4K over IP

Video Encoder

ZyPer4K ™
HYPERVELOCITY UHD VIDEO

zeevee
Intelligent AV Distribution

PRODUCT OVERVIEW

What is ZyPer4K?

ZyPer4K supports distribution of UHD and 4K, uncompressed video, audio and other data signals using off-the-shelf 10Gb Ethernet switching technology.

What are the features of ZyPer4K?

ZyPer4K's features include the following:
- Uncompressed UHD and 4K (video, audio, and control using off-the-shelf 10 Gigabit Ethernet switches
- Full HDMI 2.0 support
- Support video up to 4K/60 4:4:4 including HDR (High Dynamic Range)
- Available in both Fiber and Copper versions
- Supports analog stereo and embedded digital audio channels (up to 7.1)
- 1GbE network utility port available on all encoders and decoders
- Source and display control (Infrared and RS232)
- ICRON ExtremeUSB® USB2.0 extension for KVM/HID and Mass Storage
- HDCP 1.4 and 2.2 compliant
- Decoder option with embedded Dante Transmitter
- Optional encoder inputs supporting DisplayPort, HD-SDI, Analogue
- Optional decoder with outputs supporting HDMI and DisplayPort
- Video wall support for up to 15x15 displays
- Configurable Multi-view with support for up to 19 sources
- API for system control/monitoring using ZeeVee Management Platform
- Support for 3rd party control systems or applications (AMX, Crestron, Control4, Q-Sys, RTI).
- ZyPer4K can also be used in a point-to-point configuration to encode a 4K video source across a dedicated fiber connection to a display up to 30km away.

When will ZyPer4K products be available?

ZyPer4K HDMI 2.0 Fiber and Copper products are currently shipping.

Who or what is the target market?

Target markets for ZyPer4K include facilities or campuses that have the need to switch multiple digital sources (e.g. digital signage players, set-top boxes, PCs/Macs, media players, cameras, video conferencing systems) throughout -- using existing fiber infrastructure -- to multiple discrete displays (including flat panels, projectors, video walls).

ZyPer4K is especially attractive for applications where some combination of 4K video, zero frame latency and pixel for pixel video reproduction is essential.

Please refer to this chart for a more detailed display of target markets:

		VERTICAL MARKETS									
		Government	Education	Healthcare	MDU	Corporate	Stadiums	Worship	Transportation	Entertainment	Hospitality	Retail
APPLICATIONS	Café/Bar/Restaurant Video Distribution	x	x	x		x	x			x	x	x
	Command and Control	x		x		x	x		x	x		
	Digital Signage – Retail Advertising						x			x		x
	Guest/Patient Room Entertainment	x		x							x	
	HealthClubs/Gyms	x	x	x	x	x					x	
	Housing	x	x		x							
	Operating Rooms	x	x	x								
	Public Information Displays	x	x	x	x	x	x	x	x	x	x	
	Simulation Centers	x		x		x			x			
	Video Walls	x	x	x		x	x		x	x	x	x

