Installation and Operation Instructions

IPQAM-801

8x UHD- HD/SD IP2QAM Multiplexer & Modulator in DVB-C Annex A/C QAM
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 Microsoft Windows OS and components, electronics and especially in broadcast/broadband CATV as well as IPTV Streaming technologies and standards.

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Application Example:

Up to 8 Info-channels from different SPTS streaming sources UHD/HD/SD to 1 QAM DVB-C Channel output for INFO-Channel distribution or Digital Signage over Coax

Standard UHD-TV set with DVB-C QAM Tuner for Hospitality Environments, Airports, Lobby, Bar/Pub, Shops, Malls, ...

2x ASI Out for Cascading or Monitoring

Existing COAX-CATV network
Table of Content

8X UHD- HD/SD IPQAM MULTIPLEXER & MODULATOR IN DVB-C ANNEX A/C QAM ............................................1

CHAPTER 1 INTRODUCTION .......................................................... 5
1.1 PRODUCT OVERVIEW ..................................................................... 5
1.2 KEY FEATURES .............................................................................. 5
1.3 SPECIFICATIONS ........................................................................... 6
1.4 BLOCK DIAGRAM ........................................................................... 7
1.5 APPEARANCE AND DESCRIPTION ................................................... 7

CHAPTER 2 INSTALLATION GUIDE .................................................. 8
2.1 GENERAL PRECAUTIONS................................................................. 8
2.2 POWER PRECAUTIONS .................................................................... 8
2.3 DEVICE’S INSTALLATION FLOW CHART.............................................. 8
2.4 ENVIRONMENTAL REQUIREMENTS .................................................. 9
2.5 GROUNDING REQUIREMENT .......................................................... 9

CHAPTER 3 NETWORK INTERFACE SETUP .................................... 10
3 IPQAM LOGIN ................................................................................ 10
3.1 MANAGEMENT PROGRAM .............................................................. 10
BEFORE USING ................................................................................ 10
OBTAIN THE PROGRAM ................................................................. 10
3.1 INSTALLATION OF .NET FRAMEWORK .......................................... 10
3.1.4 NETWORK CONFIGURATION BASICS: ......................................... 13
3.2 GENERAL SETUP ............................................................................ 14
DVB-RF SETTINGS: ........................................................................... 21
SETTING UP THE IP-INPUT STREAMS: ............................................... 28
IP-INPUT PARAMETER SETTING: ......................................................... 30
CHANGE NETWORK AND GENERAL COMMANDS: .............................. 32
TV SPECIALITIES: ............................................................................... 33
SOME USEFUL HINTS ABOUT NETWORK STREAMINGS: ....................... 37
ENCODING AND CODEC PARAMETERS: .............................................. 37
GENERAL NOTES ABOUT STREAMS: .................................................. 38
MULTICAST ADDRESS RANGES: ........................................................... 38
REGISTERED PORT ............................................................................. 39
RTP: .................................................................................................... 41
ANNEX MPEG .................................................................................... 43
MPEG PSI/SI INFORMATION’S: ............................................................ 43
ANNEX CHANNEL PLAN (CATV CHANNEL PLAN) ................................. 44
APPENDIX DB .................................................................................... 45
APPENDIX A ......................................................................................... 47

SAFETY INSTRUCTIONS ................................................................. 48
SICHERHEITSHINWEISE ................................................................. 50
1. INSTALLATION .............................................................................. 50
2. BETRIEB ........................................................................................ 50
4. WARTUNG ..................................................................................... 51
5. REPARATUR ................................................................................... 51
6. VERKAUF ....................................................................................... 51
Chapter 1 Introduction

1.1 Product Overview

A compact agile DVB A/C QAM channel modulator with integrated multiplexer receiving UDP multicast streams in any Codec/Resolution incl. SD, HD, 4K UHD compatible with h.265, h.264 & MPEG2 codec from multiple Encoder- & DVB IP streamer sources. DVB-C QAM Modulator as addon Channel to existing CATV networks or serving Information-Channels or Digital Signage by Cable-TV. UHD h.265 (HEVC) -, h.264 compatible in Distribution of SD, HD and UHD TV channels through the existing CATV Coax network using state-of-art IP to QAM technology from almost any kind of video format input streams.

