

ZIGEN

IP-LOGIC

COMPLETE HD/IP
CONNECTIVITY SOLUTIONS

4K AV over IP Technical Manual



IP-LOGIC AV over IP Technical Manual
TM-003-0001-100-00 | January 10, 2020
V0.0.2

Important Safety Instructions

Read this user manual carefully before using the product. Pictures shown in this manual are for reference only. Different models and specifications are subject to real product.

This manual is only for operation instruction, please contact the local distributor for maintenance assistance. The functions described in this version were updated on January 2020. In the constant effort to improve the product, we reserve the right to make function or parameter changes without notice or obligation. Please refer to Zigen dealers for the latest details.



This warning symbol is used to alert anyone to heed important operating, installing, and maintenance instructions. Failure to do so could result in injury to installers and end-users or damage to equipment.



This lightning symbol is used to alert anyone of the presence of dangerous voltage that has to potential to cause serious injury to installers and end-users.

Safety Statements

1. Follow all instructions and heed all warnings.
2. Do not expose equipment to rain or moisture and ensure that no objects containing liquids are placed on top of equipment. This includes cups, glasses, or vases.
3. Do not place equipment in confined spaces such as cabinets or bookshelves. Do not block any ventilation holes of equipment that may restrict airflow. This may cause dangerous overheating, fire hazard, or electric shock.
4. Do not place near heat sources such as fireplaces, heaters, boilers, radiators or any apparatus that produce heat such as computers or power amplifiers.
5. Unplug equipment from power supply during dangerous lightning conditions or during prolonged periods of non-use.
6. Keep power cord away from walking traffic. Keep cord from being pinched by heavy objects.
7. Always unplug power supply before cleaning equipment. Clean only with dry cloth.
8. Handle equipment with proper Electro-Static-Discharge (ESD) practices. Failure to do so may result in equipment failure.
9. Only use attachments or accessories specified by the manufacturer.
10. No user serviceable parts inside. Refer all servicing to qualified service personnel.
11. Batteries that may be included with this product and/or accessories should never be exposed to open flame or excessive heat. Always dispose of used batteries according to the instructions.

FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference. Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.



Packing List

1. Packing List

The ZIG-IPPRO-TX is packaged with the following items:

- 1x ZIG-IPPRO-TX
- 1x Universal 100-240 VAC, 12V/3A Power Supply
- 1x IR Emitter
- 1x IR Receiver
- 2x Wall Mounting Ears including Hardware
- 2x Front Mount Cage Bracket (ZIG-ILC-Cage required and sold separately)
- 1x Quick Start Guide

The ZIG-IPPRO-RX is packaged with the following items:

- 1x ZIG-IPPRO-RX
- 1x Universal 100-240 VAC, 12V/3A Power Supply
- 1x IR Emitter
- 1x IR Receiver
- 2x Wall Mounting Ears including Hardware
- 2x Front Mount Cage Bracket (ZIG-ILC-Cage required and sold separately)
- 1x Quick Start Guide

The Essentials Control Server is packaged with the following items:

- 1x Essentials
- 1x Universal 100-240 VAC, 12V/1A Power Supply
- 2x Mounting Bracket
- 1x Quick Start Guide

If any of these products are not present upon first opening of the package, please contact Zigen or your dealer.

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Release Notes

2. Release Notes

Product	Hardware Version	Status	Revision
IP-Logic Essentials	v1.0	Initial Release	v1.0.0
ZIG-IPPRO-TX	v1.0	Initial Release	v1.0.0
ZIP-IPPRO-RX	v1.0	Initial Release	v1.0.0

Overview

3. Overview

The IP-Logic ecosystem is an extremely scalable Audio/Video over Internet Protocol (AVoIP) solution designed to distribute audio, video, and control over standard Internet Protocol (IP) networking. The modularity of the IP-Logic system allows for the utilization of standard Network switch topologies and Ethernet cabling infrastructures (Copper or Optical) to distribute and connect a large number of AV sources and displays.

The IP-Logic RX and TX series employs SDVoE technology to distribute up to UHD video over 10G network. With resolutions up to 4K/60Hz 4:4:4, 4K/60Hz Dolby Vision, HDR10+, HDR10, HLG, HDCP 2.3 video, and integrated AES67 digital audio distribution, the IP-Logic series is the superior platform for distributing nearly lossless AV over IP multimedia.

3.1. Component Descriptions

The IP-Logic series consist of hardware and software components that make up the entire AVoIP ecosystem. This modularized approach reduces overall system costs by mixing and matching only the required number of components during customer deployment.

3.1.1. Essentials



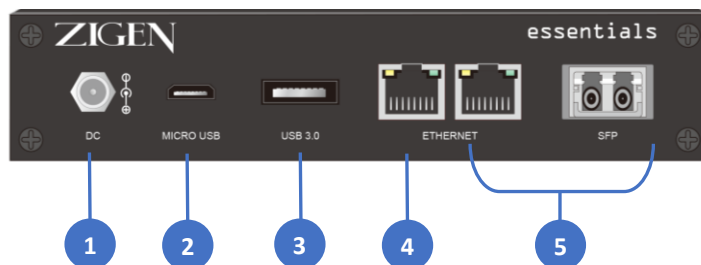
The Essentials unit is the control server for all IP-Logic AVoIP devices. This unit is the main interface for all AV Transmitters and Receivers, providing the interface to select media content from a Transmitter and displaying it to a single or multiple endpoint Receivers. Every parameter used to control any IP-Logic device passes through an Essentials unit and only a single Essentials device is required per installation.

Essentials feature auto discovery of all supported IP-Logic components within the network. Web based Graphical User Interface (GUI) and support for the most popular third-party control systems enable the most flexible configuration of AVoIP subsystems.

Essentials has two LAN ports. Ethernet 1 is assigned to connect to the facility network and must have Internet access for downloading the latest firmware/software. Ethernet 1 is also used to connect Essentials to 3rd party control systems such as Crestron, RTI, Control4, etc.

Ethernet 2 is assigned for the IP-Logic private AVoIP network and must be isolated from the facility network. Ethernet 2 will only be used for AVoIP network traffic.

Component Descriptions



1 12V DC Power Jack

Attach the included 12V DC @ 1Amp power supply to this connector. Turn the locking ring and tighten until snug to prevent the power supply from detaching accidentally.

2 1Micro USB

Reserved for future use. Do not connect any Micro USB components to this port.

3 USB 3.0

Reserved for future use. Do not connect any USB devices to this port.

4 Ethernet for Control LAN

Connect this Ethernet LAN to the facility network, which is isolated from the AVoIP (Video and Audio) network. The primary purpose of this port is to allow computers or 3rd party Control Systems to adjust all controls to all AVoIP connected IP-Logic devices.

To support automatic Firmware updates, make sure the facility network has access to the Internet.

Note: It is important to isolate the Control LAN to the AVoIP LAN. Refer to section [6.8 IP-Logic Isolated VLAN](#) for more information.

5 Ethernet for AVoIP LAN (Copper or SFP Optical)

Connect this Ethernet LAN to the AVoIP network, which is isolated from the Control LAN network. This AVoIP LAN is connected to the same VLAN network where all IP-Logic Units are connected. The Essentials unit will be able to control all system parameters of IP-Logic devices through this network. The AVoIP LAN is a 10GBaseT network which is dedicated for the distribution of real-time Video and Audio. Thus, this AVoIP LAN must be isolated from the rest of the facility Ethernet to maximize AVoIP throughput.

***Note:** Although not required, Zigen highly recommends the implementation of a DHCP server on the AVoIP network. The DHCP server will manage IP addresses for all IP-Logic devices. If a DHCP server is not used, the IP-Logic devices will resort to self-assigned AutoIP. Refer to section [6.8 IP-Logic Isolated VLAN](#) for more information.*

Component Descriptions

3.1.2. ZIG-IPPro-TX



ZIG-IPPro-TX converts up to live HDMI 2.0 video to a visually lossless streaming network packet for transmission over 10G network. The ZIG-IPPro-TX has a single 10GBaseT copper RJ-45 connector or optical connector (10G SFP+ Multi-mode or Single-mode Modules sold separately). HDCP 1.4/2.2 content protection is supported for components such as Set-Top boxes, Blue-Ray players, gaming consoles and other media players. A single ZIG-IPPro-TX can broadcast to an almost unlimited number of IP-Logic Receivers.

The ZIG-IPPro-TX has an integrated AES-67 CODEC supporting multiple standards-based discovery and connection management protocols including Dante/SAP, RAVENNA, and AVDECC. Unlike other SDVoE based competing devices, IP Logic can broadcast SDVoE and AES67 simultaneously on the same 10GbE network. This feature will reduce the number of required network switches by eliminating the need for separate network VLANs when fully deploying both AVoIP protocols.

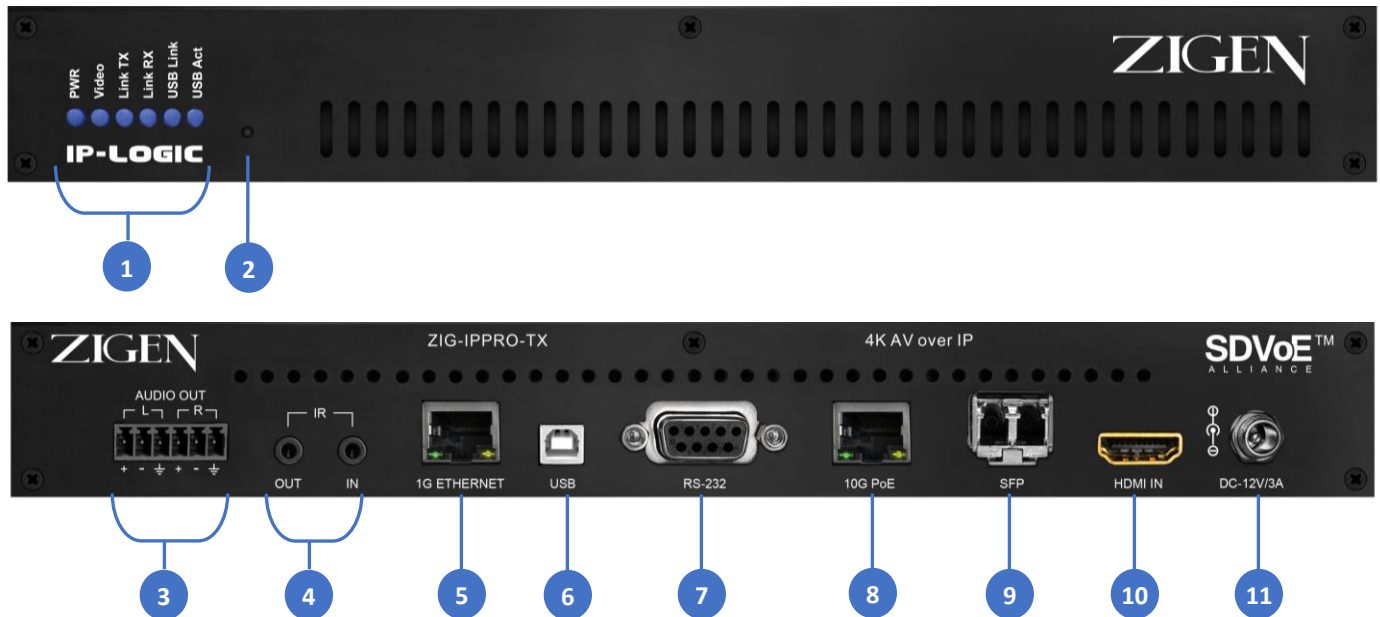
HDMI extraction of downmixed 2-channel PCM audio is supported and played out on the ZIG-IPPro-TX's built-in analog L-R audio connectors (Balanced or Unbalanced). The following audio sources could also be selected and played on the analog audio output:

- HDMI Extracted audio from other ZIG-IPPro-TX units
- ARC (ZIG-IPPro-RX)
- Balanced/Unbalanced Analog Audio In (ZIG-IPPro-RX)
- TOSLINK In (ZIG-IPPro-RX)
- AES67, Dante-AES67, RAVENNA, and Ethernet AVB Codecs

ZIG-IPPro-TX devices have IR and RS-232 inputs and outputs. The inputs will be converted to network streams to be broadcast to other IP-Logic endpoints. The signals from the outputs originate from broadcasted streams from other IP-Logic sources.

ZIG-IPPro-TX serves as a USB Local Extender (LEX) and feature a USB-Type B connector to interface with host devices such as computers. The USB packets will be converted to network streams and broadcast to other IP-Logic endpoints.

Component Descriptions



1 LED Status Lights

The blue status lights indicate the current operational status of the device.

Power – If lit, power is being applied to the unit.

Video – If lit, video from the HDMI Input is being received from a source. The negotiated HDCP decryption is successful.

Link TX – This LED should be flashing if the unit is sending AVoIP network traffic over the 10G network.

Link RX – This LED should be flashing if the unit is receiving AVoIP network traffic over the 10G network.

USB Link – If lit, then the USB port of this ZIG-IPPro-TX unit is paired with the USB port of a ZIG-IPPro-RX.

USB Act – If flashing, then USB packets are being sent and received over the 10G network.

2 Factory Default Pushbutton

Using a paper clip, press and hold this button for more than 5 seconds to reset the device to factory defaults.

3 Audio Output

6-pin Phoenix Connector for 2-Channel (Left/Right) audio outputs. The audio output can be configured for either Balanced or Unbalanced levels. Depending on the type of equipment connected (Balanced or Unbalanced Audio), the Phoenix connector must be wired as indicated on [Figure 1: Balanced Audio Pin Out](#) or [Figure 2: Unbalanced Audio Pin Out](#).

