

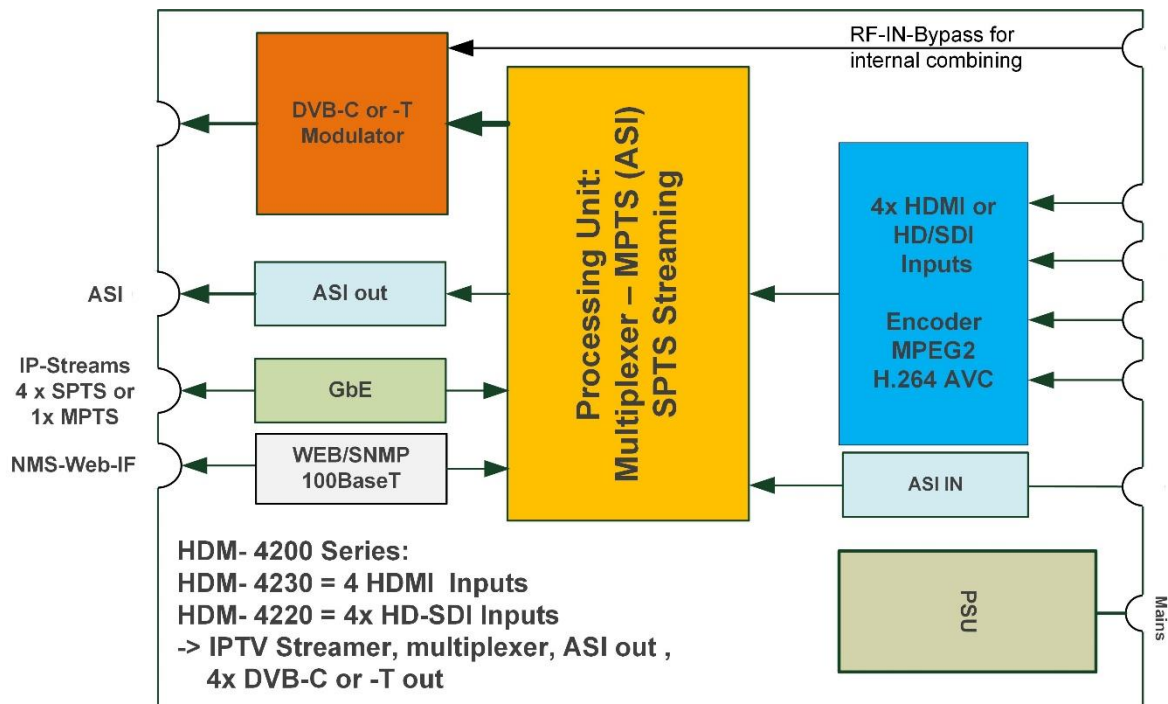
MPEG4 HD to IP / ASI Encoder & Multiplexer & DVB-T/C Modulator

Installation and Operation Instructions

HDM-4220C / HDM-4230C



Subject to technical changes w/o notification.



About This Manual

To whom it may concern

This user manual has been written to help people who have to use, to integrate and to install the product. Some chapters require some prerequisite knowledge in electronics and especially in broadcast technologies and standards.

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Chapter 1 Introduction

1.1 Product Overview

This MPEG4 AVC/H.264 HD IP & ASI Encoder is a professional HD audio & video encoding and multiplexing device. It has 1x ASI-IN, 8x HDMI (=Model 8220) or 8x HD-SDI (= Model 8210) video input interfaces, supporting MPEG-4 h.264 video encoding and MPEG 1 Layer 2 audio encoding. This device can simultaneously encode 8 channel of HD audio & video; moreover, it has an IP output port and support 1 MPTS and 8 SPTS on IP out and 2x parallel ASI Out. In conclusion, its high integrated and cost effective design makes the device widely used in varieties of digital distribution systems such as cable TV digital head-end, satellite digital TV broadcasting, Digital Signage etc..

1.2 Key Features

- **4 HDMI or HD-SDI video inputs with 4 SPTS and 1 MPTS output**
- **ASI-Input to add encoded TV Services to an existing TS**
- **Support MPEG2 and MPEG4 AVC/H.264 video encoding format**
- **MPEG1 Layer II and AAC audio encoding formats, support audio gain adjustment**
- **Gigabit Ethernet IP output over UDP and RTP/RTSP, 4 x SPTS + 1 MPTS**
- **2 parallel ASI output as copy of the MPTS**
- **Null PKT Filter function**
- **PID Remapping**
- **PCR accurate adjusting**
- **PSI/SI editing Control via web management, and**
- **Management via WEB-IF or Front Panel, easy updating by web-interface**

We assume that the user is familiar with IP settings and already knows his own system to connect the unit to. If you use the **Output Streaming** feature: **We recommend using 2 separate Switches!** At least a 100BaseT for the Management NMS RJ45 port and a second one with Gigabit Ethernet 10/100/1000BaseT with at least Layer 2+ with IGMP V2 features. Otherwise you might flood your IP-Streaming network with unnecessary Data, which might overload connected IPTV STB's because they almost have only 100BaseT capacity (Never ones use 1GbE ports) but too many inputs into a STB can result in side effects. If you need to select a Switch, we recommend ARUBA HP Procurve 2530 24G or 48G which are cost effective, easy to configure, can be trunked and supporting IGMP V2. For this model it's better to check the Firmware version because sometimes the newest one has IGMP problems.

If the switch needs routing functions, the bigger brother of this series might be the right choice.

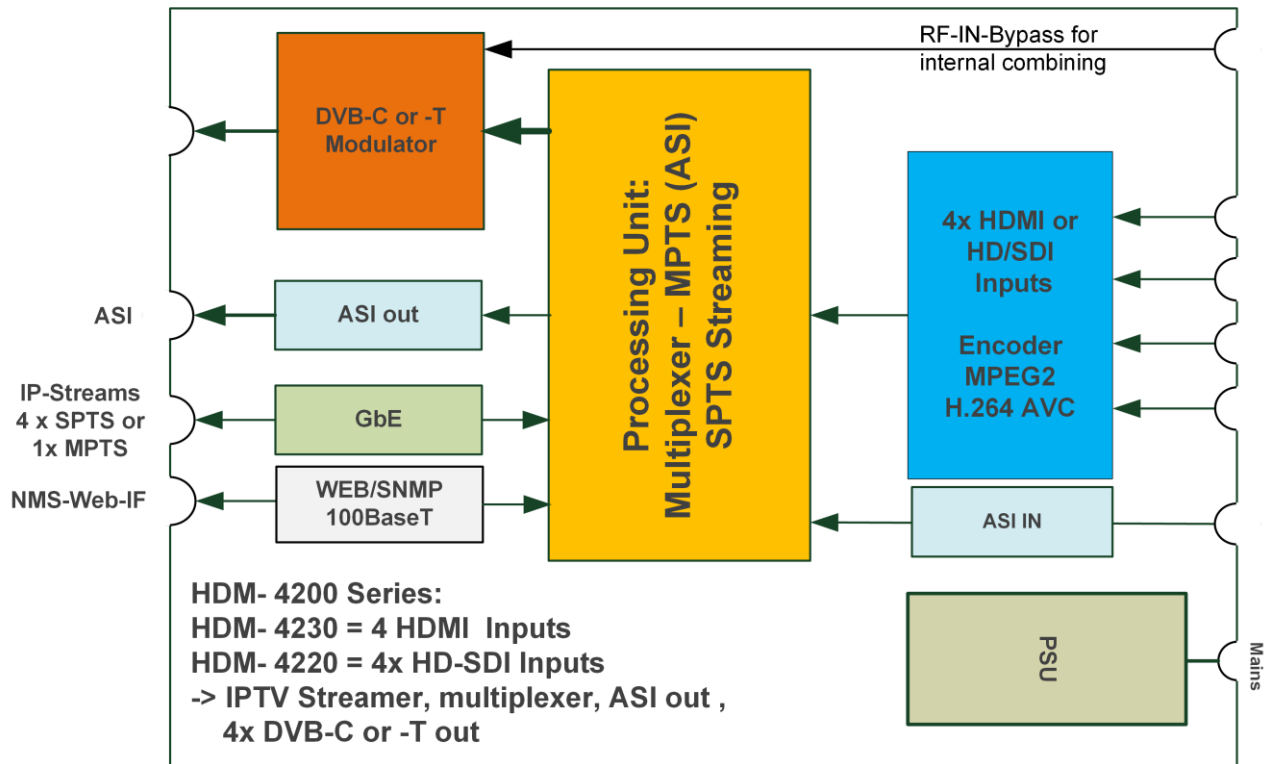
Because to not accidently put DATA and NMS port in the same sub-network the data – port setting does not allow this by default. Usually the DATA GbE Port needs an IP address- otherwise the Switch or the receivers (i.e. IPTV STB's) cannot locate the source of the streams.

1.3 Specifications

Input	2x2 HD-SDI Inputs, ASI Input, RF IN -> RF Out internal combiner		
Video	Resolution	input	1920×1080_60i, 1920×1080_50i, 1280×720_60P, 1280×720_50P, 720×576_50i, 720×480_60i, ...
		output	Following Input or Downscaling to almost all standard formats
	Encoding		MPEG2 or MPEG-4 AVC/h.264; main-, baseline- or high level Profiles 1.2 ...5.1 selectable
	Bit-rate		0,8 Mbps...12 Mbps each channel
	Rate Control		CBR/VBR
	GOP Structure		Adjustable or automatic
Audio	Encoding Codecs		MPEG-1 Layer 2, AAC (MPEG2) /AAC+ (MPEG4)
	Adjustment		Gain 0...400%
	Input enc. Selection		of Group 1...4 and Pair 1 or 2 from each SDI
	Sampling rate		48K
	Resolution		Max. 24-bit
	Bit-rate setting		64kbps,128Kbps,192kbps,224kbps,256kbps, 320kbps
Multiplexing	Function	PID remapping (automatically or manually) and PID passing from i.e. ASI IN for multiplex	
		Virtual Channel Table (VCT for DVB-C Annex B - USA)	
		NIT Generating & Insertion DVB-C Annex A/C	
		Accurate PCR adjusting	
		Generation of PSI/ SI table automatically, manual	
Stream output	4 SPTS and 1MPTS over UDP or RTP/RTSP		
	1x RJ45 Ethernet interface		
	Dual parallel ASI output as copy of the created and multiplexed MPTS		
DVB-C-Output	4 adjacent channels (30 - 1000 MHz), 16...265 QAM (Annex A), 5-9 Msps, adjustable output level max. 110 dBμV (-30.0 ... -10.0 dBm), DVB-T Modulator as option (need to be set in Factory)		
System function	Network management (WEB)		
	English language		
	Ethernet software upgrade		
Miscellaneous	Dimension(W×L×H)	485mm×440mm×44.5mm	
	Approx. weight	4.5kg	
	Environment cond.	0...45°C (working condition), -20...80°C (Storage)	
	Power requirements	AC 100V-220V±10%, 50/60Hz	
	Power consumption	25W	

Subjects to change w/o further notice

1.4 Block Diagram



1.5 Appearance and Description

Front and Rear Panel Illustration



From Left to Right: Display, GbE-DATAPort, NMS Management port, status LED's, Keypad, Enter-Button, Menu-, Lock- Unlock- Button



2x Modules either double HDMI or double SDI-inputs with extra screw-mounting, RF-Input RF-Output, ASI-IN, 2x ASI Out, ON/OFF- switch, Power plug, Grounding connector screw



(HDM-4320C HDMI instead of HD-SDI BNC – Input modules)

Chapter 2 Installation Guide

This section is to explain the cautions the users must know in some case that possible injure may bring to users when it's used or installed. For this reason, please read all details here and make in mind before installing or using the product.

