HighSecLabs
Highest Security Solutions Ltd.

NEOUS MULTI-DOMAIN IP MATRIX | **USER MANUAL**

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INTRODUCTION

Neous is High Sec Labs' KVM-over-IP solution for connecting multiple users to multiple computer sources on networks with varying classification levels. Neous connects host computers to users via a network of Transmitter and Receiver Endpoints, all of which are coordinated via the Neous Controller. Operating in tandem, the Controller can create one-to-one, one-to-many, or many-to-many connections between Endpoints across a 10Gbps network.

This manual provides instructions for installing, configuring, and operating the Controller, Endpoints, and management software of the Neous Multi-Domain IP Matrix.

IMPORTANT NOTE: The Neous IP Matrix requires connection to a 10Gbps network.

Products covered by this manual:

Neous Matrix Controller

MCK11EC-M Neous Matrix Controller w/PoE

Secure Neous Endpoints

SKCX10PHT-M Secure Copper KVM Matrix Transmitter w/Isolator
SKCX01PHR-M Secure Copper KVM Matrix Receiver w/Isolator
SKCX10PHT-ME Secure Copper KVM Matrix Transmitter w/Isolator and PoE
SKCX01PHR-ME Secure Copper KVM Matrix Receiver w/Isolator and PoE
SVCX10PHT-M Secure Copper Video Matrix Transmitter w/Isolator
SVCX01PHR-M Secure Copper Video Matrix Receiver w/Isolator
SVCX10PHT-ME Secure Copper Video Matrix Transmitter w/Isolator and PoE
SVCX01PHR-ME Secure Copper Video Matrix Receiver w/Isolator and PoE
SKFX10PHT-M Secure Fiber KVM Matrix Transmitter w/Isolator
SKFX01PHR-M Secure Fiber KVM Matrix Receiver w/Isolator
SVFX10PHT-M Secure Fiber Video Matrix Transmitter w/Isolator
SVFX01PHR-M Secure Fiber Video Matrix Receiver w/Isolator

Secure Neous Isolators

FI11PHET-M Secure 1-Port Encrypted KVM Transmitter Isolator
FI11PHER-M Secure 1-Port Encrypted KVM Receiver Isolator
FI11PHT-ME Secure 1-Port Encrypted HID-Only KVM Transmitter Isolator
FI11PHR-ME Secure 1-Port Encrypted HID-Only KVM Receiver Isolator

Commercial Neous Endpoints

SKCX10PHT-N Commercial Copper KVM Matrix Transmitter
SKCX01PHR-N Commercial Copper KVM Matrix Receiver
SKCX10PHT-NE Commercial Copper KVM Matrix Transmitter w/PoE
SKCX01PHR-NE Commercial Copper KVM Matrix Receiver w/PoE
SVCX10PHT-N Commercial Copper Video Matrix Transmitter
SVCX01PHR-N Commercial Copper Video Matrix Receiver
SVCX10PHT-NE Commercial Copper Video Matrix Transmitter w/PoE
SVCX01PHR-NE Commercial Copper Video Matrix Receiver w/PoE
SKFX10PHT-M Commercial Fiber KVM Matrix Transmitter
SKFX01PHR-M Commercial Fiber KVM Matrix Receiver
SVFX10PHT-M Commercial Fiber Video Matrix Transmitter
SVFX01PHT-M Commercial Fiber Video Matrix Receiver

Accessories

RK-1U3-NEOUS 1U Rack mount Kit for 6 Extenders and Isolators
RK-4U-HKS-10 4U Rack Mount Kit for 10 Extenders or Isolators
PDUI12 12-Port 12V DC Power Distribution Unit for Isolators
PDUI10SR 10-Port Power-Redundant 12V DC Power DIstribution Unit for Neous Extenders and Isolators

INTRODUCTION

Components

The Neous Multi-Domain IP Matrix consists of the following HSL products:

MODEL NUMBER	P/N	Description
MATRIX CONTROLLER		
MCK11EC-M	CPN33989	Neous Matrix Controller w/PoE
SECURE TRANSMITTER/RECEIVER ENDPOINTS		
SKCX10PHT-M	CPN34282	Secure Copper KVM Matrix Tx w/Isolator
SKCX10PHT-ME	CPN36741	Secure Copper KVM Matrix Tx w/Isolator and PoE
SKCX01PHR-M	CPN34283	Secure Copper KVM Matrix Rx w/Isolator
SKCX01PHR-ME	CPN36742	Secure Copper KVM Matrix Rx w/Isolator and PoE
SVCX10PHT-M	CPN34278	Secure Copper Video Matrix Tx w/Isolator
SVCX10PHT-ME	CPN36739	Secure Copper Video Matrix Tx w/Isolator and PoE
SVCX01PHR-M	CPN34279	Secure Copper Video Matrix Rx w/Isolator
SVCX01PHR-ME	CPN36740	Secure Copper Video Matrix Rx w/Isolator and PoE
SKFX10PHT-M	CPN34280	Secure Fiber KVM Matrix Tx w/Isolator
SKFX01PHR-M	CPN34281	Secure Fiber KVM Matrix Tx w/Isolator
SVFX10PHT-M	CPN34272	Secure Fiber Video Matrix Tx w/Isolator
SVFX01PHR-M	CPN34277	Secure Fiber Video Matrix Rx w/Isolator
ISOLATORS		
FI11PHT-ME	CPN34375	Secure 1-Port Encrypted HID Only KVM Tx Isolator
FI11PHR-ME	CPN34374	Secure 1-Port Encrypted HID Only KVM Rx Isolator

MODEL NUMBER	P/N	Description
COMMERCIAL TRANSMITTER/RECEIVER ENDPOINTS		
SKCX10PHT-N	CPN35104	Commercial Copper KVM Matrix Tx
SKCX01PHR-N	CPN35105	Commercial Copper KVM Matrix Rx
SKCX10PHT-NE	CPN36743	Commercial Copper KVM Matrix Tx w/PoE
SKCX01PHR-NE	CPN36744	Commercial Copper KVM Matrix Rx w/PoE
SVCX10PHT-N	CPN36651	Commercial Copper Video Matrix Tx
SVCX01PHR-N	CPN36652	Commercial Copper Video Matrix Rx
SVCX10PHT-NE	CPN36745	Commercial Copper Video Matrix Tx w/PoE
SVCX01PHR-NE	CPN36746	Commercial Copper Video Matrix Rx w/PoE
SKFX10PHT-M	CPN35106	Commercial Fiber KVM Matrix Tx
SKFX01PHR-M	CPN35107	Commercial Fiber KVM Matrix Rx
SVFX10PHT-M	CPN36649	Commercial Fiber Video Matrix Tx
SVFX01PHT-M	CPN36650	Commercial Fiber Video Matrix Rx
ACCESSORIES		
RK-1U3-NEOUS	CPN36888	1U Rack Mount Kit for 6 Extenders and Isolators

IMPORTANT NOTE: In addition, the Neous Matrix also requires a 10Gb/port network switch.

INTRODUCTION

Controller Key Features

The **Neous Controller** is a dedicated server that connects to a network switch and manages the connections between all host computers and user workstations connected to the Neous IP Matrix.

- **Matrix Management:** The Controller oversees the connections between every Transmitter and Receiver Endpoint of the Neous Multi-Domain IP Matrix.
- **Scalable Connectivity:** A single Controller manages up to 150 Transmitter and Receiver Endpoints simultaneously. Cascading multiple Controllers scales the IP Matrix.
- **Preset Matrix Configurations:** The Matrix Management Server allows administrators to create, save, and quickly apply up to 100 different Matrix configurations. This enables fast switching between common connection setups without manually reconfiguring the Matrix each time.
- **Remote Firmware Upgrade:** The Matrix Management Server can upload new firmware packages and remotely upgrade Transmitter and Receiver Endpoints, ensuring the Neous Matrix is always up-to-date with the latest features.
- **Source/User Management:** The Management Server defines the permissions of each Transmitter and Receiver, ensuring every source and user is only allowed to connect to other endpoints according to their permission classification.
- **Encryption Key Management:** The Management Server distributes AES 256 encryption keys between Endpoints to maintain secure connections between Transmitters and Receivers.
- **Zero-Latency Switching:** The Management Server connects, disconnects, and switches Transmitters and Receivers instantaneously.