TV distributions in home entertainment, surveillance control, hotels, digital signage, shops, bars, etc. excellent Video and Audio quality. High reliability. No regular service and maintenance need during operation.

1.2 Key Features

- Input: 8x UDP/RTSP*/HLS* Multicast reception (max. 51 Mb/s = DVB-C max. Data)
- Gigabit Ethernet RJ 45 Interface
- Nominal RF Output power ≥120dBµV, Range: 48...863MHz
- 0...20dB adjustable attenuation
- Test RF output – 20dB
- 2x ASI Outputs for cascading or monitoring the Transportstream
- IGMP multicast Query support
- Video over IP applications like CCTV to DVB-C
- Multiplex RTSP/HLS/UDP to MPEG-TS
- Bandwidth: 1.15MHz...8.05MHz, Symbol Rate up to 7000
- 16, 32, 64, 128, 256QAM modulation modes
- Configuration by SNMP based MS-Windows-Tool (remote setup possible)

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/or a second one with Gigabit Ethernet 10/100/1000BaseT with at least Layer 2+ with IGMP V2 features. Otherwise you might flood your network with unnecessary IP-Streaming Data, which might overload connected devices. 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 accidentally 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Description</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical dimensions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>H</td>
<td>53</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>W</td>
<td>107</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>D</td>
<td>171</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td><strong>IP Port</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>-</td>
<td>1000BASE-T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connector</td>
<td>-</td>
<td>RJ45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. throughput</td>
<td>-</td>
<td>900</td>
<td>Mbps</td>
<td></td>
</tr>
<tr>
<td>Compatible protocol</td>
<td>-</td>
<td>IP V4, RTSP, HLS, UDP</td>
<td></td>
<td>HLS (HTTP Live Streaming)</td>
</tr>
<tr>
<td><strong>RF Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impedance</td>
<td>-</td>
<td>75</td>
<td>Ω</td>
<td></td>
</tr>
<tr>
<td>Connector</td>
<td>-</td>
<td>BNC</td>
<td></td>
<td>+Test-Port -20dB</td>
</tr>
<tr>
<td>Frequency</td>
<td>-</td>
<td>48...863</td>
<td>MHz</td>
<td></td>
</tr>
<tr>
<td>Output level</td>
<td>-</td>
<td>&gt;120</td>
<td>dBμV</td>
<td>Adjustable (0...-20dB)</td>
</tr>
<tr>
<td><strong>ASI Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of ASI output</td>
<td>-</td>
<td>2</td>
<td></td>
<td>Dual parallel</td>
</tr>
<tr>
<td>Impedance</td>
<td>-</td>
<td>75</td>
<td>Ω</td>
<td></td>
</tr>
<tr>
<td>Connector</td>
<td>-</td>
<td>BNC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective bit rate</td>
<td>-</td>
<td>≤51.6</td>
<td>Mbps</td>
<td></td>
</tr>
<tr>
<td><strong>Modulation Specification</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulation scheme</td>
<td></td>
<td>16...256QAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symbol Rate</td>
<td>SR</td>
<td>1...7000</td>
<td>kS/s</td>
<td></td>
</tr>
<tr>
<td>Bandwidth</td>
<td>BW</td>
<td>1.15...8.05</td>
<td>MHz</td>
<td>8MHz default</td>
</tr>
<tr>
<td>Effective output bit rate</td>
<td></td>
<td>≤51.6</td>
<td>Mbps</td>
<td>SR=7Mbaud, 256QAM</td>
</tr>
<tr>
<td>Modulation Error Rate</td>
<td>MER</td>
<td>≥40</td>
<td>dB</td>
<td>After equalizer, 64QAM</td>
</tr>
<tr>
<td>Bit Error Rate</td>
<td>BER</td>
<td>≥9x10E-9</td>
<td></td>
<td>After FEC, 64QAM</td>
</tr>
<tr>
<td>Carrier to Noise</td>
<td>C/N</td>
<td>≥45</td>
<td>dB</td>
<td></td>
</tr>
</tbody>
</table>

Subjects to change w/o further notice
1.4 Block Diagram

![Block Diagram](image)

