Signal Intelligence

ZyPer4K

HDMI 2.0
IP VIDEO DISTRIBUTION SYSTEM

User Manual

Updated December 2017

Document symbol conventions:

Indicates an important piece of information affecting the operation of the unit. Retain this information.

Indicates a point of caution. Failure to heed this information may cause a hazard of some form to the operator or others in the field of operation.

Indicates a point regarding the electrical safety of the box. Failure to abide by the information presented may result in an electrical shock hazard to the operator or others in the field of operation.

Indicate a point affecting the RF performance of the box. Failure to heed or abide by the information presented may result in emissions or susceptibility that can affect the unit or nearby equipment. Performance conforming to the regulatory limit may be compromised or affected.

About ZeeVee:

ZeeVee is the leading manufacturer of high-quality encoder/modulator/decoder products for video distribution over any type of transmission media; be it RF coax, fiber, or copper ethernet.

Established in 2007, ZeeVee has been manufacturing industry-leading products while operating the company responsibly in compliance with the strictest levels of regulatory and environmental requirements. The standards by which we govern our corporate conduct are far higher than that required by law.

Our mission is to completely fulfill the toughest customer application requirements with the highest quality products we can produce. After the sale, we strive to support the customer with award-winning support and service. Our goal is that no customer shall be ever be dissatisfied. It is both our mission and our passion.

ZeeVee, Incorporated
295 Foster Street, Suite 200
Littleton, Massachusetts
01460, USA

www.zeevee.com
support@zeevee.com
Phone: 1-877-493-3833

CONTENTS

System Description

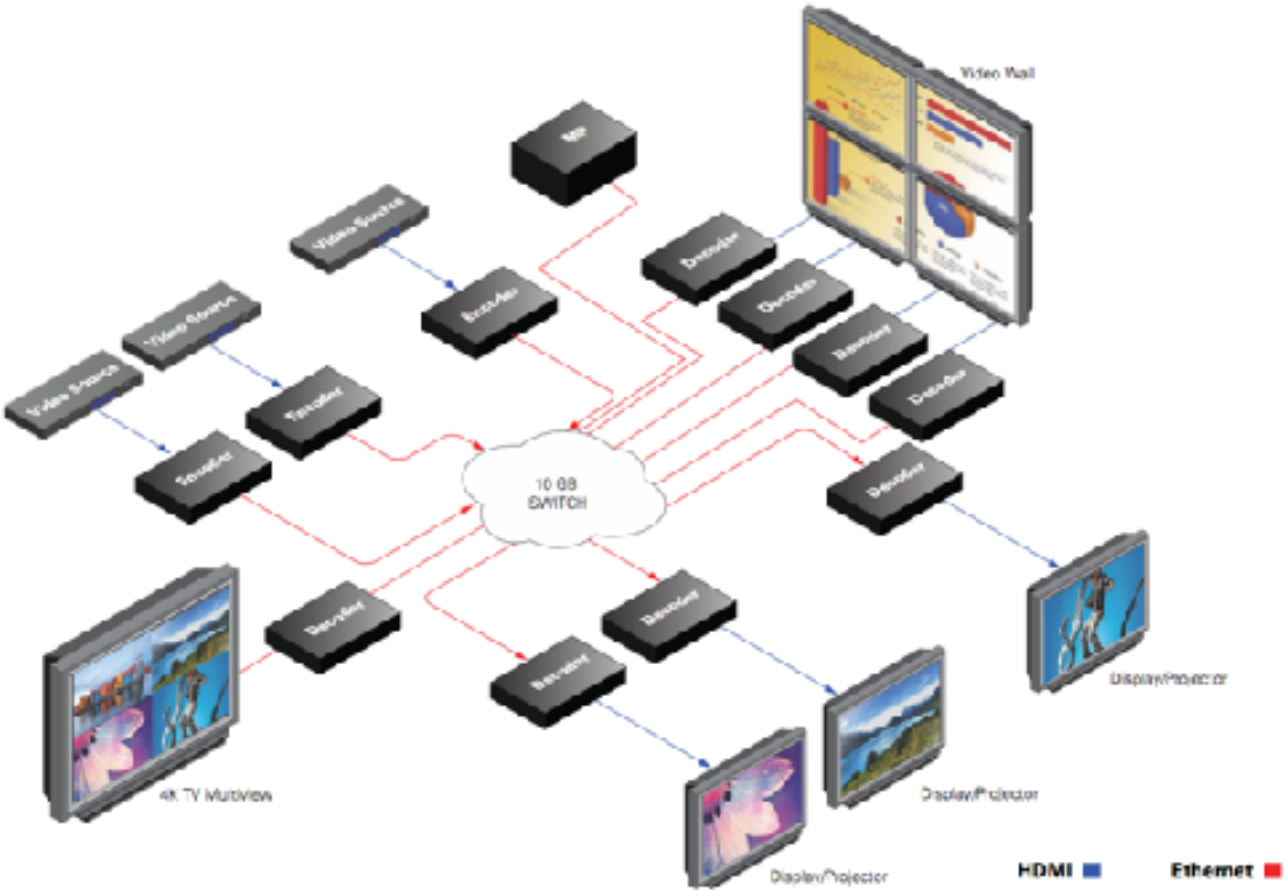
The ZyPer4K series of products from ZeeVee provide a means for transmitting and receiving up to 4K audio-visual information across a standard 10Gb IP network with outstanding quality at very low latencies.

A minimal system consists of:

- Video Source (Up to 4K)
- ZyPer4K Encoder device
- CatX Cable or Fiber cables with SFP modules
- ZyPer4K Decoder device
- Video sink (display device)

A fully realized system consists of:

- (N) Video Sources (HDMI 2.0 support with HDR)
- (N) ZyPer4K Encoder devices
- 10Gb Ethernet switching Infrastructure (> (N+M) ports of non-blocking capacity)
- (M) ZyPer4K Decoder devices
- (M) Video sink (display devices)
- ZyPerMP control node



System Elements

Encoder Function

The function of the ZyPer4K Encoder Device (Encoder) is to accept audio and video data over a variety of interface types, and translate that data to a format suitable for transmission over a standard 10Gb Ethernet network.

Video data is segmented, encrypted, prepared for transmission, and sent by the Encoder unit. No unit other than those so designated by the control entity shall be able to receive the video stream sent by an Encoder.

The format of the IP data is fully in compliance with industry-standard IEEE 802.3 Ethernet networking practices. Any switch or device capable of passing 10G Ethernet traffic can be employed to carry ZyPer4K A/V traffic. (See *ZyPer4K Network Requirements and Security Considerations* document)

Other ports on the Encoder devices are for the carriage of USB, IR, RS232 and audio data as well as a 1Gbit/second utility port for general purpose connectivity of devices to the 10G bulk data infrastructure.

Common Interfaces on all Encoders:

- Power Input (12VDC)
- RS232 Input/Output
- 1Gbit/sec Utility Ethernet Port
- Analog Audio Input
- Infrared Input
- Infrared Output
- HDMI 2.0 Input
- Equipotential Grounding Lug

Optional Interfaces on Encoder Units:

Ethernet Bulk Media Interface:
10Gb Fiber *or* 10Gb Copper

USB:
(none) *or*
USB Type-B Interface

Extended Media Input:
(none) *or*
HDSDI *or*
DisplayPort *or*
Analog (YPrPb/VGA/S-Video)

In total there are 16 different, unique Encoder types that can be ordered.

HDMI Fiber	HD-SDI Fiber	DisplayPort Fiber	Analog Fiber
HDMI Fiber with USB	HD-SDI Fiber with USB	DisplayPort Fiber w/USB	Analog Fiber w/USB
HDMI Copper	HD-SDI Copper	DisplayPort Copper	Analog Copper
HDMI Copper with USB	HD-SDI Copper w/USB	DisplayPort Copper w/ USB	Analog Copper with USB

Decoder Function

The function of the ZyPer4K Decoder device (Decoder) is to accept 10G Ethernet traffic that represents the information to be decoded and displayed. When the appropriate IP stream is received the Decoder unit will first strip off the encryption that protects the payload on its transit across the network. It then reformats the video and audio information for display and plays it out its HDMI video output. Audio is also played out the appropriate port as included.

Other ports on the Decoder devices are for the carriage of USB, IR, RS232 and audio data as well as a 1Gbit/second utility port for general purpose connectivity of devices to the 10Gb bulk data infrastructure.