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Endpoint and Isolator Key Features

Neous Endpoints provide secure KVM-over-IP extension between source computers and user workstations. Each Endpoint is either a Transmitter or Receiver, paired with a NIAP-certified Isolator that keep network domains isolated from each other.

- **KVM-over-IP Extension:** Neous Matrix Endpoints operate on a closed network that allows one-to-one, one-to-many, or many-to-many connections between any connected computer in the Neous IP Matrix.
- **Long-Range Connections:** Neous Endpoints connect via copper (RJ45) or fiber (SFP), with distances of up to 100m or 10km, respectively.
- **4K UHD Support:** Neous Endpoints can stream video at up to 4K (3840×2160) @30Hz for secure models and 60Hz for commercial models, all with zero latency.
- **On-Screen Display:** Neous KVM Receiver Endpoints feature an on-screen display that enables users to connect to available Transmitters (per the permissions managed by the Controller), load Presets, restart the Transmitter or Receiver, adjust the on-screen Title settings, and view device information.
- **Dual Combo DP/HDMI Connectors:** HSL's combined DP/HDMI connectors offer greater flexibility for connecting a wider range of source and display devices.

Secure Endpoint and Isolator Key Features

- Secure KVM/Video Isolation: Connected Isolators filter unwanted data and enforce a unidirectional data flow for video and HID in their respective directions, ensuring isolation between domains.
- Phylax Encryption: Each Neous Isolator performs FIPS 140-3-compliant enrcyption on HID traffic, preventing man-in-the-middle hijacking of data and ensuring positive identification between users and sources.

Commercial Endpoint Key Features:

- RS-232 Remote Control Support: Commercial Receiver Endpoints can extend remote control commands sent via RS-232 to devices connected to Transmitter Endpoints.
- USB 2.0 Support: Commercial Endpoints can extend USB 2.0 devices such as webcams.

Specifications

Neous Controller

MODEL NUMBER	MCK11EC-M
FEATURES	
Core Processor	ARM Cortex A53 Quad-Core
RAM	2Gb
Solid State Drive	NVMe, 256GB
Copper Link Port	1x RJ45, 1 Gbps
PORTS	
Video Ports	1x DP, 1x HDMI
USB	4xUSB 2.0 Type A
Serial Port	4-Pin Serial Terminal Block
PHYSICAL	
Dimensions	140x230x28mm / 5.5x9.1x1.1in
Weight	1.5kg / 3.3lb
POWER	
Power Type	External
AC Input	100 to 240V AC
Power Output	12 VDC
Max Power Consumption	13.5W
ENVIRONMENTAL	

MODEL NUMBER	MCK11EC-M
Operating Temperature	0°C to 40° C / 32°F to 104° F
Storage Temperature	-20°C to 60° C / -4°F to 140° F
Humidity	0%-80% RH, non-condensing
SOFTWARE	
Supported OS	Linux (Yocto-based)
General Info	
Manufactured	TAA/BAA Compliant
Product Lifecycle	10 Years
Product Warranty	2 Years

INTRODUCTION

Secure Copper Endpoints

MODEL NUMBER	SKCX10PHT-M / SKCX01PHR-M	SVCX10PHT-M / SVCX01PHR-M	SKCX10PHT-ME / SKCX01PHR-ME	SVCX10PHT-ME / SVCX01PHR-ME
Endpoint Pair	Secure Copper KVM IP Matrix Endpoints	Secure Copper Video IP Matrix Endpoints	Secure Copper KVM IP Matrix Endpoints w/PoE	Secure Copper Video IP Matrix Endpoints w/PoE
No. of Sources	1			
Extension Type	Copper			
Link Port	RJ45			
Extension Length	100m			
ENCODER UNIT				
TRANSMITTER MODEL	**SKCX10PHT-M**	**SVCX10PHT-M**	**SKCX10PHT-ME**	**SVCX10PHT-ME**
Video Port	DP / HDMI			
Max Resolution	UHD 4k up to 3840x2160 30Hz			
Mouse/Keyboard	USB Type B	n/a	USB Type B	n/a
ISOLATOR MODEL	**FI11PHT-ME**	**FV11PH-MT**	**FI11PHT-ME**	**FV11PH-MT**
Video Input Port	DP / HDMI			
Video Output Port	DP / HDMI			
Mouse/Keyboard In	USB Type B	n/a	USB Type B	n/a
Mouse/Keyboard Out	2xUSB Type A	n/a	2xUSB Type A	n/a
DECODER UNIT				
RECEIVER MODEL	**SKCX01PHR-M**	**SVCX01PHR-M**	**SKCX01PHR-ME**	**SVCX01PHR-ME**
Video Port	DP / HDMI			
Max Resolution	UHD 4k up to 3840x2160 30Hz			
Mouse/Keyboard	2xUSB Type A	n/a	2xUSB Type A	n/a
ISOLATOR MODEL	**FI11PHR-ME**	**FV11PH-MR**	**FI11PHR-ME**	**FV11PH-MR**
Video Input Port	DP / HDMI			
Video Output Port	DP / HDMI			
Mouse/Keyboard In	USB Type B	n/a	USB Type B	n/a
Mouse/Keyboard Out	2xUSB Type A	n/a	2xUSB Type A	n/a

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MODEL NUMBER	SKCX10PHT-M / SKCX01PHR-M	SVCX10PHT-M / SVCX01PHR-M	SKCX10PHT-ME / SKCX01PHR-ME	SVCX10PHT-ME / SVCX01PHR-ME
PHYSICAL				
Endpoint Dimensions	140x210x28mm / 5.5x8.3x1.1in			
Endpoint Weight	145x105x28mm / 5.7x4.1x1.1in			
Isolator Dimensions	145x105x28mm / 5.7x4.1x1.1in			
Isolator Weight	0.3kg / 0.6lb			
POWER				
Power Supply Type	External; Isolator powered independently or via Tx/Rx.		External; Isolator powered independently or via Tx/Rx.	
Adapter AC Input	100V to 240V AC			
Adapter Power Output	12V DC			
Max Power Consumption	13.5W			
ENVIRONMENTAL				
Operating Temperature	0°C to 40° C / 32°F to 104° F			
Storage Temperature	-20°C to 60° C / -4°F to 140° F			
Humidity	0%-80% RH, non-condensing			
SOFTWARE				
Supported OS	Windows, MacOS, Linux			
SECURITY				
Compliance	Isolators Compliant with NIAP Common Criteria PP4.0 PSD Protection Profile			
GENERAL INFO				
Manufactured	BAA Compliant			
Product Lifecycle	10 Years			
Product Warranty	2 Years			