What are some of the target applications where ZyPer4K can be used effectively?	ZyPer4K can effectively distribute any number of source devices to any number of displays. Example applications include: • Digital signage content distribution for Public Information Displays, Way-finding or advertising (including large-format touchscreen applications) • High-end graphics with no latency in Visualization and Simulation environments (e.g. Oil and Gas strata spectral recognition) • Command and control environments • CAD/CAM and graphic design studios • In-room guest/patient entertainment systems • Broadcast facilities • Live event video distribution (stadiums, concert halls) • Commercial facilities for digital signage distribution and Conference/Meeting room AV interconnects. • Medical facilities including Operating Rooms with IEC60601 certified units.
What are the key benefits of ZyPer4K over existing solutions?	The benefits of ZyPer4K over other solutions are many: • Uses 10Gb Ethernet switches to distribute uncompressed 4K (4K/60) video, audio, and control. ZyPer4K allows you to use almost any off-the-shelf 10Gb Ethernet switch to encode data, whereas other solutions use complex and expensive proprietary switches. • Support for fiber and copper cabling and switches • Offers infinitely scalable and flexible input-output options without limitations. For example, use a 24 port Network Switch in any input-output configuration that fits the situation – for example, 1x23, 6x18, 4x20 and so on. • Provides secure, AES128 bit encryption. • Lets you perform installations quickly and easily with its simple "plug-and-play" approach. This approach allows for rapid and cost-effective deployment. • Offers considerable cost-savings with its scalable, flexible, and easy-to-use features. • Offers ability for use in a point-to-point configuration to encode a 4K video source across a dedicated fiber connection to a display up to 30km away.
How does ZyPer4K complement existing ZeeVee products?	Other ZeeVee products use coax infrastructure for video distribution. ZyPer4K offers the ability to distribute high definition uncompressed video, audio, and other data signals using off-the-shelf 10Gb Ethernet switching technologies.
How does ZyPer4K transport signals?	ZyPer4K converts signals from connected sources (video, audio, and control) into Ethernet packets and uses standard Ethernet switching technology to connect sources and displays in an infinitely scalable architecture. All ZyPer4K devices use standard Ethernet addressing mechanisms to facilitate correct distribution of sources to targets/displays.
With what other solutions in the market does ZyPer4K compete?	ZyPer4K competes with conventional matrix systems from many providers, including the widely available HDBaseT products from almost everyone in the market including Altinex, AMX, ATEN, Atlona, Crestron, Extron, Gefen, Intelix and Kramer. We also compete with a variety of solutions that employ compression techniques to enable the use of lower bandwidth/higher latency 1Gb network switches.
How complex is system installation and configuration?	Encoder and decoder units are auto-detected upon connection making configuration and system setup extremely simple. We do not require detailed system certification/instruction for system setup and configuration.
How many inputs and outputs can ZyPer4K support?	ZyPer4K is infinity scalable and completely flexible with regard to input and output configurations. You are not limited to the conventional (4x4, 16x16, 32x32 and so on) options. Rather you can use any combination of inputs and outputs on a particular network switch (for instance on a 24 port Network switch: 1x23, 2x22, 3x21 and so on up to 21x3).
In addition to video, what other signal types does ZyPer4K support?	ZyPer4K also supports the distribution of audio and control (RS232, Infra-Red) signals as well as USB2.0 devices (e.g. Keyboards, mice, Mass storage, cameras, touchscreens).
How does the cost of the ZyPer4K system compare against traditional AV distribution systems?	The encoder and decoder devices are priced very competitively against many other providers in the video switching market. The real cost savings in a deployment come from the significant cost savings of the central switcher and in the expected time savings for system design, configuration, installation and commissioning. A conventional 16x16 (32 port) fiber matrix switcher could cost on average USD $40k. A slightly larger 48 port 10Gb Ethernet switch costs roughly $5k. This represents a 50% increase in input-output ports with over 85% reduction in cost. Contact us if you need switch recommendations or want to price out a ZyPer4K system.

Does ZyPer4K support Independent signal routing?	Yes. Independent signal routing allows you to route video from one source to a display, and then perhaps route audio to that display from a different source. An example when this may be important is when you have a separate audio distribution system and need to send audio only to that system. Independent routing also becomes important with control signals that you need to send separately to different displays or different sources, or with USB Signals that you need to send separately.
Does ZyPer4K support KVM (Keyboard, Video, Mouse) applications?	Yes. ZyPer4K does offer models that support KVM applications using USB2.0 connected devices. To achieve this, we utilize ExtremeUSB® technology from ICRON.
What about supporting other HID peripherals?	Yes. Any USB2.0 or lower HID peripheral can connect into our USB enabled encoders and decoders.
How does the video wall feature work?	ZyPer4K allows a user to stretch a single source across any wall of monitors (n x m = an array of n monitors wide by m monitors high) without the need for any additional, costly hardware or software. Each display in the video wall receives a cropped portion of the original source and does allow for bezel compensation (if required). Maximum supported wall size is 15x15.
How does the Multi-view feature work?	ZyPer4K supports multi-view/compositing capability that allows a user to create a well-defined configuration using up to 19 sources to be represented on a single display. e.g. Picture in Picture, Quad-View, L-Wrap 6 segment, 4x4 Grid.

