LIGHTNING

SPECIFICATIONS

iMAG SYSTEMS

Table of Contents

1 Introduction

1.1 Overview

iMAGsystems LIGHTNING LZ1501E / LZ1502D series Encoders and Decoders provide the flexible, powerful, and scalable solution at resolutions up to 4096x2160@60Hz, 3840x2160@60Hz (4:4:4) and 3840x2160@60Hz (4:2:0 10-bit HDR).

They allow uncompressed UHD media to be switched and distributed over standard 10GbE Ethernet networks. A local area network is covered with a range up to 300m over fibre optic cable, up to 100m over a single Cat 6a cable or above. Standard features like, bi-directional serial, bi-directional IR, and independent analog audio input/output are included. LZ1501E / LZ1502D allow USB extension to take place to control keyboards, mouse, webcams, flash drives, speakers, microphones, and other USB devices. They are the perfect solution for any zero-frame latency and signal routing applications.

Common applications include classrooms, conference rooms, performing arts, and broadcasts.

1.2 Features

- Powerful DIRECTOR software running on a dedicated LZ500DS/LZ550DS Intel NUC system controller
- HDMI 2.0 and HDCP 2.2 compliant
- Lossless distribution of most timing formats
- Light compression when the raw data rate exceeds the 10Gb Ethernet bandwidth
- Fan-less heat radiation structure
- Supports input and output resolutions up to 4096x2160@60Hz, 3840x2160@60Hz (4:4:4) and 3840x2160@60Hz (4:2:0 10-bit HDR)
- Zero frame latency
- Supports point to point transmission, distance up to 100m with a 4K signal
- Supports point to multiple, multiple to multiple mode via 10GbE Ethernet Switch
- Instant and seamless switch between Non-HDCP and same timing sources
- Video wall capabilities with bezel compensation
- Multiview capabilities of displaying up to 32 individual video streams on a single Decoder
- With independent analog audio input and output at 2-channels, 24-bits@48KHz/channel
- Supports Bi-directional IR or IR commands sent from the API
- Supports Bi-directional RS232 or RS232 commands sent from the API
- With 1GbE auto sensing port, for PC control, upgrading and so on
- USB 2.0 for routing of keyboard, mouse and other USB devices
- Bandwidth needed: 4K signal at about 6~8 Gbps, 1080P signal at about 1.485 Gbps

Note:

All the descriptions, specifications, illustrations and pictures in this document are subject to change without notice.

2 Specifications

2.1 Encoder LZ1501E

Technical Specifications	
VIDEO	
Input	1 × HDMI, 1x DisplayPort
Input Signal Type	HDMI 2.0 with HDCP 2.2 (HDCP in output follows input)
Supported Resolutions	**Up to UltraHD 4K x 2K 50/60 Hz, RGB/YCbCr with 4:4:4-pixel encoding** 640×480^8, 800×600^8, 1024×768^8, 1280×1024^8, 1360×768^8, 1440×900^8, 1440×1050^8, 1600×1200^8, 720×480^7(480i59), 720×480^7(480p59), 720×576^6(576i50), 720×576^6(576p50), 1280×720^5(720p50), 1280×720^7(720p59), 1280×720^8(720p60), 1920×1080^6(1080i50), 1920×1080^7(1080i59), 1920×1080^8(1080i60), 1920×1080^1(1080p23), 1920×1080^2(1080p24), 1920×1080^3(1080p25), 1920×1080^4(1080p29), 1920×1080^5(1080p30), 1920×1080^6(1080p50), 1920×1080^7(1080p59), 1920×1080^8(1080p60), 3840×2160^1(2160p23), 3840×2160^2(2160p24), 3840×2160^3(2160p25), 3840×2160^4(2160p29), 3840×2160^5(2160p30), 3840×2160^6(2160p50), 3840×2160^8(2160p60), 4096×2160^5, 4096×2160^8 ^{1}=23.98Hz, ^{2}=24Hz, ^{3}=25Hz, ^{4}=29.97Hz, ^{5}=30Hz, ^{6}=50Hz, ^{7}=59.94Hz, ^{8}=60Hz
Pixel Clock	594MHz
EDID	EDID is stored on the Encoder and can be set from any Decoder
Latency	• Sync <0.03 ms (uncompressed) <0.12 ms (compressed) • Sync_scale ¼ frame • Fast 1-2 frames • Video Wall 1 frame • Multiview 1-2 frames
Bandwidth	• 1080P 60Hz/4:4:4/24bit ≈ 3.564Gbps • 4K 30Hz/4:4:4/24bit ≈ 7.128Gbps
AUDIO	
Inputs	Embedded HDMI or Analog 3.5mm phono connector
Support audio format	Stereo
CONTROL	
RS232	1x Bi-Directional 4pin Phoenix connector
USB	1x USB 2.0 type B HOST
Ethernet	Audio/Video: 1x 10 Gigabit RJ45 LAN: 1x Gigabit RJ45
Ethernet Cable Length	100 Meters maximum with CAT6A (point-to-point / point-to-switch)
GENERAL	
Operating Temperature	0 to + 40°C (32 to + 104 °F)
Storage Temperature	-20 to +70°C (-4 to + 140 °F)
Humidity	10% to 90%, noncondensing
Power Supply	12 VDC 3 A
Power Consumption	15.24 W
Dimensions	230mm(L) x 139mm(D) x 35mm(H) with mounting 264mm(L) x 139mm(D) x 45mm(H)
Weight	1.28 kg (2.82 lb)
Certification	CE, RoHS compliant

