4KPROIP Series

HDMI 2.0 4K AV over IP Distribution

4KPROIP-CAT-EN · 4KPROIP-CAT-DE · 4KPROIP-FOC-EN · 4KPROIP-FOC-DE

4KPROIP-CAT-EN-U · 4KPROIP-CAT-DE-U ·4KPROIP-FOC-EN-U · 4KPROIP-FOC-DE-U

Version :4KPROIP_2019V.1.5

General Safety Instructions

When using electronic products, please review the following safety precautions before installing or using the products.

i. Read these instructions.
ii. Keep these instructions.
iii. Follow all instructions.
iv. Heed all warnings.
v. Be sure all cables and equipment are connected to the unit as described in the manual.
vi. Do not use this product near water.
vii. Do not place the product on top of any easily combustible materials such as carpet or fabric.
viii. Do not stacking the product on top of a hot component such as a power amplifier.
ix. Do not use liquid or aerosol cleaners to clean the product. Clean only with a dry cloth and always unplug the power to the device before cleaning.
x. Do not block any ventilation openings. Blocking the airflow could cause damage. Arrange components so that air can flow freely. Ensure that there is adequate ventilation if the product is placed in a stand or cabinet. Install or place the product in a proper ventilated area, away from direct sunlight or any source of heat such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
xi. Power cord must be accessible to allow for the removal of the power from the product.
xii. Only use attachments/accessories specified by the manufacturer.
xiii. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp.
xiv. To avoid electric shock, never stick anything in the slots on the case or remove the cover.

Be careful with electricity:

- **Power outlet:** To prevent electric shock, be sure the electrical plug used on the product power cord matches the electrical outlet used to supply power to the aegis product. Use only the power adapter and power connection cables designed for this unit.

- **Power Adaptor:** Be sure the power adaptor is 12V3A, please matching the rating of the power voltage.

- **Lightning:** For protection from lightning or when the product is left unattended for a long period, disconnect it from the power source.

- **ESD:** Handle the product with proper ESD care. Failure to do so can result in failure.

Trademarks *All trademarks in this document are the properties of their respective owners.*

Table of Content

System Description

The 4KPROIP series of products from aegis provide an effective and powerful audio and video multifunction system solution with KVM function via 10Gbit network. This system delivers visually lossless 4K2K AV signals with zero latency over long distance Category 6 cable or fiber.

A System Consists of :

- Video Sources
- 4KPROIP Encoder devices
- Cat.6 Cable up to 100M or Fiber Cables support 10KM, 20KM, or 40KM
- 10Gb Ethernet Switching
- HDMI 2.0
- 4KPROIP Decoder devices
- Video Sink (display devices)
- 4KPROIP-CBS Control Software Device
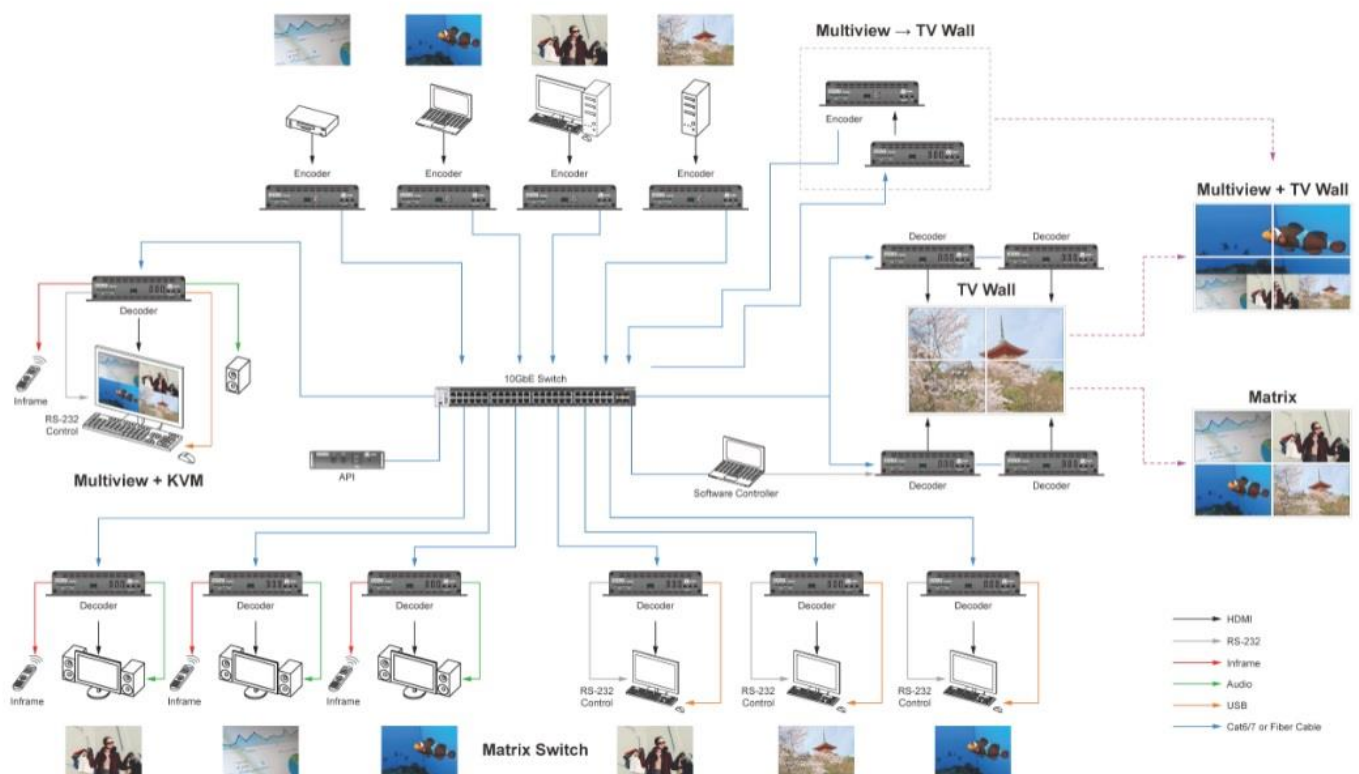
System Elements

Encoder Function

The function of the 4KPROIP Encoder Device is to receive audio and video data from variety of source interfaces and convert the data to a format suitable for transmission via 10Gbit network switch.
The video stream sent by an Encoder will only be received by designated control entity.