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Secure Fiber Endpoints

MODEL NUMBER	SKCX10PHT-M / SKCX01PHR-M	SVCS10PHT-M / SVCX01PHR-M
Endpoint Pair	Secure Fiber KVM IP Matrix Endpoints	Secure Fiber Video IP Matrix Endpoints
No. of Sources	1	
Extension Type	Fiber	
Link Port	10Gbps	
Extension Length	10km	
ENCODER UNIT		
TRANSMITTER MODEL	**SKFX10PHT-M**	**SVFX10PHT-M**
Video Port	DP / HDMI	
Max Resolution	UHD 4k up to 3840x2160 30Hz	
Mouse/Keyboard	USB Type B	n/a
ISOLATOR MODEL	**FI11PHT-ME**	**FV11PH-MT**
Video Input Port	DP / HDMI	
Video Output Port	DP / HDMI	
Mouse/Keyboard In	USB Type B	n/a
Mouse/Keyboard Out	2xUSB Type A	n/a
DECODER UNIT		
RECEIVER MODEL	**SKFX01PHR-M**	**SVFX01PHR-M**
Video Port	DP / HDMI	
Max Resolution	UHD 4k up to 3840x2160 30Hz	
Mouse/Keyboard	2xUSB Type A	n/a
ISOLATOR MODEL	FI11PHR-ME	FV11PH-MR
Video Input Port	DP / HDMI	
Video Output Port	DP / HDMI	
Mouse/Keyboard In	USB Type B	n/a

MODEL NUMBER	SKCX10PHT-M / SKCX01PHR-M	SVCS10PHT-M / SVCX01PHR-M
Mouse/Keyboard Out	2xUSB Type A	n/a
PHYSICAL		
Endpoint Dimensions	140x210x28mm / 5.5x8.3x1.1in	
Endpoint Weight	145x105x28mm / 5.7x4.1x1.1in	
Isolator Dimensions	145x105x28mm / 5.7x4.1x1.1in	
Isolator Weight	0.3kg / 0.6lb	
POWER		
Power Supply Type	External; Isolator powered independently or via Tx/Rx.	
Adapter AC Input	100V to 240V AC	
Adapter Power Output	12V DC	
Max Power Consumption	13.5W	
ENVIRONMENTAL		
Operating Temperature	0°C to 40° C / 32°F to 104° F	
Storage Temperature	-20°C to 60° C / -4°F to 140° F	
Humidity	0%-80% RH, non-condensing	
SOFTWARE		
Supported OS	Windows, MacOS, Linux	
SECURITY		
Compliance	Isolators Compliant with NIAP Common Criteria PP4.0 PSD Protection Profile	
GENERAL INFO		
Manufactured	BAA Compliant	
Product Lifecycle	10 Years	
Product Warranty	2 Years	

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Commercial Copper Endpoints

MODEL NO.	SKCX10PHT-N / SKCX01PHR-N	SVCX10PHT-N / SVCX01PHR-N	SKCX10PHT-NE / SKCX01PHR-NE	SVCX10PHT-NE / SVCX01PHR-NE
Endpoint Pair	Commercial Copper KVM IP Matrix Endpoints	Commercial Copper IP Matrix Video Endpoints	Commercial Copper KVM IP Matrix Endpoints with PoE	Commercial Copper Video IP Matrix Endpoints with PoE
No. Of Sources	1	1	1	1
Extension Type	Copper			
Link Port	RJ45			
Extension Length	100m			
ENCODER UNIT				
TX MODEL	**SKCX10PHT-N**	**SVCX10PHT-N**	**SKCX10PHT-NE**	**SVCX10PHT-NE**
Video Port	DP / HDMI			
Max Resolution	UHD 4k up to 3840x2160 60Hz			
Mouse and Keyboard	1xUSB Type B	No	1xUSB Type B	No
Audio Port	3.5mm jack			
USB 2.0 Port	USB Type B			
RS-232 Port	3-pin Serial Block			
DECODER UNIT				
RX MODEL	**SKCX01PHR-N**	**SVCX01PHR-N**	**SKCX01PHR-NE**	**SVCX01PHR-NE**
Video Port	DP / HDMI			
Max Resolution	UHD 4k up to 3840x2160 60Hz			
Mouse and Keyboard	2xUSB Type A	No	2xUSB Type A	No
Audio Port	3.5mm jack			
USB 2.0 Port	USB Type A			
RS-232 Port	4-pin Serial Block			

MODEL NO.	SKCX10PHT-N / SKCX01PHR-N	SVCX10PHT-N / SVCX01PHR-N	SKCX10PHT-NE / SKCX01PHR-NE	SVCX10PHT-NE / SVCX01PHR-NE
PHYSICAL				
Dimensions	140x210x28mm / 5.5x8.3x1.1in			
Weight	1.3kg / 2.8lb			
POWER				
Power Supply Type	External		External or PoE	
Adapter AC Input	100V to 240V AC			
Adapter Power Output	12V DC			
Max Power Consumption	13.5W			
ENVIRONMENTAL				
Operating Temperature	0°C to 40° C / 32°F to 104° F			
Storage Temperature	-20°C to 60° C / -4°F to 140° F			
Humidity	0%-80% RH, non-condensing			
SOFTWARE				
Supported OS	Windows, MacOS, Linux			
GENERAL INFO				
Manufactured	TAA / BAA Compliant			
Product Lifecycle	10 Years			
Product Warranty	2 Years			

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Commercial Fiber Endpoints

MODEL NO.	SKFX10PHT-N	SKFX01PHR-N	SVFX10PHT-N	SVFX01PHR-N
Endpoint Pair	Commercial Fiber KVM IP Matrix Transmitter	Commercial Fiber KVM IP Matrix Receiver	Commercial Fiber Video IP Matrix Transmitter	Commercial Fiber Video IP Matrix Receiver
No. Of Sources	1	1	1	1
Extension Type	LC Single Mode Fiber			
Link Port	10Gbps			
Extension Length	10km			
Video Port	DP / HDMI			
Max Resolution	UHD 4k up to 3840x2160 60Hz			
Mouse and Keyboard	1xUSB Type B	2xUSB Type A	No	
Audio Port	3.5mm jack			
USB 2.0 Port	USB Type B	USB Type A	USB Type B	USB Type A
RS-232 Port	3-pin Serial Block	4-Pin Serial Block	3-Pin Serial Block	4-Pin Serial Block
IR Port	IR Output	IR Input	IR Output	IR Input
Physical				
Dimensions	140x210x28mm / 5.5x8.3x1.1in			
Weight	1.3kg / 2.8lb			
Power				
Power Supply Type	External			
Adapter AC Input	100V to 240V AC			
Adapter Power Output	12V DC			

MODEL NO.	SKFX10PHT-N	SKFX01PHR-N	SVFX10PHT-N	SVFX01PHR-N
Max Power Consumption	13.5W			
Environmental				
Operating Temperature	0°C to 40° C / 32°F to 104° F			
Storage Temperature	-20°C to 60° C / -4°F to 140° F			
Humidity	0%-80% RH, non-condensing			
Software				
Supported OS	Windows, MacOS, Linux			
General Info				
Manufactured	TAA / BAA Compliant			
Product Lifecycle	10 Years			
Product Warranty	2 Years			

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Server Rack Mount Kit (Optional)

MODEL	RK-1U3 NEOUS
PHYSICAL	
Dimensions	611.3x478.2x44.3mm / 24.1x18.1x1.7in
Weight	4.5kg / 9.9lbs

Power Distribution Unit (Optional)

MODEL	PDUI10SR	PDUI12
PDUI Features		
Required AC Input Sources	2	2
Redundant Power Supply	Yes	Yes
Required Operating Inputs	2	1
DC Outlets	10	12
DC Output	12V	12V
Max Power Consumption	168W	48V
Neous Compatible	Yes	Yes*
Physical		
Dimensions	342x148x42mm / 13.7x5.8x1.7in	
Environmental		
Operating Temperature	0°C to 50° C / 32°F to 122° F	
Storage Temperature	-20°C to 60° C / -4°F to 140° F	
Humidity	0%-80% RH, non-condensing	
General Information		
Manufactured	TAA and BAA Compliant	
Product Life-Cycle	10 Years	
Product Warranty	2 Years	

* The PDUI12 Power Distribution Unit can support up to 6 Neous Endpoints and paired Isolators but cannot support more than 6 Endpoints.

