User Manual

ez-Caster EN8
8CH HD Video over IP Encoder

H.264 HD Encoder

ez-Caster EN8 – HDMI-IP H.264 Encoder Manual

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Installation Precautions

This page states the safety measures the users must take to avoid circumstances where the system may occur physical damages or injuries. Please THOROUGHLY go over this page before the system installation/operation.

General Precautions

- Maintain dust FREE condition during and after System Installation/Operation.
- Please place the system cover in a safe location when opened.
- Securely stow tools and cables away from the passages.
- Avoid wearing loosened clothes or accessories during installation/Operation.
- Avoid any unnecessary actions that may damage/harm system or personnel.
- Do NOT open the system unless advised by Lumantek representative. Lumantek takes no responsibility on units with broken RMA seals.

Power Precautions

- Please check cable overload before connecting the system to the power supply.
- Avoid wearing metal accessories (Rings, Earrings) connecting system to the power source.
- Avoid operating on wet floors. Make sure power extension cables, floors, and instruments are grounded and in a safe operating condition.

- Please discharge static electricity by touching grounding metals before starting hardware installation.
- The grounding parts must be disassembled last.
- Manufacture takes no responsibilities on Direct/Indirect losses or damages due to use of inappropriate parts or services by unauthorized service provider
- Supplying power during the system installation may cause damages to the system and personnel.

AC Power Precautions

- This unit utilizes AC power, the cord comes with a grounding function.
- Please connect the system to the power socket with groundings.
- Use Green/Yellow 0.75mm2 (18AWG) or higher grade grounding cables.
- Do NOT block power sockets with tools or boxes. Please keep it clear at all times.

Contents

ez-Caster EN8 – 8CH H.264 Video-IP Encoder

H.264 8CH HD Encoder

1. Introduction

ez-Caster EN8 is 8 channels H.264 HD Encoder. It consists of HDMI inputs and IP output. it supports H.264 Video compression and MPEG-1 Layer2, MPEG-2 AAC,MPEG-4 AAC for Audio compression.

2. System Specification

TS MUX/ System	System Delay Normal mode : 150ms + (300ms/500ms/1000ms) Low latency mode : 120ms TS Bit-rate : 4 ~ 20 Mbps
Video Encoder	Support Input Resolutions - 1920x1080@60i/59i/50i/30p/29p/25p/24p/23p - 1280x720@60p/59p/50p - 720x480@60i/59i - 720x576@50i Automatic Resolution Detection Support for resolution conversion (refer to Appendix #A) Video bit rate: 3.5~18 Mbps. TS ID, PMT/PCR/VIDEO/AUDIO PID modifiable Profile : HD (HP@L4)/ SD(HP@L3) Advanced Settings(option) Support GOP structure setting (refer to Appendix #B): Normal mode/Low latency mode configuration CPB Delay (300ms/500ms/1000ms) configuration
Audio Encoder	MPEG1 Layer II Stereo Encoder Output bit rate: 64/96/112/128/160/192/224/256/320/384 Kbps Encoding sample rates: 48KHz MPEG2 AAC, MPEG4 AAC Output bit rate(LC): 48 ~512 Kbps Audio sample rate: 48KHz
TS over IP Output	• Ethernet 1000Base-T • Connector: RJ-45 • Streaming Protocol : MPEG2-TS/UDP • Transport Protocol : UDP, Unicast or Multicast • Unicast, Multicast
Management	• Windows Application (NMS) • Ethernet 10Base-T/100Base-TX • Support USB 2.0
Physical	• Dimension: 45(H) X 420(W) X 290(D) (excluding connectors) • Temperature: 0~45℃ • Weight:2.1Kg • Power Consumption: 30W(max.)

# 3. Product description

3.1. Product Parts Name

< ez-Caster EN8 Main frame – Front>
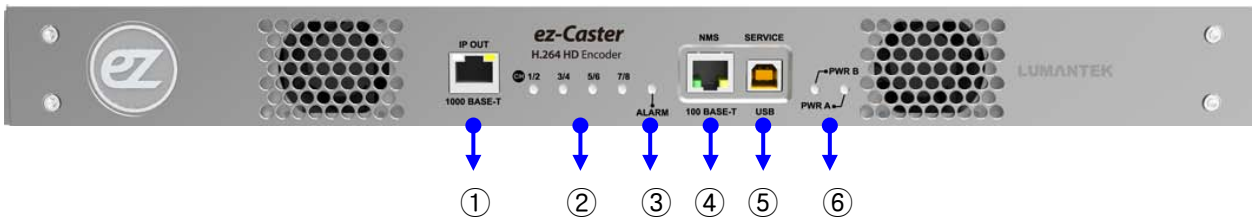
① IP OUT : H.264 IP Output LAN Port (1000Base-T full-duplex).

