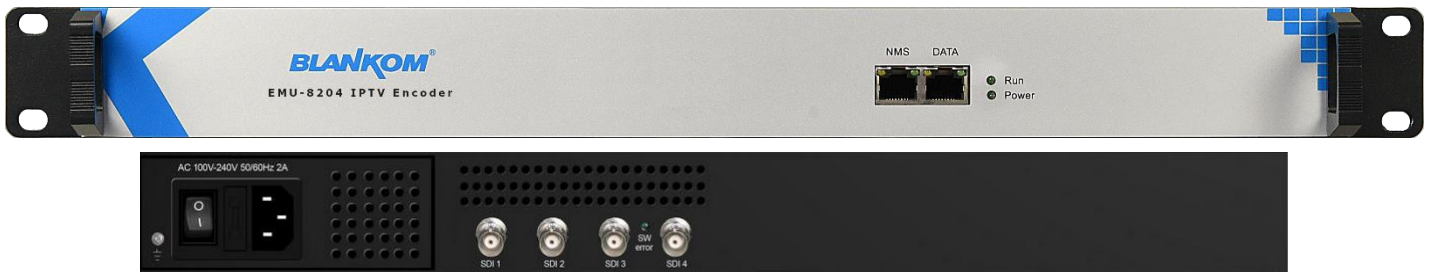


# IPTV HEVC/h.264 Encoder with 4/8/12 Inputs



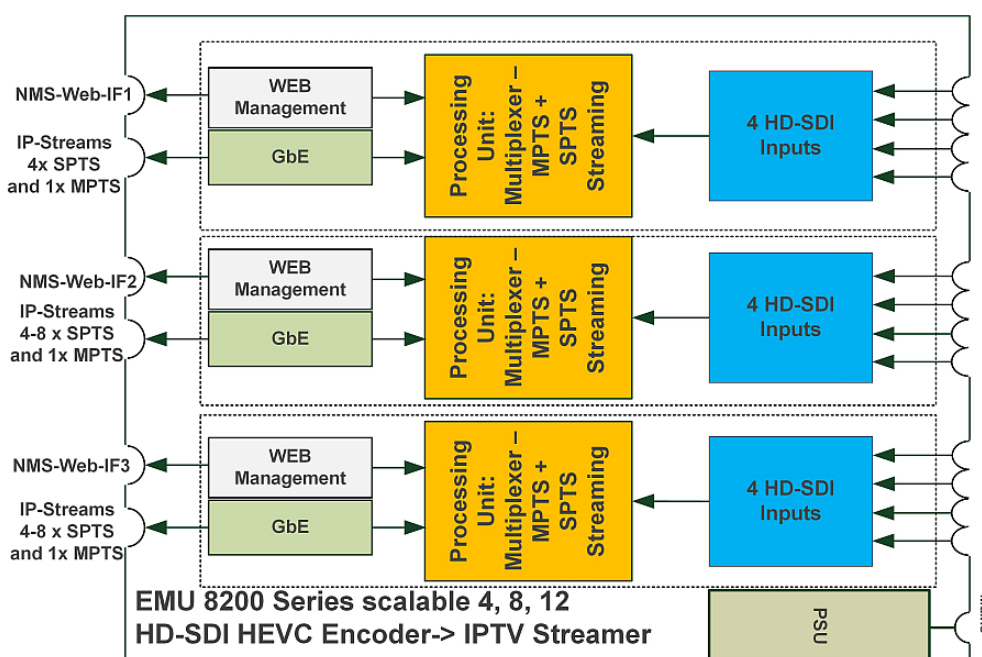
- 4 SDI input, 8 SPTS IPTV and 1 MPTS output (EMU 8204)
- 8 SDI input, 8 SPTS IPTV and 2 MPTS output (EMU 8208)
- 12 SDI input, 12 SPTS IPTV and 3 MPTS output (EMU 8212)
- On-Screen Graphics, Scrolling Text, QR Code insertion optional
- Accurate PCR adjusting
- PID filtering and re-mapping
- PSI/SI rebuilding and editing
- “Null PKT Filter” function
- Audio: MPEG1L2, AAC, AC3pass
- Remote control by a modern web based management
- Updates via Web-interface,
- **IPv6** supported now for NMS and Streaming

*4 ... 12 HD-SDI input  
IPTV Encoder  
with Text or Graphic  
Logo-Insertion*

## BLANKOM EMU 8200 series:

MPEG4\* AVC/H.264 and HEVC/h.265 HD IP Encoder is a professional HD audio & video encoding and multiplexing device. Input: 4, 2x4 or 3x4 HD-SDI Video input interfaces, supporting HEVC and MPEG-4\* Video encoding and MPEG 1L2, AAC and AC3 passing audio encodings. This very compact Encoder simultaneously encodes up to 4, 8 or 12 HD-SDI compatible HD Audio & Video channels to IP out as a multiplexed 1..3 MPTS and 4, 8 or 12 SPTS IP streams as UDP/RTP/RTSP Multi-/Unicast per Module. Every encoded Video-picture can be added with Text, Graphic or QR-code overlays: As optional feature available. High integrated and cost effective design fits perfect into widely use cases in varieties of digital distribution systems such as cable TV digital head-end, satellite digital TV broadcasting etc.

