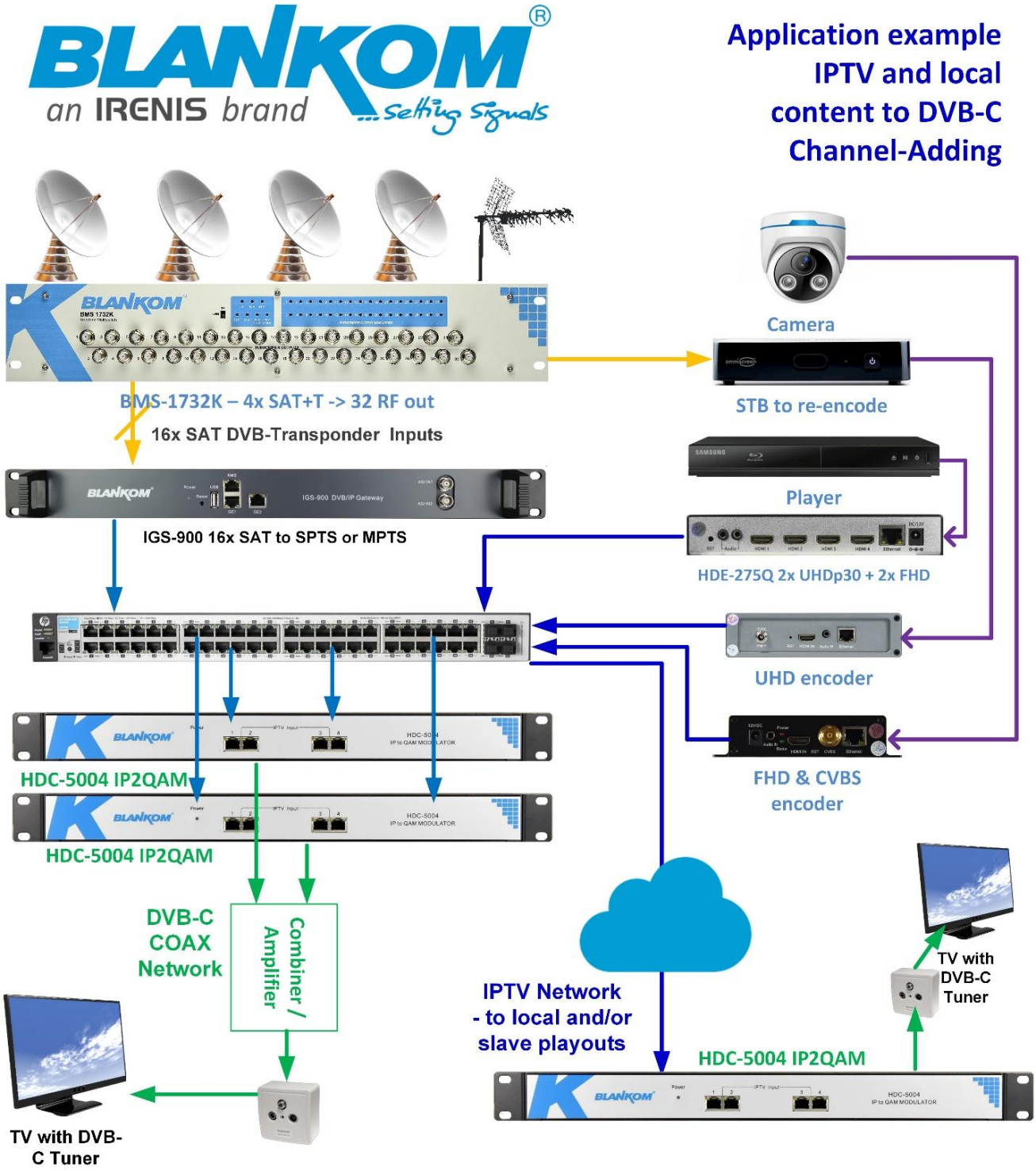
1.2 Key Features

- 4 Ethernet IP input ports (IPTV 1,2,3,4) 1 IP 4x MPTS outputs (DATA=REAR panel)
- 512 IP (SPTS/MPTS) input over UDP/RTP protocol
- Support up to 748 PID's remapping per channel
- PCR adjusting/PSI/SI editing and inserting /PID Remapping/PID pass
- Excellent RF output performance index, MER≥40db
- 4 multiplexed or scrambled TS over UDP output
- 4 adjacent QAM carriers' output, compliant to DVB-C (EN 300 429) and ITU-T J.83 A/B/C
- USB for upgrading CPU/FPGA
- IPTV Synchronization & NTP -> TDT
- Web-based Network management

1.3 Block Diagram



1.3.1 Application Example



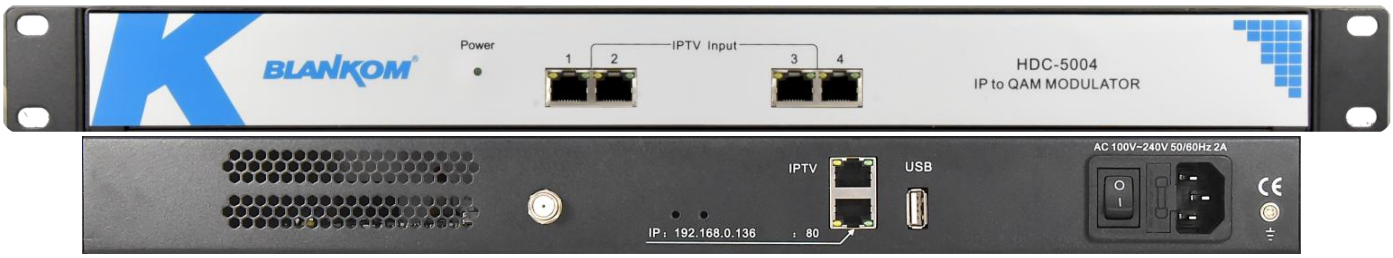
We assume, that the user is familiar with all abbreviations mentioned in this manual which is written for skilled RF technicians and DVB-specialists.

1.5 Specifications

Input	Input	512 from 4x IP inputs by 100Mb/s Ethernet Ports
	Transport Protocol	TS over UDP/RTP, unicast and multicast, IGMP V2/V3
	Transmission Rate	max 84Mbps for each IPTV-1…4 input
Mux	Remapping	Max. 780 PIDs per Channel
	Output Channel	4 adjacent -> 4x IP out as MPTS (from 4 MUX)
	Functions	PID remapping (auto / manually)
		PCR restamping
		PSI/SI table automatically generating NIT, LCN generation and inserting, auto or manual
Encryption Parameters	Max simulcrypt CA	4
	CA Standard	ETR289, ETSI 101 197, ETSI 103 197
	Connection	Local/remote connection to CAS
Modulation Parameters	QAM Channel	4 adjacent carrier
	Modulation Standard	DVB-C Annex A/C and B *EN300 429/ITU-T J.83A/B*
	Symbol Rate	5.0...9.0 Msps, 1 kSps steps, FEC
	Constellation	16, 32, 64, 128, 256QAM *dep. On A/C or B*
	FEC	RS (204, 188) inner/outer configurable
RF Output	Interface	1 F-type output port for 4 QAM channel, 75Ω impedance
	RF Range	30...1000 MHz, 1kHz steps
	Output Level	-10 dBm...+0 dBm (87...107 dbµV), 0.1dB steps
	MER	≥ 40dB
	ACLR	-60 dBc
TS output	4 MPTS IP output over UDP/RTP multicast by 1x100/1000M Gbit-Ethernet Port (@ Rear – IPTV –port)	
System	Network management software (NMS) support (Rear: 100BaseT) and USB port upgrade support	
General	Dimensions	19'' 1U: 430mm×180mm×44mm (WxLxH)
	Weight	3kg
	Temperature	0...45℃ (operation), -20...80℃ (storage)
	Power Supply	AC 100V±10%, 50/60Hz or AC 220V±10%, 50/60Hz
	Consumption	15.4W

Chapter 2: Connection Description

2.1 Front & Rear panel



Front:	Power LED, 4x IPTV 1…4 **Input stream RJ45** ports
Rear left	RF output F-female 75 Ohm
…	IPTV GbE Input/Output (**Output** of the 4x MPTS from the QAM Muxes)
…	NMS/CAS: Network management port and CAS data port
	USB-Port for Firmware upgrade or TS-Player for INFO-Channels
…	Power switch, Fuse
…	AC IEC Power Socket
Rear right	Grounding

Chapter 3 Installation Guide

3.1 Acquisition Check

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

- HDC-5004 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 5 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. (No https)
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 as Figure-1. Input the Username and Password (Both the default ***Username and Password are "admin".***
And then click "Login" to start the device setting.

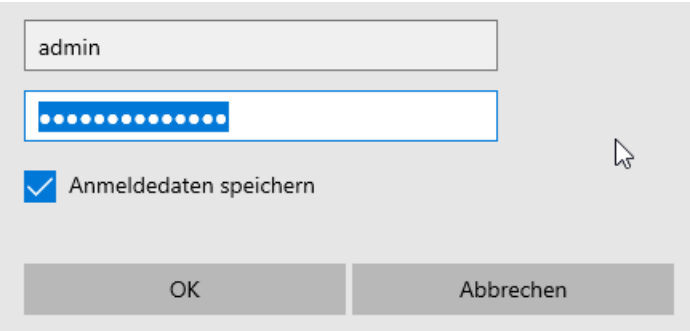


Figure-1

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:

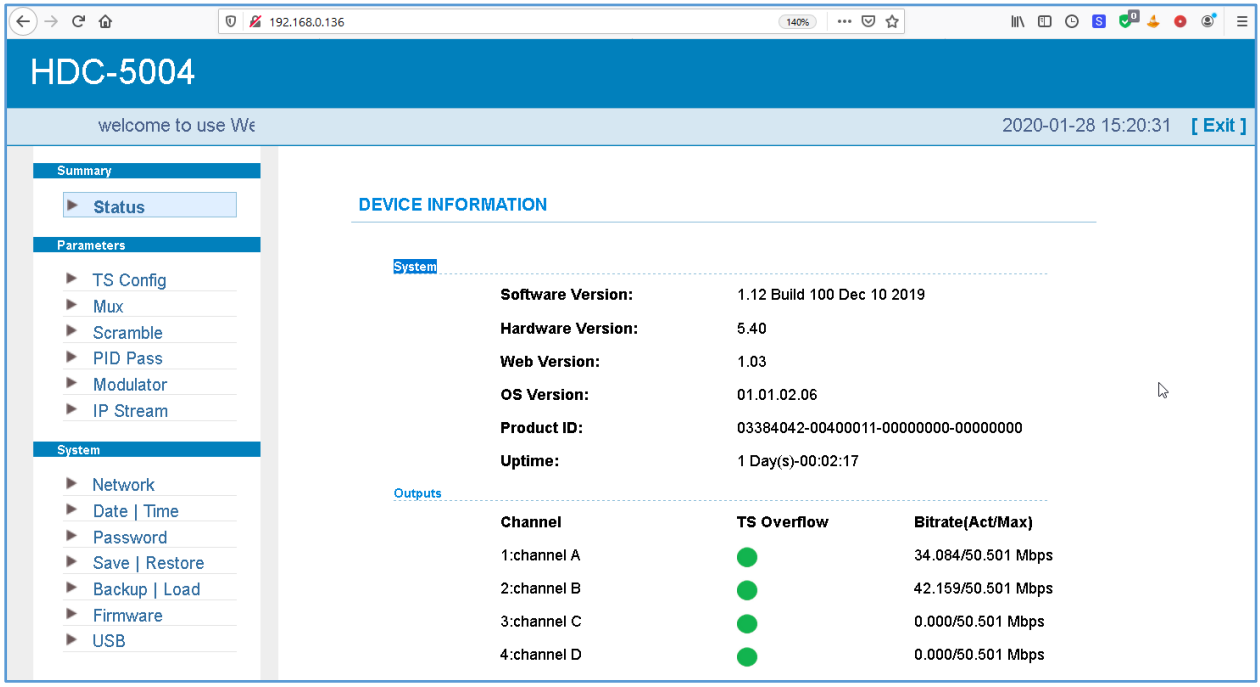
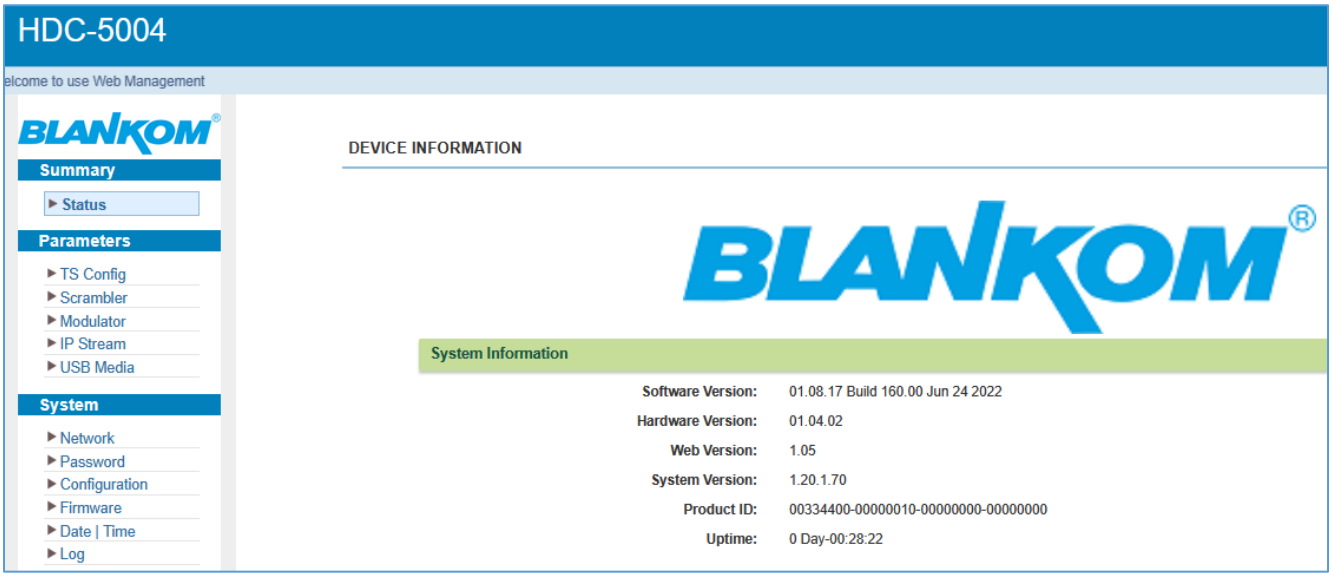


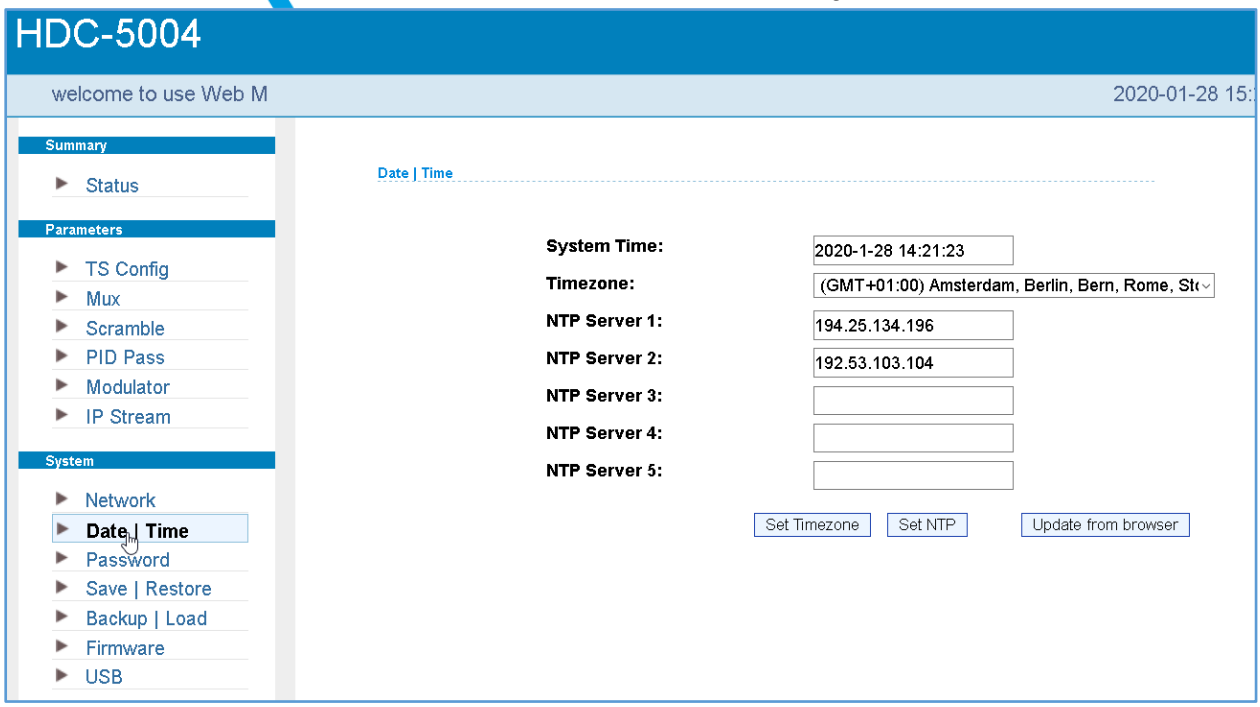
Figure-2

Or to show the latest Version:

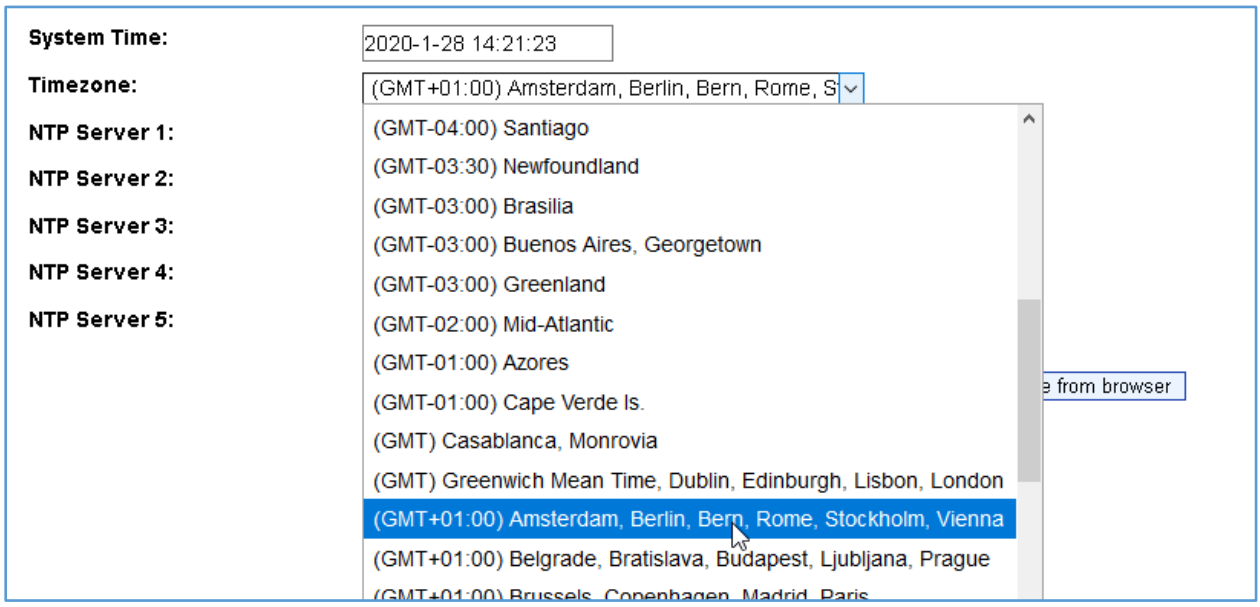


4.2.1.1 Setting Date and Time

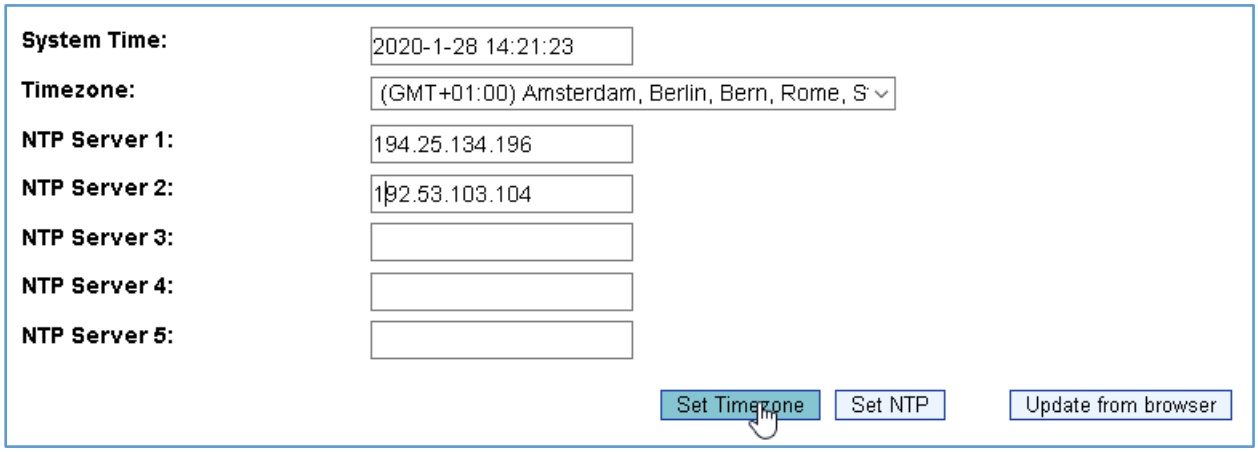
The device supports setting of Date and Time by a) browser you are using to the web-IF – so your computer. But for the correct Time and Date it is almost better to configure time zone + NTP servers:



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



first set time zone than config NTP-Server!