② LINK LED : Ch1/Ch2, Ch3/Ch4, Ch5/Ch6, Ch7/Ch8 State LED.

③ ALARM LED : light up when problem occurs.

④ NMS : LAN port for device control (10BaseT/100BaseTX half/full duplex).

⑤ SERVICE : Port for firmware update (USB2.0).

⑥ PWR LED : POWER LED(PWR A/PWR B).

< ez-Caster EN8 Main frame – Rear >
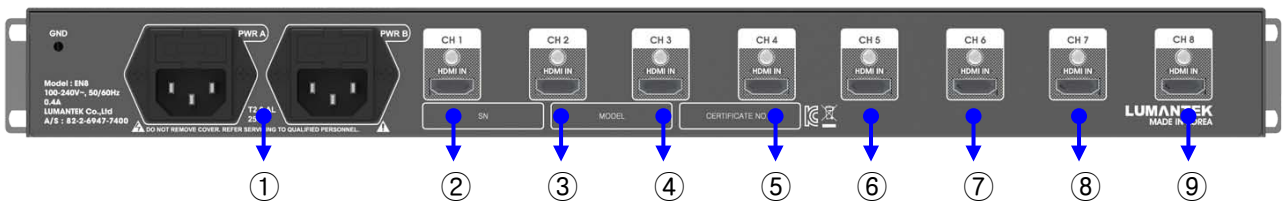
① PWR A, PWR B : Redundancy power

② CH1 : HDMI Input 1

③ CH2 : HDMI Input 2

④ CH3 : HDMI Input 3

⑤ CH4 : HDMI Input 4

⑥ CH5 : HDMI Input 5

⑦ CH6 : HDMI Input 6

⑧ CH7 : HDMI Input 7

⑨ CH8 : HDMI Input 8

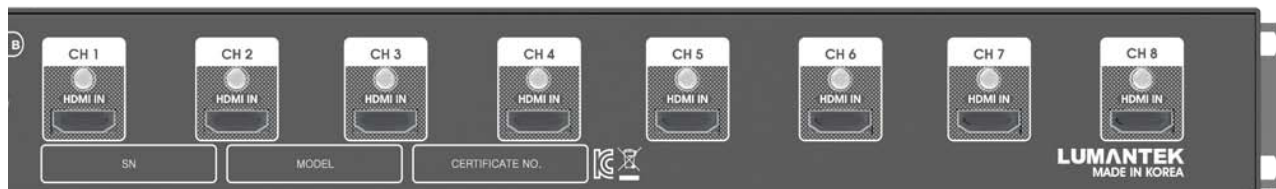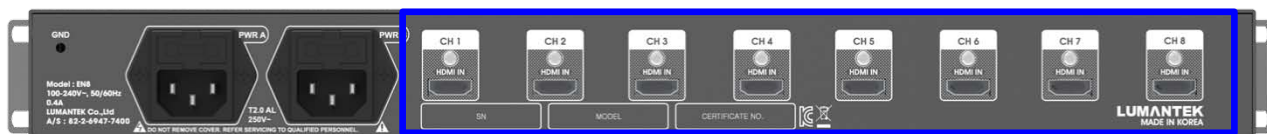## 3.2. Components

This product is composed of followings

① ez-Caster EN8 Main Frame.
② AC Power Cord : 220V AC Power Cord.

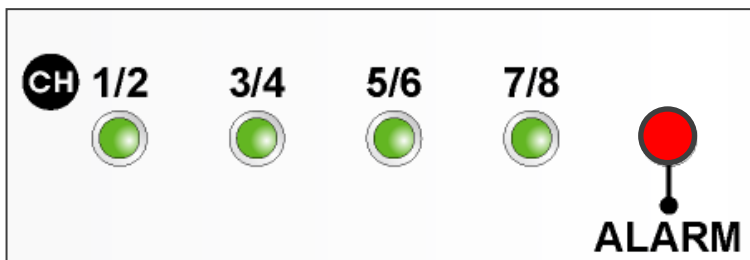ez-Caster EN8 Main Frame

AC power cord

4. Product Operation

4.1. Status LED

Normal, Status LED is GREEN and RED indicate Alarm.