\* Dep. On common Resolutions



## Technical specifications:

<b>Input</b>	4/8/12×HD-SDI inputs (4 each Module)			
<b>Video Encoding</b>	Encoding Format	HEVC/ H.265 , MPEG 4 AVC/H.264		
	Resolution (HD-SDI) Note: because of its modular Fujitsu chip it demands per module on each input the same signal resolutions	<b>Input</b>	<b>Output</b>	
			<b>HEVC/H.265</b>	<b>MPEG-4 AVC/H.264</b>
		4x1080P-50	4x1080P-50	2x1080P-50
		4x1080P-60	4x1080P-60	2x1080P-60
		4x1080I-50	4x1080P-50	4x1080I-50 2x1080P-50
		4x1080I-60	4x1080P-60	4x1080I-60 2x1080P-60
		4x720P-50	4x720P-50	4x720P-50
	4x720P-60	4x720P-60	4x720P-60	
	Chroma	4:2:0		
Bitrate	0.5Mbps...20Mbps (each channel)			
Encoding Rate Control	CBR/VBR			
GOP Structure	IBBP, IPPP			
Advanced picture correction	De-interlacing, Noise Reduction, Sharpening			
<b>Audio Encoding</b>	Encoding Format	MPEG-1 Layer 2, LC-AAC, HE-AAC, HE-AAC V2, AC3 Passthrough		
	Sampling rate	48KHz		
	Bit-rate (each channel)	48Kbps...384Kbps (MPEG-1 Layer 2 & LC-AAC) 24 Kbps...128 Kbps (HE-AAC) 18 Kbps...56 Kbps (HE-AAC V2)		
	Audio Gain	0...255		
<b>OSD (optional)</b>	<b>Text/logo/QR code Insertion Function OnScreenDisplay Overlay</b>			
<b>Stream output per module</b>	IP (1 MPTS and maximum 4 SPTS) output over UDP/RTP/RTSP per module, 1000M/100M Base-T Ethernet interface (unicast/ multicast); IPv4, IPv6 output IP null packet filter: MPTS- PID-8191dec adding or dropping			
<b>System</b>	Web based management, IPv4 and IPv6			
	English control interface			
	Ethernet software upgrade			
<b>Miscellaneous</b>	Dimension (W× L× H)	482mm×328mm×44mm		
	Approximately weight	5kg		
	Temperature	0...45°C(work), -20...80°C (Storage)		
	Power	AC 100V-220V±10%, 50/60Hz		

**EMU-8200 Series HEVC/H.265 encoder's advantages:**

**1. Providing correct adapted Transport-Streams for modulators**

These HEVC/H.265 encoder adopts Fujitsu chips which offers a most stable bitrate with lower fluctuation compared with other encoding chips, so optimal as TS -source for modulators. It is widely used in variety of digital distribution systems such as CATV digital head-end, satellite and terrestrial digital TV, etc.

**2. Encoding with highest compression format—B frame (IBBP)**

**What is B Frame?**

There are 3 major picture types used in the different video algorithms, they are I, P and B.

They are different in the following characteristics:

I-frames are the least compressible but don't require other video frames to decode.

P-frames can use data from previous frames to decompress and are more compressible than I-frames.

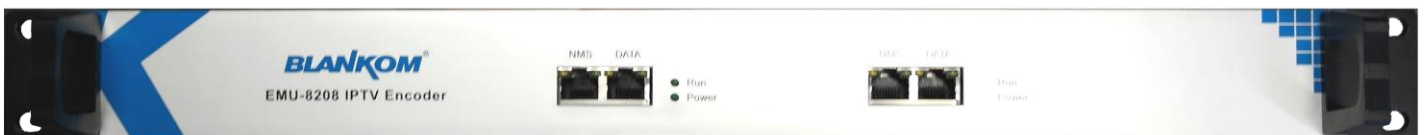
B-frames can use both previous and forward frames for data reference to get the highest amount of data compression.

Frame Type	Byte of data/KB	Compression Ratio
I	18	7:1
P	6	20:1
B	2.5	50:1

In one word, B frame is the highest compression format which makes it possible to process HD video at low bit rates. A HEVC/H.265 encoder is not able to reduce bandwidth unless it is operating with B frames. In the encoder-codec parameters, B frame is often described in the GOP (Group of Pictures) structure, like "IBBP".