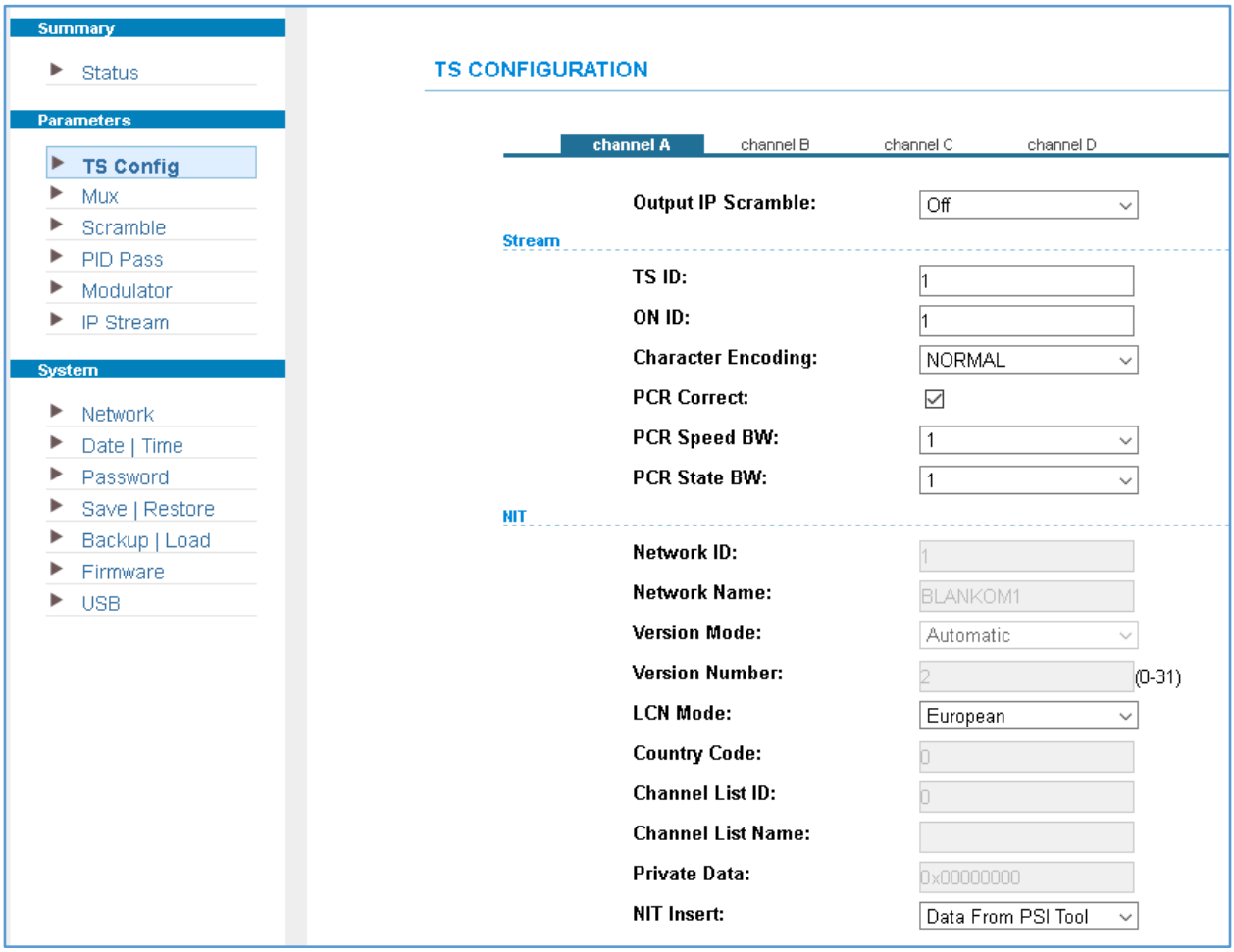
And you are done – but your Device need a connection to these NTP addresses. -> Local Gateway settings should fit as well to asure the connection to external NTP servers via Internet. The NTP or the correct time is needed for the

TDT Injection to the output multiplexes. TOT offset table can be injected from an IP stream by PID forwarding iof necessary.

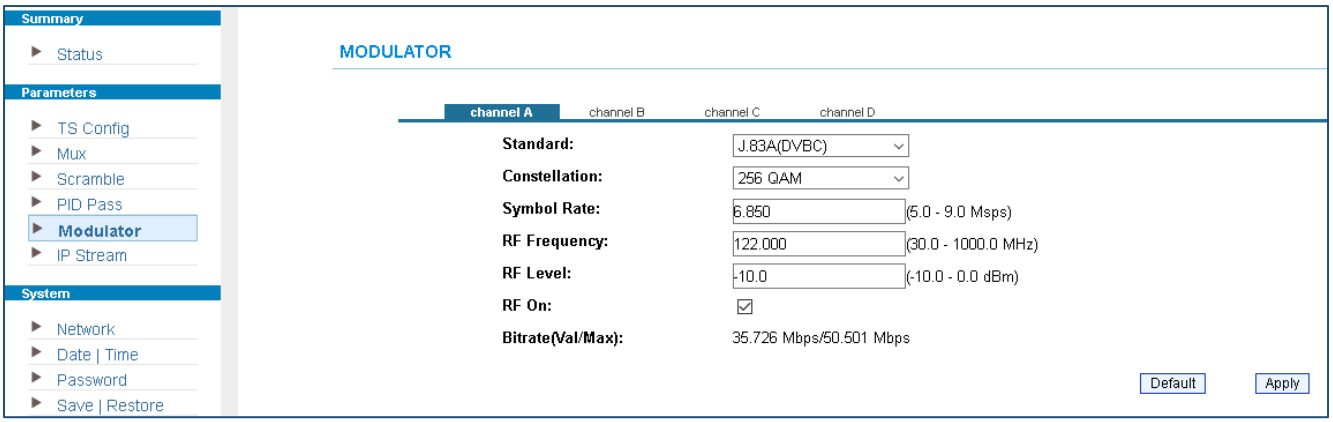
4.2.2 Parameters "TS Config" - Menu

- **The TS Config Menu sets the basics for your 4 QAM channels**

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.

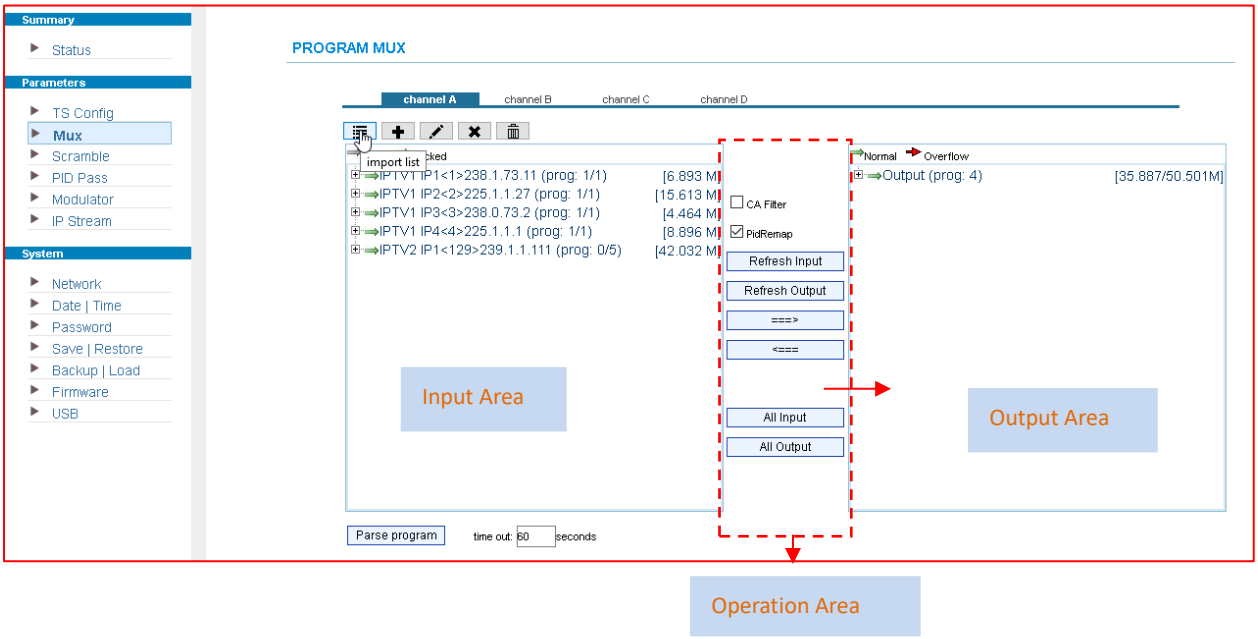


Corresponding with:



Please do not use ITU –DVB for Europe, because that's related to US and Korea… EU= J83A

The MUX Menu:



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 and also PID forwarding). If similar PIDs are in the Input streams, please remap them avoiding conflicts

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.

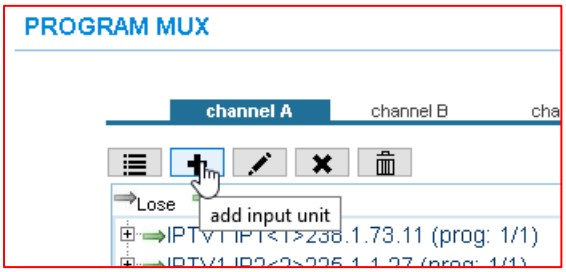
<=== Similarly, you can remove TV Services from the multiplex in the right box.

All Input To select all the input programs

All Output To select all the output programs

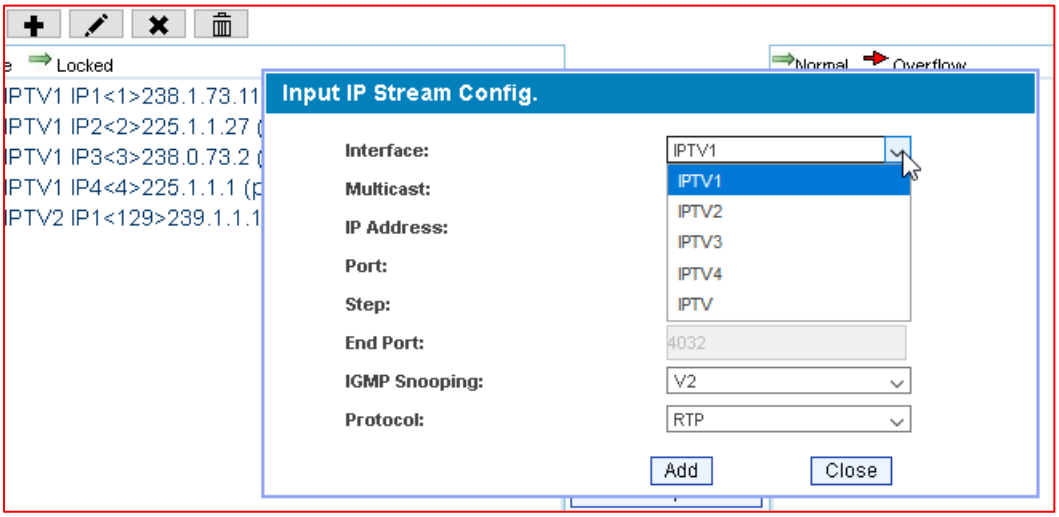
Parse program To parse programs time out: 60 seconds time limitation of parsing input programs from TS

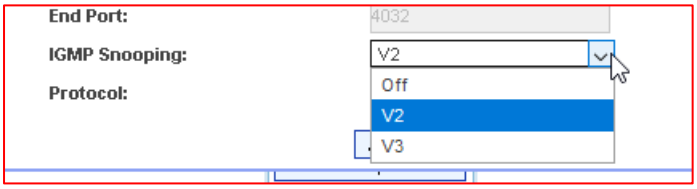
This must be used for every Input stream to read its content after setting up the IP addresses:



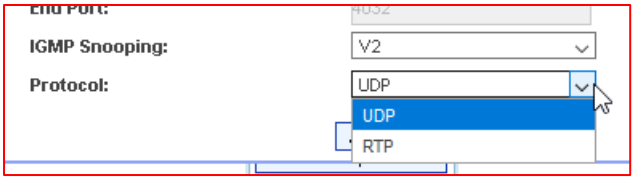
Window opens….

Select the input RJ45 port: 'IPTV 1…4' or Rear-Side 'IPTV'



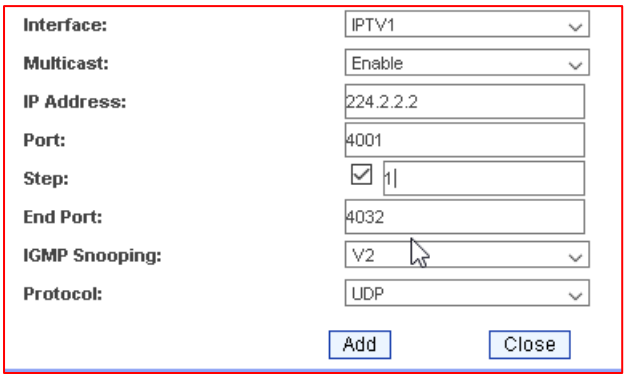


Select IGMP Version or OFF (not useful)



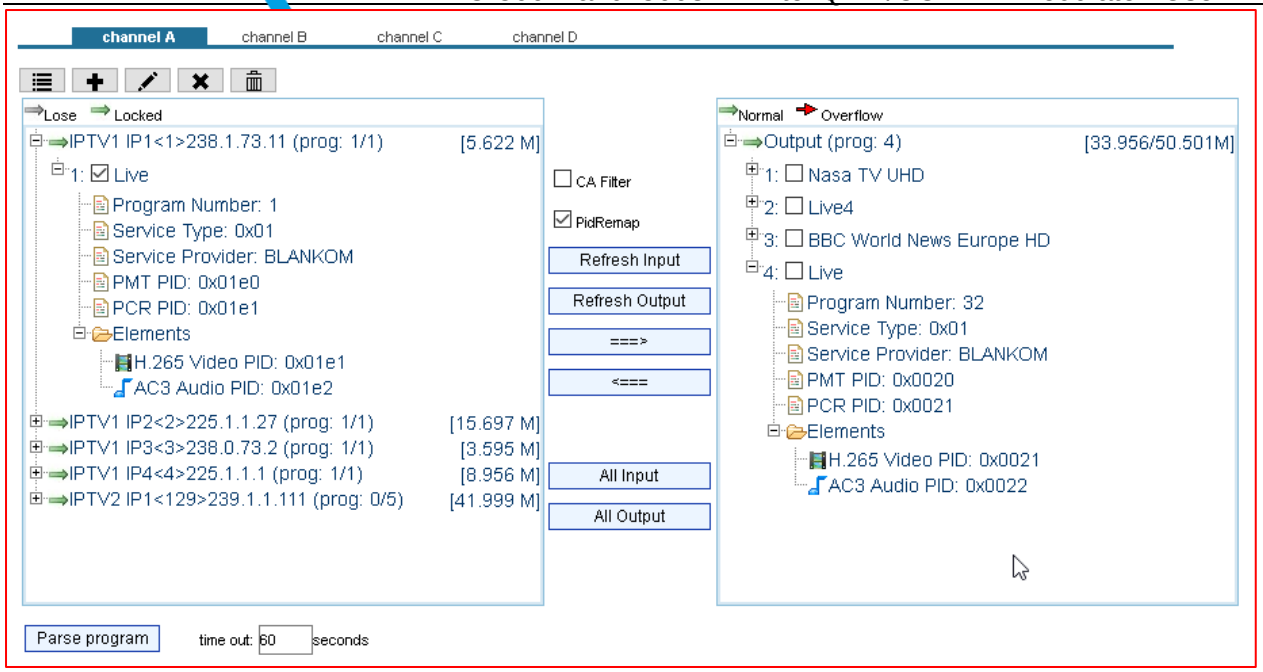
Select Input protocol of the stream UDP/RTP

You can address 1 or many IPTV streams:

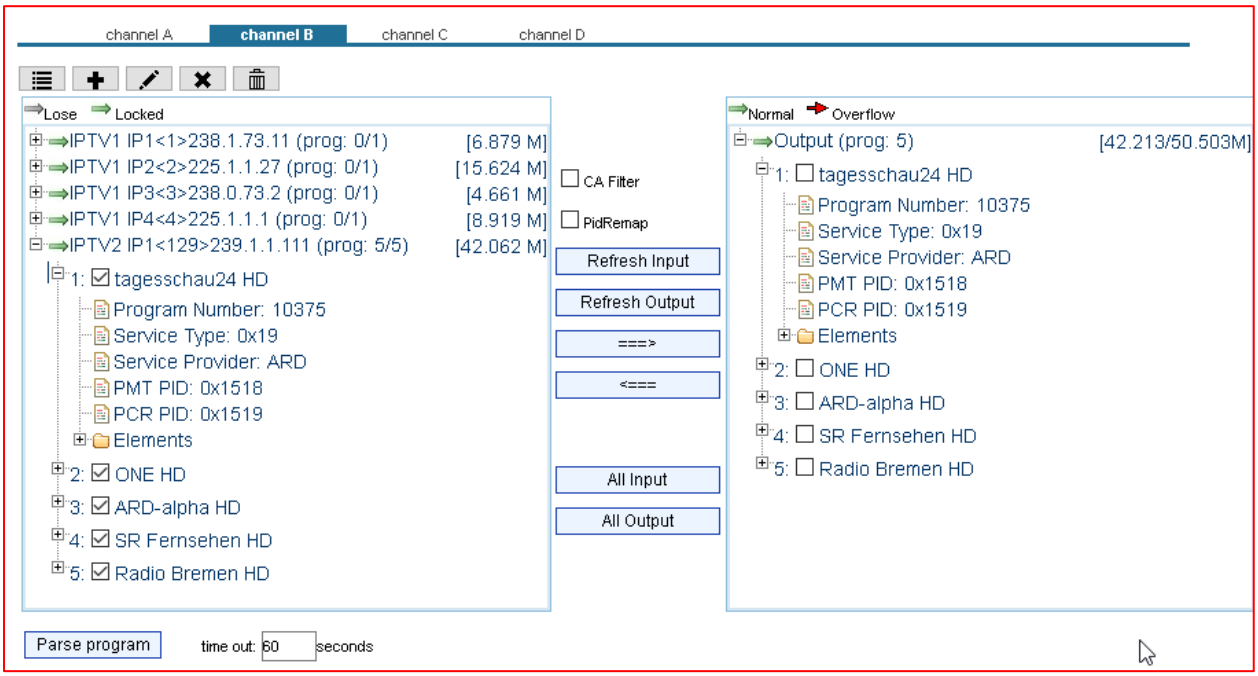


Finally Add and Close this window.

Your streams shown in the left window will cover all of them. Do not forget to PARSE them to get the content.



Example with PID-remapping.

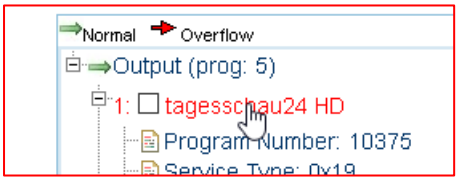


And w/o - > MPTS Input to DVB-C Channel 2 output

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 apopup as dialog box (Figure 6) where you can change or insert new data or even rename the service.