Common Interfaces on all Decoders:

- Power Input (12VDC)
- RS232 Input/Output
- 1Gbit/sec Utility Ethernet Port
- Analog Audio Output
- Infrared Input
- Infrared Output
- HDMI 2.0 Output
- Equipotential Grounding Lug

Optional Interfaces on Decoder Units:

Ethernet Bulk Media Interface:
10Gb Fiber *or* 10Gb Copper

USB:
(none) *or*
2x USB Type-A Interface

In total there are 4 different, unique Decoder types that can be ordered.

HDMI Fiber	HDMI Fiber with USB	HDMI Copper	HDMI Copper with USB

Management Platform

Most installations will require a ZyPer Management Platform (ZyPerMP). This device controls the operation and manages the connectivity between endpoints. The management platform is a hardened controller node that must reside on the same logical network as the ZyPer4K Encoders and Decoders. It runs a ZeeVee application as its sole function. The application presents an API to potential third party management platforms as well as hosting its own Maestro-Z management application.

In point-to-point applications every element is essential. The ZyPer4K Encoder and Decoder will detect this special case and self-configure appropriately.

Any installation beyond simple point-to-point link extension-like applications require a ZyPerMP.

The purpose of the Management Platform is to interface user operational requests into the specific device-level control needed to effect connectivity changes, screen management, interface management, and distribute software and control data to all the endpoints of the overall system. The ZyPerMP is the entity that insures all the endpoints, are accounted for, operating properly, and performing the correct operation at the correct time.

Further, the ZyPerMP is the element that guarantees security, manages access to the overall system and prevents rogue listeners or observers from snooping or spoofing unwanted content.

Multiple ZyPerMP devices may be deployed in a redundant configuration to provide for fault tolerant control of the greater ZyPer4K overall system.

Operation of the ZyPerMP, the Maestro-Z application, and the ZyPer-API are beyond the scope of this manual and are documented separately in far greater detail in the *ZyPer Management Platform User Manual*. Documentation can be downloaded from the ZeeVee website.

https://www.zeevee.com/documentation-all-products

Detailed Interface Descriptions

Encoder

The function of the encoder is to accept raw video images, encode, encrypt and format them for transmission. There are several different variations based on the user's desired input, media type and interface description. The encoder supports inputs up to 4K resolution including full HDMI 2.0 support. (4K resolution 4:4:4 at 60Hz)

Enclosure variants

There are two different sizes of the ZyPer4K Encoder unit enclosure.

Input Function	Box Size
HDMI Input	Base unit: 175mm Wide x 43mm High x 144mm Deep
HDMI + HDSDI Input	Extended unit: 227mm Wide x 43mm High x 144mm Deep
HDMI + DisplayPort Input	Extended unit: 227mm Wide x 43mm High x 144mm Deep
HDMI + Analog Video Input	Extended unit: 227mm Wide x 43mm High x 144mm Deep

The USB option does not affect the enclosure size.
The type of bulk media (10Gb Fiber or 10Gb Copper) does not affect the enclosure size.

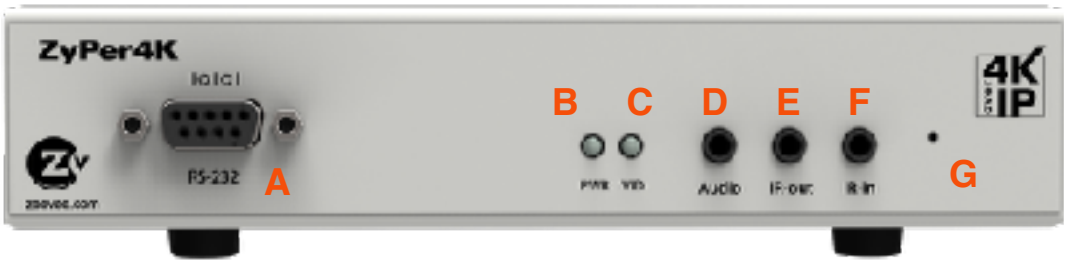
Common Ports

The following ports are common to all encoders, regardless of the options or enclosure variant

Port Name	Index	Definition
Power	A	12VDC from supply. Center Post is + Ring is -

Port Name	Index	Definition
Utility Network	B	10/100/1000Base-T Ethernet port. Used for general purpose device attachment to network. Traffic will be switched on to media network.
Ground Lug	C	For equipotential referencing of the box, this lug may be connected the environmental ground using a customer-supplied ground lead.

Port Name	Index	Definition
HDMI Input	A	HDMI 2.0 Input port. Capable of up to 4K60 with HDCP2.2 encryption.



Port Name	Index	Definition
RS 232 Port	A	RS232 Control Port for sending and receiving side-band serial traffic to/from decoders as directed by Maestro-Z management
LED PWR	B	LED illuminated when unit is powered
LED VID	C	LED Illuminated when active video is being processed

Port Name	Index	Definition
Audio	D	Audio Input/Output Jack. Input or Output of line-level stereo audio on 3.5mm jack. Direction of port configured by Maestro-Z.
IR-OUT	E	Infrared Commands information passed back FROM decoders as configured by Maestro-Z.
IR-IN	F	Infrared Commands to be passed TO decoders as configured by Maestro-Z.
RESET	G	Reset to factory defaults. Using a wire or paper clip, lightly press into this hole while unit is being powered on. Hold for 10 seconds to reset the unit to factory defaults.

Optional Ports - 10Gb Ethernet

The customer may chose which type of Ethernet interface is appropriate for the application being addressed. Only one is present at a time and either is available regardless of the enclosure size.

Port Name	Index	Definition
10G Fiber	A1	10 Gigabit Ethernet Connection. Uses standard 10Gb pluggable devices SFP devices.
10G Copper	A2	10Gb Ethernet over Cat6a (or better) cabling. RJ45
TX Activity	B	Blue LED illuminates in synchrony with the transmission of 10Gb Ethernet data
RX Activity	C	Blue LED illuminates in synchrony with the receipt of 10Gb Ethernet data

Optional Ports - USB

ZyPer4K Encoder units are available with or without a USB port.

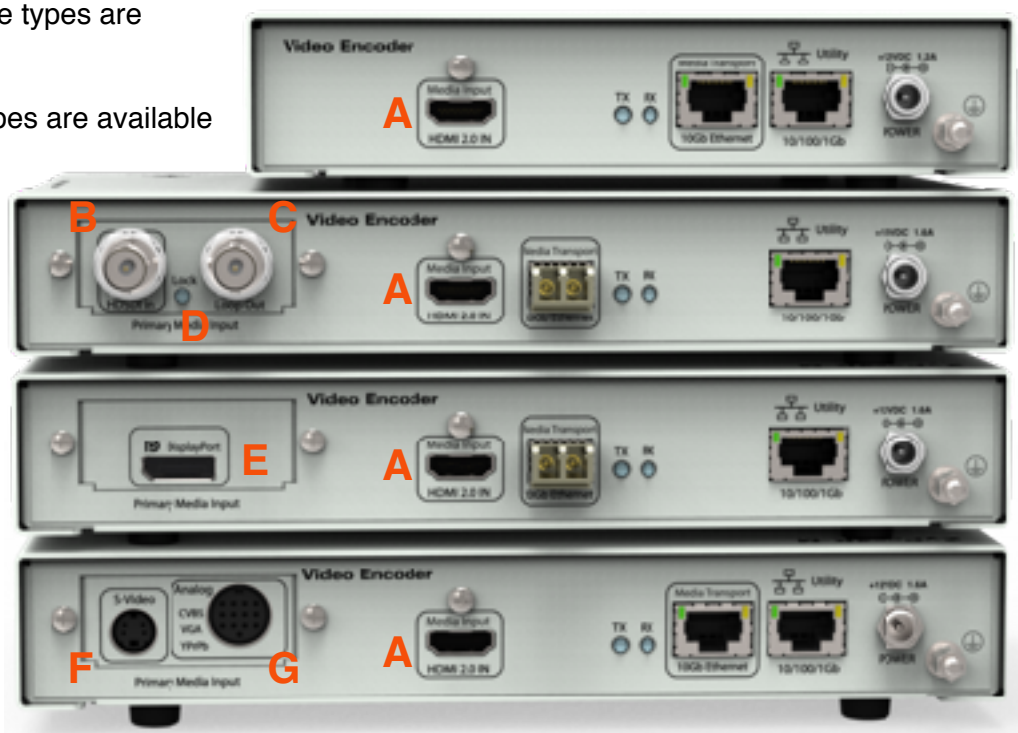
Port Name	Index	Definition
USB	A	USB 2.0 Type B port. Configuration and routing of USB handled by the Maestro-Z configuration. Lower unit shown with no USB installed.