2.2 Decoder LZ1502D

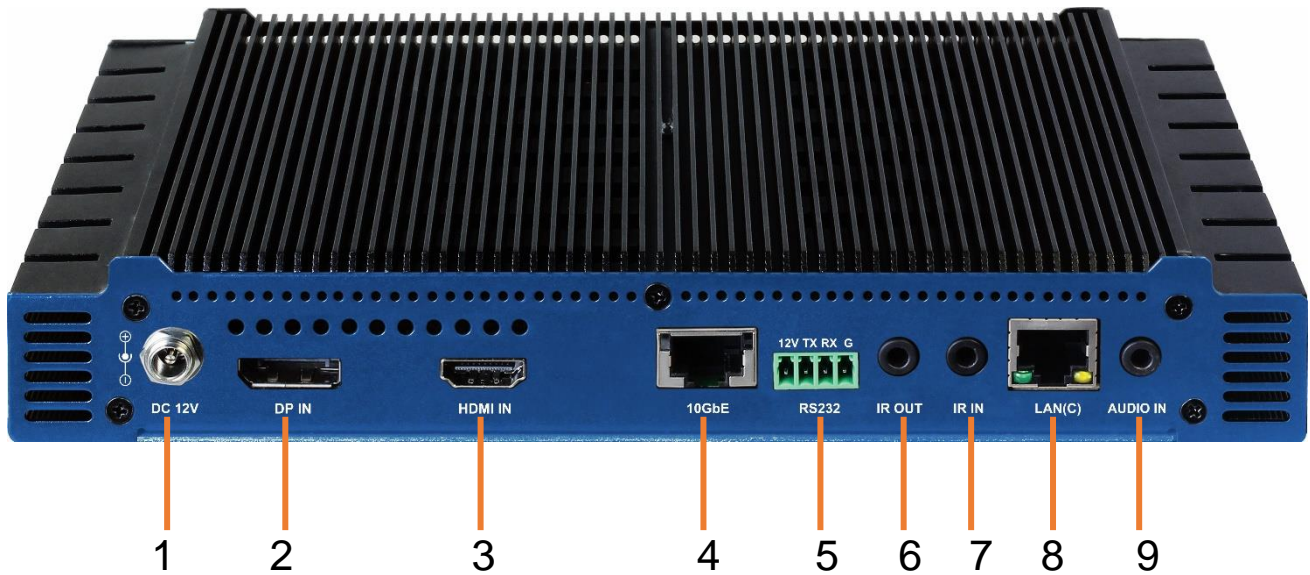| Technical Specifications	
VIDEO	
Output	1 × HDMI
Output Signal Type	HDMI 2.0
Supported Resolutions	**Up to UltraHD 4K x 2K 50/60 Hz, RGB/YCbCr with 4:4:4-pixel encoding** 640x480^8, 800x600^8, 1024x768^8, 1280x1024^8, 1360x768^8, 1440x900^8, 1440x1050^8, 1600x1200^8, 720x480^7(480i59), 720x480^7(480p59), 720x576^6(576i50), 720x576^6(576p50), 1280x720^5(720p50), 1280x720^7(720p59), 1280x720^8(720p60), 1920x1080^6(1080i50), 1920x1080^7(1080i59), 1920x1080^8(1080i60), 1920x1080^1(1080p23), 1920x1080^2(1080p24), 1920x1080^3(1080p25), 1920x1080^4(1080p29), 1920x1080^5(1080p30), 1920x1080^6(1080p50), 1920x1080^7(1080p59), 1920x1080^8(1080p60), 3840x2160^1(2160p23), 3840x2160^2(2160p24), 3840x2160^3(2160p25), 3840x2160^4(2160p29), 3840x2160^5(2160p30), 3840x2160^6(2160p50), 3840x2160^8(2160p60), 4096x2160^5, 4096x2160^8 ^{1}=23.98Hz, ^{2}=24Hz, ^{3}=25Hz, ^{4}=29.97Hz, ^{5}=30Hz, ^{6}=50Hz, ^{7}=59.94Hz, ^{8}=60Hz
AUDIO	
Outputs	Embedded HDMI or Analog 3.5mm phono connector
Support audio format	Stereo
CONTROL	
RS232	1x Bi-Directional 4pin Phoenix connector
USB	2x USB 2.0 type A (mouse keyboard)
Ethernet	Audio/Video: 1x 10 Gigabit RJ45 LAN: 1x Gigabit RJ45
Ethernet Cable Length	100 Meters maximum with CAT6A (point-to-point / point-to-switch)
GENERAL	
Operating Temperature	0 to + 40°C (32 to + 104 °F)
Storage Temperature	-20 to +70°C (-4 to + 140 °F)
Humidity	10% to 90%, noncondensing
Power Supply	12 VDC 3 A
Power Consumption	19.84 W
Dimensions	230mm(L) x 139mm(D) x 35mm(H) with mounting 264mm(L) x 139mm(D) x 45mm(H)
Weight	1.28 kg (2.82 lb)
Certification	CE, RoHS compliant