Press:



->

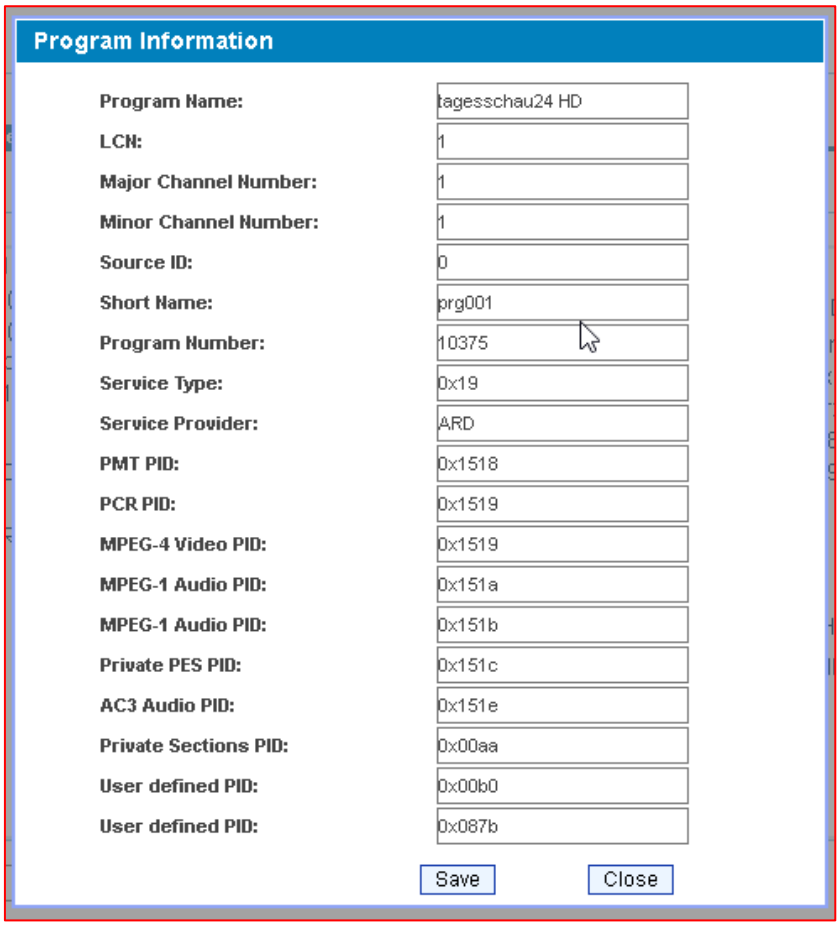
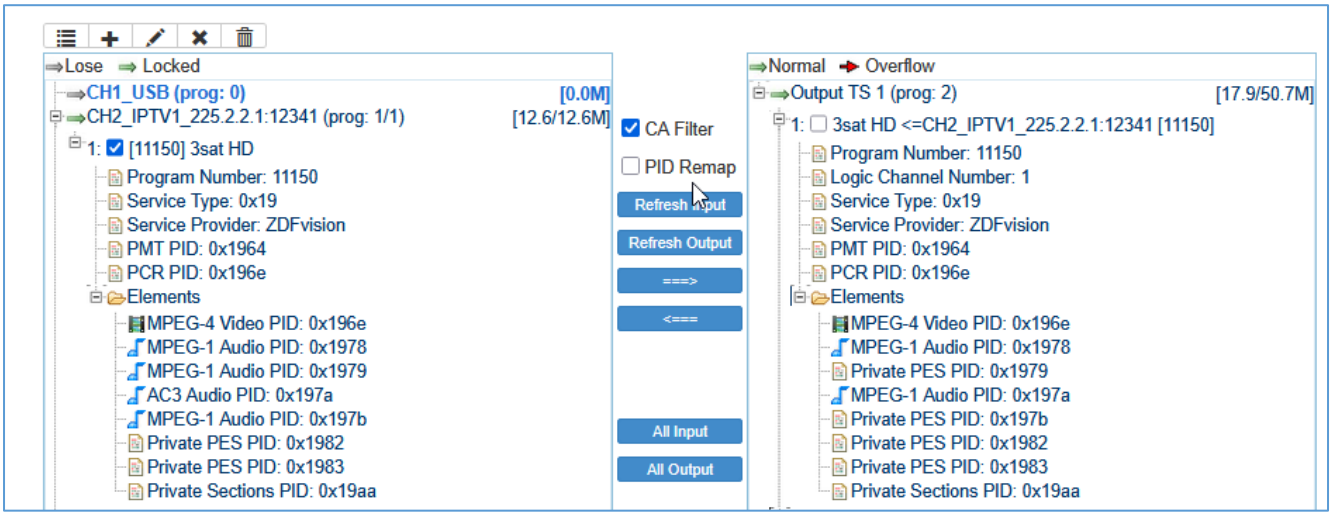


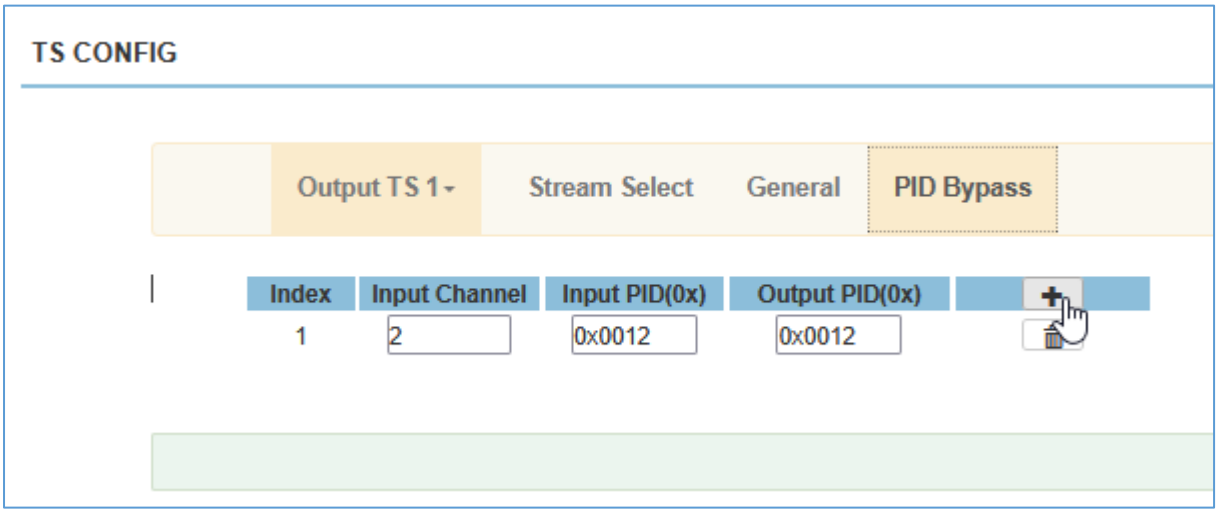
Figure 6

Passing EPG:

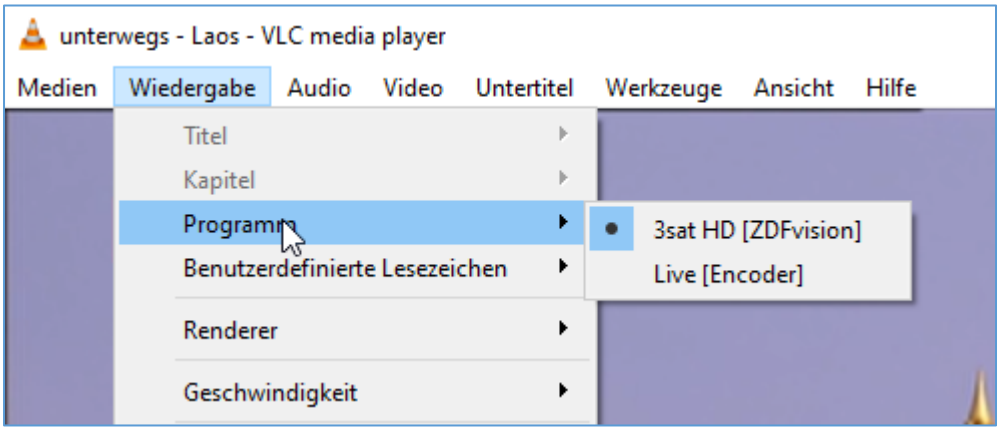
If 1 or more inputs are carrying the EIT table and you want to pass it to the Modulator output, you should consider:
1st: Do not use the PID-remapping:



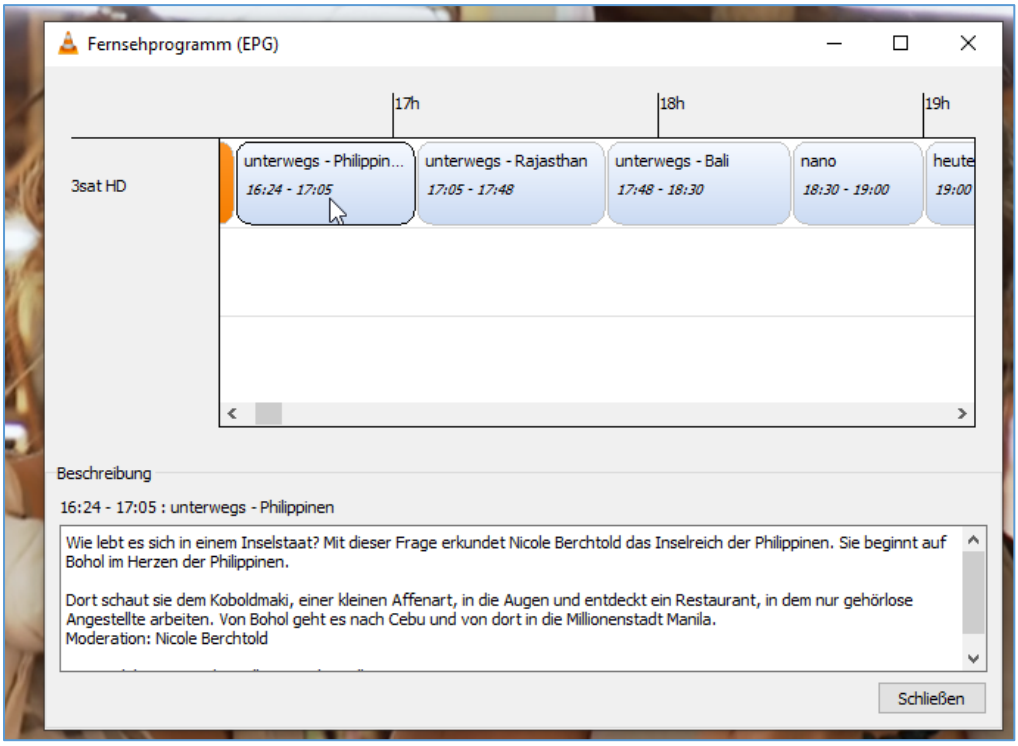
Then enter into



Select the right Channel input you have an SPTS (or MPTS) with EIT on PID12hex, add 12 pass to 12 out and you are good:
Check with VLC: (MPTS output on DATA-port at the rear-panel):



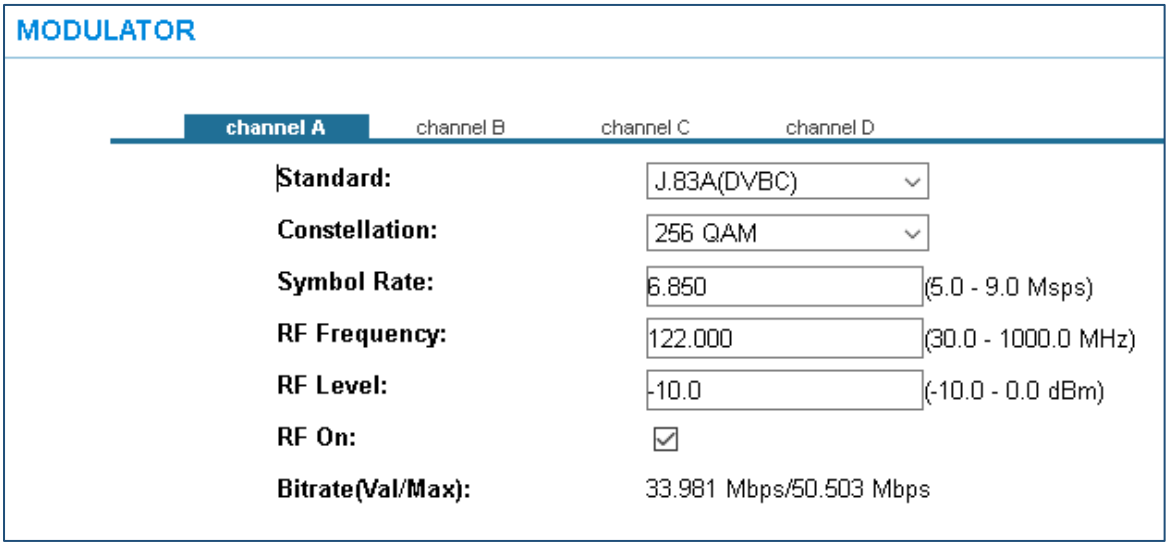
-> Werkzeuge -> EPG:



Attention: The Unit does NOT remultiplex the EIT-PID Database from different sources!!!

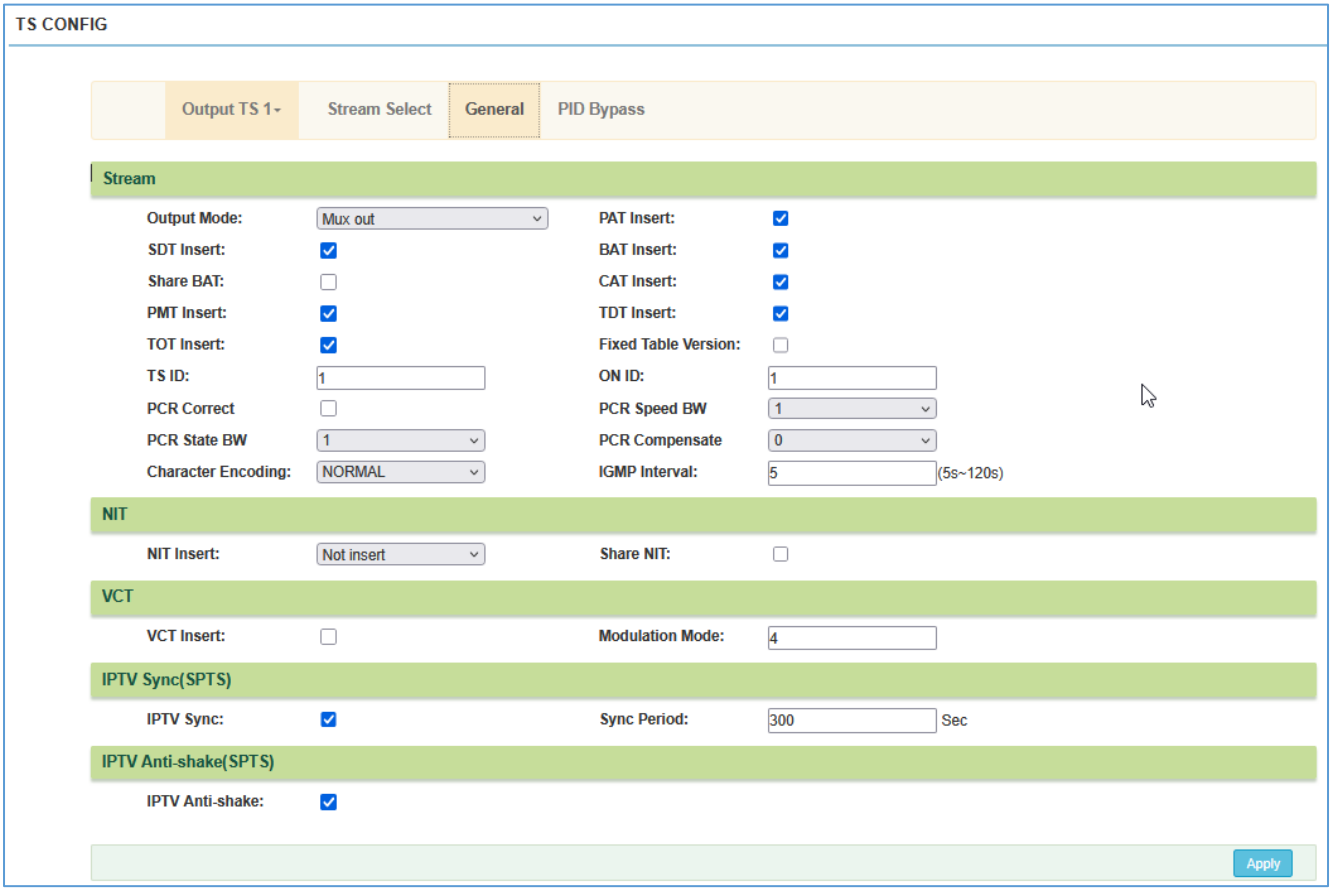
RF-Output settings:

4 adjacent channels- first channel sets up the start frequency (middle), all need same QAM mode 16…256 and symbol rates, independent output level attenuation…:

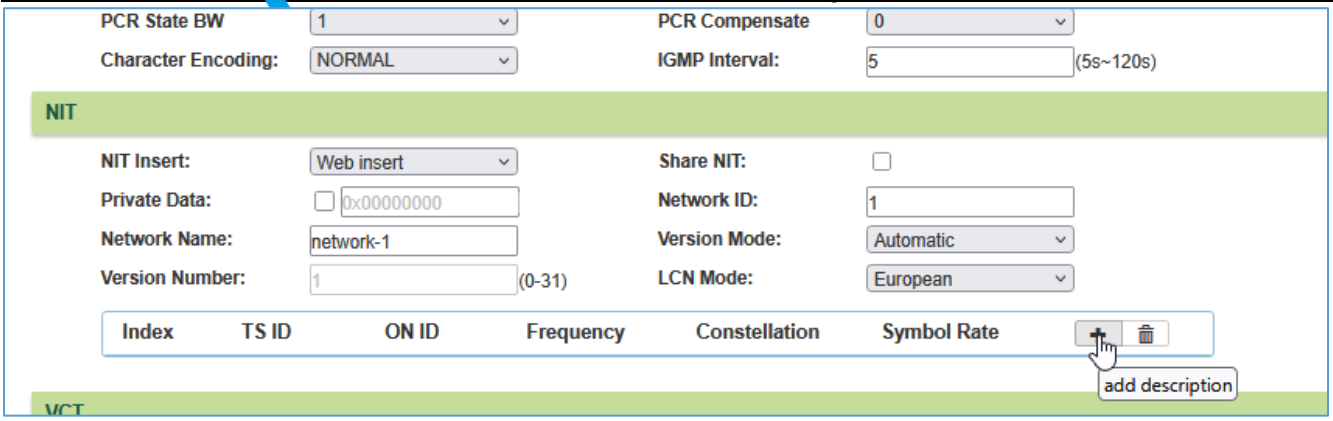


For the output level, see Annex – conversion table dBm -> dBµV.
Set QAM Mode (Annex A/C = Normal DVB, Annex B = US Norm), mode 16…256 QAM and other values. This setup configures adjacent channel from a start frequency.
To individually configure the 4 channels set them accordingly in every single config mode.

DVB-tables:

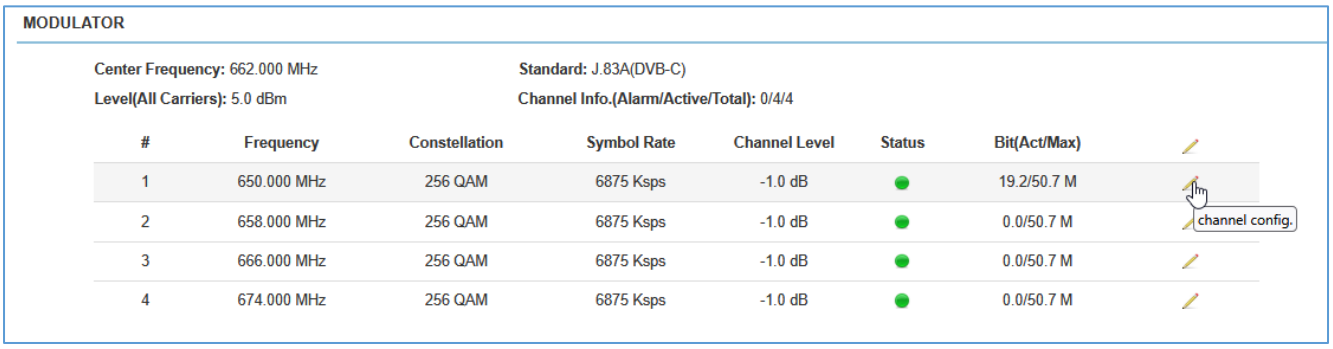


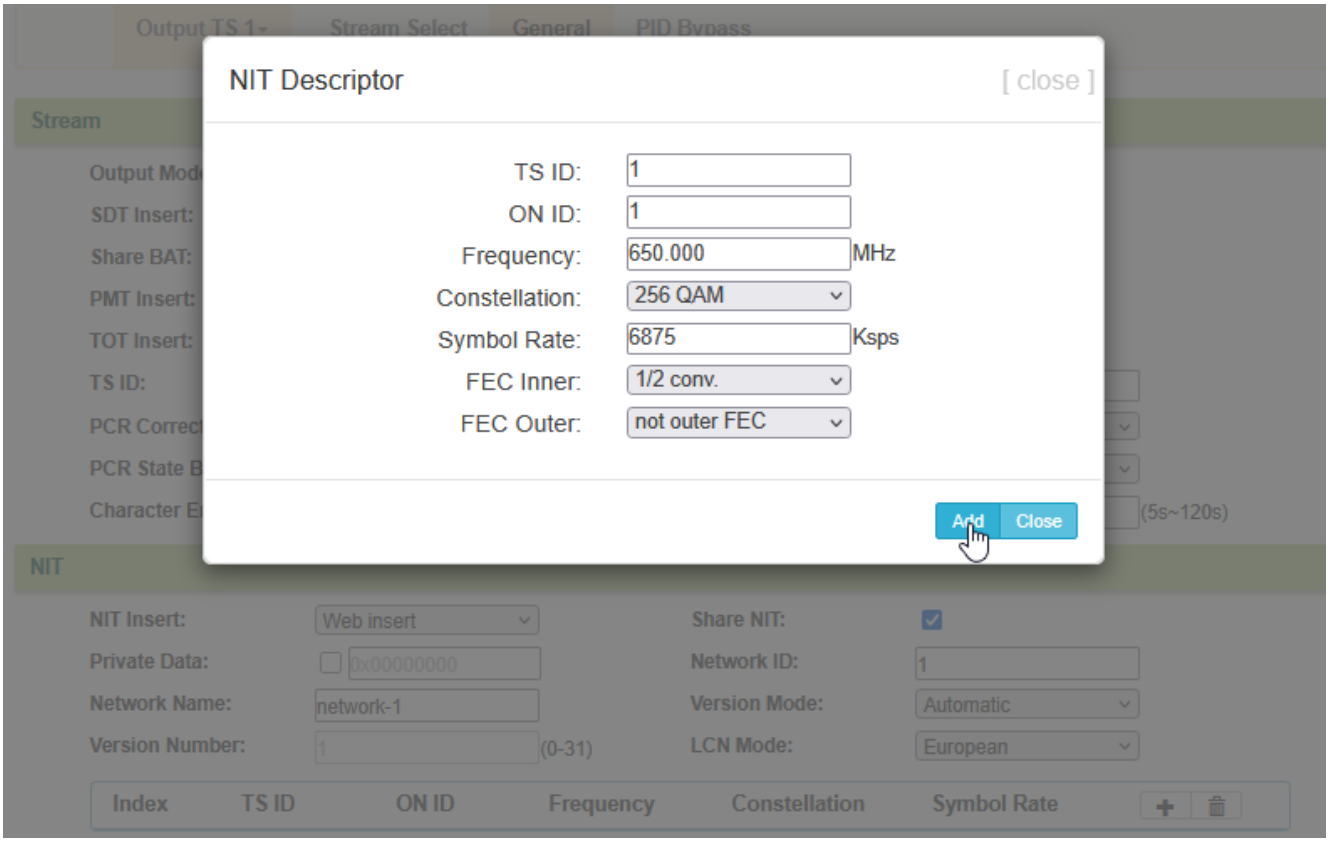
You can add the NIT by adding manually all frequencies (and also from the rest of the cable-network):