Common Interfaces on all Transmitters:

Power Input (12V DC)

RS232 (in/out)

Audio Input/output

IR Receiver

IR Blaster

HDMI 2.0

1G LAN Ethernet Port

Optional Interfaces on Transmitters:

Ethernet Bulk Media Interface:

10Gb Fiber or 10Gb LAN Copper

USB

None or 3X USB-B Interface

4 different Aegis Transmitters can be ordered:

HDMI Copper	HDMI Fiber
HDMI Copper with USB-B type	HDMI Fiber with USB-B type

Decoder Function

The function of the 4KPROIP Decoder Device is to decoding the received information from 10G Ethernet traffic to be displayed.   It strips off the encryption and reformates the audio and video information for display via HDMI video output while plays audio out from Audio output port.

Common Interfaces on all Receivers:

Power Input (12V DC)

RS232 (in/out)

Audio output

IR Receiver

IR Blaster

HDMI 2.0

1G LAN Ethernet Port

Optional Interfaces on Receivers:

Ethernet Bulk Media Interface:

10Gb Fiber or 10Gb LAN Copper

USB

None or 3X USB-A Interface

4 different aegis Receivers can be ordered:

HDMI Copper	HDMI Fiber
HDMI Copper with USB-A type	HDMI Fiber with USB-A type

Control Devices

The aegis'control devices, 4KPROIP-CBS, are the simple user-friendly Web UI software that operate and manage the connectivity between encoders and decoders for all kind of video management, dispatch the AV signal to the end sync device. The 4KPROIP-CBS is the control box that bounded with the control software, aPro4kcs.   These control devices centralize control and manage of point-to-point applications via web interface which shows the connection status included all of the encoders and decoders. The control devices must reside on the same logical network as the 4KPROIP encoders and decoders. The application presents an API to potential third-party management platforms.

Feature
➢   Simple user-friendly
➢   Web UI shows the connection status of Encoder (TX) and Decoder (RX)
➢   Remotely away operational KVM, USB, IR Switching to selective P/C or DVD or TV source.
➢   Centralizes control and manage via the web interface of the aegis control software device.
➢   The web interface shows the connection status included all the transmitter and receiver.
➢   Matrix switching
➢   Video Wall set up and control
➢   Multi-view set up and control
➢   IR (Infrared) Remote Control Routing
➢   USB Routing
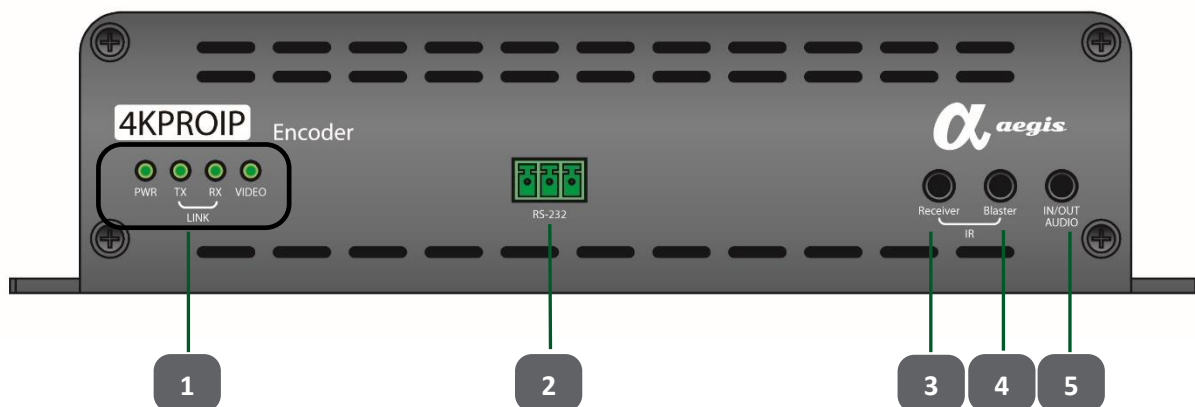
Element Detailed Descriptions

Encoder

The encoder supports 4K @ 60Hz (4:4:4). There are total 4 types of 4KPROIP encoders that have bulk media (10Gb Copper or 10Gb Fiber) and with USB option.