Component Descriptions

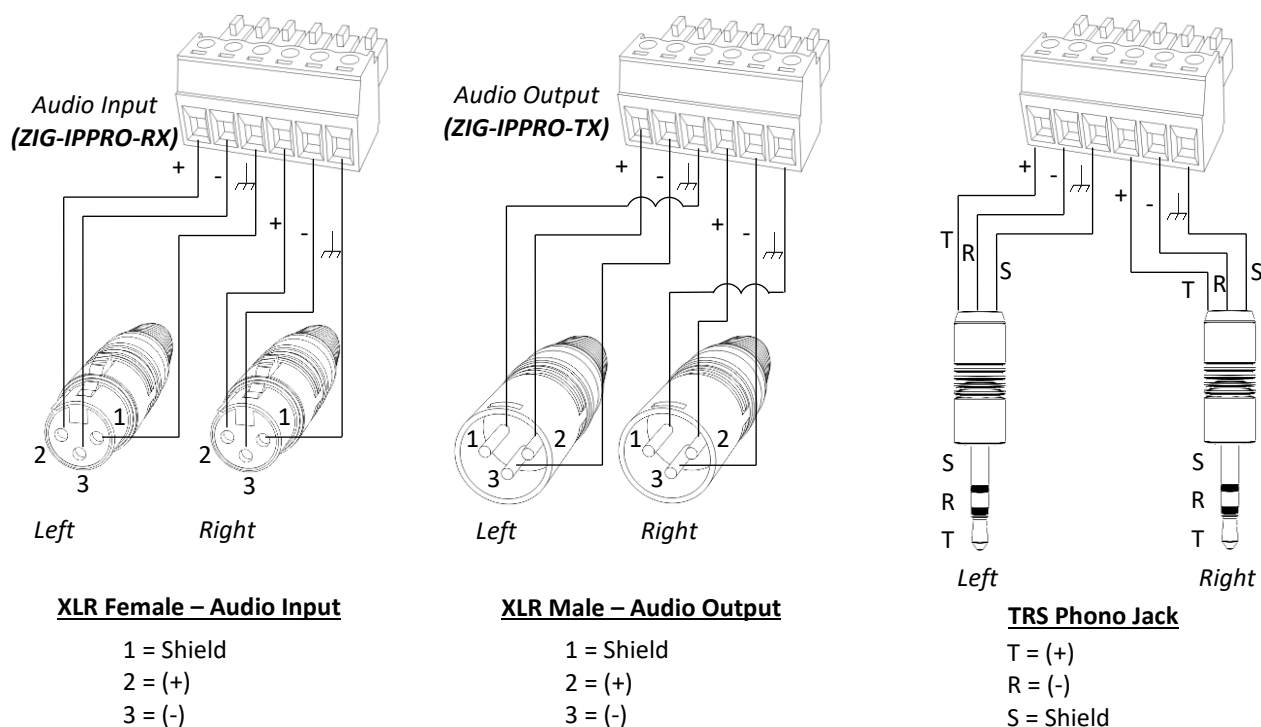


Figure 1: Balanced Audio Pin Out

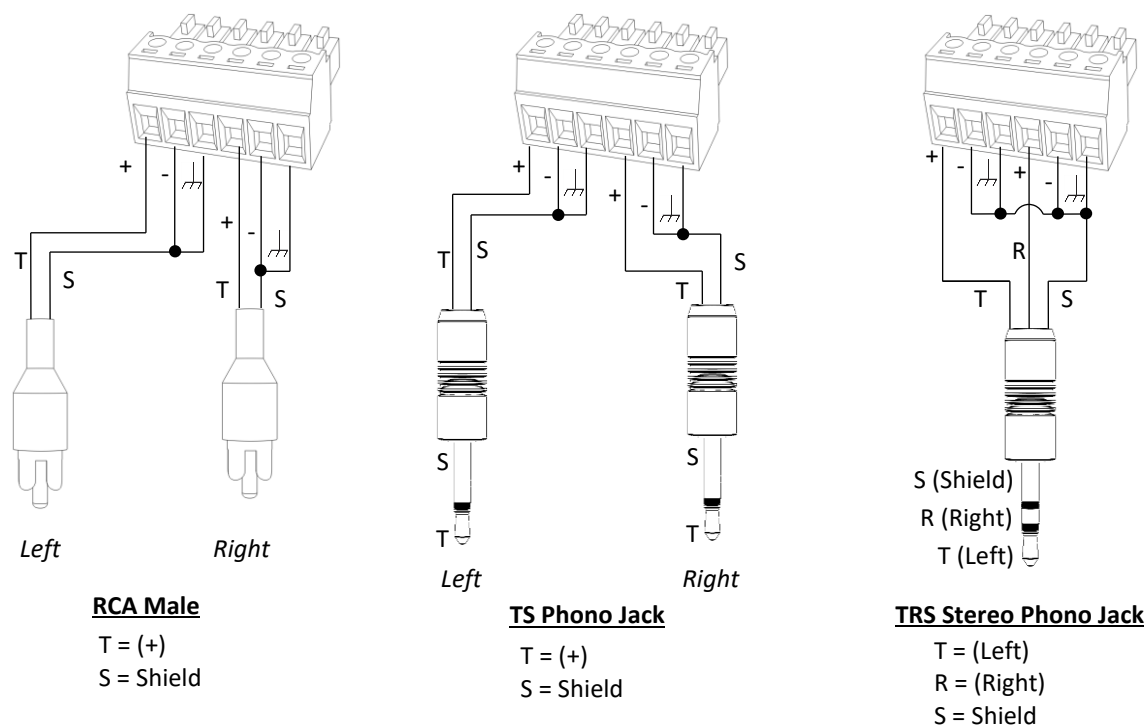


Figure 2: Unbalanced Audio Pin Out

Component Descriptions

Ensure that the ZIG-IPPRO-TX audio setting is properly configured for either Balanced or Unbalanced audio.



Important: Ensure the ZIG-IPPRO-TX audio settings match the audio interface (Balanced or Unbalanced). Failure to do so may result in extremely high volume and possibly causing damage to speakers or other equipment.

The Audio output can be sourced from the following inputs:

- Embedded 2-channel PCM audio from Local HDMI.
- Embedded 2-channel PCM audio from other ZIG-IPPRO-TX units.
- ARC from ZIG-IPPro-RX.
- Balanced/Unbalanced Analog Audio In from ZIG-IPPro-RX.
- TOSLINK In from ZIG-IPPro-RX.
- AES67, Dante-AES67, RAVENNA, and other Ethernet AVB Codecs

Selection, control and pairing assignments of audio are performed on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

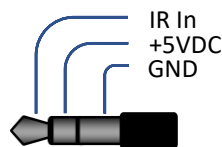
4 IR Input and Output

The IP-Logic Input and Output interface circuitry is identical to both RX and TX. The IR input supports Infrared Receivers as well as IR output electrical interfaces from Control Systems.

IR Inputs

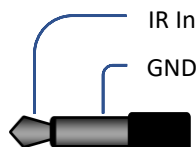
When using Infrared Receivers, it is recommended to use the included Zigen IR Receiver with the proper 3.5mm Jack pin out:

1. Tip = Signal
2. Ring = Power
3. Shield = GND



When interfacing with the electrical IR outputs from Control Systems, use a 2 pin 3.5mm Jack with the following pin out:

1. Tip = Signal
2. Ring/Shield = GND



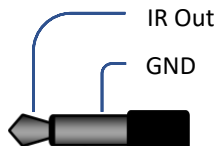
Control system electrical interfaces vary greatly with adjustable signals ranging from 3V up to 24V. For IP-Logic to properly decode the IR serial data, it is important to adhere to the following logic thresholds: < 0.8 volts for logic 0, >1.5 volts for logic 1. Adjust the control system's IR Output signal levels if required to meet the threshold requirements of IP-Logic.

Component Descriptions

IR Outputs

When using Infrared Emitters, it is recommended to use the included Zigen IR Emitter with the proper 3.5mm Jack pin out:

1. Tip = Signal
2. Ring/Shield = GND



Pairing assignments of IR input and IR output done on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

5 1G Ethernet

The IP-Logic is equipped with a 1Gbps Ethernet port to serve as a “Virtual Switch”. This virtual switch flows through the 10Gbps VLAN and is designed to extend a 1Gbps Ethernet port between TX and RX. This interface allows additional hosts to be connected to the 10Gbps network.

This IEEE 802.1ab compliant LAN interface performs with the characteristic behavior of a virtual unmanaged switch and does not have control over discrete Layer 2 or Layer 3 configuration parameters. Below are some important items to take into consideration when using the 1Gbps network interface:

- No support for jumbo packets due to hardware limitations.
- No VLAN or priority assignments.
- No implementation of spanning tree protocol (STP/BPDU) loop protection.
- Do not loop back the 1Gbps interface to the same switch network as the 10Gbps interface.
- Do not use as a bridge between a 10Gbps switch to a 1Gbps switch.
- Using this port allows 3rd party hosts (Audio Codecs, Computers, etc.) to participate in the 10Gbps AVoIP network.

6 USB

IP-Logic extends USB 2.0 interface over IP. A USB Host such as a PC is typically connected to the ZIG-IPPRO-TX and a USB Device (Keyboard, Mouse, Webcam, Flash Drives) is connected to the ZIG-IPPRO-RX. The RX is equipped with a two-port hub to allow multiple devices to connect to a host.

A virtual USB hub could be configured by connecting one Transmitter with up to seven Receivers. It is important to remember that only one high-speed USB device (Webcams or Flash Drives) be connected to an RX unit at any time. There are no limits to the number simultaneous connections of low speed devices such as Keyboards and Mice.

Pairing assignments of USB transmitters and receivers are done on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

Component Descriptions

7 RS-232

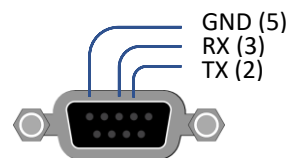
IP-Logic is compatible with full duplex TIA-232-C compliance. IP-Logic devices utilize a 3-wire RS-232 connection with no flow control hardware support. Because of the packet nature of data transmission between TX and RX devices, Isochronous transmission is not guaranteed.

Note: Sustained transmission over a long period of uninterrupted RS-232 traffic is only guaranteed with baud rates up to 19,200 bps. Exceeding this baud rate without breaks in the transmission will result in data loss.

Prior to connecting RS-232 devices to IP-Logic, configure the UART settings such as baud rate, data width, stop bits and parity. These settings will persist until changed in the Essentials webserver.

Pairing assignments of RS-232 transmitters and receivers are done on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

The pin out of the RS-232 9-pin DSub connector are as follows:



8 10G Ethernet with POE

This 10Gbase-T Copper Ethernet LAN (RJ-45) connects to the AVoIP network. This port broadcasts video (SDVoE), audio (AES67), and control network packets to other IP-Logic devices connected on the same VLAN. A single or multiple 10G managed switch is required and the number of Ethernet ports on the switch(s) are dictated by the number of IP-Logic devices deployed in the system. A Managed Layer 3 switch is recommended, however, a Layer 2 Managed switch with IGMP Version 2 support can also be used. Refer to section [6.3 10Gbase-T Ethernet Switch Requirements](#) for more information on the requirements of the 10G managed switch.

The Essentials unit will be able to control all system parameters of the ZIG-IPPRO-TX through this network provided the Essentials AVOIP LAN is connected on the same subnet.

Note: Although not required, Zigen highly recommends the implementation of a DHCP server on the AVoIP network. The DHCP server will manage IP addresses for all IP-Logic devices. If a DHCP server is not used, the IP-Logic devices will resort to self-assigned AutoIP. Refer to section [6.8 IP-Logic Isolated VLAN](#) for more information.

The 10G Ethernet port supports Power Over Ethernet (POE) the power the ZIG-IPPRO-TX and eliminate the need for the external power supply. The ZIG-IPPRO-TX is POE Compliant with 30 Watts, IEEE802.3at Type 2 PoE+. Ensure that the POE injector is capable of supplying this much power. Refer to section [5.4 Power over Ethernet \(PoE\)](#) for more information on POE.

Component Descriptions

Below is a list of recommended Ethernet Category cable for the 10G Ethernet (RJ-45) port:

Cable Length

Cat5e	30 meters (100 feet)
Cat6	30 meters (100 feet)
Cat6e	100 meters (330 feet)
Cat7	100 meters (330 feet)

9 SFP Optical Ethernet

This 10Gbase-T SFP Optical Ethernet LAN connects to the AVoIP network to distribute packet video (SDVoE), audio (AES67), and control. This port functions the same as the 10Gbase-T Copper Ethernet LAN. The SFP Optical takes precedence in the event that both 10G copper and optical ports are connected to the AVoIP network; however, the POE on the 10G copper port will always be active if connected to a suitable POE injector.

A Zigen recommended SFP+ module is required (not included) to use this port. Below is a list of available SFP+ modules:

Fiber Length

OM3 multi-mode Fiber	300 meters (1000 feet)
single-mode Fiber	10,000 meters (32,800 feet)

9 HDMI Input

19-pin Type A HDMI input connector conforming to HDMI 2.0b. HDCP version 1.4, 2.2, and 2.3 are supported.

Connect this HDMI Input to a source such as Cable Set Top Box, Media Players, Blu-ray Player, Computers, etc. The incoming video will be packetized for broadcast over the 10G Ethernet port (Copper or Optical).