CH 1/2 LED - indicates LAN active Status of CH1 and CH2.

CH 3/4 LED - indicates LAN active Status of CH3 and CH4.

CH 5/6 LED - indicates LAN active Status of CH5 and CH6.

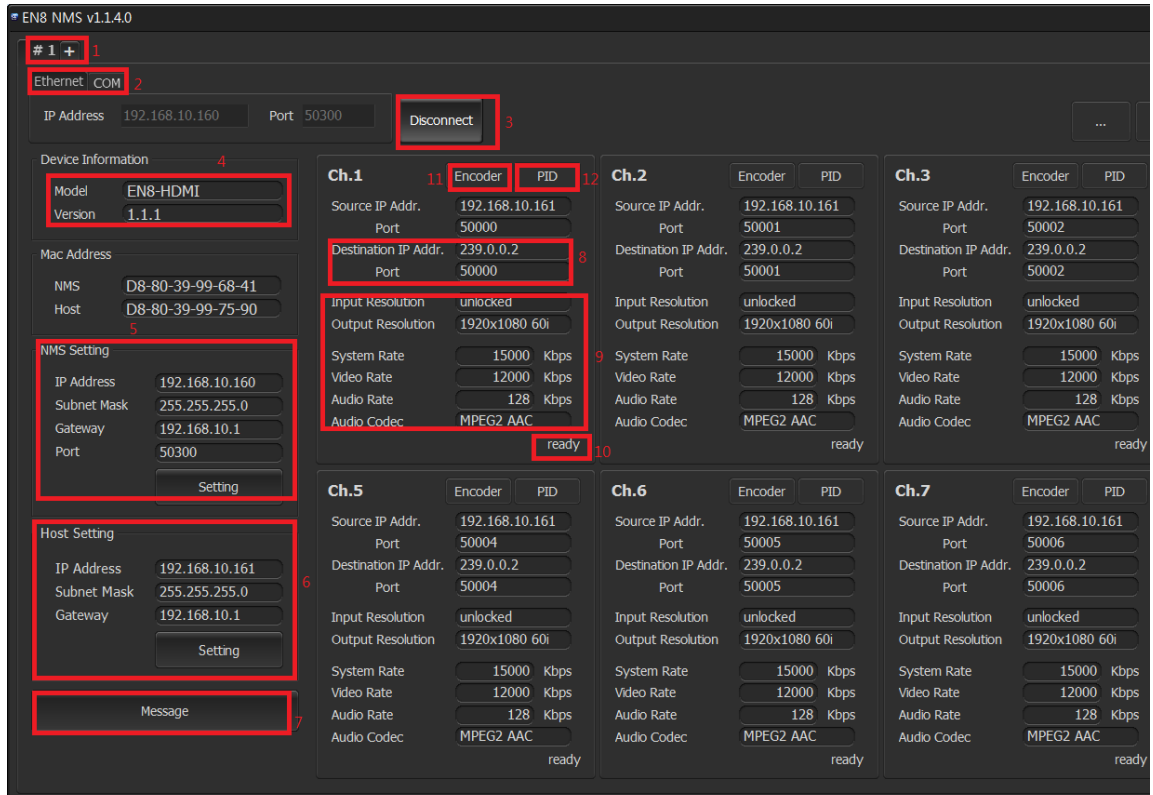CH 7/8 LED - indicates LAN active Status of CH7 and CH8.

ALARM - indicates internal error.

* Note: it will flash during firmware upgrade.

4.2. NMS control

Execute NMS software to connect the device and change the setting. (Further information and operation will be added later)

1) UI Description

① Device selection, using "+" user can add device..
② Select connection method(Ethernet / COM port, refer to 2-2 NMS connection method)
③ Connection button (Connect/Disconnect toggles depending on connection status)
④ Display EN8 model number and firmware version
⑤ EN8 NMS IP configuration
⑥ Source setting for UDP when it Streaming
⑦ Check message of EN8 (only work when it is connected through COM)
⑧ Destination for Streaming IP information
⑨ Encoder information
⑩ Encoder status (wait, ready, play)
⑪ Encoder setting button
⑫ PID setting button