3 Panel Description

3.1 Encoder LZ1501E

3.1.1 Front Panel

No.	Indicator/Button	Description
1	USB Host Port	Connect this port to a host computer using a USB standard-B cable
2	LINK TX indicator	**Off:** not sending data **Blinking:** sending data
3	LINK RX indicator	**On:** processing the video signal but not receiving any data **Off:** not receiving any data **Blinking:** receiving data and processing the video signal
4	VIDEO indicator	**On:** A stable video signal is detected **Off:** No stable video signal is detected
5	POWER indicator	**On:** when LZ1501E is powered on
6	RESET button	Restore to factory defaults Hold button while applying power until front panel LED's start to flash
7	ID button	Reserved for future version

3.1.2 Rear Panel

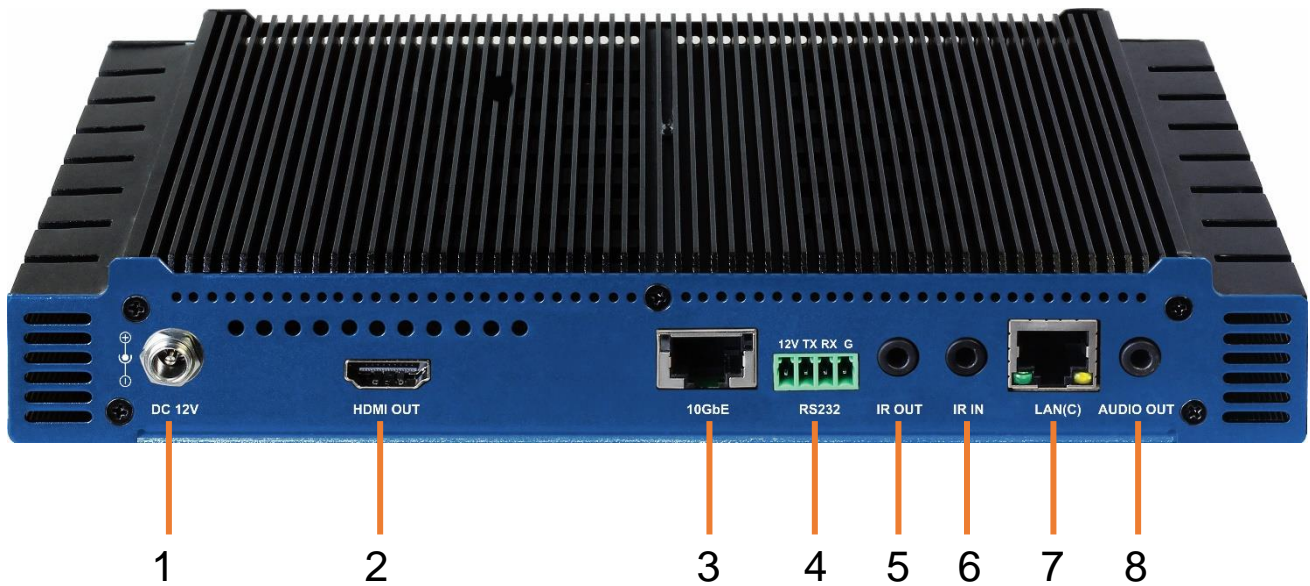| No.	Ports	Description
1	DC 12V	Connects to a power supply, DC 12V 3A
2	DP IN	Connects to a DisplayPort source device for source input
3	HDMI IN	Connects to a HDMI source device for source input
4	10GbE	• Connects to a Decoder LZ1502D for communication with each other • Connects to a 10 Gigabit switch for communicating with other Decoders LZ1502D for matrix switching between LZ1501E and LZ1502D via software **Note:** You can also connect a switch, a router or a computer to LAN (CONTROL) port for matrix switching between LZ1501E and LZ1502D via software
5	RS232	Bi-directional RS-232 communication with a RS-232 device
6	IR OUT	Connects to an IR emitter for IR communication with an IR device
7	IR IN	Connects to an IR receiver to allow the signal to be sent to any LZ1502D Decoder
8	LAN (Control)	10/100/1000 Base-T connection to the network
9	AUDIO IN /OUT	Analog audio port configurable as an input or output

3.2 Decoder LZ1502D

3.2.1 Front Panel

| No.	Indicator/Button	Description
1	USB1	Connect this port to a USB device such as a keyboard and mouse
2	USB2	Connect this port to a USB device such as a keyboard and mouse
