



- ▶ Single 4K60, dual 4K30, or quad 1080p DisplayPort video/audio with USB 2.0, analog audio, and serial over single CAT6 or fiber
- ▶ Point-to-point extension or networked IP matrix switching over 1Gb Ethernet switch
- ▶ OSD with preview function and hot keys for local switching
- ▶ Central manager for configuration and remote switching, not required for operation
- ▶ Visually lossless video quality with seamless switching and low latency

## Features and Benefits

- Available in 2-port or 4-port as compact transmitter/receiver units or PCIe transmitter cards for installation in a PC chassis
- USB 2.0 works with standard keyboard and mouse as well as flash drives and other devices
- Low network bandwidth simplifies and lowers the cost of network installation
- Video is encrypted for increased security
- Seamless switching function presents new video instantly
- OSD provides user login and switching capability with thumbnail preview function
- Based on user login, access to computers or type of USB device can be restricted
- USB keyboard and mouse can be programmed for shared access or single user only
- Programmable hot keys allow switching with simple keyboard sequences
- Integrates with existing networking equipment and standard Gigabit Ethernet infrastructure
- Compatible with Microsoft® Active Directory Services for user authentication, and with SNMP for remote monitoring
- Rack mount and HDMI or VGA converter options available

## Product Overview

The UltraLink E-Series is a scalable, high-performance KVM and AV extension and switching system. You may run them point-to-point-as an extender by connecting transmitter and receiver units directly together with CAT6 or fiber.

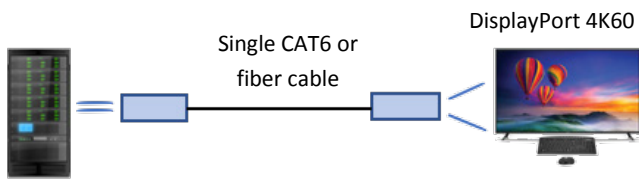
As a distributed matrix switching system, the UltraLink E-Series transmitters and receivers are connected to video sources, computers, displays, and peripherals as well as a standard 1Gbps Ethernet switch with CAT6 or fiber. Secure switching operation is easily controlled through the provided system manager software or through hot keys and OSD with thumbnail preview.

This robust system delivers DisplayPort 1.2 4K60 single-head video, 4K30 dual-head video, or 1080p quad-head video in 4:4:4 color with digital embedded audio. Accompanying signals include analog stereo audio in and out, USB 2.0, and RS232.

The UltraLink E-Series system is designed for simple installation, secure encrypted connectivity, reliable performance, scalable flexibility, and intuitive operation. This product is suitable in a wide range of applications such as control rooms, network operation centers, healthcare facilities, military and government sites, transportation venues, broadcast studios, and industrial environments.

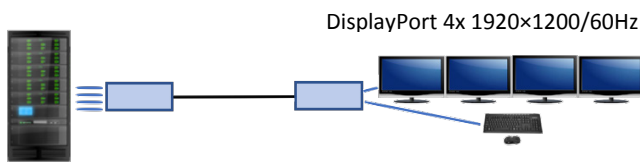
## Typical Applications

The UltraLink E-Series can be deployed as a point-to-point extender or as a networked matrix switch on a Gigabit Ethernet network.



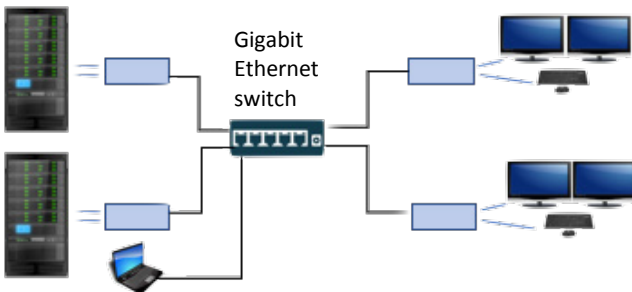
UltraLink E-Series as a point-to-point extender

The UltraLink E-Series can support a dual-head or quad-head work station over a single CAT6 or fiber cable with single keyboard/mouse control.