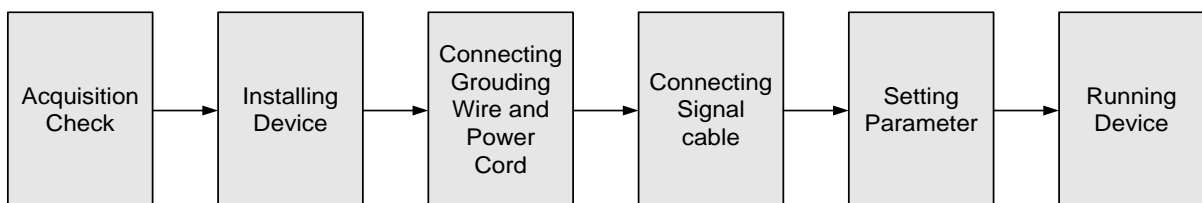
2.1 General Precautions

- Must be operated and maintained free of dust or dirty.
- The cover should be securely fastened, do not open the top case of the products when the power is on.
- After use, securely stow away all loose cables, external antenna, and others.

2.2 Power precautions

- When you connect the power source, make sure to not overload it.
- Avoid operating on an open wet floor. Make sure the extension cable is in good condition
- Make sure the power switch is off before you start to install the device

2.3 Device's Installation Flow Chart:



2.4 Environmental Requirements

Item	Requirement
Machine Hall Space	When user installs machine frame array in one machine hall, the distance between 2 rows of machine frames should be 1.2...1.5m and the distance against wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1 \times 10^7 \dots 1 \times 10^{10} \Omega$, Grounding current limiting resistance: $1 M\Omega$ (Floor bearing should be greater than $450 \text{Kg}/\text{m}^2$)
Environment Temperature	5...40°C (sustainable), 0...45°C (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 $110\text{V} \pm 10\%$, 50/60Hz or AC $220\text{V} \pm 10\%$, 50/60Hz. Please carefully check before running.

2.5 Grounding Requirement

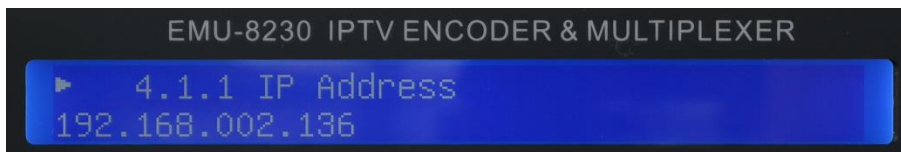
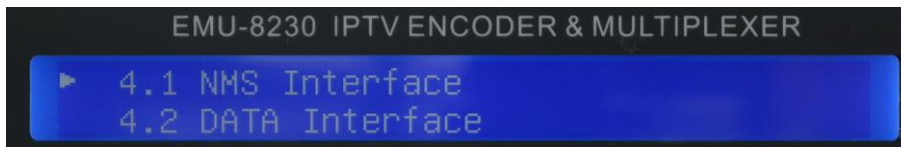
- For safe function all modules' or the Chassis should be grounded: That is the basis of reliability and stability of devices. Also, they are the most important guarantee of lightning arresting and interference rejection.
- Grounding connection must be installed with a copper conductor in order to reduce 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 are well electric conducted and not corrosive.
- 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 19" rack should be not less than 16 better 25 mm^2 .

Chapter 3 WEB Interface Setup

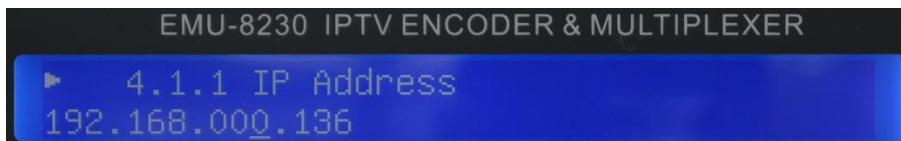
The user can control this device and setup the configuration by a computer connected to the device to its web NMS Port. The user should ensure that the computer's IP address is different from the other device's IP address, otherwise, it would cause IP conflicts.

3.1 Encoder login

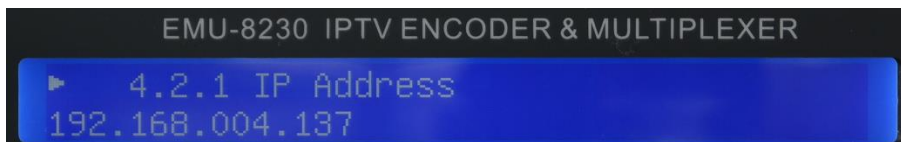
The default IP address of this device is 192.168.0.136 -> Please check the front panel LC Display and change to Network by **UNLOCK** the Keypad with pressing LOCK-Key once than MENU and use the arrow keys to navigate and ENTER Key to access the submenus. You can always return back by MENU-Key. These pictures are from another device but similar and shown as examples:



Select - change

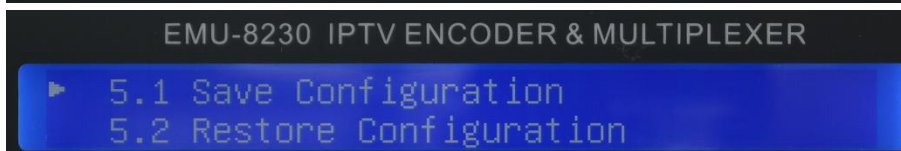
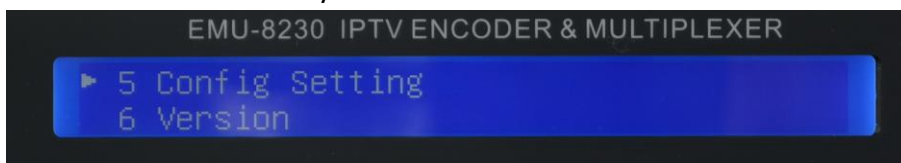


-> ENTER



change IP address

of the GbE DATA Port to your needs



SAFE it please.



CONFIRM it.

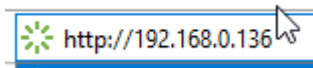


For some values, a reboot should be considered to enable the settings and take effect. Almost all of the needed settings can be accessed by the Front panel w/o Web-IF. **The Menu structure is nearly self-explaining.**

Connect the PC (Personal Computer) and the device with network cable directly (Check usage of crosslink cable eventually or network interface should support MDI/MDX), or using a at least Fast Ethernet 100BaseT switch and use a "ping" command to confirm they are on the same network segment.

I.e. the PC IP address is 192.168.99.252, we then change the device IP to 192.168.02.xxx (xxx can be 1 to 254 except 252 to avoid an IP conflict) according to the EMU IP.

Use your web browser like Firefox, to connect the device with your PC/Laptop by entering the URL of the Encoder & Modulator's IP address in the browser's address bar and press Enter:



A Popup will show the Login interface. Insert the Username and Password (Both default Username and Password are "admin") and then click OK to enter the device setting menu.

Note: We recommend using the newest version of the browser Firefox.

3.1.1 Network configuration basics:

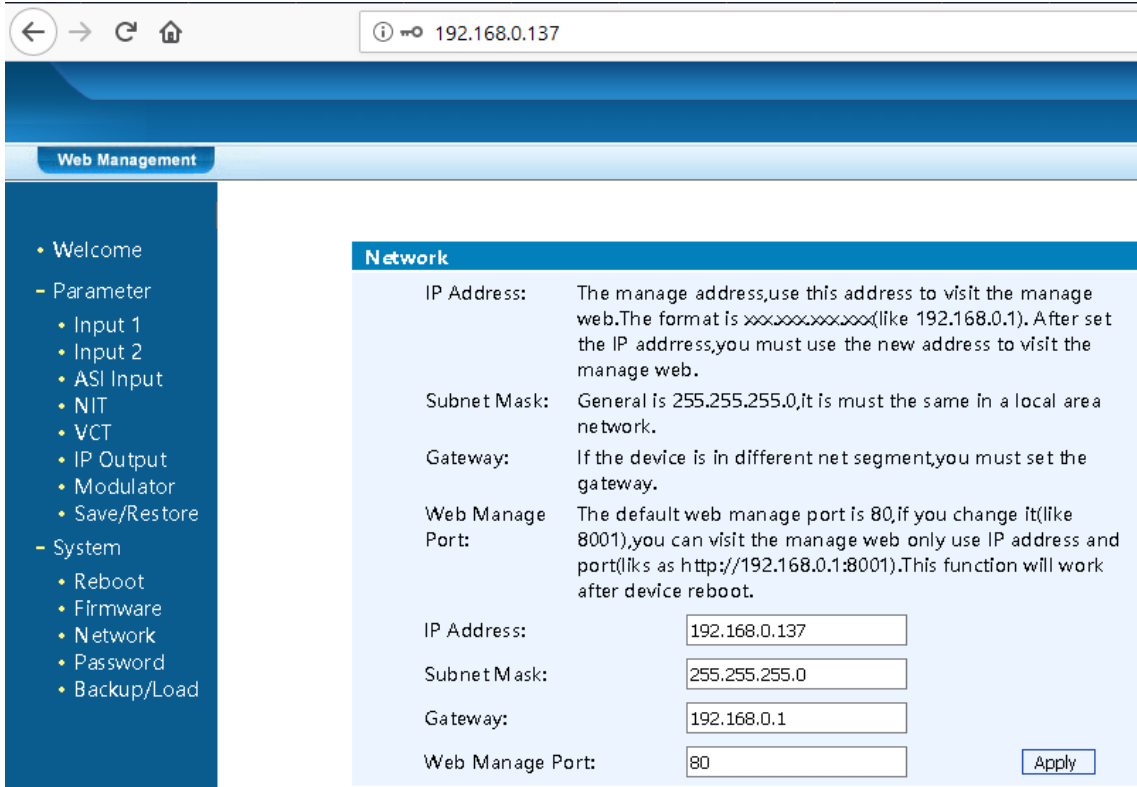
NMS and DATA port should not use the same subnet at all. It checks whether these settings are correct and separated - otherwise it refuses.

The problem is that both RJ45 are not secured against a loop. The solution is that you need to separate the NMS from the Streaming network as described before. Network Menu:

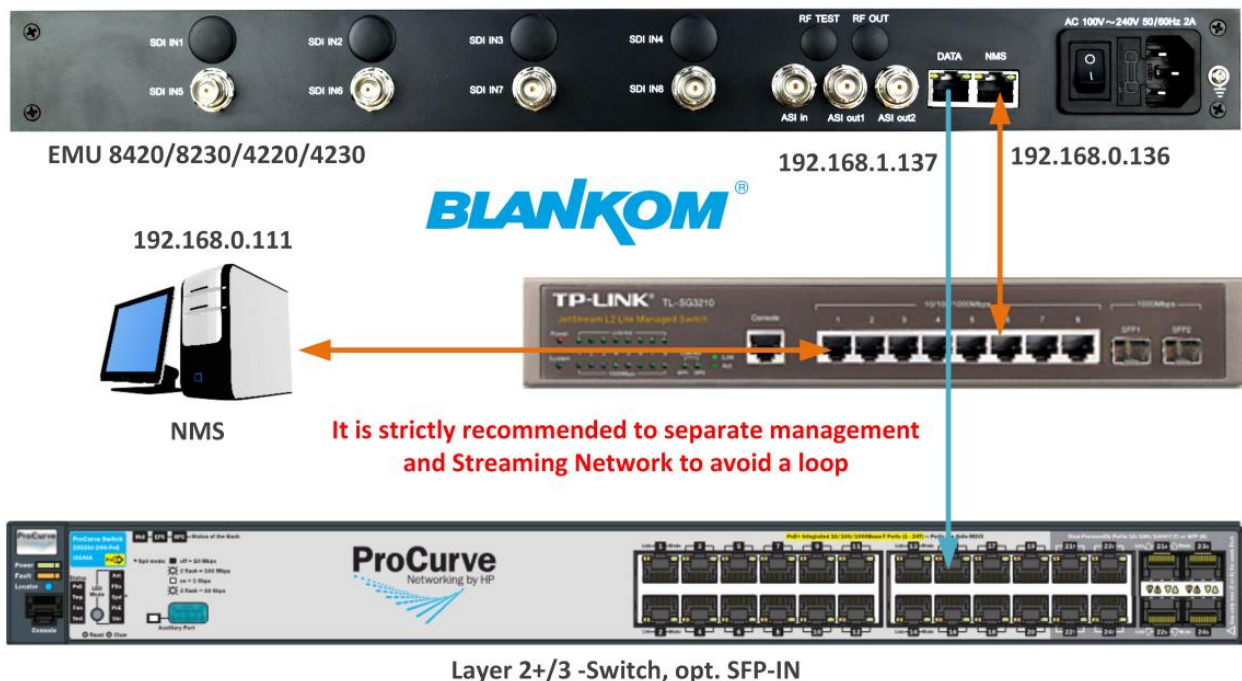
Parameter	Description
IP Address:	The manage address,use this address to visit the manage web.The format is xxx.xxx.xxx.xxx(like 192.168.0.1). After set the IP address,you must use the new address to visit the manage web.
Subnet Mask:	General is 255.255.255.0,it is must the same in a local area network.
Gateway:	If the device is in different net segment,you must set the gateway.
Web Manage Port:	The default web manage port is 80;if you change it(like 8001),you can visit the manage web only use IP address and port(like as http://192.168.0.1:8001).This function will work after device reboot.