3	LINK TX indicator	**Blinking:** Sending data **Off:** Not sending any data
4	LINK RX indicator	**On:** Processing the video signal but not receiving any data **Off:** Not processing the video signal and not receiving any data **Blinking:** Receiving data and processing the video signal
5	VIDEO indicator	**On:** A stable video signal is detected **Off:** No stable video signal is detected
6	POWER indicator	**On:** when LZ1502D is powered on.
7	EDID/RESET button	Press once to copy the connected HDMI display's EDID to all the Encoders LZ1501E on the network **Note:** This feature can be enabled/disabled within the software. If other display devices are not compatible with this display's EDID, these displays may have abnormal pictures such as no picture. In that case, try to replace the display devices or press EDID/RESET button on the Decoder connected to them Restore to factory defaults. Hold button while applying power until front panel LED's start to flash
8	ID button	Reserved for future version

3.2.2 Rear Panel

No.	Ports	Description
1	DC 12V	Connects to a power supply, DC 12V 3A
2	HDMI OUT	Connects to a HDMI display device for source output
3	10GbE	• Connects to a Encoder LZ1501E for communication with each other • Connects to a 10 Gigabit switch for communicating with other Encoders LZ1501E for matrix switching between LZ1501E and LZ1502D via software **Note:** You can also connect a switch, a router or a computer to LAN (CONTROL) port for matrix switching between LZ1501E and LZ1502D via software
4	RS232	Bi-directional RS-232 communication with a RS-232 device
5	IR OUT	Connects to an IR emitter for IR communication with an IR device
6	IR IN	Connects to an IR receiver to allow the signal to be sent to any LZ1501E Encoder
7	LAN (CONTROL)	10/100/1000 Base-T connection to the network
8	AUDIO OUT	Analog audio output that connects to an audio output device such as an amplifier, for outputting audio from an Encoder LZ1501E