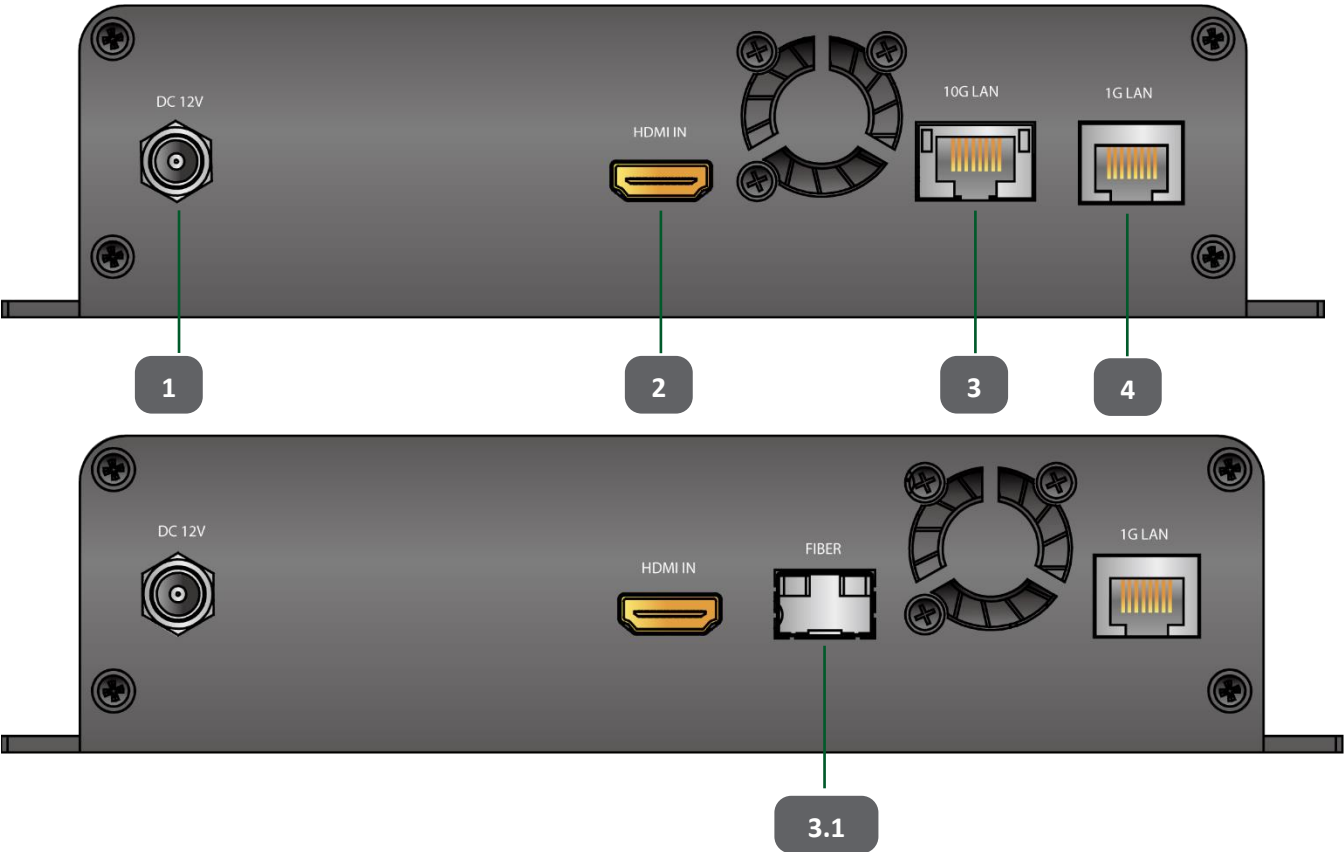| Unit No.	Input Function	Box Size & Weight
4KPROIP-CAT-EN	Copper, HDMI, Analog Audio, Infrared, RS-232C, 1 Gb	205mm (W) x 135mm (D) x 50mm (H); 750g
4KPROIP -CAT-EN-U	Copper, HDMI, Analog Audio, Infrared, RS-232C, 1 GbE & USB	205mm (W) x 135mm (D) x 50mm (H); 750g
4KPROIP -FOC-EN	Fiber, HDMI, Analog Audio, Infrared, RS-232C, 1 GbE	205mm (W) x 135mm (D) x 50mm (H); 755g
4KPROIP -FOC-EN-U	Fiber, HDMI, Analog Audio, Infrared, RS-232C, 1 GbE & USB	205mm (W) x 135mm (D) x 50mm (H); 755g

Ports Description:

Common ports (front panel)

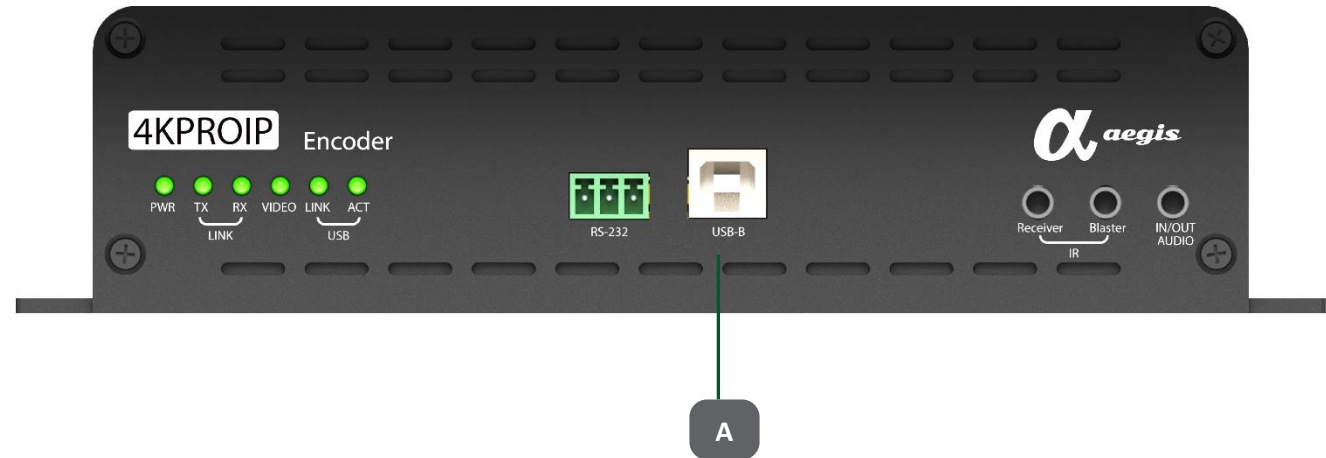| ID	Port Name	Description
1	Function Indicator	The indicators show the corresponding status of the functions: power, TX/RX link, and video.
2	RS232	RS232 Control port for sending and receiving side-band serial traffic to/from encoders. Communication up to 115.2K Baud rate.
3	IR Receiver	IR receives IR signals from the IR remote device and pass the commands to decoders
4	IR Emitter	IR receives commends that pass back from decoders
5	Audio In/out	Analog audio input/output for the line level stereo audio on 3.5mm

4KPROIP

Common ports (rear panel)

ID	Port Name	Description
1	Power Jack	Connect 12 Volt DC, 24mp, 24 watts (max.)
2	HDMI Input	HDMI 2.0 input. Supports up to 4K/60 (4:4:4) with HDCP 2.2
3	10G LAN	Connect a LAN over Cat.6a (up to 100m) to 10G Network hub.
3.1	Fiber	Connect fiber optical to 10G Network hub. Support 10KM, 20KM or 40KM Distance
4	1G LAN	Connect a general purpose device to network or to the API box.