The change will immediately take effect after confirming it with SET button. So you need to login with the new IP address here as example changed to 192.168.0.137:

The change will immediately take effect after confirming it with SET button. So you need to login with the new IP address here as example changed to 192.168.0.137:



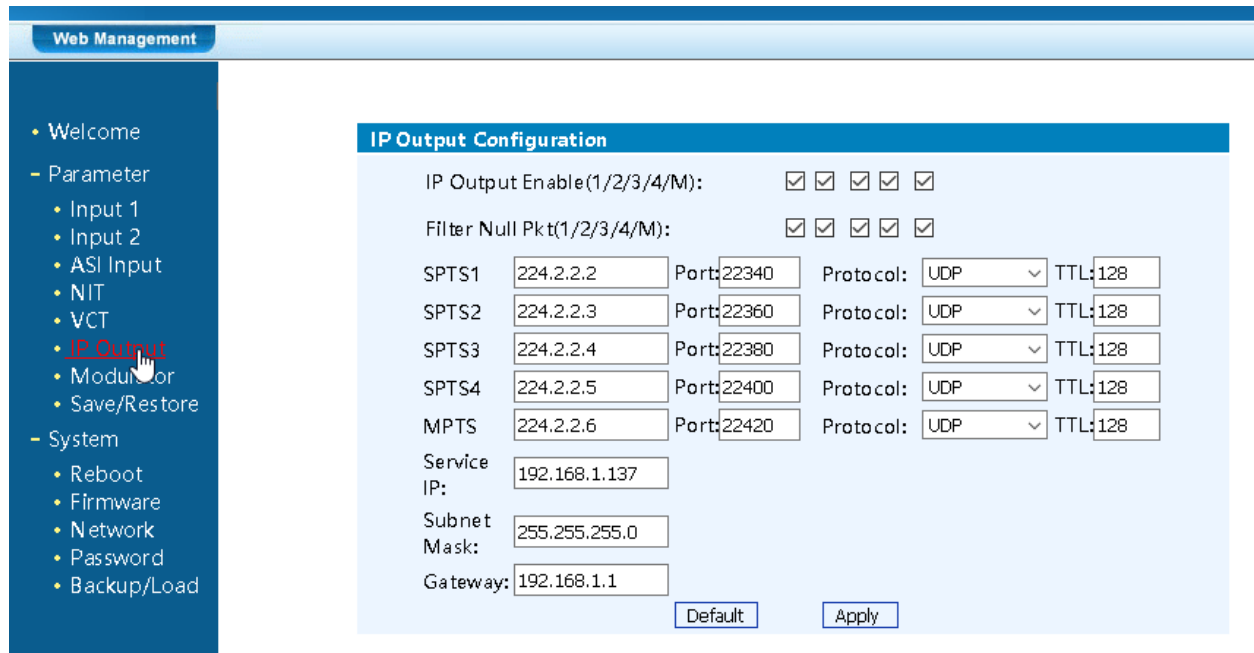
Follow this rule to physically separate the Ethernet ports (Example with another Encoder but similar to handle):



You can configure the device IP addresses as following:

- First connect the NMS port **only (see above)**, than change that to your needs: Both DATA and NMS port can be independently configured.

The DATA Streaming port has to be configured in the IP Output section:

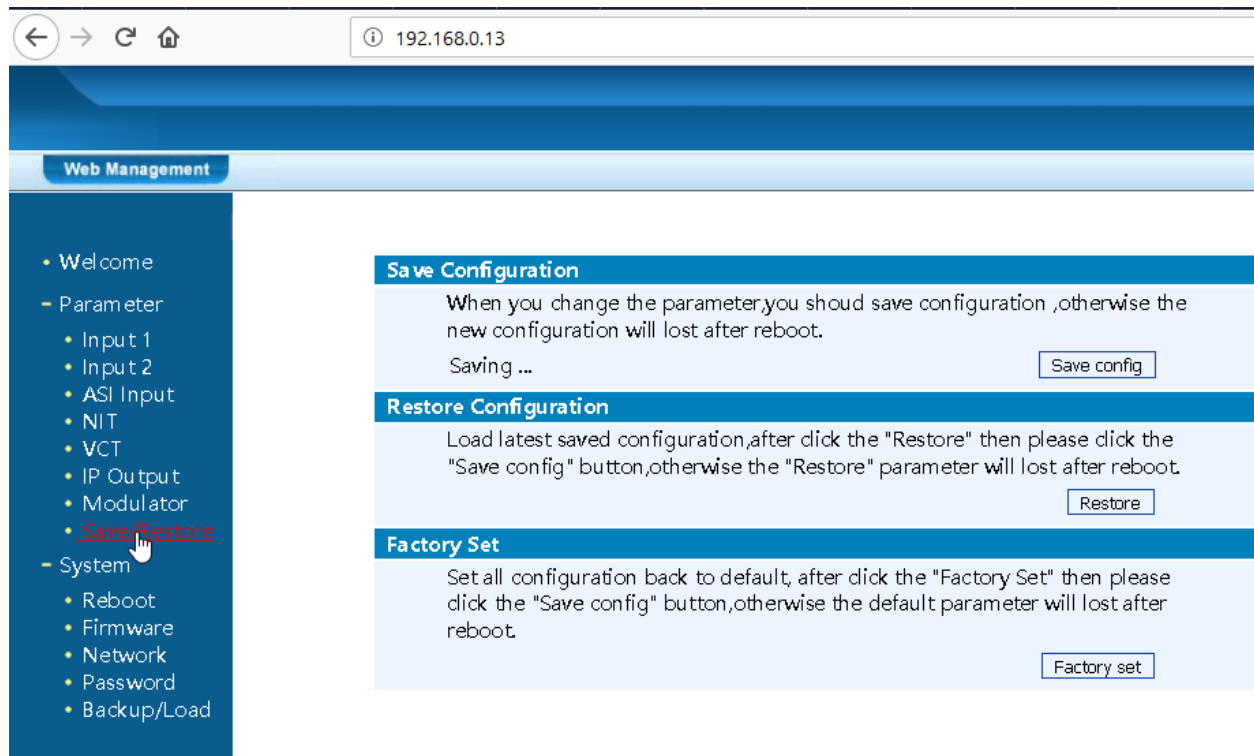


Change to your needs, change/set the values:

Change to your needs and avoid same subnet - means 192.168.0.x is forbidden for the DATA port or should be avoided.

If you change the Gateway, you probably need to reboot to enable that. But SAVE before reboot ;-).

So go to SAVE the configuration is always a good idea (for next booting safely with the already done configuration):



And you are good to go.

If you need to check the outgoing streams, set your PC into same network range like the DATA port.

But: Consider the need to change your Ethernet cable from the management Switch to the Streaming Switch and double IP address settings in your PC to both ranges.

Intelligent switches with Loop detection can also be used i.e. if you separate the Network ports by VLAN's. You will find some more about streaming things at the end of this manual. Note: If you have set more than 2 IP ranges in your PC and try to get the Streams by VLC: VLC is somehow stupid and do not recognize via which Ethernet (RJ45 or WIFI) IP address –Source it can grab the Stream. The difference is to manually set the METRIC values: The lower the Value the higher the priority for that interface IP address.

3.2 General Setup

Status

After login into the encoder, you start with the status interface:

The screenshot shows the BLANKOM web management interface. The main content area displays the following information:

HDM-4220C Encoder&Modulator

Version Information	
Software Version:	3.16sA Build 139 Aug 20 2019
Hardware Version:	9.7
Web Version:	1.24

Status Information			
Input			
	Input 1	Input 2	ASI
Interface:	SDI	SDI	ASI
Bitrate:	10.542 Mbps	12.922 Mbps	40.082 Mbps

Output				
	Output A	Output B	Output C	Output D
Maxout Bitrate:	50.501 Mbps	50.501 Mbps	50.501 Mbps	50.501 Mbps
Current Bitrate:	19.796 Mbps	10.590 Mbps	23.529 Mbps	10.605 Mbps
TS Overflow:	●	●	●	●
RF Frequency:	650.000 MHz	656.000 MHz	662.000 MHz	668.000 MHz
RF Outlevel:	-10.0 dBm			

HDM-4230C:

The screenshot shows a web browser interface for the HDM-4230C Encoder & Modulator. The address bar shows the IP address 192.168.0.136. The page title is 'HDM-4230C Encoder & Modulator'. The main content area is divided into two sections: 'Version Information' and 'Status Information'. The 'Version Information' section lists the Software Version (3.18sA Build 139 Oct 9 2019), Hardware Version (9.7), and Web Version (1.24). The 'Status Information' section is divided into 'Input' and 'Output' tables. The 'Input' table shows two HDMI inputs with bitrates of 12.587 Mbps and 12.591 Mbps, and an ASI input with a bitrate of 0.000 Mbps. The 'Output' table shows four outputs (A, B, C, D) with maximum bitrates of 38.811 Mbps and current bitrates of 12.620 Mbps, 0.033 Mbps, 0.033 Mbps, and 12.625 Mbps respectively. The 'TS Overflow' status is indicated by green circles for all outputs. The 'RF Frequency' is 650.000 MHz, 656.000 MHz, 662.000 MHz, and 668.000 MHz for outputs A, B, C, and D respectively. The 'RF Outlevel' is -10.0 dBm.

Version Information			
Software Version:	3.18sA Build 139 Oct 9 2019		
Hardware Version:	9.7		
Web Version:	1.24		

Status Information			
Input			
	Input 1	Input 2	ASI
Interface:	HDMI	HDMI	ASI
Bitrate:	12.587 Mbps	12.591 Mbps	0.000 Mbps

Output				
	Output A	Output B	Output C	Output D
Maxout Bitrate:	38.811	38.811	38.811	38.811
	Mbps	Mbps	Mbps	Mbps
Current Bitrate:	12.620	0.033	0.033	12.625
	Mbps	Mbps	Mbps	Mbps
TS Overflow:	●	●	●	●
RF Frequency:	650.000	656.000	662.000	668.000
	MHz	MHz	MHz	MHz
RF Outlevel:	-10.0 dBm			

Note: We recommend to control and check the configured Transport-Stream Values with a TS analyser like a DekTec Fantasi (can be obtained from IRENIS GmbH) and the corresponding Software like stream-Expert either at the ASI out and / or the SPTS and MPTS streams.