**Corresponding products:**

- IP to 16 QAM DVB-C Modulator HDC-5016
- HDC-5004 IP to QAM Modulator with remuxed TV services i.e. for hospitality content addons to existing networks
- Digital Signage: IP Decoder HDD-275
- IPTV Middleware Server OMNISCREENTV + SetTopBoxes or Hospitality TV Sets from tested vendors
- BLANKOM IPTV STB: 7500+ / 6700+



**Front EMU-8208 2x NMS-Web-IF ports, 2x Streaming Ports GbE**

equipped with 2 Modules – each with 4 encoder-streamer-boards:



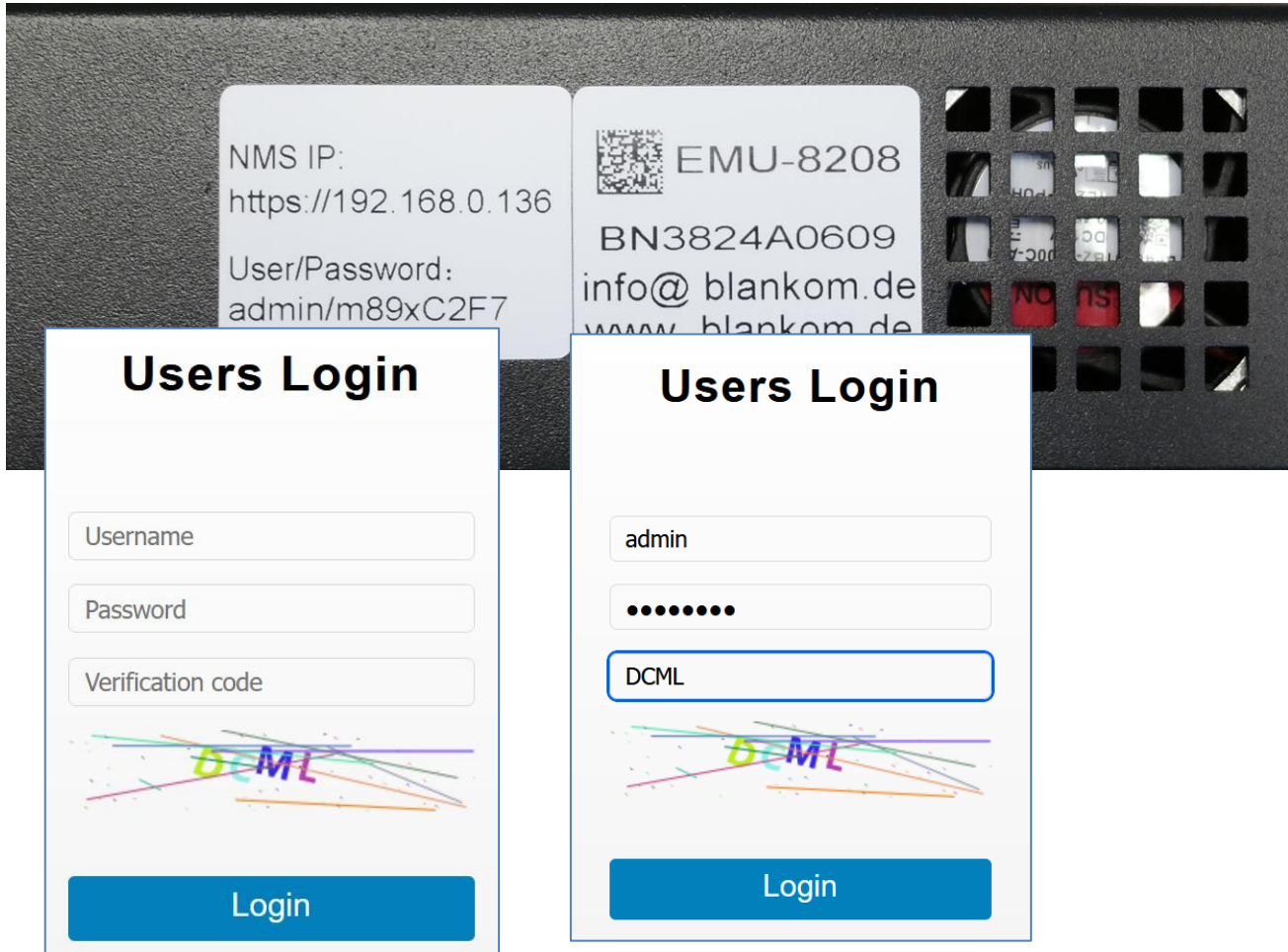
**Rear-View**

**Please always check our web – Download section for actual Manuals as PDF.**

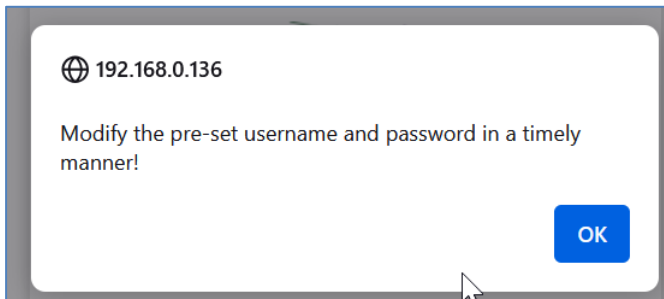
QUICK-START

Login Web-Interface each Module NMS: <http://192.168.0.136>:

The Login-data can be found on the sticker on it:



Note the message:



The default password works for both installed modules. We recommend to change them later on and store the data somewhere near the unit, or make a sticker, so that your next technician can find them...