1.5 Appearance and Description

Front and Rear Panel Illustration

**Front (left picture)**
*From Left to Right:*

- **COM-port** for debugging by Serial adapter cable (not delivered with the product), **GbE-DATAPort** (includes the NMS Management), **status LED's** and a FAN (this needs to be kept open for air cooling purpose)

**Rear:**
- **RESET-Button** (can be used to restore default settings)
- **RF-Test-Output** = -20dB attenuated
- **RF-Out** (please use a BNC-IEC adapter for your inserting into an existing CATV network or to the F-Input of a BLANKOM Multiswitch which have a terrestrial input to the coax as pathways (active or passive available).
- **ASI 1+2** output for passing the final remultiplexed Transportstream to other Equipment
- **USB connector** (not in use), **Power LED Red, 12V DC Input (+=middle Jack-pin).**
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:

Delivered EU – Power Supply:
100- 240V AC to 12V DC 2.08A
2.4 Environmental Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Hall Space</td>
<td>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.</td>
</tr>
</tbody>
</table>
| Machine Hall Floor  | Electric Isolation, Dust Free  
Volume resistivity of ground anti-static material: 1X10⁷...1X10¹⁰Ω.  
Grounding current limiting resistance: 1MΩ (Floor bearing should be greater than 450Kg/㎡) |
| 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 110V±10%, 50/60Hz or AC 220V±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 mm².
Chapter 3 Network Interface Setup

The user can control this device and setup the configuration by a computer connected to the device to its NMS Port which is both: NMS connection and Stream-Input. 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  IPQAM login

The default IP address of this device is 192.168.1.49, def. username/password is admin/admin

3.1 MANAGEMENT PROGRAM

BEFORE USING

OBTAIN THE PROGRAM

You can get the latest version of this management program from our service, it is a freeware, and green software, that is, you can run it directly without an installation process.

Note: If you need the software, please get in touch with IRENIS / BLANKOM Service / Sales or the distributors contact to get it.

3.1 INSTALLATION OF .NET Framework

3.1.1   OBTAIN

Before you use the management program, you need install "Microsoft .NET Framework 2.0" firstly, you can get this package from Microsoft website link as below:


If you are using windows7, you don't have to install it. Usually since Windows10, the .Net Framework should be integrated and is downwards compatible with .NET2.0.

3.1.2   INSTALLATION

Figure 6 to 9 show you the installation process of .NET Framework.
Figure 1 Start installation

Figure 2 Agreement acceptance
Figure 3 Installing

![Image of Microsoft .NET Framework 2.0 Setup with 'Installing components' section highlighting 'The items you selected are being installed.' and progress bar showing installation progress.]

Figure 4 Installation finished

![Image of Microsoft .NET Framework 2.0 Setup with 'Setup Complete' section highlighting 'Microsoft .NET Framework 2.0 has been successfully installed.' and 'Product Support Center' link.]

- It is highly recommended that you download and install the latest service packs and security updates for this product.
- For more information, visit the following Web site:
- Product Support Center
3.1.4 Network configuration basics:

Connect the PC (Personal Computer) and the device better not with a network cable directly (Check usage of crosslink cable eventually or network interface should support MDI/MDX), better using a at least Gigabit-Ethernet 1000BaseT 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 192.168.01.xxx (xxx can be 1 to 254 except 252 to avoid an IP conflict) according to the IPQAM IP.

Example for multiple IP addresses in your PC:

<table>
<thead>
<tr>
<th>Eigenschaft</th>
<th>Wert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beschreibung</td>
<td>Realtek PCI e GBE Family Controller</td>
</tr>
<tr>
<td>Physische Adresse</td>
<td>2011-01-04 07:03:15F</td>
</tr>
<tr>
<td>DHCP-aktiv</td>
<td>Nein</td>
</tr>
<tr>
<td>IPv4-Adresse</td>
<td>192.168.01.103</td>
</tr>
<tr>
<td>IPv4-Subnetmaske</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>IPv4-Adresse</td>
<td>192.168.1.101</td>
</tr>
<tr>
<td>IPv4-Subnetmaske</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>IPv4-Adresse</td>
<td>192.168.1.222</td>
</tr>
<tr>
<td>IPv4-Subnetmaske</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>IPv4-Adresse</td>
<td>192.168.200.100</td>
</tr>
<tr>
<td>IPv4-Subnetmaske</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>IPv4-Standardgateway</td>
<td>192.168.0.1</td>
</tr>
<tr>
<td>IPv4 DNS Server</td>
<td>192.168.0.1</td>
</tr>
<tr>
<td>Endanwenderschnitt</td>
<td>8.8.8.8</td>
</tr>
</tbody>
</table>

multiple addresses can be used as statics.