Extended Input Options

All Encoder units contain a single HDMI 2.0 input port. Optionally, units may be ordered with an “extended” input. Units so ordered will reside in a somewhat larger enclosure.

Available interface types are shown:

(note: All input types are available with either 10Gb Fiber or 10Gb Copper Ethernet ports)



Port Name	Index	Definition
HDMI 2.0	A	All encoders contain an HDMI 2.0 port capable of up to 4KP60 4:4:4 with embedded audio and HDCP 2.2 encryption.
3G-SDI Input	B	3G-SDI Input supports up to 1080P60 w/up to 8-channels of embedded audio.
3G-SDI Loop	C	Copy of 3G-SDI Input port, retimed and re-amplified and presented for downstream devices.
LOCK LED	D	Blue LED illuminated when receiving valid HDSDI input
DisplayPort	E	Standard DisplayPort Input supporting up to 4K60 input rate with embedded audio.
S-Video	F	Standard S-Video video input. NTSC and PAL supported. Use STD cable.
ZeeVee Hydra Connection	G	13-Pin High density DIN connector allows for all signals related to Analog Video to be input. Types of Hydra Cable supported: • Analog Video (YPrPb + S/PDIF + CVBS + LR Audio) • VGA Video (HD15 VGA input + LR Audio)

DisplayPort Input Option

The ZyPer4K Encoder may be purchased with the “DisplayPort Input Option” pre-installed at the factory.

Type	Parameter
DisplayPort Option	Single DisplayPort receptacle support v1.3 of the DisplayPort standard.
Direction	Input
Resolutions	Same complete set of resolutions as supported by the resident HDMI module on the core Encoder unit.
DRM	HDCP 2.2 only (DPCP not supported)
Audio	Up to 8-channels of LPCM audio can be received on the DisplayPort interface.

“3G-SDI” Option

The ZyPer4K Encoder can be purchased with the commonly referred-to “3G-SDI Option”.

A common industry “mis-application” is to refer to anything as “HD-SDI” when in reality the intent is 1080P60 , which is 3G-SDI.

Type	Parameter
3G-SDI Option	Single Input port supporting Single-Link 3G-SDI SMPTE424M input
LoopThrough	Retimed, re-amplified, direct-copy of the input signal provided on the “Loop” port for downstream chaining of the 3G-SDI input. SMPTE424M compatible.
Connectors	50-ohm BNC-type connector (input and output)
Format	Level-A Level-B Dual Link Mapping (B-DL) *Dual Stream (B-DS) mapping is NOT supported.*
Resolutions	640x480 (p/i) 720x576 (25Hz/50Hz)(p/i) 1280x720 (p/i) 1920x1080 (p/i) all at 24/25/29.97/30/50/59.94/60Hz refresh rates except where noted
Audio	2-channels of SMPTE299M audio

Analog Option

The ZyPer4K Encoder can be purchased with the “Analog Input Option”. This provides for four different types of possible video input (only one input active at a given time).

Type	Parameter
Analog Input Option	4 different types of Analog video input supported.
S-Video	Standard 4-pin mini-DIN S-Video input Supports 480i and 576i resolutions (NTSC and PAL)
CVBS	*Composite Video. Standard RCA plug spawned from ZeeVee Hydra cable connected to 13-pin DIN connector.* *Supports 480i and 576i resolutions (NTSC and PAL)*
YPrPb	Standard Component Video input provided through Red, Green and Blue RCA connectors spawned by the ZeeVee Hydra Cable connected to the 13-Pin DIN connector. 640x480 (p/i) 720x576 (25Hz/50Hz)(p/i) 1280x720 (p/i) 1280x1024 (p) 1920x1080 (p/i) all at 24/25/29.97/30/50/59.94/60Hz refresh rates except where noted
VGA	A standard 15-Pin HD DSUB male VGA connector is provided through the use of the appropriate ZeeVee Hydra cable connected to the13-PIN DIN connection on the rear pos the unit. 640x480 (p) 720x576 (p) 800x600 (p) 1024x768 (p) 1280x720 (p) 1280x1024 (p) 1366x768 (p) 1440x1080 (p) 1600x1200 (p) 1920x1080 (p)
Analog Audio (RCA-type DIN cable)	2-channels of line-level L/R analog stereo input through the Red/White plug spawned by the appropriate ZeeVee Hydra cable connected to the 13-pin DIN jack.
Analog Audio (VGA-type DIN cable)	2-channels of line-level L/R analog stereo input through 3.5mm plug spawned by the VGA version of the ZeeVee Hydra cable connected to the 13-Pin DIN jack.

Type	Parameter
Digital Audio	When S/PDIF connection of the ZeeVee Hydra analog breakout cable is employed, received audio can be 2-channels of LPCM, or digitally encoded. If digitally encoded audio is received, it will be passed through unmodified through the Z4K system to the decoders (see HDMI Port specification).

Two different variants of the ZeeVee Hydra breakout cable may be purchased separately for use in the specific user application

VGA BREAKOUT

- HD-15 supporting numerous resolutions up to 1900x1600
- Analog audio input carrying stereo L/R line-level audio for transport.

Analog Breakout

Following connections supported:
- YPrPb - resolutions up to 1080P60
- CVBS - PAL and NTSC resolutions
- S/PDIF - digital audio input
- Analog L/R stereo line-level audio

When using the Analog breakout, only ONE of the input types (YPrPb or CVBS) may be active at a given time.

Similarly, only one type of audio input (S/PDIF or L/R Stereo) may be active at a given time.

Decoder

The function of the ZyPer4K Decoder is to accept a 10Gb IP feed containing the video information to be displayed. It decrypts, decodes and formats the video and audio information for display on the attached viewing device. The decoder is capable of outputting any HDMI 2.0 resolution supplied by the encoder including full 4K, 4:4:4 at 60Hz. There are several different variations based on the user's desired media type and USB options.

Enclosure variants

There is one size of the ZyPer4K Decoder unit enclosure.

Input Function	Box Size
HDMI Output	Base unit: 175mm Wide x 43mm High x 144mm Deep

Common Ports

The following ports are common to all decoders, regardless of the interface options.

Port Name	Index	Definition
Power	A	12VDC from supply at 1.2A (center +, ring-)
Utility Network	B	10/100/1000Base-T Ethernet port. Used for general purpose device attachment to network. Traffic will be switched on to media network.
Ground Lug	C	For equipotential referencing of the box, this lug may be connected the environmental ground using a customer-supplied ground lead.

Port Name	Index	Definition
HDMI Output	A	HDMI 2.0 Output port. Capable of up to 4K60 4:4:4 with embedded audio and HDCP2.2 encryption.

Port Name	Index	Definition
RS 232 Port	A	RS232 Control Port for sending and receiving side-band serial traffic to/from encoders as directed by Maestro-Z management
LED PWR	B	LED illuminated when unit is powered
LED VID	C	LED Illuminated when active video is being processed
Audio	D	Audio Output Jack. Drives line-level stereo audio on 3.5mm jack.
IR-OUT	E	Infrared Commands information passed FROM Encoders to Decoders as configured by Maestro-Z
IR-IN	F	Infrared Commands to be passed TO Encoders as configured by Maestro-Z.
RESET	G	Reset to factory defaults. Using a wire or paper clip, lightly press into this hole while unit is being powered on. Hold for 10 seconds to reset the unit to factory defaults.

Optional Ports: 10Gb Ethernet

Port Name	Index	Definition
10G Fiber	A1	10 Gigabit Ethernet Connection. Uses standard 10Gb SFP devices.
10G Copper	A2	10Gb Ethernet over Cat6a or better cabling. RJ45

Optional Ports: USB

The ZyPer4K Decoder device can be ordered with optional USB connectivity.

Shown to the left is a unit with the USB option (top) and without the USB option (bottom) installed. This is a build-time option and is not retrofittable to the product.

Port Name	Index	Definition
USB	A	2 ports of USB 2.0 Type-A connectivity. Either port may be used and both operate simultaneously.

Ethernet Options

The ZyPer4K Encoder or Decoder can me ordered with a single 10G bulk media port that is either Fiber Ethernet or Copper Ethernet. Only one of those options is supported at a given time.