2) NMS Connection

• COM port(USB) connection
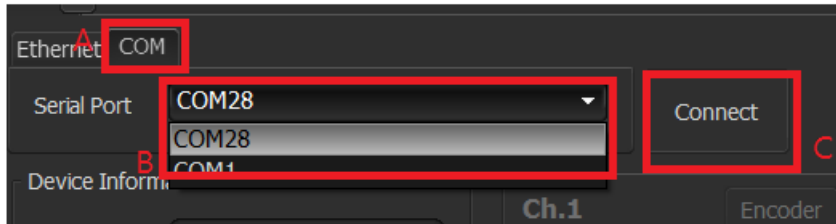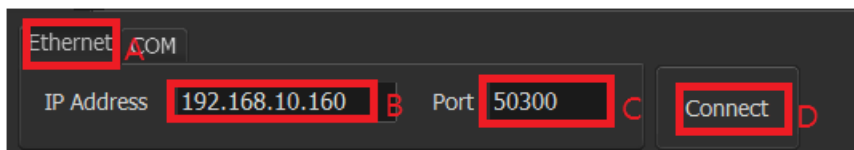

① Connect PC and EN8 by USB cable
② On Connection Tab click COM(A).
③ Chose available Com port from drop box (B).
④ Click Connect(C).

※ When user connecting to EN8 for the first time, user may need to to set NMS IP.
Using COM port to connect and then set NMS IP. Afterward use Ethernet port.
※ in order to connect COM port , CDM v2.12.06 WHQL Certified.exe must be installed.
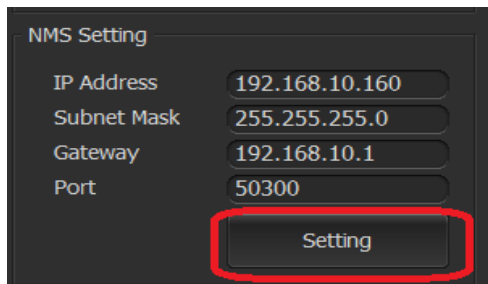
• Connect by Ethernet

① Connect Lan cable to NMS, PC and EN8 have to be in same Network.
② Click Ethernet TAB (A).
③ Enter the NMS IP Address (B) and port(C) for EN8.
④ Click Connect (D) button to connect.

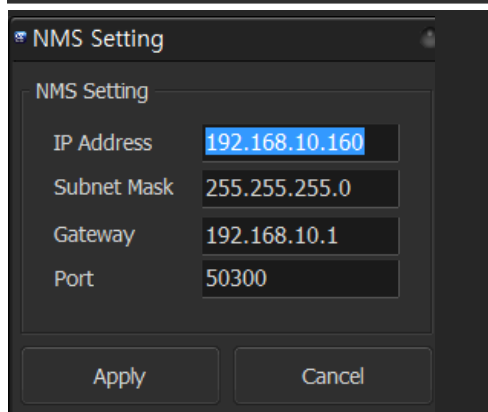※ default settings of NMS IP Address is 192.168.10.160, and Port 50300.

3) EN8 IP Setting

• EN8 IP setting
　　① NMS Setting : EN8 NMS socket setting for Window NMS Program

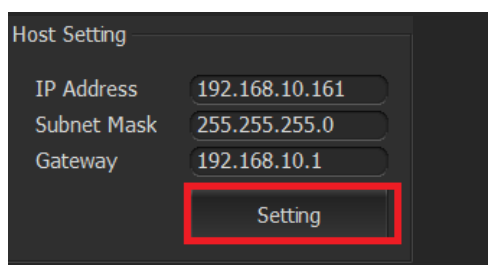Press "Setting" Button in the NMS Setting section.

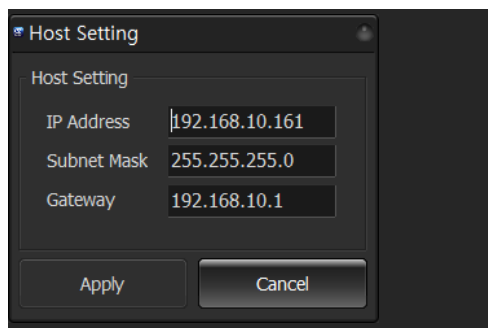Enter setting value of EN8 NMS socket and press "Apply".

※ 1. EN8 does not support DHCP, so be careful not to collide IP addresses.
※ 2. Default NMS socket value showing on the Picture.