VIDEO

What types of compression does ZyPer4K use?	ZyPer4K will only compress if the source data is greater than 10Gb/s (Example 4K/60 4:4:4) In this case the ZyPer4K implements a light compression scheme to just bring the total data from transmission under the 10Gb/s threshold.
What video source signals and resolutions does ZyPer4K support?	ZyPer4K supports all video resolutions supported by HDMI 2.0. Currently, we support HDMI, 3G-SDI, Display Port 1.3 and Analogue connectivity. Other source connections (e.g. DVI) can be connected using widely available adapters and converters.
Does ZyPer4K support cinema 4K (4096x2160)?	Yes.
Does ZyPer4K support seamless switching?	Yes, ZyPer4K supports seamless switching between similar resolution sources and also synchronizes displays while you switch inputs.
How much bandwidth does ZyPer4K need to send 1080p and UltraHD (4k/30) video?	ZyPer4K encodes video, audio, and control signals, in addition to any additional network traffic from devices connected to the encoder or decoder 1 Gb Ethernet utility ports. When we talk about bandwidth we typically focus on video bandwidth. Here are the bandwidths needed: • Encoding 1080p/60fps video requires approximately 3.25 Gbps (Gigabits per second). • Encoding 4K (4k/30 4:4:4 or 4k/60 4:2:0) requires approximately 6.5 Gbps. Note: 4K/60 4:4:4 signals require approximately 13.0 Gbps which can be lightly compressed with no visual loss to be capable of transmission on a 10Gb link.
How does ZyPer4K address and achieve HDCP key management?	ZyPer4K maintains HDCP Key management through secure key negotiation at both source and display and the use of 128-bit AES encryption on packetized Ethernet data between all sources and displays.
Does ZyPer4K scale video resolutions?	ZyPer4K distributes and displays sources at their native resolutions. The decoder will automatically up or down scale to the preferred resolution of the connected display. Optionally, the user can manually set the decoder to scale to any desired resolution.

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AUDIO

Does ZyPer4K support analog audio distribution?	Yes. Sources which provide analog audio can be connected into ZyPer4K encoders and distributed throughout the system.
Can Audio signals be routed independently?	Yes. Audio and Video signals can be routed independently but typically audio embedded into an HDMI signal is routed along with its video. We can however embed analog audio from a source into the HDMI output on a decoder.
Can ZyPer4K Embed and De-Embed Audio?	Yes. Analog audio inserted into any ZyPer4K encoder can be combined/embedded at its destination (ZyPer4K decoder) into the outbound HDMI signal. Also, the embedded digital audio on an HDMI signal can be de-embedded at its destination (ZyPer4k decoder) and sent to either the HDMI connector, the analog audio connector, or Both (if the original signal is not encoded)
Can ZyPer4K manage encoded audio?	Yes. Any encoded audio stream can be routed from encoder to decoder.
Does ZyPer4K support a multi-channel down-mix?	Yes. If the audio source provides unencrypted multi-channel audio (e.g. LPCM), the ZyPer4K encoder can de-embed and down-mix this audio stream to a 2 channel stereo signal, that can be routed independently to any decoder on the network.
Does the ZyPer4K support Dante?	Yes, the ZyPer4K system can co-exist on a Dante audio network. Also there is a version of the ZyPer4K decoder that has an embedded Dante transmitter.
How much noise/sound does the ZyPer4K internal fan make?	The fan noise specification is 15.7 dB(a) We use the same fan in all ZyPer4K models except for the silent/fanless decoder. Note this is the sound level of the fan itself and does not account for any sound dampening resulting from having the fan located inside the ZyPer4K unit.
Does ZyPer4K support audio extraction at the source (encoder)?	Yes. The ZyPer4K encoder can extract audio from its connected source OUT to the on-board analog audio connector. This extracted audio can be either the original 2 channel analog stream OR a 2 channel down-mix of an unencrypted multi-channel digital stream.

CONTROL

How do you control which sources are displayed on which destination displays?	ZyPer4K requires the ZyPer Management Platform. This platform provides a fully functioned HTML5 GUI that gives users the ability to switch sources, route signals independently and setup video walls and display groups/zones.
API. Does ZyPer4K support external control systems?	Yes. The ZyPer Management Platform is a self-contained LINUX appliance that hosts the API and supports both Telnet and AJAX/JSON connections for 3rd party control systems/programs. This appliance also serves up the GUI for system configuration and simple AV routing. ZeeVee currently has driver modules available for Crestron, Control4, RTI, Q-Sys and Barco control systems. Native support for the ZMP is included in Utelogy, Isaac and DTV Game Control.
Will ZyPer4K allow me to control source devices and displays?	Yes. Since the ZyPer4K encoder and decoder units provide connectivity for RS232 and Infra-Red decoders and emitters, we can support control of source devices and control displays (Power On/Off, input selection) from either the central management platform or from an external control system e.g. touch panel. The ZyPer4K also supports CEC communication over HDMI for controlling displays.