INSTALLATION

Before Installation

Before opening the product's sealed packaging, inspect the seal's condition to verify that the product was not accessed or tampered with during delivery. If the packaging seal looks suspicious, contact HSL support and do not use the product.

Package Contents

Once the product's packaging is opened, inspect the contents of the package to make sure all components are included.

Model Number	P/N	Component	Qty
Controller			
MCK11EC-M	CPN33989	Neous Matrix Controller w/PoE	1
		PWR DP/HDMI Retention Kit	1
Secure Copper Endpoints			
SVCX10PHT-M / SVCX10PHT-ME	CPN34278 / CPN36739	Neous Copper Video Matrix Transmitter	1
		FV11PH-MTX Secure 1-Port Video Tx Isolator	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1
SVCX01PHR-M / SVCX01PHR-ME	CPN34279 / CPN36740	Neous Copper Video Matrix Receiver	1
		FV11PH-MR Secure 1-Port Video Receiver Isolator	1
		PWR DP/HDMI Retention Kit	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1
SKCX10PHT-M / SKCX10PHT-ME	CPN34282 / CPN36741	Neous Copper KVM Matrix Transmitter	1
		FI11PHT-ME Secure 1-Port KVM Transmitter Isolator	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1
SKCX01PHR-M / SKCX01PHR-ME	CPN34283 / CPN36742	Neous Copper KVM Matrix Receiver	1
		FI11PHR-ME Secure 1-Port KVM Receiver Isolator	1
		PWR DP/HDMI Retention Kit	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1
Secure Fiber Endpoints			
SVFX10PHT-M	CPN34272	Neous Fiber Video Matrix Transmitter	1
		FV11PH-MTX Secure 1-Port Video Tx Isolator	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1
SVFX01PHR-M	CPN34277	Neous Fiber Video Matrix Receiver	1
		FV11PH-MR Secure 1-Port Video Receiver Isolator	1
		PWR DP/HDMI Retention Kit	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1

INSTALLATION

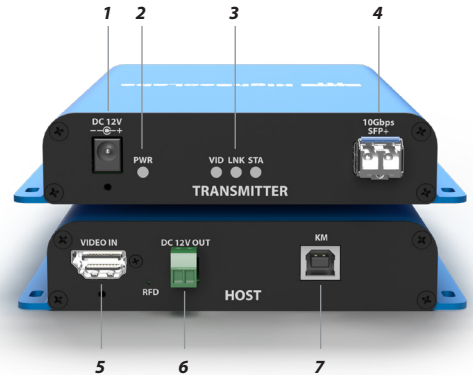
Model Number	P/N	Component	Qty
SKFX10PHT-M	CPN34280	Neous Fiber KVM Matrix Transmitter	1
		FI11PHT-ME Secure 1-Port KVM Transmitter Isolator	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1
SKFX01PHR-M	CPN34281	Neous Fiber KVM Matrix Receiver	1
		FI11PHR-ME Secure 1-Port KVM Receiver Isolator	1
		PWR DP/HDMI Retention Kit	1
		0.15m USB A (male) to USB B (male) Cable	1
		0.15m HDMI 2.0 Cable	1
		0.15m DC Power Cable	1
		Wall-Mounted 12V DC Power Supply	1
Rack Mount Kit			
RK-1U3-NEOUS	CPN36888	1URack Mount Kit w/Rails for 6 Extenders and Isolators	1
		3x5mm Threaded Standoff Hex	8
		3x6mm Philips Head Screw	16
Power Distribution Units			
PDUI10SR	CPN37954	10-Port Power-Redundant 12VDC Power Distribution Unit for Neous	1
		1.8m/6ft Power Extender Cable	1
		Adapters Kit- Plugs UK/USA/AU/EU to ERC230/C13	1
		1U Rack Mount Kit	1
PDUI12	CPN18598	12-Port 12V DC Power Distribution Unit for Isolators	1
		1.8m/6ft Power Extender Cable	1
		Adapters Kit- Plugs UK/USA/AU/EU to ERC230/C13	1
		1U Rack Mount Kit	1
Commercial Copper Endpoints			
SKCX10PHT-N	CPN35104	Commercial Copper KVM IP Matrix Transmitter	1
		Wall-Mounted 12V DC Power Supply	1

Model Number	P/N	Component	Qty
SKCX01PHR-N	CPN35105	Commercial Copper KVM IP Matrix Receiver	1
		PWR DP/HDMI Retention Kit	1
		Wall-Mounted 12V DC Power Supply	1
SVCX10PHT-N	CPN36651	Commercial Copper Video IP Matrix Transmitter	1
		Wall-Mounted 12V DC Power Supply	1
SVCX01PHR-N	CPN36652	Commercial Copper Video IP Matrix Receiver	1
		Wall-Mounted 12V DC Power Supply	1
SKCX10PHT-NE	CPN36743	Commercial Copper KVM IP Matrix Transmitter with PoE	1
		Wall-Mounted 12V DC Power Supply	1
SKCX01PHR-NE	CPN36744	Commercial Copper KVM IP Matrix Receiver with PoE	1
		PWR DP/HDMI Retention Kit	1
		Wall-Mounted 12V DC Power Supply	1
SVCX10PHT-NE	CPN36745	Commercial Copper Video IP Matrix Transmitter with PoE	1
		Wall-Mounted 12V DC Power Supply	1
SVCX01PHR-NE	CPN36746	Commercial Copper Video IP Matrix Receiver with PoE	1
		Wall-Mounted 12V DC Power Supply	1
Commercial Fiber Endpoints			
SKFX10PHT-N	CPN35106	Commercial Fiber IP KVM Matrix Transmitter	1
		Wall-Mounted 12V DC Power Supply	1
SKFX01PHR-N	CPN35107	Commercial Fiber KVM IP Matrix Receiver	1
		PWR DP/HDMI Retention Kit	1
		Wall-Mounted 12V DC Power Supply	1
SVFX10PHT-N	CPN36649	Commercial Fiber Video IP Matrix Receiver	1
		Wall-Mounted 12V DC Power Supply	1
SVFX01PHR-N	CPN36650	Commercial Fiber Video IP Matrix Receiver	1
		PWR DP/HDMI Retention Kit	1
		Wall-Mounted 12V DC Power Supply	1

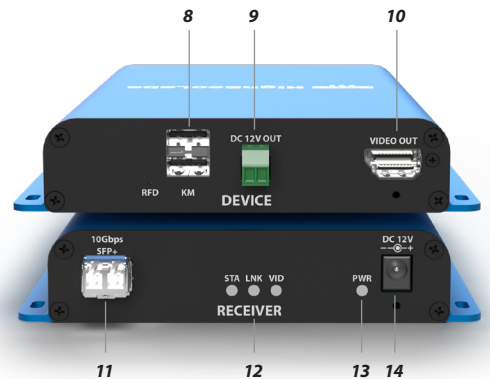
Port and LED Index

Secure Extender

Transmitter



Receiver



Transmitter Side

1 12v DC In
2 Power indicator LED
3 Connection indicator LEDs

Device Side

4 SFP Fiber Optic or RJ45 Copper Port
5 DP/HDMI Video In
6 12v DC Out
7 KM USB-B (KVM Endpoints only)

Device Side

8 KM USB-A (KVM Endpoints only)
9 12v DC Out
10 DP/HDMI Video In

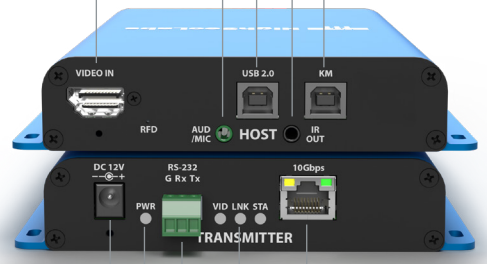
Receiver Side

11 SFP Fiber Optic or RJ45 Copper Port
12 Connection indicator LEDs
13 Power indicator LED
14 12v DC In

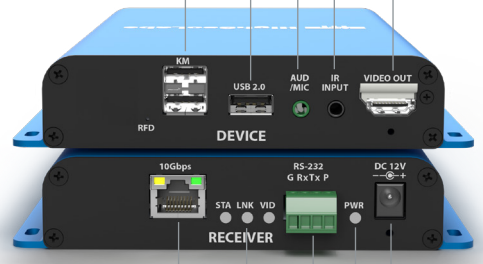
INSTALLATION

Commercial Extender

Transmitter



Receiver



Transmitter Side

1 DP/HDMI Video In
2 Audio 3.5mm jack
3 USB 2.0 In (KVM Models Only)
4 IR Control Out
5 Keyboard/Mouse USB 2.0 B In (KVM Models Only)

