MPEG4 HD to IP Encoder
Installation and operation Instructions

EMU 8500 Series
8 ... 24 Inputs depending on ordered device
About This Manual

To whom it may concern

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

Disclaimer

No part of this document may be reproduced in any form without the written permission of the copyright owner. The contents of this document are subject to revision changes without notice due to continued progress in methodology, design and manufacturing. We shall have no liability for any error or damage of any kind resulting from the use of this document.

Copyrights

This document contains some confidential information. Its usage is limited to the owners of the product. It shouldn't be copied, modified, or translated in another language without prior written authorization from us.
# Table of Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABOUT THIS MANUAL</td>
<td>2</td>
</tr>
<tr>
<td>CHAPTER 1 INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1 PRODUCT OVERVIEW</td>
<td>1</td>
</tr>
<tr>
<td>1.2 KEY FEATURES (NUMBER OF I/O DEPENDING ON MODEL)</td>
<td>1</td>
</tr>
<tr>
<td>1.3 SPECIFICATIONS</td>
<td>2</td>
</tr>
<tr>
<td>1.4 BLOCK DIAGRAM</td>
<td>3</td>
</tr>
<tr>
<td>1.5 APPEARANCE AND DESCRIPTION</td>
<td>4</td>
</tr>
<tr>
<td>CHAPTER 2 INSTALLATION GUIDE</td>
<td>4</td>
</tr>
<tr>
<td>2.1 GENERAL PRECAUTIONS</td>
<td>5</td>
</tr>
<tr>
<td>2.2 POWER PRECAUTIONS</td>
<td>5</td>
</tr>
<tr>
<td>2.3 DEVICE’S INSTALLATION FLOW CHART ILLUSTRATED AS FOLLOWING</td>
<td>5</td>
</tr>
<tr>
<td>2.4 ENVIRONMENTAL REQUIREMENTS</td>
<td>5</td>
</tr>
<tr>
<td>2.5 GROUNDING REQUIREMENT</td>
<td>6</td>
</tr>
<tr>
<td>CHAPTER 3 WEB INTERFACE SETUP</td>
<td>6</td>
</tr>
<tr>
<td>3.1 ENCODER LOGIN</td>
<td>6</td>
</tr>
<tr>
<td>3.2 ENCODER SETUP</td>
<td>7</td>
</tr>
<tr>
<td>CHAPTER 4 TROUBLESHOOTING</td>
<td>21</td>
</tr>
<tr>
<td>IMPORTANT NOTES!</td>
<td>21</td>
</tr>
<tr>
<td>RECOMMENDATIONS:</td>
<td>22</td>
</tr>
<tr>
<td>CHAPTER 5 PACKING LIST</td>
<td>28</td>
</tr>
<tr>
<td>CONTACT:</td>
<td>28</td>
</tr>
</tbody>
</table>
Chapter 1 Introduction

1.1 Product Overview

This MPEG4 AVC/H.264 HD IP Encoder is a professional HD audio & video encoding and multiplexing device. It has 12 HDMI (8/16/20/24 HDMI optional) video input interfaces, supporting MPEG-4 h.264 video encoding and MPEG 1 Layer 2 audio encoding. This device can simultaneously encode 8(12/16/20/24 HDMI optional) channel HD audio & video; moreover, it has an IP output port and support 1 MPTS and 8 SPTS (12/16/20/24 SPTS) IP out. In conclusion, its high integrated and cost effective design makes the device widely used in varieties of digital distribution systems such as cable TV digital head-end, satellite digital TV broadcasting, Digital Signage etc..

1.2 Key Features (Number of I/O depending on model)

- 8× HDMI video inputs with 8 SPTS and 1 MPTS output through Data 1 or Data 2
- 12 × HDMI video inputs with 12 SPTS and 1 MPTS output through Data 1 or Data 2
- 16 × HDMI video inputs with 16 SPTS and 1 MPTS output through Data 1 or Data 2
- 20 × HDMI video inputs with 20 SPTS and 1 MPTS output through Data 1 or Data 2
- 24×HDMI video inputs with 24 SPTS or 1 MPTS output through Data 1 or Data 2
- Support MPEG4 AVC/H.264 video encoding format
- MPEG1 Layer II audio encoding format, support audio gain adjustment
- Support 1 ASI output (optional) as copy of the MPTS
- Support IP output over UDP and RTP (Nx SPTS + 1x MPTS)
- Support QR code, LOGO, OSD insertion
- support “Null PKT Filter” function
- Support PID Remapping
- Support PCR accurate adjusting
- Support PSI/SI editing and inserting
- Control via web management, and easy updates via web
- Lowest cost per channel, breakthrough price