NETWORKING

What network switches will ZyPer4K work with?	ZyPer4K should work with any 10Gb Ethernet switch that supports Multicast and IGMP snooping. IGMP snooping allows a switch to forward only multicast traffic between encoder and decoders that have requested it. Users who require seamless switching will need a 10Gb switch that also supports fast-leave/immediate-leave.

Do you have a list of approved switches that ZyPer4K has been tested against already?	Yes. We have performed testing against a variety of 10Gb switches from Netgear, Arista, Cisco, Commscope, Dell, Juniper, HP, Huawai and Extreme Networks. Specific model information can be made available upon request.
Do 10Gb switches have enough bandwidth for typical video applications?	Yes. 10Gb switches that operate at line rate speeds provide enough bandwidth on the backplane for 10Gb duplex (i.e. in both directions simultaneously) for all ports. So a 24 port switch has 24x10x2 = 480Gbs of bandwidth on the backplane which can easily deal with a fully loaded video system.
Can you add ZyPer4K to an existing system?	Yes, it's very easy. As long as there is an existing 10Gb Ethernet switch and IGMP snooping is enabled, it's as simple as plugging ZyPer4K units into an available port and using the management software to auto-detect and route signals. Users may choose to segment traffic using VLANs or create a separate network for video distribution only.
Is a ZyPer4K system secure?	Yes. Security is extremely important to our clients. All communication routed over the 10Gb Ethernet network is secured using 128-bit AES encryption between all encoders and decoders.
Does ZyPer4K encode data using Multicast, Broadcast, or Unicast?	ZyPer4K uses all three but in different ways. Video and audio packets are typically multi-casted. Control packets (IR, RS232) are typically unicasted or broadcasted.
Can ZyPer4K encoders and decoders work on the same network as other devices (e.g. printers, VOIP phones, servers, desktops, laptops)?	Yes. This is a very important aspect of the ZyPer4K architecture. If a customer already has a 10Gb infrastructure, ZyPer4K can immediately connect into it and start encoding and switching signals. Since the data is encoded into standard Ethernet packets, there is no interference with other Ethernet equipment residing on the same network, such as desktops, laptops, phones, etc. As long as there is enough bandwidth on the network switch and the network hardware supports IGMP, ZyPer4K will work.
How much network bandwidth does ZyPer4K require?	ZyPer4K encodes video, audio, and control signals, in addition to any additional network traffic from devices connected to the encoder or decoder 1 Gb Ethernet ports. When we talk about bandwidth we typically focus on video bandwidth. Here are the bandwidths needed: • Encoding 1080p/60fps video requires approximately 3.25 Gbps (Gigabits per second). • Encoding 4K (4k/30 4:4:4 or 4k/60 4:2:0) requires approximately 6.5 Gbps. Note: 4k/60 4:4:4 signals require approximately 13.0 Gbps which can be lightly compressed with no visual loss to be capable of transmission on a 10Gb link.
How much latency can I expect from Source to Destination on a standalone/dedicated 10Gb network?	You can expect a latency of less than 30ms (milliseconds). When seamless switching is disabled (i.e. framebuffer is disabled), latency is reduced even further to less than 100μs (microseconds).
Can ZyPer4K send a single source to a single display (point-to-point configuration)?	Yes. In this point-to-point configuration, ZyPer4K sends the video, audio and any control signals (IR or RS232) from the source to the display over a dedicated link. ZyPer4K also extends a LAN connection between any source or display points.
How does a Network administrator manage the ZyPer4K devices?	The ZyPer4K Management Platform provides a graphical interface to allow users to manage the encoder and decoder units, signal routing, video walls, multiviews and zones. Network access can be managed by 802.1X MAB.
How might you use the 1Gb Ethernet ports on the ZyPer4K encoder and ZyPer4K decoder?	Every ZyPer4K encoder and decoder provides a fully functional 1Gb Ethernet port for use by any standard Ethernet equipment. This configuration means you don't have to run multiple cables to a source or display. You can connect a variety of devices into this port, including Wireless Access Points (WAPs), VOIP telephones, VTCs (Video Teleconferencing Codecs) and SMART TVs/Displays.
Does ZyPer4K support POE?	The ZyPer4K-XS encoders and decoders support POE. (Introduced June 2021). The ZyPer4K-XR encoders and decoders support POE. (Introduced January 2022)