Host Side

6 DC 12V Power In
7 Power Indicator LED
8 3-Pin Serial Block
9 Connection Indicator LEDs
10 SFP Fiber Port or RJ45 Copper Port

Device Side

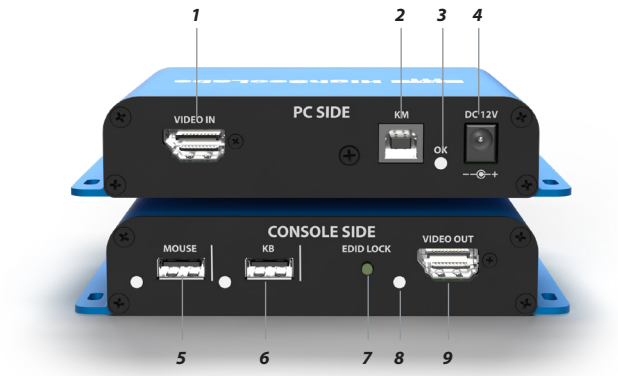
11 Keyboard/Mouse USB 2.0 A Out (KVM Models Only)
12 USB 2.0 A Out (KVM Models Only)
13 Audio 3.5mm jack
14 IR Control In
15 DP/HDMI Video Out

Receiver Side

16 SFP Fiber Port or RJ45 Copper Port
17 Connection Indicator LEDs
18 4-Pin Serial Block
19 Power Indicator LED
20 12V DC Power In

INSTALLATION

Isolator

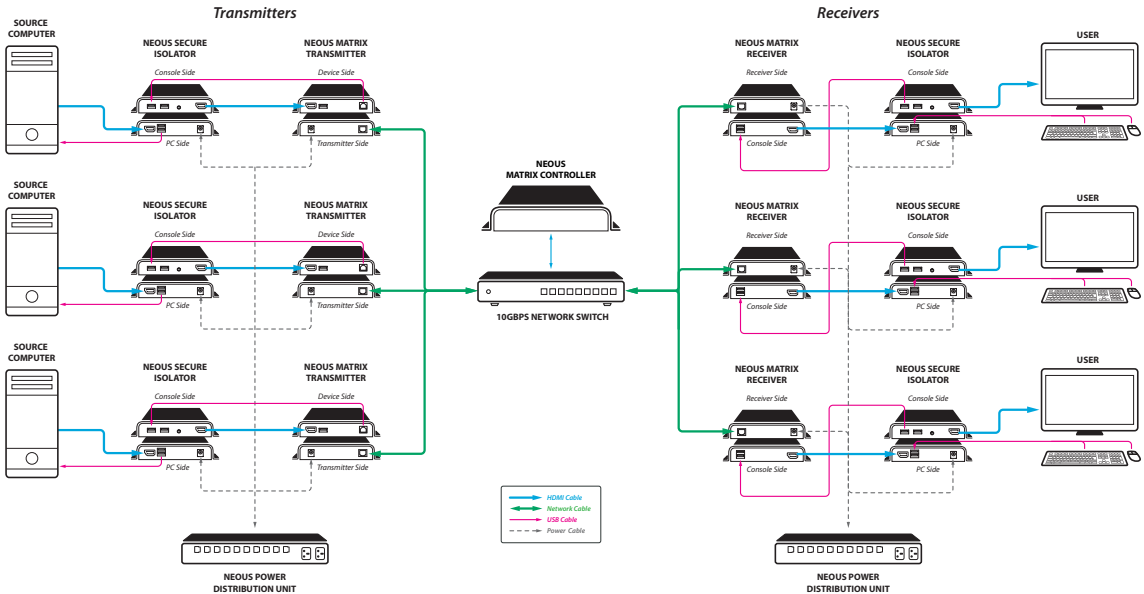


1 HDMI In
2 USB B Port KM In (KVM Isolators Only)
3 Power Indicator LED
4 12V DC In
5 USB A Mouse Out (KVM Isolators Only)
6 USB A Keyboard Out (KVM Isolators Only)
7 EDID Lock Indicator LED
8 Video Indicator LED
9 HDMI Video Out

Pre-Installation Precautions

- Verify that all computers and peripheral devices are powered OFF before connecting them to the Endpoints.
- Do not connect Neous Endpoints to computing devices that:
  - Are TEMPEST computers.
  - Include telecommunication equipment.
  - Include frame grabber video cards.
  - Include special audio processing cards.

Neous Secure Matrix Diagram



Secure Matrix Cable Installation

Pair All Transmitters and Receivers to Isolators

1. Connect each Neous Matrix Transmitter to a Secure Isolator by connecting the HDMI port on the Transmitter's host side to the HDMI port on the Isolator's console side.

Note: While the Transmitter and Isolator both have DP/HDMI video ports, they must only connect to each other via HDMI.

2. (KVM Endpoints only) Connect the USB A port labeled 'KM' on each Isolator's console side to the USB B port on the Transmitter's device side.
3. Connect each Neous Matrix Receiver to a Secure Isolator by connecting the HDMI port on the Receiver's host side to the HDMI port on the Isolator's console side.

Note: While the Isolator and Receiver both have DP/HDMI video ports, they must only connect to each other via HDMI.

4. (KVM Endpoints only) Connect the USB A port labeled 'KM' on each Isolator's console side to the USB B port on the Receiver's device side.

Connect All Pairs to Power

1. Connect all Neous Matrix Transmitters, Receivers, and Secure Isolators to power sources via the DC12V port on each device.

Note: The SVCX10PHT-ME, SVCX01PHR-ME, SKCX10PHT-ME, and SKCX01PHR-ME Copper Endpoints with PoE can provide power directly to their respective connected Isolators.

Connect All Transmitter Endpoints to Source Computers

1. Connect each source computer's video port to a paired Transmitter and Isolator via the HDMI port on the Isolator's PC side.
2. (KVM Endpoints only) Connect each source computer's keyboard and mouse to a paired Transmitter and Isolator via the USB A Ports labeled 'KM' on the Isolator's PC side.

Note: The PDUI12 Power Distribution Unit can support up to 6 Neous Endpoints and Isolators; it cannot support more than 6 Neous Endpoints.

Connect All Receiver Endpoints to User Workstations

1. Connect each user's display to a paired Receiver and Isolator via the HDMI port on the Isolator's PC side.
2. (KVM Endpoints only) Connect each user's keyboard and mouse to a paired Receiver and Isolator via the USB A Ports labeled 'KM' on the Isolator's PC side.

Note: Receiver Endpoints can also be connected to KVM switches by connecting them to the corresponding video, keyboard, and mouse ports.

INSTALLATION

Connect All Endpoints to the 10Gb/port Network Switch

Note: It is recommended to use a switch built for AV.

- Connect all Transmitters to the 10Gb/Port Network Switch via the Transmitters' LAN ports on the transmitter side.
- Connect all Receivers to the Network Switch via the Receiver's LAN ports on the receiver side.

Note: The exact type of connection varies depending on the model of the Network Switch used.