**Entry Page:**

The screenshot shows the BLANKKOM EMU-8208 web management interface. The browser address bar shows the URL https://192.168.0.136. The page title is EMU-8208. The interface includes a navigation menu on the left with sections for Summary, Parameters, and System. The main content area is titled 'Status' and features the BLANKKOM logo. Below the logo is a 'System Information' section with the following details:

Software Version:	73.01.06 d01 Build 153.00 Jul 16 2024-10:44:06
Hardware Version:	02.00.00HV
Web Version:	30.01.01
System Version:	2.02.1.02
Product ID:	d2240000-00000012-00000000-00000000
Uptime:	0 Day-00:35:31
Temperature:	44.91 °C
VccInt:	998.29 mV
VccAux:	1798.83 mV
VccBRam:	999.02 mV

If you have questions to our service please always mention these data and sent by email please.

**Network:**

The screenshot shows the BLANKKOM Network configuration page. It is divided into two sections: NMS and DATA. Each section contains a list of network parameters with corresponding input fields.

**NMS**

IP Address:	192.168.0.136
Subnet Mask:	255.255.255.0
Gateway:	192.168.0.1
Web Management Port:	443
MAC Address:	20:25:02:26:14:18
IPv6 Address:	2000::2220:12ff:fe34:136
IPv6 Gateway:	2000::1
IPv6 Prefix:	64

**DATA**

IP Address:	192.168.2.138
Subnet Mask:	255.255.255.0
Gateway:	192.168.2.1
MAC Address:	20:35:02:26:14:18
IPv6 Address:	2001::2220:12ff:fe34:2138
IPv6 Gateway:	2001::1
IPv6 Prefix:	64



The network ports are supporting IPv6 now (since model improvement end of 2024)  
Please change the values according to your local needs. Please avoid IP-collisions.

Encoder: each has a similar config-menu per module 4 Channels:

If Input is connected, it shows the values of the detected Video parameters after a few seconds.  
Change the encoding parameters to your needs:

**GOP Struct:** IBBP  
**Bitrate:** IPPP  
**Out Resolution:** IBBP

**Audio**

**Format:** MPEG1 Layer2  
**Audio Gain:** (0 ~ 255)  
**Audio Check:** LC-AAC, HE-AAC, HE-AAC V2

**Program**

**Program Output:** AC3 Pass Through

**Audio**

**Format:** MPEG1 Layer2  
**Bitrate:** 128 Kbps  
**Audio Gain:** 128 (0 ~ 255)  
**Audio Check:**   
**Audio Delay Mode:** Mode 1, Custom, Mode 1, Mode 2

**Program**

Finally APPLY the settings and maybe RESTART the Encoder if needed. Please be patient, it takes a while to re-sync the encoding chip.

**IP-Streams:**

**BLANKOM**<sup>®</sup>

**Summary**

- Status

**Parameters**

- Encoder
- IP Stream**
- OSD

**System**

- Network
- License
- User Management
- Configuration
- Firmware
- Date | Time
- Log

**IP Stream**

IP Protocol: IPv4

#	IP Address	Port	Protocol	Pkt Length	Null PKT Filter	Status	Bit(Act/Max)
MPTS 1	224.2.2.2	2000	UDP	7	<input type="checkbox"/>	<span style="color: green;">●</span>	4.1/30.0 M
SPTS 1	224.2.2.2	3000	UDP	7	<input type="checkbox"/>	<span style="color: grey;">●</span>	0.0/20.0 M
SPTS 2	224.2.2.2	3002	UDP	7	<input type="checkbox"/>	<span style="color: grey;">●</span>	0.0/20.0 M
SPTS 3	224.2.2.2	3004	UDP	7	<input type="checkbox"/>	<span style="color: grey;">●</span>	0.0/20.0 M
SPTS 4	224.2.2.2	3006	UDP	7	<input type="checkbox"/>	<span style="color: grey;">●</span>	0.0/20.0 M

Please change all IP addresses to different ones to avoid IGMP conflicts: Channel2 = SPTS 1

Channel 2 Config. [close]

Enable:

IP Address: 224.2.2.1

Port: 10001 (0-65535)

Bitrate(Mbps): 20 (0-40Mbps)

Protocol: UDP

Pkt Length: 7

Null PKT Filter:

Channel 1 = the multiplexed MPTS output:

Channel 1 Config. [ close ]

Enable:

IP Address:

Port:  (0~65535)

Bitrate(Mbps):  (0~300Mbps)

Protocol:  ▾

Pkt Length:  ▾

Null PKT Filter:

Please assure the Bitrate of this has to be at least the value of all 4 encoder bitrates in total added together. Otherwise the output will be disturbed. If you want to serve an IP to DVB-modulator with the MPTS, many of them needs CBR-Streams which includes the PID 8191dec named Zero-Packets filling. If you want to stream VBR, check the Null-Packet filter to ON.

IP Protocol:

#	IP Address	Port	Protocol	Pkt Length	Null PKT Filter	Status	Bit(Act/Max)
MPTS 1	224.2.2.0	20000	UDP	7	<input type="checkbox"/>	<span style="color: green;">●</span>	4.3/30.0 M
SPTS 1	224.2.2.1	10001	UDP	7	<input checked="" type="checkbox"/>	<span style="color: green;">●</span>	4.1/20.0 M
SPTS 2	224.2.2.2	10002	UDP	7	<input checked="" type="checkbox"/>	<span style="color: gray;">●</span>	0.0/20.0 M
SPTS 3	224.2.2.3	10003	UDP	7	<input checked="" type="checkbox"/>	<span style="color: gray;">●</span>	0.0/20.0 M
SPTS 4	224.2.2.4	10004	UDP	7	<input checked="" type="checkbox"/>	<span style="color: gray;">●</span>	0.0/20.0 M

Checked by VLC:

**Aktuelle Medieninformationen**

Allgemein | Metadaten | Codec | Statistiken

Informationen über den Aufbau des Mediums oder des Streams. Muxers, Audio- und Videocodes, Untertitel werden angezeigt.