Ping it: Open CMD-line window:

```
C:\Users\Paps>ping 192.168.1.49
Pinging 192.168.1.49 with 32 Bytes of Data:
Packet: Gesandt = 4, Empfangen = 4, Verloren = 0 (0% Verlust),
Min. = 0ms, Maximum = 2ms, Mittelwert = 0ms
```
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 and check 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

Starting the PC-NMS-Software:

After unpacking the compressed file by unzipped in a folder of your choice, by using i.e. 7Zip freeware:

Go to this folder:

```
<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BLANKOM NMS 20190820.zip</td>
<td>7-Zip</td>
<td>CRC SHA</td>
<td>Edit with Notepad++</td>
<td>Ausgewählte Objekte auf Viren überprüfen</td>
<td>Freigeben...</td>
<td></td>
</tr>
</tbody>
</table>
```

```
<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
```

```
BLANKOM NMS 20190820.zip
```

```
->
```

```
BLANKOM NMS 20190820
```

Go to this folder:

```
<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NMS</td>
<td>devn</td>
<td>dlls</td>
<td>language</td>
<td>tools</td>
<td>bsrDev.dll</td>
<td>datadef.dll</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31.07.2019 09:50</td>
<td>31.07.2019 09:50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31.07.2019 09:50</td>
<td>31.07.2019 09:50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31.07.2019 09:50</td>
<td>31.07.2019 09:50</td>
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<td>31.07.2019 09:50</td>
<td>31.07.2019 09:50</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31.07.2019 09:50</td>
<td>31.07.2019 09:50</td>
</tr>
</tbody>
</table>
```

```
```

```
double click / open NMS.exe (If you do not see the .exe,
your folderview has been set to not show the file extensions and the NMS only is shown with its Icon.
Anyway, a window will open:
```
Insert admin as the password:

than click OK
So now you can search the unit in your network. (Windows should not act as an own SNMP Agent – port 161).
usually it will find:
And it will appear in the list:

Simply connect to it:

Success:
Notice the bottom window: Shows the actual status of your IP streams coming in...

Now ‘READ’ from the IPQAM:

And you will see the former configuration or all is left blank (factory):
You can change the values according to your need

But need to ‘APPLY’ them to let them take effect.
You always will see a status window popping up:
DVB-RF settings:

We should go to QAM Parameters first to adjust maximum capacity of our Multiplexed Datastream:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Enable</th>
<th>Modulation mode</th>
<th>Frequency (MHz)</th>
<th>Symbol rate (Kbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIRST –READ** the actual values than you should see the stored settings.
Advice: max. DVB-C Channel bitrate can be 51.6Mb/s in a Transportstream but we recommend to give the QAM a little overhead of 10%. So 5 Mbit should be left in the calculations of your stream reception to avoid the distortion of all channels transmitted when heavy bitrate peaks are overloading the channel.

Please adjust the center Frequency according to the CENELEC Channel-Plan which is common for most TV sets/Tuners/STB... -> See table example in the Annex. But you are free to use any...

The Output can be adjusted from the highest output dbm (or in dBµV – comparison table – see annex)
Please make sure not to exceed the levels of your desired Inputs of the CATV receivers like STB or TV sets. Also the TV sets sometimes need to be set to a different country to enable its DVB-C Channelplan at all.