Optional ports (front panel)

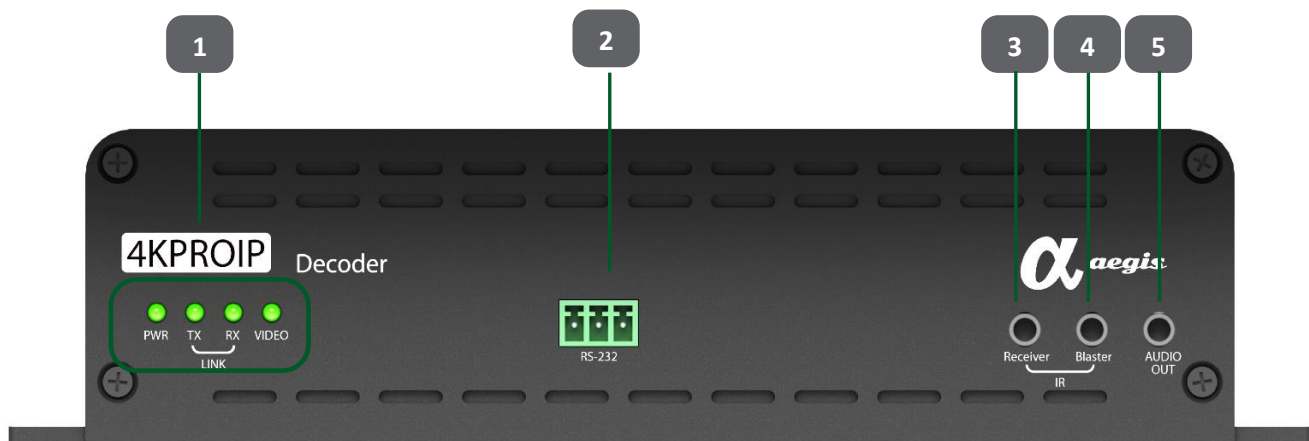| ID	Port Name	Description
A	USB-B	480Mbps USB 2.0 Type B (female) are to be connected to a host (PC) as optional.

Decoder

The decoder outputs HDMI2.0 resolution sending by the encoder including full 4K @ 60Hz (4:4:4). There are total 4 types of 4KPROIP encoders that have bulk media (10Gb Copper or 10Gb Fiber) and with USB option.

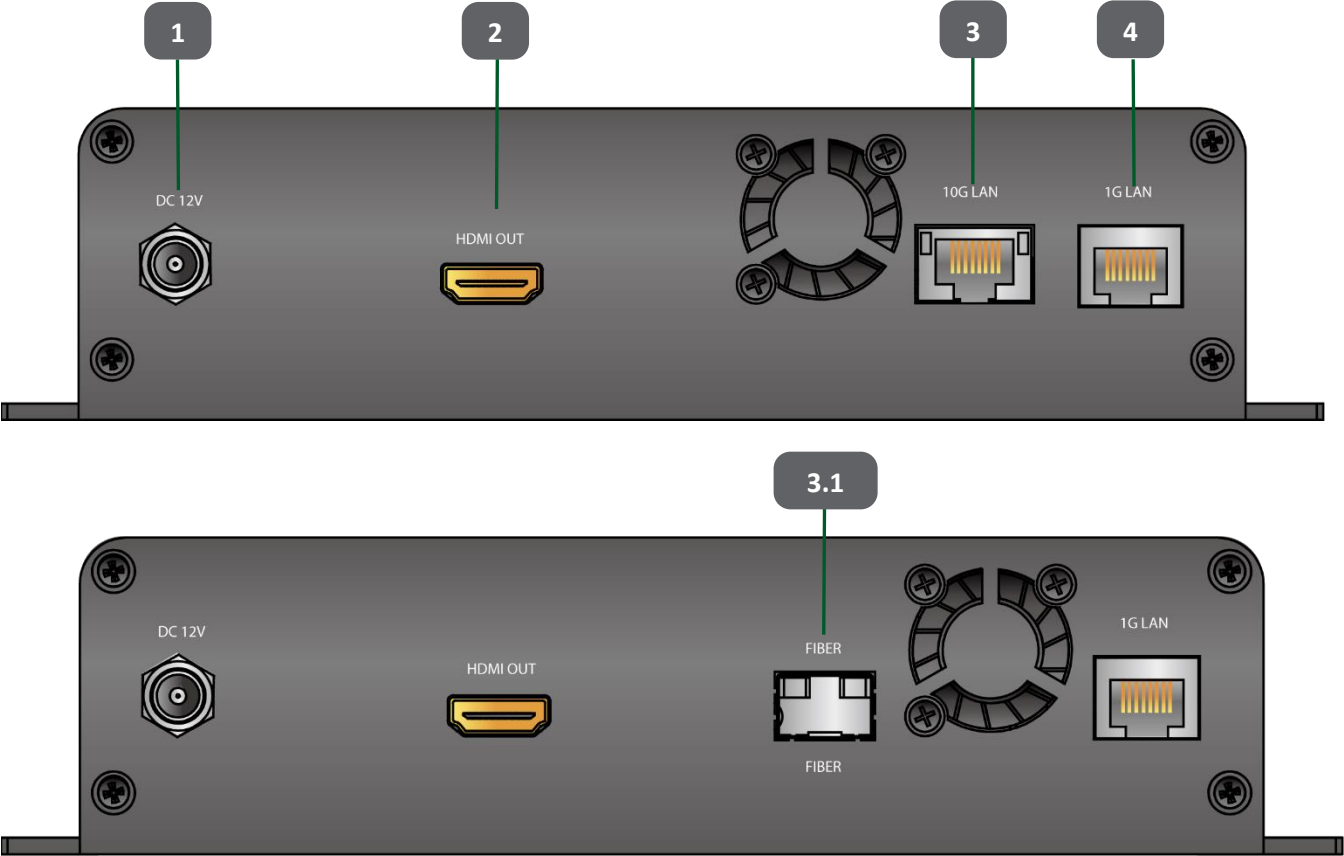| Unit No.	Input Function	Box Size & Weight
4KPROIP -CAT-DE	Copper, HDMI, Analog Audio, Infrared, RS-232C, 1 Gb	205mm (W) x 135mm (D) x 50mm (H); 750g
4KPROIP -CAT-DE-U	Copper, HDMI, Analog Audio, Infrared, RS-232C, 1 GbE & USB	205mm (W) x 135mm (D) x 50mm (H); 750g
4KPROIP -FOC-DE	Fiber, HDMI, Analog Audio, Infrared, RS-232C, 1 GbE	205mm (W) x 135mm (D) x 50mm (H); 755g
4KPROIP -FOC-DE-U	Fiber, HDMI, Analog Audio, Infrared, RS-232C, 1 GbE & USB	205mm (W) x 135mm (D) x 50mm (H); 755g