We assume that the user is familiar with IP settings and already knows his own system to connect the unit to. If you use the Output Streaming feature: We recommend using 2 separate Switches! At least a 100BaseT for the Management NMS RJ45 port and a second one with Gigabit Ethernet 10/100/1000BaseT with at least Layer 2+ with IGMP V2 features. Otherwise you might flood your IP-Streaming network with unnecessary Data, which might overload connected IPTV STB’s because they almost have only 100BaseT capacity (Never ones use 1GbE ports) but too many inputs into a STB can result in side effects. If you need to select a Switch, we recommend HP Procurve 2530 24G or 48G which are cost effective, easy to configure, can be trunked and supporting IGMP V2. If the switch needs routing functions, the bigger brother of this series might be the right choice. Because to not accidently put DATA and NMS port in the same sub-network the data – port setting does not allow this by default. Usually the DATA GbE Port needs an IP address- otherwise the Switch or the receivers (i.e. IPTV STB’s) cannot locate the source of the streams.
1.3 Specifications

<table>
<thead>
<tr>
<th>Input</th>
<th>8 HDMI inputs (8/12/16/20/24 input optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution input</td>
<td>1920×1080_60P, 1920×1080_60i, 1920×1080_50P, 1920×1080_50i, 1280×720_60P, 1280×720_50P, 720×576_50i, 720×480_60i,</td>
</tr>
<tr>
<td>Encoding</td>
<td>MPEG-4 AVC/h.264</td>
</tr>
<tr>
<td>Bit-rate</td>
<td>1Mbps...13Mbps each channel</td>
</tr>
<tr>
<td>Enc. Rate Control</td>
<td>CBR/VBR</td>
</tr>
<tr>
<td>GOP Structure</td>
<td>IP...P (P Frame adjustment, without B Frame)</td>
</tr>
<tr>
<td>Audio</td>
<td></td>
</tr>
<tr>
<td>Encoding</td>
<td>MPEG-1 Layer 2</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>48KHz</td>
</tr>
<tr>
<td>Resolution</td>
<td>24-bit</td>
</tr>
<tr>
<td>Bit-rate</td>
<td>64kbps, 128Kbps, 192Kbps, 224Kbps, 256Kbps, 270Kbps, 320Kbps, 384Kbps</td>
</tr>
<tr>
<td>Multiplexing</td>
<td></td>
</tr>
<tr>
<td>Maximum PID Remapping</td>
<td>180 input per channel</td>
</tr>
<tr>
<td>Function</td>
<td>PID remapping (automatically or manually)</td>
</tr>
<tr>
<td></td>
<td>Accurate PCR adjusting</td>
</tr>
<tr>
<td></td>
<td>Generate PSI/SI table automatically</td>
</tr>
<tr>
<td>Stream output</td>
<td>8...24 SPTS IP or 1MPTS output over UDP/RTP, 1*1000 Base-T Ethernet interface. <strong>The 24 HDMI encoder has either 24 SPTS or 1 MPTS output.</strong> ASI output (optional) as copy of the MPTS</td>
</tr>
<tr>
<td>System function</td>
<td>Network management(WEB)</td>
</tr>
<tr>
<td></td>
<td>English</td>
</tr>
<tr>
<td></td>
<td>Ethernet software upgrade</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
</tr>
<tr>
<td>Dimension(W×L×H)</td>
<td>482mm×410mm×44mm</td>
</tr>
<tr>
<td>Approx weight</td>
<td>8kg</td>
</tr>
<tr>
<td>Environment</td>
<td>0...45°C (work); -20...80°C (Storage)</td>
</tr>
<tr>
<td>Power requirements</td>
<td>AC 110V± 10%, 50/60Hz, AC 220 ± 10%, 50/60Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>70W</td>
</tr>
</tbody>
</table>
1.4 Block Diagram

Remark: The full equipped EMU-8524 supports either 24 SPTS or 1x MPTS
1.5 Appearance and Description

Front and Rear Panel Illustration

1. Power supply and Grounding Pole
2. 8...24 HDMI input
3. Reset Key
4. Data Port Indicator
5. ASI output port BNC(Optional)
6. DATA Ports (1 or 2 GbE port for IP stream output)
7. NMS/CAS one 100BaseT

ASI-Out Option:
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 Illustrated as following

```
Acquisition Check → Installing Device → Connecting Grounding Wire and Power Cord → Connecting Signal cable → Setting Parameter → Running Device
```