Type	Encoder	Decoder	Parameter
Fiber Ethernet	✓	✓	Single 10GBASE-F-xx receptacle supporting installation of: Duplex fiber cable, SFP+ module (1 LC connector) *SFP+ module sold separately.*
Copper Ethernet	✓	✓	Single 10GBASE-T RJ45 connector

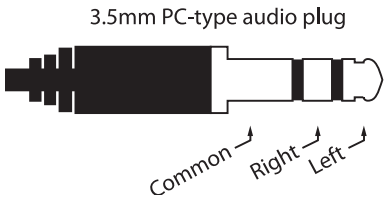
**only one of the above may be installed at a given time

Other Ports

Type	Encoder	Decoder	Parameter
Utility Ethernet	✓	✓	Single 1GBASE-T- RJ45 receptacle for general purpose connectivity at Encoder or Decoder side. Traffic is switched onto same logical segment as the bulk media traffic. *Recommend connection to a terminal leaf.*
RS232	✓	✓	Connector: 1-DB9 Standard 9-pin Female DCE connector Communication: up to 115.2K baud
USB-A (2)		✓	[optional] 2 x Standard USB 2.0 Type-A port
USB-B	✓		[optional] 1x Standard USB2.0 Type-B port
Analog Audio	✓		3.5mm L/R analog audio jack 2-channel L/R line level stereo input — or Maestro-Z configured as — 2-channel L/R stereo output (down-mixed from HDMI port of encoder)
Analog Audio		✓	3.5mm L/R analog audio jack 2-channel L/R stereo output
IR Input	✓	✓	3.5mm plug for IR Capture Dongle (ZeeVee Model#: Z4KIRRX) *** capture dongle sold separately*

Type	Encoder	Decoder	Parameter
IR Output	✓	✓	3.5mm plug for IR Transmitter (ZeeVee Model#: Z4KIRTX) *** transmit dongle sold separately*

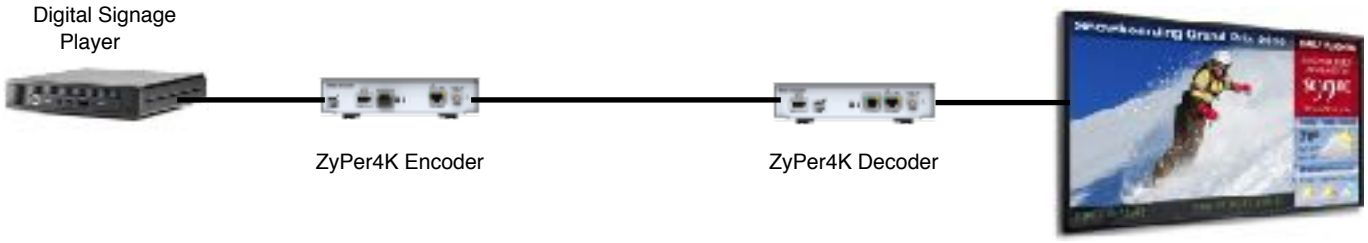
Analog Audio Jack supports a 3.5mm PC-audio type plug with the pinout as shown to the right:



Setting Up ZyPer4K in a Point to Point Environment

A point to point, or one to one environment involves connecting one source directly to one display. A network switch is not needed in this basic configuration. This environment also does not require configuration through the ZyPer4K management software and is a true “plug and play” setup.

If using analog audio, RS232 or Infrared, you may need to configure the Encoder and Decoder with our management software. See the ZyPer4K Management Platform User Manual for more information.



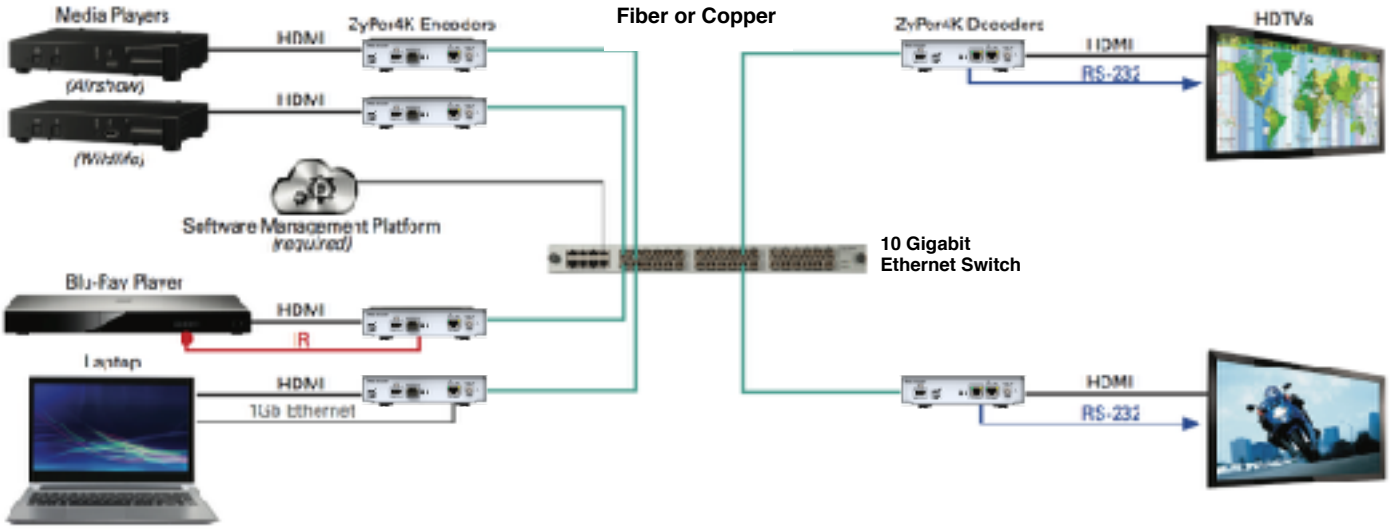
1. Connect HDMI cable from active source to Encoder (HDMI In port). Ensure Encoder is plugged in and pwr LED light illuminated. When HDMI cable is connected, the video (vid) light will illuminate.

2. Connect Ethernet cable either using SFP+ module (Fiber) or RJ45 jack (Copper) between Encoder and Decoder. (Both Encoder and Decoder must be same configuration. Fiber or Copper in this configuration)

3. Connect HDMI cable from active display to Decoder (HDMI Out port). Ensure Decoder is plugged in and that pwr light is illuminated.

Setting up ZyPer4K in Many to Many Environment

A many to many, or switched environment involves connecting many sources to many displays. ZyPer4K allows you a flexible and scalable amount of input-output options without limitations. For example, in a 24-port configuration, you can configure a 1x23, 6x18, or 4x20 (and so on) system. A network switch is needed in these many to many configurations. These environments also require configuration through the ZyPer4K management software.



To set up ZyPer4K in a many to many environment, you have to:

- Install ZyPer4K management software
- Connect all Encoders and Decoders to the 10Gb network switch
- Switch (or route) video from sources to displays

Please consult the *ZyPer Management Platform User Manual* for additional details on switching/routing video from sources to displays.

Please consult the *ZyPer4K Network Requirements and Security Considerations* document for details on Network switch requirements.

Both documents are available on the ZeeVee website:

https://www.zeevee.com/documentation-all-products

Device Technical Specifications

Encoder and Decoder HDMI Video Specifications

All encoders and decoders have one exposed HDMI port. It is an input on the encoder and an output on the decoder. All the parameters in terms of the formats of video and audio carried are the same for either.

HDMI	ZyPer4K Enc	ZyPer4K Dec	
HDMI Standard Port	✓	✓	HDMI 2.0 with HDR and HDCP 2.2 Support
Direction	✓		Input
		✓	Output
Connector	✓	✓	Type-A receptacle (female)
HDMI Resolutions	✓	✓	Supports all major VESA resolutions and variations including full **HDMI 2.0 and HDR support**: 640x480 (p/i) 720x576 (25Hz/50Hz)(p/i) 800x600 (p) 1024x768 (p) 1280x720 (p/i) 1280x1024 (p) 1366x768 (p) 1440x1080 (p) 1600x1200 (p) 1920x1080 (p/i) 2048x1536 (p) 3840x2160 (p) **Including 4:4:4, 60 Hz support** 4096x2160 (p) **Including 4:4:4, 60 Hz support** all at 24/25/29.97/30/50/59.94/60Hz refresh rates except where noted
HDMI Audio	✓	✓	LPCM, Dolby (5.1, 6.1, 7.1), AC3, DTS, Dolby EX, THX, DTS-ES, Dolby TrueHD, DTS-HD Master (HDMI to HDMI audio is “passed-through” from encoder to decoder) *Additional restrictions may result from the audio supported at encoder’s input.*

Physical and Environmental

The following parameters apply to all encoders and decoders unless specifically stated otherwise.