- ▼ Stream 0
  - Originale ID: 103
  - Codec: MPEG-H Part2/HEVC (H.265) (hevc)
  - Typ: Video
  - Videoaufösung: 1920x1080
  - Pufferabmessungen: 1920x1080
  - Bildwiederholrate: 50
  - Decodiertes Format:
  - Ausrichtung: Oben links
  - Grundfarben: ITU-R BT.601 (525 Zeilen, 60 Hz)
  - Farbübertragungsfunktion: ITU-R BT.709
  - Farbraum: ITU-R BT.601 Bereich
  - Farbsättigungslage: Links
- ▼ Stream 1
  - Originale ID: 102
  - Codec: MPEG Audio layer 1/2 (mpga)
  - Typ: Audio
  - Kanäle: Stereo
  - Abtastrate: 48000 Hz
  - Bits pro Sample: 32
  - Bitrate: 128 kb/s
- ▼ TV-101 [Programm 101]
  - Status: Running
  - Typ: Digital television service
  - Herausgeber: TV-Provider

Ort:



**If you want to use IPv6:**

IP Protocol: IPv6

#	IP Address	Port	Protocol	Pkt Length	Null PKT Filter	Status	Bit(Act/Max)
MPTS 1	ff15::1	20000	UDP	7	<input type="checkbox"/>	<span style="color: green;">●</span>	4.3/30.0 M 
SPTS 1	ff15::1	10001	UDP	7	<input checked="" type="checkbox"/>	<span style="color: green;">●</span>	3.9/20.0 M 
SPTS 2	ff15::1	10002	UDP	7	<input checked="" type="checkbox"/>	<span style="color: grey;">●</span>	0.0/20.0 M 
SPTS 3	ff15::1	10003	UDP	7	<input checked="" type="checkbox"/>	<span style="color: grey;">●</span>	0.0/20.0 M 
SPTS 4	ff15::1	10004	UDP	7	<input checked="" type="checkbox"/>	<span style="color: grey;">●</span>	0.0/20.0 M 

Please change the Addresses to your needs as well and assure, the used Gigabit-Switch supports IPv6 and the Multicast Streaming Filtering:

Switches actually pay attention to IPv4 IGMP and ICMPv6 MLD packets that go through them whenever a host requests to join or leave a multicast group. Usually this functionality is called "IGMP snooping" (for IPv4) or "MLD snooping" (for v6).

This makes multicast-aware switches slightly more than pure L2 devices. ([RFC 4541](#) describes switch IGMP/MLD snooping in more detail.) In fact, RFC 4541 even recommends snooping switches to forward multicast frames based on L3 (IP) addresses rather than L2 (MAC), though the frames still retain their original L2 header (which wouldn't be the case with pure-L3 forwarding as routers do), so it's a layer-breaking mix of L2/L3 functionality.

(Not all switches actually snoop IGMP/MLD subscriptions; in particular, smaller unmanaged switches often do not care at all, and even in managed "enterprise" switches it is frequently disabled by default. So **IN PRACTICE**, often the packets actually reach all hosts and are filtered by the host OS.)

Similarly, Wi-Fi access points frequently have a "Multicast Enhancement" feature which is also based on IGMP/MLD snooping, therefore also being slightly more than pure L2 bridges. (Radio is an inherently broadcast medium, but actual multicast frames are sent at low rates; "multicast enhancement" converts them to unicast frames – one copy per recipient – which are faster and more reliable to deliver.)