2.4 Environmental Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine 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 Floor    | Electric Isolation, Dust Free  
Volume resistivity of ground anti-static material: 1X10^7...1X10^10Ω.  
Grounding current limiting resistance: 1MΩ (Floor bearing should be greater than 450Kg/m²) |
| 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 |
### 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 WEB Interface Setup

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

#### 3.1 Encoder login

The default IP address of this device is 192.168.0.136. Connect the PC (Personal Computer) and the device with network cable directly (Check usage of crosslink cable eventually or network interface should support MDI/MDX), or using a at least Fast Ethernet 100BaseT switch and use a "ping" command to confirm they are on the same network segment. 
I.e. the PC IP address is 192.168.99.252, we then change the device IP to 192.168.99.xxx (xxx can be 1 to 254 except 252 to avoid an IP conflict).
Use your web browser like Firefox, to connect the device with your PC/Laptop by entering the URL of the Encoder & Modulator’s IP address in the browser’s address bar and press Enter:

http://192.168.0.136

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

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

### 3.2 Encoder Setup

**Status**

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

**Parameters → Module 1...6**

This encoder support up to 2 / 3 / 4 / 5 / 6 modules with 8 / 12 / 16 / 20 / 24 HDMI inputs. From the menu on the left side of the webpage, clicking “Module1-6”, displays the information of each encoding channel:
As soon as an Input is automatically detected, the Status will show its parameters from the HDMI source. Bitrates and other usual settings can be configured independently for every encoder Channel and Module. For IPTV receivers we recommend using VBR instead of CBR settings to save bandwidth and do not end up in Peaks if bitrates which might cause distortions if the CBR bitrate is peaky lower than the output settings. PCR-Correction should be used to assure this method for the receivers for smooth streaming.

**Parameters → TS Config:**

From the menu on the left side of the WEB-IF, selecting “TS Config” displays the interface where the user can configure the MPTS multiplexer output parameters. First of all the General settings should be considered to adjust the MPTS output data rate, TS ID, ON ID, PCR Correction values. Remark: IPTV STB’s often can only see the first Service in a multiplexed TS, for this case the SPTS modes are better to use.

**TS Config → Stream select:**

From the menu at the upper side of the webpage by using “Stream select” displays the interface where the user can select program(s) to multiplex out and modify program info.: The Button
"Parse Programm" initialize the reading and reloading of the input data.

Configure ‘Input Area’ and ‘Output Area’ with buttons in ‘Operation Area’. Instructions are as following:

Select the Input channels to process them to the output.

By expanding the single encoded services you'll get the default information and
Opens a popup to modify them to the output multiplex:

<table>
<thead>
<tr>
<th>Input Program</th>
<th>Output Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV-101</td>
<td>TV-102</td>
</tr>
<tr>
<td>Service Type</td>
<td>Service Type</td>
</tr>
<tr>
<td>TV-Provider</td>
<td>TV-Provider</td>
</tr>
<tr>
<td>PMT PID</td>
<td>PMT PID</td>
</tr>
<tr>
<td>PCR PID</td>
<td>PCR PID</td>
</tr>
<tr>
<td>MPEG4 Video PID</td>
<td>MPEG4 Video PID</td>
</tr>
<tr>
<td>MPEG1 Audio PID</td>
<td>MPEG1 Audio PID</td>
</tr>
</tbody>
</table>

**Explanations:**

- **Locked**: To check input IP lock or not, green means current IP is locked
- **Overflow**: To check current TS overflow or not, a red color means current TS overflow, so you need to reduce the amount of TV services for this TS
- **PID Remap**: To enable/disable the PID remapping – almost not necessary
- **Refresh Input**: To refresh the input program information
- **Refresh Output**: To refresh the output program information
- **Select one input program first and click this button to transfer the selected program to the right box to output.**
- **Select all input programs**

**Time limitation of parsing input programs**
**TS Config → PID Bypass:**

From the TS Config menu on the upper side of the webpage, clicking “PID Bypass” displays the interface as Figure-7 where user can add PIDs to be passed, click the “+” symbol, input current IP channel number, then input current IP source PID and output PID which is configurable according to your needs, then click “set”

![TS Config Interface](image)

**Parameters → IP Stream:**

This encoder supports TS to output in IP (8 / 12 / 16 / 20 / 24 SPTS and/or 1 MPTS) format through the DATA1 and DATA2 port.