4 Hardware Installation

Warnings:
- Before the installation, disconnect the power supplies from all the devices.
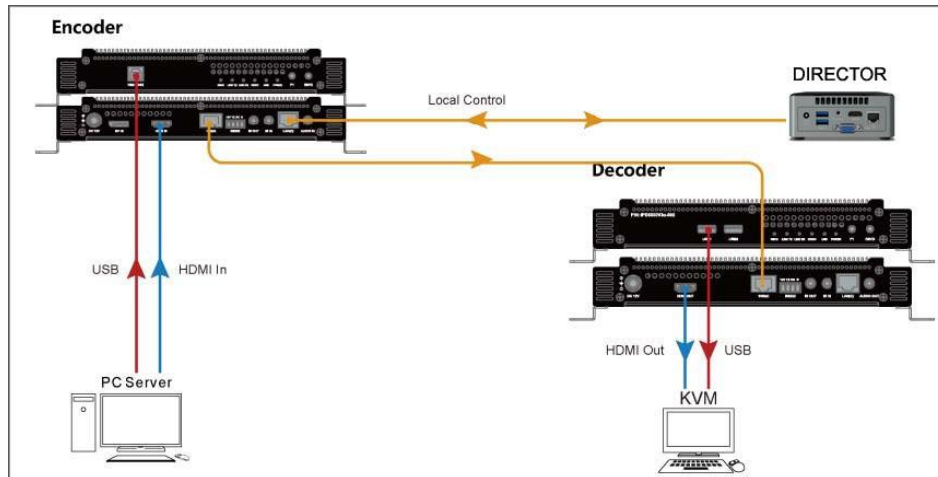- During the installation, connect or disconnect the cables gently.
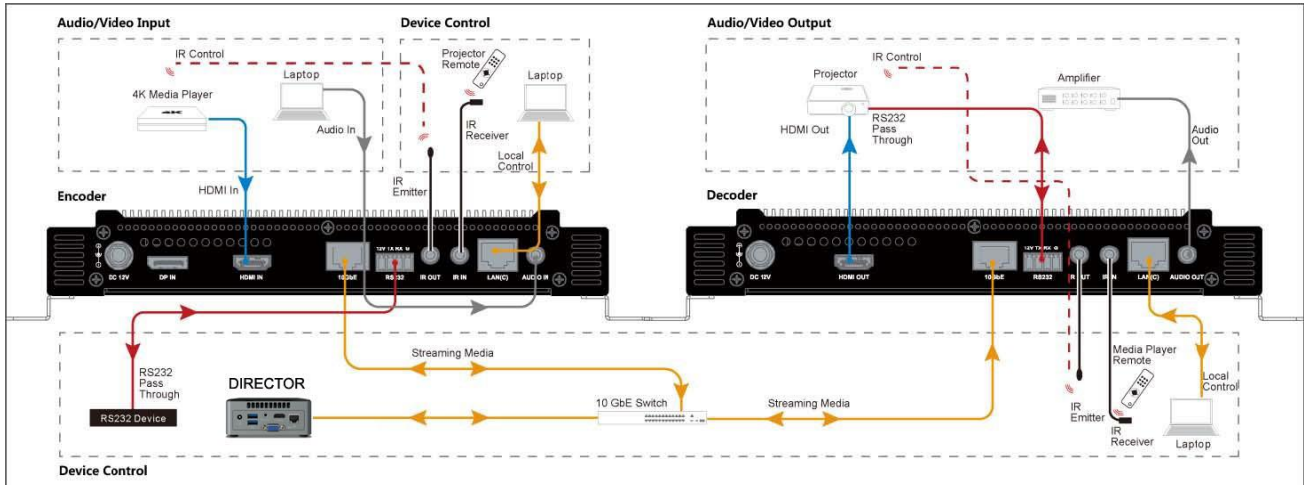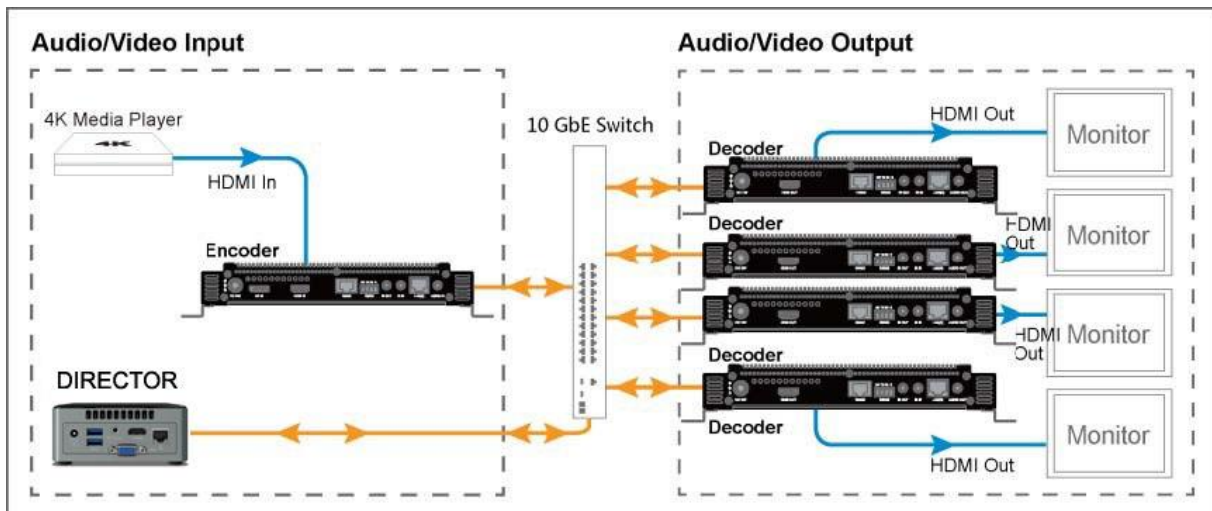