For 4K video resolutions, Zigen highly recommends the use of Premium 4K Certified HDMI cables. Zigen offers these cables ranging from 3.0 meters to 9.15 meters.

The HDMI Input supports the latest HDR standard such as Dolby Vision and HDR10+.

10 DC-12V/3A Power Jack

Connect the included Universal AC Power Adaptor to this power jack. The ZIG-IPPRO-TX requires 12 VDC at 3 Amps. Tighten the locking collar to prevent the power jack from accidental disconnection.

As an alternative to the Universal AC Power Adaptor, the ZIG-IPPRO-TX supports IEEE802.3at Type 2 PoE+, 30 Watts over the 10G Ethernet Copper RJ-45 port. A suitable upstream POE power injector is required for this power option.

Component Descriptions

3.1.3. ZIG-IPPro-RX



ZIG-IPPro-RX decodes network packet streams over the 10G IP Network and converts the signal up to live HDMI 2.0 video and audio. A single 10G copper RJ-45 connector or optical connector (10G SFP+ Modules sold separately) are used to receive the network packets. The HDCP 1.4/2.2/2.3 supported HDMI output is connected to displays such as TVs, projectors, monitors, and HDMI Audio Processors.

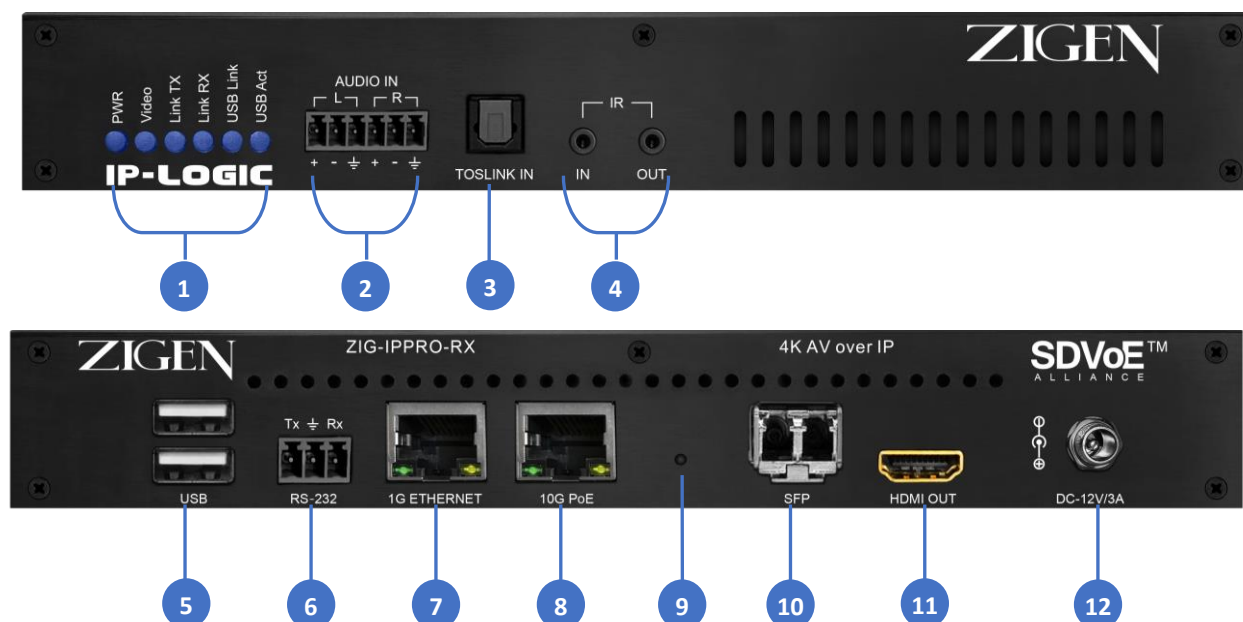
ZIG-IPPro-RX can upscale or downscale an incoming stream. Frame rate conversion and color-space conversion are also supported to optimize the HDMI video to the native video format of the display.

Audio Return Channel (ARC), Balanced or Unbalanced Analog Audio Input, and Optical Audio TOSLINK Input are included for streaming over IP Network. These streamed audio channels will be received by selected ZIG-IPPro-TX to be played out on its respective analog audio connectors. The same streamed audio channels can also be sent to the ZIG-IPPro-TX's integrated AES67 CODEC to be broadcasted to other AES67 enabled devices.

ZIG-IPPro-RX devices have IR and RS-232 inputs and outputs. The inputs will be converted to network streams to be broadcast to other IP-Logic endpoints. The signals from the outputs originate from broadcasted streams from other IP-Logic sources.

ZIG-IPPro-RX serves as a USB Remote Extender (REX) and feature dual USB-Type A connectors to interface with slave devices such as keyboards, mice, webcams, or USB Drives. The USB packets will be converted to network streams and broadcast to other IP-Logic endpoints.

Component Descriptions



1 LED Status Lights

The blue status lights indicate the current operational status of the device.

Power – If lit, power is being applied to the unit.

Video – If lit, valid packet video from the network is being received by the receiver.

Link TX – This LED should be flashing if the unit is sending AVoIP network traffic over the 10G network.

Link RX – This LED should be flashing if the unit is receiving AVoIP network traffic over the 10G network.

USB Link – If lit, then the USB port of this ZIG-IPPro-RX unit is paired with the USB port of a ZIG-IPPro-TX.

USB Act – If flashing, then USB packets are being sent and received over the 10G network.

2 Analog Audio In

6-pin Phoenix Connector for 2-Channel (Left/Right) audio input. The audio input can be configured for either Balanced or Unbalanced levels. Depending on the type of equipment connected (Balanced or Unbalanced Audio), the Phoenix connector must be wired according to [Figure 1: Balanced Audio Pin Out](#) or [Figure 2: Unbalanced Audio Pin Out](#).

Ensure that the ZIG-IPPRO-RX audio level settings are properly configured for either Balanced, Unbalanced, or Headphone audio.



Important: Ensure the ZIG-IPPRO-RX audio settings match the audio interface (Balanced or Unbalanced). Failure to do so may result in extremely high audio volume and possibly causing damage to speakers or other equipment.

The Analog Audio will be digitized then converted to packet data to be broadcast to other ZIG-IPPRO-TX units. This Analog Audio input can be heard from a paired ZIG-IPPRO-TX's analog audio output.

Component Descriptions

Selection, control and pairing assignments of audio are performed on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

3 TOSLINK In

The TOSLINK input is typically connected to a Smart TV's TOSLINK output. This interface supports 2-Channel PCM format and can be selected to be broadcast to other ZIG-IPPRO-TX units. This TOSLINK input can be heard from a paired ZIG-IPPRO-TX's analog audio output.

4 IR In and Out

The IP-Logic Input and Output interface circuitry is identical to both RX and TX. The IR input supports Infrared Receivers as well as IR output electrical interfaces from Control Systems.

IR Inputs

When using Infrared Receivers, it is recommended to use the included Zigen IR Receiver with the proper 3.5mm Jack pin out:

4. Tip = Signal
5. Ring = Power
6. Shield = GND



When interfacing with the electrical IR outputs from Control Systems, use a 2 pin 3.5mm Jack with the following pin out:

3. Tip = Signal
4. Ring/Shield = GND

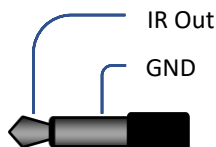


Control system electrical interfaces vary greatly with adjustable signals ranging from 3V up to 24V. For IP-Logic to properly decode the IR serial data, it is important to adhere to the following logic thresholds: < 0.8 volts for logic 0, >1.5 volts for logic 1. Adjust the control system's IR Output signal levels if required to meet the threshold requirements of IP-Logic.

IR Outputs

When using Infrared Emitters, it is recommended to use the included Zigen IR Emitter with the proper 3.5mm Jack pin out:

1. Tip = Signal
2. Ring/Shield = GND



Pairing assignments of IR input and IR output done on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

Component Descriptions

5 USB

IP-Logic extends USB 2.0 interface over IP. A USB Host such as a PC is typically connected to the ZIG-IPPRO-TX and a USB Device (Keyboard, Mouse, Webcam, Flash Drives) is connected to the ZIG-IPPRO-RX. The RX is equipped with a two-port hub to allow multiple devices to connect to a host.

A virtual USB hub could be configured by connecting one Transmitter with up to seven Receivers. It is important to remember that only one high-speed USB device (Webcams or Flash Drives) be connected to an RX unit at any time. There are no limits to the number simultaneous connections of low speed devices such as Keyboards and Mice.

Pairing assignments of USB transmitters and receivers are done on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

6 RS-232

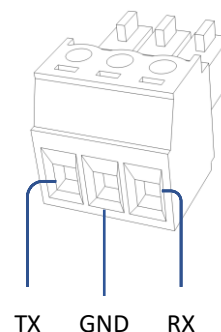
IP-Logic is compatible with full duplex TIA-232-C compliance. IP-Logic devices utilize a 3-wire RS-232 connection with no flow control hardware support. Because of the packet nature of data transmission between TX and RX devices, Isochronous transmission is not guaranteed.

Note: Sustained transmission over a long period of uninterrupted RS-232 traffic is only guaranteed with baud rates up to 19,200 bps. Exceeding this baud rate without breaks in the transmission will result in data loss.

Prior to connecting RS-232 devices to IP-Logic, configure the UART settings such as baud rate, data width, stop bits and parity. These settings will persist until changed in the Essentials webserver.

Pairing assignments of RS-232 transmitters and receivers are done on the Essentials webserver or through 3rd Party Control Systems with appropriate drivers.

The pin out of the RS-232 9-pin DSub connector are as follows:



7 1G Ethernet

The IP-Logic is equipped with a 1Gbps Ethernet port to serve as a “Virtual Switch”. This virtual switch flows through the 10Gbps VLAN and is designed to extend a 1Gbps Ethernet port between TX and RX. This interface allows additional hosts to be connected to the 10Gbps network.

This IEEE 802.1ab compliant LAN interface performs with the characteristic behavior of a virtual unmanaged switch and does not have control over discrete Layer 2 or Layer 3 configuration parameters. Below are some important items to take into consideration when using the 1Gbps network interface:

Component Descriptions

- No support for jumbo packets due to hardware limitations.
- No VLAN or priority assignments.
- No implementation of spanning tree protocol (STP/BPDU) loop protection.
- Do not loop back the 1Gbps interface to the same switch network as the 10Gbps interface.
- Do not use as a bridge between a 10Gbps switch to a 1Gbps switch.
- Using this port allows 3rd party hosts (Audio Codecs, Computers, etc.) to participate in the 10Gbps AVoIP network.

8 10G POE Ethernet

This 10Gbase-T Copper Ethernet LAN (RJ-45) connects to the AVoIP network. This port broadcasts video (SDVoE), and control network packets to other IP-Logic devices connected on the same VLAN. A single or multiple 10G managed switch is required and the number of Ethernet ports on the switch(s) are dictated by the number of IP-Logic devices deployed in the system. A Managed Layer 3 switch is recommended, however, a Layer 2 Managed switch with IGMP Version 2 support can also be used. Refer to section [6.3 10Gbase-T Ethernet Switch Requirements](#) for more information on the requirements of the 10G managed switch.

The Essentials unit will be able to control all system parameters of the ZIG-IPPRO-RX through this network provided the Essentials AVOIP LAN is connected on the same subnet.

Note: *Although not required, Zigen highly recommends the implementation of a DHCP server on the AVoIP network. The DHCP server will manage IP addresses for all IP-Logic devices. If a DHCP server is not used, the IP-Logic devices will resort to self-assigned AutoIP. Refer to section [6.8 IP-Logic Isolated VLAN](#) for more information.*

The 10G Ethernet port supports Power Over Ethernet (POE) the power the ZIG-IPPRO-RX and eliminate the need for the external power supply. The ZIG-IPPRO-RX is POE Compliant with 30 Watts, IEEE802.3at Type 2 PoE+. Ensure that the POE injector is capable of supplying this much power. Refer to section [5.4 Power over Ethernet \(PoE\)](#) for more information on POE.

Below is a list of recommended Ethernet Category cable for the 10G Ethernet (RJ-45) port:

Cable Length

Cat5e	30 meters (100 feet)
Cat6	30 meters (100 feet)
Cat6e	100 meters (330 feet)
Cat7	100 meters (330 feet)

9 Factory Default Pushbutton

Using a paper clip, press and hold this button for more than 5 seconds to reset the device to factory defaults.

Component Descriptions

9 SFP Optical Ethernet

This 10Gbase-T SFP Optical Ethernet LAN connects to the AVoIP network to distribute packet video (SDVoE) and control. This port functions the same as the 10Gbase-T Copper Ethernet LAN. The SFP Optical takes precedence in the event that both 10G copper and optical ports are connected to the AVoIP network; however, the POE on the 10G copper port will always be active if connected to a suitable POE injector.

A Zigen recommended SFP+ module is required (not included) to use this port. Below is a list of available SFP+ modules:

Fiber Length

OM3 multi-mode Fiber	300 meters (1000 feet)
single-mode Fiber	10,000 meters (32,800 feet)

9 HDMI Output

19-pin Type A HDMI output connector conforming to HDMI 2.0b. HDCP version 1.4, 2.2, and 2.3 are supported.

Connect this HDMI Output to a sink device such as a Display or an AV Receiver. The incoming packet video from the 10G Ethernet port (Copper or Optical) will be decoded to real-time HDMI video.

For 4K video resolutions, Zigen highly recommends the use of Premium 4K Certified HDMI cables. Zigen offers these cables ranging from 3.0 meters to 9.15 meters.