Selecting ‘IP Stream’, will display the interface where to set IP out parameters for the MPTS and several SPTS. The amount of shown SPTS in this menu depends from the MPTS assigned ones:

![IP Stream Interface](image)

As soon as the Input encoded services have been pushed to the output, the SPTS stream addresses are defined by default with address and port numbers which can of course modified to your local needs later.
Each Stream can be modified here:

Enable/disable, IP address, port number, Bitrate (CBR maximum), select UDP or RTP transport protocol, Packet length (7=OK), Null Packet filter (PID 8191 in DVB/MPEG standard). This should be selected to send VBR streams to the IPTV world.

Attention: EMU-8524 difference: Only SPTS or MPTS selectable by Firmware.
Parameters → OSD On Screen Display as Overlay:

Selecting ‘OSD’, will show the interface to configure the OSD parameters.

Select to configure logo, TEXT=Caption or a QRCode

Choose the program 1/2/3/4 of Module 1/2/3 to apply the logo insertion, or you can select “all” to apply all programs and all modules.

Browse and select the Logo which has been created.

Put your logo everywhere.

Select the text color and background color.

Enter your text here.

Put your caption anywhere.

Important Note: Currently this text-insertion can be only configured if you are using the FireFox browser.
Remark: It might be, that the text-insertion (marquee function - Laufschrift) cannot be set to upper left corner because of different formats: 720/1080. Play a little with the settings…

System → Network:

Selecting ‘Network’, it will display the interface to set network parameters.

DATA 1 = GbEthernet, DATA2 100BaseT can be selected for the Stream outputs. The settings can be done independently. Do not forget to take them by APPLY.

System → password

From the left menu, selecting “Password” display the screen where you can set the login account and password for the web NMS. Be careful, not to lose the user/PW combination otherwise you are not able to login later and need to RESET the unit by the front panel button (press > 15 sec)
to the factory defaults.

System → Configuration:
From the menu on left side of the webpage, click “Configuration” will display the sub menu where to save/restore/factory setting/backup/load your configurations.

System → Firmware:
Selecting “Firmware”, will display the screen where to update firmware for the modulator.

Example: Usually there are 3 Files to update:
1) SOMETHING _-----_.--_ Encoder_ARM_1.76-00----_201707102004.pkg:
   Please upgrade it on firmware page by selecting "Host" option.

2) SOMETHING_ENCODER_12_Ver1.4_20170629_0923.bin:
   Please upgrade it on firmware page by selecting "Host" option.

3) DX224S_Encoder_v1.33.enc:
   Please upgrade it on firmware page by selecting "All Mod" option.

You can upgrade them without considering a special sequence.

1): unrar/unzip the files first
FIRMWARE

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

Current Software Version: 1.73H Build 153.01 Apr 27 2017
Current Hardware Version: 1.2.0.0.0
step 1: select type:
step 2: select file:

Please select the right file.

Upgrade

UPGRADE!

confirm

firmware upgrade, please wait...

please manual reboot the device. succeed mod: 1 2 — failed mod:

2) next file:
Warning:
1. Upgrade firmware.
   If you want to keep the current firmware, please choose the option to keep the current firmware.
2. Upgrade will keep the current configuration, otherwise the device will not be configured.
3. After upgrade, you need to restart the device.

Current Software Version: 1.73H Build 153.01 Apr 27 2017
Current Hardware Version: 1.2.0.0.0
step 1: select type: Host
step 2: select file: NDS3542K_NDS3542

firmware upgrade, please wait...

Current Software Version: 1.73H Build 153.01 Apr 27 2017
Current Hardware Version: 1.2.0.0.0
step 1: select type: Host
step 2: select file: NDS3542K_NDS3542

Upgrade success, please manual reboot the device.

last:
Before:

After upgrading the System, the overview shows the new version:

NOW REBOOT by ON-OFF-ON Switch at the rear panel. But wait a few seconds before switching ON again.
System → Date/Time:
Selecting “Date/Time” will show the menu to set date and time and NTP options for the device:

![Date/Time Menu](image)

System → Log:
Selecting “Log” will show the log interface to check or export the Kernel/System log:

![Log Interface](image)
Chapter 4 Troubleshooting

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

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.

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.

No part of this publication may be reproduced in any form or by any means or used to make any derivative work (such as translation, transformation or adaptation) without the written permission from Blankom / IRENIS GmbH.

IRENIS GmbH reserves the right to revise this publication and make changes in its content from time to time, whereby it shall not be obligatory for IRENIS GmbH to provide notification of such revision or change.

IRENIS GmbH provides this manual without warranty of any kind, neither implied nor expressed, this includes also any warranties regarding the merchantability and fitness for a particular purpose. IRENIS GmbH may improve this manual or make changes in the products described herein at any point of time.