Ports Description:

Common ports (front panel)

ID	Port Name	Description
1	Function Indicator	The indicators show the corresponding status of the functions: power, TX/RX link, and video.
2	RS232	RS232 Control port for sending and receiving side-band serial traffic to/from encoders. Communication up to 115.2K Baud rate.
3	IR Receiver	IR receives IR signals from the IR remote device and pass the commands to decoders
4	IR Emitter	IR receives commends that pass back from decoders
5	Audio out	Analog audio output for the line level stereo audio on 3.5mm

Common ports (rear panel)

| ID	Port Name	Description
1	Power Jack	Connect 12 Volt DC, 24mp, 24 watts (max.)
2	HDMI Input	HDMI 2.0 input. Supports up to 4K/60 (4:4:4) with HDCP 2.2
3	10G LAN	Connect a LAN over Cat.6a (up to 100m) to 10G Network hub.
3.1	Fiber	Connect fiber optical to 10G Network hub. Support 10KM, 20KM or 40KM Distance
4	1G LAN	Connect a general purpose device to network or to the API box. (cat.6a, RJ 45)

Optional ports (front panel)
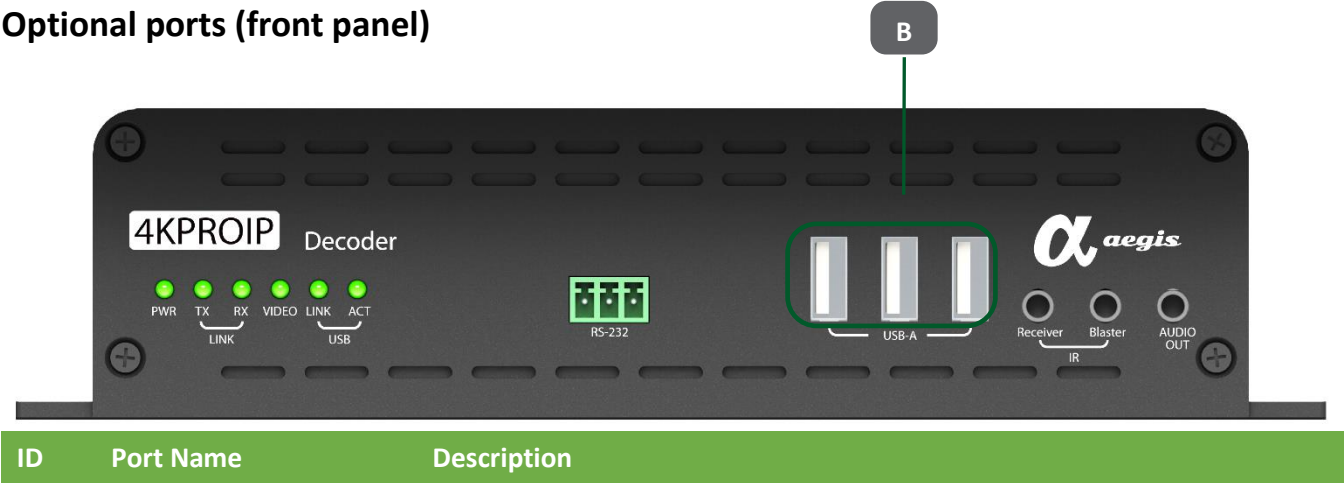
ID	Port Name	Description

| B | USB-A | 480Mbps USB 2.0 Type A are to be connected to a host (PC) or device (ie. mouse, Keyboard, etc.) for KVM features. |

Application
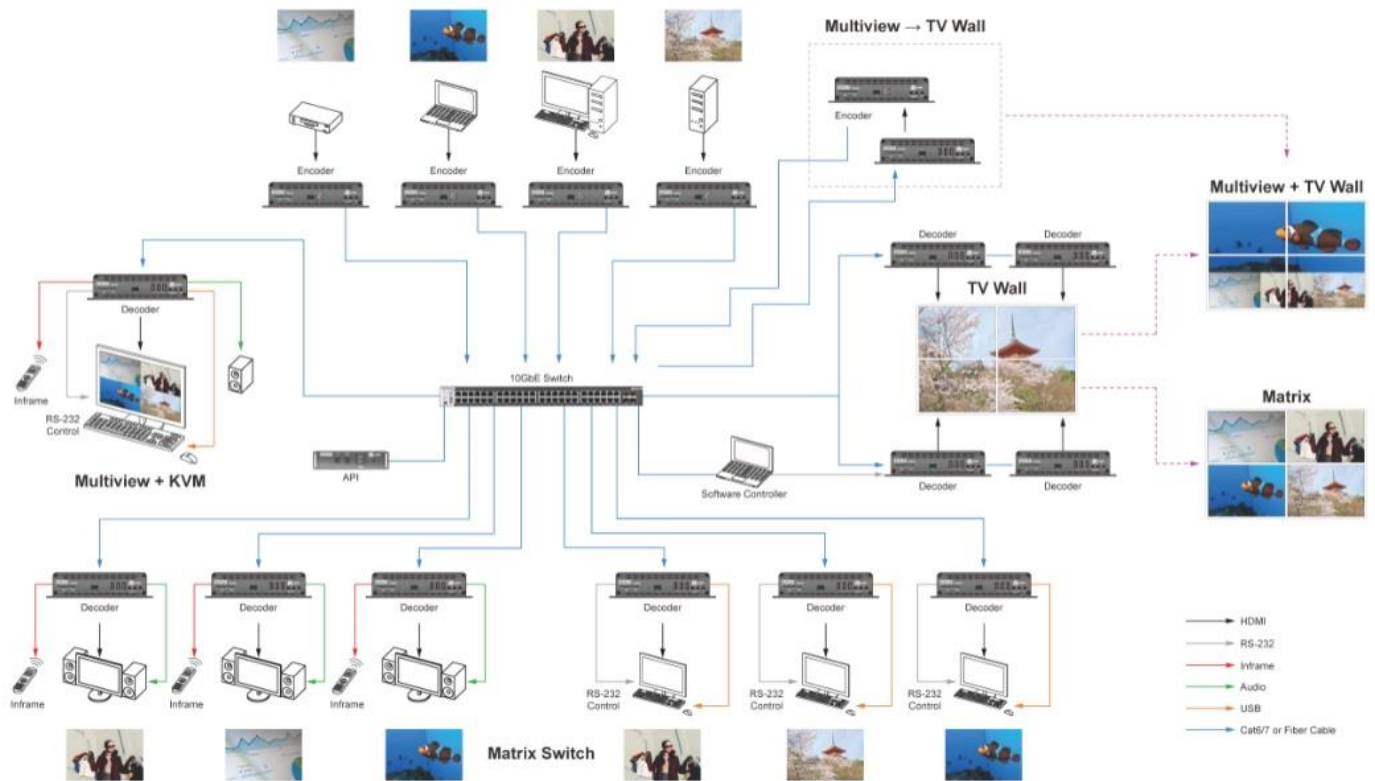
Here is the diagram of the Full function of the Product