The HDMI Output supports the latest HDR standard such as Dolby Vision and HDR10+.

10 DC-12V/3A Power Jack

Connect the included Universal AC Power Adaptor to this power jack. The ZIG-IPPRO-RX requires 12 VDC at 3 Amps. Tighten the locking collar to prevent the power jack from accidental disconnection.

As an alternative to the Universal AC Power Adaptor, the ZIG-IPPRO-RX supports IEEE802.3at Type 2 PoE+, 30 Watts over the 10G Ethernet Copper RJ-45 port. A suitable upstream POE power injector is required for this power option.

Features

3.2. Features of IP-Logic Series

Features	ZIG-IPPRO-TX/RX
HDMI 2.0	✓
HDCP 1.4/2.2/2.3	✓
Maximum resolution	4K UHD/DCI
Maximum 4K Framerate	60fps 4:4:4
Video Compression	SDVoE (1.4:1 artifact-free when exceeding 10G)
Audio Compression	SDVoE (Lossless)
Audio Network Transport	AES67 and ST2110-30/31
Audio Discovery and Registration	Dante-AES67, RAVENNA, Ethernet AVB
Scaling	✓
Single-Frame Switching	✓
Video Wall	✓
Bezel Correction	✓
Multiview	✓
Color-Space-Conversion	✓
Chroma Sub-Sampling	✓
Frame-Rate Conversion	✓
Multichannel Audio Downmixing	✓
SDVoE Latency	< 120ms (Genlock mode)
AES67 Latency	125 us
Analog Audio Balanced/Unbalanced	RX (Input), TX (Output)
Audio Delay	✓
Auto Discovery (IP)	✓
Auto IP	✓
Dolby Vision, HDR10+, HDR10, HLG	✓
Preview Thumbnail streams	✓
On-Screen Display	✓
CEC	✓
ARC	✓
EDID Management	✓
10GbE SFP Optical (Default port)	Simultaneous transport of SDVoE and AES67 (TX)
10GbE Copper RJ-45	Simultaneous transport of SDVoE and AES67 (TX)
1GbE Copper RJ-45	✓
IR In	✓
IR Out	✓
RS-232 In	✓
RS-232 Out	✓
USB 2.0 (480 Mbps)	✓
USB (Host Connection Type-B)	TX
USB (Device Connection Type-A)	RX

Features

USB Hub (Dual Type-A)	RX
Open Control API	✓
Web GUI	✓
Programmable EDID	✓
Peak Bandwidth per stream	10Gb
PoE	✓
Fanless Chassis	✓
Rack Mountable	IP-Logic Pro Cage with intelligent thermal management (support for up to ten IP Logic devices)
Drivers	¹ Crestron, RTI, Control4, URC, Savant

¹ Control system drivers subject to availability.

Video and Audio Applications

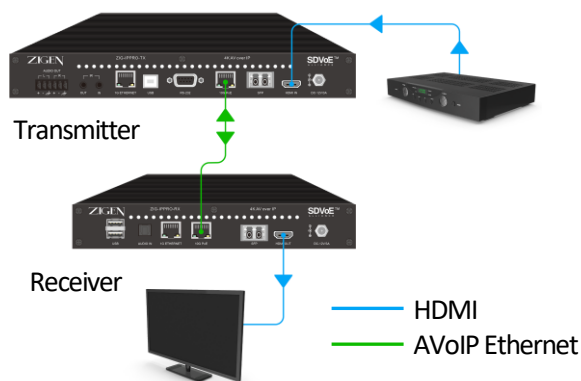
4. Video and Audio Applications

IP-Logic can be configured from a simple Point-to-Point connection without a managed network switch, to a complex videowall application using multiple Transmitters and multiple Receivers. As the customer needs grow, the deployment can be easily scaled by adding more Transmitters and Receivers as required.

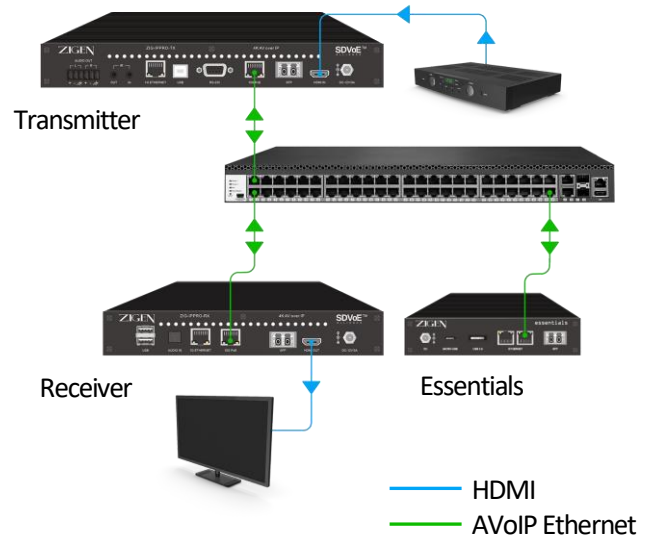
4.1. Point to Point - Single Transmitter and Single Receiver

The simplest connection of IP-Logic is a single Transmitter and a single Receiver in a “Point-to-Point” configuration without the need for Essentials and a managed network switch. Although this type of connection does not allow any control of the IP-Logic devices, an Essentials and a network switch may have to be employed first so that the Transmitter and Receiver will automatically connect. Once connected, Essentials and the network switch could be removed.

Point-to-Point Direct Connection



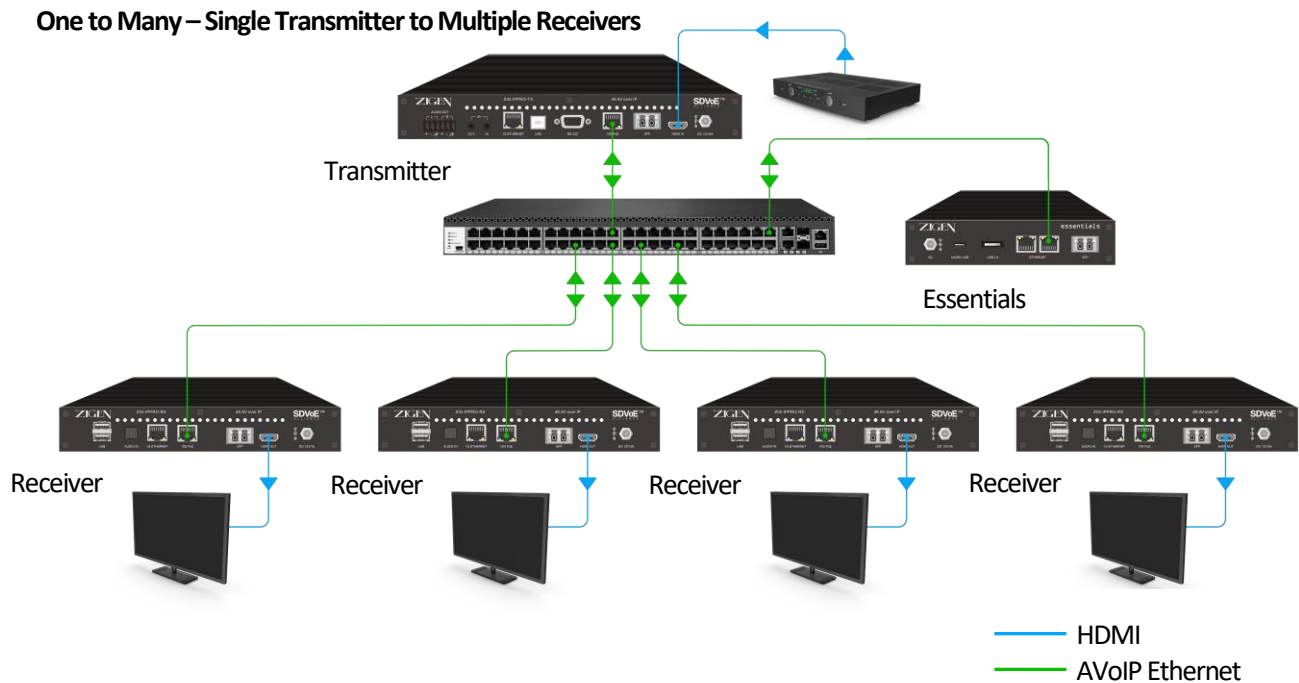
Point-to-Point Connection



Video and Audio Applications

4.2. One to Many - Single Transmitter to Multiple Receivers

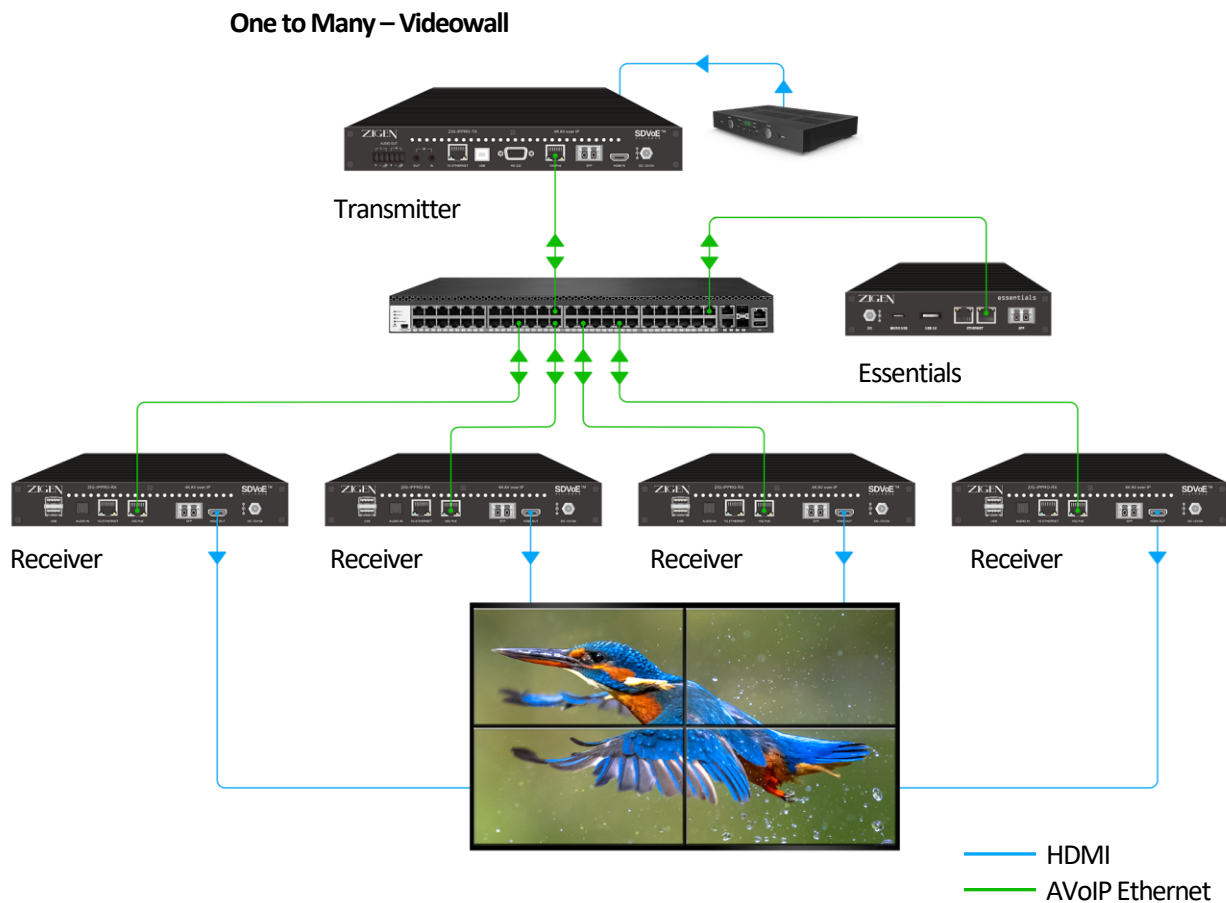
A One to Many consist of one IP-Logic Transmitter sending a single video stream to multiple IP-Logic Receivers. In this scenario, a single Transmitter will broadcast a video network stream and numerous Receivers will receive this broadcast for showing on their local display device. This scenario is similar to the function of a dedicated distribution amplifier.



Video and Audio Applications

4.3. One to Many – Videowall

The videowall scenario is similar to the One to Many – Single Transmitter to Multiple Receives where the interconnect between the Transmitter and Receives are the same. The only difference is the Receivers are configured to scale a small portion of the incoming video stream depending on the location of its local display to an array of displays. A Videowall effectively turns the array of displays into one very large display. IP-Logic has bezel correction to compensate for the thickness of the display bezel by virtually hiding the pixels that need to be obscured by the display bezel.