Type	Parameter
A/C Adapter	100-1240VAC 50-60Hz 0.7-0.45A draw on AC Mains Output Max: 12VDC 2.5A
ZyPer4K unit power consumption	12VDC at 1.2A max 12W nominal (Encoder without extended media option) 12VDC at 1.6A max 16W nominal (Encoder with extended media option) 12VDC at 1.2A max 12W nominal (Decoder)
Dimensions (LxWxH) maximum envelope	163mm x 175mm** x 43mm* (Decoder or Encoder with no extended input option) 166mm x 228mm** x 43mm* (Encoder with extended input option) *subtract 6mm from height if rubber feet are removed ** add 48mm to overall width if both mounting ears are installed
Weight	880g (Decoder, Encoder with no extended input option) 1070g (Encoder with extended input option)
Operating Temperature	0° C to +40° C (32° F to 104° F)
Non-Operating Temp	-20° C to +80° C (-4° F to +176° F)
Humidity (op/storage)	20% to 90% (Non-Condensing)
Coating	White, satin anti-microbial powder coat

General Safety and Care Instructions

Safety

<u>WARNING:</u> When using electronic products, basic precautions should always be followed, including:

- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with in accordance with cleaning instructions included in this manual.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions for spacing and clearance to allow proper airflow.
- Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Power cord must be accessible to allow for the removal of the power from the unit.
- Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where cords exit from the apparatus.
- Unplug this apparatus during lightning storms.
- Unplug this apparatus when unused for long periods of time.
- Only use attachments/accessories supplied or specified by the manufacturer.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or excessive moisture, does not operate normally, or has been dropped.

<u>WARNING:</u> To reduce the risk of fire or electric shock do not operate this apparatus in a position where it is exposed to dripping or splashing liquids, rain, moisture, or excessively high humidity. Objects containing liquid shall not be placed in proximity to the unit such that they present a risk of spillage onto the apparatus.

Shock and Fire Hazard:
The unit's metal case, power supply, and grounding terminals and lugs are essential in containing radio energy as well as safeguarding the user from any risk of electrical shock. The metal shell of the unit protects the internal circuitry from environmentally induced over stress conditions and is an integral part of the compliant system.

WARNING: Do not open the box or in any way expose the internal circuitry.

WARNING: There are no user-serviceable parts inside the unit. Opening or damaging the ZyPer4K unit in any way voids the warranty and immediately nullifies any assertion of regulatory compliance made by ZeeVee. Any required service shall be performed by trained and qualified service personnel authorized by ZeeVee.

Cleaning

Encoder, Decoder and ZyPerMP Unit Cleaning Procedures

Before cleaning:

1.Switch off or fully disconnect the AC power from the external supply unit connector to the ZyPer unit.
2.If the state of the AC power cannot be established, disconnect the DC input plug from the ZyPer unit before proceeding.

Cleaning Procedure:

1. Any unused cable receptacles should be covered with the supplied rubber plugs or a piece of tape to prevent cleaner from entering and possibly affecting operation.

2. Clean the exterior of the unit with a soft cotton cloth that has been lightly moistened with an approved and recognized cleaning agent.

   The exterior of the unit has been tested for compatibility with, and resistance to, the following products:

   - ✦ Alcohol (Isopropyl and Ethyl)
   - ✦ Ammonia-based cleaners (Windex)

   In case none of the above cleaning products is available, water may be used.

   The ZyPer4K unit is fairly tolerant to cleaning with moistened cleaning cloths, but the unit is not fluid tight. Care should be taken to not spray cleaner directly on to the unit or into the vents to avoid liquid ingress and damage to the internal electronics.

***CAUTION:* Do not apply or spray liquid directly on to the unit's exterior as excess liquid may cause damage to internal electronics. Apply the liquid to the cleaning cloth first.**

3. Repeat with water-moistened cloth only.

4. Wipe with a dry cloth

5. Air vents shall be checked to make sure that they are free of accumulated lint or blockages.

   Should the air vents appear clogged use a vacuum cleaner with a soft-bristle brush attachment to loosen and draw the debris out of the vents and away from the unit.

   Do not loosen and blow the debris in to the unit as internal buildup of debris will degrade the ability of the unit to cool itself and reliability may be adversely affected.

Do not apply power if there is any evidence of fluid in the interior of the unit.

ZyPerMP Specific Cleaning Procedure

The ZyPerMP control unit is not designed to be placed in an environment that would subject it to impurities that require as frequent cleaning as the encoder and decoder units. Should the ZyPerMP unit need cleaning, the same procedures apply as enumerated above, only a very sparing amount of cleaner should be applied to the cleaning cloth.

Important Siting and Application Considerations

ZyPer4K Equipment Type and Uses

ZyPer4K Intended Uses

- Equipment is intended for the distribution of Audio Visual Information in and around a facility.
- Equipment is intended to distribute Human Interface and control information over the same network as the Audio Visual information following the same or different logical distribution paths.
- Equipment does not generate video information itself, but accepts and distributes video information from industry-standard devices which generate such audio visual information.
- Equipment is intended for the sophisticated display and presentation of decoded information that has been distributed by companion ZyPer4K equipment.
- Equipment is intended to be controlled from a central control node (the ZyPerMP) which ties in to a customer control system for sophisticated presentation and management of the information flow and direction.

WARNING: The installer should test and validate a complete setup with the actual devices before deploying to a final production installation.

Installation Environment

The general area where the ZyPer4K unit is to be installed shall be clean and free of obstructions or clutter.

Mounting Options

- Unit may be mounted horizontally on the installed rubber feet
- Unit may be bolted to a horizontal surface using the provided L-brackets with or without feet installed.
- Unit may be mounted vertically only if appropriate clearance is provided around the grille work for adequate airflow. The appropriate ZyPer4K rack mount kits insure that airflow space is sufficient when mounting vertically.
- Units may be stacked in a horizontal orientation providing stack is no higher than 3 units when using the provided rubber feet
  - Greater stacking requires that the user remove the rubber feet and externally bracing the stack of units.
- In all cases, insure that the units are rigidly held in place and will not be subject to impact and there is no possibility of toppling.
- Do not stack any other equipment or devices on top of the unit weighing more than 3Kg and only if sufficient bracing is provided to protect against toppling.

<u>WARNING:</u> Failure to adhere to these recommendation could result in unsafe operation, damage to the equipment, or injury to the operators.

Mounting Brackets

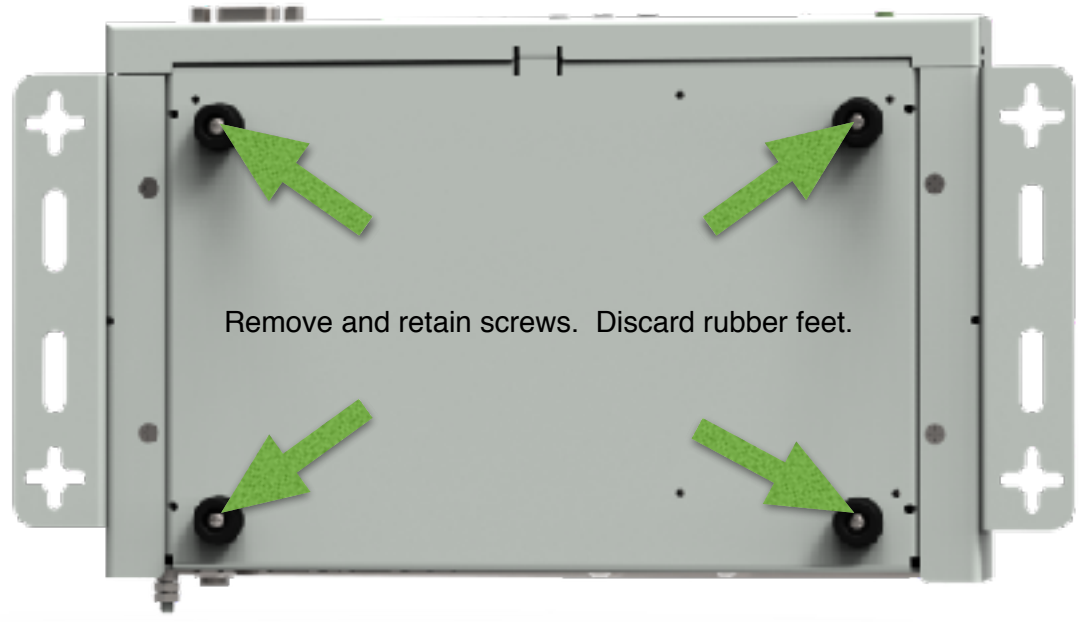
ZyPer4K equipment may be used horizontally and simply sit upon the rubber feet that are factory installed. It is recognized that in some sites a more rigid and secure installation is desired. To that end, each ZyPer4K device is supplied with two L-shaped brackets which may be optionally used to rigidly affix the unit to a shelf, wall, or any sturdy surface.