UltraLink E-Series as a quad-head display extender

Create a scalable KVM matrix switch over IP and add single, dual, or quad-head work stations as required with any user able to switch to any host PC, subject to configured access permissions.



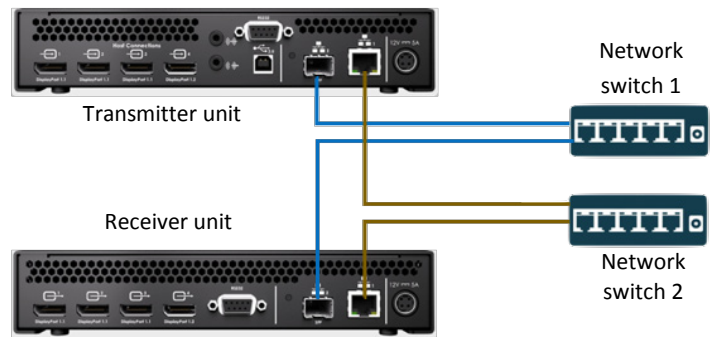
UltraLink E-Series as a KVM matrix switch over IP

**Transmitter Card** These two or four port cards implement zero-U installation by placing them inside a PC chassis. Only 12V power is used from the PCIe connector. Video connectors are mini DisplayPort. USB 2.0 is present, but no audio or RS232.



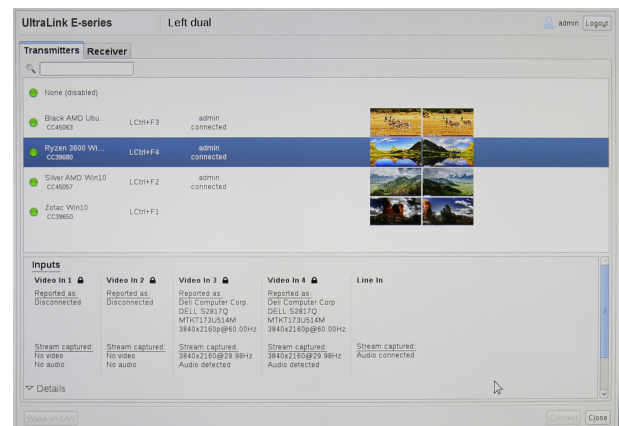
**Management Software** The included system manager software provides for secure, centralized management of all UltraLink E-Series networked devices. The software discovers connected UltraLink devices, and offers options to setup device parameters. The system settings are stored in each transmitter and receiver device. The system manager is not required for operation and is used primarily for configuration.

**Link redundancy** The UltraLink E-Series standalone units can be configured for link redundancy, ensuring that the networked devices can continue to operate in the event of a network cable or switch failure.



Connecting CAT6 and fiber for link redundancy

**OSD Control** The OSD is displayed via a program-mable hot keys providing each user with a powerful GUI interface. The OSD lists the available video sources by name with a thumbnail preview. You can switch to them by selecting them with keyboard or mouse. Useful diagnostic and status information is also shown. You can also switch directly without the OSD by using a distinct hot key for each source.



OSD showing thumbnail preview of four dual-head computers

## FREQUENTLY ASKED QUESTIONS

### 1. What is the typical network bandwidth used ?

The UltraLink E-series uses a proprietary compression technique optimized for KVM operation. If you play a 4K60 video, typical bandwidth is around 120 Mbits/sec. Non-moving screens will typically use only about 12Mbits/sec.

### 2. That seems like a very low bandwidth for 4K video, what type of quality can I expect ?

The video is visually lossless. If you put the uncompressed video side by side with the compressed video, you will be challenged to find any visual differences.

### 3. What kind of latency is there ?

Typical latency is 2-3 frames. For 4K60 and 2K60 this is around 40ms, for 4K30 this is around 80ms. There are some settings to reduce the latency at the expense of increased bandwidth.