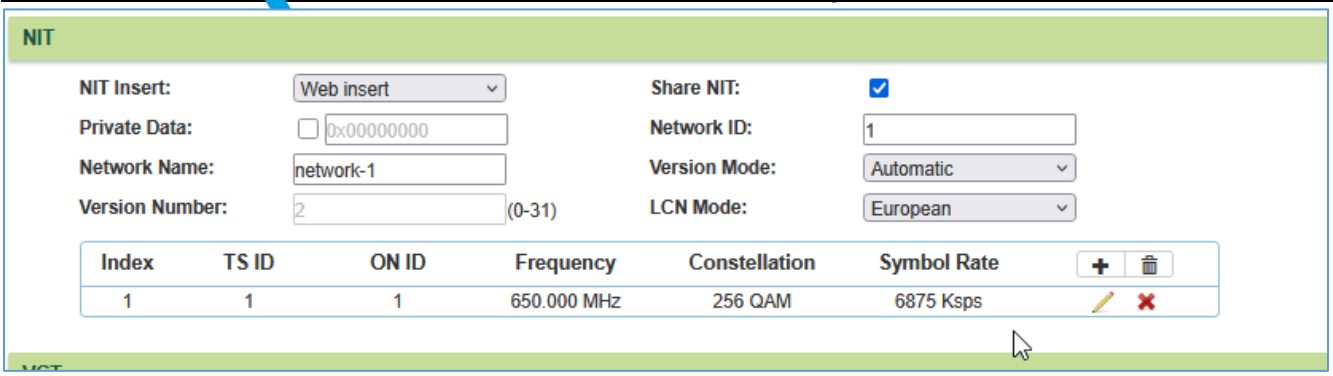
Remark: BAT is almost not necessary, TDT/TOT might work if you set the internal clock date correctly by using an NTP server address.

The NIT should contain its own values:



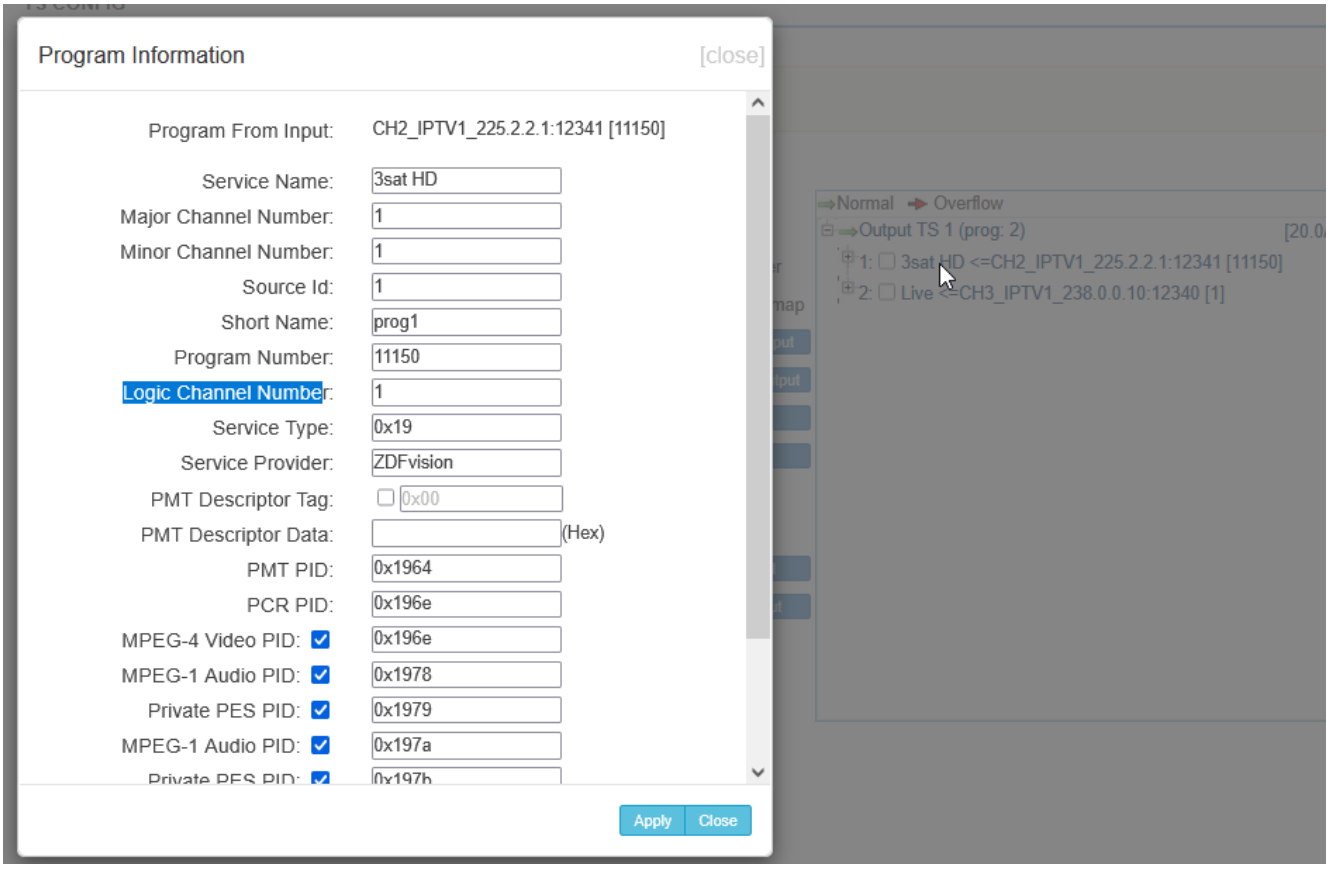


See:



Enter the next….

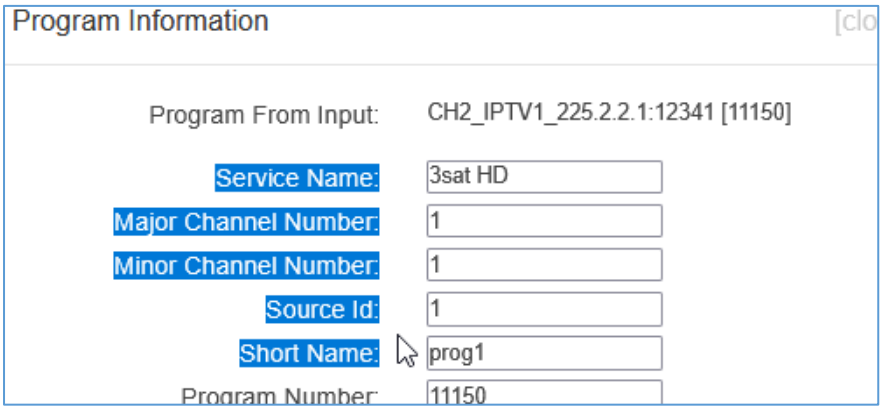
In the single stream menu by double-click:



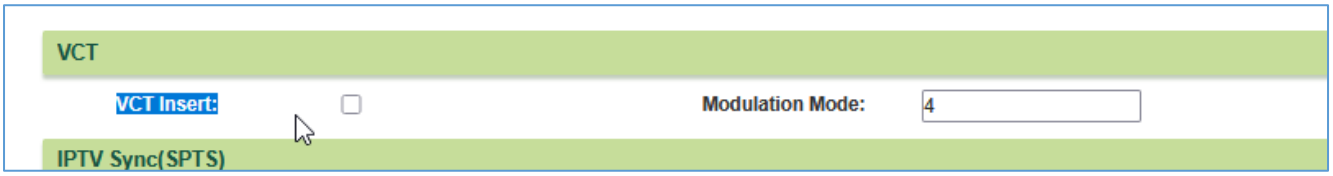
You can assign the LCN to the service.

Please do not give double values to the different services: always different ones please.

For DVB-C except in USA and Korea, you can ignore these settings because they are belonging to ATSC/ITU-J83 Annex B = US norm with 6 MHz:



and



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 – check local T2 frequencies please.

Chapter 5 Troubleshooting

Our ISO9001 quality assurance system has been approved by CQC organization. We guarantee the products' quality, reliability and stability. All of our products have been passed the testing and inspection before shipping out from factory. The testing and inspection scheme already covers all the Optical, Electronic and Mechanical criteria which have been published by us. To prevent potential hazard, please strictly follow the operational conditions.

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 need to unplug 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

Chapter 6 Packing list

- HDC-5004 IP QAM Modulator 1 pc
- User's Manual (check www.blankom.de -> Downloads) 1 pc
- Power Cord, dep. on country 1 pc

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

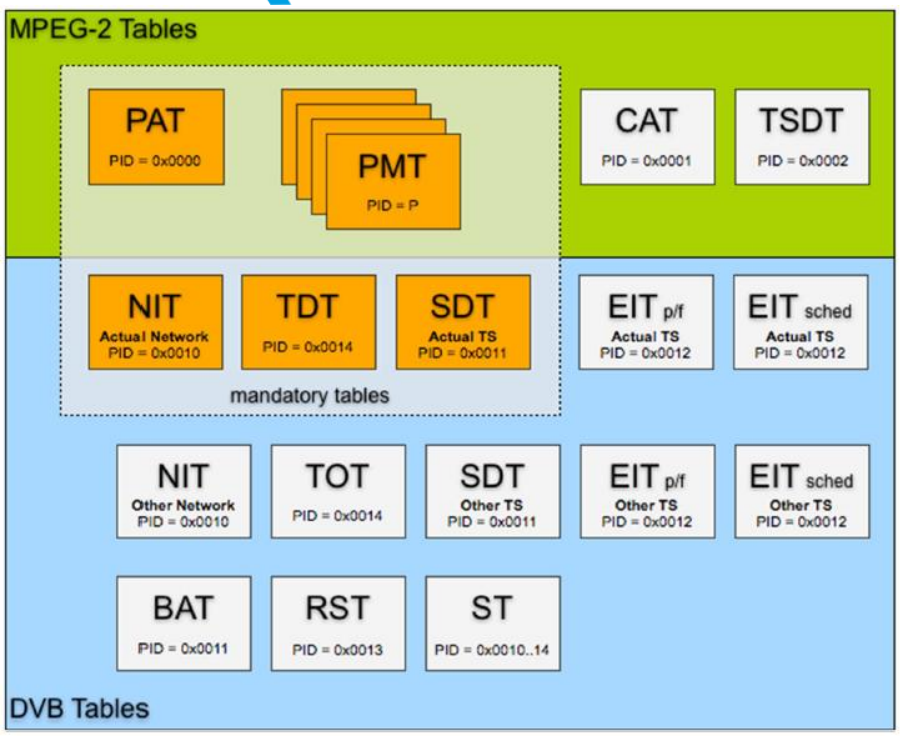


Table 1: PID allocation for SI

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

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

[illegible]

l'environnement. Renseignez-vous auprès de l'organisme compétent.

[illegible]

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

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 or 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

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

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

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.

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.

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

Verkauf

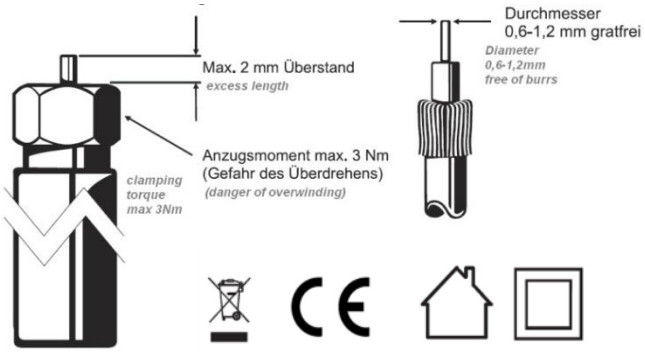
Vorsicht: Im Falle eines Verkaufs müssen diese Sicherheitshinweise und die Bedienungsanleitung des entsprechenden Geräts dem Käufer ausgehändigt werden.

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:



SAT: 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:

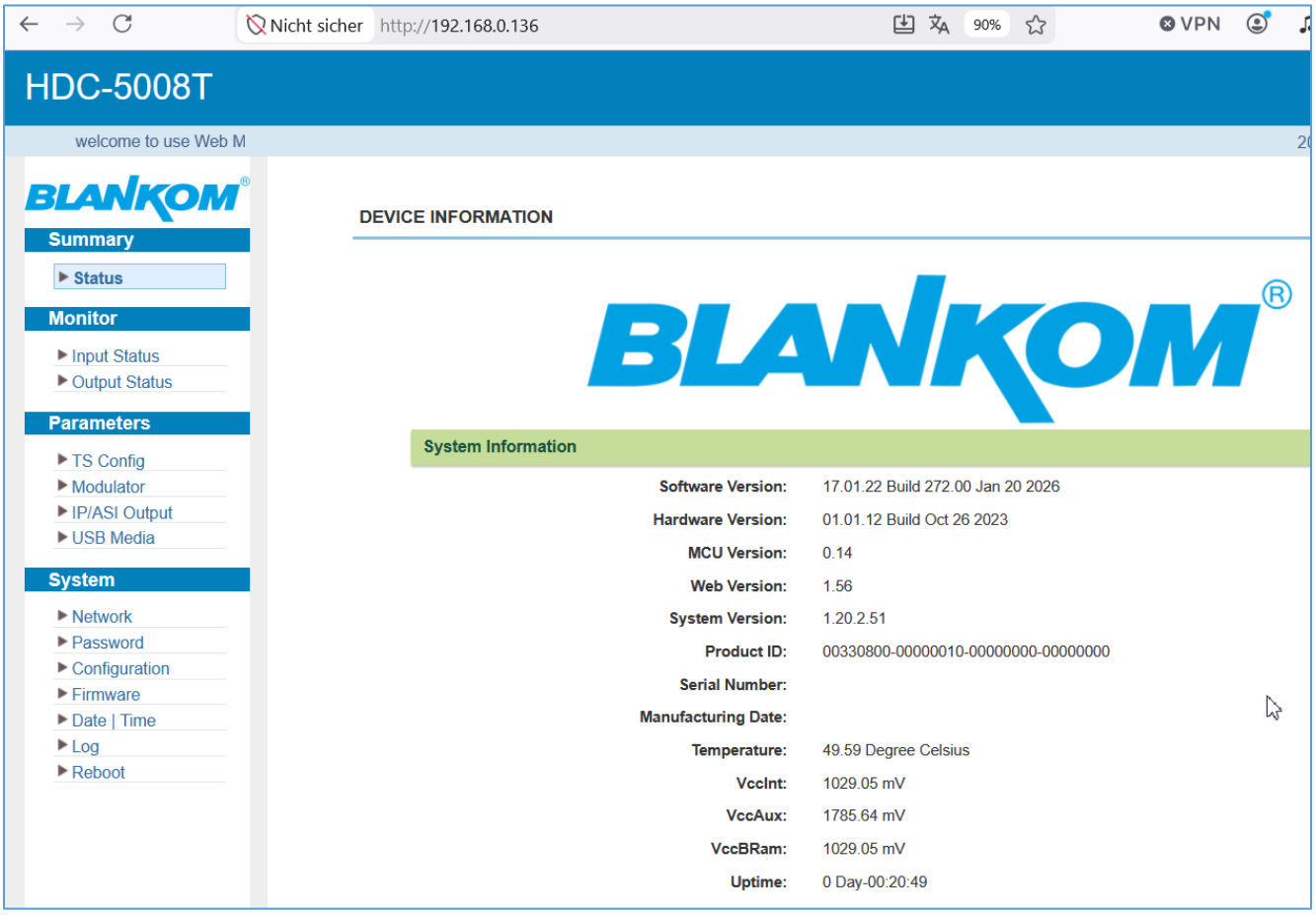
IRENIS GmbH
Hauptstr. 29
31171 Nordstemmen- Germany
Phone: +49 5069 4809781

Managing Director: Dipl.Ing. Murad Önol
Commercial Register: HRB 206370 / District Court Hildesheim

Web: www.blankom.de **E-Mail:** contact@blankom.de

Addon-manual for the new HDC-5008:

with DVB-T Modulator (basically all is the same except the output modulator settings are different.

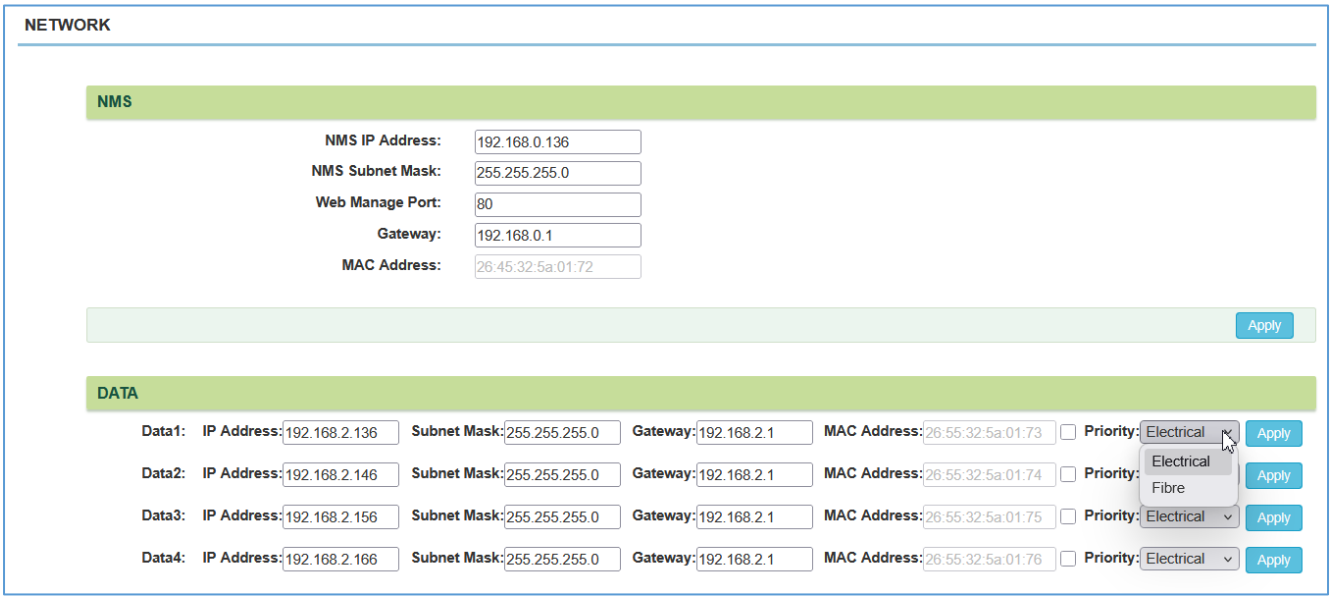


This status picture is needed every time you'll need support from us! And the Firmware versions

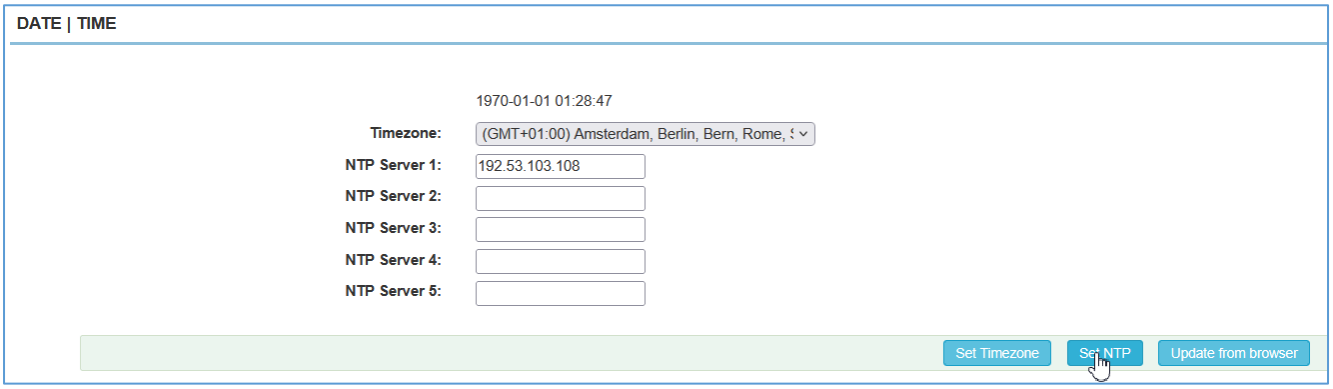
screenshot is almost helpful also.