The brackets are supplied in a separate polyethylene bag included in the packaging for the unit.

It is up to the installer to provide the appropriate screws or bolts to affix the unit to whatever surface it is to be mounted.

The optional L-Brackets allow for the ZyPer4K unit to be rigidly mounted flat to a cart, plate, wall, or any type of flat surface. The hole, cross, and slot cutouts allow for great flexibility in mounting

When using the L-Brackets, first remove the screws and rubber feet on the bottom of the unit. Retain the screws as they will be used to affix the L-Brackets to the ZyPer4K unit body. The rubber feet are not used when mounting with the L-Brackets.



Affix the L-Brackets to the sides of the unit using the retained screws from the rubber feet (repeat for each side).

Recommended mounting hardware for rigid mount

The installer must provide the appropriate hardware to mount the L-Brackets to whatever surface is used.

Drywall: When mounting to drywall, ZeeVee recommends use of Drywall anchors for #6 up to #10 hardware and washers appropriate to the size screw utilized. The recommended sequence of hardware would be; Drywall anchor, Flat Washer, ZyPer4K L-Bracket, Flat Washer, Screw or Bolt.

Sheet Metal Shelf or Equipment: #6 up to #10 thread-forming or thread-cutting machine screws. Pilot holes should be drilled using the equipment as an outline template. Should the removal of equipment periodically be required use thread-cutting screws. The recommended sequence of hardware would be; Flat Washer, ZyPer4K L-Bracket, Flat washer, Lock Washer (when using thread cutting screw), Screw or Bolt.

There should be 4 sets of screws and associated hardware in as “outboard” a position as is practicable.

Ventilation

Ambient environmental temperature and humidity shall not exceed that specified in the Detailed Specifications portion of this document.

Ambient temperature in this case refers to the temperature of air entering the device through the ventilation grille. Care should be taken to not enclose the device or deploy in an fashion where airflow loops or local “hot spots” can cause the inlet air to rise above the specified limit for normal operation.

In general 25mm (≈ 1inch) of clearance should be provided around the ventilation openings unless an external air mover insures that the inlet temperature is at or below the specified limit.

If the equipment is mounted in an enclosed cabinet, it is the job of the installer to insure that within the cabinet or enclosure the ZyPer4K equipment does not experience local temperatures in excess of that specified in the Detailed Specifications portion of this document.

Water and moisture

Never expose the ZyPer4K unit to direct rain, moisture, or excessively high humidity.

Never use the device near water - e.g. near a bathtub, basin, pool, sink, or in a wet basement.

Clean only in accordance with the instructions in this manual.

AC Mains Connection

The ZyPer4K Encoder and Decoder units are powered through an external AC/DC converter unit.

The Encoder and Decoder units must be powered and connected using the supplied external AC/DC converter. The voltage supplied to the Encoder and Decoder units from the external supply is 12VDC at less than 2.0A

- Do not substitute the supplied AC/DC power supply unit with another component. The overall system compliance is dependent on each of the provided elements being present and operational.

<u>INFORMATION:</u> The introduction of a foreign, non-ZeeVee element nullifies any claim of regulatory compliance asserted by ZeeVee.

The AC/DC power supply shall be powered from the appropriately rated AC mains voltage which allows for a wide range of input, generally from 100VAC through 240VAC.

Only use a power cord with an appropriately rated protective earth connection. The protective earth connection is essential to the overall safety of the system.

<u>WARNING:</u> Bypassing or omitting the protective earth connection increases the risk of electrical shock and radio emissions

Install the equipment in such a manner as the IEC power cord ingress in to the AC/DC adapter is accessible as this is the boundary of the AC mains system and the point at which the ZyPer4K equipment is disconnected from the AC mains power if needed.

The equipment should be installed as near as is practicable to an AC outlet.

- Do not substitute or extend the DC cable from the AC/DC unit.

The ZyPer4K system is intended and rated for continuous operation

Should the ZyPer4K equipment be unused for an extended period of time it should be disconnected from the AC mains at the AC inlet to the external AC/DC converter in order to protect the equipment from transient over-voltage conditions.

AC Power Cord

Connect the external AC/DC supply unit to the AC mains with a UL-listed detachable power cord, 3-wire, type SJ or equivalent, 18 AWG min., rated 250 V min., plug 5-15P configuration for 120V application, or 6-15P for 240V application.

AC/DC converter inlet side of AC cord shall be of type IEC320C13

•Do not overload wall outlets and extension cords.

Power cords should be routed so that they are not likely to be walked upon or pinched by items placed upon or compressing them.

Match the rating of the power cord to the voltage of the power outlet in accordance with the specific requirements and in compliance with safety standard of your particular country.

Equipotential Referencing

Safety and compliance with standards is highly dependent on the proper crafting of the electrical realm in which electrical equipment operates. It is also good practice to properly ground all electrical equipment.

The ZyPer4K equipment may be connected to the the known and common equipotential reference by bonding the devices electrically. This is achieved by connecting the equipotential plane reference to the unit via the equipotential stud.

The ZyPer4K devices all have a universal stud on the rear of the unit near the power connector for this purpose. Two nuts are also provided to allow for a “locking connection”. This stud is sized and threaded for #8 hardware.

This is a reference point that In order to insure the voltage potential of the enclosure of the ZyPer4K unit is referenced to a known common level.

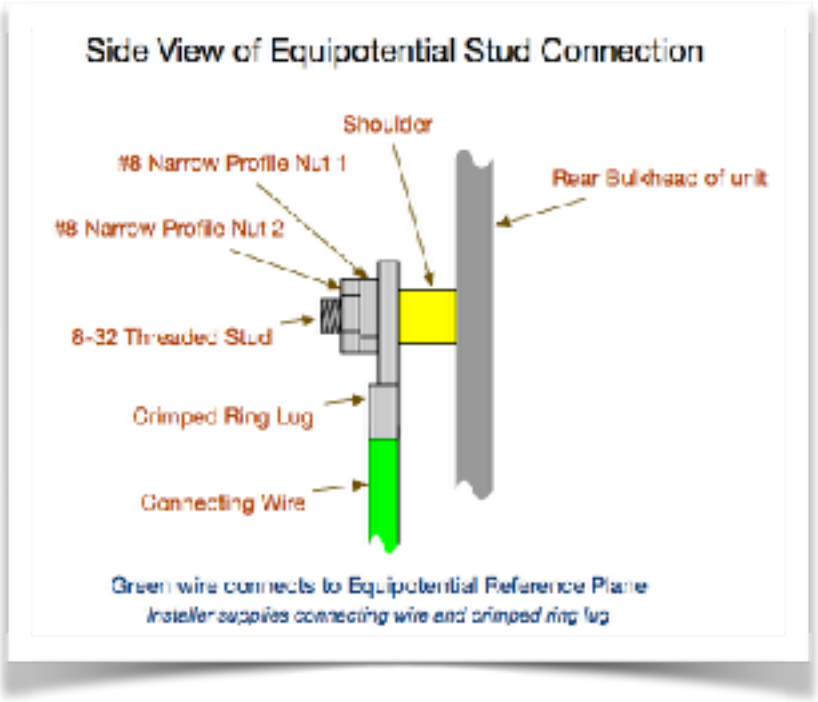
The grounding wire and crimped lug is NOT provided as part of the ZyPer4K unit as that item is site-specific.

Installer-Required Action

If used, the installer must connect to the Equipotential Stud with a wire terminated with a crimped ring lug with internally toothed locking feature similar to the item shown. The locking feature insures the ring lug will not loosen over time given environmental handling or vibration.

The Equipotential Stud is an 8-32 threaded connection. Employ a ring lug of the proper diameter to insure the most reliable connection.

High-quality wire of 16 gauge or heavier is recommended by ZeeVee, It is the responsibility of the installer to determine the needs of the specific installation.



Responsibility and Stewardship

ZeeVee is committed to using the planet's resources efficiently and having as little negative impact on the environment and health of mankind as possible.

Our products consume very little energy and attempt to provide the highest level of function for the smallest investment in resources.

Reduction of Hazardous Substances (RoHS)

RoHS Directive 2011/65/EC, Directive 2002/95/EC, Directive 2003/11/EC

Product Lines:

ZyPer Products supplied by ZeeVee, Inc.