　　② Host setting : EN8 streaming socket

Press "Setting" in the Host Setting section.

Press "Apply" after entering Streaming socket information of EN8.

※ Setting for Port each channel.

• Above IP Address were already set in previous "Host setting" therefore it can not be change in this section.

• Source port for each channel.

※ Refer to "Destination setting" for setting issue of streaming source.

• Destination Setting :

• Set for each channel's IP and Port value for destination of streaming data.

Click the encoder button of the channel you want to set.

Enter Destination IP Address and Port and then press "Apply".

※ Make sure that Destination IP address or port are different for each channels.
- Need to set the IP differently, or set the Port for a different value.

4) Encoder setting for each channel.
※ After changing the Encoder setting on the NMS, it takes 10 seconds for the EN8 to be actually applied. Therefore we recommend user to set all other settings and NMS change in the end. (IP related settings are applied immediately)

A) Basic information
    A: Model
    B: Encoder firmware version
    C: Detected Input

B) Output Resolution Setting

Ch.7 Encoder Setting

Encoder Info

Model: EN8-HDMI   Firmware Version: 1.0.2
HDMI Input State: 1920x1080 60i

IP Setting

Source IP Address: 192.168.10.161   Port: 50006
Destination IP Address: 239.0.0.2   Port: 50001

Encoder Setting

Output Resolution: 1920x1080 60i

- 1920x1080 60i
- 1920x1080 30p
- 1280x720 30p
- 720x480 60i

System Rate: (4000   )

Audio Rate: (48~512 Kbps, Recommand : 128 Kbps)

Encoder Mode: Normal Mode

GOP Size: 15 (6~63)   GOP Adaptive: 3
GOP Structure: I Br B B P   CPB Delay: 0.3 sec

Apply   Cancel

- Clicking on "Output Resolution" drop box, it will display list of the resolutions that can be output from the detected input. (refer to Appendix A)
- If user do not specified the output resolution, the output resolution will follow default resolution. The default values are set according to the following rules:

a. If previously set "Output Resolution" was the resolution that can be output from the current input resolution. It will be automatically set as output resolution.
b. If previously set "Output Resolution" was not resolution that can be output from current input resolution. It will be automatically set both input and output same resolution.

C) Bit-rate Setting

A: Entire bit-rate of TS
B: Video rate(ES standard)
C: Audio rate(ES standard)
- Please refer to Appendix C for configurable Audio codec.

※ A > B + C must be satisfied, B and C are ES standard whereas A is TS standard. Therefore A should be set a little bit more value for the margin.

D) Encoder Mode Setting

Set the delay mode between the Encoder input and output.

- Normal mode: default mode, Delay is controlled by CPB Delay(Refer to CPB Delay Setting).

- Low Delay Mode: there are few constrains but this mode is minimum latency.

E) GOP setting

- GOP Size value should be set between 6~63.
- When GOP Adaptive value is 0

  If GOP Structure is IBBP or IPPP then the GOP Size should be a multiple of 3.

  If GOP Structure is IBP, then the GOP Size should be a multiple of 2.

  If GOP Structure is IBrBBP, then the GOP Size should be a multiple of 4.
- When GOP Adaptive is 2

  GOP Structure can only select IBrBBP and the actual output GOP size of the stream is
  maintained at a value of +/-3 from the input value.
- When GOP Adaptive is 3

  GOP Structure can only select IBrBBP and the actual output GOP size of the stream is
  maintained at a value of +3 from the input value.

- Default value of GOP Size=15, GOP Adaptive=3, GOP Structure= I Br B B P.
- If GOP Adaptive is not 0, GOP Size may not be a multiple of 4.
- It can not be set in Low Delay mode.
- For more detailed information please refer to Appendix B