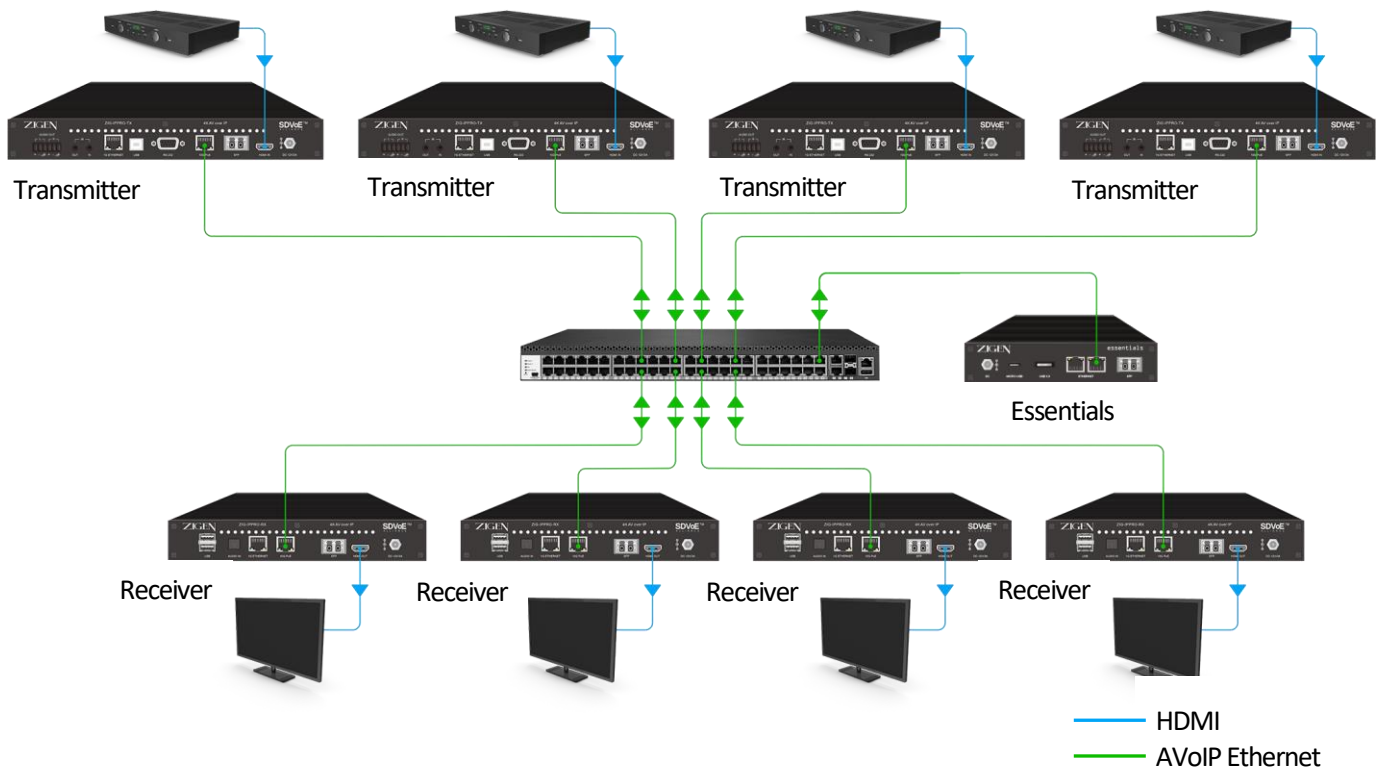


Video and Audio Applications

4.4. Many to Many - Multiple Transmitters to Multiple Receivers

Many to Many Connections consist of multiple Transmitters and multiple Receivers on the same network. In this scenario, multiple Transmitters will broadcast video network streams and numerous selected Receivers will receive the broadcast for showing on their local display device. This scenario is similar to the function of a dedicated matrix switch.

Many to Many – Multiple Transmitters to Multiple Receivers

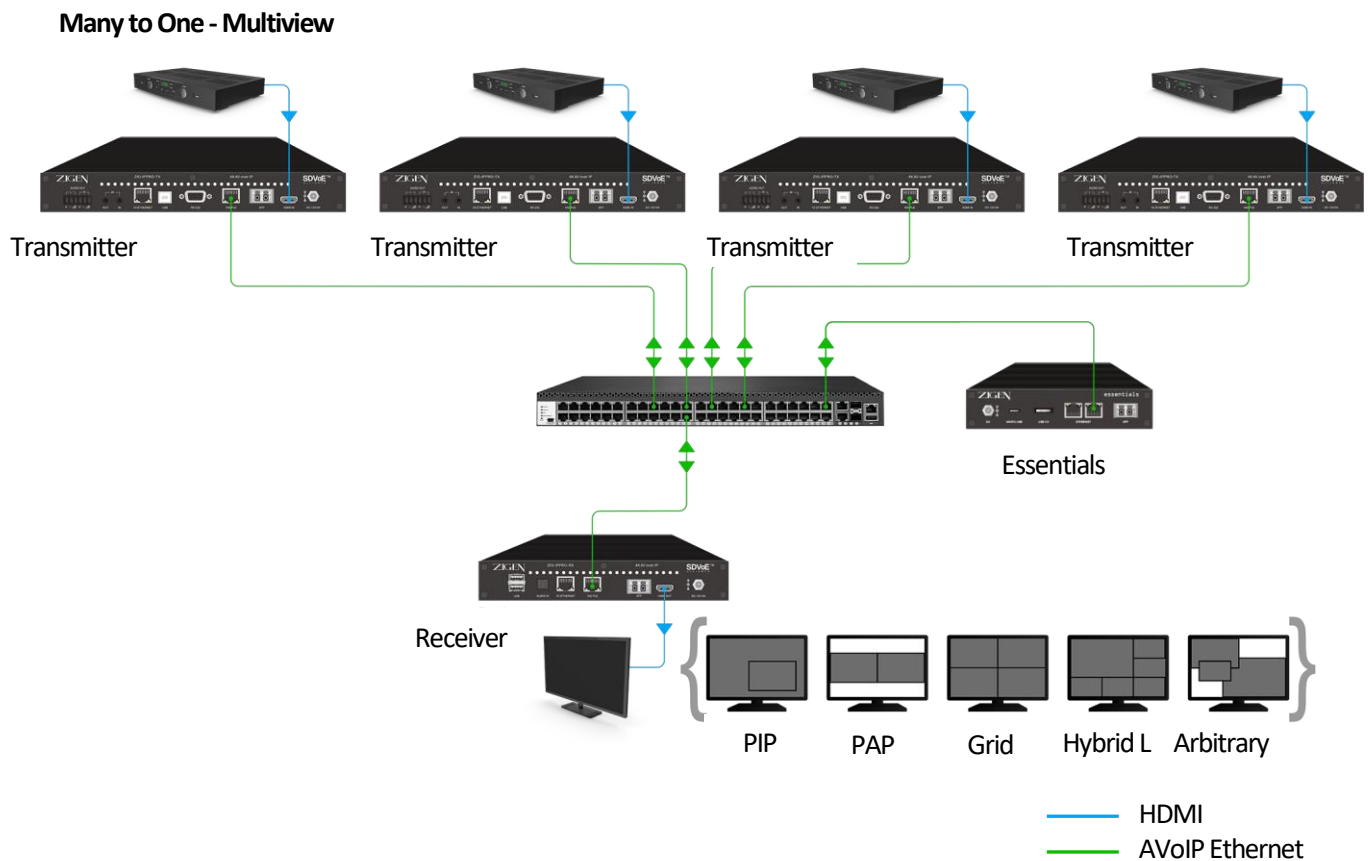


Video and Audio Applications

4.5. Multiview – Multiple Transmitters to a Single Receiver

A Multiview Connection consists of multiple Transmitters and one Receiver on the same network. In this scenario, multiple Transmitters will broadcast video network streams and a single Receiver will receive all desired broadcasts for showing on its local display device. IP-Logic supports numerous Multiview layouts for displaying multiple video elements on a single display including the following:

- Picture in Picture (PIP)
- Picture and Picture (PaP)
- Matrix Grid (2x2, 3x3, 4x4, etc.)
- L-Shape Hybrid Grid
- Arbitrary (elements are placed anywhere on the screen)



Video and Audio Applications

4.6. AES67 Stream Distribution

A major highlight of the IP-Logic Ecosystem is the inclusion of both SDVoE and AES67 sharing the same network LAN. A separate network is not required, therefore, reduces deployment costs.

IP-Logic units featuring AES67 Audio Network Transport can be structured to stream in a One-to-One or One-to-Many configuration. IP-Logic can extract or inject audio packets between SDVoE and AES67 systems (contingent on the options of the IP-Logic units).

Depending on the features of the IP-Logic devices, AES67 Transmitters (Encoders) receive their audio sources from HDMI equipped units (AppleTV, Cable Box, Blu-ray), unbalanced analog audio (Smart Phones, Tablets, Media Players), balanced analog audio (audio mixers, sound processors, microphones) or TOSLINK optical audio (TV, Audio/Video Receivers).

Similarly, AES67 Receivers (Decoders) can output audio to HDMI equipped devices (TVs, AV receivers), unbalanced audio (Sound Bars, self-powered speakers), or balanced audio (mixing consoles, professional amplifiers) depending on the features of the IP-Logic device.

Installation Guidelines

5. Installation Guidelines

The IP-Logic system is simple to deploy; however, it is highly recommended to prototype the installation at the integrator facility before installing at the customer site. The devices can be preconfigured and debugged in a controlled and flexible environment where more time can be dedicated to determining problem areas with the installation. With early preparation, the installer will save time and money and minimize the time constraint of installation at the customer site.