### 4. Can I put this on my network with normal data traffic ?

Yes and no. It is important to understand that this is real time data and interruptions in the flow of data can cause video artifacts. The UltraLink devices should be connected directly to the Ethernet switches. AV and USB traffic flows only between the UltraLink units. Normal data traffic on the other ports of the switch do not affect the UltraLink operation as there is no need for communication between the UltraLinks and the other computers.

### 5. How do I configure my Ethernet switches ?

You should enable IGMP snooping. Each Ethernet switch is different. Usually you enable global IGMP snooping, global query, and VLAN IGMP snooping. Enabling this is not strictly required, but the bandwidth will be multiplied when one source connects to multiple displays.

### 6. How do I assign IP addresses ?

You can either assign them through DHCP or configure each unit with a static IP. DHCP assignment can be done with a separate DHCP server or if no DHCP server is present, DHCP auto-configuration will occur as a default.

### 7. What is the typical throughput of the USB for copying files from a flash disk ?

Typical rate is about 10MBytes/sec. This is sufficient, for example, to play a movie from USB flash disk and is about ¼ of the maximum rate achievable if connected directly.

### 8. How do keyboard and mouse sharing and USB restrictions function ?

The first user to connect to a video source becomes the current owner of that source. Other users connecting later are guests. If the guests have been configured to allow access to USB, they can share the keyboard and mouse access with the current owner. Otherwise, the guest may only view the computer's video. By configuration from the central manager, USB devices may be blacklisted, so that for example only keyboard and mouse may be used, but not USB flash drives.

### 9. What are the audio features ?

The transmitter accepts audio from the DisplayPort source and from the analog line in port. Either of these may be routed to the headphone/line out jack on the receiver. If speakers are present in the display, these will output the DisplayPort embedded audio. The receiver accepts a microphone or audio source on the mic in/line in jack. This is routed to the line out jack at the transmitter. For video conferencing or other similar applications, you can connect a standard headset with headphone and microphone to the receiver and route it to a PC connected to the transmitter.

### 10. What if the video source is not DisplayPort, but HDMI, DVI, or VGA ?

Rose provides products to convert from one video format to another such as HDMI to DisplayPort. These plug-and-play converters make the system capable of using any video.

### 11. Can I use smaller distributed switches instead of one big switch ?

You can utilize stacking or link aggregation to connect switches together as long as you do not interfere with the bandwidth between the UltraLinks. A common situation is to interconnect 1G switches with 10G ports. The exact mechanics of this varies with each switch, but it is standard networking practice.

### 12. Do you have a list of recommended Ethernet switches ?

Rose does not maintain a published list. The features needed by the UltraLink are usually present in a managed switch. Stick with later models of reputable manufacturers for best results. For large systems where you intend to distribute switches, you may wish to consult Rose.