CABLING

What cabling does ZyPer4K use?	ZyPer4K currently support both fiber and copper cabling for its 10Gb transmission rates. 10Gb Network switches are said to support SFP+ (10Gb Fiber) and/or 10GBaseT (10Gb copper).

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Does it use single-mode or multi-mode cables?	ZyPer4K can use either single-mode or multi-mode cables.
Can ZyPer4K use both simplex (uni-directional) and duplex (bi-directional) fiber cabling ?	ZyPer4K cannot use simplex (uni-directional) or duplex (bi-directional) fiber cabling. ZyPer4K requires use of full-duplex fiber cabling because it encodes over 10Gb Ethernet (gigabit Ethernet is a full- duplex transport system).
How far can ZyPer4K send signals over fiber and copper?	Fiber cable properties determine distances, but in general 50/125 multi-mode fiber (MMF) can encode up to 300m, and 9/125 single-mode fiber (SMF) up to 30km. 10 Gigabit Ethernet typically requires at least Cat6a cabling to achieve 100m distances, but other cable types can be used (with reduced distance limitations).

Cable Type	10GBase-T
Cat5	Not Supported
Cat5e	55m (180 ft)
Cat6 UTP	55m (180 ft)
Cat6 STP	100m (330ft)
Cat6A UTP	100m (330ft)
Cat7	100m (330ft)

Can you mix and match cabling types in installations?	Yes, you can use many different fiber cabling types together in one installation, e.g. some connections over SM fiber, some over MM fiber, and some over UTP.
Does ZyPer4K use OM3 and OM4 fiber optic cable?	Yes, ZyPer4K uses both. OM3 and OM4 are both 50/125 core fiber but the difference between OM3 and OM4 fiber is bandwidth (2,500 megahertz vs. 4,700 megahertz), which in this case has limited impact on the distance that the signal can be encoded.