5.1. IP Logic Mechanical Dimensions

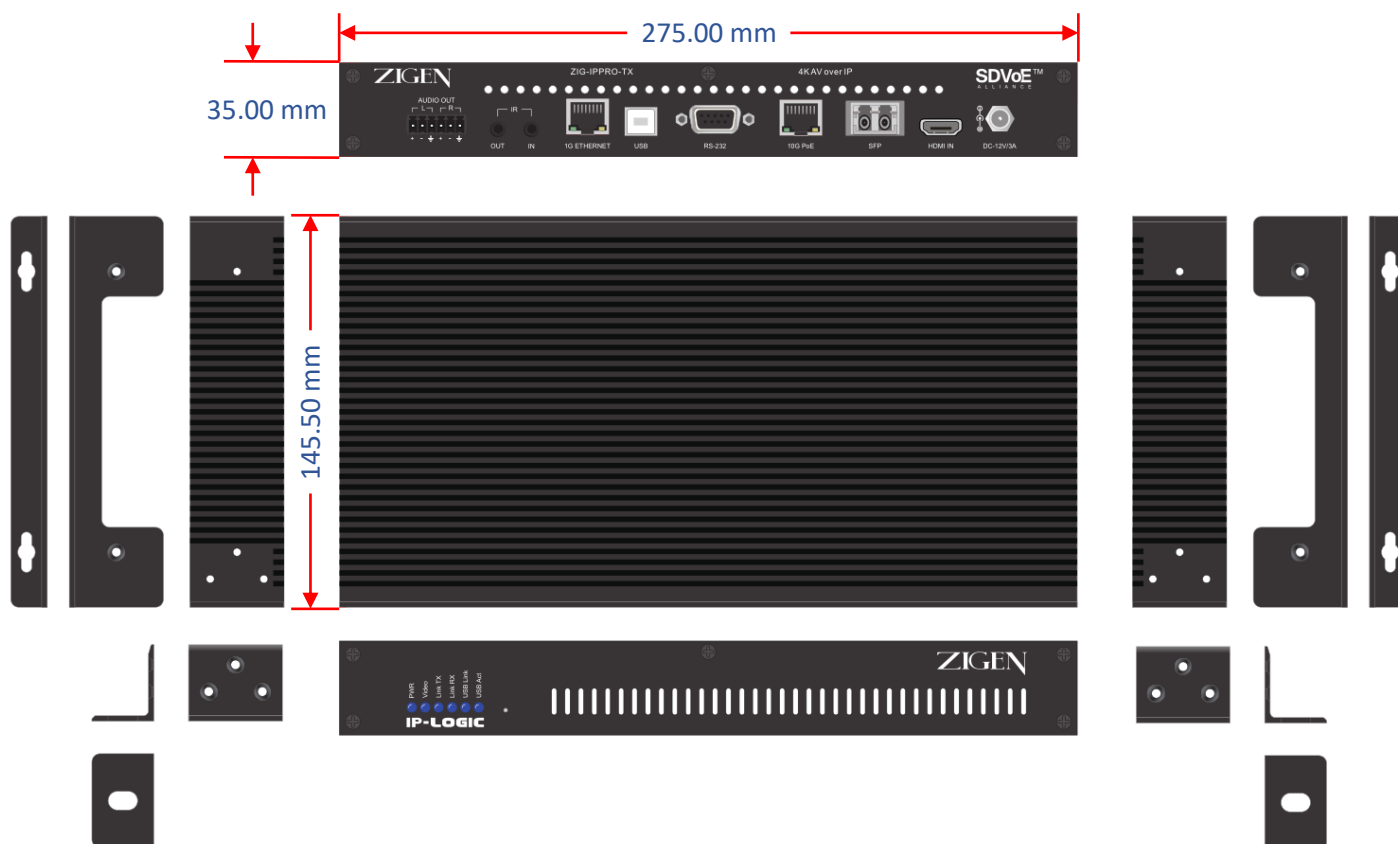


Figure 3. ZIG-IPPRO-TX Dimensions

Installation Guidelines

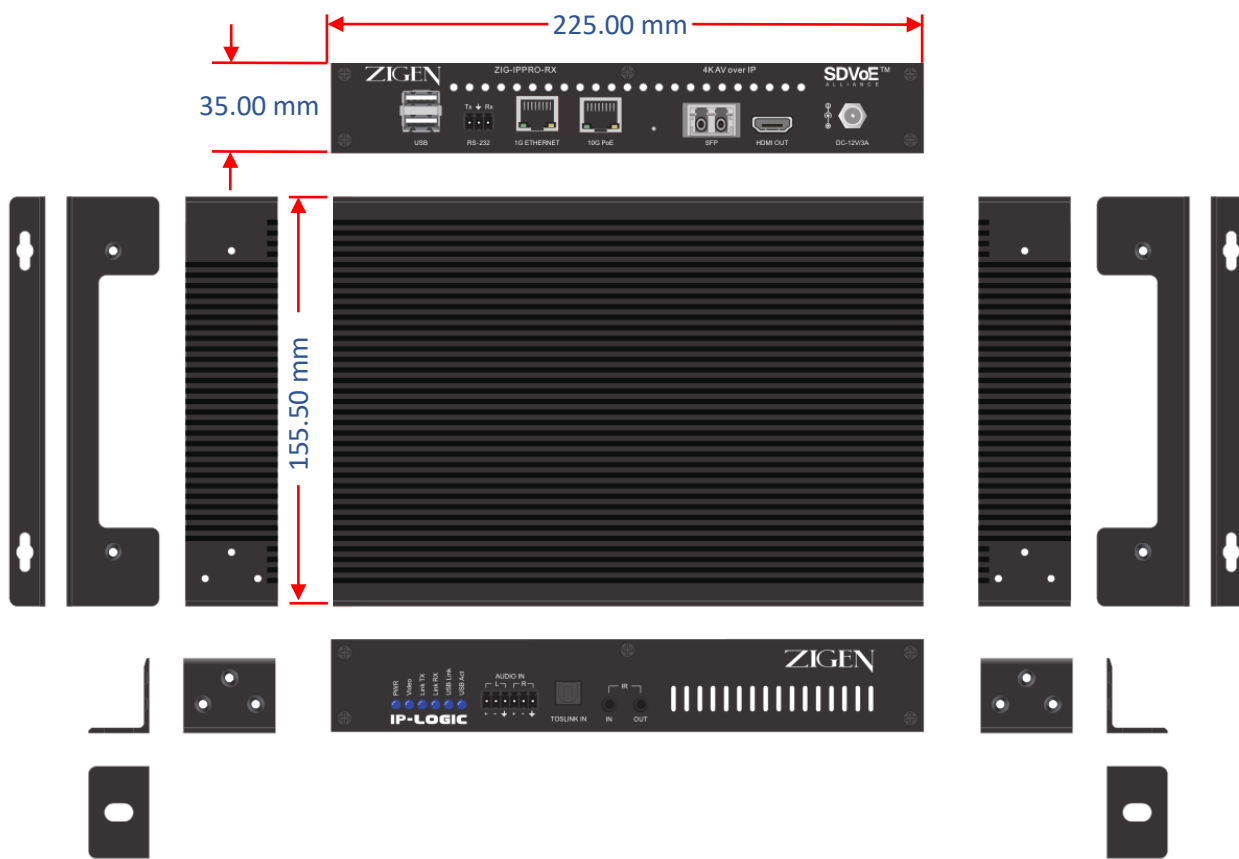


Figure 4. ZIG-IPPRO-RX Dimensions

Installation Guidelines

5.2. Wall and Panel Mounting

The IP-Logic units include all necessary hardware for wall or panel mounting. Secure the appropriate mounting ear set on both sides of the IP-Logic devices (see [Figure 5. Wall Mount Ear Installation](#) and [Figure 6. Panel Mount Ear Installation](#)). The type of ear to be installed depends on the installation.

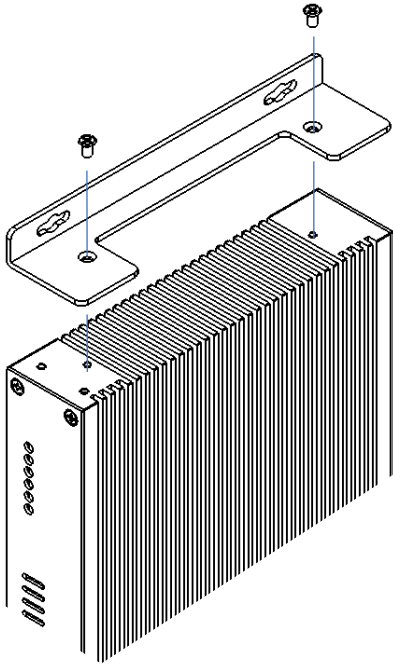


Figure 5. Wall Mount Ear Installation

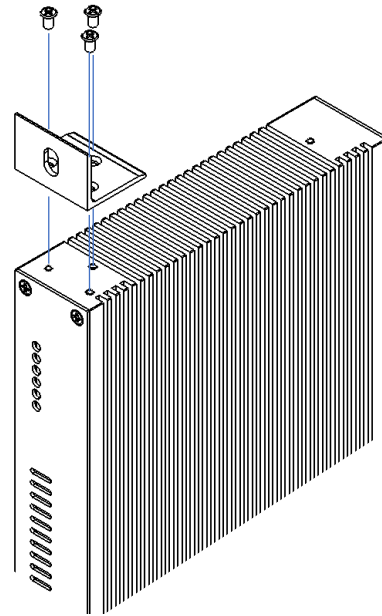


Figure 6. Panel Mount Ear Installation

5.3. Rack Mounting

The IP-Logic devices can be rack mounted using the ZIG-ILC-CAGE option (sold separately). The ZIG-ILC-CAGE has all the necessary hardware for installing on an equipment rack.

Install the Rack Mount Ears that came with the ZIG-ILC-CAGE kit to both sides of the IP-Logic device (see [Figure 7. Rack Mount Ear Installation](#)). Secure the IP-LOGIC unit to the wall or panel.

Install the required video, audio, and control cables on the back of the IP-LOGIC device then apply power.

Installation Guidelines

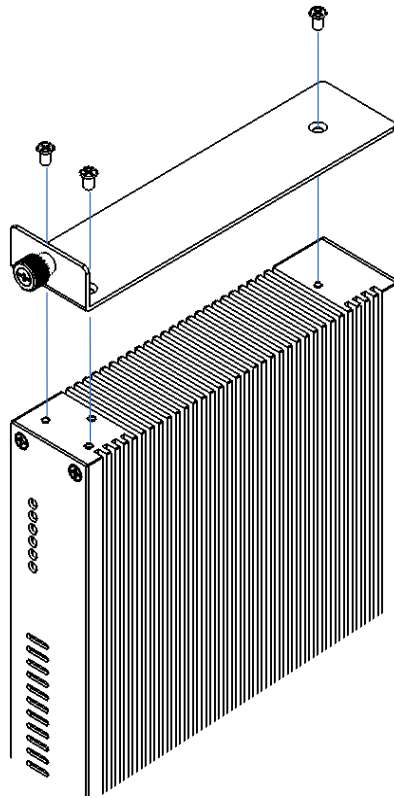


Figure 7. Rack Mount Ear Installation

Remove the required number of Cover Plates on the ZIG-ILC-CAGE. **Figure 8** shows the Cover Plate for slot #4 was removed before installing an IP-Logic unit.



Important: The ZIG-ILC-CAGE has intelligent thermal management with fans located on the bottom of the chassis to adequately cool installed IP-Logic devices. Intelligent thermal management will keep fan speeds to a minimum to reduce unwanted fan noise and will only increase fan speeds when IP-Logic devices start to reach the upper limits of its operating temperatures. The Cover Plates are an integral part of the thermal profile, therefore, only remove the required number of Cover Plates. Do not leave any of the ZIG-ILC-CAGE front access opening uncovered.



Important: Do not block the air intake of the ZIG-ILC-CAGE.

Slide the IP-Logic unit with installed rack ears inside the ZIG-ILC-CAGE. Align the unit then tighten the thumb screws of the rack ears to securely mount the IP-LOGIC device to the Cage.

Install the required video, audio, and control cables on the back of the IP-LOGIC device then apply power.

Installation Guidelines

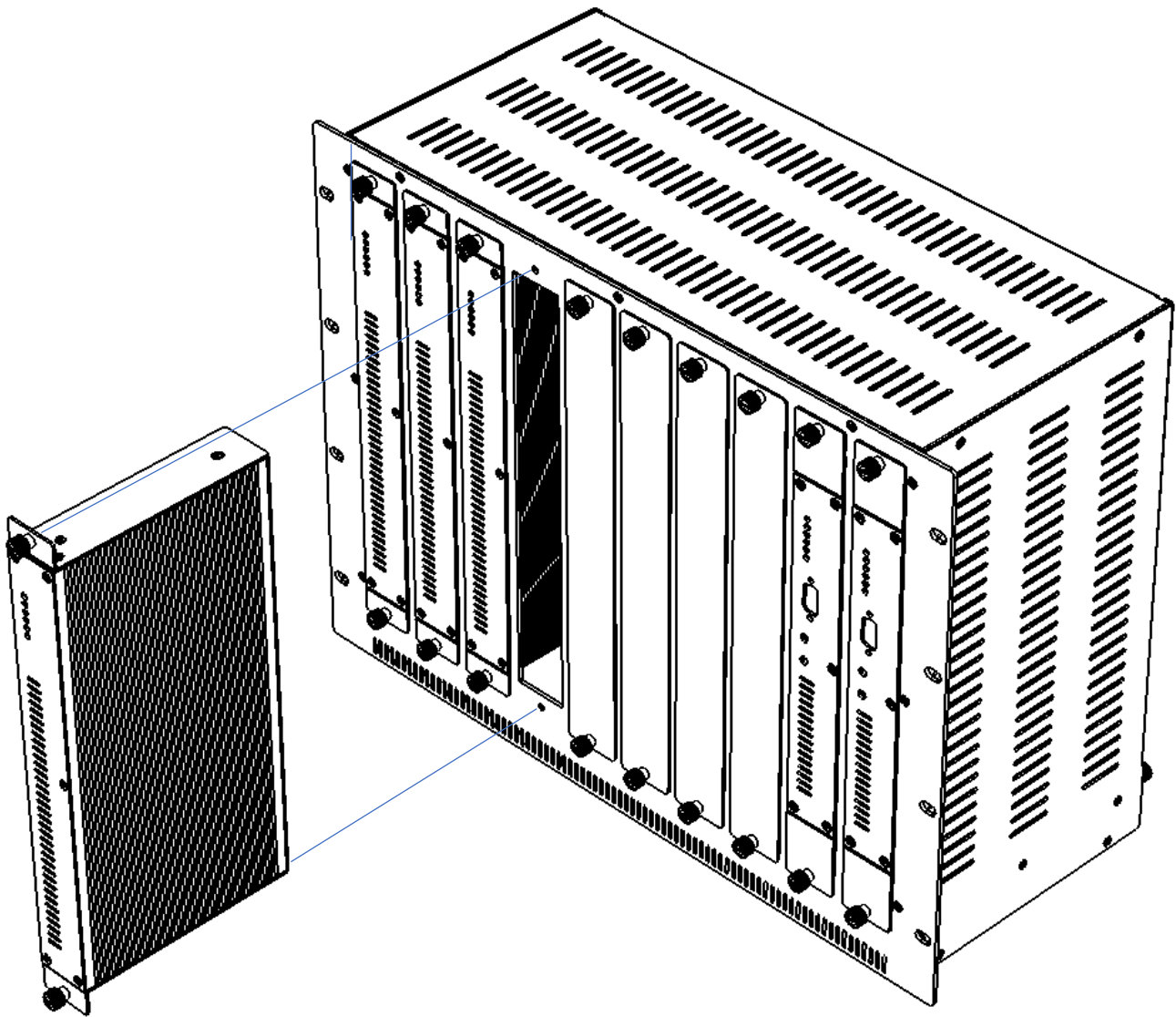


Figure 8. Optional ZIG-ILC-CAGE for Rack Mount Installation

5.4. Power over Ethernet (PoE)

Most IP-Logic devices support PoE to eliminate the need for an external power supply. Powering of most PoE enabled devices centralizes the power distribution to a network switch, capable of providing PoE power.



Important: Pay special attention to the power limits of the PoE sourcing capable network switch. Ensure that the total power budget of IP-Logic units do not exceed the power budget of the PoE network switch.

Installation Guidelines

5.5. Thermal Requirements

Reliability of electronic devices is predicated on proper thermal management. Heat will cause detrimental effects to the longevity and reliability of electronic components. Install IP-Logic units away from heat sources, such as heaters, fireplaces, and other electronic devices.

5.6. Mounting

Most IP-Logic devices are fan-less designs to eliminate fan noise and improve reliability. However, the devices must be positioned vertically where the heat sink fins are oriented up and down. The chassis can be bolted to walls or other objects using the included mounting brackets.

Do not place objects on top of the chassis, which may reduce the effectiveness of convection cooling. Properly route all cables away from the chassis so that trapped heat does not cause hotspots on the chassis.

Do not lay down the units flat on a table surface for an extended period as this may not provide sufficient convection cooling. Do not stack units on top of each other as this will cause rapid overheating of the units below. Ensure that there is at least 25mm (1 inch) clearance between units.

When rack mounting, use the optional ZIG-ILC-CAGE (sold separately). The Cage supports up to 10 IP-Logic devices and uses intelligent thermal management to optimally control the fan speed for sufficient cooling while operating the fans at minimal speed to reduce fan noise.

5.7. Firmware Revisions

IP-Logic units are shipped with the latest release of Firmware and Software. If new firmware/software releases become available, Essentials will automatically download the latest revisions from Zigen servers. After the Essentials download of firmware/software, the end-user will be prompted to update the IP-Logic devices.

Note: *For automatic downloads to work, the Essentials Control LAN port must be connected to the facility network with Internet access.*

5.8. Video Source and Display Settings

IP-Logic systems support interconnection with the most popular sources and displays in the market. Audio/Video quality of encoding, and decoding begins with properly configured sources and displays. Below are recommended guidelines to guarantee the reproduction of the best picture and audio quality:

- Most displays feature Overscan or other custom aspect ratio settings. These settings must be disabled if using the displays in a Videowall. Follow the display's manual to turn off these features.