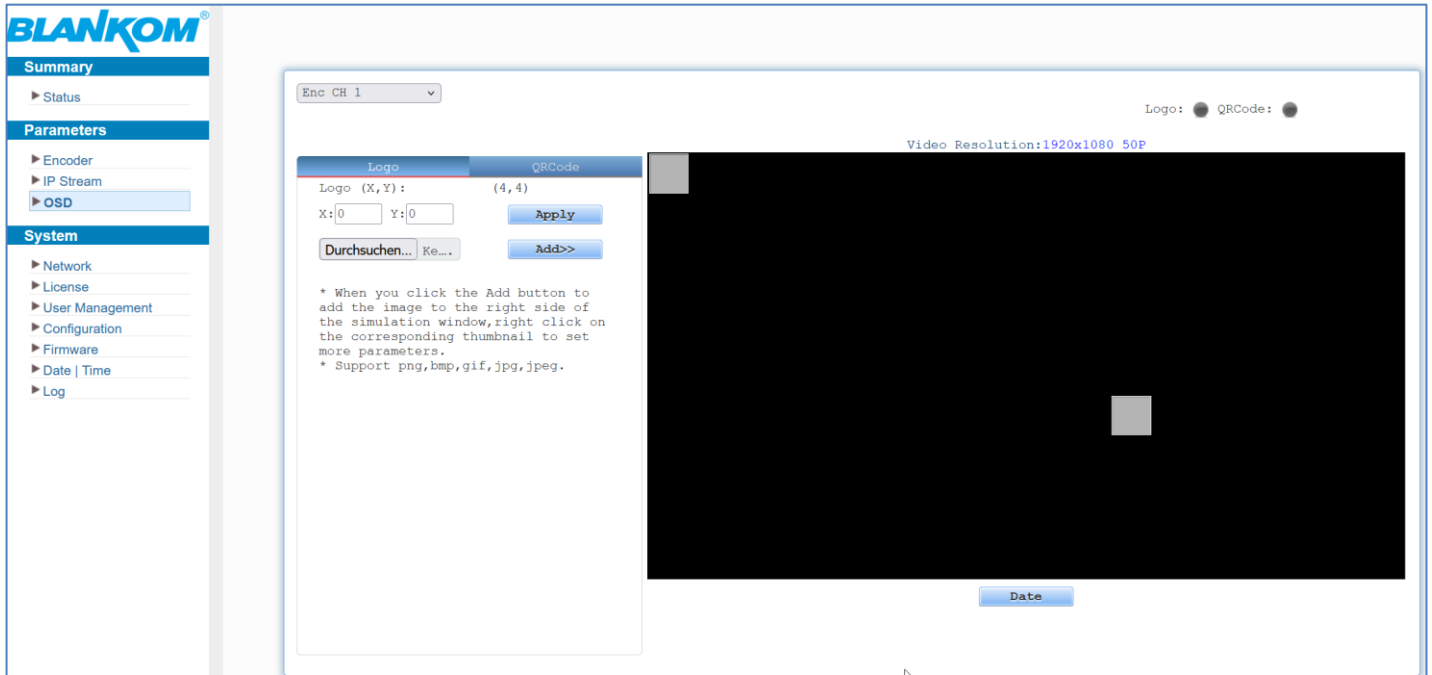
But note that certain multicast groups do not use IGMP or MLD at all – in particular, the ff02::1 "All Nodes" group doesn't use MLD and therefore is **EFFECTIVELY** a broadcast group (RFC 2710 section 5; RFC 4541 section 3), even if people don't like to admit it. Similarly 224.0.0.1 "All Nodes" (as well as the rest of 224.0.0.x) in IPv4 is functionally a broadcast group as IGMP is not used for it.

See also:

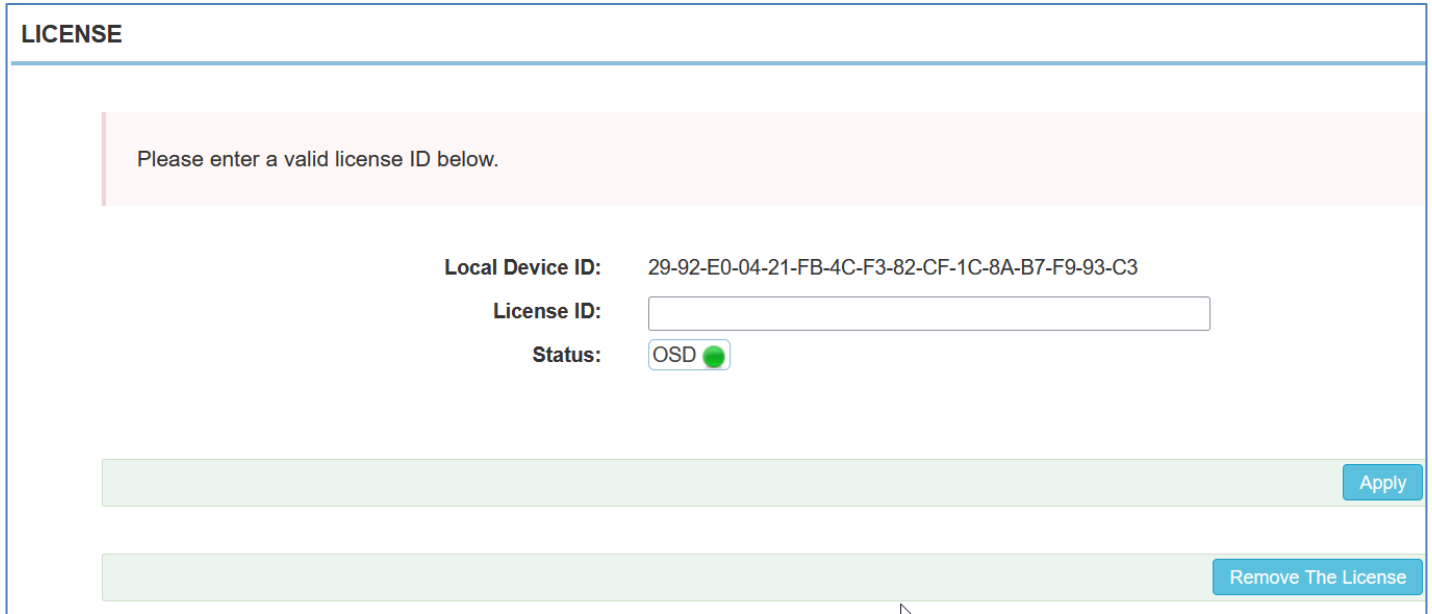
- RFC 1112: [IGMPv1](#)
- RFC 2236: [IGMPv2](#) and RFC 2710: [MLDv1](#)
- RFC 3376: [IGMPv3](#) and RFC 3810: [MLDv2](#)
- RFC 4541: [Considerations for IGMP and MLD Snooping Switches](#)