ZEEVEE SUPPORT

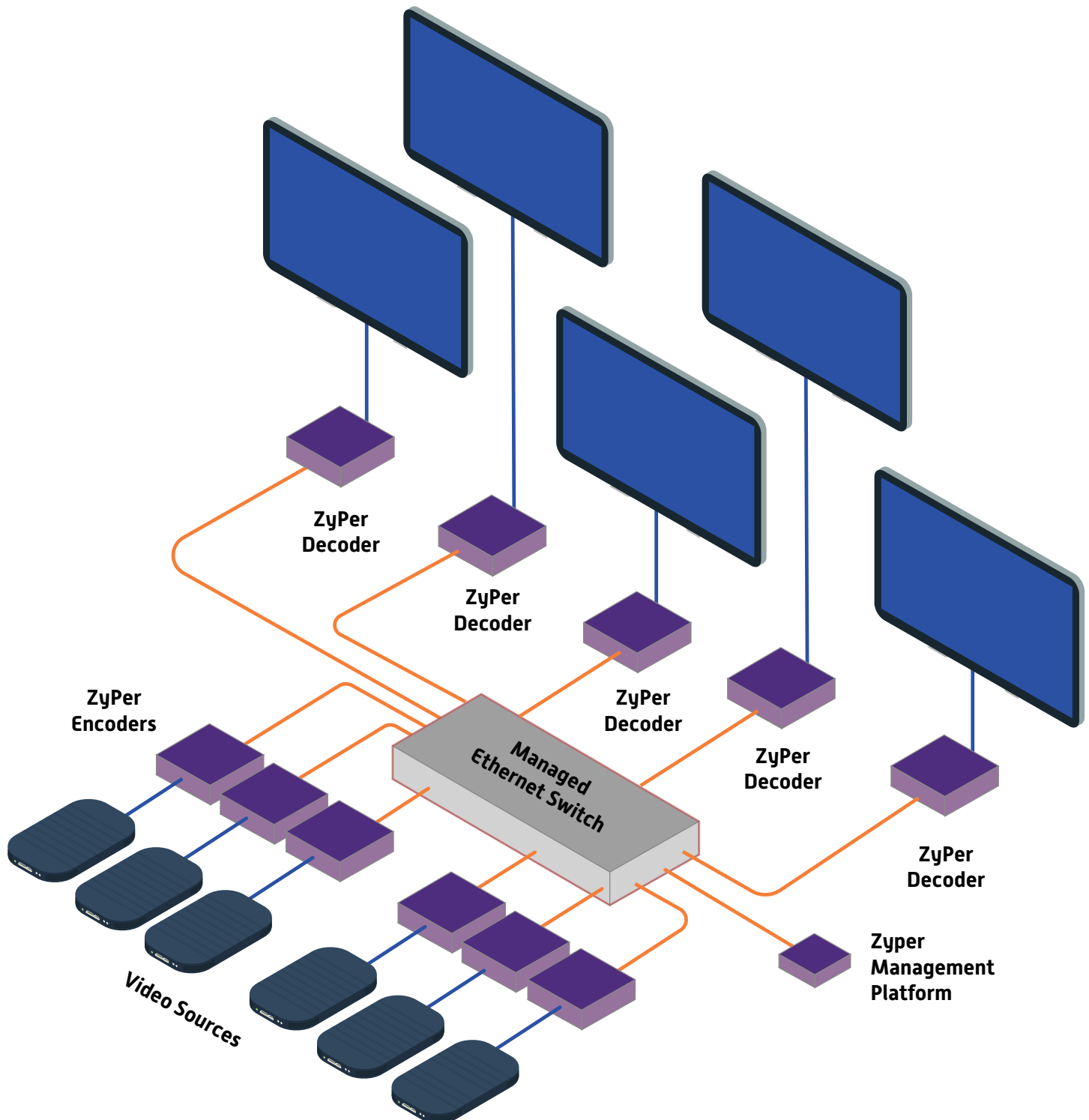|	
Is the customer support provided the same as other ZeeVee products?	Yes, ZyPer4K products come with the same excellent customer technical support as our other ZeeVee products.
What is included with the ZyPer4K product?	The ZyPer4K encoder and decoder units each ship with a power supply. Optional mounting L-bracket hardware is available for most models. VESA mounting hardware availble for most models as well.
How is the product mounted?	You can install ZyPer4K modules in our custom Z4K Rack (19" rackmount enclosure housing up to 8 devices), on a shelf or using our custom L-Brackets on the wall, mounted behind a display or projector or in any place where it fits securely.
What is the product warranty?	ZeeVee warranties ZyPer4K against defects in materials and workmanship for a period of three years from the date of purchase. For detailed warranty information, please refer to the warranty contained in the product's user manual or look on the website under Warranty Registration.
Where can I see ZyPer4K in action?	Contact us to discuss your needs and schedule a demonstration or evaluation system. Email us at sales@zeeve.com or call at North America Sales +1 (347) 851-7364 ; EMEA Sales +44 1494 956677 ; International Sales +1 (347) 851-7364.

SCHEMATIC

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ZyPer4K distributes HDMI, SDI, DisplayPort and Analogue sources connected into an off-the-shelf 10Gb Ethernet switch to an almost infinite number of displays using either single-mode or multi-mode fiber.

ZyPer4K also supports point-to-point installations where a single source is extended over fiber to a single display.

ZyPer Decoder

ZyPer Decoder

ZyPer Decoder

ZyPer Decoder

ZyPer Decoder

ZyPer Encoders

Managed Ethernet Switch

Video Sources

Zyper Management Platform

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Here you will find some common industry terms and their definitions. You may consider these terms helpful as you learn about, design and configure ZyPer4K. These definitions were taken from Wikipedia and edited somewhat for glossary purposes.

10Gb Ethernet – 10 Gigabit Ethernet (10GE, 10GbE, or 10 GigE) is a group of computer networking technologies for encoding Ethernet frames at a rate of 10 gigabits per second. 10GbE can use either copper or fiber cabling. However, because of its higher bandwidth requirements, higher-grade copper cables are required.

AutoIP – This is a method of automatically assigning IP addresses to networked computers and printers.

Broadcast – Broadcast refers to encoding communication that will be decoded by every device on the network. The scope of the broadcast is limited to a broadcast domain. Broadcast a message is in contrast to unicast addressing in which a host sends datagrams to another single host identified by a unique IP address.