- One to Many
- Many to One
- Many to Many
- TV Wall

Setting Up 4KPROIP-Hardware

One to One

One to one means connecting one source directly to one display. This is a simple "plug and play" set up that does not need a 10 Gigabit Ethernet switch nor a software platform.
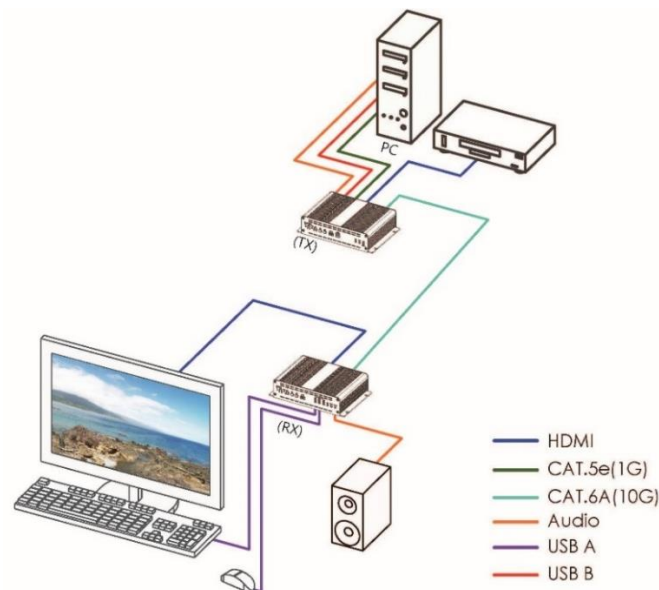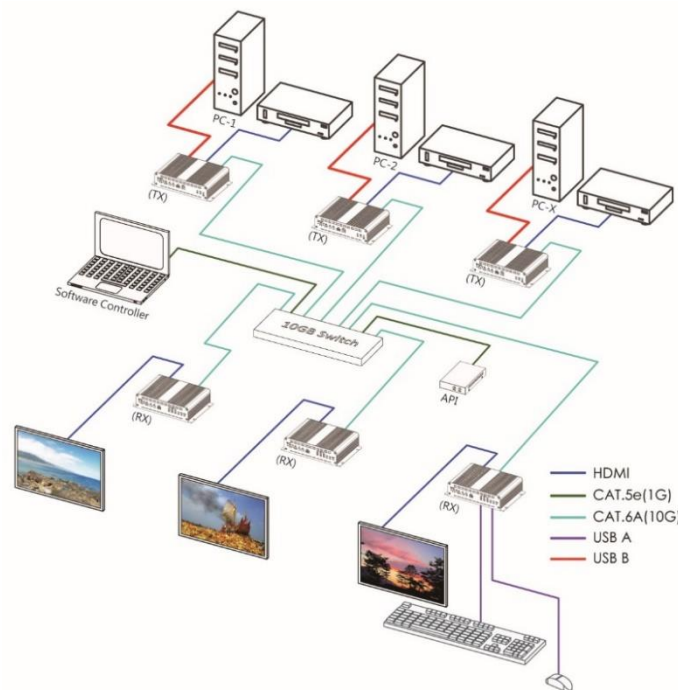

1. **POWER:** Plug power of encoder and decoder with 12V/3A adaptor
2. **HDMI:** Connect HDMI from active source, ie. PC or BD that supports HDMI 2.0 4K/HDR to Encoder (HDMI port)
    Connect HDMI from active display device ie. TV or screen that support HDMI2.0 4K/HDR UHD to Decoder
    Recommend use HDIM 2.0 Premium cable for high resolution to reduce compatibility issues
3. **CAT.5e:** Connect CAT.5e cable from control device (ie.PC) to Encoder (1G LAN port) for transmitting control instructions.
4. **CAT.6:** Connect Ethernet cable either by Fiber or CAT.6A copper between Encoder (Fiber port or 10G LAN port) and Decoder(Fiber port or 10G LAN port) .
    Both Encoder and Decoder must be the same Fiber or Copper configuration.
5. **AUDIO:** Connect Audio line from active source to Encoder (Audio In/Out port) that supports PCM L/R. Then connect Audio line from Decoder (Audio Out port) to Audio display device for playing out the sound source.
6. **USB:** In the optional port of USB for KVM feature, plug USB from control device (ie. PC or BD) to Encoder (USB B port) act as a Host.
    Then plug USB from Decoder (USB A port) to device (ie. keyboard, mouse etc.)
7. **IR:** Plug IR receiver and sensor kits to both Encoder and Decoder for bidirectional IR signal channel
    **This needs to be equipped with control software **

8. **RS232:** Both Encoder and Decoder have RS232 ports for control channel. (Default Baud rate: 57600 with software switch setting)

Many to Many

Many to many means connecting many sources to many displays.   This system offers flexibility and options of amount of inputs and outputs connections.   For example, one input to many outputs or many inputs to one output or many inputs to many outputs. This needs a network switch and a software controller.