Installation Guidelines

- Confirm that the source video resolution and frame rate are compatible with the display. The operator may have to enable scaling on the RX or configure the source device to output a compatible resolution for the display. EDID management could be employed to inform the source of a list of suitable resolutions for a specific display.
- Turn off all Low Power or ECO settings of the sources and displays to ensure the media content is being displayed. If no video or audio is present, it does not necessarily indicate a component failure and could be easily remedied by disabling the ECO settings of all devices.
- Enable CEC control for all displays and sources to allow IP-Logic components to control these devices. A specific manufacturer may have a unique name for this function (ie: “Simplink”™, “AnyNet”™) so please refer to the display’s manual for more information. The Essentials device will allow CEC management to send custom commands to displays and sources.

5.9. Control Signals

The IP-Logic infrastructure support control signals such as RS-232, IR, USB, CEC, and Ethernet. These signals can be routed and switched from one IP-Logic endpoint to another IP-Logic endpoint. Refer to Appendix for a compatibility list of control signals.

System Deployment Guidelines

6. System Deployment Guidelines

Adhering to these recommended guidelines will ensure a successful IP-Logic AVoIP deployment scheme. Prototyping the IP-Logic installation at the integrator's facility is highly recommended before installation at the customer site.

6.1. AV Cabling

A successful implementation of AVoIP is only limited by the weakest link on the AV chain. Just like any hardware equipment, cabling also plays an important role in providing the best video quality and reliability. Cable length could also limit the bandwidth of video signals causing picture dropouts or noise on the HDMI video.

To future proof your installation, Zigen Corporation highly recommends its 4K Premium Certified Passive HDMI 2.0 Cables (available lengths from 3.0 meters to 9.15 meters) especially when transporting UHD 2160p@60 8bits 4:4:4 (17.82 Gb/s bandwidth).

6.2. Network Cabling

For IP-Logic devices streaming over 10GBaseT, Cat6a shielded cabling or better is highly recommended. Typically, these copper cables are sufficient for lengths up to 100 meters. For longer distances, fiber optic cabling will be required using a suitable SFP+ Fiber Modules (sold separately). Short range Multi-Mode fiber optic cabling can support distances up to 300 meters, while long/extended range Single-Mode fiber optic cabling can extend up to 10K – 40K meters.

It is important that these cables be tested in a similar installation environment to test performance. Altogether, termination, shielding, and cable quality determines cross-talk immunity, interference susceptibility, and cable length margins. These factors need to be taken into account before utilizing any cables in an installation.

6.3. 10Gbase-T Ethernet Switch Requirements

IP-Logic AVoIP solutions transport video and audio packets in the network domain. Major name brand managed switches have been tested with IP-Logic. Many of these well-established switches are featured with the most basic requirements for IP-Logic.

IP-Logic platform implements managed network switches which support 10Gbps (10GBaseT). IP-Logic technology encodes uncompressed or lightly compressed video with resolutions up to 4K in addition to other AV signals such as Audio, USB, IR, RS-232, and 1G Ethernet.

HDMI video streams alone utilize raw bandwidth of approximately 3.5 Gbps for HD video (1080P) and 9 Gbps for 4K (UHD) video, coupled with additional bandwidth for Audio and control signals. Therefore, it is strongly recommended to use managed Layer 3, 10GbE switches.

System Deployment Guidelines

Layer 2 10GbE switches could also be used provided they support the multicast configuration listed below:

- IGMP Version 2 Support
- IGMP Snooping
- Filter/Drop Unregistered Multicast Traffic
- Disable Unregistered Multicast Flooding
- Enable Fast Leave Support
- Disable Green, Energy Efficient Ethernet (EEE), or any Energy Saving feature.

IP-Logic uses Multicast broadcasting to enable transmission of video streams to multiple endpoints. An unmanaged Ethernet switch may default broadcast traffic to all ports on the switch and all video packets will be sent to every decoding device.

The Internet Group Management Protocol (IGMP) is an integral part of IP multicast and is a communications protocol implemented by hosts and adjacent routers on IPv4 networks to initiate and manage multicast group membership. IGMP Snooping is an important feature for Ethernet switches used in an IP-Logic AVoIP environment. IP-Logic devices implement the IGMP protocol by requesting data from transmitted multicast groups. The Ethernet switch then employs IGMP snooping to identify IGMP messages and targets the multicast packets only to specific receivers who want to receive them, thereby, optimizing Multicast traffic. Ensure that all Ethernet switches have IGMP Snooping enabled.

By default, multicast traffic should be blocked until the packets are requested by a multicast group member. An IGMP Querier is the master router or switch that manages the IGMP filter lists. The Querier's responsibilities are as follows:

- To send out IGMP group membership queries on a timed interval.
- To retrieve IGMP membership reports from active members.
- To allow updating of the group membership tables.

A Layer 2 Network Switch supporting IGMP snooping passively checks IGMP packets passing through the network, determines group registration, and configures multicasting accordingly. Without IGMP Querying and Snooping, Multicast traffic will be similar to a Broadcast transmission, which sends packets to all ports on the network. With IGMP Querying and Snooping, Multicast packets are only forwarded to network ports that connect to members of that Multicast group, optimizing network traffic passing through the switch.

When an IP-Logic endpoint wants to leave a Multicast group, the IGMP Leave Group command is sent to the Ethernet switch. Leaving this group could take some time unless the Enable Fast Leave function is enabled. With this feature enabled on an Ethernet switch, video switching times could be dramatically shortened. Therefore, it is highly recommended to enable the Fast Leave option on the switch.

System Deployment Guidelines

6.4. Network Switch Implementation

The network switch implementation must be carefully planned in the design phase of an IP-Logic AVoIP installation. The configuration of the network switch depends on the number of transmitters and receivers required or whether multiple switches may be installed across a campus or on different floors of a building.

6.5. Network Switch Port Requirements

The IP-Logic family of products utilize different Ethernet cable standards. The following IP-Logic devices need to be connected to the following Network Switch ports:

Essentials	1Gb/s Full Duplex	1GBaseT	IEEE 802.3ab
ZIP-IPPRO-TX	10Gb/s Full Duplex	10GBaseT	IEEE 802.3an/ IEEE 802.3ae
ZIP-IPPRO-RX	10Gb/s Full Duplex	10GBaseT	IEEE 802.3an/ IEEE 802.3ae

6.6. Single Switch Implementation

This is the simplest network switch design. Usually a network switch supporting Layer 2 IGMP is all that is required. All IP-Logic devices are connected to a single network switch or stack and must be fully non-blocking with a single broadcast domain. This type of design is usually installed in a single rack or closet and the number of IP-Logic endpoints are only limited by the number of 10GBaseT ports.

6.7. Multiple Switch, Switch Stacks and Link Aggregation

For multiple switches or stacks, be wary of the following IP-Logic network criteria:

- Extremely low tolerance for packet loss and out-of-order packets (OOP).
- Efficient use of multicast delivery by eliminating flooding and/or saturation of inter-switch links.

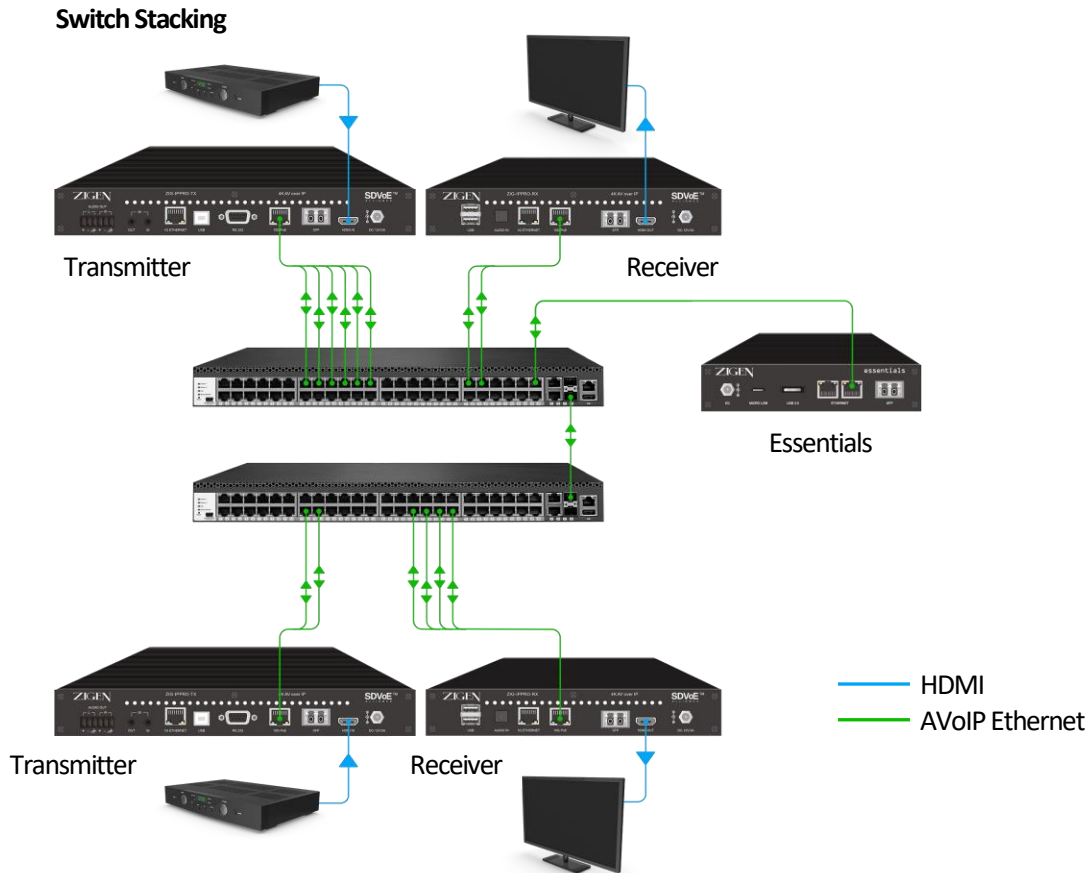
6.7.1. Switch Stacking

To increase the number of switch ports, Zigen recommends the use of “Stacking over Ethernet” and manage the switches as a single Layer 2 device using multiple available links for stacking. Two or more switches appear as a single switch with the added benefit of having the port capacity of the combined switches. It is important to consider the following:

- Non-blocking AV switching is not guaranteed even if the switches have multiple 10G, 40G or even 100G stacking links.
- Major switch vendors feature different stacking over Ethernet options such as:
 - Stackwise Virtual Link offered by Cisco.
 - SummitStack stacking technology from Extreme OS.
 - Netgear 4300 Series easily supports stacking over Ethernet.
- There is no industry standard for stacking where some vendors utilize certain port modes, while others implement dedicated high-speed links for stacking. Regardless of the stacking

System Deployment Guidelines

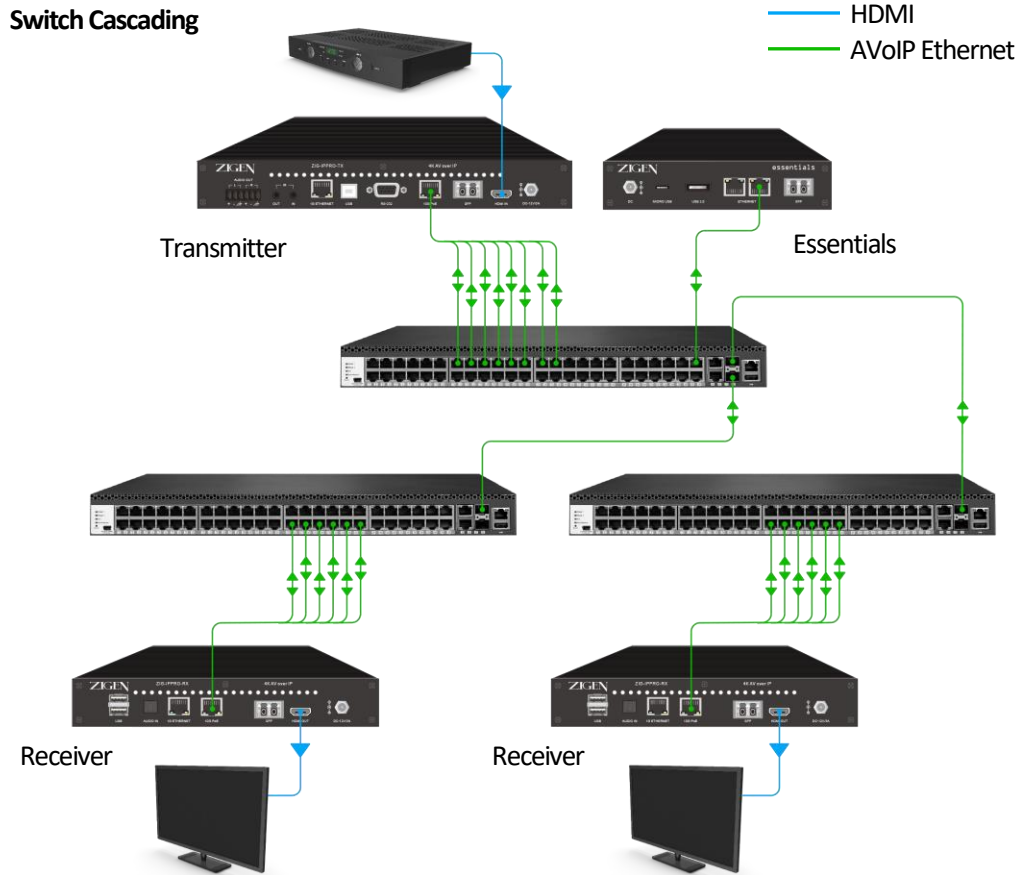
implementation, there is a finite bandwidth with these links and attention must be paid not to exceed the available bandwidth when routing AV between switches.