**The On-Screen-Display menu:**

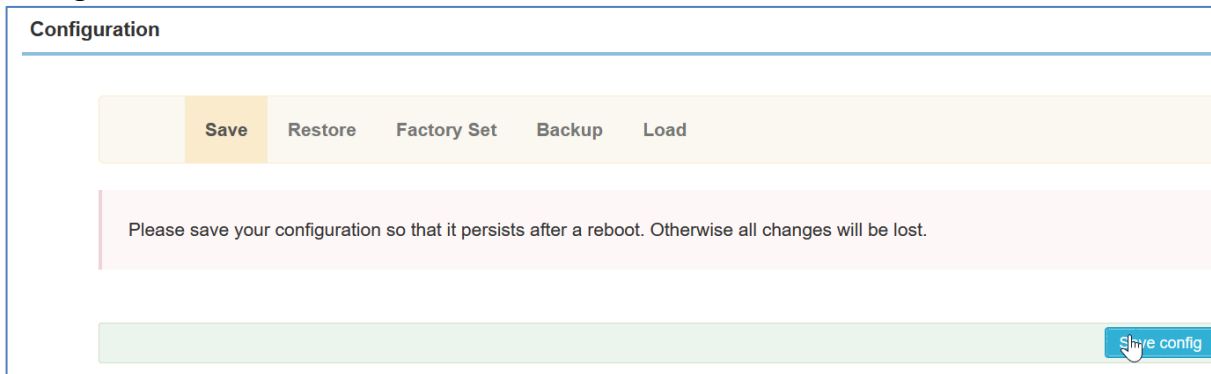
Here you can add logos (pictures or text into) or QR codes to your encoded Video as Overlays:



The **License –Menu** is for adding extras – like the above OSD- feature on demand if your device was delivered w/o this feature.



**Configuration:** Safe your config and/or restore or backup/load it from PC is recommended after you made your settings:



With the **USER management** menu you can setup new usernames and passwords:

**User Management**

Change the user name and password to prevent others from logging in to the device  
We recommend that the password should be at least 6 digits  
It is recommended that the password contain uppercase and lowercase letters,digits,and special characters

Current Username: admin  
Current Password:   
New Username:   
New Password:   
Cryptographic Strength:   
Confirm New Password:

**FIRMWARE:**

**Firmware**

Warning:  
1. Update the firmware in order to improve the functionality of the device. Please make sure to use the correct firmware file.  
2. The update process may take some time, please do not turn off the power during the upgrade.  
3. After the upgrade has completed, please manually reboot the device.

Current Software Version: 73.01.06 d01 Build 153.00 Jul 16 2024-10:44:06  
Current Hardware Version: 02.00.00HV

Keine Datei ausgewählt.

**Date and Time** settings: If you have a NTP server, please use this after you have set your timezone:

**Date | Time**

1970-01-01 02:31:02

Timezone: (GMT+01:00) Amsterdam, Berlin, Bern, Rome, ! v

NTP Server 1: 192.53.103.108  
NTP Server 2:   
NTP Server 3:   
NTP Server 4:   
NTP Server 5:

Or update it from your connected PC/Browser:

2025-03-04 14:22:21

**Timezone:** (GMT+01:00) Amsterdam, Berlin, Bern, Rome, ! ▾

**NTP Server 1:** 192.53.103.108

**NTP Server 2:**

**NTP Server 3:**

**NTP Server 4:**

**NTP Server 5:**

Set Timezone    Set NTP    Update from browser

**Remarks: Encoding:** If you want to use h.264 AVC instead of HEVC (h.265) you must first bset Encoder Channel 4 to h.264 then the others will follow – you’ll get a message:

🌐 192.168.0.136

if you want to encode h.264, select the channel 4 firstly

OK

Enc CH 1    Enc CH 2    Enc CH 3    **Enc CH 4**

**Video**

**Format:** H.264 ▾    **GOP Struct:** IBBP ▾

**Rate Mode:** CBR ▾    **Bitrate:** 4.00 (4 ~ 20 Mbps)

**Average Bitrate:** 3.50 (3.5 ~ 20 Mbps)    **Out Resolution:** 1920 x 1080 50p ▾    Auto

**Audio**

**Format:** HE-AAC ▾    **Bitrate:** 24 Kbps ▾

**Audio Gain:** 128 (0 ~ 255)    **Audio Delay Mode:** Mode 1 ▾

**Audio Check:**

Because this 4-Channel encoding modules are using a 4-channel encoder chipset and does not allow a mixed encoding Codec usage within a module.