This Example here has an additional ASI TS Input and is shown after the ENCODERS:

- Welcome
- Parameter
 - Input 1
 - Input 2
 - **ASI Input**
 - NIT
 - VCT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - Password
 - Backup/Load

1CH ASI Configuration (EN06)

Set Tuner PID Pass

Input Program A B C D
E

Input Program

- 1 BBC World News Europe HD
- 2 INSIGHT TV HD
- 3 INSIGHT TV HD INT
- 4 NHK WORLD-JPN
- 5 Al Jazeera English HD
- 6 MB LIVE

Passthrough

Multiplex

Refresh Input

Refresh Output

Select Program

Cancel Program

All Input

All Output

Output Program

- 1 BBC World News Europe HD

Parse timeout seconds

An ASI TransportStream is always and every time with ConstantBitRate (CBR) which depends from its source. To view the ASI Input-content you need to press Set Tuner and or before Refresh the Input:

1CH ASI Configuration (EN06)

Set Tuner PID Pass

Input Program A B C D
E

Input Program

- 1 BBC World News Europe HD
- 2 INSIGHT TV HD
- 3 INSIGHT TV HD INT
- 4 NHK WORLD-JPN
- 5 Al Jazeera English HD
- 6 MB LIVE

Passthrough

Multiplex

Refresh Input

Refresh Output

Select Program

Cancel Program

All Input

All Output

Output Program

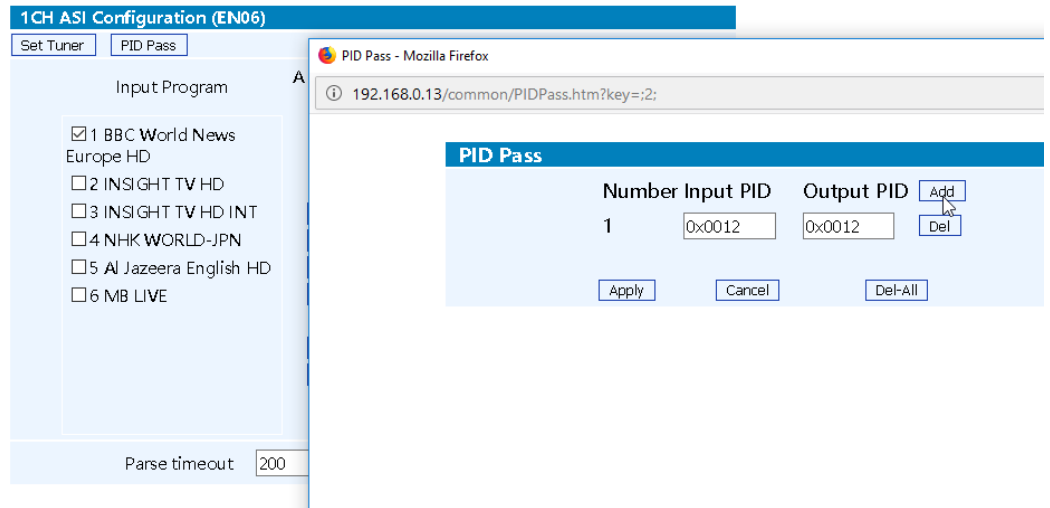
- 1 BBC World News Europe HD
- 2 INSIGHT TV HD
- 3 INSIGHT TV HD INT
- 4 NHK WORLD-JPN
- 5 Al Jazeera English HD
- 6 MB LIVE

Parse timeout seconds

Then select to pass through or Multiplex

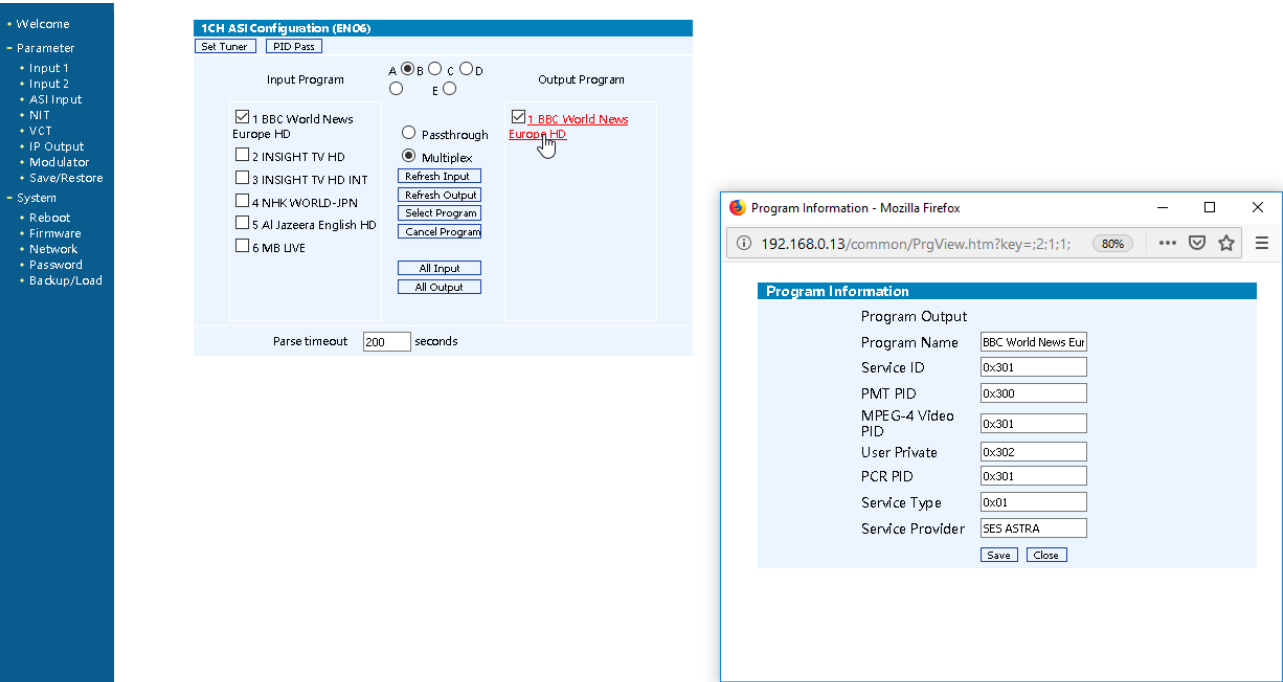
Here you can mix an Input TS with the encoded Services, select the outputs to go with and even can pass PID's from ASI TS manually: A Popup Window will appear (please set your browser to support or allow Popups!!!!)

- Welcome
- Parameter
 - Input 1
 - Input 2
 - ASI Input
 - NIT
 - VCT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - Password
 - Backup/Load

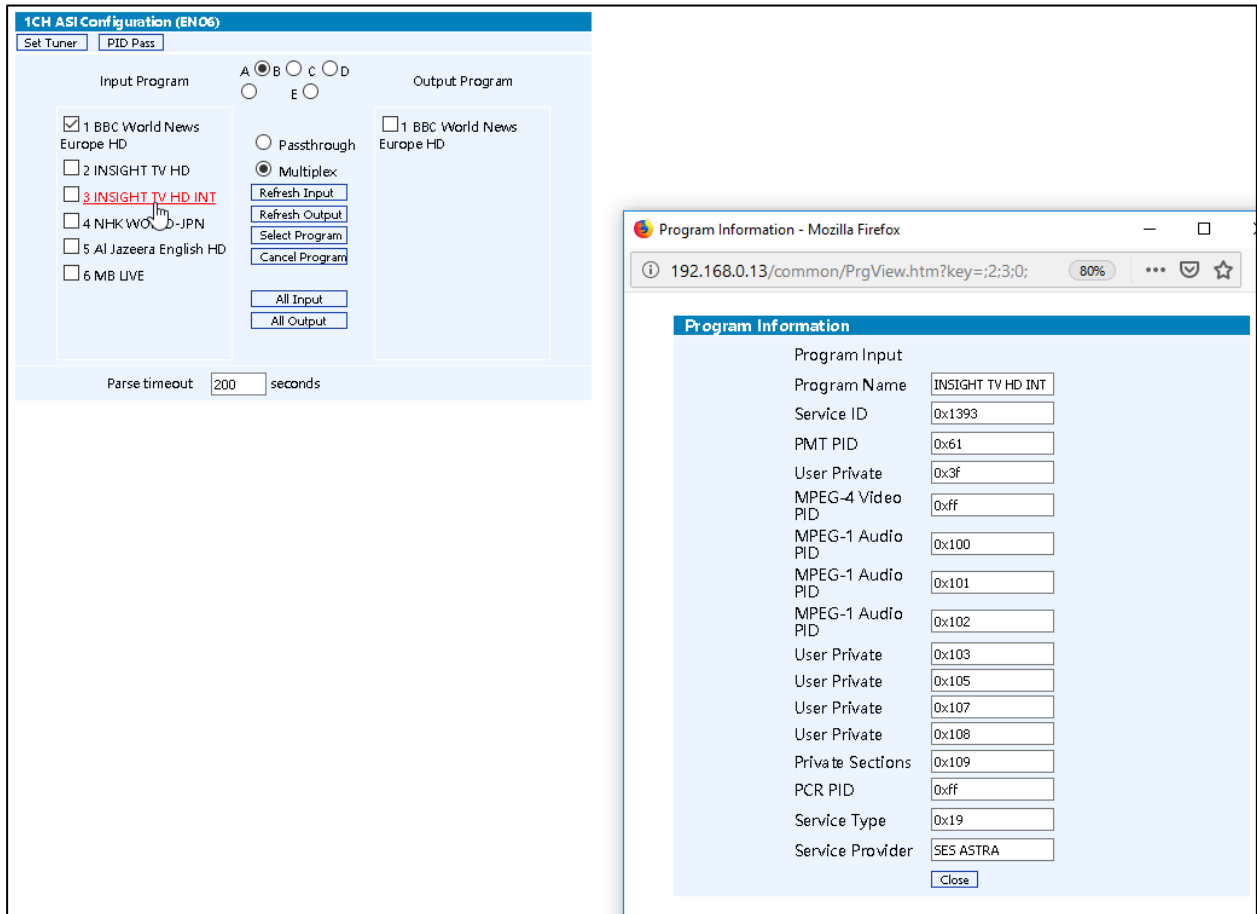


Example to pass the EIT Table from the ASI Input to the new multiplexed output see above, ADD PID 0x0012 (hex) (= PID 18 dec).

Selecting a Service in the ASI will popup its information which can be edited:



With the Multiplex function you can add the encoded Services to an existing transport stream coming in from ASI and push that out to ASI 1+2 and in parallel to an MPTS output. Be careful to set the Bitrate for the CBR MPTS output accordingly. Encoder bitrates 1...4...8 + incoming data rate from ASI IN + approximately 15% overhead to avoid peaks in the variable services bitrates disturbing all of the output services. Maximum ASI-out net output rate = 213 Mb/s.



Encoder Setups

The encoder is equipped with 2x dual encoder modules with HDMI or HD-SDI inputs. From the menu on the Top of the webpage select the modul1 or 2 and it shows the information of the 2 encoding channel:

- Welcome
- Parameter
 - **Input 1**
 - Input 2
 - ASI Input
 - NIT
 - VCT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - Password
 - Backup/Load

2CH Mpeg2/H.264 HD Encoder Configuration (EN14)			
Video Format	H.264	Mpeg2	
Aspect Ratio	Auto	Auto	
Low delay	Manual	Normal	
Video BitRate(Mbps)	12.000	12.000	
DTS Delay	200 (1-500)	200 (1-500)	
GOP Bframe	2 (<=3)	2 (<=3)	
Gop Pframe	4 (<=6)	4 (<=6)	
H.264 Profile	High Profile	Main Profile	
H.264 Level	Level 5.1	Level 3.1	
Auto Config	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Resolution	1920*1080_60i	1920*1080_50i	
Audio Format	Mpeg2	Mpeg4 AAC	
Dialog Normalization	-31 (-31 - -1)dB	-31 (-31 - -1)dB	
Audio BitRate	320 Kbps	192 Kbps	
Audio Gain(0-400%)	100%	100%	
Audio Group	Group 1	Group 4	
Audio Pair	Pair 1	Pair 2	
Program Out Enable(ABCDE)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	
Service Provider	TV-Provider	TV-Provider	
Program Name	TV-101	TV-102	
Service ID	0x101	0x102	
PMT PID	0x100	0x104	
Video PID	0x101	0x105	
Audio PID	0x102	0x106	
PCR PID	0x103	0x107	
Video:	●	●	
Video Format:	1920x1080 50i	unknown	
Encoding:	●	●	
Bitrate:	5.401 Mbps	0.000 Mbps	
Rom Version:	6.1.2.211	6.1.2.211	
		<input type="button" value="Default"/>	<input type="button" value="Apply"/>

These settings are almost self-explaining. The PID-values are always to consider as HEX please and you should avoid overlapping's or double setups for the TV services. We assume, that you are an expert in DVB. Otherwise make yourself familiar before screwing up the machine.

HDM-4320C HDMI configuration:

These slightly differ from the HD-SDI port inputs ... naturally....:

Because HDMI contains only 1 Audio Signal instead of several like HD-SDI can contain.