Connect the Neous Matrix Controller

- Connect a video display to the Neous Matrix Controller via the Controller's DP or HDMI video port.
- Connect a mouse and keyboard to the Controller via the USB A ports.
- Connect the Controller to the Network Switch via the Controller's LAN port.
- If there is a redundant Controller, connect it to the Network Switch.

Note: The exact type of connection varies depending on the model of the Network Switch used.

Power ON the Multi-Domain Matrix

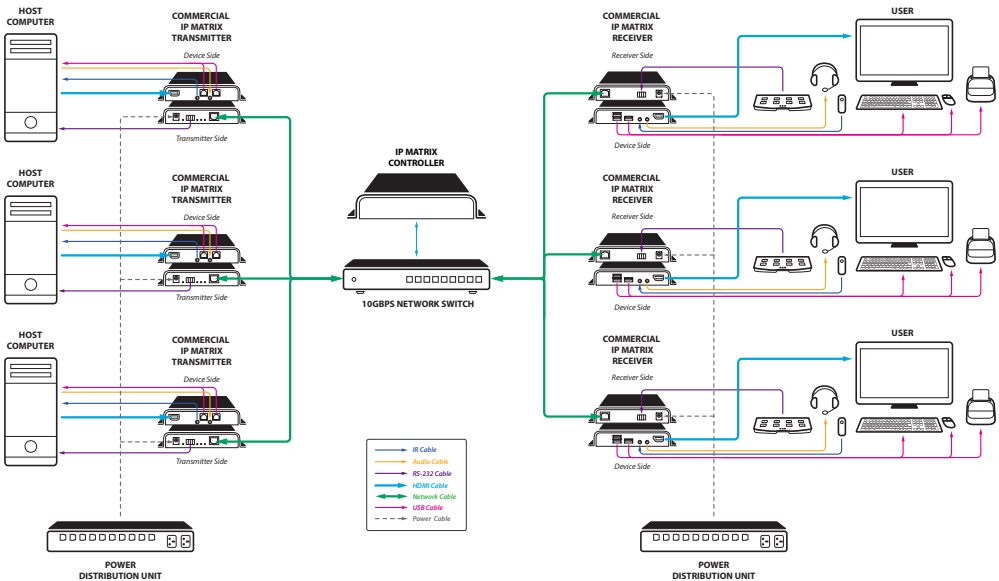
- Power ON all source computers and user displays.
- Power ON the Network Switch.
- Power ON the Neous Matrix Controller.

Connect the Transmitters and Receivers to the Neous Management Server

- Log in to the Neous Controller. The default login credentials are as follows:
  - Default username: admin
  - Default password: Neous12_
- Open the Neous Management Server.
- The Management Server will automatically detect all active Neous Transmitters and Receivers.

Note: The Management Server may take up to 60 seconds to detect an active Transmitter or Receiver.

Neous Commercial Matrix Diagram



Commercial Matrix Cable Installation

Connect All Transmitter Endpoints to Source Computers

1. Connect each source computer to the SFP Fiber Port or RJ45 Copper Port on the Transmitter's Host side.
2. Connect each source computer's video port to a paired Transmitter via the DP/HDMI port labeled 'VIDEO IN' on the Transmitter's Host side.
3. Connect each source computer's audio to the 3.5mm jack labeled 'AUD/MIC' on the Transmitter's Host side.
4. (KVM Endpoints only) Connect each source computer's keyboard and mouse to the USB B Port labeled 'KM' on the Transmitter's Host side.
5. (Optional) To support USB 2.0 devices, connect each connected computer to the USB B Port labeled 'USB 2.0' on the Transmitter's Host side.

Connect All Receiver Endpoints to User Workstations

1. Connect each user's workstation to the SFP Fiber Port or RJ45 Copper Port on the Receiver's Device side.
2. Connect each user's video display to the DP/HDMI port labeled 'VIDEO OUT' on the Receiver's Device side.
3. Connect each user's audio to the 3.5mm jack labeled 'AUD/MIC' on the Receiver's Host side.
4. (Optional) Connect each user's USB peripherals to the USB A port labeled 'USB' on the Receiver's Device side.
5. (KVM Endpoints Only) Connect each user's keyboard and mouse to the USB A ports labeled 'KM' on the Receiver's Device side.

Note: Receiver Endpoints can also be connected to KVM switches by connecting them to the corresponding video, keyboard, and mouse ports.

Connect All Endpoints and Controller(s) to the 10Gb/port Network Switch

Note: It is recommended to use a switch built for AV.

- Connect all Transmitters to the 10Gb/Port Network Switch via the Transmitters' LAN ports on the transmitter side.
- Connect all Receivers to the Network Switch via the Receiver's LAN ports on the receiver side.
- Connect the Neous Matrix Controller to the 10Gb/Port Network Switch via the PC's HDMI port.
- If there is a redundant Controller, connect it to the Network Switch via the HDMI port.

Note: The exact type of connection varies depending on the model of the Network Switch used.

INSTALLATION

Connect the Neous Matrix Controller

- Connect a video display to the Neous Matrix Controller via the Controller's DP or HDMI video port.
- Connect a mouse and keyboard to the Controller via the USB A ports.
- Connect the Controller to the Network Switch via the Controller's LAN port.

Note: The exact type of connection varies depending on the model of the Network Switch used.

Power ON the Multi-Domain Matrix

- Power ON all source computers and user displays.
- Power ON the Network Switch.
- Power ON the IP Matrix Controller.

Connect the Transmitters and Receivers to the Matrix Management Server

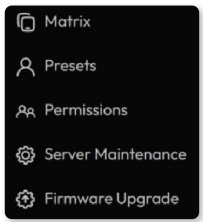
- Log in to the Neous Controller. The default login credentials are as follows:
  - Default username: admin
  - Default password: Neous12_
- Open the Neous Management Server.
- The Management Server will automatically detect all active Neous Transmitters and Receivers.

Note: The Management Server may take up to 60 seconds to detect an active Transmitter or Receiver.

Neous Management Server

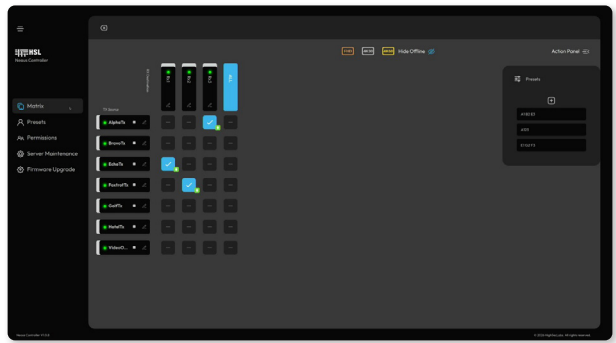
The Neous Management Server allows administrators to configure the entire Neous IP Matrix.

The main menu displays 3 tabs on the left side of the screen:



- **Matrix:** Connect Neous Transmitter and Receiver Endpoints.
- **Presets:** Create, edit, load, save, and apply preset Matrix configurations.
- **Permissions:** Manage which Endpoints have access to each other.
- **Server Maintenance:** Perform maintenance that clears and resets the entire IP Matrix.

Matrix



The **Matrix** menu displays a grid of all connected Neous Endpoints, with each horizontal row representing a Transmitter and each vertical column representing a Receiver.

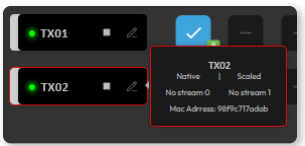
OPERATION

Transmitter/Receiver Information

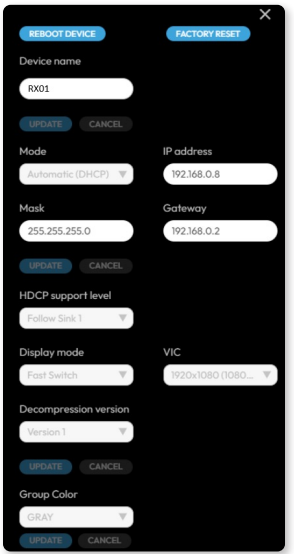
Each Transmitter and Receiver is specified by an indicator box at the start of its respective row or column. If the Endpoint is connected, the dot by its name will be green.