F) CPB Delay Setting
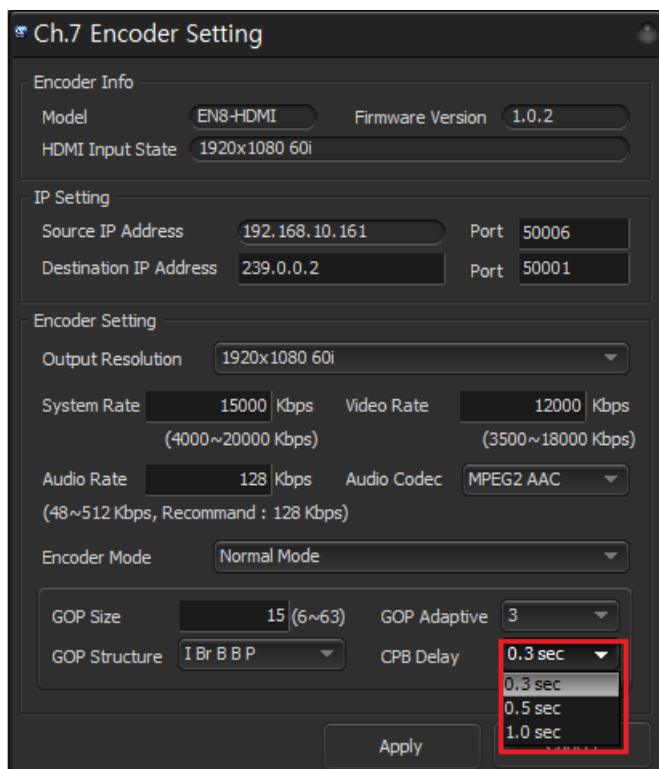
- Set the CPB (Coded Picture Buffer) Delay.
- Lower the value, lower the system delay and higher the value, the better the picture quality.
- Default value is 1.0second.
- Can not be set in Low Delay Mode.

APPENDIX

#A. Supported input and output resolutions
59.94, 29 => 29.97, 23 => 23.98

Input	Output / Frame rate	1920x1080								1280x720								720x480		720x576
		60i	59i	30p	29p	24p	23p	50i	25p	60p	59p	30p	29p	24p	23p	50p	25p	60i	59i	50i
1920x1080	60i	o	-	o	-	-	-	-	-	-	-	o	-	-	-	-	-	o	-	-
	59i	-	o	-	o	-	-	-	-	-	-	-	o	-	-	-	-	-	o	-
	30p	-	-	o	-	-	-	-	-	-	-	o	-	-	-	-	-	-	-	-
	29p	-	-	-	o	-	-	-	-	-	-	-	o	-	-	-	-	-	-	-
	24p	-	-	-	-	o	-	-	-	-	-	-	-	o	-	-	-	-	-	-
	23p	-	-	-	-	-	o	-	-	-	-	-	-	-	o	-	-	-	-	-
	50i	-	-	-	-	-	-	o	-	-	-	-	-	-	-	-	o	-	-	o
	25p	-	-	-	-	-	-	-	o	-	-	-	-	-	-	o	-	-	-	-
1280x720	60p	-	-	-	-	-	-	-	-	o	-	-	-	-	-	-	-	-	-	-
	59p	-	-	-	-	-	-	-	-	-	o	-	-	-	-	-	-	-	-	-
	50p	-	-	-	-	-	-	-	-	-	-	-	-	-	o	-	-	-	-	o
720x480	60i	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	-	-
	59i	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o	-
720x576	50i	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	o

#B. GOP Structure

- Frame Type

I-Frame	- Construction of a single complete image without using prediction. - The best quality picture, but the largest capacity (file size).
P-Frame	- Use Forward Prediction. - Contains the data of the part where the change occurred in previous I-frame or P-frame. -if referred I-Frame or P-Frame data is lost then this P-frame data is lost too. - The image quality is lower than [I-Frame]but capacity is smaller than I-Frame.
B-Frame	- Use bidirectional prediction. - Referred previous I-Frame and subsequent P-Frame or previous P-Frame and subsequent P-Frame. - Loss together with referred Frame data. - The most degraded image quality but the smallest capacity.

- What is GOP (Group of Picture)
  Assemblage of a Key Frame (I-Frame) to next key frame.

  ex) GOP Structure : I B B P, GOP size = 15

  I B B P B B P B B P B B P B B P I… Frames are repeated in this form.
  Generally, when GOP size increased resulted in increase of B-Frame. Consequently, image quality deteriorated but the size/capacity can be reduced. On the other hand, if GOP size reduced then B-Frame reduced and resulted in improvement on quality of image but the capacity(file size) increases. However, if the transmission bandwidth is small, reducing the GOP size may deteriorate the picture quality.

#C. Audio Codec and Rate

MPEG-1 Audio Layer2	64, 96, 112, 128,b160, 192, 224, 256, 320, 384 (Kbps) Default value : 128 Kbps
MPEG-2 AAC / MPEG-4 AAC	48~512(kbps) Default value: 128 Kbps