1. **POWER:** Plug power of encoder and decoder with 12V/3A adaptor
2. **HDMI:** Connect HDMI from active source, ie. PC or BD that supports HDMI 2.0 4K/HDR to Encoder (HDMI port)
   Connect HDMI from active display device ie. TV or screen that support HDMI2.0 4K/HDR UHD to Decoder
   Recommend use HDIM 2.0 Premium cable for high resolution to reduce compatibility issues
3. **CAT.6:** Connect Ethernet cable either by Fiber or CAT.6A copper from Encoder (Fiber port or 10G LAN port) to 10GB Switch.
   Connect Ethernet cable either by Fiber or CAT.6A copper from Decoder (Fiber port or 10G LAN port) to 10GB Switch.
   Both Encoder and Decoder must be the same Fiber or Copper configuration.
4. **CAT.5e:** Connect CAT.5e (1G) cable from Software Controller (ie Notebook) to 10GB Switch.
5. **CAT.5e:** Connect CAT.5e (1G) cable from API to 10GB Switch.
6. **AUDIO:** Connect Audio line from active source to Encoder (Audio In/Out port) that supports PCM L/R. Then connect Audio line from Decoder (Audio Out port) to Audio display device for playing out the sound source.

7. **USB:** In the optional port of USB for KVM feature, plug USB from control device (ie. PC or BD) to Encoder (USB B port) act as a Host. Then plug USB from Decoder (USB A port) to device (ie. keyboard, mouse etc.)
8. **IR:** Plug IR receiver and sensor kits to both Encoder and Decoder for bidirectional IR signal channel **This needs to be equipped with control software **
9. **RS232:** Both Encoder and Decoder have RS232 ports for control channel. (Default Baud rate: 57600 with software switch setting)

Indicator LED Light

PWR : PWR shows in greenlighting indicates power is connected.
When the green light blinks indicates it is in operating.
When it does not blink indicates it is not loaded correctly.

LINK TX: The greenlight blinks indicates data is in transmitting or receiving
The greenlight in solid light indicates data has completed transmitting or receiving.
The greenlight off indicates no connection.

LINK RX: The greenlight blinks indicates data is in transmitting or receiving
The greenlight in solid light indicates data has completed transmitting or receiving.
The greenlight off indicates no connection.

VIDEO : The greenlight blinks indicates the active video is in processing.

LINK USB : The greenlight is on indicates the USB of encoder & decoder are paired.
ACT USB : The greenlight is on indicates the data is transmitting or receiving after paired.

Technical Specifications

4KPROIP Series	
Power supply	Input: 100-240VAC 50-60Hz Output:12V / 3A
Inputs	TX: HDMI x1, IR x2, Audio x1, 1G RJ45 x1, RS232 x1, USB B x1(female) RX: 10G LAN Port x1
Outputs	TX: 10G LAN Port x1 RX: HDMI x1, IR x2, Audio x1, 1G RJ45 x1, RS232 x1, USB A x3
USB A	480Mbps USB 2.0
USB B	480Mbps USB 2.0
HDMI	HDMI 2.0 with HDP
HDCP	HDCP 2.2 Compliant
RS232	pass-through (115Baud Rate)
IR	Bi-directional (30kHz-60kHz)
Compression	Uncompressed
Latency	Zero
Resolution	4K/60Hz 4:4:4
10G Copper Distance	Support up to 100M with Cat 6 or Cat.6a
Weight	Encoder:1420g Decoder:1420g
Operation Temperature	-20°C to +55°C (-68°F to 131°F)
Storage Temperature	-30°C to +70°C (-86°F to 158°F)
Humidity	10% to 90%
Dimension	Encoder: 204X133X48mm (L x W x H) Decoder: 204x133x48mm (Lx W x H)
Raw Material	Aluminum Enclosure

Recommend Cable

4KPROIP Series of AV Over IP was developed to work with the most basic HDMI and LAN infrastructure. Although the 4KPROIP Series will work with most cables. aegis has recommended Cables are have been tested in a Recognized Testing facility and have met the requirements set by the HDMI and TIA/EIA-568C.2. The goal of Recommended Cables is to assist installers, integrators, and consumers in selecting HDMI and LAN cables that meet the requirements, and as such provide optimal performance with 4KPROIP Series devices.
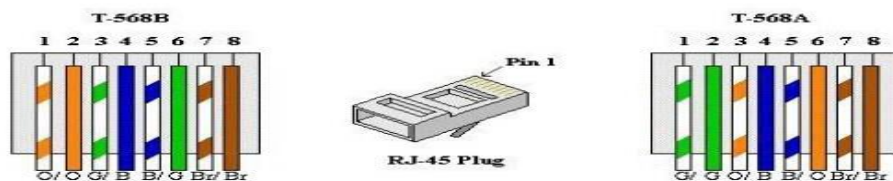
HDMI

Please, Kindly use of "Certified Premium High Speed HDMI Cable", it is highly recommended.

Fiber

Please, Kindly use Multi-mode or single mode SFP+ fiber cable is highly recommended.
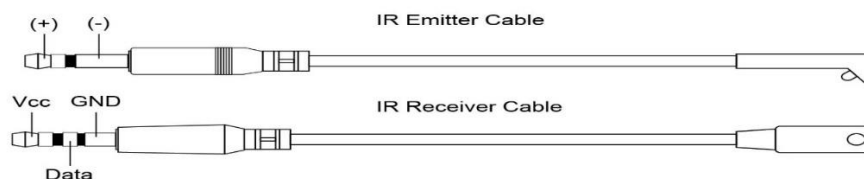
LAN wire Cable

Please, Kindly use of industry standard Cat.6, Cat.6a or Cat.7 cable is highly recommended. Here are the PIN Wiring layout for LAN cables are shown below.
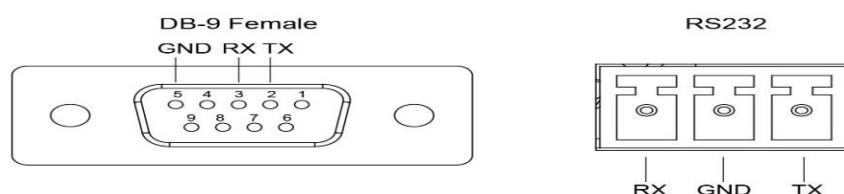

IR Cable

IR Pin Assignment

RS232

RS232 Protocol.