(Left) Neous Transmitter indicator, (Right) Neous Receiver indicator

If there is an issue with the connection, the indicator box will be outlined in red. Hovering the mouse cursor over the indicator box will display information about the Endpoint.



Move the mouse cursor over the indicator box for the desired Transmitter or Receiver and click the edit icon to edit the unit's information.



Neous Transmitter/Receiver Information

OPERATION

- **Reboot Device:** Perform a power cycle on the selected Endpoint.
- **Factory Reset:** Restore the selected Endpoint to its factory settings.
- **Device Name:** Assign the Endpoint a name to identify it in the Matrix.
- **Mode:** Determine how the Endpoint receives its IP address:
  - Automatic (DHCP)
  - Manual
- **IP Address:** View the Endpoint's IP address.
- **Mask:** View the Endpoint's subnet mask.
- **Gateway:** View the Endpoint's gateway.
- **Group Color:** Change the color of the Endpoint's indicator box for easy identification.
  - Red
  - Orange
  - Green
  - Blue
  - Purple
  - Gray

The following information is only available for Neous Receivers:

- **HDCP Support Level:** Select which device is checked for HDCP capability:
  - Follow Sink 1: Check the receiving video display.
  - Follow Sink 2: Check a second connected video display.
  - Follow Source: Check the source computer.
- **Display Mode:** Select how the Receiver outputs video:
  - Genlock: Synchronize video processing speed across all devices.
  - Fast Switch: Allow each device to process video as fast as possible.
  - Genlock Scaling: Scale each video stream and synchronize it across all devices.
- **VIC:** Select the scale of the Receiver's video:
  - 640x480 (4:3) 60Hz
  - 720x480 (4:3) 60Hz
  - 720x480 (16:9)60Hz
  - 720x576 (4:3) 50Hz
  - 720x576 (16:9) 50Hz
  - 1280x720 (720p) 24Hz/25Hz/30Hz/50Hz/60Hz
  - 1920x1080 (1080p) 24Hz/25Hz/30Hz/50Hz/60Hz/120Hz
  - 3840x2160 (2160p) 24Hz/25Hz/30Hz/50Hz/60Hz
  - 4096x2160 (256:135) 24Hz/25Hz/30Hz/50Hz/60Hz
- **Decompression Level:** Select the Receiver's method for decompressing video.
- **Reboot OSD:** Reset the selected Endpoint's On-Screen Display.

OPERATION

Connect or Disconnect Transmitters and Receivers

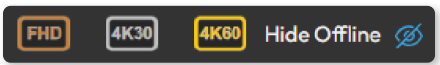
Example: Transmitter (Tx) 1*0 is connected to Receiver (Rx) 05, Tx02 is connected to Rx03, Tx03 is connected to Rx04, Tx04 is connected to Rx02, and no Tx is connected to Rx01.*

To connect a Transmitter Endpoint to a Receiver, click the box where the Transmitter's row intersects with the Receiver's column. The square will display a blue checkmark icon.

By default, HID traffic is not enabled on a connection, as indicated by the gray box in the bottom-right corner of the checkmark icon. Click on the gray box to enable HID traffic between the Transmitter and Receiver. The box will turn green to indicate that HID traffic is enabled.

If two Endpoints are connected, clicking the box will disconnect them.

Resolution and Hide Offline Options



There are four buttons along the top of the Matrix menu:

- **FHD:** Change the video resolution to 1920x1080 (Full HD)
- **4K30:** Change the video resolution to 3840x2160 (4K UHD) 30Hz
- **4K60:** Change the video resolution to 3840x2160 (4K UHD) 60Hz

Note: Neous Secure KVM and Video Isolators do not support 3840x2160 60Hz; this resolution is only supported with commercial models.

- **Hide/Show Offline:** Toggle whether offline Endpoints are visible.

OPERATION

Select Presets

The Action Panel on the right side of the Matrix Menu opens a drop-down menu that shows all available Preset configurations.

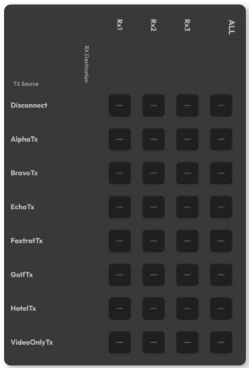
Clicking a Preset will load the saved configuration. Clicking the button creates a new Preset, which can be edited in the **Presets** tab.

Presets

The **Presets** menu allows administrators to create, edit, load, save, apply, and delete preset Matrix configurations.

OPERATION

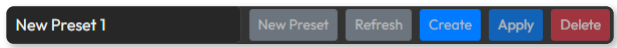
Create a Preset



The **Presets** menu displays a grid of all connected Neous Endpoints, with each horizontal row representing a Transmitter and each vertical column representing a Receiver. To connect a Transmitter to a Receiver, click the box where the Transmitter's row intersects with the Receiver's column. The square will display a blue checkmark icon. If two Endpoints are connected, clicking the square will disconnect them.

Selecting a box in the **Disconnect** square disconnects the corresponding Receiver from all Transmitters.

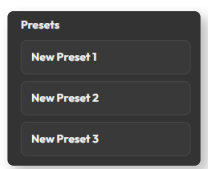
Along the top of the Presets tab is a row of buttons that perform the following actions:



- **New Preset:** Create a new Preset. Connect Endpoints by clicking the square in the grid where the Transmitter's row and the Receiver's column intersect.
- **Refresh:** Refresh the connection with all Transmitters and Receivers.
- **Create:** Save the configuration as a new selectable Preset. The Management Server can save up to 100 Presets.
- **Apply:** Apply the selected Preset to the Matrix.
- **Delete:** Delete the selected Preset.

Load a Saved Preset

The right side of the screen presents a menu of all saved Presets.



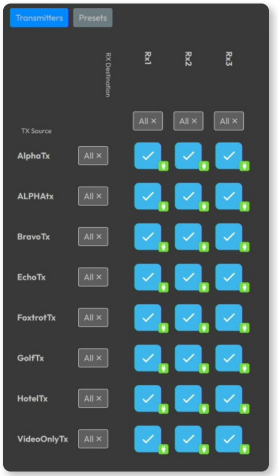
To load a Preset, click the corresponding button from the menu.

OPERATION

Permissions

The **Permissions** menu allows administrators to create multiple classification levels within the Neous Matrix by determining which devices have access to each other.

Transmitters



The **Transmitters** menu allows administrators to manage which Transmitters can access each Receiver.

OPERATION

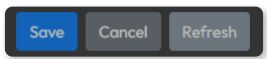
Connect or Disconnect Endpoints

To connect a Transmitter to a Receiver, click the box where the Transmitter's row intersects with the Receiver's column. The square will display a blue checkmark icon. If two Endpoints are connected, clicking the square will disconnect them.

Select All

Each Transmitter's row and each Receiver's column has an additional button labeled '**ALL X**' or '**ALL ✓**'. If a row or column has at least one pair of connected Endpoints, the button appears as **ALL X**, and clicking it disconnects all Endpoint pairs in that row/column. Likewise, if there are no connected Endpoint pairs, the button appears as **ALL ✓**, and clicking it connects all Endpoint pairs in that row/column.