- Welcome
- Parameter
 - Input 1
 - Input 2
 - ASI Input
 - NIT
 - VCT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - Password
 - Backup/Load

2CH Mpeg2/H.264 HD Encoder Configuration (EN13)

Video Format	H.264	Mpeg2
Aspect Ratio	Auto	Auto
Low delay	Normal	Normal
Video BitRate(Mbps)	12.000	12.000
DTS Delay	200 (1-500)	200 (1-500)
GOP Bframe	2 (<=3)	2 (<=3)
Gap Pframe	4 (<=6)	4 (<=6)
H264 Profile	High Profile	Main Profile
H264 Level	Level 5.1	Level 3.1
Auto Config	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Resolution	1920*1080_50i	1920*1080_50i
Audio Format	Mpeg4 AAC	Mpeg2
Audio Normalization	-31 (-31 - -1)dB	-31 (-31 - -1)dB
Audio BitRate	192 Kbps	192 Kbps
Audio Gain(0-400%)	100	100
Program Out Enable(ABC DE)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Service Provider	TV-Provider	TV-Provider
Program Name	TV-101	TV-102
Service ID	0x101	0x102
PMT PID	0x100	0x104
Video PID	0x101	0x105
Audio PID	0x102	0x106
PCR PID	0x103	0x107
Video	●	●
Video Format:	1920x1080 50i	unknown
Encoding:	●	●
Bitrate:	12.546 Mbps	0.000 Mbps
Rom Version:	0.0.2.211	0.0.2.211

NIT-Settings:

- Welcome
- Parameter
 - Input 1
 - Input 2
 - ASI Input
 - **NIT**
 - VCT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - Password
 - Backup/Load

NIT Insert

Output A B C D E

Close NIT

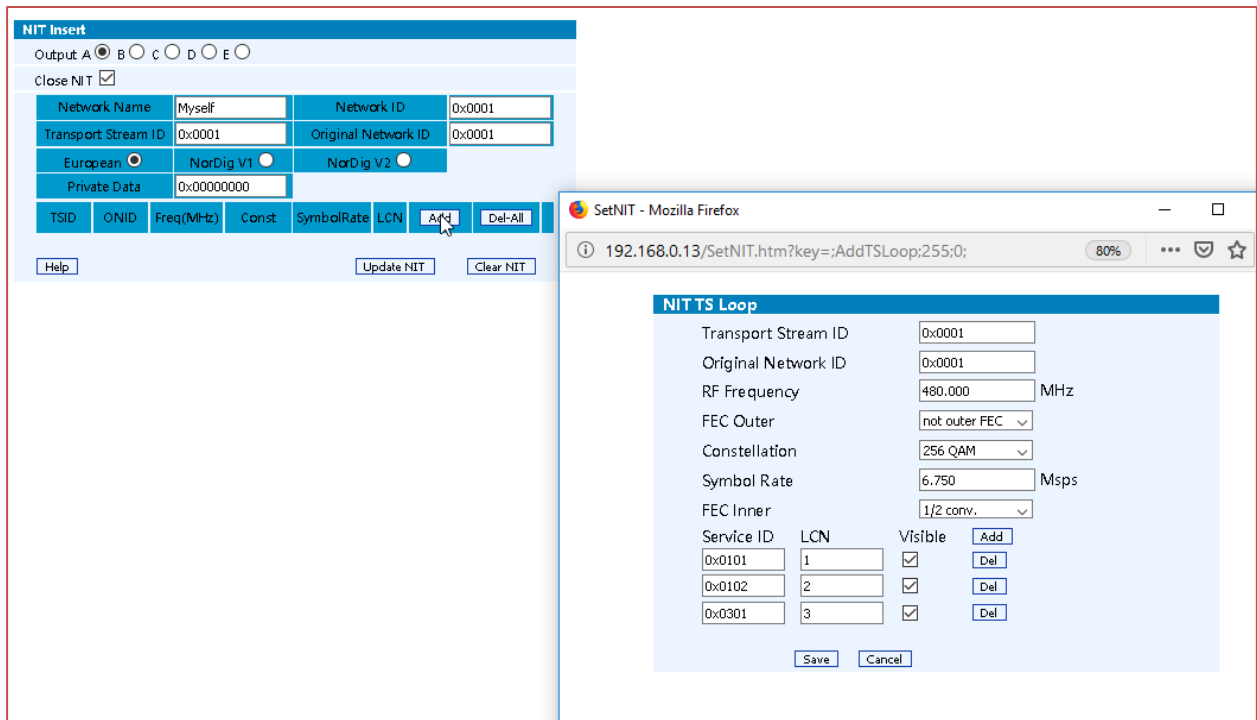
Network Name	Myself	Network ID	0x0001
Transport Stream ID	0x0001	Original Network ID	0x0001
European <input checked="" type="radio"/>	NorDig V1 <input type="radio"/>	NorDig V2 <input type="radio"/>	
Private Data	0x00000000		

TSID	ONID	Freq(MHz)	Const	SymbolRate	LCN	Add	Del-All

In this menu the output TS NIT of all RF channels and the ASI TS can be configured and manually edited. A Popup will appear after pressing ADD.

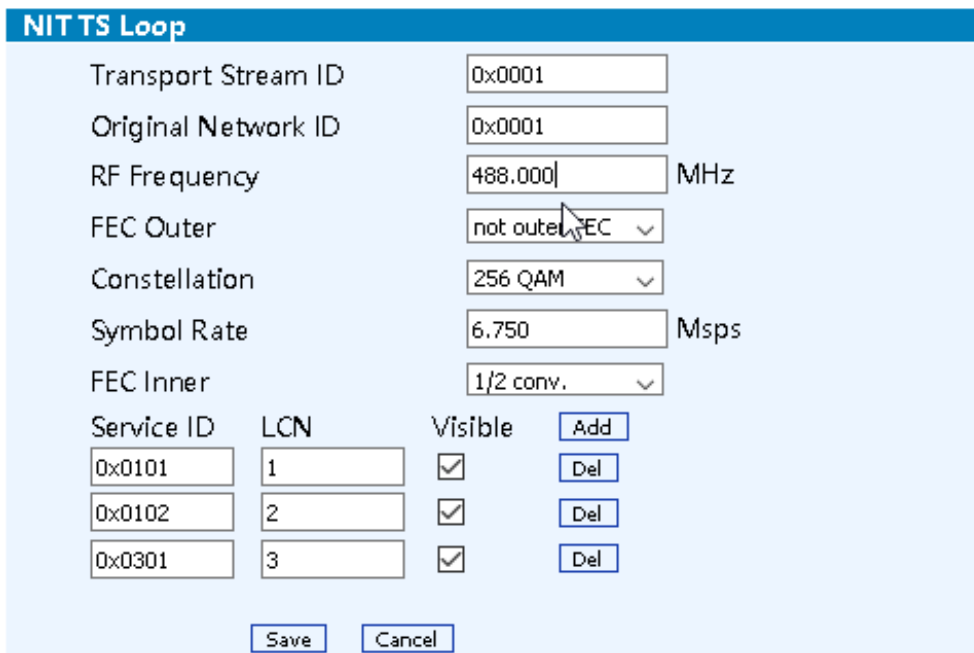
NOTE: The POPUP Blocker in your Browser should be disabled.

You should set this according to the existing network values of your CATV frequencies.



Logical channels number can be assigned to your 4 Service ID's and you can add more ... Do not forget to safe...

Add next frequency (do insert the Frequency as Kiloherzt example: 488 MHz = 480.000):



Please make yourself familiar what is the NIT and how to setup it.

The NIT can be chosen as compatible format according to NorDig V1 or V2 standard or European Version:

NIT Insert

Output A B C D E

Close NIT

Network Name	Myself	Network ID	0x0001
Transport Stream ID	0x0001	Original Network ID	0x0001
European <input checked="" type="radio"/>	NorDig V1 <input type="radio"/>	NorDig V2 <input type="radio"/>	
Private Data	0x00000000		

TSID	ONID	Freq(MHz)	Const	SymbolRate	LCN	Add	Del-All
0x0001	0x0001	480.000	256 QAM	6.750	yes	Detail	Del
0x0001	0x0001	488.000	256 QAM	6.750	yes	Detail	Del

Help Update NIT Clear NIT

Similar is the handling of the Virtual Channel Table (VCT) support for the **non** Nordig/European CATV networks:

Virtual Channel Table

Output A B C D E

VCT Mode	Close VCT
Transport Stream ID	0x0001

TSID	ModulationMode	Carrier Frequency	Add	Del-All

Update VCT

SetTVCT - Mozilla Firefox

192.168.0.13/SetVCT.htm?key=;Add;255;

Channels Loop

Modulation Mode

Carrier Frequency

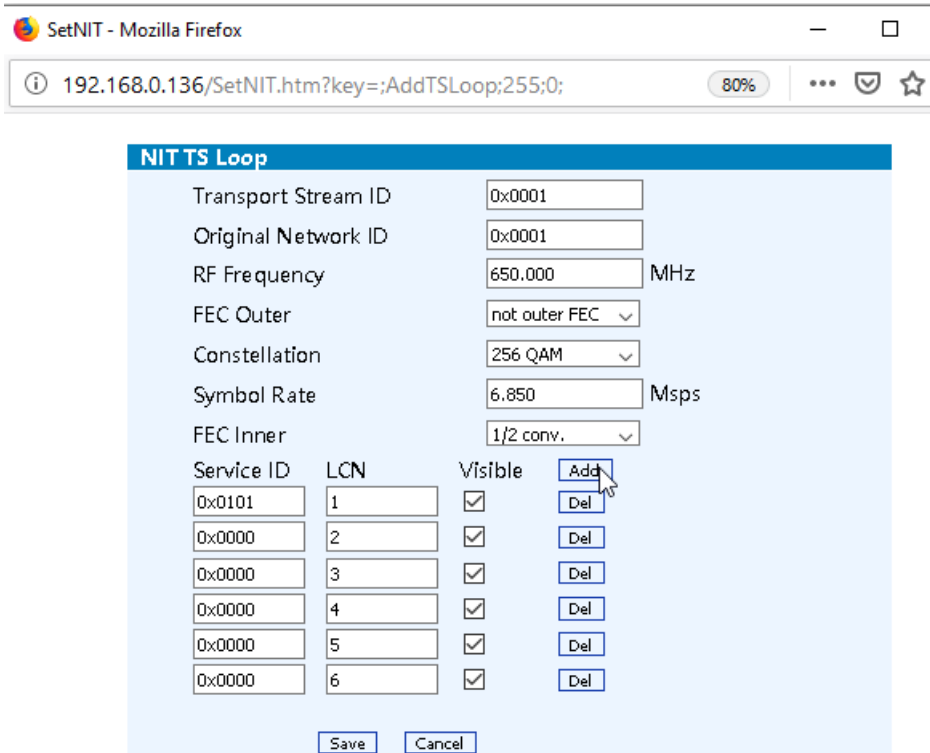
Channel TSID

Program Number	Short Name	Major Channel Number	Minor Channel Number	Source ID	Add
0x0101	<input type="text"/>	1	1	0x0001	Del
0x0102	<input type="text"/>	1	2	0x0001	Del
0x0301	<input type="text"/>	1	3	0x0001	Del

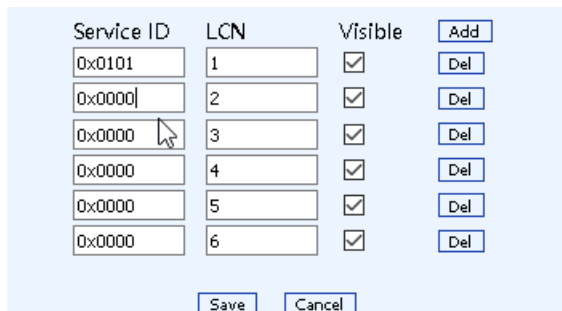
Save Cancel

You can skip that or let it empty in Europe.