Recommend Network Switch

The aegis AV Over IP Series will work with most non-blocking, IGMP 10G network switch. Layer 3 will allow more controllability; however, Layer 2 will work fine as well. It is highly recommended to communicate with the representative of the desired network switch brand to confirm configuration and capabilities. Below are some models that have been tested with the aegis 4KPROIP Series.

Switch Speed

The 4KPROIP Series requires the switch to be a 10GbE.

4KPROIP Series technology is used to transmit uncompressed video up to 4K along with other AV signals such as audio, USB and control signals. For video alone, the raw bandwidth is about 4Gb/sec for HD; and 8Gb/sec for 4K. Therefore it is obvious to understand why 4KPROIP series require 10GbE network switches.

Packets Routing

To enable the transmission of a source to multiple destinations, aegis 4KPROIP series devices make use of Multicast. The default behavior of layer 2 Ethernet switch is to broadcast those packets which mean that every packet will be transmitted to all possible destinations. Therefore, any network switch used with 4KPROIP Series must support IGMP Snooping. 4KPROIP-CAT series endpoints use IGMP protocol to assign the endpoints into multicast groups and the router uses IGMP snooping to route multicast packets efficiently to receivers that want to receive them.

Many switches have the IGMP Snooping feature disabled by default and manual configuration is required. Often, a simple checkmark near "Enable IGMP Snooping" is the only thing needed to enable IGMP Snooping.

However, the implementation of IGMP Snooping is vendor specific and additional configuration is often needed.

An Ethernet switch can be informed that a device wants to leave a multicast channel by sending it an IGMP LEAVE GROUP packet. Once received, the time it takes for the switch to apply the new configuration may vary from one switch to another. Most switches implement and include FASTLEAVE configuration option. When enabled, it takes much less time for a particular port to leave a multicast group to assign the port to a different multicast group. The end results are a noticeably shorter video switching time. aegis recommends that always enable the FASTLEAVE option when it is available. With the FASTLEAVE option, seamless switching is possible for 4K video sources. Without FASTLEAVE option, 'seamless' switching is limited to 1080P 60 Hz video signals.

Ethernet Switch Configuration

The following list includes all network switch configuration options that aegis Engineers have come across so far. Look for these or similar options when configuring your switch.

1. Enable IGMP Snooping

    a. Must be enabled

2. Enable IGMP Snooping on VLAN 1

    a. Must be enabled when all ports default to VLAN1

3. Filter/Drop unregistered Multicast traffic

    a. If not applied, the behavior of the switch will broadcast multicast packets if the switch has unknown destination for that packet.

    b. Must be enabled if found

4. Unregistered Multicast Flooding

    a. Must be disabled if found

5. Filter Unregistered Multicast (different wording than number 4 above)

    a. Must be enabled if found

6. Enable IGMP Query

7. Enable IGMP Query on VLAN1

8. Set IGMP Version to IGMP V2

    a. Must be set if found

9. Enable FASTLEAVE on port X

    a. This is optional. Should be enabled, if found

10. Enable FASTLEAVE for VLAN1

    a. This is optional. Should be enabled if found

Declaration

aegis Inc. declares that its product is compliance to the EU Directives.

- EU Directives 2011/65/EU.
- EU Directives 2003/11/EC.

The following restricted material is **Not Used** and does not exceed the legal limited.

RoHS Restricted Substance	Allowable Limit
Cadmium and its compounds	**100 ppm (0.01 weight %)**
Mercury and its compounds	**1000 ppm (0.1 weight %)**
Hexavalent chromium and its compounds	**1000 ppm (0.1 weight %)**
Lead and its compounds	**1000 ppm (0.1 weight %)**
Polybrominated biphenyls (PBB)	**1000 ppm (0.1 weight %)**
Polybrominated diphenyl ethers (PBDE)	**1000 ppm (0.1 weight %)**
Bis(2-ethylhexyl) phthalate (DEHP)	**1000 ppm (0.1 weight %)**
Butyl benzyl phthalate (BBP)	**1000 ppm (0.1 weight %)**
Dibutyl phthalate (DBP)	**1000 ppm (0.1 weight %)**
Diisobutyl phthalate (DIBP)	**1000 ppm (0.1 weight %)**

For definitions and exemptions, please see the RoHS Directive 2011/65/EU

FCC Compliance Statement

The aegis Av over IP 4KPROIP series of the device has been tested and found to comply with the limits for Class B digital Device pursuant to Part 15 of the FCC rules. The operation is to subject to the following conditions.

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Warranty

Limited **3** Year Warranty

aegis INC. ("Manufacturer") warrants that this product is free of defects in both materials and workmanship for a period of 3 years as defined herein for parts and labor from date of purchase. This Limited Warranty covers products purchased in the year 2019 and after. During the warranty period, and upon proof of purchase, the product will be repaired or replaced (with same or similar model) at our option without charging for parts or labor for the specified product lifetime warranty period.

This warranty shall not apply if any of the following:

A.   The product has been damaged by negligence, accident, lightning, water, or mishandling.

B.   The product has not been operated in accordance with procedures specified in operating instructions.,

C.   The product has been repaired and or altered by other than the manufacturer or authorized service center.

D.   The product's original serial number has been modified or removed.

E.   External equipment other than supplied by the manufacturer, in the determination of a manufacturer, shall have affected the performance, safety or reliability of the product.

F.   Part(s) are no longer available for the product.

If the product needs repair or replacement during the specified warranty period, the product should be shipped back to Manufacturer at Purchaser's expense. Repaired or replaced product shall be returned to Purchaser by standard shipping methods at Manufacturer's discretion. Express shipping will be at the expense of the Purchaser.

No other warranty, express or implied other than Manufacturers shall apply.

The manufacturer does not assume any responsibility for consequential damages, expenses or loss of revenue or property, inconvenience or interruption in operation experienced by the customer due to a malfunction of the purchased equipment. No warranty service performed on any product shall extend the applicable warranty period. This warranty does not cover damage to the equipment during shipping and Manufacturer assumes no responsibility for such damage. This product warranty extends to the original purchaser only and will be null and avoid upon any assignment or transfer.