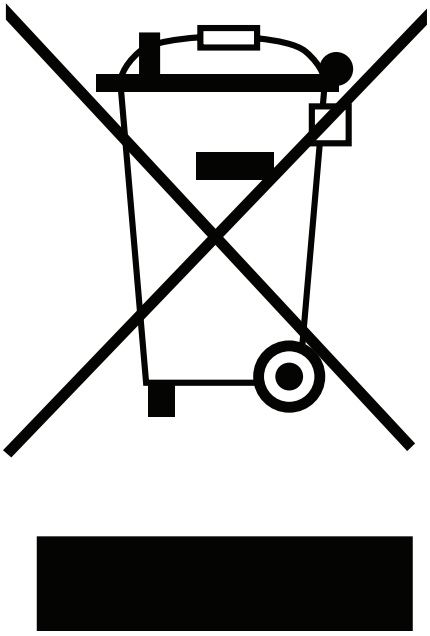
Material	Limit
Lead and its compounds (Pb)	<1000 ppm
Hexavalent Chromium and its compounds (Cr VI)	<1000 ppm
Cadmium and its compounds (Cd)	<100 ppm
Mercury and its compounds (Hg)	<100 ppm
Polybrominated diphenyl ethers (PBDEs)	<1000 ppm
Polybrominated biphenyls (PBBs)	1000 ppm
Bis(2-Ethylhexyl) phthalate (DEHP)	<1000 ppm
Benzyl butyl phthalate (BBP)	<1000 ppm
Dibutyl phthalate (DBP)	<1000 ppm
Diisobutyl phthalate (DIBP)	<1000 ppm

Be advised that based on the information available to ZeeVee from our component and sub-assembly providers, the product lines listed above do not contain as intentional additives, any of the referenced materials at the levels indicated, as referenced in the subject EU directives. To the best of our knowledge, none of these materials are generated during production and the supplied component parts of the ZeeVee products do not contain the listed materials. Since we do not expect these materials to be present, we do not specifically run a complete analysis on all finished goods, excepting for periodically auditing the finished goods and component materials in certain circumstances.

This information is believed to be accurate and refers to the laws, regulations and products at the date of issue. However, ZeeVee makes no express or implied representations or warranties with respect to the information contained herein. It is the responsibility of our customers to determine that their use of ZeeVee products is safe, lawful, and technically suitable for their applications. Because of possible changes in the laws and regulations, we cannot guarantee that the status of the listed products will remain unchanged.

Waste Electrical and Electronic Equipment

WEEE Directive 2012/19/EU on waste electrical and electronic equipment



The WEEE Directives (2008/98/EC and 2012/19/EU) place an obligation on electrical equipment manufacturers and importers to recycle electronic products at the end of their useful life.
ZeeVee products that are marked with the WEEE symbol (see left) indicate that the product must NOT be disposed of with other household waste. Instead, it is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved re-processor or by returning it an authorized agent of ZeeVee or their distributor for recycling. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly

For more information about the the recycling of this product, please contact your local waste disposal authorities or local municipal waste disposal service.

For specific questions related to WEEE compliance of ZeeVee products contact:
support@zeevee.com

This information is believed to be accurate and refers to the laws, regulations and products at the date of issue. However, ZeeVee makes no express or implied representations or warranties with respect to the information contained herein. It is the responsibility of our customers to determine that their use of ZeeVee products is safe, lawful, and technically suitable for their applications. Because of possible changes in the laws and regulations, we cannot guarantee that the status of the listed products will remain unchanged.

ZeeVee, Inc.
295 Foster Street, Littleton, MA 01460

FCC Compliance Statement

The ZyPer4K family of devices has been tested and found to comply with the limits for Class A Digital Devices pursuant to Part 15 of the FCC Rules. Operation is subject to the following conditions: 1) these devices may not cause harmful interference, and 2) these devices must accept any interference received including interference that may cause undesired operation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed or used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. reorient or relocate the receiving antenna
2. increase the separation between the equipment and the receiver
3. connect the equipment to an outlet on a circuit different from that to which the receiver is connected
4. consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

In order to insure compliance with the referenced FCC regulations, only deploy the equipment with provided or approved accessories in the manner indicated in this and other pertinent manuals.

Use only approved and properly shielded cables of good quality.

Address any inquiries to:

ZeeVee, Inc.
295 Foster Street, Suite 200
Littleton, MA 01462

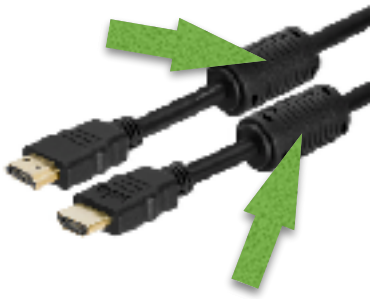
EMC Information

The ZyPer4K devices should be mounted and operated in accordance with the guidelines specified in this guide to maintain the integrity of the expected EMC characteristics.

The supplied Power Supply (AC/DC Conversion unit) should be used. The ZeeVee 12V Rack Mount Power Supply (Z4KPWRCTR12) may also be used. Any other AC/DC supply has not been tested or verified to perform at the levels indicated in this manual.

Media cables are not provided and the ZyPer4K devices are generally fairly tolerant of different types and manufacture styles.

- Media cables should be of good quality and rated for the performance levels of the interface to which they are connected.
  - e.g. 4K HDMI ports should only be connected to HDMI cables rated for 4K operation at the desired resolutions.
  - e.g. 3G-SDI cables should be of the appropriated impedance and within the length restrictions of the greater 3G-SDI specification
- HDMI cables shall be of the type incorporating integral Ferrite cores in order to achieve rated compliance levels and the cleanest electromagnetic environment in the vicinity of the unit.