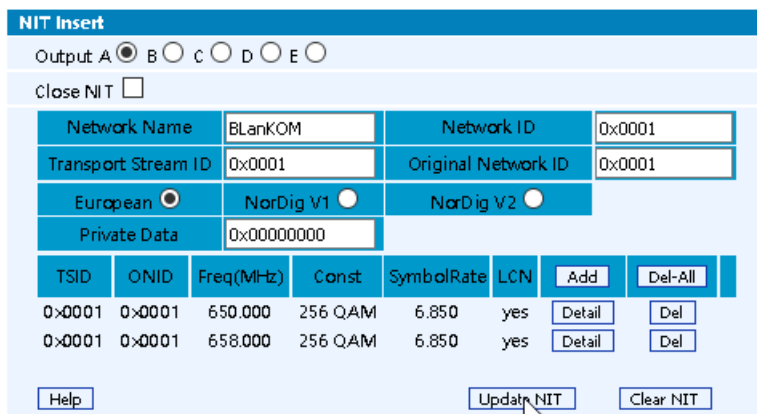
Example for an inserted NIT:



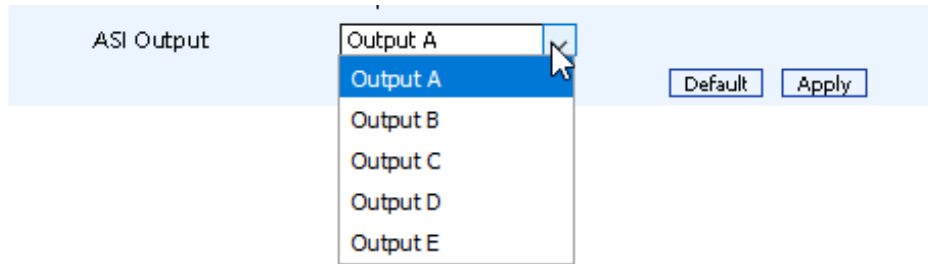
The service ID's need to be adjusted according to your encoded TV services and their SID's (in Hex values):



If there is an existing Network and you add these 4 QAM channels to it, you can combine the existing NIT (Like coming from a Cable Operator like KDG/Vodafone or any other) with your HDM.



-> added a 2nd channel 650 + 658MHz manually, here the ASI A routed to the ASI BNC-connector output as to have a look at the Transportstream:



Connected TS analyser:
Before and after adding the 2nd frequency:

The screenshot displays the BLANKOM software interface with the following sections:

- Settings:** Includes controls for Freeze, Refresh, Reset, PID, Service ID, Bitrate (short-term), Gate (1s), and Time Slice (100ms).
- PID info (8):**
 - 0x0000 PAT (16.0 kbps / 0.03%):** Bitrate: 1.476 bps / 0.00%, PCR: No, Scrambled: No, CC Errors: 2, Type: NIT-actual.
 - 0x0010 NIT-actual (1.48 kbps / 0.00%):** Bitrate: 2.772 bps / 0.01%, PCR: No, Scrambled: No, CC Errors: 1, Type: SDT-actual.
 - 0x0011 SDT-actual (2.8 kbps / 0.01%):** Bitrate: 16.043 bps / 0.03%, PCR: No, Scrambled: No, CC Errors: 1, Type: PMT.
 - 0x0100 PMT (16.0 kbps / 0.03%):** Bitrate: 12.675.291 bps / 25.1%, ES Info, PCR: No, Scrambled: No, CC Errors: 0, Type: AVC/H.264 Video, Stream ID: 224.
 - 0x0101 AVC/H.264 Video (12.7 Mbps / 25.1%):** Bitrate: 212.637 bps / 0.4%, PCR: No, Scrambled: No, CC Errors: 0, Type: HE-AAC Audio, Stream ID: 192.
 - 0x0102 HE-AAC Audio (212 kbps / 0.4%):** Bitrate: 50.873 bps / 0.1%, PCR: Yes, Scrambled: No, CC Errors: 0, Type: PCR.
 - 0x0103 PCR (50 kbps / 0.1%):** Bitrate: 37.526.507 bps / 74.3%, Type: Null packets.
 - 0x1FFF Null packets (37.5 Mbps / 74.3%):** Type: Null packets.
- Transport stream 1:**
 - Services (1):** TV-101 (12.9 Mbps / 25.5%)
 - Tables:** PAT, PMT, NIT-actual.
 - Network ID: 1**
 - Table ID: 64:** Table PID: 16, Table version: 13, Repetition rate: 0.7Hz, Table interval: 1.50s, Number of sections: 1, Section length: 97 bytes.
 - Network Name Descriptor:** Descriptor tag: 0x40, Network name: BLANKOM, Transport-Stream ID: 1, Original Network ID: 1.
 - Cable Delivery System Descriptor:** Descriptor tag: 0x44, Frequency: 650.0000 MHz, Outer FEC: 1 (No outer FEC coding), Modulation: 5 (256-QAM), Symbol rate: 6.8500 Msymbol/s, Inner FEC: 5 (7/8).
 - Service List Descriptor:** Descriptor tag: 0x41, Service: 257, Service type: 1 (Digital television).
 - Logical Channel Descriptor:** Transport-Stream ID: 1, Original Network ID: 1.
 - Cable Delivery System Descriptor:** Descriptor tag: 0x44, Frequency: 658.0000 MHz, Outer FEC: 2 (RS(204/188)), Modulation: 5 (256-QAM), Symbol rate: 6.8500 Msymbol/s, Inner FEC: 5 (7/8).
 - Service List Descriptor:**
 - Logical Channel Descriptor:**
 - SDT-actual:** Transport-Stream ID: 1 (onw=1), Table ID: 66.

The status bar at the bottom shows: Ready, 188 Byte, TsRate: 50.501.649bps / 24.9%, Mode: DVB, ASI/SDI, DTU-245B at 0x01.

With changed values for the FEC (outer) ...

Usually the TV set would not update it's NIT except you perform a manual tuning to one of these channels where you have inserted the NIT of this device. Some TV sets will only be store one NIT, and if you need the using of a NIT in your Coax-CATV network we recommend to place these extra inserted QAM DVB-C Channels in a free 4 channel range as lowest as possible by i.e. using a Band-Filter (to exclude these bandwidth and later add this 4x RF channels and combine both networks after or in it.

The TV sets (or DVB-C STB's) would read the NIT from the first RF QAM channel they will find (i.e. @ around 306MHz which is a common Value in particular with a cable operator using

Internet with DOCSIS 3.1). Than they store it and they might not find all Channels! So we recommend to have an eye on these details of the NIT very carefully.

IP-OUTPUT Parameters:

IP Output Configuration

IP Output Enable(1/2/3/4/M):

Filter Null Pkt(1/2/3/4/M):

SPTS1: Port: Protocol: TTL:

SPTS2: Port: Protocol: TTL:

SPTS3: Port: Protocol: TTL:

SPTS4: Port: Protocol: TTL:

MPTS: Port: Protocol: TTL:

Service IP:

Subnet Mask:

Gateway:

Addresses, Ports and mode can be adjusted here.

DVB-RF settings:

- Welcome
- Parameter
 - Input 1
 - Input 2
 - ASI Input
 - NIT
 - VCT
 - IP Output
 - **Modulator**
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - Password
 - Backup/Load

Modulator Configuration

RF On (ABCD)

Standard:

Constellation:

Symbol Rate: (5.000 - 9.000 Msps)
Msps

RF Frequency A: MHz (30.000 - 1000.000 MHz)

RF Frequency B: MHz (30.000 - 1000.000 MHz)

RF Frequency C: MHz (30.000 - 1000.000 MHz)

RF Frequency D: MHz (30.000 - 1000.000 MHz)

RF Outlevel: dBm (-30.0 - -10.0 dBm)

Output E Bitrate: (0.000 - 99.000 Mbps)
Mbps

ASI Output:

Here the settings for the Outputs A B C D (RF channels) ON/OFF and selection of what ASI out can be assigned to. The Multiplex ASI output can only be as high as 99 Mb/s while each RF-Channel Datarates depending on the modes setup: Symbol rate is usually 6750-6850 and 256 QAM the highest and best value for QAM out: max. Datarate is 51 Mb/s incl. Zero pakets on PID8191dec. **Please set the RF-Center frequencies of the QAM channels according to the values shown in the Annex of this document** and adjust the QAM output levels accoring to your combining network. Hint: QAM265 level are to be set to 4dB less than PAL channels while QAM64 has to be 10dB less than PAL (according to Kabel Deutschland Technical Specifications).

Safe and Restore the configuration:

The screenshot shows a web interface with a left-hand navigation menu and three main configuration panels. The navigation menu includes: Welcome, Parameter (Input 1, Input 2, ASI Input, NIT, VCT, IP Output, Modulator, **Save/Restore**), and System (Reboot, Firmware, Network, Password, Backup/Load). The 'Save/Restore' menu item is highlighted with a mouse cursor. The three configuration panels are:

- Save Configuration:** When you change the parameter, you should save configuration, otherwise the new configuration will be lost after a reboot. A 'Save config' button is visible.
- Restore Configuration:** Load the latest saved configuration. After clicking 'Restore', please click the 'Save config' button, otherwise the 'Restore' parameter will be lost after a reboot. A 'Restore' button is visible.
- Factory Set:** Set all configuration back to default. After clicking 'Factory Set', please click the 'Save config' button, otherwise the default parameter will be lost after a reboot. A 'Factory set' button is visible.

NOTE: The Symbol Rate has to be entered with the (American style) “.” as the thousand comma: Like: **6.900** Mpsps (**Mega** symbols per second).

In case accidentally something happened, the factory settings can be restored.

The screenshot shows the same web interface as above, but with the 'Reboot' menu item in the System section highlighted by a mouse cursor. The 'Reboot' panel contains the following text: "Some configuration will work after a reboot of the device, such as Web Management Port set, Firmware update, Configuration Load (reboot automatically)." and a 'Reboot' button.

The Reboot is sometimes necessary if essential parameters have been changed.

Firmware updates can be installed in case there are new versions available from the engineering team for fixing issues or adding improvements. -> Please ask us if something is happening:

- Welcome
- Parameter
 - Input 1
 - Input 2
 - ASI Input
 - NIT
 - VCT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - **Firmware**
 - Network
 - Password
 - Backup/Load

Firmware

Warning: 1. Update firmware to get new function, please choose the right firmware to update. If you use a wrong file, the device may not work.
 2. Update will keep a long time, please do not turn off the power, otherwise the device will not work.
 3. After update, you must reboot device manually.

File: Keine Datei ausgewählt.

Password

- Welcome
- Parameter
 - Input 1
 - Input 2
 - ASI Input
 - NIT
 - VCT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - **Password**
 - Backup/Load

Password

Modify the login name and password to make the device safely. If forget the name or password, you can reset it by keyboard in LCD menu. The default login name and password is "admin". Also please note the capital character and lowercase character.

Current UserName:

Current Password:

New UserName:

New Password:

Confirm New Password:

Keyboard and LCD Lock

The default username and password for the administrator can be changed.

But DO NOT forget that or write it down somewhere ;-)

Also the Front panel operation can be blocked here.

Some useful remarks:

- Installing the device in the place in which environmental temperature between 0 to 45 °C
- Assure good ventilation for the heat-sink on the rear panel and other heat-sink holes if necessary
- Checking the input AC 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 (For RF devices)
- Checking whether all signal cables have been properly connected
- Frequently switching on/off device is not recommended; the interval between every switching on/off should be more than 10 seconds.

Packing List

MPEG4 HD IP Encoder

1 pcs

User Manual	1 pcs
Power Cord (depending on Country)	1 pcs
some HDMI Cables maybe or BNC dep. on Model.	

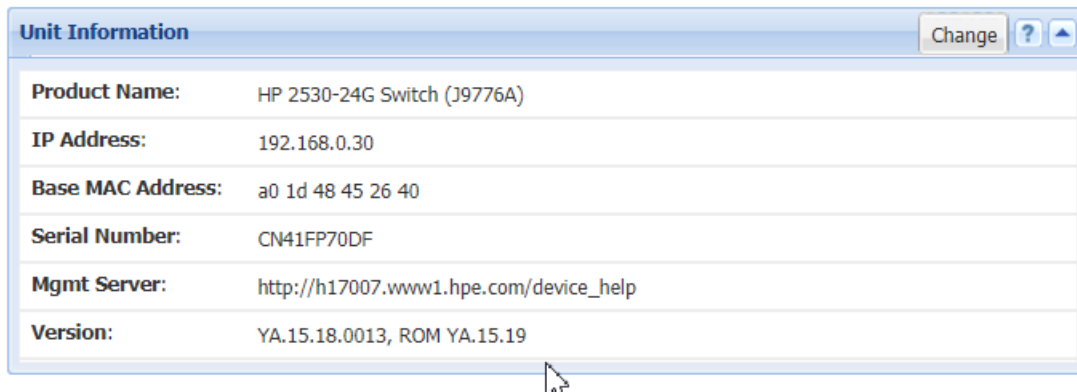
Some useful hints about network streamings:

We recommend to make yourself familiar with the h.264 AVC (and HEVC depending on Encoder unit) encoding methods as well as streaming itself.