6.7.2. Switch Cascading

To accommodate situations where multiple switches are installed in different floors of a building or installed across campus, switch cascading with dedicated link ports or aggregate link ports are used for switch interconnects. These link ports often have higher bandwidth than the switch ports, however, care must be taken not to exceed the total AV bandwidth between switches.

System Deployment Guidelines



6.8. IP-Logic Isolated VLAN

All IP-Logic devices should reside on a single VLAN. Most switches default to a single VLAN and there is no need to create more.

It is highly recommended to isolate the IP-Logic VLAN environment from all other networked devices in a facility (for example: control systems, wireless routers, computers, printers, etc.). The Essentials control server is equipped with two network ports: AVoIP LAN and Control LAN.

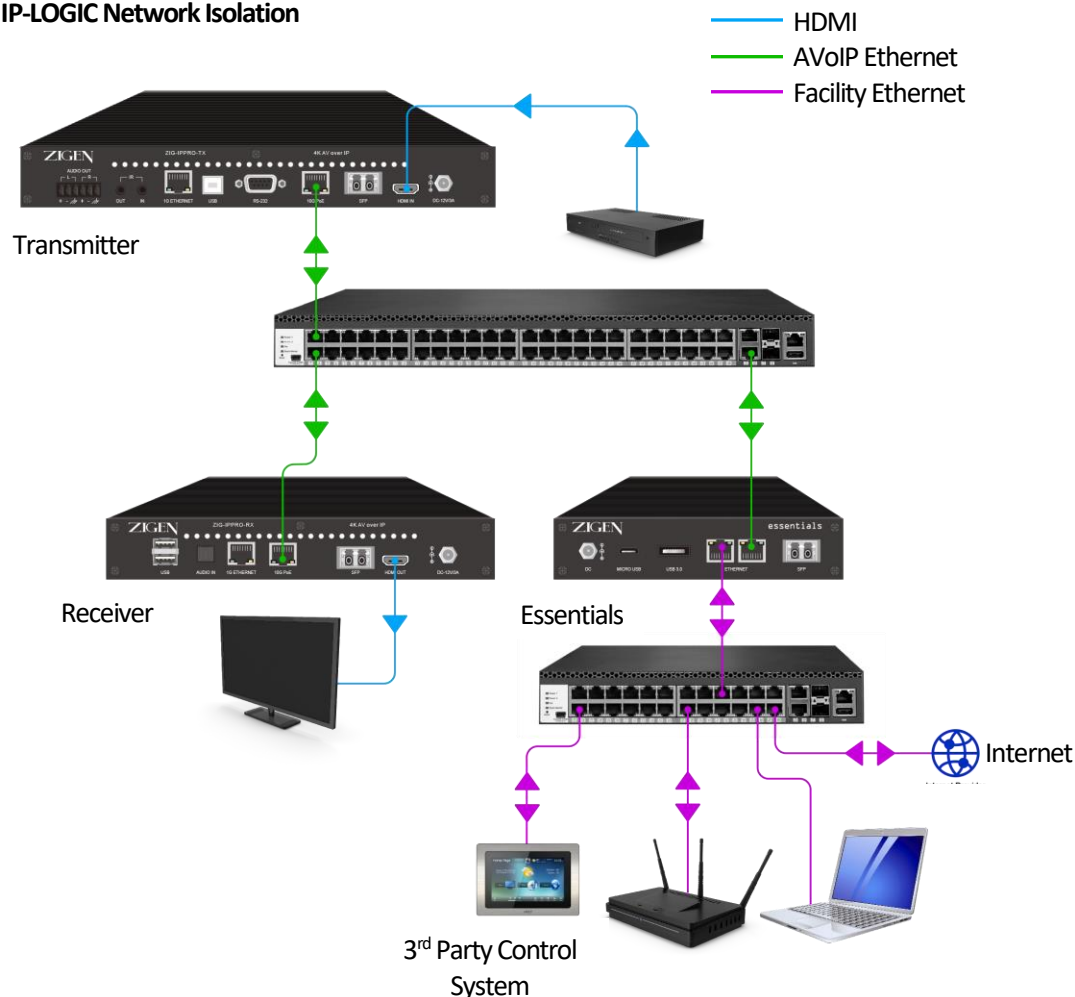
The AVoIP LAN is used to connect Essentials to other IP Logic devices such as ZIG-IPPRO-RX and ZIG-IPPRO-TX.

The Essentials Control LAN is connected to the facility Ethernet to interface with 3rd party Control Systems. If the Control LAN is provided with Internet access, then Essentials can download the latest firmware/software from Zigen servers.

Both Essentials network ports support the IP-Logic control Application Program Interface (API) to allow complete isolation between the AVoIP IP-Logic environment and Control Systems.

Although all IP-Logic devices residing in the private isolated network support AutoIP, it is highly recommended to install a DHCP server to this private network to automatically assign IP addresses. The DHCP server could be used to centrally manage the IP address assignment, for instance, partitioning the IP addresses of IP-Logic devices using DHCP Reservation based on room location within the facility. Most managed switches have a built-in DHCP server, which may have to be enabled.

IP-LOGIC Network Isolation



System Deployment Guidelines

6.9. PoE Guidelines

Some IP-Logic devices feature Power over Ethernet (PoE) to eliminate the need for an external power supply. However, Ethernet switches with PSE PoE enabled ports or PoE injectors are required. IP-Logic gets the PoE power signals from the 10GBaseT copper (RJ-45 port) connector.

The PoE power budget for IP-Logic devices are as follows:

ZIG-IPPRO-TX	PoE compliant 30W IEEE802.3at Type 2 PoE+
ZIG-IPPRO-RX	PoE compliant 30W IEEE802.3at Type 2 PoE+

Appendix

7. Appendix

7.1. IP-Logic Series Specifications

Features	ZIG-IPPRO-TX/RX
HDMI	2.0b ¹
HDCP	1.4/2.2/2.3
Maximum Video Resolution	2160p60 8 bits, 4:4:4 2160p60 10 bits, 4:2:2
Maximum 4K Framerate	60fps 4:4:4
Video Compression	SDVoE (1.4:1 artifact-free when exceeding 10G)
Maximum HDMI Bandwidth	17.82 Gbps
Maximum HDMI Pixel Clock	595 MHz
Audio Compression	SDVoE (Lossless)
Color Space Support	RGB, YUV
YUV Subsampling	4:4:4, 4:2:2, 4:2:0
HDR Support	Dolby Vision, HDR10+, HDR10, HLG
Interlace Support	✓
Scaling	✓
Single-Frame Switching	✓
Video Wall	✓
Bezel Correction	✓
Multiview	✓
Color-Space-Conversion	✓
Chroma Sub-Sampling	✓
Frame-Rate Conversion	✓
Multichannel Audio Downmixing	✓
SDVoE Latency	< 120ms (Genlock mode)
AES67 Latency	125 us
Audio Network Transport	AES67 and ST2110-30/31 (TX)
Audio Discovery and Registration	Dante-AES67, RAVENNA, Ethernet AVB (TX)
Analog Audio	Balanced Unbalanced Microphone Inputs (RX) Balanced Unbalanced Outputs (TX)
TOSLINK	Input (RX)
All HDMI 2.0b Surround Sound standards including Dolby/DTS Audio Support	✓ (HDMI Path)
2 Channel PCM Audio	✓
Audio Delay	✓ (TX)
Auto Discovery (IP)	✓
Auto IP	✓
Preview Thumbnail streams	✓
On-Screen Display	✓
CEC	✓

Specifications

ARC	✓
EDID Management	✓
10GbE SFP Optical (Default port)	Simultaneous transport of SDVoE and AES67 (TX)
10GbE Copper RJ-45	Simultaneous transport of SDVoE and AES67 (TX)
1GbE Copper RJ-45	✓
IR In	✓
IR Out	✓
RS-232 In	✓
RS-232 Out	✓
USB 2.0 (480 Mbps)	✓
USB (Host Connection Type-B)	TX
USB (Device Connection Type-A)	RX
USB Hub (Dual Type-A)	RX
Open Control API	✓
Web GUI	✓
Programmable EDID	✓
Video and Audio Diagnostics	✓
Peak Bandwidth per stream	10Gb
PoE	✓
Fanless Chassis	✓
Rack Mountable	ZIG-ILC-CAGE with intelligent thermal management (support for up to ten IP Logic devices)
Drivers	Crestron, RTI, Control4, URC, Savant 2
Power (RX TX)	12VDC 3A, POE Compliant (30W IEEE802.3at Type 2 PoE+)
Dimensions (RX/TX)	225mm x 35mm x 155.5mm 275mm x 35mm x 145.5mm
Temperature	0° to 40° C (10% - 90% Non-Condensing Humidity)
Regulatory Safety and Emissions	CE FCC RoHS UL Listed Power Supplies

¹ HDMI version only supports major video resolutions used in common video installations. Not all resolutions and framerates listed in HDMI 2.0b are supported.

² Control system drivers subject to availability.

7.2. IP-Logic Control Specifications

ZIG-IPPRO-RX/TX

RS-232 Extension TX -> RX	✓
RS-232 Extension RX -> TX	✓
RS-232 RX (Custom packets through API)	✓
RS-232 TX (Custom packets through API)	✓
RS-232 Baud Rate	2,400 – 115,200 bps ¹
RS-232 Data Width	7, 8 bits
RS-232 Stop Bits	1, 2

RS-232 Parity	None, Even, Odd
IR Extension TX -> RX	✓
IR Extension RX -> TX	✓
IR RX (Custom packets through API)	✓
IR TX (Custom packets through API)	✓
IR Control System Input (Auto select)	✓
IR Receiver Module Input (Auto select)	✓
CEC RX (Custom packets through API)	✓
USB Extension TX (Client) -> RX (Host)	✓
USB Version	1.1, 2.0, 3.0 Super-speed (2.0 Rates)
USB Physical Hub (RX)	✓
USB Virtual Hub	to 7 RX Units to one TX ²
USB Operating System Support	Windows, OSX, Linux

¹ Sustained transmission over a long period of uninterrupted RS-232 traffic is only guaranteed with baud rates up to 19,200 bps. Exceeding this baud rate without breaks in the transmission will result in data loss.

² For Virtual Hub environment, it is not recommended to connect multiple high-speed devices such as flash drives or webcams on any RX units at the same time.

7.3. IP-Logic Default Factory Settings

The IP-Logic devices are configured to factory defaults at the time of shipment. The following are the default IPv4 Network settings:

	IP Address	Subnet Mask	Gateway
ZIP-IPPRO-TX	DHCP (auto IP)	DHCP (auto IP)	DHCP
ZIP-IPPRO-TX	DHCP (auto IP)	DHCP (auto IP)	DHCP
Essentials AVoIP	DHCP (auto IP)	DHCP (auto IP)	DHCP
Essentials Control	DHCP (auto IP)	DHCP (auto IP)	DHCP

“Zignet-Finder.exe” is a utility application to find connected IP Logic devices regardless of its subnet location within the facility. Download the utility at the zigencorp.com website. Zignet-Finder can identify the device’s network information such as IP Address, Subnet Mask, and Gateway. The utility can also change the device network information. The Essentials web-based GUI can be found using a computer and a web browser (ie: Chrome, Firefox, Safari) and entering Essential’s hostname “ipessentials.local” or its IP Address on the browser’s URL field.

Document Revision History

8. Document Revision History

V0.0.2 – January 10, 2020

1. Added installation mounting description.
2. Added detailed component descriptions for all IP-Logic units.
3. Added explanation of new Balanced/Unbalanced/Microphone audio levels.
4. Updated Specification Tables

V0.0.1 – July 16, 2019

1. Technical Reference Manual Initial Release

Warranty

9. Warranty

Powered Product Warranty

Zigen warrants its powered products against any defects in materials and workmanship for a period of three years from the date of invoice. Touchscreen displays carry a one-year parts and labor warranty. If a malfunction occurs during the warranty period, Zigen will repair or replace a product to its original operating condition. A return authorization number must be obtained from Zigen before products are returned for service.

Non-Powered and Cable Products - Lifetime Limited Performance Warranty

Zigen warrants that its non-powered products and cable products will be free from defects in material and workmanship for as long as you or your customer owns the product. All Zigen non-powered products and cables are designed and engineered to meet and exceed performance specifications. If, at any time, the product fails due to manufacturer defect, Zigen will repair or replace the product to ensure that it meets original performance specifications. Reduced performance due to normal wear and tear, or damages caused by misuse or negligence will not be covered. Zigen will test and evaluate all non-powered and cable products claimed defective. Products must be shipped to Zigen, prepaid along with proof of purchase only after obtaining a Return Merchandise Authorization (RMA) number from Zigen. This statement of policy is in lieu of any other policy expressed or implied and no representative or person is authorized to assume any other liability or adopt any other policy for Zigen without our written consent.

Return Policy

If you would like to return a Zigen product, it can be done within 30 days of purchase for a full refund, less shipping and handling. Zigen will not be responsible for shipping and handling of product returns. Returns will only be accepted of products with proof of purchase, products in the original packaging with zero to minimal use and a Return Merchandise Authorization RMA number provided by Zigen.