## Specifications

Description	TX-4 Port	RX-4 Port	TX-2 Port	RX-2 Port	PCIe TX 4 Port	PCIe TX 2 Port
<b>Dimensions WxDxH</b>	8.53" × 7.45" × 1.68" (1RU) 21.66 × 18.9 × 4.26 cm				PCI express x8 electrical and x16 mechanical	
<b>DisplayPort 1.1</b>	Ports 1,2,3	Ports 1,2,3	Ports 1,2	Ports 1, 2	Ports 1,2,3	Ports 1,2
<b>DisplayPort 1.2</b>	Port 4	Port 4	—	—	Port 4	—
<b>Maximum resolution</b> <b>TX units = input</b> <b>RX units = output</b>	1× 3840×2160@60Hz 2× 3840×2160@30Hz 2× 2560×1600@60Hz 3× 1920×1200@60Hz 4× 1920×1080@60Hz		1× 2560×1600@60Hz 2× 1920×1200@60Hz		Same as the standalone chassis	Same as the standalone chassis
<b>Color space</b>	YUV 4:4:4 / RGB 8:8:8		YUV 4:4:4 / RGB 8:8:8		YUV 4:4:4 / RGB 8:8:8	
<b>DP (In) connectors</b>	4×DP	—	2×DP	—	4×Mini DP	2×Mini DP
<b>DP (Out) connectors</b>	1×DP (local)	4×DP	1×DP (local)	2×DP		
<b>Audio (In) connectors</b>	1× 3.5mm	2× 3.5mm	1× 3.5mm	2× 3.5mm		
<b>Audio (Out) connectors</b>	1× 3.5mm	2× 3.5mm	1× 3.5mm	2× 3.5mm		
<b>Digital audio</b>	Uses embedded digital audio through DisplayPort on transmitters. The receiver units have the option to de-embed the digital audio and convert to analog audio.					
<b>Serial RS-232</b>	1× DB9(F)	1× DB9(M)	1× DB9(F)	1× DB9(M)		
<b>USB2.0</b>	1× USB-B (2.0) 2× USB-A (2.0)	6× USB-A (2.0)	1× USB-B (2.0) 2× USB-A (2.0)	4× USB-A (2.0)	1× Mini USB-B (2.0)	
<b>Network port</b>	1× RJ45 TX 1× SFP cage (accepts optional MM/SM module)				1× SFP cage (accepts RJ45 copper or optional MM/SM fiber module)	
<b>Networking Interface</b>	1000 Base-T Ethernet					
<b>CAT6 cable distance</b>	Up to 328ft, 100 meters					
<b>Multimode fiber cable</b>	OM2, OM3, OM4 (50/125µm) 1804ft, 550 meters, OM1 (62.5/125µm) 902ft, 275 meters					
<b>Singlemode fiber cable</b>	OS1, OS2 (9,125µm): 3.10 miles, 5 Km					
<b>External power adapter</b>	Input: 100V to 240V AC, 50/60Hz Output: +12V DC, 5A				Not used, gets power from PCIe	
<b>Output connector</b>	DIN 4-pin female locking connector					
<b>Typical power</b>	44W	41W	24.5W	26.5W	41W	32.5W
<b>Controls</b>	Status LED indicators. On/Off and recessed reset button					
<b>Laser emissions</b>	850µm laser compliant to 21CFR, subpart J, Class 1 (MM fiber only)					
<b>Temperature</b>	Operating: 32°F – 104°F (0°C – 45°C)			Storage: -40°F – 158°F (-40°C – 70° C)		
<b>Humidity</b>	20 to 80% non-condensing			5 to 95%, non-condensing		
<b>Compliance</b>	Class A: CE, FCC, ICES-3, KC, RCM, VCCI					

## Part Numbers

<b>ULE-RXA2</b>	UltraLink E-Series Receiver unit, 2 DisplayPort 1.1, 4 USB type-A, resolution up to 1080p/60 4:4:4
<b>ULE-RXA4</b>	UltraLink E-Series Receiver unit, 3 DisplayPort 1.1 and 1 DisplayPort 1.2, 6 USB type-A, resolution up to 4K/60 4:4:4
<b>ULE-TXA2</b>	UltraLink E-Series Transmitter unit, 2 DisplayPort 1.1 (in), 1 DisplayPort 1.1 (local out), 1 USB-B (input), 2 USB type-A (local), resolution up to 1080p/60 4:4:4
<b>ULE-TXA4</b>	UltraLink E-Series Transmitter unit, 3 DisplayPort 1.1 and 1 DisplayPort 1.2 (in), 1 DisplayPort 1.1 (local out), 1 USB-B (input), 2 USB type-A (local), resolution up to 4K/60 4:4:4 (3840×2160)
<b>ULE-TXC2</b>	UltraLink E-Series PCIe Transmitter card, 2 Mini DisplayPort 1.1 (in), 1 USB 2.0 Type Mini-B, resolution up to 1080p/60 4:4:4
<b>ULE-TXC4</b>	UltraLink E-Series PCIe Transmitter card, 3 Mini DisplayPort 1.1 (in), 1 Mini DisplayPort 1.2 (in), 1 USB 2.0 Type Mini-B, resolution up to 4K/60 4:4:4 (3840×2160)
<b>ULE-SW2.01.00.010</b>	UltraLink E-Series central manager

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