**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.
See, the null-pakets of the DVB-TS is constant according to the max. data rate of the QAM-DVB-C settings while the content is fluctuating which depends on the Video stream and their single datarates. Now we can insert some more or less important values to the PSI/SI tables:
To have a common Date/Time table transported you can use the PC to IPQAM mode of setting the Time & Date tables accordingly:

- Apply will update the TS-TDT/TOT table

Actually the software is not capable of reading that from the Input-Streams and update that to the multiplexed TS. Also the tool for injecting any further NIT and EIT Information tables in 188byte isn’t available yet but:

You can add a STATUS-line as EPG Information (EIT-Table PID18dec / 12hex) – which might not be fully ready yet.
Please uncheck to insert the Character Table because that is not recommended and will not work actually. Please don’t tick the "Insert Char-table type", while Chinese need this, others not.

Also the HEX-Generator as file importing for that isn’t finished.

Than inject EIT – Check that and APPLY:

You can crosscheck with DekTec Analyser if you have one:
Usually the receiving TV set would not update its NIT (Network information Table) Recommendation: You perform a manual tuning to the RF-channel 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 Channel in a free 8MHz 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.

So for the operating of this extra DVB-C Injector, we recommend to not use NIT at all.

If no combining will be done, you won’t need a NIT but need to perform the manual Tuning like:
But now something completely different:

**Setting up the IP-Input streams:**

We are using as example some HDMI to IP encoders and some DVB-SAT-Streamers:

![HDMI Input Status](image)

Please note, that these handover the STREAM-URI as UDP or RTP to be convenient with the VLC notation/syntax:

VLC like to have an @ after the /:
While it displays it w/o the @:

So it’s almost a good idea to monitor your input streams when configuring the multiplexer.

Note: There are sooo many different sources which are acting slightly different from the standards for RTSP and if you face problems, we can arrange a remote login to the unit with i.e. Teamviewer Anydesk or Windows remote but it will take some time to analyse and fix that.
### IP-Input Parameter setting:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Enable</th>
<th>IP address/RTSP URL</th>
<th>Locked</th>
<th>TS rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td><a href="http://192.168.1.66:8554:0">http://192.168.1.66:8554:0</a></td>
<td>Yes</td>
<td>3.743456 Mbps</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td><a href="http://192.168.1.73/0">http://192.168.1.73/0</a></td>
<td>Yes</td>
<td>0.993245 Mbps</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td><a href="http://192.168.1.66:8554/0">http://192.168.1.66:8554/0</a></td>
<td>Yes</td>
<td>2.716234 Mbps</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td><a href="http://192.168.1.57/0/0">http://192.168.1.57/0/0</a></td>
<td>Yes</td>
<td>2.512496 Mbps</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>udp://2251.2.23.10011</td>
<td>Yes</td>
<td>4.942144 Mbps</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>udp://2018.0.0.1:12340</td>
<td>Yes</td>
<td>6.572482 Mbps</td>
</tr>
<tr>
<td>7</td>
<td>No</td>
<td><a href="http://192.168.1.1/0">http://192.168.1.1/0</a></td>
<td>No</td>
<td>0.000000 Mbps</td>
</tr>
<tr>
<td>8</td>
<td>Yes</td>
<td>udp://2251.2.23.10012</td>
<td>Yes</td>
<td>4.257245 Mbps</td>
</tr>
</tbody>
</table>

**Addresses, Ports and mode can be adjusted here. Enabling and disabling as well as changing the Service provider name and program name.**

The URI for VLC udp with an @ works here as well.
Please be a little patience, it take some time to acquire a stream and insert this into the mux.

Channel Datrates 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). **NOTE:** The Symbol Rate has sometimes in some devices have to be entered with the (american style) "." As the thousand komma:
Like: **6.900** Msp (Mega symbols per second).
Change network and general commands:

Here you can change the device Network parameters to your needs. It’s almost helpful to have the sources of the IP streams in the same subnet like this QAM Modulator.

In case accidently something happened, the factory settings can be restored and the IP address 192.168.1.49 will be restored.

**The Reboot is sometimes necessary if essential parameters has been changed.**

Firmware updates can be installed in case there are new versions available from the engineering fixing issues or adding improvements. -

Please ask us if something is happening.

**The default username and password for the administrator can be changed.** But DO NOT forget that or write it down somewhere ;-)

If all is not working and you’ll get no access,

A reboot sometimes helps and re-connect of power source.