IGMP is one of the important mechanism for IPTV securing overloadings of i.e. STB's by pushing too many streams to it.

As **a Multicast capable Switch** we recommend is the HP (ARUVA) 2530 24G or 48G.

(For Floor switches we have an own branded one and support IGMP as well) IGMP should be set to ON in the port configs. The latest HP Firmware might not be the best choice. Better to test IGMP functions before installation into a HOT running System and eventually do a downgrade of the Firmware. This one works:



Encoding and codec parameters

We recommend to check https://en.wikipedia.org/wiki/H.264/MPEG-4_AVC for basics and HEVC-specialities. Loss resilience features including:

- A [Network Abstraction Layer](#) (NAL) definition allowing the same video syntax to be used in many network environments. One very fundamental design concept of H.264 is to generate self-contained packets, to remove the header duplication as in MPEG-4's Header Extension Code (HEC).^[36] This was achieved by decoupling information relevant to more than one slice from the media stream. The combination of the higher-level parameters is called a parameter set.^[36] The H.264 specification includes two types of parameter sets: Sequence Parameter Set (SPS) and Picture Parameter Set (PPS). An active sequence parameter set remains unchanged throughout a coded video sequence, and an active picture parameter set remains unchanged within a coded picture. The sequence and picture parameter set structures contain information such as picture size, optional coding modes employed, and macroblock to slice group map.^[36]
- [Flexible macroblock ordering](#) (FMO), also known as **slice groups**, and arbitrary **slice** ordering (ASO), which are techniques for restructuring the ordering of the representation of the fundamental regions (*macroblocks*) in pictures. Typically considered an error/loss robustness feature, FMO and ASO can also be used for other purposes.
- ...

- Switching slices, called SP and SI slices, allowing an encoder to direct a decoder to jump into an ongoing video stream for such purposes as video streaming bit rate switching and "trick mode" operation. When a decoder jumps into the middle of a video stream using the SP/SI feature, it can get an exact match to the decoded pictures at that location in the video stream despite using different pictures, or no pictures at all, as references prior to the switch.

General notes about Streams:

Multicast Address Ranges:

We recommend, that the addressing of your Multicast streams should be in conjunction with this listings to avoid conflicts with other network equipment or protocols.

<https://www.iana.org/assignments/multicast-addresses/multicast-addresses.xhtml>

One small part from this:

IPv4 Multicast Address Space Registry

Last Updated

2018-01-05

Expert(s)

Stig Venaas

Note

Host Extensions for IP Multicasting [RFC1112] specifies the extensions required of a host implementation of the Internet Protocol (IP) to support multicasting. The multicast addresses are in the range 224.0.0.0 through 239.255.255.255. Address assignments are listed below.

The range of addresses between 224.0.0.0 and 224.0.0.255, inclusive, is reserved for the use of routing protocols and other low-level topology discovery or maintenance protocols, such as gateway discovery and group membership reporting. Multicast routers should not forward any multicast datagram with destination addresses in this range, regardless of its TTL.

Available Formats  [XML](#)  [HTML](#)  [Plain text](#)

Registries included below

- [Local Network Control Block \(224.0.0.0 - 224.0.0.255 \(224.0.0/24\)\)](#)
- [Internetwork Control Block \(224.0.1.0 - 224.0.1.255 \(224.0.1/24\)\)](#)
- [AD-HOC Block I \(224.0.2.0 - 224.0.255.255\)](#)
- [RESERVED \(224.1.0.0-224.1.255.255 \(224.1/16\)\)](#)
- [SDP/SAP Block \(224.2.0.0-224.2.255.255 \(224.2/16\)\)](#)
- [AD-HOC Block II \(224.3.0.0-224.4.255.255 \(224.3/16, 224.4/16\)\)](#)
- [RESERVED \(224.5.0.0-224.251.255.255 \(251 /16s\)\)](#)
- [DIS Transient Groups 224.252.0.0-224.255.255.255 \(224.252/14\)\)](#)
- [RESERVED \(225.0.0.0-231.255.255.255 \(7 /8s\)\)](#)
- [Source-Specific Multicast Block \(232.0.0.0-232.255.255.255 \(232/8\)\)](#)
- [GLOP Block](#)
- [AD-HOC Block III \(233.252.0.0-233.255.255.255 \(233.252/14\)\)](#)

- [Unicast-Prefix-based IPv4 Multicast Addresses](#)
- [Scoped Multicast Ranges](#)
- [Relative Addresses used with Scoped Multicast Addresses](#)

Multicast (as opposed to unicast) is used to send UDP packets from 1 source to multiple destination servers. This is useful for example for streaming from a satellite/DVB-T receiver to multiple receiving PCs for playback. Multicast can also be used on the output of an encoder to feed multiple streaming servers. Multicast only works with UDP and is not possible with TCP due to the 2 way nature of TCP, most commonly multicast is used with RTP and MPEG2-TS.

A multicast IP address must be chosen according to IANA information, we recommend using an address in the range **239.0.0.0 to 239.255.255.255** as this is reserved for private use. Using multicast addresses in the 224.0.0.0 range may clash with existing services and cause your stream to fail. For more details see <http://www.iana.org/assignments/multicast-addresses/multicast-addresses.xml>

Choosing a UDP port number for multicast streams is also important. Even if you use a different multicast IP for each of your streams, we strongly recommend using different UDP port numbers as well. This is because a server and all software running on the server receives ALL multicast traffic on an open port and extra processing is required to filter out the required traffic. If the each stream arrives on a different port, the server can safely ignore any traffic on ports that are not open. Port numbers MUST be chosen so that don't clash with any existing services or ephemeral ranges. The ephemeral range for Windows Vista, 7, 2008 is 49152 to 65535, for older Windows it is 1025 to 5000 and for Linux it is 32768 to 61000. For more information on Windows see <http://support.microsoft.com/kb/929851> Care should also be taken to avoid system ports 0 to 1024. See <http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml> Generally one of the unassigned User Ports (**1024-49151**) should be used, you can run the **netstat -abn** (as admin under windows) command to see which ports are currently in use.

Registered port

A **registered port** is a [network port](#) (a sub-address defined within the [Internet Protocol](#), in the range 1024–49151) assigned by the [Internet Assigned Numbers Authority](#) (IANA) (or by [Internet Corporation for Assigned Names and Numbers](#) (ICANN) before March 21, 2001,^[1] or by USC/ISI before 1998) for use with a certain protocol or application.

Ports with numbers 0–1023 are called *system or well-known ports*; ports with numbers 1024–49151 are called *user or registered ports*, and ports with numbers 49152–65535 are called *dynamic and/or private ports*.^[2] Both system and user ports are used by transport protocols (TCP, UDP, DCCP, SCTP) to indicate an application or service.

- **Ports 0–1023** – system or [well-known ports](#)
- **Ports 1024–49151** – user or registered ports
- **Ports >49151** – dynamic / private ports

https://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers

Range for Ephemeral port

The [Internet Assigned Numbers Authority](#) (IANA) suggests the range 49152 to 65535 ($2^{15}+2^{14}$ to $2^{16}-1$) for dynamic or private ports.^[4]

Many [Linux kernels](#) use the port range 32768 to 61000.^[note 2] [FreeBSD](#) has used the IANA port range since release 4.6. Previous versions, including the [Berkeley Software Distribution](#) (BSD), use ports 1024 to 5000 as ephemeral ports.^{[2][3]}

[Microsoft Windows](#) operating systems through XP use the range 1025–5000 as ephemeral ports by default.^[4] [Windows Vista](#), [Windows 7](#), and [Server 2008](#) use the IANA range by default.^[5] [Windows Server 2003](#) uses the range 1025–5000 by default, until Microsoft security update MS08-037 from 2008 is installed, after which it uses the IANA range by default.^[6] Windows Server 2008 with Exchange Server 2007 installed has a default port range of 1025–60000.^[7] In addition to the default range, all versions of Windows since Windows 2000 have the option of specifying a custom range anywhere within 1025–65535.^{[8][9]}

Packet structure

		UDP Header																															
Offsets	Octet	0								1								2								3							
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0	Source port																Destination port															
4	32	Length																Checksum															

The UDP header consists of 4 fields, each of which is 2 bytes (16 bits).^[4] The use of the fields "Checksum" and "Source port" is optional in IPv4 (pink background in table). In IPv6 only the source port is optional (see below).

Source port number

This field identifies the sender's port when meaningful and should be assumed to be the port to reply to if needed. If not used, then it should be zero. If the source host is the client, the port number is likely to be an ephemeral port number. If the source host is the server, the port number is likely to be a well-known port number.^[4]

Destination port number

This field identifies the receiver's port and is required. Similar to source port number, if the client is the destination host then the port number will likely be an ephemeral port number and if the destination host is the server then the port number will likely be a well-known port number.^[4]

Length

A field that specifies the length in bytes of the UDP header and UDP data. The minimum length is 8 bytes because that is the length of the header. The field size sets a theoretical limit of 65,535 bytes (8 byte header + 65,527 bytes of data) for a UDP datagram. However the actual limit for the data length, which is imposed by the underlying [IPv4](#) protocol, is 65,507 bytes (65,535 – 8 byte UDP header – 20 byte [IP header](#)).^[4]

In IPv6 [jumbograms](#) it is possible to have UDP packets of size greater than 65,535 bytes.^[5] [RFC 2675](#) specifies that the length field is set to zero if the length of the UDP header plus UDP data is greater than 65,535.

Checksum

The [checksum](#) field may be used for error-checking of the header and data. This field is optional in IPv4, and mandatory in IPv6.^[6] The field carries all-zeros if unused.^[7]

RTP:

a part from: <https://tools.ietf.org/html/rfc3550>

Chapter 11:

RTP relies on the underlying protocol(s) to provide demultiplexing of

RTP data and RTCP control streams. For UDP and similar protocols, RTP SHOULD use an **even** destination port number and the corresponding RTCP stream SHOULD use the next higher (odd) destination port number.

For applications that take a single port number as a parameter and derive the RTP and RTCP port pair from that number, if an odd number is supplied then the application SHOULD replace that number with the next lower (even) number to use as the base of the port pair. For applications in which the RTP and RTCP destination port numbers are specified via explicit, separate parameters (using a signaling protocol or other means), the application MAY disregard the restrictions that the port numbers be even/odd and consecutive although the use of an even/odd port pair is still encouraged. The RTP and RTCP port numbers MUST NOT be the same since RTP relies on the port numbers to demultiplex the RTP data and RTCP control streams.

In a unicast session, both participants need to identify a port pair for receiving RTP and RTCP packets. Both participants MAY use the same port pair. A participant MUST NOT assume that the source port of the incoming RTP or RTCP packet can be used as the destination port for outgoing RTP or RTCP packets. When RTP data packets are being sent in both directions, each participant's RTCP SR packets MUST be sent to the port that the other participant has specified for reception of RTCP. The RTCP SR packets combine sender information for the outgoing data plus reception report information for the incoming data. If a side is not actively sending data (see [Section 6.4](#)), an RTCP RR packet is sent instead.