Enc CH 1   Enc CH 2   Enc CH 3   Enc CH 4

**Video**

Format: H.264   GOP Struct: IBBP  
 Rate Mode: CBR   Bitrate: 4.00 (4 ~ 20 Mbps)  
 Average Bitrate: 3.50 (3.5 ~ 20 Mbps)   Out Resolution: 1920 x 1080 25p   Auto

**Audio**

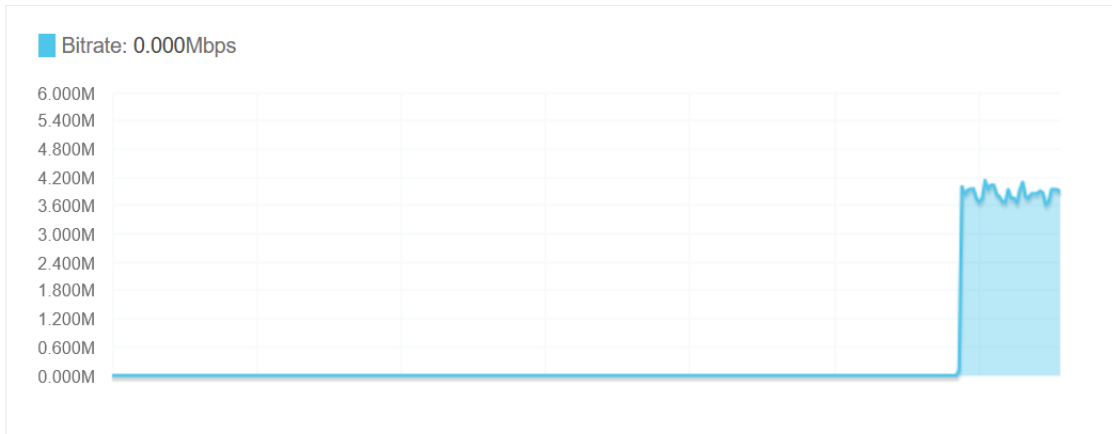
Format: HE-AAC   Bitrate: 24 Kbps  
 Audio Gain: 128 (0 ~ 255)   Audio Delay Mode: Mode 1  
 Audio Check:

**Program**

Program Output:    Service Name: TV-101  
 Service Provider: TV-Provider   Program Number: 101  
 PMT PID: 0x0064   PCR PID: 0x0067  
 Video PID: 0x0065   Audio PID: 0x0066  
 Character Encoding: GBK   Share PCR PID:

**Status**

Encoder Chip Version: 00.0E.01.28   Interface Version: SDI 1.2 MIPI 00.14  
 Input Lock: ●   Encode Status: ●  
 Input Information: 1920 x 1080P 50fps   Bitrate: 3.888 Mbps



Apply

Restart



If you changed a value i.e. from 1080p25 to non – AUTO p50 (or IBBP to IPPP, ...) you need to wait some seconds until the encoder re-synced:

**Video**

Format: <input type="text" value="H.264"/>	GOP Struct: <input type="text" value="IPPP"/>	
Rate Mode: <input type="text" value="CBR"/>	Bitrate: <input type="text" value="6.00"/> (4 ~ 20 Mbps)	
Average Bitrate: <input type="text" value="3.50"/> (3.5 ~ 20 Mbps)	Out Resolution: <input type="text" value="1920 x 1080 50p"/>	Auto <input type="checkbox"/>

**Audio**

Format: <input type="text" value="HE-AAC"/>	Bitrate: <input type="text" value="24 Kbps"/>	
Audio Gain: <input type="text" value="128"/> (0 ~ 255)	Audio Delay Mode: <input type="text" value="Mode 1"/>	
Audio Check: <input checked="" type="checkbox"/>		

**Program**

Program Output: <input checked="" type="checkbox"/>	Service Name: <input type="text" value="TV-104"/>
Service Provider: <input type="text" value="TV-Provider"/>	Program Number: <input type="text" value="104"/>
PMT PID: <input type="text" value="0x0070"/>	PCR PID: <input type="text" value="0x0073"/>
Video PID: <input type="text" value="0x0071"/>	Audio PID: <input type="text" value="0x0072"/>
Character Encoding: <input type="text" value="GBK"/>	Share PCR PID: <input type="checkbox"/>

**Status**

Encoder Chip Version: 00.0E.01.28	Interface Version: SDI 1.2 MIPI 00.14
Input Lock: <span style="color: green; font-weight: bold;">●</span>	Encode Status: <span style="color: green; font-weight: bold;">●</span>
Input Information: 1920 x 1080P 50fps	Bitrate: <span style="background-color: #4CAF50; color: white; padding: 2px;">5.672 Mbps</span>

■ Bitrate: 0.000Mbps

The graph shows a blue area representing bitrate over time. The y-axis ranges from 0.000M to 8.000M. The bitrate starts at 0, then jumps to a level around 4.000M, and then further to a peak of approximately 5.672M. A mouse cursor is visible on the right side of the graph.

Note>: There is a difference between Encoding – in CBR or VBR and the **Streaming in VBR and CBR!** You can check our websites [www.blankom.de](http://www.blankom.de) – know how or tutorials about this issues in encoding processes.

Encoding in CBR results in a more stable bitrate processing and VBR is more flexible see changed to VBR:

