HD Encoder HDE-(4)264B / -265B

User Manual
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Product Outline

HD encoder & streamer for live broadcasting platforms and Video-over-IP applications. Up to 1920x1080@60fps HD resolution. Very stable operation on multicast distribution on local area networks. Suitable for Video-over-IP application through internet. 4 IP output streams at the same time with different resolutions, e.g. for LAN, Youtube, Facebook, Twitch simultaneously.

- h.265 / h.264 encoder & IP streamer combined (dep. on Model)
- 1 HDMI input, (4 with HDE-4264B)
- 2 IP streams output (8 with HDE-4264B)
- Stable and effective embedded HiLinux OS
- HD Resolution 1080p, 1080i, 720p and downscaling down to 176x144
- Low latency: > 200ms … 1500 … 2000ms max., depending on configuration and load
- IP output: Unicast / Multicast- RTSP, RTMP, HTTP, UDP/RTP, FLV, ONVIF, HLS
- Distribution of Video camera, PC Monitor, dif. STB, DVD / Blu-ray player content over LAN, WAN or Internet
- Live stream broadcast, Digital signage, Video conferencing, RTSP-ONVIF support
- Video-over IP applications
- IPTV/OTT/Info-Channel applications
- Local IPTV on LAN applications, Corporate IPTV, Hotel IPTV, Campus IPTV, Education IPTV
- VLC and FFmpeg mode selectable, VBR/CBR bitrate mode encoding
- Logo insertion (as *.bmp file) and Text insertion feature on main stream & on secondary stream(s), for each channel
- HLS encoding feature, Android and iOS mobile devices compatible

Statement:

Text and pictures herein are subject to changes w/o notifications.
The user manual will be updated and uploaded to www.blankom.de sometimes without special notice.

This user manual is provided only as a reference guide for technicians as an example helping novices with the setup. Knowledge of Codecs and the IP-Streaming world as well as network protocols is highly recommended. These encoder devices are based on high integrated ARM CPU’s with embedded encoder graphic engines. You can compare this electronic architecture with advanced embedded computers like a raspberry PI and is running on HiLinux OS.
The devices do not have any RF related in- or outputs and therefore no EMV based influences have to be considered to SAT- or CATV in this RF-World and networks at any time.
Default Values

The factory default administrator account:  admin
The factory-default user password:  admin
The factory default IP address:  192.168.1.168  NM 255.255.255  GW 192.168.1.1, DNS
settings might vary but can be changed to local needs

Set the administrator’s computer IP as: 192.168.1.* to avoid IP conflicting with the units own default IP address 192.168.1.168.
192.168.1.*: use an IP setting “*” in the number range 2-254 and except the units default IP.
Remark: .0 is often the network router, .1 often the Gateway of the used router, .255 might be a network broadcasting address.
Please change these account settings according to your local policy and network. -> Do not forget to safe and backup the configuration by Web-Interface and its related system-sub-menu.
The encoder can be always set back to factory default settings by using the RESET-switch in Web-IF or the button at the front.

A few words about Network settings and VLC – Player on a PC/Laptop.

Usually the default IP settings should be changed according to your local network.
If you have i.e. a company network structure with multiple subnet’s like
A:
  - 192.168.0.1 (Gateway example a Fritzbox –DSL Router)
  - Netmask 255.255.255.0
  - DHCP enabled, or your IP Range for static IP Addresses are 192.168.0.100 - 250
B:
  - 192.168.1. … and so on...

You should configure the network port of the Encoder to your preferred network by using a static and FREE IP address. Avoid collisions please!!!
If you use the default settings and cannot receive the encoded streams in your device by VLC, please make sure, your network card doesn’t have 2 IP addresses manually setup:
VLC cannot gather automatically via which of your IP addresses and maybe from different network interfaces (WIFI/GBE) it should receive the stream. This can be forced by setting your METRIC Values accordingly and/or configure appropriate routes.
Application Example

Of course, instead of the HDMI-Encoder a usage of the HD-SDI-encoder SDE-264/265 is possible in parallel too. The HDE’s can be easily used with a PC/Laptop with 4K UHD outputs (dep. on Model) of a 2nd graphic card or a Blue Ray Player output for i.e. Hotel – Guest Information displays in the lobby streaming to a BLANKOM UHD IPTV STB. Because it supports 1 Main-Stream encoding in max. 4K@30fps and 1 sub-stream downscaled into HD or less @30fps in parallel the same content can be deployed to several destinations (HLS, RTMP, RTSP/http, and multicasts). 4K60fps version will come soon.

For detailed information see separate specifications for each model or simply ask us before you buy.
Specifications:

**INPUT**
- One HDMI compatible input connector (HDE-4264 = 4 Inputs)
- Input Resolution 2160p (UHD Versions only), 1080p, 1080i, 720p and below
- Embedded audio from HDMI signal or optional Stereo Input by 3.5mm jack

**OUTPUT**
- Simultaneous 2 different streams output per channel (Mainstream and 1 Substream) per input
- Video data rate 0.1 Mbps … 32 Mbps
- Output Resolution 2160p (UHD Versions only), 1080p, 1080i, 720p and below (max. 2160p@30/60 fps depending on model or 1080p@30/60 fps on main stream)
- Main Stream output resolution support: 3840×2160 (UHD Versions only), 1920×1080, 1680×1056, 1280×720, 1024×576, 850×480, 720×576, 720×540, 720×480, 720×404, 704×576, 640×480, 640×360, 608×448, 544×480, 480×384, 480×360, 480×320, 480×272, 480×270, 400×320, 400×224, 352×480, 352×228, 320×256, 320×240, 320×180, 240×180, 176×144. Dep. on model.
- Latency: 200ms … > 1500ms max., depending on configuration, load and model

**SYSTEM**
- HiLinux OS
- Unicast/Multicast HTTP, RTSP, RTMP, UDP/RTP, HLS, (FLV), ONVIF (RTSP Mode G711)
- HD Video encoder h.264 (MPEG-4, AVC) and h.265 HEVC (only HDE-265B supporting both)
- base/main/high profile Level 4.0 selectable
  - UHD 4K max. 30/60fps (HDE-4K5 / -4K4 only -> see separate flyer)
- Audio encoder AAC, MP3
- Data interface RJ45, 100 Base-T Ethernet interface, Management by web browser
- Encoding Rate control CBR/VBR
- GOP Structure IBBP Adv
- Pre-treatment De-interlacing, Noise reduction, Sharpening, Y-C adjustments
- Sampling rate Auto (44100/48000)
- Audio Bit-rate 48K/64K/96K/128K/160K/192K
- Audio Sampling precision 24 bit
- Audio Data Rate 12 kbps … 320 kbps …. 40000… max. 640000 depending on used Codecs
- User interface: WEB GUI
- 2 different Logo (as *.bmp file) and Text insertion feature on main stream & on secondary
- Firmware upgrade support by WebIF

**GENERAL (HDE-264B/265B)**
- DC 12V max 2A external desktop power adapter
- Dimensions: 148 x 102 x 41mm
- Weight: 303g + ext. PSU 134g
- Power consumption: 6-10W
- HDE-4264B: 3000g , 1RU, 19”, PSU internal
## Video

**Input**
1x HDMI connector  
(or 4 for the HDE-4264B)

**HDMI Resolution**
1080P/1080i/720P @50/60Hz and below

**Encoding Levels**
h.264 (MPEG4) / h.265 (HEVC) (HDE-265B can both)  
High / Main / Baseline Profile selectable

**Output TS Steam Resolution**
1\(^{st}\) stream: max support of, 1920x1080P@60fps ...  
2\(^{nd}\) stream 1 step downsampled only max 720p

**Video fps**
5-30 fps  
and other modes up to 60fps with lower resolutions only

**Video Bitrate**
0.1... 32Mbps adjustable

**Bitrate control**
VBR / CBR encoding

**TS Protocols**
Unicast: HTTP/HLS/RTMP/RTSP (w/ selectable ONVIF)  
Multicast: UDP/RTP

## Audio

**Input**
HDMI Audio  
or external Stereo Jack 3.5mm

**Sample Rates**
44.1 kHz, 48.0 kHz

**Encoding**
AAC / LC or HE, MP3, or  
G.711 (i-Law/a-Law) for RTSP-ONVIF protocol only

**Bitrate**
12K ... 320K adjustable dep. on Codec & Resolution chosen

**ONVIF**
G.711

## Network

**Network**
1000Base-T Ethernet interface

## System

**Control Panel**
Http Web, english

**Firmware Update**
By Web-IF

## Working environment

**Operating temperature**
-20 ... 80 °C

**Storage temperature**
-40 ... 90 °C

**Relative Humidity**
5% ... 90% non-condensing

## Dimension & Accessories

**Dimension**
148 x 102 x 41mm

**Weight**
310g  +  PSU 45g

**Power adapter**
110-230 VAC IN -> DC 12V 2A  
(HDE-4K5 = DC 5V 2A, USB)
Appearance and description

Front: RJ45, ext.Audio IN, LED’s, HDMI, Reset button hole

Rear: Power connector + = middle pin

LED’s are showing the operating status located at the front of the unit:
LED: RED- POWER ON. YELLOW (for HDMI-Version): HLS/ RTMP stream on, for SDI = network input connection. Green for HDMI: network OK and for SDI encoder: HLS/ RTMP stream=on

Hard Reset: Operating ready (BLUE), Ethernet connected (GREEN), Signal Input ready (RED). LAN LEDs showing connection and data transfer. Press the RST = RESET Button to restore factory defaults: Use a thin wire & press > 7 seconds until LEDs showing a reboot process.

Sticker on the bottom shows default IP/User/PW

Installation Guide

Accessories

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

- HDE-264B or 265B Encoder 1 pcs
- User’s Manual (usually via download PDF from Blankom.de) 1 pcs
- Power Supply with 110...230VAC - 12VDC 2A with Euro plug 1 pcs

Some models will have Audio- Stereo Chinch → 3.5mm jack and/or HDMI cable in the box

Installation Preparation

If you need to encode 4 sources or more, you can use HDE-4264B as a higher integrated platform with a separate Management Ethernet port and Data-Streaming port in 19 Inch 1RU size and integrated PSU:

When you install the device, please follow the below steps. The details of installation will be described in this paperwork. The main content of this chapter includes:
- Checking the possible device missing or damage during the transportation
- Preparing relevant environment for installation
- Connecting signal cables (HDMI/SDI depending on source interface)
- Connecting communication ports RJ45 100BaseT and GbE (WEB-IF + Streaming)
- Connecting the power supply
- The LED’s should flash and if the OS is loaded, LED’s are constantly ON
- RJ45 – port LED’s showing Ethernet connection ready
- Suggestion: CAT 6E Ethernet cable for GbEthernet for streaming purpose it should be shielded.
  Example: DST CAT6 = Double shielded twisted pair
**IMPORTANT NOTE:**

Please connect your PC/Laptop and the Encoder(s) always to the Ethernet with a GbE auto-negotiation Switch (10/100/1000BaseT) or fixed 1GbE switches - if both devices are supporting that speed in between. Please do not use PoE Switches. Otherwise you might damage either your laptop or the encoder RJ45 port or at least get connection problems. Assure that your switch doesn’t do Multicast-blocking on the ports you connect it — if you use UDP/RTP multicasts. Please use **High-Speed HDMI Cables** to secure UHD-Content support. DVI to HDMI Adapter do not support Audio, so an external Audio jack 3.5mm from the sound-card output can be used (Analog Stereo)

**Browser configuration**

*We recommend to use the latest Firefox browser on your PC/Laptop for this operation.*

**Login Interface**

A login interface will pop up firstly when the software is running and give a user prompt to input user name and password (The default user name is *admin* and password is *admin*). You can change user and password as needed. Details please refer to below ... System Settings). The menu shows up as follows - *This might look slightly different depending on your used browser*:

![Authentifizierung erforderlich](image)

You will enter the STATUS page.

First of all change the network settings to your needs:

**Network settings:**

Default settings: DHCP=OFF because otherwise your router will give it an IP-address and it might change from time to time when restarting the power of the device. You probably need to check your router for its actual IP address ... so better to use a fixed IP. DNS-address can be changed as well as the default streaming ports for HTTP and RTSP.
In this example we have changed it to 192.168.0.168, GW 192.168.0.1 :

-> APPLY and the device asks for a reboot which you should perform.

After the reboot, please log in with your browser and use the new address:

Remember: default user/password is admin/admin which can be changed to your needs here:
Back to the Status page:

In this status page the streams you will land in the HDMI-Main-stream info-page and the actual enabled Stream address will be shown. By simply copy and paste (to i.e. VLC-player) of the address an easy setup output can be controlled:

Just copy and paste:

To VLC: Please note, that in some addresses VLC needs this @ in between (UDP and RTP):
Example with Laptop player as a source output on 2nd display port by HDMI

Please be a little patient when changing the HDMI-Source and/or its resolution: The encoder needs some time to swing into the new content (Audio and Video). If after a source changing, the encoder doesn’t stream, you can control the Input value here:

That might be also the case if the input is disconnected or out of range (some 4K encoder models supports only 30fps on UHD). Sometimes the encoder need a complete restart to change some essential settings (i.e. network) but usually most settings can be changed in real- during runtime.
The AUDIO overview just shows Stereo, Input sample rate and the running encoded bits in size total.

The hardware status is just informal and shows if some packets/frames were interrupted or lost.

**System settings:**

Here you can change your password. If you once forgot your password, you can **reset** the unit by a front-switch button (press RST > 10 seconds better 15 by a needle through the hole) and all default factory settings will come back. Or you can reset the unit if you already are logged in. The Version info shows actual installed Firmware Version.
Scheduled restart interval adjustment:

The device can also be forced to reboot periodically to swing into new input- and output circumstances -like if the network is periodically interrupted (i.e. by DSL Router or ISP disconnection over night) - you can program a scheduled task for restarting every 0...200 hours.

**Hint:** If you change some settings in particular for the encodings, and press SETUP/Modification, a popup message will appear:

Please confirm this. And may be this

Software update:

Self-explaining isn't it? The filename must be `upgrade.bin` and must be selected from your PC/Laptop, than start the upload. A reboot will be necessary after this finished Upload -see above menu item.

**WARNING:** Flashing the wrong firmware will probably cause the device to not be able to start any more. So it is highly recommended to ask us before.

**Encoder Settings**

The Encoder is designed to safe its own CPU and RAM resources to not beeing overloaded by highest settings applying. So the MAIN Stream support encoding (even upscaling) to 2160p30!
Therefore the input resolution shouldn’t be higher than that.
Supported Codecs can be chosen in the Stream V(ideo)enc: h.264 or h.265 (HEVC) depending on model !!!
The encoded Video can be mirrored or flipped

The bitrate control of the encoding process can be set to VBR (variable) or CBR (constant):

The channel name can be changed and will be shown in the TS tables.

is self-explaining isn’t it?
Quantization in an H.264 encoder is controlled by a quantization parameter, QP, that ranges from 0 to 51. QP is an index used to derive a scaling matrix. It is possible to calculate the equivalent quantizer step size (Qstep) for each value of QP. As QP increases, Qstep increases; in fact, Qstep doubles for every increase of 6 in QP.

If VBR was selected, another setting appears:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitrate control</td>
<td>vbr</td>
</tr>
<tr>
<td>Key Interval</td>
<td>50</td>
</tr>
<tr>
<td>Encoded size</td>
<td>vbr</td>
</tr>
<tr>
<td>H.264 Profile</td>
<td>main profile</td>
</tr>
<tr>
<td>Encoding frame rate</td>
<td>50</td>
</tr>
<tr>
<td>Min QP</td>
<td>5</td>
</tr>
<tr>
<td>Max Qp / Max Qp</td>
<td>Min Qp + 1</td>
</tr>
<tr>
<td>Encoding frame rate</td>
<td>50</td>
</tr>
<tr>
<td>Package</td>
<td>main profile</td>
</tr>
</tbody>
</table>

[5-60] (Encoded frame rate: 5-60 available, it isn’t available for interlaced usage/inputs “I”). The default settings are almost sufficient but you can play with them...

but might be changed manually:

To change the video quality, higher level = higher fluctuation

**Key-Interval:**

[5-200] (is the gap to show “I frame” and “P frame” 100sec / 25 = every 4sec comes one I frame)
Important:
can be chosen for all of your Multicast output streams which you usually configure (Address + Port) in the Main + Secondary stream menus. Some essential hints for RTP and Multicasts can be found at the end of this manual. Read it carefully before setup a RTP.

Higher bitrates, better picture quality, but higher network penetration.

VLC or FFMPEG mode, choose the proper one based on your Video streaming server capabilities:
These are the packet selection for the Transport stream. 188x7 is almost the standard.

In the following the different streaming modes and protocols will be described. This encoder Series supports only one selection for the Main stream and one for the 2nd stream.

When you are changing the stream method and protocol in the WebIF, the former selected will be disabled automatically.

Another limitation for the second stream output is the encoding picture size: It will be always less than the Input size i.e. 1080p HD, the 2nd stream will start always only at 720:

Most common settings from the main stream will automatically apply for the 2nd stream because both encoder processes depending on the main stream adjustment while the output streaming usage is more or less independent.

**DVB-Transportstream related settings:**

To be conform with IP-Input of multiplexers / Modulators, several improvements has been done in the past to be DVB-TS conform:
**UNICAST** can be streamed as Point to Point by HTTP or RTSP (RTMP as well but that’s a topic for later in this manual):

If you chose http, and apply, the stream address will be shown in the status page:

So the encoder asks the VLC user to insert username/password which are the same like you have setup in:
VLC is asking...

BTW: Some settings apply for both Main and secondarys and are adjusted only in the Mainstream settings, like the RTSP net-transport mode: UDP or TCP. **BTW2: RTSP is used if need ONVIF (Camera syncs)**

Direct Streaming to a Unicast Address P2P:

so you set the destination address, while the receiver must have set your ‘source’ address and port number to receive it from you.

**Multicast** (explanations see end of this document):

RTP is used as one Top Layer of UDP, transporting time stamps and additional header + information. And a second stream on Port-Number +1 = The RTCP information which the receiver can use to recover some lost packets. So the receiver should also support RTP. If it doesn’t it uses udp and ignore the RTP addons.

**RTMP-settings:**

Internet Video portals often receive your life stream by some particular settings.
IP mode opens

more demands for details instead putting all in the URL-Mode in one line.

Here is an example:

rtmp://a.rtmp.youtube.com/live2/*************

Server IP: a.rtmp.youtube.com; app name: live2; URL:*************

Usually you get your username/password and tokens from the server-provider.

**Example for streaming to VIMEO Live by RTMP:**

VIMEO gives the user an RTMP –address with a live token at the end. No username/password is necessary because they handover individual stream-keys which simply needs to be inserted as

rtmp://rtmp.cloud.vimeo.com/live?token=***********/streamkey

Than you can control it by checking the vimeo live portal of your stream.
Extended Settings:

This works in parallel for both streams Main and secondary.

Here you set ONVIF support for the RTSP as well. Default= Off

Select the source: HDMI embedded or external 3.5mm Jack.

Audio bitrates for sampling can be chosen:

Higher bitrates assuring higher sound quality.

You can select only left or right or both:

As well as the codec:

And the AAC-Version:

As well as pass through or resample the Audio:

techn. data are subject to change w/o notice!
The device is giving popup hints for settings of different ranges in different modes/protocols and codecs used. You’ll get a hint if the values are not corresponding:

HE AAC, bitrate should be in 24000-51000!

If you need ONVIF:

Audio Level can be decreased or increased:

Preview Feature in Status Page:

The until now not described nice feature of this BLANKOM HDE-(4)264B/265B Versions is the possibility to directly see your encoded Mainstream in the Web-IF by html5:

This works actually only with h.264 encoders because the HEVC h.265 codec isn’t part of the HLS Apple protocol for html5 we are using here. The settings to enable the preview are slightly tricky:

Step1: In Extended – Settings you need to enable HLS:
Set it to ON and Apply. The addresses will be shown.

Then Enable the Mainstream-RTSP – Stream:

Change to the Preview window and you might need to refresh the page a few times to reload the browser-cache:
Inserting LOGO and Text as OSD Overlay:

Both encoder streams can overlay Text in different colours and sizes as well as logo’s you design.

2 Logos can be uploaded independently and will be stored in the unit:

The Main osd logo has to be named `logo.bmp`
while the 2nd osd logo must be named `logo_ext.bmp`

A slightly tip: Do not upload to big logo files to the unit. < 500kByte should be OK.
If you have a transparent PNG and you like to convert it to a transparent BITMAP:
Here is the trick by IRFANVIEW:
Main Menu-left side: File safe under...

Safe it as Bitmap. If its too big, resize it:

Rename it to logo.bmp:
And Upload:
Switch it on and before you might select your position counted from upper left corner:
You’ll see it after a few moments in the preview window (MAIN stream only):

This is position x=650pxl y= 300pxl so counted from upper left as x=0 y=0

Same rules apply for the TEXT overlay insertion:
Additional: You can set an ALPHA value for the transparency setting, Font size and colour.
The Text line is limited to 255 characters.
If you like to place text and logo in your 2nd stream, the 2nd OSD logo file upload must be named to `logo_ext.bmp`. Please calculate different size and distances of pixels because the 2nd stream has a lower resolution than full HD!

The Logo is limited to the file-mode BMP (Windows usual bitmap). The Logo can also be designed as Transparent by keeping its background in the colour – 0xF1F1F1 (a slightly grey):

Please consider its max resolutions and size:

*less than 500kbyte and need to be setup as 24bit sampled*

If this isn’t working, just chose the IRFANVIEW way PNG->BMP.

In general, needed settings and changing of **RTMP-HLS settings** can be done here:

You can adjust your streams **Picture corrections/enhancements**:
As well as Picture quality settings/filterings:

And a smart encoding processing:

These extra settings should be always checked in the client receiver / decoder of the stream to adjust convenient and optimal streamed picture quality.
Upgrading the Firmware

Failure workaround:
If something happens somehow or you flashed the other wrong firmware accidently (instead HDE-265B the HDE-264B file or vice versa) and the unit is not accessible after a firmware upgrade, it has an emergency portal to try the upgrade again:  [http://IP-ADDRESS:90](http://IP-ADDRESS:90)
In case you have done a Hard- RESET by the Front-Button (or Soft-Reset by the web-IF) by pressing RST-hole > 7 seconds – LEDS will show when it has been done and it reboots check IP address:
Remark: The original factory default IP address will be restored: 192.168.1.168 › See Initial settings chaper before.

You simply upload the firmware file again (remember it has to be the right one for that Hardware)
Please reboot:

Confirm this:

After reboot:
Change back to the normal http-IP address:  
(remember to set your PC IP address accordingly) 
And …

we are back in town:
Checking stream values with a stream analyser:

Of course, the Input on HDMI will cause the encoder settings capabilities. Example: If the HDMI Input does not contain an AC3 Audio Signal, the AC3-mode can be set in some of the encoder models in the AUDIO Submenu but might not being processed. If no Audio comes in (See above stream analyser screenshot), no Audio will be processed as well. If AAC,MP2/3 is detected, it cannot encode to AC3. So its recommended to check the source than process the Audio encoding settings.

You can also check the Audio codec with i.e. VLC:
Audio Encoding settings

You can change the Encoder Audio codec anytime but after restarting the IP-Receiver (VLC) you see the new codec active (Picture right above)

**AC3 works with HDE-264/265 only**, not the ‘B’ Versions, they have only AAC and MP3 codec support.

The RTSP is used by ONVIF, so the Audio Settings for ONVIF should be set according to G.711:

Audio encoding settings are a general issue and are working for all streams: Main – and sub-streams.

**Remark:** Supported ONVIF version is **2.8.32**

So that’s all for the configuration actually. Do not expect a high professional encoder with realtime encoding capabilities because such units cost around 10K USD and more.

Also this encoder is limited to one Audio mode only (no Dual Language AC3 support or multiple Stereo by embedded SDI signals (depending on Frontend used : HDMI/HD-SDI/VGA/CVBS, ...).

**HDE-4264B:**

The 19” unit has 4 HDMI encoder chips combined on one mainboard and uses 1 management port and 1 GbE port. The operating Menu is similar to the single encoders and we only show here the differences:
Of course we have 2 Ethernet ports to setup:

- The web-IF can be reached by both ports. Please avoid collisions with existing IP addresses.
- The Management port has a fixed and static IP address. We recommend not to use DHCP on the DATA port.

The 4 different Inputs can be configured individually by selecting the appropriate inputs:
Same applies for the 2nd Streams:

And for the Audio settings:

and for the
OnScreenDisplay settings:

As well as for the RTMP/HLS settings:

If you set this to ON:

You’ll get a separate Access-address page:
Actually the Preview is not fully running here if your browser doesn’t export to VLC:

This might be fixed and improved in a new firmware soon. And we update this manual accordingly.
Regarding Latency:

Depends on used Chipset. Please do not expect a realtime encoding from this devices. The range is from 200ms up to 2 seconds (worst case).

Here is an example page used with an encoder and a media server by RTMP:

![Example Page](image)

The Latency is of course depending from the encoder settings profile and the related values like:

- Bitrate, Profile
- Stream capacity
- Improvement settings
- Downscaling settings (Same as Input ... down to 176x144 size)
- And finally the OSD Insertion actions (if you enable this).

All these values have an impact on processing load and therefore the latency.
Finally some useful Hints about the 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 overloading 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:

![Unit Information](image-url)
Encoding and codec parameters


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](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** (224.5.0.0-224.5.255.255 (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](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](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](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, 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. 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


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.[1]

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.[3] 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.[5] Windows Server 2008 with Exchange Server 2007 installed has a default port range of 1025–60000.[2] 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.[4][5]

Packet structure

The UDP header consists of 4 fields, each of which is 2 bytes (16 bits).[3] 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.\[4\] 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.\[4\] 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

[4] techn. data are subject to change w/o notice!
an RTCP RR packet is sent instead.

Note: Regarding SAP (Session Announcement Protocol)

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

IPv4 administrative scope sessions using administratively scoped IP multicast. The multicast address to be used for SAP announcements is the highest multicast address in the relevant administrative scope zone. For example, if the scope range is 239.16.32.0 - 239.16.33.255, then 239.16.33.255 is used for SAP Announcements.

So please do not use these addresses for your streams.
About This Manual
This manual is written for system integrators, IT technicians and knowledgeable end users. It provides information for the installation and use of the Product described herein

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

Do not open the top case w/o unplugged power source because serious injury or death may be the result!
Inside are components under risk from electrostatic discharge. To avoid equipment damages do not touch these components or, observe the respective handling rules!
For continued protection against fire, the fuses may only be replaced by identical fuses with the same electrical specifications which are designed for the corresponding fuse positions.

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Änderungen vorbehalten / Subject to change w/o notifications
Appendix A

Product Disposal

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

警告

警告

警告

Warnung

¡Advertencia!

Attention

Attention

Waarschuwing

Appendix A

Product Disposal

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

警告

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警告

Warnung

¡Advertencia!

Attention

Attention

Waarschuwing
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 have 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.
5. **Sale**

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

6. **Disposal**

- **Caution:** Dispose of the device in accordance with the applicable environmental regulations.
- **Caution:** Dispose of batteries (if present) in accordance with the applicable environmental regulations.

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**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

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*techn. data are subject to change w/o notice!*
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 Verteilerveripheie 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 Montag e- 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: Der Montage- bzw. Aufstellungsort 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 an Gerät als auch mögliche Folgeschäden (Brandgefahr) zu vermeiden, dürfen für Wandmontage vorgesehenen Geräte nur auf einer ebene Grundfläche montiert werden und nicht über Kopf.

Warnung: (Nur für optische Sender sowie deren Verteilerveripheie) Blicke 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 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 übermäßig 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 Verteilerveripheie) 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 Netzeilabdeckung 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 Brandgefar.

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

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

**Installationshinweis für den F-Anschluss: / Installation guide for F-connectors:**

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**


*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*

**Montage und Sicherheitshinweise / Installation and safety instructions**

- 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 75Ohm resistors including DC Blocker. Otherwise the device may be inoperable or damaged.
• 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**

**Zur Beachtung / Important notes:**

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

Bitte installieren Sie die Anschlüsse gemäß dem Aufdruck

*Please install according to the sticker on the Multiswitch*

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

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