RTP (Real-Time Transport Protocol)	
Familie:	Netzwerkprotokoll
Einsatzgebiet:	Transport von Medien-Streams
Port:	beliebiger freier, gerader Port größer 1024
RTP im TCP/IP-Protokollstapel:	
Anwendung	RTP
Transport	UDP
Internet	IP (IPv4, IPv6)
Netzzugang	Ethernet Token Bus Token Ring FDDI ...
Standard:	RFC 3550 (RTP: A Transport Protocol for Real-Time Applications, 2003)

any port (even, not odd > 1024)

ANNEX MPEG

MPEG PSI/SI Information's:

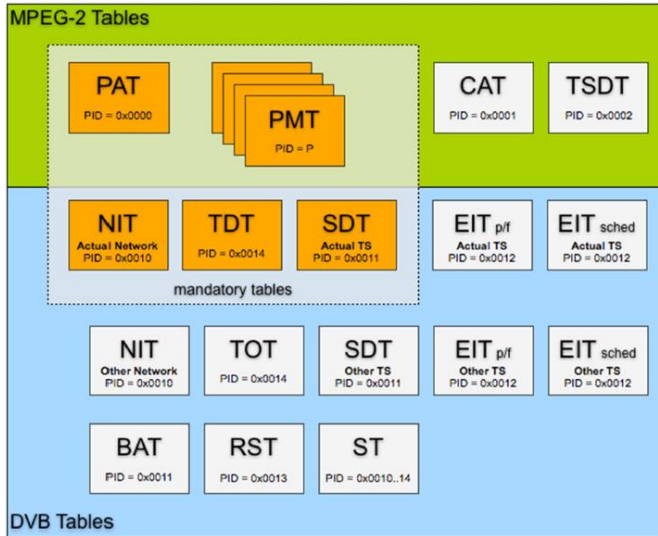


Table 1: PID allocation for SI

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.

As VCT is a part of the American ATSC standard and for DVB-C Annex-B networks:

6MHz bandwidth,
64 or 256 QAM only,
a fixed Symbol rate of

You should use in EU:
J.83A

ANNEX Channel Plan (CATV channel plan)

Bereich Bands	Kanal Channel	Kanal- frequenzen Channel	Mitten- frequenz Middle	Bild- träger Picture	Ton- träger Sound	Bereich Bands	Kanal Channel	Kanal- frequenzen Channel	Mitten- frequenz Middle	Bild- träger Picture	Ton- träger Sound
B I	2	47...54	50,50	48,25	53,75	B IV	21	470...478	474,00	471,25	476,75
	3	54...61	57,50	55,25	60,75		22	478...486	482,00	479,25	484,75
	4	61...68	64,50	62,25	67,75		23	486...494	490,00	487,25	492,75
USB Unterer Sonder- kanal- bereich Midband	S 02	111...118	114.50	112.25	117.75		24	494...502	498.00	495.25	500.75
	S 03	118...125	121.50	119.25	124.75		25	502...510	506.00	503.25	508.75
	S 04	125...132	128.50	126.25	131.75		26	510...518	514.00	511.25	516.75
	S 05	132...139	135.50	133.25	138.75		27	518...526	522.00	519.25	524.75
	S 06	139...146	142.50	140.25	145.75		28	526...534	530.00	527.25	532.75
	S 07	146...153	149.50	147.25	152.75		29	534...542	538.00	535.25	540.75
	S 08	153...160	156.50	154.25	159.75		30	542...550	546.00	543.25	548.75
	S 09	160...167	163.50	161.25	166.75		31	550...558	554.00	551.25	556.75
	S 10	167...174	170.50	168.25	173.75		32	558...566	562.00	559.25	564.75
		5	174...181	177.50	175.25	180.75		33	566...574	570.00	567.25
B III	6	181...188	184.50	182.25	187.75		34	574...582	578.00	575.25	580.75
	7	188...195	191.50	189.25	194.75		35	582...590	586.00	583.25	588.75
	8	195...202	198.50	196.25	201.75		36	590...598	594.00	591.25	596.75
	9	202...209	205.50	203.25	208.75		37	598...606	602.00	599.25	604.75
	10	209...216	212.50	210.25	215.75	B V	38	606...614	610.00	607.25	612.75
	11	216...223	218.50	217.25	222.75		39	614...622	618.00	615.25	620.75
	12	223...230	226.50	224.25	229.75	40	622...630	626.00	623.25	628.75	
	OSB Oberer Sonder- kanal- bereich Superband channels	S 11	230...237	233.50	231.25	236.75		41	630...638	634.00	631.25
S 12		237...244	240.50	238.25	243.75		42	638...646	642.00	639.25	644.75
S 13		244...251	247.50	245.25	250.75		43	646...654	650.00	647.25	652.75
S 14		251...258	254.50	252.25	257.75		44	654...662	658.00	655.25	660.75
S 15		258...265	261.50	259.25	264.75		45	662...670	666.00	663.25	668.75
S 16		265...272	268.50	266.25	271.75		46	670...678	674.00	671.25	676.75
S 17		272...279	275.50	273.25	278.75		47	678...686	682.00	679.25	684.75
S 18		279...286	282.50	280.25	285.75		48	686...694	690.00	687.25	692.75
S 19		286...293	289.50	287.25	292.75		49	694...702	698.00	695.25	700.75
S 20		293...300	296.50	294.25	299.75		50	702...710	706.00	703.25	708.75
ESB Erweiterter Sonder- kanal- bereich Hyperband channels	S 21	302...310	306.00	303.25	308.75		51	710...718	714.00	711.25	716.75
	S 22	310...318	314.00	311.25	316.75		52	718...726	722.00	719.25	724.75
	S 23	318...326	322.00	319.25	324.75		53	726...734	730.00	727.25	732.75
	S 24	326...334	330.00	327.25	332.75		54	734...742	738.00	735.25	740.75
	S 25	334...342	338.00	335.25	340.75		55	742...750	746.00	743.25	748.75
	S 26	342...350	346.00	343.25	348.75		56	750...758	754.00	751.25	756.75
	S 27	350...358	354.00	351.25	356.75		57	758...766	762.00	759.25	764.75
	S 28	358...366	362.00	359.25	364.75		58	766...774	770.00	767.25	772.75
	S 29	366...374	370.00	367.25	372.75		59	774...782	778.00	775.25	780.75
	S 30	374...382	378.00	375.25	380.75		60	782...790	786.00	783.25	788.75
	S 31	382...390	386.00	383.25	388.75		61	790...798	794.00	791.25	796.75
	S 32	390...398	394.00	391.25	396.75		62	798...806	802.00	799.25	804.75
	S 33	398...406	402.00	399.25	404.75		63	806...814	810.00	807.25	812.75
	S 34	406...414	410.00	407.25	412.75		64	814...822	818.00	815.25	820.75
	S 35	414...422	418.00	415.25	420.75		65	822...830	826.00	823.25	828.75
	S 36	422...430	426.00	423.25	428.75		66	830...838	834.00	831.25	836.75
	S 37	430...438	434.00	431.25	436.75		67	838...846	842.00	839.25	844.75
	S 38	438...446	442.00	439.25	444.75		68	846...854	850.00	847.25	852.75
	S 39	446...454	450.00	447.25	452.75		69	854...862	858.00	855.25	860.75
	S 40	454...462	458.00	455.25	460.75						
	S 41	462...470	466.00	463.25	468.75						

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
37	97	-11.75	70.79	0.067

dBmV	dB μ V	dBm 75 Ω	mV _{RMS}	mW 75 Ω
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

מדינת ישראל

הרשות

לטיפול במוצרי אלקטרוניקה ומוצרי חשמל יש להתייעץ עם רשות המוסמכת לטיפול במוצרי אלקטרוניקה ומוצרי חשמל.

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

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القوانين واللوائح الوطنية

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 and Usage).
- **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 regulation...
- 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.

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

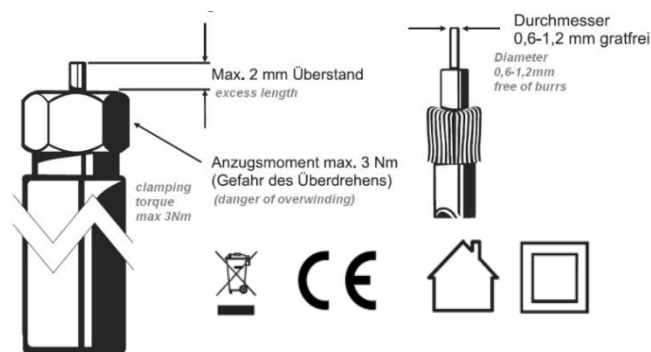
Vorsicht: Entsorgen Sie das Gerät entsprechend den geltenden umweltrechtlichen Bestimmungen. Elektrische und elektronische Geräte dürfen nicht in den Hausmüll!

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 are almost marked as:

HH= Horizontal High-Band

HL = Horizontal Low-Band = LH

VL = Vertical Low-Band = LV

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

Installation and safety instructions / Montage und

Sicherheitshinweise

- Die beschriebenen Geräte dienen ausschließlich der Installation von Satelliten-Empfangsanlagen.
- *The equipment described is designed solely for the installation of satellite receiver systems.*
- Jegliche anderweitige Nutzung oder die Nichtbeachtung dieses Anwendungshinweises hat den Verlust der Gewährleistung bzw. Garantie zur Folge.
- *Any other use, or failure to comply with these instructions, will result in voiding of warranty cover.*
- Die Geräte dürfen nur in trockenen Innenräumen montiert werden. Nicht auf oder an leicht entzündlichen Materialien montieren.
- *The equipment may only be installed in dry indoor areas. Do not mount on or against highly combustible materials.*
- Die Geräte sind mit einer Potenzial-Ausgleichsleitung (Cu, mindestens 4 mm²) zu versehen.
- *The equipment must be provided with an earthing wire (Cu, at least 4 mm²).*
- Die Sicherheitsbestimmungen der jeweils aktuellen Normen EN 60728-11 und EN 60065 sind zu beachten.
- *The safety regulations set out in the current EN 60728-11 and EN 60065 standards must be complied with*
- Verbindungsstecker: HF-Stecker 75 Ohm (Serie F) nach EN 61169-24
- *Connector: HF plug 75 Ohm (series F) to EN 61169-24.*
- **Nicht benutzte Teilnehmerausgänge** sollten mit 75-Ohm Widerständen (z. B. EMK 03) abgeschlossen werden. (Verringerung der terrestrischen Signalwelligkeit)
- **Unused subscriber ports** should be closed off by 75 Ohm resistors (e.g. EMK 03).
- **Nicht benutzte Kaskadenausgänge** sind mit 75 Ohm Widerständen inkl. DC-Blocker abzuschließen. 75 Ohm Widerstände ohne Gleichspannungssperren können das Gerät beschädigen!
- **Unused trunk outputs** must be terminated with 75 Ohm resistors including DC Blocker. Otherwise the device may be inoperable or damaged.
- Bitte überprüfen Sie die Anlage vor Inbetriebnahme auf evtl. Kurzschlüsse der Koaxial-Kabel. Es ist darauf zu achten, dass die Eingangspiegel der SAT-Ebenen möglichst gleich hoch sind. Power-LEDs zeigen den Betrieb an. Falls die nicht leuchten, bitte die Stromzufuhr kontrollieren.
- *Please check the installation against shortage in coax cables and connectors before switching on. The input levels should be adjusted accordingly. Power-LED's showing operational mode. If this is not illuminated, please check the power source.*
- **Stromführendes Gerät**
- **Current-carrying unit**
- Nicht öffnen oder am Gerät manipulieren!
- *Do not open or tamper with the unit!*
- Bei Arbeiten an der Anlage immer die Netzstecker aus der Steckdose ziehen!
- *When working on the system always unplug the mains plug from the wall socket!*
- Auf ausreichenden Abstand achten! Nach allen Seiten mind. 5 cm!
- *Ensure adequate clearance! Min. 5 cm to all sides!*
- Nicht über Kopf montieren.
- *Do not install overhead.*
- Für die Geräteentwärmung muss freie Luftzirkulation möglich sein. Überhitzungsgefahr!

- *Free circulation of air must be possible to discharge the heat emitted by the unit. Risk of overheating!*
- *Zulässige Umgebungstemperatur -20 bis +50°C*
- *Permissible ambient temperature -20 to +50°C*

Important notes: / Zur Beachtung

- *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 auf den Geräten – falls vorhanden

Please install according to the sticker on the devices if shown.

Hinweis: Elektrische Installationen sollten nur durch geschultes Fachpersonal vorgenommen werden!

Note: Electrical installations should only be done by well-educated and skilled technicians!

Document History:

Initial: July 2017	First release	RRI
November 2018 V1.1	Added Network hints	RRI
April 2019	Addons and corrections	Ralf Riedel
Oct. 2019	Addons HDMI, NIT	RRI

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