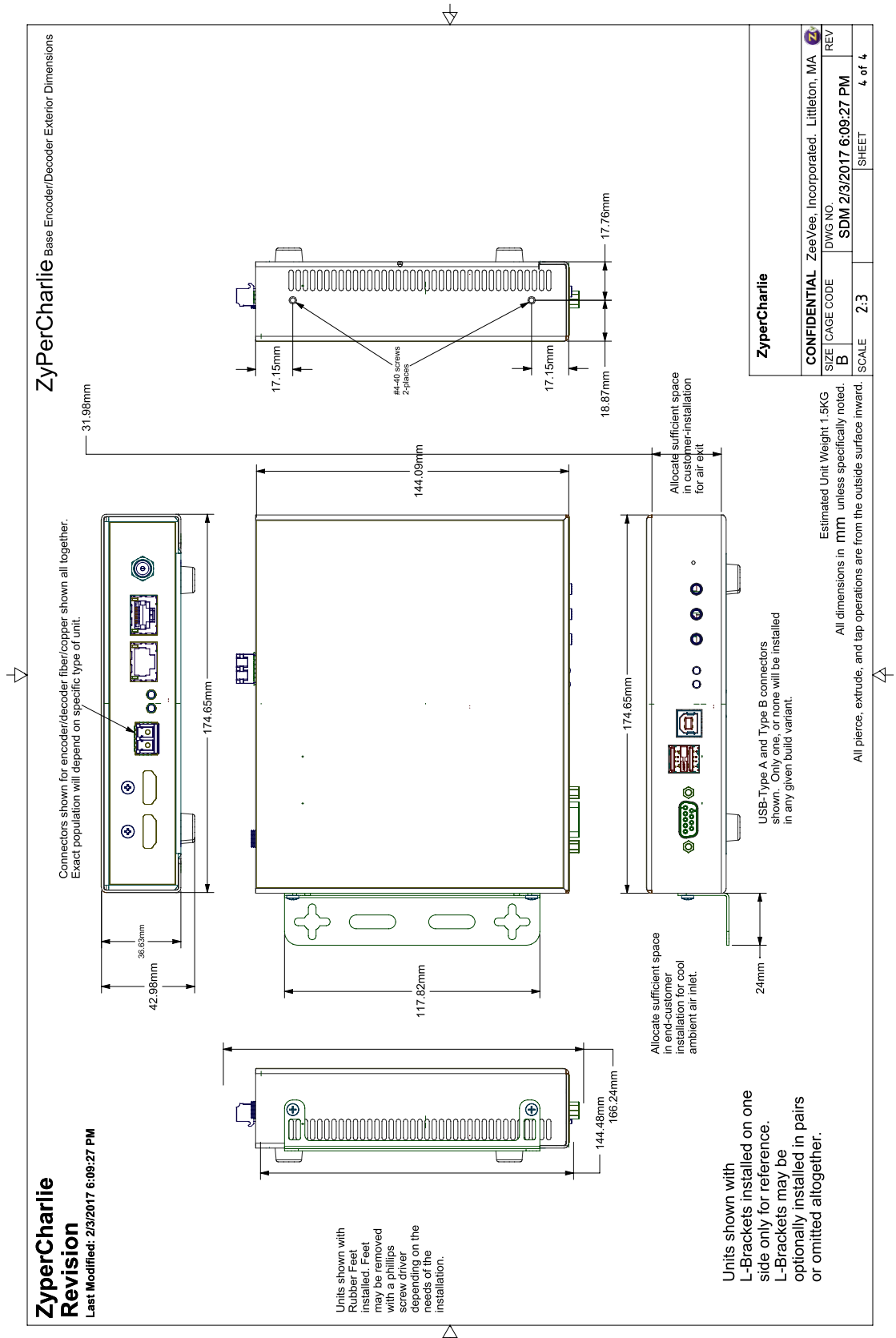
Electromagnetic Emissions

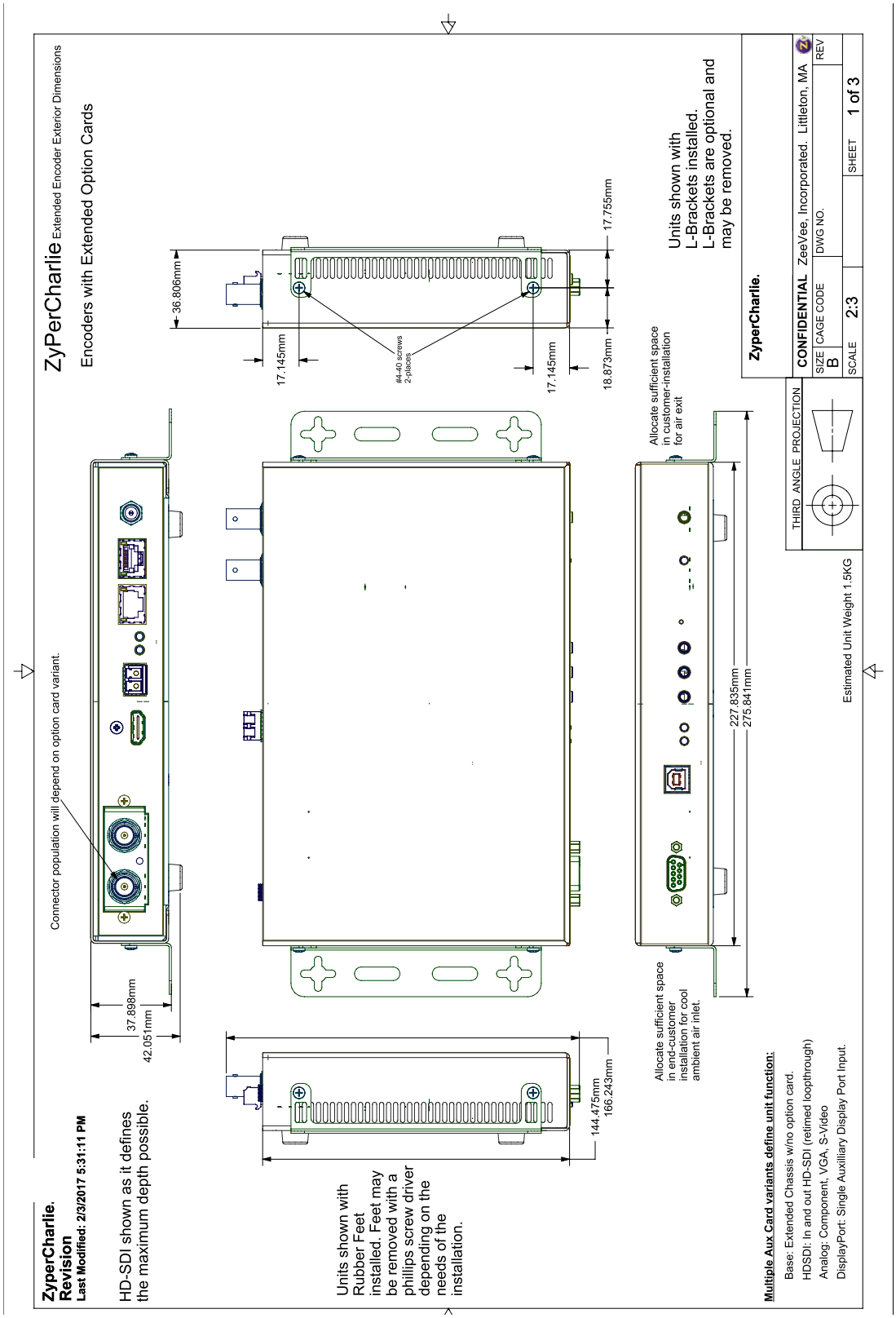
Test	Compliance Level	Notes
RF emissions: CISPR 11	Group 1	ZyPer4K emissions are very low and not expected to cause unintentional interference.
RF emissions: CISPR 11	Class A	Commercial equipment for use in commercial environments.
Harmonic emissions: IEC 61000-3-2	Class D	Suitable for use in all commercial and domestic low-voltage environments.
Voltage fluctuations/ flicker emissions: IEC 61000-3-3	Compliant	

Electromagnetic Immunity

Test	IEC Standard	EN60601 Compliance Level	Result	Deployment Note
Electrostatic Discharge (ESD)	61000-4-2	± 6kV contact ± 8kV air	PASS	Expect hard floor of wood, tile, ceramic, metallic material. If floor has synthetic covering, expected relative of humidity of 30% shall be maintained to avoid static charge buildup.
Radiated RF	61000-4-3	3 V/m 80 MHz to 2.5 GHz	PASS	Minimum separation guidelines should be observed if placing equipment close to intentional RF radiator.
Electrical fast transient/burst transient	61000-4-4	± 2kV for power supply lines ± 1kV for input/ output lines	PASS	Expected power quality typical for commercial facility.
Surge	61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	PASS	Expected power quality typical for commercial facility.
Conducted RF	61000-4-6	3 Vrms 150 kHz to 80 MHz	PASS	Minimum separation guidelines should be observed if placing equipment close to intentional RF radiator.
Power frequency (50/60 Hz) magnetic field	61000-4-8	3 A/m	PASS	
Voltage dips, short interruptions and voltage variations on power supply input lines	61000-4-11	<5%U_T [1](>95%dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (>95% dip in U_T) for 5s	PASS	Typical commercial facility power expected. Good practice dictates that a UPS system shall be employed if continued operation through any possible AC delivery disturbance is desired.

Physical Dimension Diagrams




ZyPerCharlie Extended Encoder Exterior Dimensions
Encoders with Extended Option Cards
ZyperCharlie.
Revision
Last Modified: 2/3/2017 5:31:11 PM
Connector population will depend on option card variant.
HD-SDI shown as it defines the maximum depth possible.
37.898mm
42.051mm
Units shown with Rubber Feet installed. Feet may be removed with a phillips screw driver depending on the needs of the installation.
144.475mm
166.243mm
36.806mm
17.145mm
#4-40 screws 2 places
17.145mm
18.873mm
17.755mm
Allocate sufficient space in customer-installation for air exit
Allocate sufficient space in end-customer installation for cool ambient air inlet.
227.835mm
275.841mm
Units shown with L-Brackets installed. L-Brackets are optional and may be removed.
ZyperCharlie.
Estimated Unit Weight 1.5KG
THIRD ANGLE PROJECTION
CONFIDENTIAL ZeeVee, Incorporated. Littleton, MA
SIZE B
CAGE CODE
DWG NO.
REV
SCALE 2:3
SHEET 1 of 3
Multiple Aux Card variants define unit function:
Base: Extended Chassis w/no option card.
HDSDI: In and out HD-SDI (retimed loopthrough)
Analog: Component, VGA, S-Video
DisplayPort: Single Auxilliary Display Port Input.

Disclaimers

ZeeVee has striven to insure that this document is accurate and represents the described products fully. Although, ZeeVee assumes no responsibility for errors found, should any be found, please contact support@zeevee.com and corrections will be issued as appropriate.

ZeeVee hardware designs are property of ZeeVee.

Components, sub-assemblies, and methods utilized in the designs are free of any encumbrances or appropriate licenses and rights have been obtained by ZeeVee for the use in the described products in the intended manner.

ZeeVee software is the sole property of ZeeVee except within the restrictions and guidelines of any open-source or public-license component utilized. ZeeVee represents that normal usage of the product in a typical customer installation is fully within the granted rights and privileges of any licensed component. Visit www.zeevee.com for further details.

The specifications of the described products may change at any time without notice.

ZeeVee forbids unauthorized disassembly, reverse-engineering, duplication, or any other attempt to recreate all or portions of the hardware or software outside of any use explicitly authorized in writing by ZeeVee.

Trademarks

All trademarks are the property of their respective owners.

Copyright