So we first do the network settings:

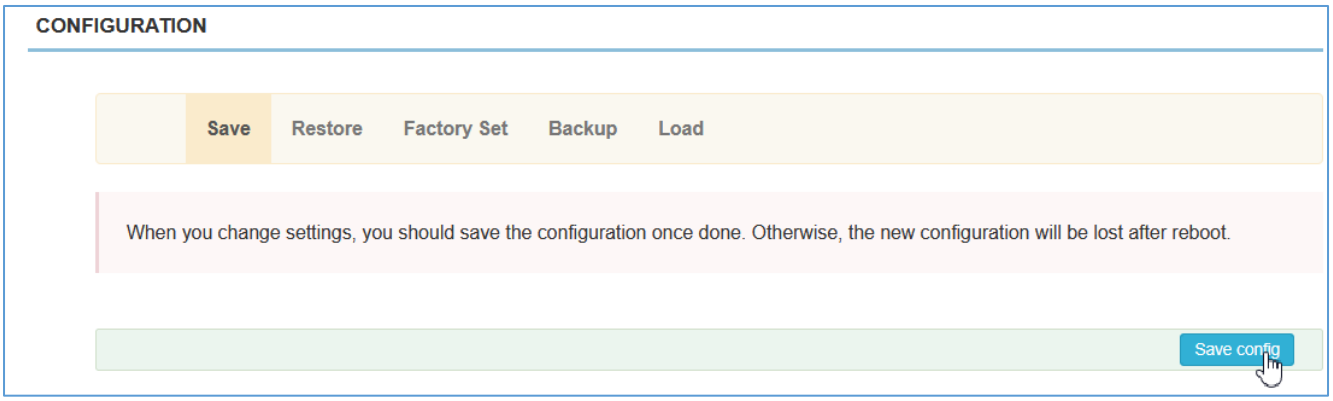
Please note that the 4 DATA-ports should not be in the same subnet like the NMS management port.



You can select the 4 SFP input (Fibre) or 4 RJ45 GbEthernet or only one of them ;-)



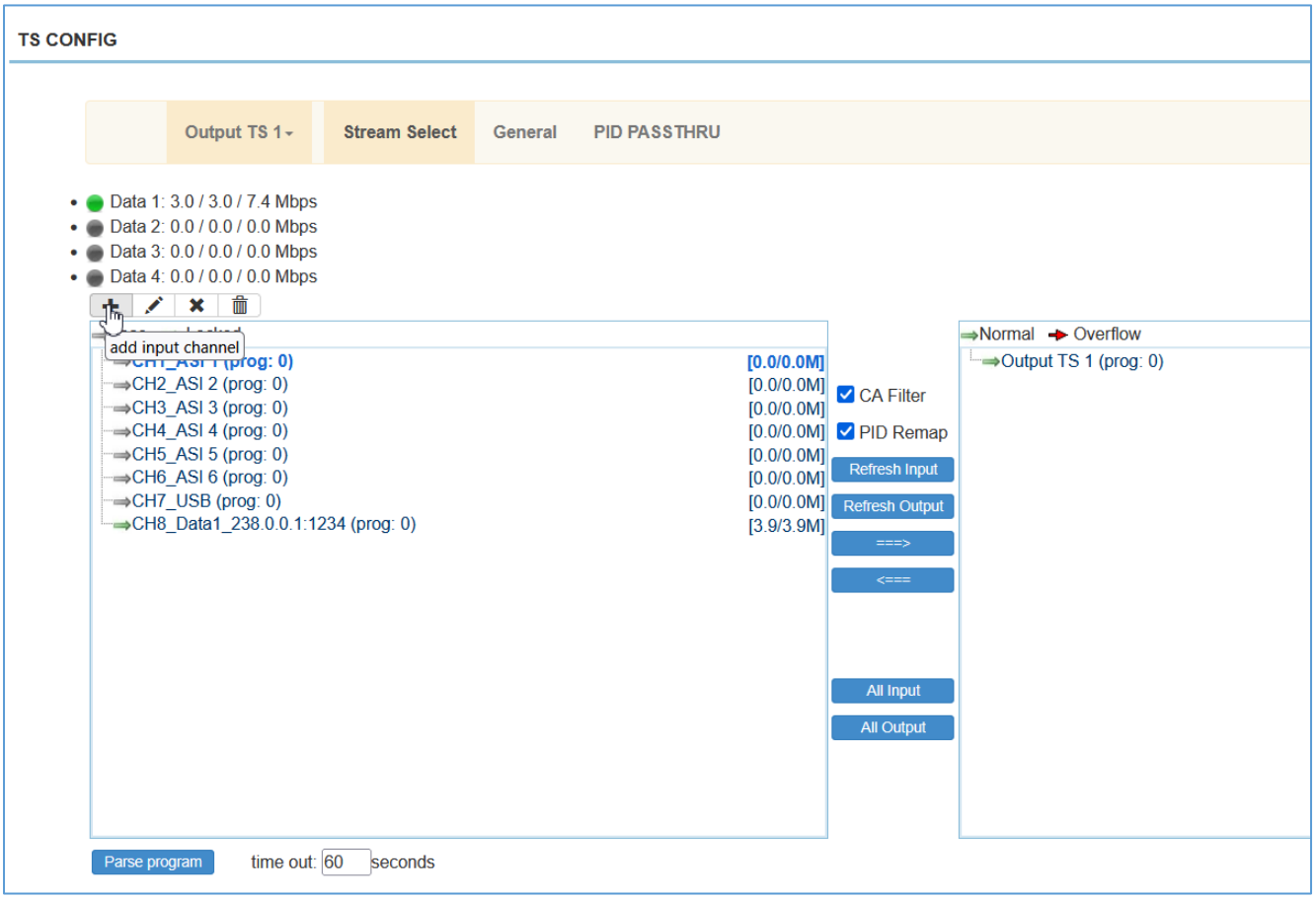
Date-Time should be used to later on insert the Time and date table into the multiplexes.



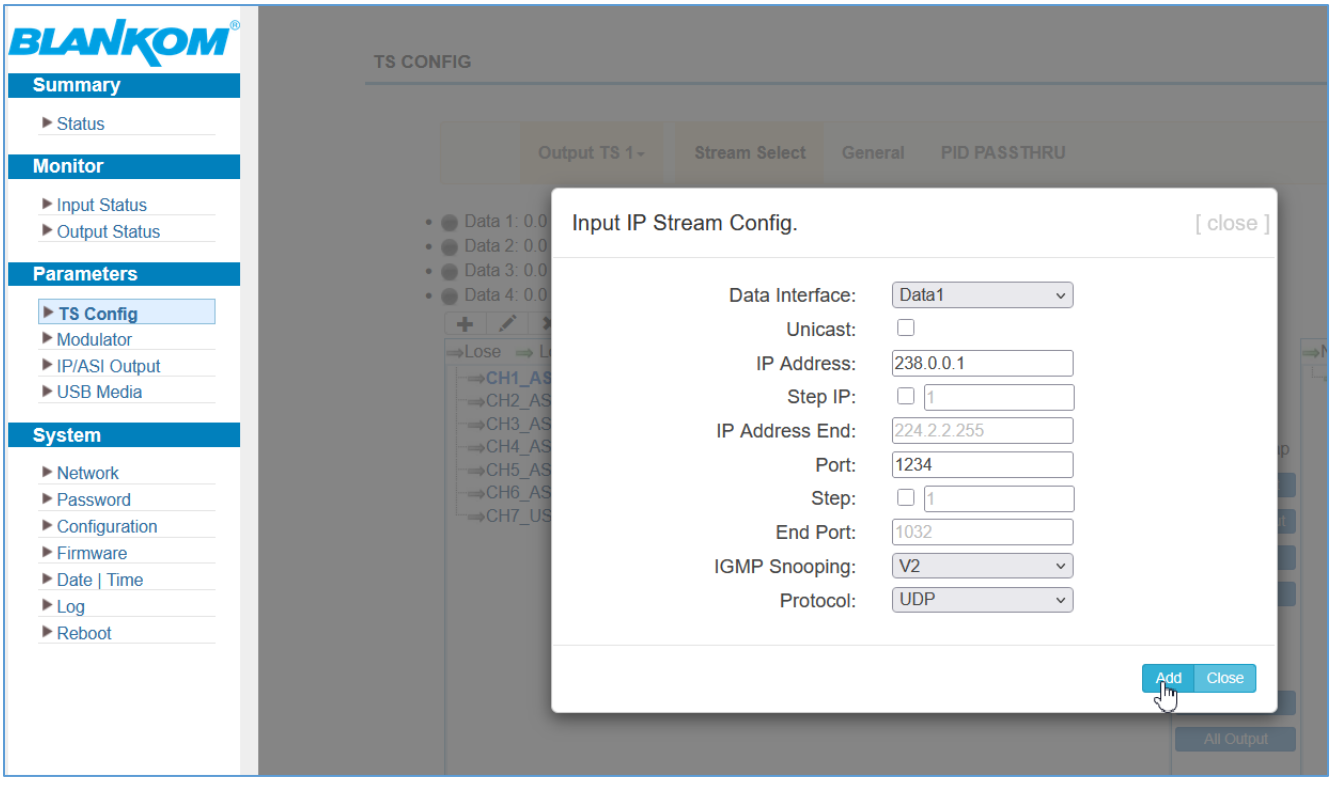
It is always a good idea to

- Write your IP addresses down somewhere or also
- your changed username and password

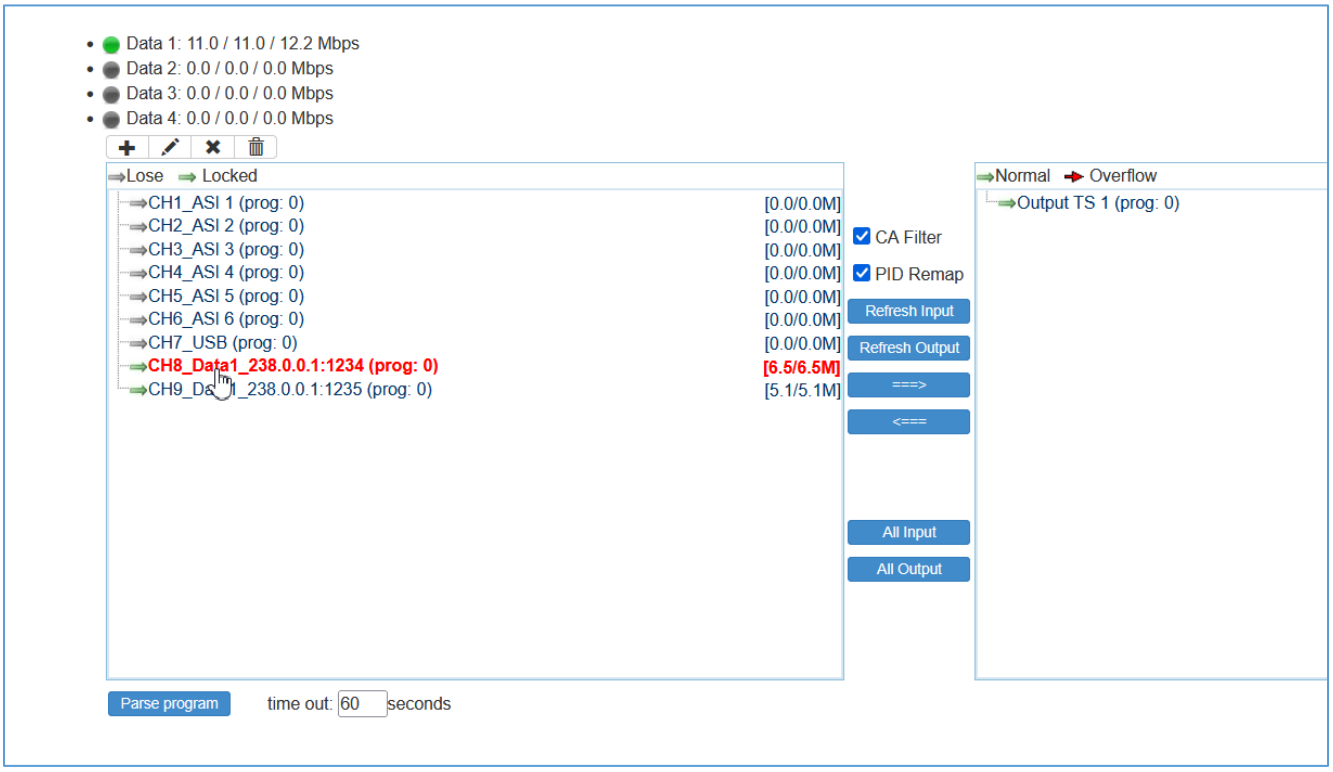
- and save the settings periodically after you have done some changes



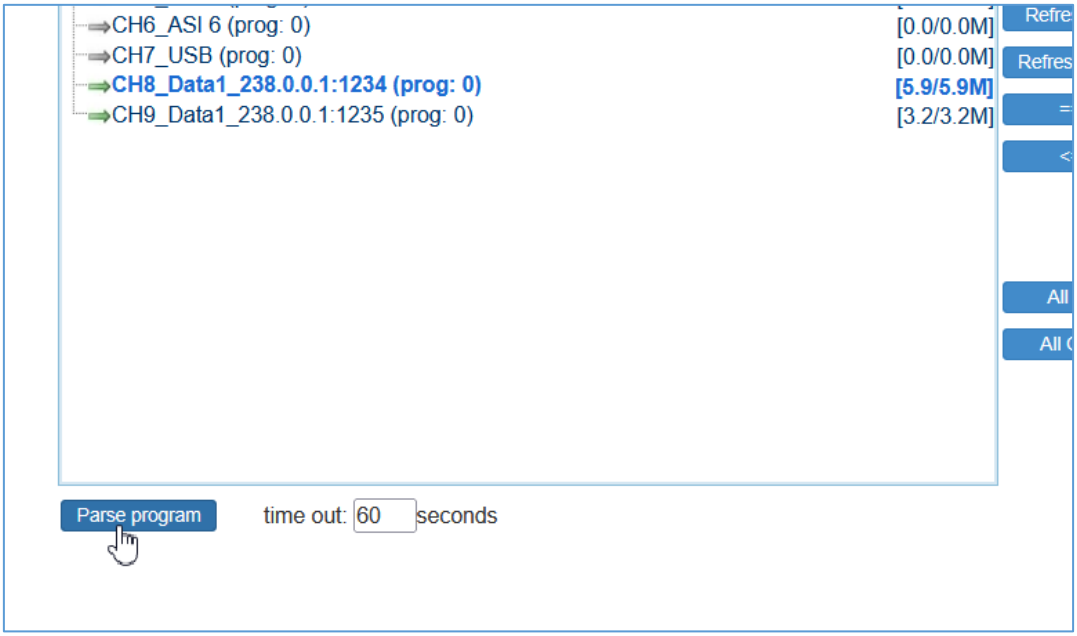
Add a stream input (UDP or RTP):



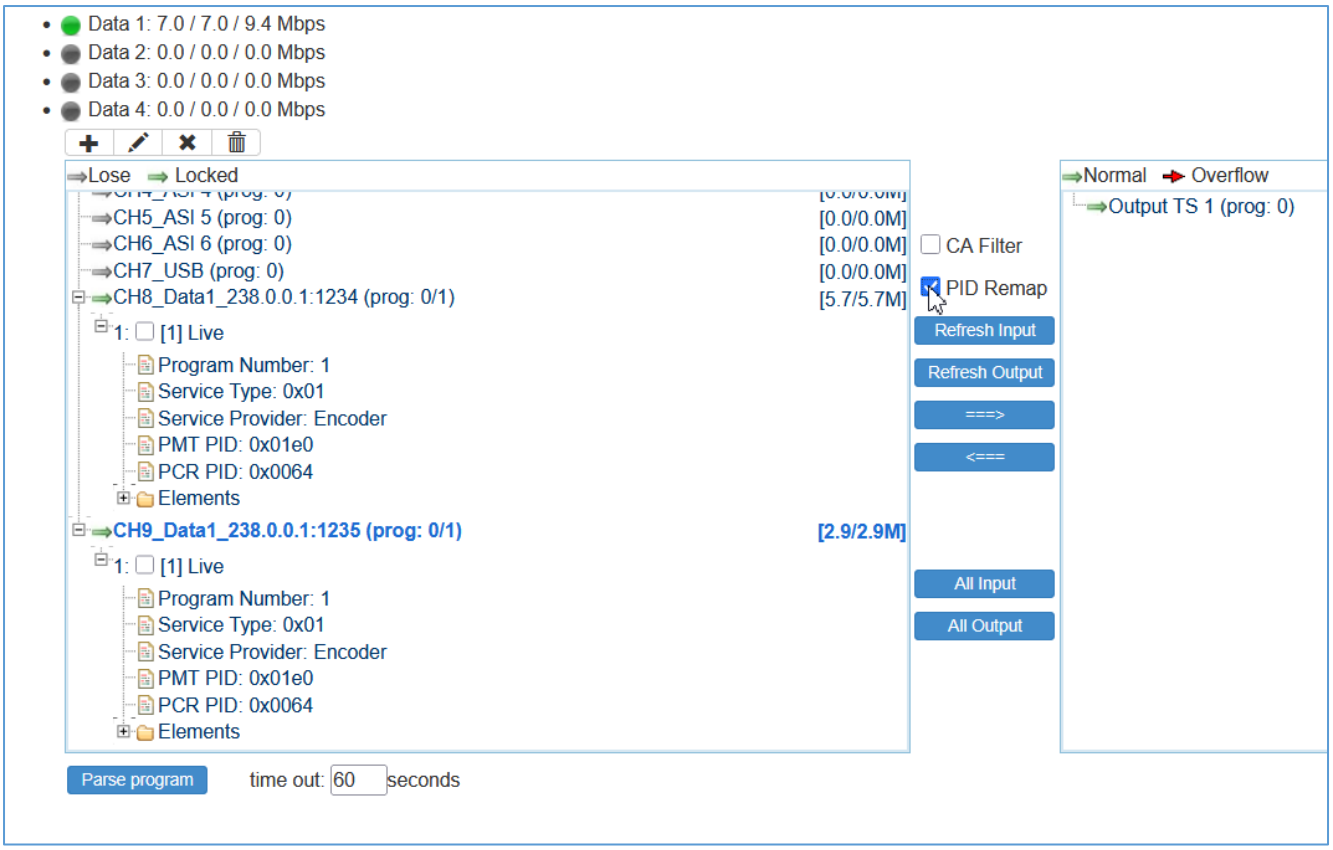
You'll get some values if successful:



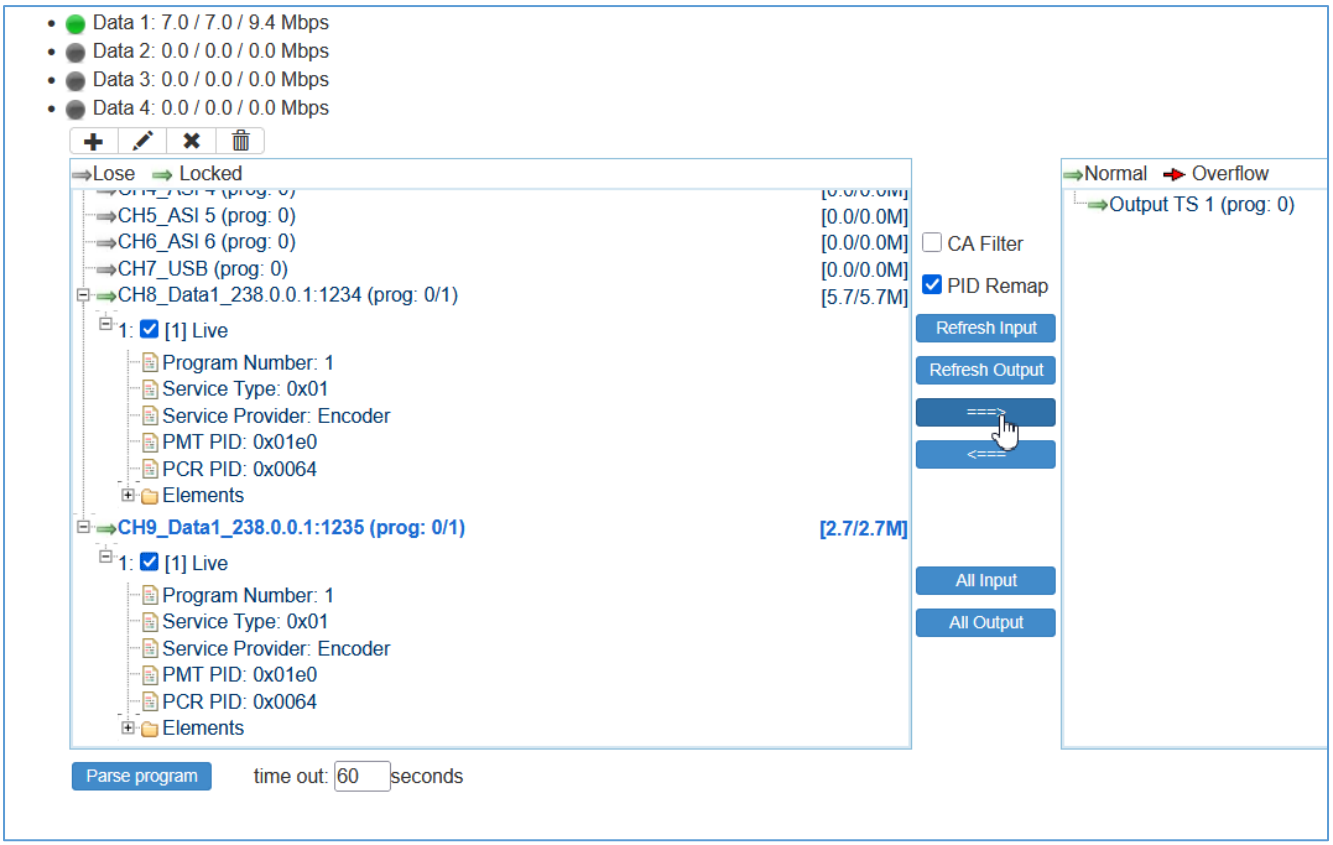
Guess we did a mistake… (Importing streams from same IP Address but different ports… IGMP will refuse its proper function…)



Nevertheless, every time when you add a new stream or ASI or USB input, you need to PARSE its content

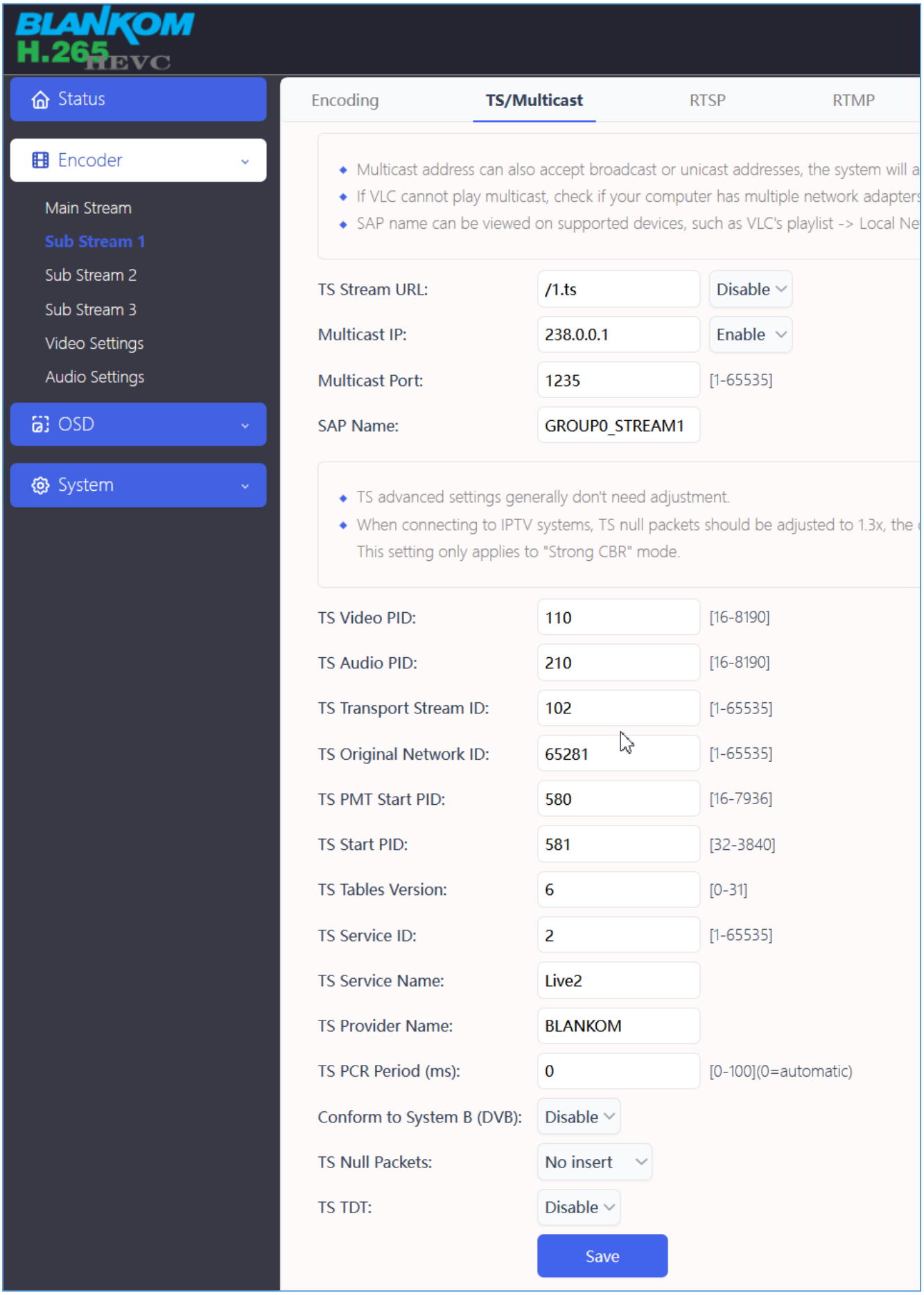


You need to check the PID-values because double ones need a PID remapping to avoid multiplexer collissions! See above, we have 2 times the same – so we need to change that.



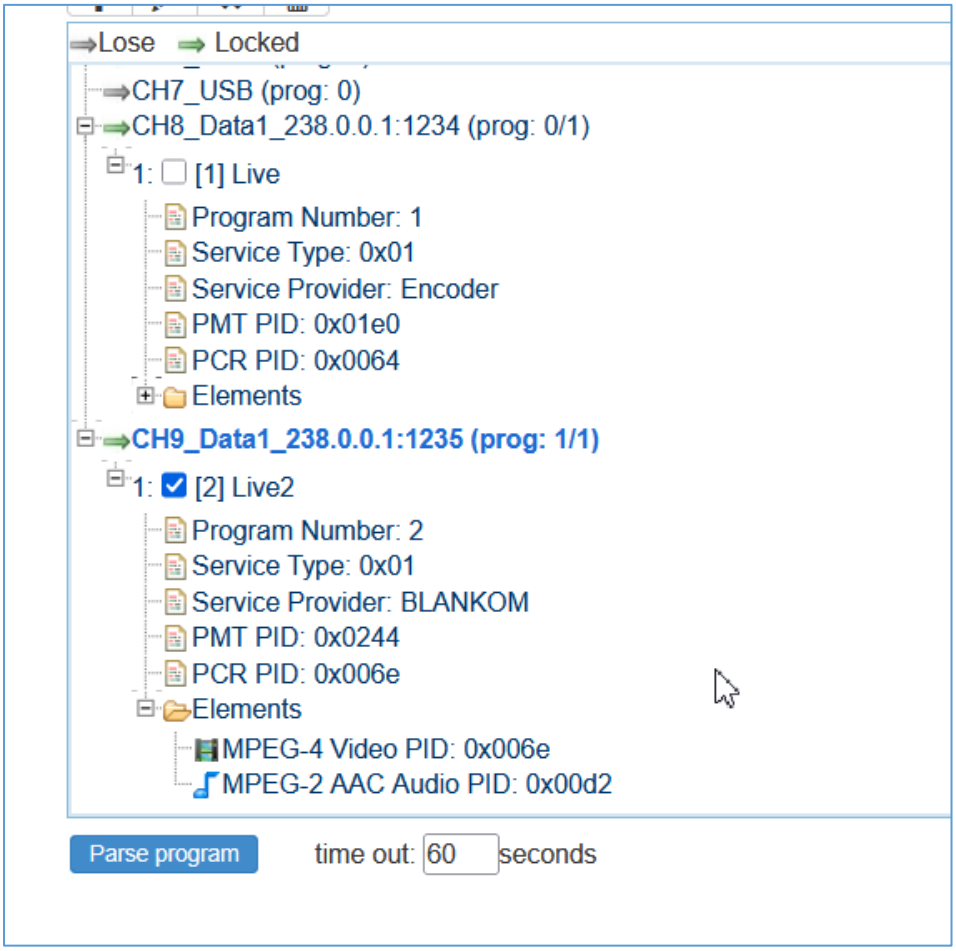
A Problem if both input streams are using the same DVB-Table PID's and values:
The internal mux cannot separate them, so your source streams must have different names, PIDs and so on:

We are using here 2 Streams from the same SDI-encoder-streamer and modify their values:

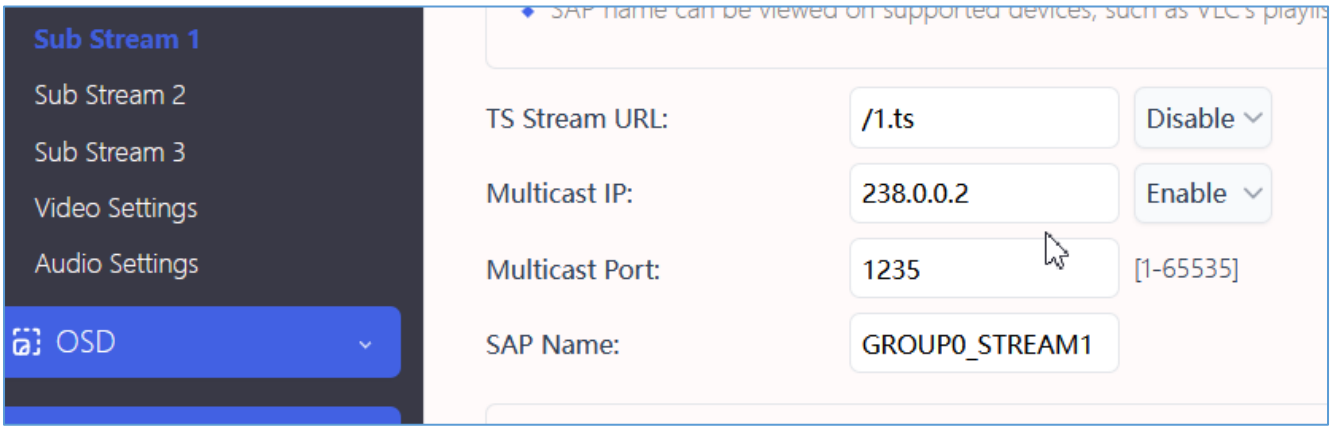


Of course it needs a new **parsing**:

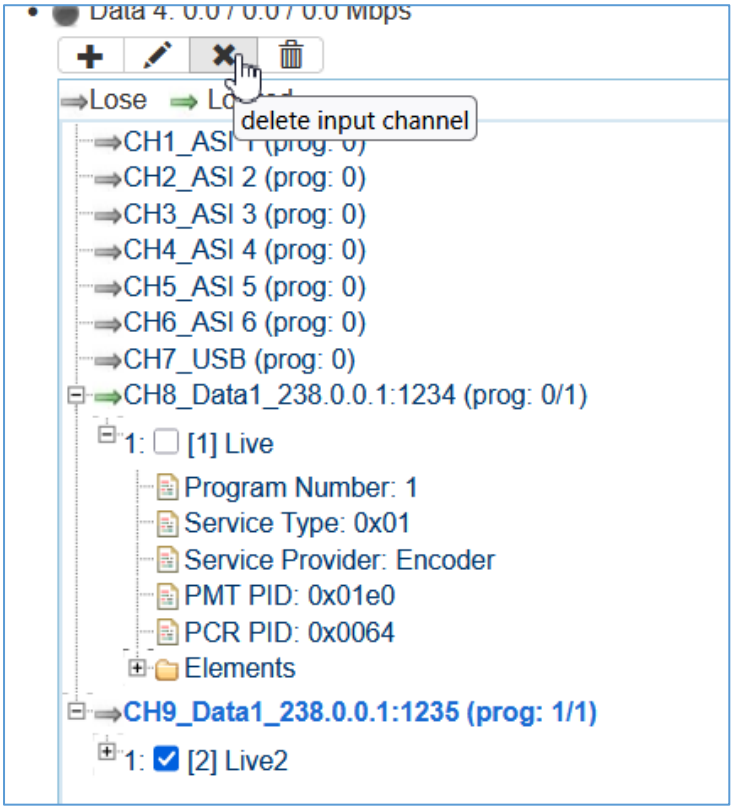
And e' Voila:



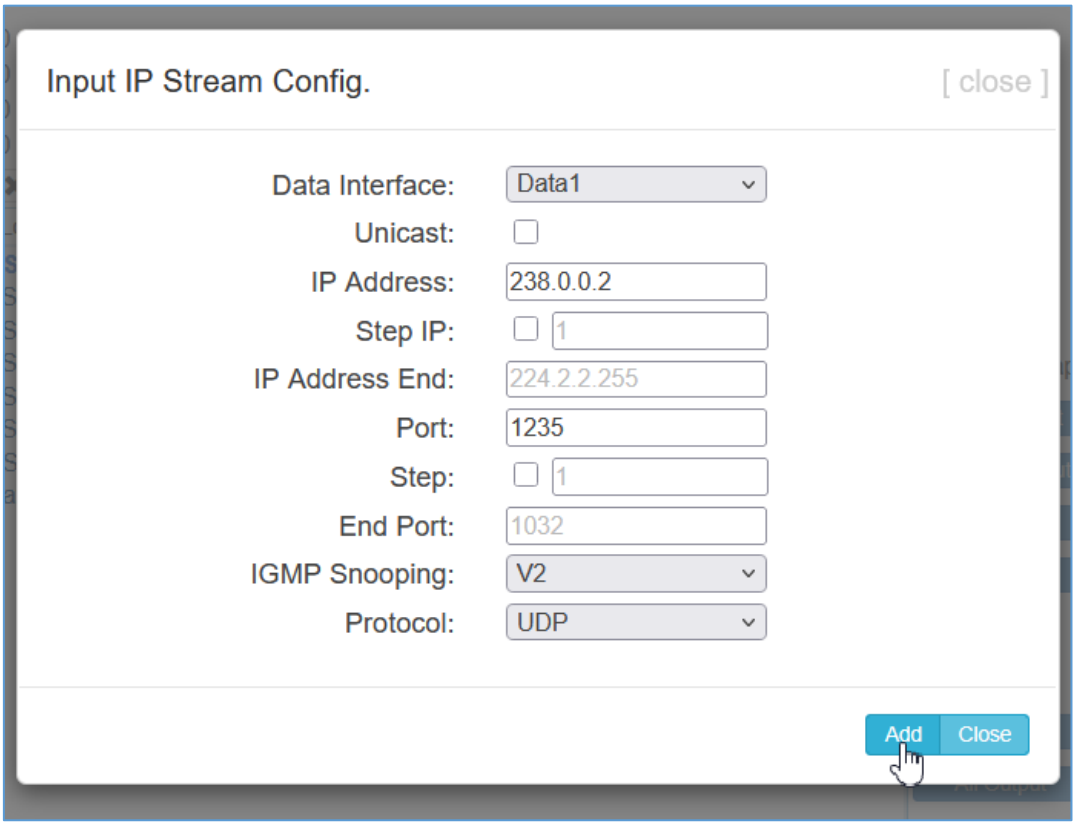
But another issue: The UDP Address is the same and the Port number is different – so IGMP would not work. We need 2 input streams with different Address.

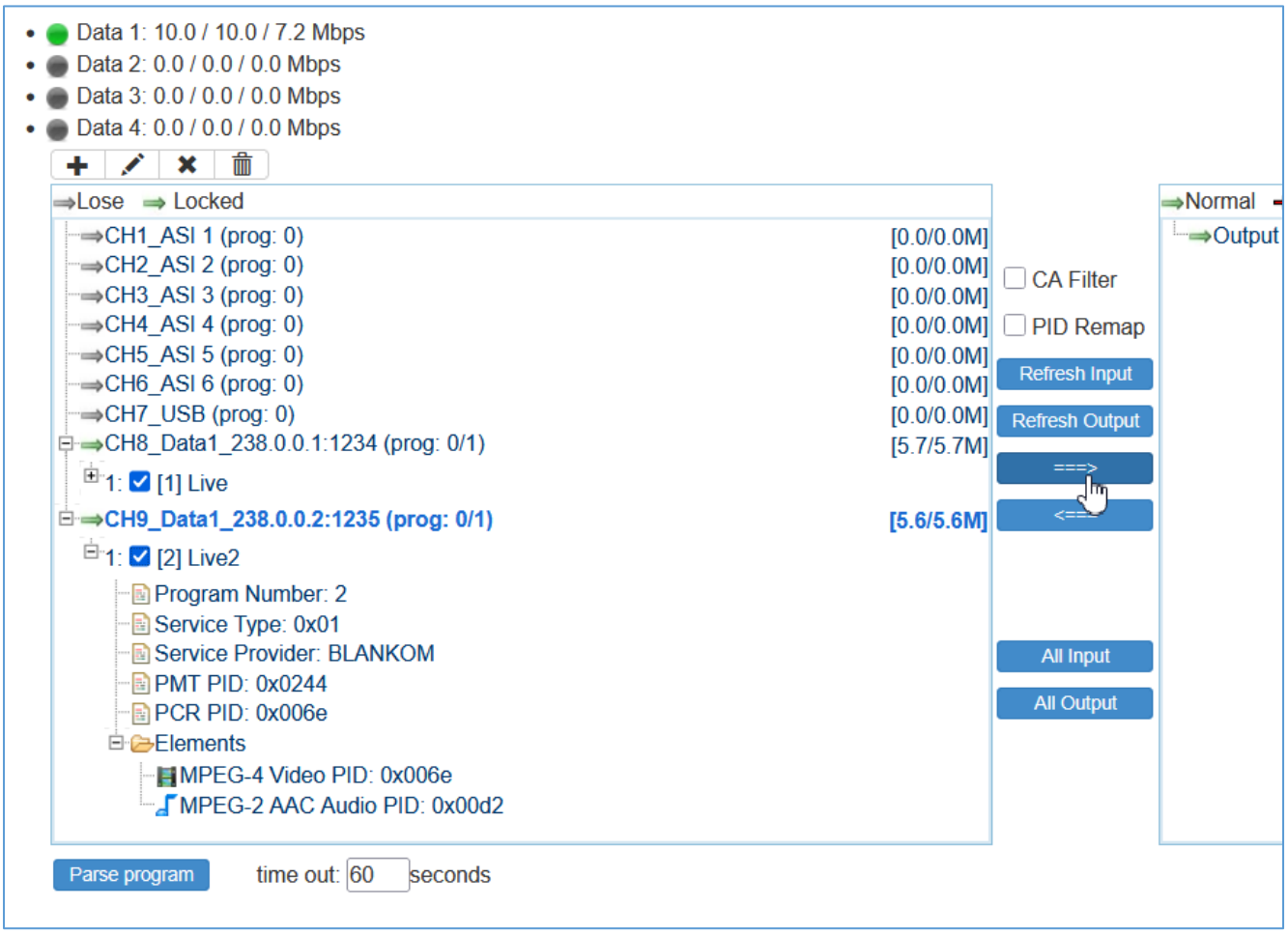


Now we must delete the former stream from the listing:



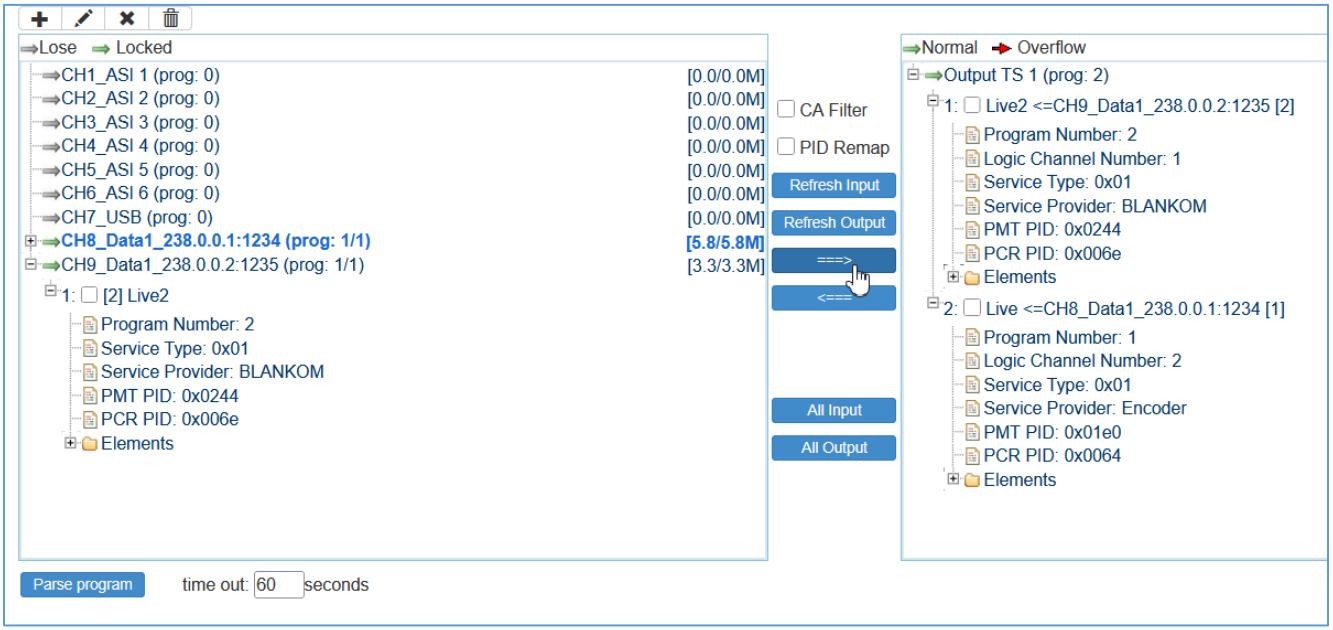
Create the IP-Input by start again and do **parsing**:





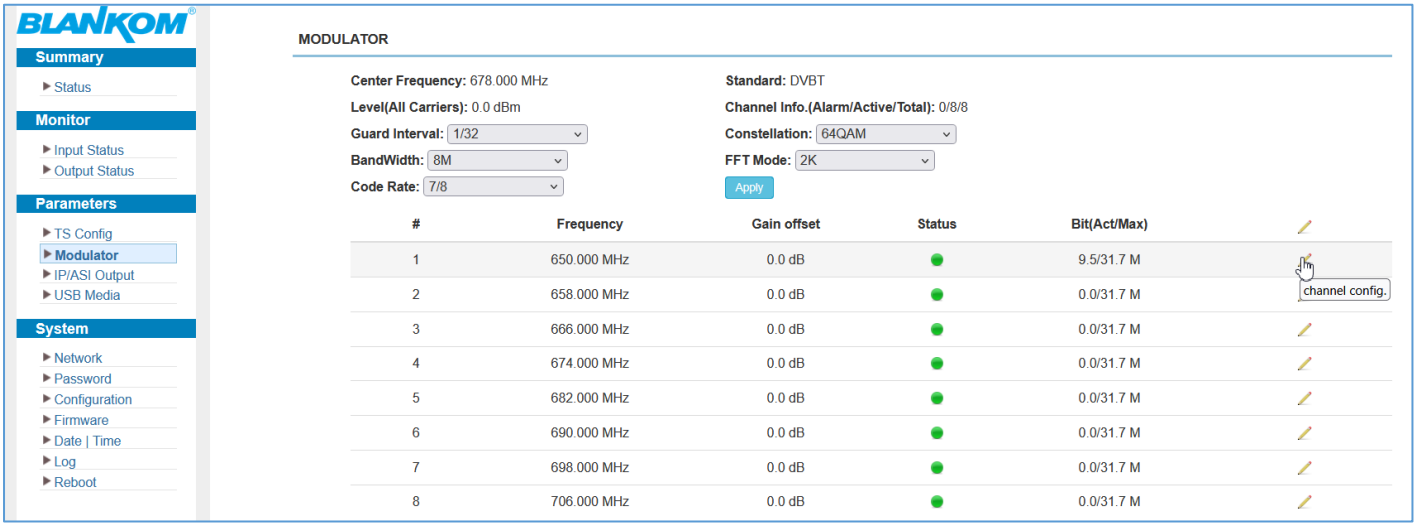
So we are ready to push them to the multiplexer output of TS1 of 8.

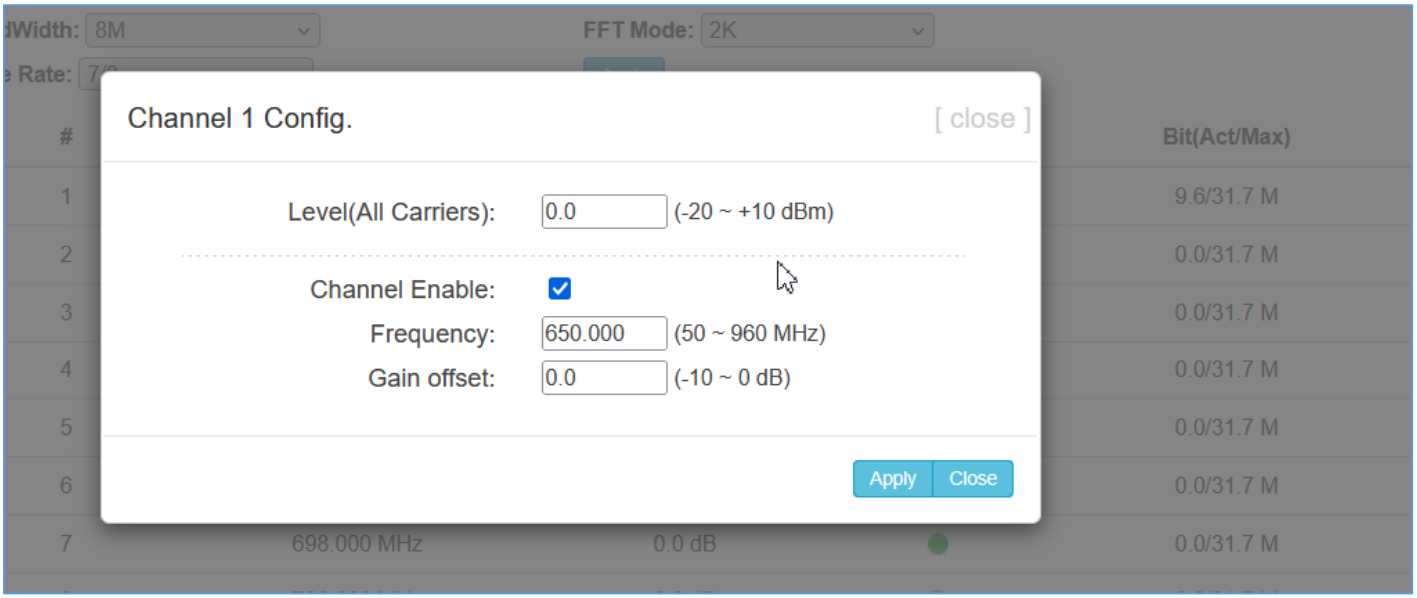
Now path this to the mux-site:



And we have both and did not need to do the PID-remapping because they were already different from the source. **Time to save the config again**.

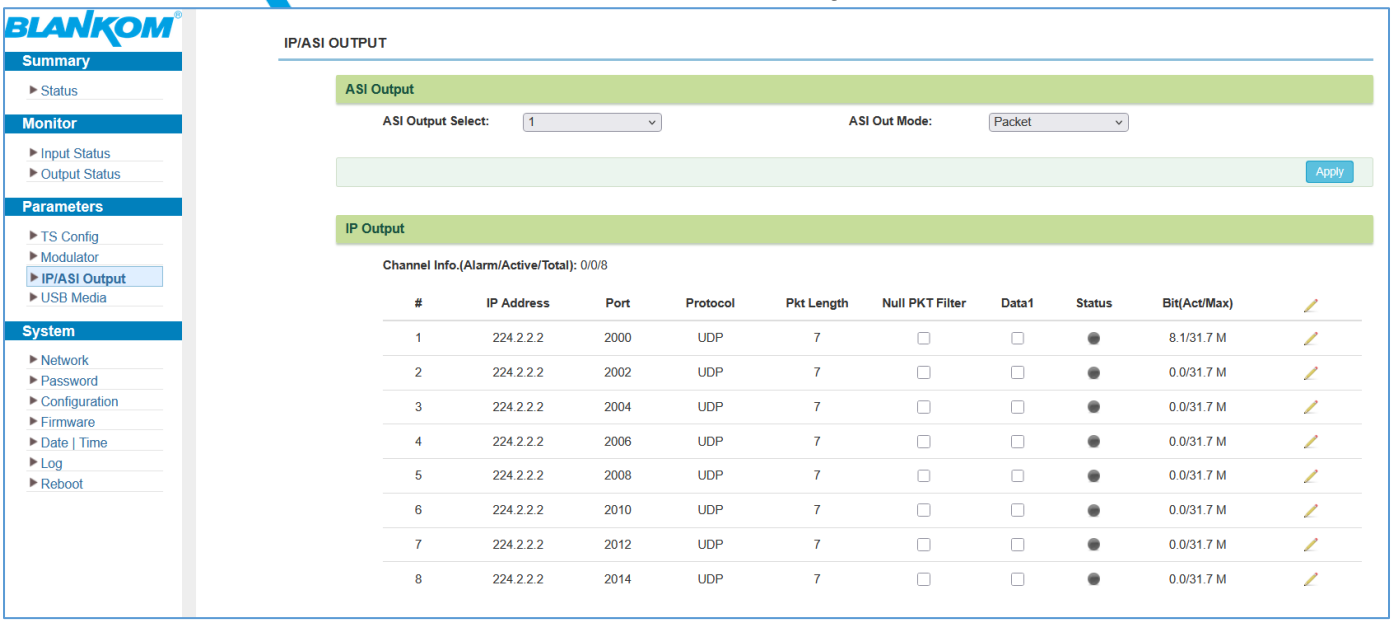
Output Settings:





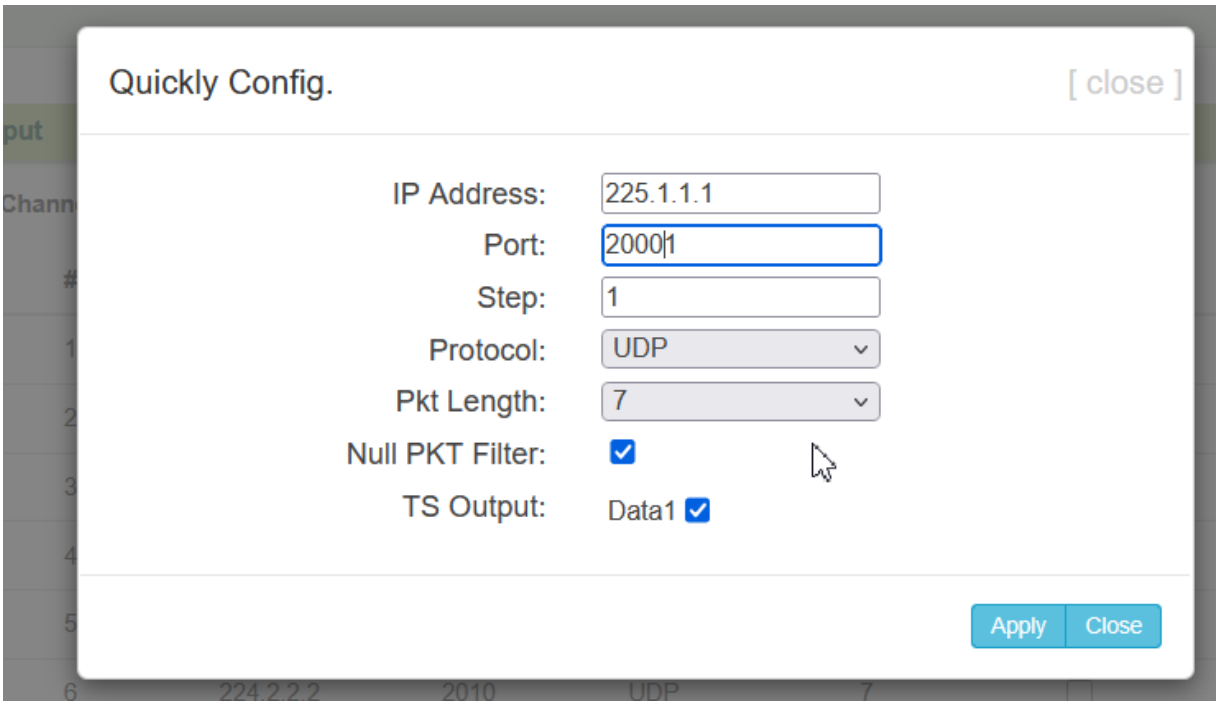
The default settings are showing the max. Data rate of 31.7 Mb/s capacity in one DVB-T channel-Mux.
You can keep those COFDM-Modulator settings (set to maximum), but if you need to go over Air, you should decrease FEC, increase FFT-Mode from 2K carrier to better robust 8K carrier but your total data rate per channel will also decrease.
You can set the common levels for all increase +10dBm or attenuate by -20dBm maximum.
The single channels can be adjusted by the GAIN offset value to the common levels.

IP ASI out:



First of all if you want to stream either MPTS or the SPTS streams, you should change the default settings of UDP/RTP Addresses: (RTP ports should be > 5000 and only even numbers- 5004 5006…)

We start here with UDP mode 225.1.1.1:20001 and increase by 1 each:



Set the Null-Pkt-Filter to ON if you do not want to stream the Mux output including them (PID8191dec) filled up to the max. TS datarate and occupies Network bandwidth.

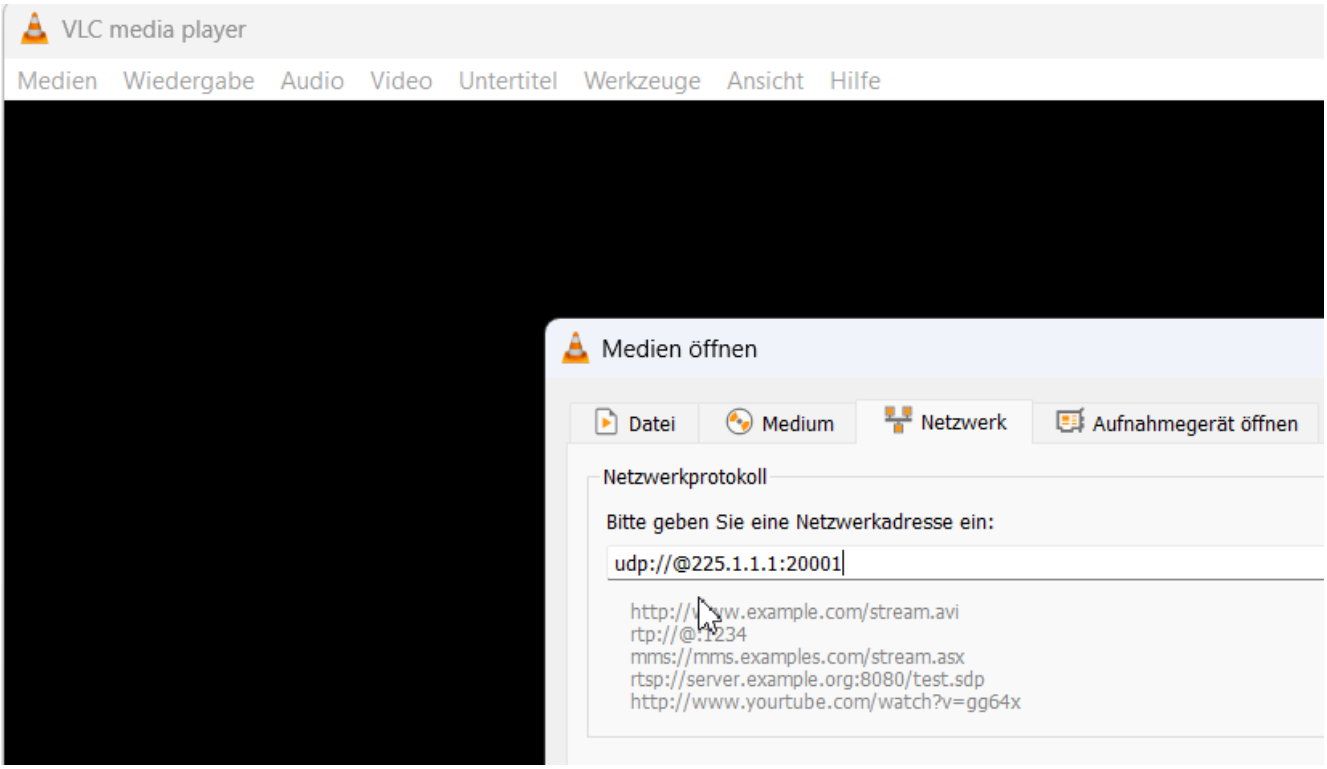
This automatic STEPS works only for the ports, so we need to change the IP output addresses accordingly and manually 8 times:

IP Output

Channel Info.(Alarm/Active/Total): 0/8/8

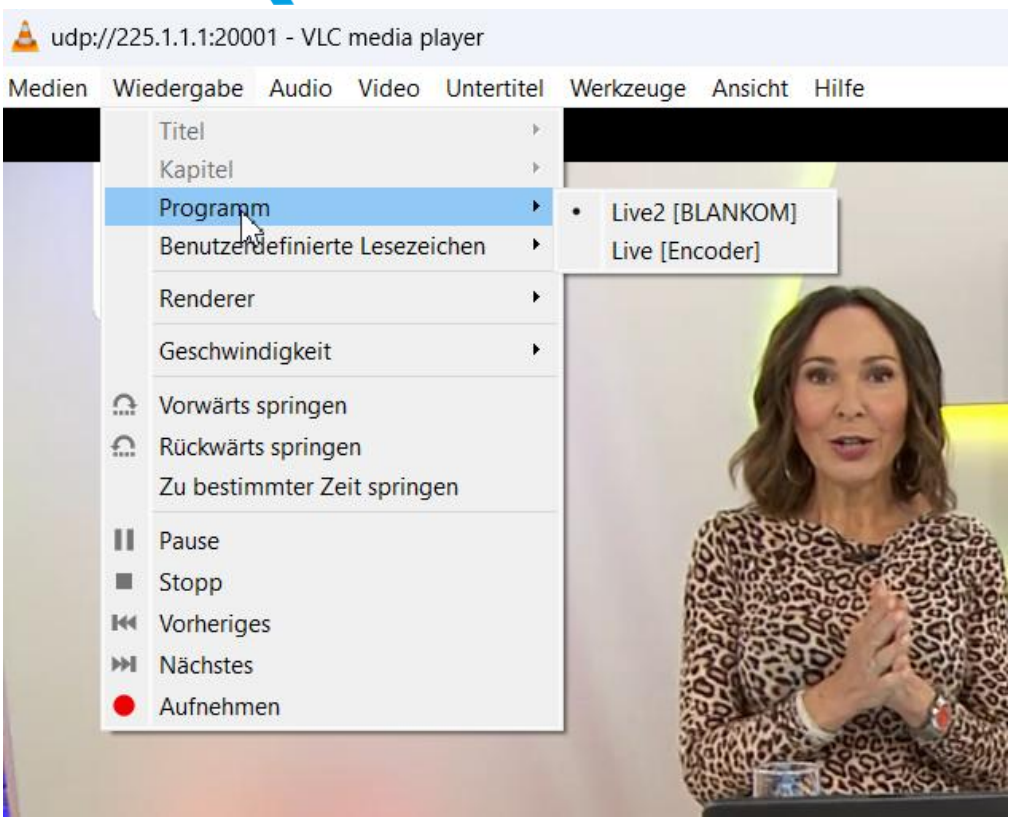
#	IP Address	Port	Protocol	Pkt Length	Null PKT Filter	Data1	Status	Bit(Act/Max)	
1	225.1.1.1	20001	UDP	7	☑	☑	●	8.2/31.7 M	✎
2	225.1.1.2	20002	UDP	7	☑	☑	●	0.0/31.7 M	✎
3	225.1.1.3	20003	UDP	7	☑	☑	●	0.0/31.7 M	✎
4	225.1.1.4	20004	UDP	7	☑	☑	●	0.0/31.7 M	✎
5	225.1.1.5	20005	UDP	7	☑	☑	●	0.0/31.7 M	✎
6	225.1.1.6	20006	UDP	7	☑	☑	●	0.0/31.7 M	✎
7	225.1.1.7	20007	UDP	7	☑	☑	●	0.0/31.7 M	✎
8	225.1.1.8	20008	UDP	7	☑	☑	●	0.0/31.7 M	✎

So we can check that now:



GOT it:

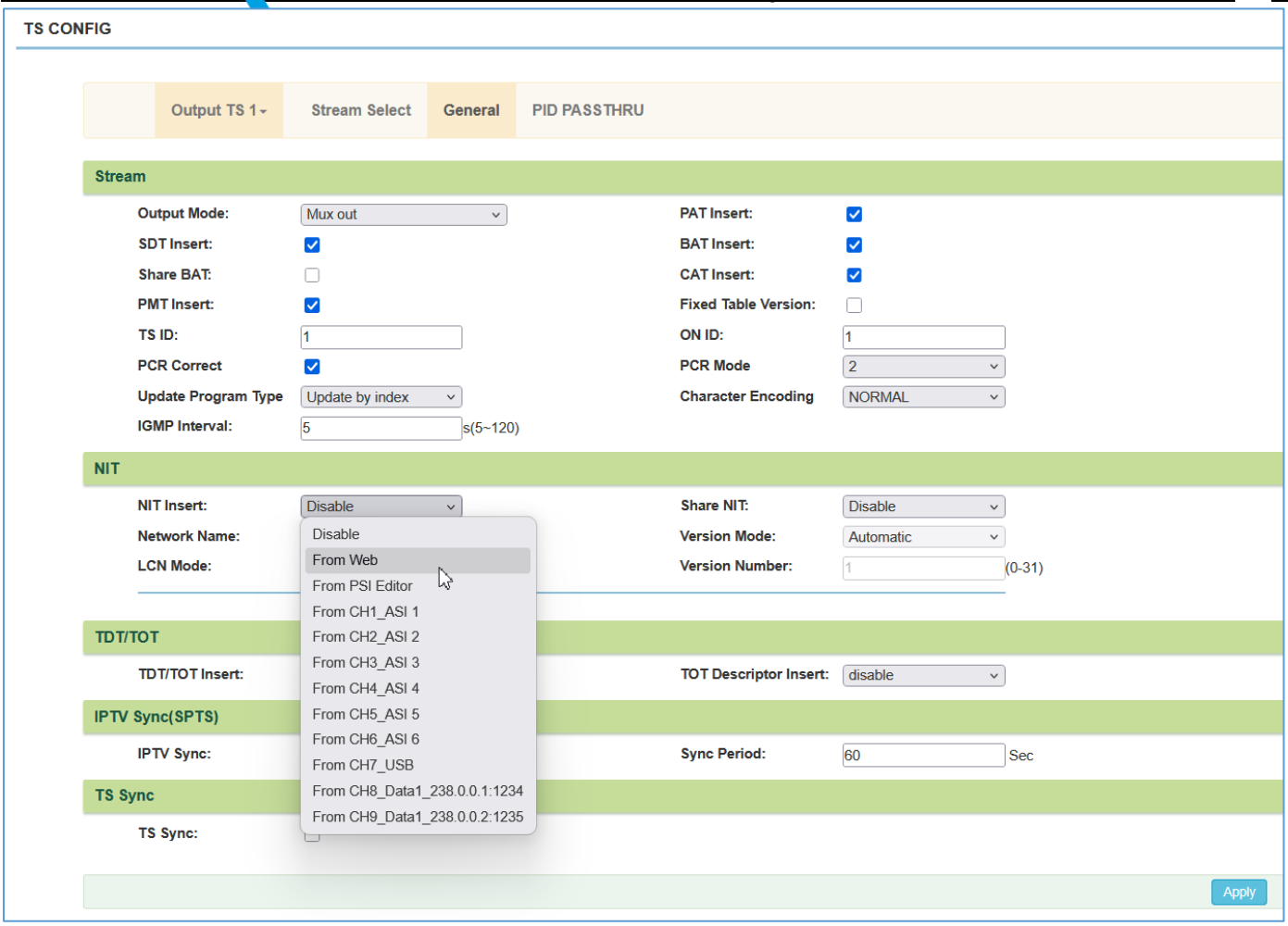
2 Services in the multiplex:



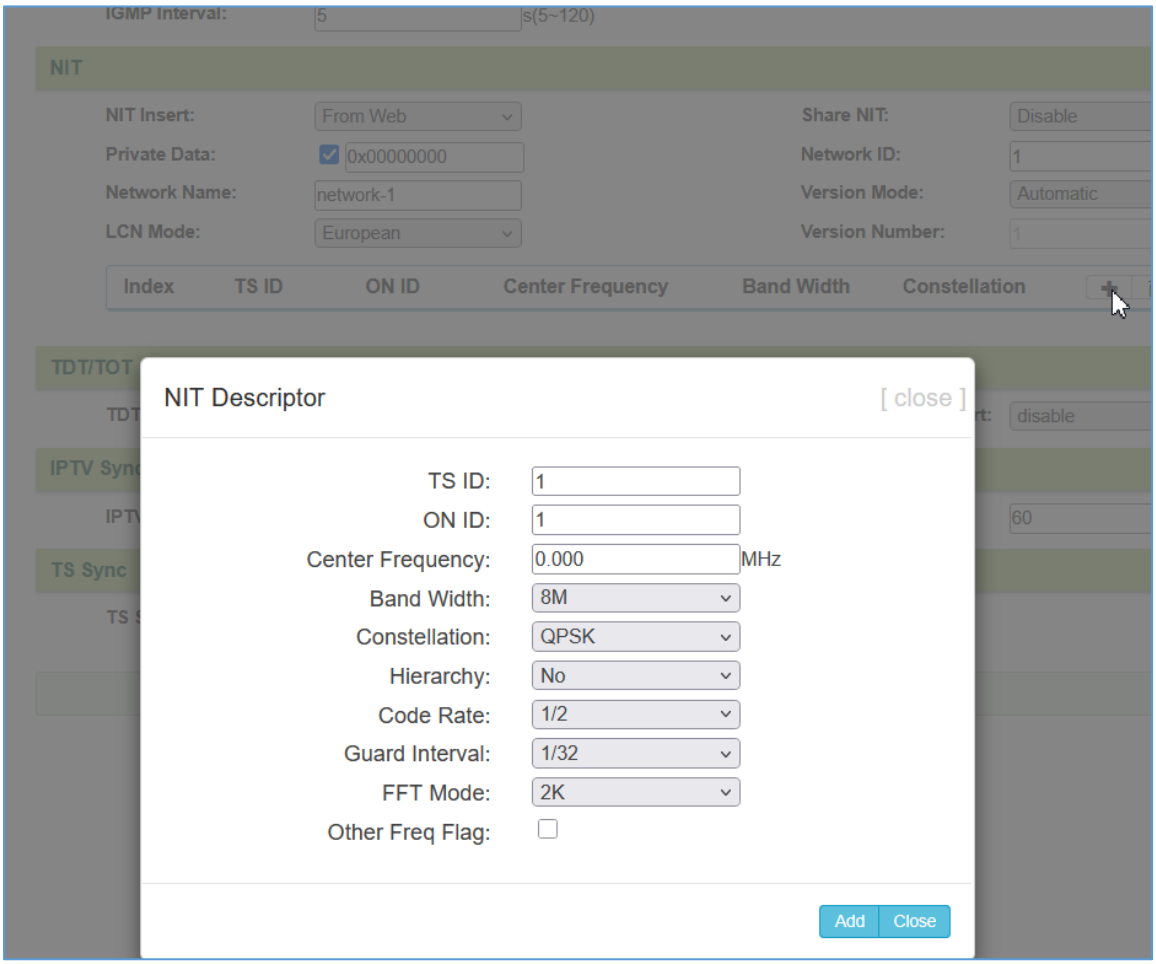
If you need to check the DVB-Tables and modify them we recommend to use an analyser like Dek

Tec Fantasi.

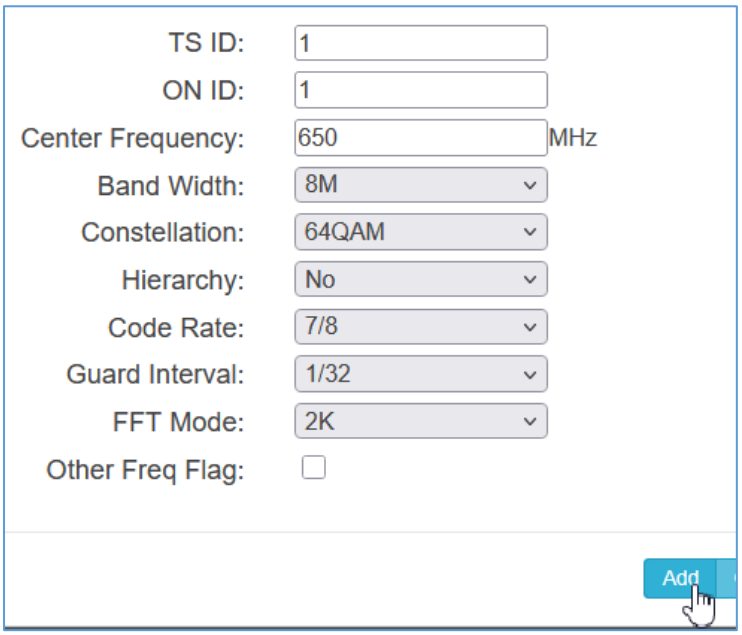
The DVB-Tables can be modified here:

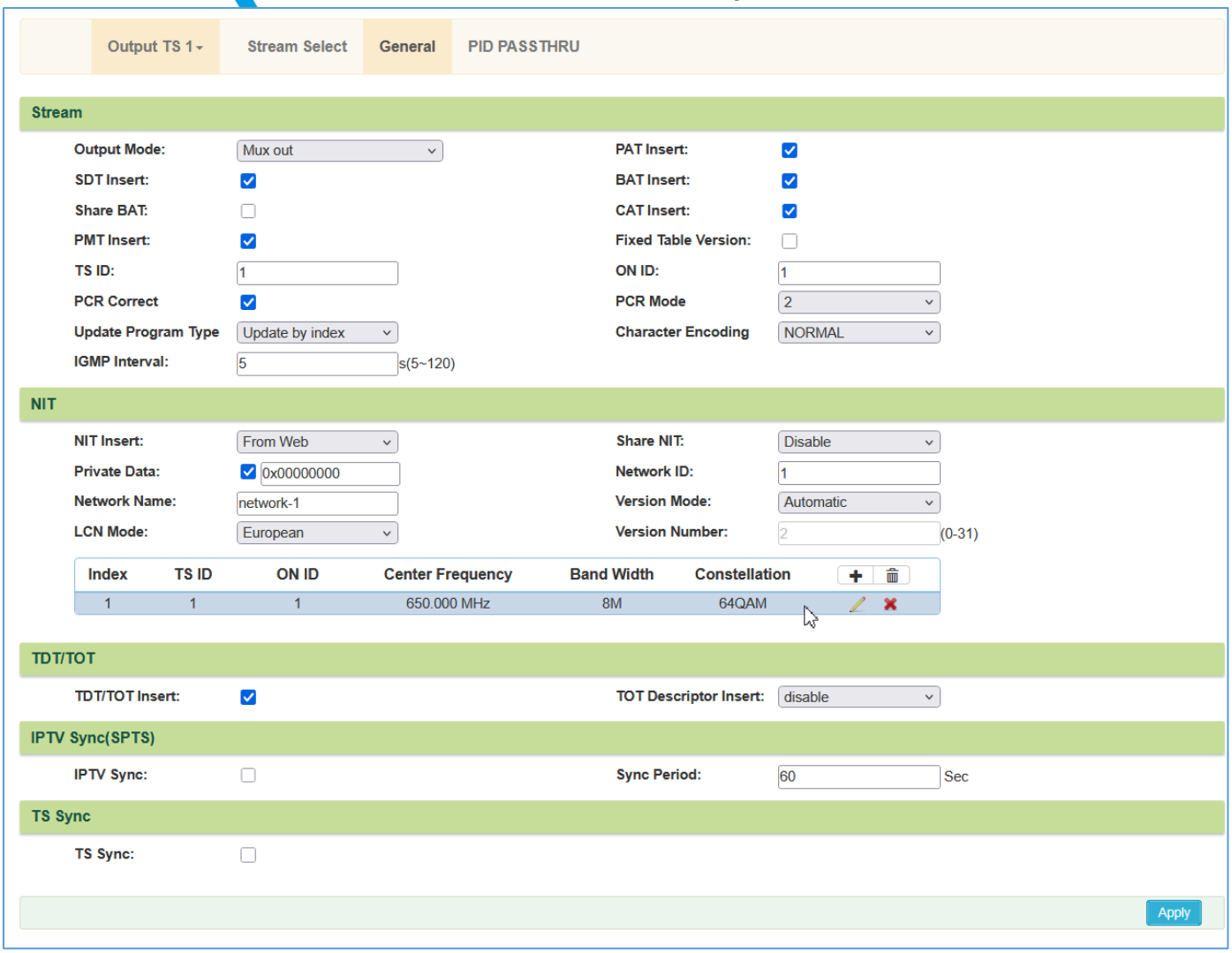


To insert a NIT we recommend to configure that by hand:



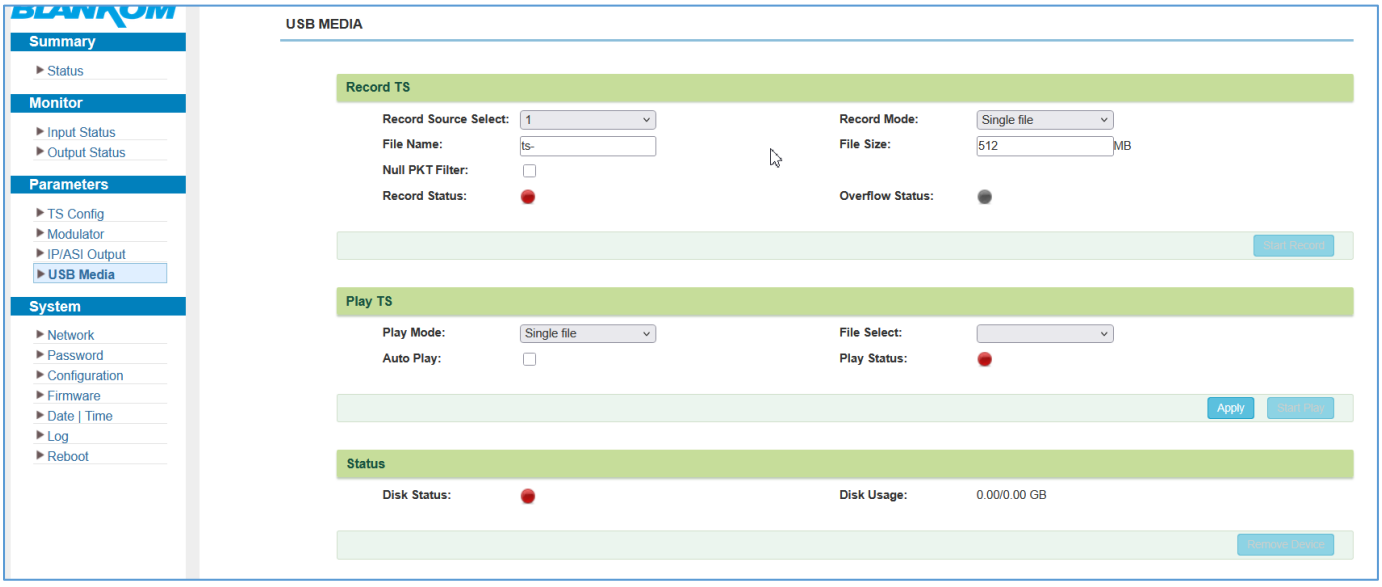
Off course this must fit to your channel line-up of the modulator values:





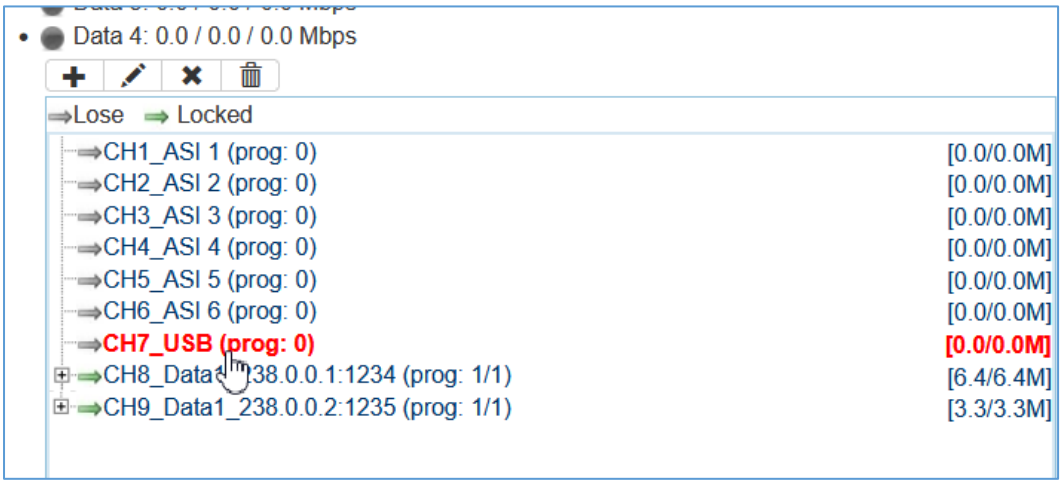
Above we set the first frequency with a NIT. You can use share NIT if this should be inserted to all multiplexed outputs.

USB-Media:

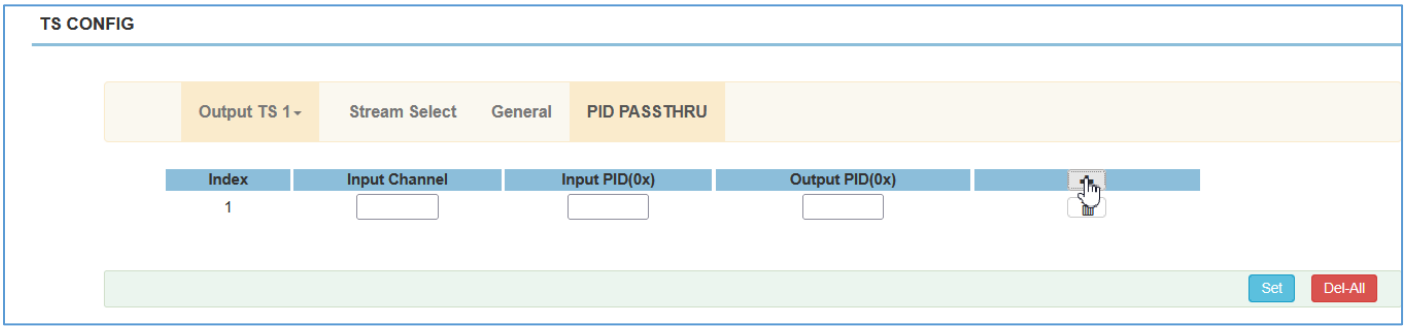


Here you can record TS files to your USB-device (FAT32) and also playback TS files which can be inserted into a selected mux by your choice or to all. The files should be valid files according to MPEG&DVB norm with proper table structures. And according to the codecs your TV sets are

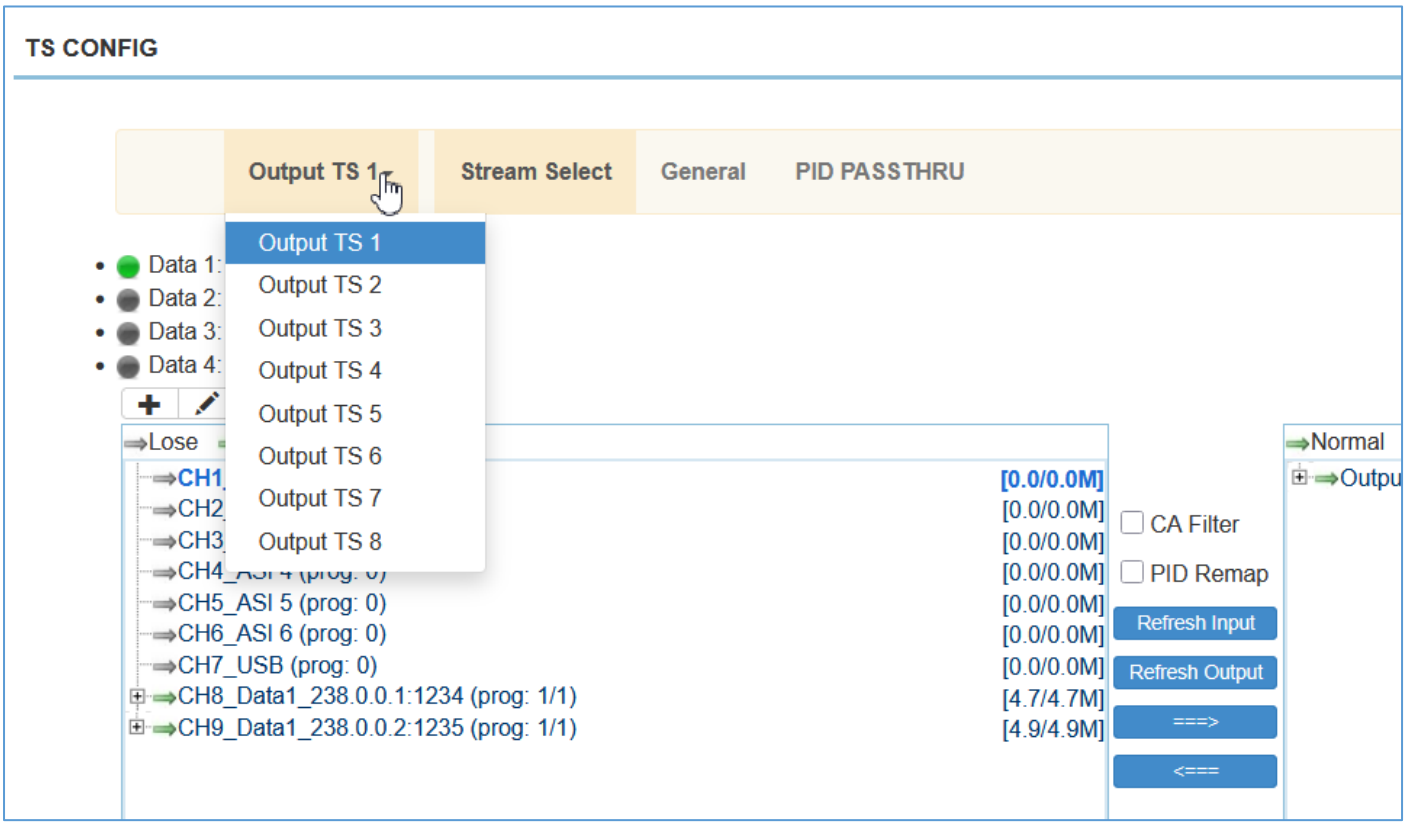
supporting (h.264 AVC is almost common but HEVC might work as well).



You can also pass particular stream components from an input e.g. the EPG-data from an Input like a DVB-SAT Gateway -> streams an MPTS of a Transponder. To kkep that in yxour output, you must add PID12hex by selecting the source and pass it:



Now you can carry on with the next output multiplex:



That's all for a quick-start. Of course DVB is not trivial…