Installation Notes
All types of the IRENIS-BLANKOM family are 19” devices with 1 RU height designed for installation in 19” racks. In addition to the front panel screws an internal module support is required at the rack. Depending on the Frontend used and the operating adjustments, the RF-input port carries DC Voltage (13V /18V, max. 400 mA).

By connecting a mains cable, the device can become functional without any auxiliary appliances. The power supply units are designed for the wide range of 100-230V AC; a manual adjustment of the voltage is not necessary.

For some models the second power connector is feeding another independent power supply for internal redundancy. For a maximum of redundancy both power supplies should use different circuits. All the outputs are decoupled from one another. Thus, the circuit does not have any effect on the functioning of the device. Connections that are not required need not to be terminated.

**Suggestion:** CAT 6E Ethernet cable for GbEthernet

**Note:**

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

IPv4 administrative scope sessions using administratively scoped IP multicast. The multicast address to be used for announcements is the highest multicast address in the relevant administrative scope zone.

For example, if the scope range is 239.16.32.0 - 239.16.33.255, then 239.16.33.255 is used for SAP Announcements.

**Recommendations:**

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:
General notes about Streams:

Multicast 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

Available Formats

Registries included below

- Local Network Control Block (224.0.0.0 - 224.0.0.255 (224.0.0/24))
- Internetwork Control Block (224.0.1.0 - 224.0.1.255 (224.0.1/24))
- AD-HOC Block I (224.0.2.0 - 224.0.255.255)
- RESERVED (224.1.0.0-224.1.255.255 (224.1/16))
- SDP/SAP Block (224.2.0.0-224.2.255.255 (224.2/16))
- AD-HOC Block II (224.3.0.0-224.4.255.255 (224.3/16, 224.4/16))
- RESERVED (224.5.0.0-224.251.255.255 (251 /16s))
- DIS Transient Groups 224.252.0.0-224.255.255.255 (224.252/14))
- RESERVED (225.0.0.0-231.255.255.255 (7 /8s))
- Source-Specific Multicast Block (232.0.0.0-232.255.255.255 (232/8))
- GLOP Block
- AD-HOC Block III (233.252.0.0-233.255.255.255 (233.252/14))
- Unicast-Prefix-based IPv4 Multicast Addresses
- Scoped Multicast Ranges
- Relative Addresses used with Scoped Multicast Addresses
Multicast (as opposed to unicast) is used to send UDP packets from 1 source to multiple destination servers. This is useful for example for streaming from a satellite/DVB-T receiver to multiple receiving PCs for playback. Multicast can also be used on the output of an encoder to feed multiple streaming servers. Multicast only works with UDP and is not possible with TCP due to the 2 way nature of TCP, most commonly multicast is used with RTP and MPEG2-TS.

A multicast IP address must be chosen according to IANA information, we recommend using an address in the range 239.0.0.0 to 239.255.255.255 as this is reserved for private use. Using multicast addresses in the 224.0.0.0 range may clash with existing services and cause your stream to fail. For more details see http://www.iana.org/assignments/multicast-addresses/multicast-addresses.xml
Choosing a UDP port number for multicast streams is also important. Even if you use a different multicast IP for each of your streams, we strongly recommend using different UDP port numbers as well. This is because a server and all software running on the server receives ALL multicast traffic on an open port and extra processing is required to filter out the required traffic. If the each stream arrives on a different port, the server can safely ignore any traffic on ports that are not open. Port numbers MUST be chosen so that don't clash with any existing services or ephemeral ranges. The ephemeral range for Windows Vista, 7, 2008 is 49152 to 65535, for older Windows it is 1025 to 5000 and for Linux it is 32768 to 61000. For more information on Windows see http://support.microsoft.com/kb/929851 Care should also be taken to avoid system ports 0 to 1024. See http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml Generally one of the unassigned You 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 you or registered ports, and ports with numbers 49152-65535 are called dynamic and/or private ports.[2] Both system and you 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 – you 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]

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.

Packet structure

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

<table>
<thead>
<tr>
<th>Source port</th>
<th>Destination port</th>
<th>Length</th>
<th>Checksum</th>
</tr>
</thead>
</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.

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.

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).

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.
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.

We assume, that this professional unit is used by professional technicians knowing all relevant norms, regulations, abbreviations (i.e. DVB, ATSC, ...) and specifications.

Chapter 5 Packing List

MPEG4 HD IP Encoder 1 pcs
User Manual 1 pcs
Power Cord (depending on Country) 1 pcs
some HDMI Cables

Contact:

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

Managing Director: Dipl.Ing. Murad Önom
Commercial Register: HRB 206370 / District Court Hildesheim
Web: www.blankom.de  E-Mail: info@blankom.de