Cat6a UTP – Category 6 cable (Cat 6), is a standardized cable for Gigabit Ethernet and other network physical layers that is backward compatible with the Category 5/5e and Category 3 cable standards. Category 6a is defined at frequencies up to 500 MHz—twice that of Cat 6. Category 6a performs at improved specifications, in particular in the area of alien crosstalk as compared to Cat 6 UTP (unshielded twisted pair), which exhibited high alien noise in high frequencies. There are two types of CAT6A cable, unshielded (UTP) and shielded (F/UTP). F/ UTP denotes foiled/unshielded twisted pair and consists of four unshielded twisted pairs encased in an overall foil shield.

CEC – The CEC (Consumer Electronics Control) capability allows HDMI devices to control each other when necessary and allows the user to operate multiple devices with one remote control handset.

DHCP – Dynamic Host Configuration Protocol (DHCP) is a standardized network protocol used on Internet Protocol (IP) networks for dynamically distributing network configuration parameters,such as IP addresses for interfaces and services. With DHCP, computers request IP addresses and networking parameters automatically from a DHCP server, reducing the need for a network administrator or a user to configure these settings manually.

EDID – Extended display identification data (EDID) is a data structure provided by a digital display to describe its capabilities to a video source (e.g. graphics card or set top box).

HDCP – High-bandwidth Digital Content Protection (HDCP) is a type of digital content protection developed to prevent copying of digital audio and video content as it travels across connections.

HID -- HID (Human Interface Device) is a type of computer device that interacts directly with, takes input from, and may deliver output to humans.

HDMI – High-Definition Multimedia Interface (HDMI) is a proprietary audio/video interface for transferring uncompressed video data and compressed or uncompressed digital audio data from an HDMI-compliant source device, such as a display controller, to a compatible computer monitor, video projector, digital television, or digital audio. HDMI is a digital replacement for existing analog video standards.

IGMP – The Internet Group Management Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IP networks to establish multicast group memberships. IGMP can be used for one-to-many networking applications such as online streaming video and gaming, and allows more efficient use of resources when supporting these types of applications. IGMP operates between the client computer and a local multicast router.

KVM – A KVM (Keyboard, Video, Mouse) switch is a hardware device that allows a user to control multiple computers from one or more sets of keyboards, video monitors, and mice.

Multicast – Multicast (one-to-many or many-to-many) distribution is group communication where information is addressed to a group of destination computers simultaneously.

Multi-mode fiber – Multi-mode optical fiber is mostly used for communication over short distances, such as within a building or on a campus. Typical multimode links have data rates of 10 Mbit/s to 10 Gbit/s over link lengths of up to 600 meters (2000 feet) — more than sufficient for the majority of premises applications.

POE – Power over Ethernet or PoE describes any of several standardized or ad-hoc systems that pass electrical power along with data on Ethernet cabling. This allows a single cable to provide both data connection and electrical power to devices such as wireless access points or IP cameras. PoE allows long cable lengths. Power may be carried on the same conductors as the data, or it may be carried on dedicated conductors in the same cable.

Single-mode fiber – A single-mode optical fiber (SMF) is an optical fiber designed to carry light only directly down the fiber – the transverse mode. These modes define the way the wave travels through space, i.e. how the wave is distributed in space. Waves can have the same mode but have different frequencies. This is the case in single-mode fibers, where we can have waves with different frequencies, but of the same mode, which means that they are distributed in space in the same way, and that gives us a single ray of light.

SFP Modules – The small form-factor pluggable (SFP) is a compact, hot-pluggable transceiver used for both telecommunication and data communications applications. SFP transceivers are available with a variety of encoder and decoder types, allowing users to select the appropriate transceiver for each link to provide the required optical reach over the available optical fiber type (e.g. single-mode fiber or multi-mode fiber).

UltraHD -- Ultra-high-definition television (UHD) is normally defined as displays that have an aspect ratio of at least 16:9 and at least one digital input capable of carrying and presenting native video at a minimum resolution of 3840×2160 pixels.   4K video refers to displays with an aspect ratio of 17:9 and a resolution of 4096 x 2160 pixels.

Unicast – Unicast distribution is used for all network processes in which a private or unique resource is requested.

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