4.1 Package Content

● 1x Encoder / Decoder

● 1x Power Adapter (12VDC 3A)

● 1x Phoenix RS232 male 4-pin plug

● 1x IR Emitter

● 1x IR Receiver (30kHz ~ 50kHz)
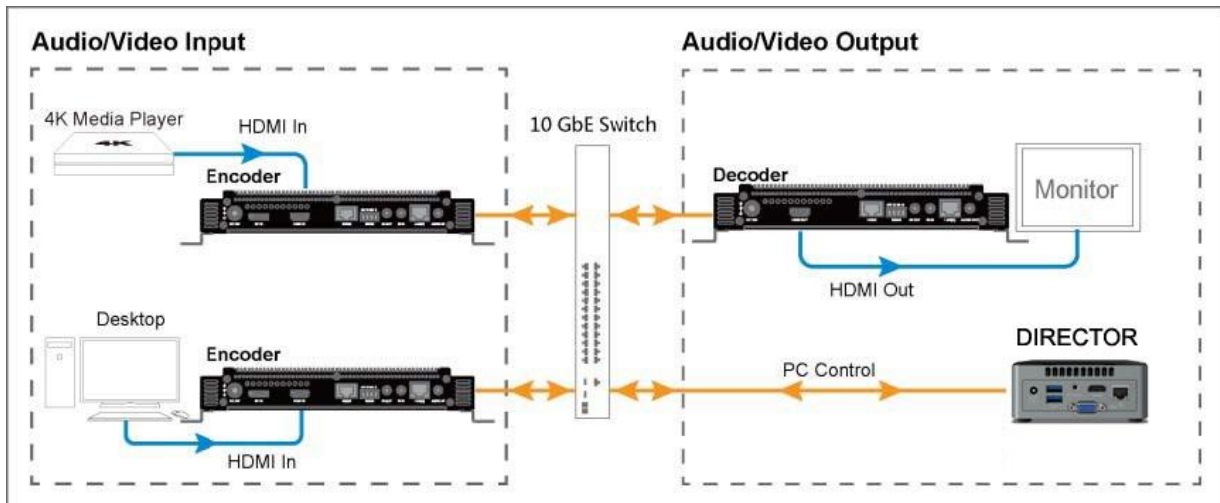
● 2x Mounting brackets
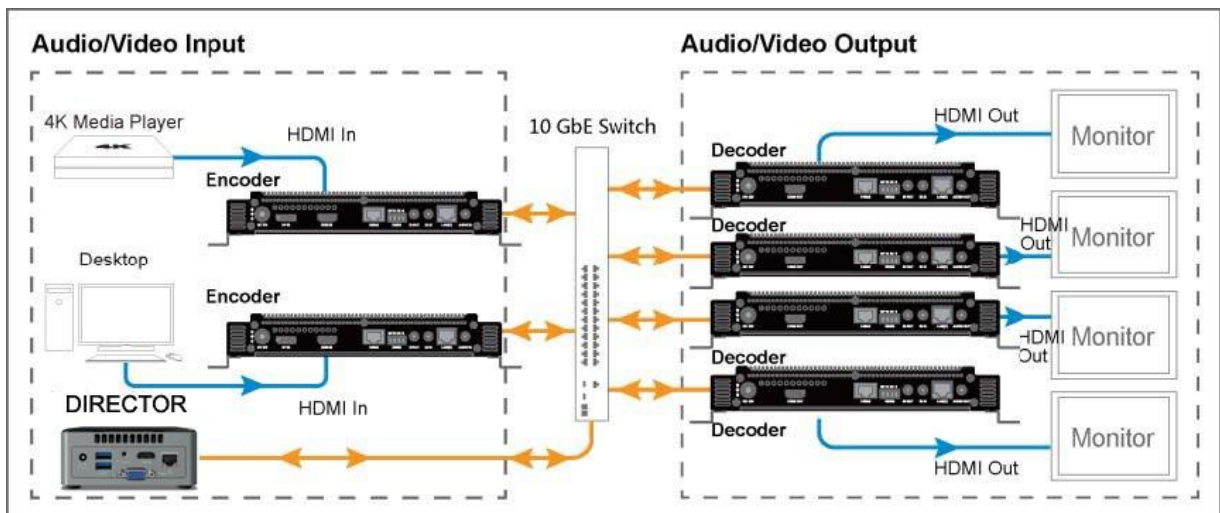
5 Typical Applications

5.1 Point to Point

5.2 Point to Multipoint

5.3 Multipoint to Point

5.4 Multipoint to Multipoint

6 LIGHTNING Controller LZ500DS

6.1 Overview

To control the LIGHTNING Encoders LZ1501E and Decoders LZ1502D the LIGHTNING Controller LZ500DS is required. The LIGHTNING Controller provides a single point of control over all the LIGHTNING devices on the network. A 3rd party control system needs to only create a TCP connection to the LIGHTNING Controllers IP address on Port 6980.

6.2 Specifications

Technical Specifications	
Power Supply	12-19 VDC
Power Consumption	65 Watts
I/O Connection	1 × 10/100/1000 Mb/s (RJ45)
Operating Temperature	0°C ~ +50°C (32°F ~ 122°F) 10% ~ 90%, non-condensing
Product Dimension (W x H x D)	114.3 mm x 111.8 mm x 50.8 mm

6.3 Panel Description

1 Intel® Celeron® processor J3455, 1.5 GHz to 2.3 GHz Burst
2 Intel® HD Graphics
3 Two DDR3L SO-DIMM sockets (up to 8 GB, 1866 MHz)
4 1x SATA3 port for connection to 2.5" HDD or SSD
5 Intel® Dual Band Wireless-AC 3168 and Bluetooth* 4.2
6 Back panel DC power connector (12–19V)
7 Two USB 3.0 ports on the back panel
8 Combo speaker/TOSLINK optical audio jack
9 VGA port
10 One full-size HDMI* 2.0 display port supporting 8 channel audio (7.1 surround sound)
11 Gigabit LAN
12 Multi-color front panel LED ring
13 Support for user-replaceable third-party lids
14 Kensington lock support
15 SD card slot
16 Consumer infrared sensor
17 Two USB 3.0 ports (including one charging port)
18 Headphone/microphone jack
19 Front panel power button
20 Dual array front microphones