To **RESET it**, there is a button at the front named **RESET**: Press for > 10 seconds by using a hard wire through the hole. This will reboot the unit into default IP address.

The Stream and other settings mostly will be kept in its nonvolatile memory.
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.
- If you change the stream content, the TV set need to recognize this – like if you change from a UHD with HEVC to a Stream with MPEG4 and AAC audio, the TV set must be re-tuned too these changed channels.

TV specialities:

Please use the manual search instead of network search with ATP (Automatic tuning preset):

Example with a Hisense UHD TV set:
Manuelle Digital TV-Suche

Tuner-Modus: Kabel

- Frequenz: 0 KHz
- QAM-Modulation: 16QAM
- Sender gefunden: 0
- Signalqualität: 0
- Signalpegel: 6

Start

Manuelle Digital TV-Suche

Tuner-Modus: Kabel

- Frequenz: 655000 KHz
- QAM-Modulation: 16QAM
- Sender gefunden: 0
- Signalqualität: 0
- Signalpegel: 6

Start
Signal dB might be too high – please use attenuators and screw down the level:

here we have already -20dB...

A CATV measurement instrument /spectrum analyser might be very necessary.

TV sets are feeling well if the QAM RF level input would be not more than 75-80 dBµv.

The Unit is transmitting at the output more than 110dBµV so you should attenuate if you have not sooo long distances by Coax and not so much splitters in that.

Higher frequencies will have higher attenuation over Coax cables ... so called SLOPE.

So for a better linear transmitting: use lower frequencies in around 300 MHz (compatible to Docsis 3.1 Internet gateway channels over CATV networks).
Manuelle Digital TV-Suche

- Tuner-Modus
- Frequenz: 655000 KHz
- QAM-Modulation: 16QAM
- Sender gefunden: 6
  - Signalqualität: 100
  - Signalpegel: 95

Start

Found them:
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:

![Image](image.png)

**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). 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. 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.

- **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 (224.0/24))
- Internetwork Control Block (224.0.1.0 - 224.0.1.255 (224.1/24))
- 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

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

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. 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]\n
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. 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. Windows Server 2008 with Exchange Server 2007 installed has a default port range of 1025–60000. 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.\[5][6]\n
Packet structure

<table>
<thead>
<tr>
<th>Offsets Octet</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octet Bit</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Source port</td>
<td>Length</td>
<td>Checksum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The UDP header consists of 4 fields, each of which is 2 bytes (16 bits). 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. 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. The field carries all-zeros if unused.

**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)](image_url)

- **Anwendung**: RTP
- **Transport**: UDP
- **Internet**: IP (IPv4, IPv6)
- **Netzzugang**: Ethernet, Token Bus, Token Ring, FDDI...

*any port (even, not odd > 1024)*
ANNEX MPEG

MPEG PSI/SI Information’s:

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

<table>
<thead>
<tr>
<th>Table</th>
<th>PID value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAT</td>
<td>0x0000</td>
</tr>
<tr>
<td>CAT</td>
<td>0x0001</td>
</tr>
<tr>
<td>TSDT</td>
<td>0x0002</td>
</tr>
<tr>
<td>reserved</td>
<td>0x0003 to 0x000F</td>
</tr>
<tr>
<td>NIT, ST</td>
<td>0x0010</td>
</tr>
<tr>
<td>SDT, BAT, ST</td>
<td>0x0011</td>
</tr>
<tr>
<td>EIT, ST, CIT</td>
<td>0x0012</td>
</tr>
<tr>
<td>(ETSI TS 102 323 [13])</td>
<td></td>
</tr>
<tr>
<td>RST, ST</td>
<td>0x0013</td>
</tr>
<tr>
<td>TDT, TOT, ST</td>
<td>0x0014</td>
</tr>
<tr>
<td>network synchronization</td>
<td>0x0015</td>
</tr>
<tr>
<td>RNT (ETSI TS 102 323 [13])</td>
<td>0x0016</td>
</tr>
<tr>
<td>reserved for future use</td>
<td>0x0017 to 0x001B</td>
</tr>
<tr>
<td>link-local inband signalling</td>
<td>0x001C</td>
</tr>
<tr>
<td>measurement</td>
<td>0x001D</td>
</tr>
<tr>
<td>CIT</td>
<td>0x001E</td>
</tr>
<tr>
<td>SIT</td>
<td>0x001F</td>
</tr>
<tr>
<td>Bereich</td>
<td>Kanal- frequenzen Channel</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>B I</td>
<td>2 47...54</td>
</tr>
<tr>
<td></td>
<td>3 54...61</td>
</tr>
<tr>
<td></td>
<td>4 61...68</td>
</tr>
<tr>
<td></td>
<td>21 470...478</td>
</tr>
<tr>
<td>USB</td>
<td>S 02 111...118</td>
</tr>
<tr>
<td></td>
<td>S 03 118...125</td>
</tr>
<tr>
<td></td>
<td>S 04 125...132</td>
</tr>
<tr>
<td></td>
<td>S 05 132...139</td>
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<tr>
<td></td>
<td>S 06 139...146</td>
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<tr>
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<td>S 07 146...153</td>
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<tr>
<td></td>
<td>S 08 153...160</td>
</tr>
<tr>
<td></td>
<td>S 09 160...167</td>
</tr>
<tr>
<td></td>
<td>S 10 167...174</td>
</tr>
<tr>
<td>B III</td>
<td>S 11 174...181</td>
</tr>
<tr>
<td></td>
<td>S 12 181...188</td>
</tr>
<tr>
<td></td>
<td>S 13 188...195</td>
</tr>
<tr>
<td></td>
<td>S 14 195...202</td>
</tr>
<tr>
<td></td>
<td>S 15 202...209</td>
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<tr>
<td></td>
<td>S 16 209...216</td>
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<tr>
<td></td>
<td>S 17 216...223</td>
</tr>
<tr>
<td></td>
<td>S 18 223...230</td>
</tr>
<tr>
<td></td>
<td>S 19 230...237</td>
</tr>
<tr>
<td></td>
<td>S 20 237...244</td>
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<tr>
<td></td>
<td>S 21 244...251</td>
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<td></td>
<td>S 22 251...258</td>
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<tr>
<td></td>
<td>S 23 258...265</td>
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<tr>
<td></td>
<td>S 24 265...272</td>
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<td>S 25 272...279</td>
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<td>S 26 279...286</td>
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<td>S 27 286...293</td>
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<td>S 28 293...300</td>
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<td>S 29 300...307</td>
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<td>S 30 307...314</td>
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<td>S 31 318...325</td>
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<td></td>
<td>S 32 326...333</td>
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<td>S 33 334...341</td>
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<td>S 34 342...350</td>
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<td>S 35 350...358</td>
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<td>S 36 358...366</td>
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<td>S 37 366...374</td>
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<td>S 38 374...382</td>
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<td>S 39 382...390</td>
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<td>S 40 390...398</td>
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<td>S 41 398...406</td>
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<td>S 42 406...414</td>
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<td>S 43 414...422</td>
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<td>S 44 422...430</td>
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<td>S 45 430...438</td>
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<td>S 46 438...446</td>
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<td>S 47 446...454</td>
</tr>
<tr>
<td></td>
<td>S 48 454...462</td>
</tr>
<tr>
<td></td>
<td>S 49 462...470</td>
</tr>
</tbody>
</table>

ANNEX Channel Plan (CATV channel plan)
### Appendix DB

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

<table>
<thead>
<tr>
<th>dBmV</th>
<th>dBµV</th>
<th>dBm 75Ω</th>
<th>mVRMS</th>
<th>mW 75Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>68</td>
<td>-40.75</td>
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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。
Warnung
Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.
¡Advertencia!
Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.
Attention
La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.
경고
이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.
Waarschuwing
De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.
Safety instructions

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 impained by covering the

- Ventilation openings with objects such as newspapers, tablecloths, curtains, etc. *(risk of fire)*.
- **Warning:** Follow all instructions in the device-specific operating manual.

### 3. Maintenance

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

### 4. Repairs

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

This also applies when you clean the device or work on the connections.

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

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

### 5. Sale

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

### 6. Disposal

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

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

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: 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 vorgesehen 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).
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: 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.

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**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


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 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

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!

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