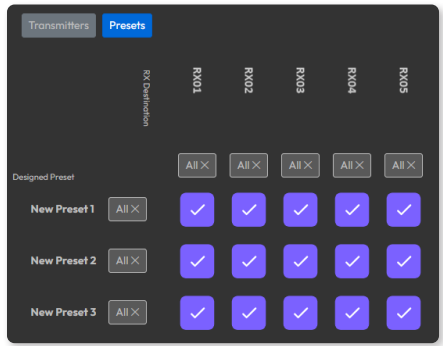
Additional Options



There are three buttons in the upper-right corner of the menu:

- **Save:** Save all changes made to Permissions.
- **Cancel:** Undo all changes made to Permissions.
- **Refresh:** Refresh the connection to all Transmitters and Receivers.

Permission Presets



The **Presets** menu allows administrators to determine which Preset configurations have access to each Receiver in the Neous Matrix. This allows for the creation of multiple classification levels across the entire Matrix.

Connect or Disconnect Presets

To include a Receiver in a Preset, click the square where the Preset's row intersects with the Receiver's column. The square will display a purple checkmark icon. If two Endpoints are connected, clicking the square will disconnect them.

Select All

Each Preset's row and each Receiver's column has an additional button labeled '**ALL X**' or '**ALL ✓**'. If a row or column has at least one pair of connected Endpoints, the button appears as **ALL X**, and clicking it disconnects all Endpoint pairs in that row/column. Likewise, if there are no connected Endpoint pairs, the button appears as **ALL ✓**, and clicking it connects all Endpoint pairs in that row/column.

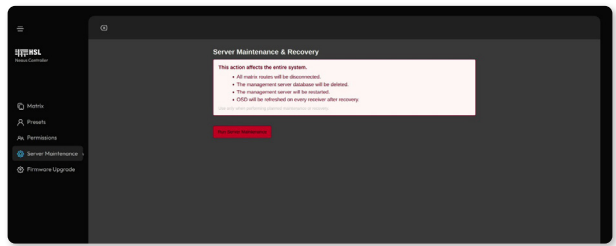
Additional Options

There are three buttons in the upper-right corner of the menu:

- **Save:** Save all changes made to Permissions.
- **Cancel:** Undo all changes made to Permissions.
- **Refresh:** Refresh the connection to all Transmitters and Receivers.

Server Maintenance

The **Server Maintenance** tab provides the option to perform automated server maintenance and recovery in the event of a crash, a security breach, or a significant software upgrade.



Important Notes:

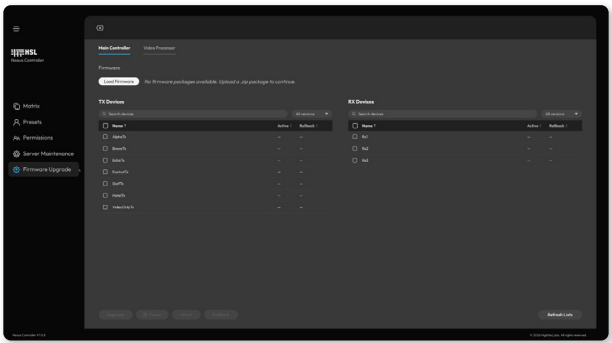
Performing server maintenance affects the entire system: the IP Matrix Controller and all connected Endpoints.

- All routes between Transmitter and Receiver Endpoints are disconnected.
- All saved Preset and Permission configurations are deleted.
- The Management Server is restarted.
- The OSD on every Receiver is restarted.

OPERATION

Firmware Upgrade

The Firmware Upgrade tab provides the ability to upgrade the components of the Neous Matrix to ensure it is up-to-date.



Main Controller Menu

The Main Controller menu allows administrators to upload and install new firmware packages onto one or multiple Transmitter and Receiver Endpoints.

Load Firmware

Select a .zip package with the updated firmware and upload it to the Management Server.

Once the firmware package is loaded, select the desired Endpoint(s) to upgrade.

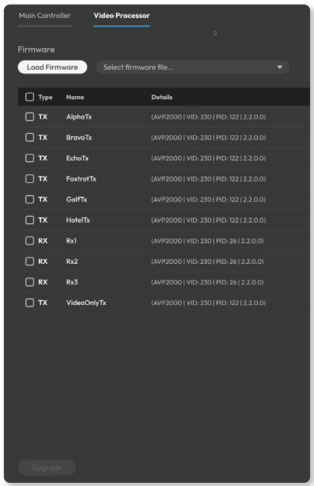
There are four buttons along the bottom of the menu:

- Upgrade: Load the firmware package onto the selected Endpoint(s).
- Pause: Pause the firmware update at its current progress.
- Abort: Cancel the firmware update.
- Rollback: Revert to the last saved firmware version.

The Refresh Lists button in the lower-right corner of the menu refreshes the lists of Tx and Rx Endpoints.

OPERATION

Video Processor Menu



The Video Processor Menu allows administrators to load and install few firmware for the video processor of a Transmitter Endpoint.

Load Firmware

Select a .zip package with the updated firmware and upload it to the Management Server.

Once the firmware package is loaded, select the desired Endpoint(s) to upgrade, and click the Upgrade button at the bottom of the menu to install the new firmware.

OPERATION

KVM Receiver On-Screen Display

Neous KVM Receiver Endpoints have additional controls that can be operated independently from the Controller. This is done via an On-Screen Display (OSD), which can connect a Transmitter directly to a Receiver and configure settings.

Note: For all of the key combinations listed below, the character | represents keys being pressed in sequence. For example, if the key combination is two presses of the Left Control key, it is written as **LCtrl | LCtrl**.

HID Request

If HID traffic is not enabled on a Receiver, it can send a request to the Controller to receive HID signals from the connected Transmitter. If another Receiver is connected, the Receiver that sent the HID request will take HID control from that unit. To send an HID request from the Receiver, enter the key combination **LCtrl | LCtrl | h**.

Operating the On-Screen Display

To activate the OSD, enter the key combination **LCtrl | LCtrl | o**. Opening the OSD presents a list of selectable menus.

To navigate the menus of the OSD, use the keyboard arrow keys.

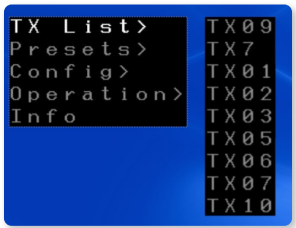
Note: If a Transmitter is not streaming video from the host (for example, if its video cable is disconnected from the Network Switch or its PC is in Sleep Mode), the Transmitter will appear in red.

To select an option, press **Enter**.

To close the OSD, press **Escape**.

OPERATION

Transmitter List



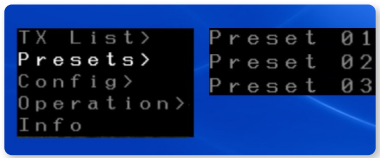
From the **Tx List** menu, select which transmitter to connect to the Receiver. To connect to a Transmitter, scroll to it in the menu and press **Enter**.

Favorites

Favorite Transmitters are displayed at the top of the Transmitter List.

Note: Favorites are deleted when the Receiver is rebooted.

Presets



From the **Presets** menu, select any saved preset configurations.

Configuration

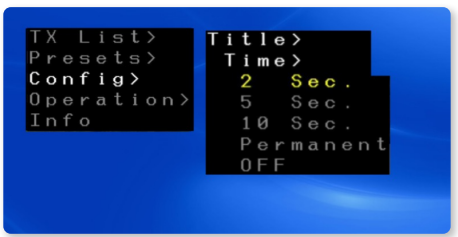
The **Config** menu contains options to change the settings for displaying the title of the connected Transmitter and to enable or disable Favorites.

OPERATION

Title

From the **Title Menu**, select how long the title of a connected Transmitter remains on screen, the position of the screen where the title is displayed, and the amount of information that is included in the title.

Time



Select how long the title is displayed on-screen:

- 2 Seconds
- 5 Seconds
- 10 Seconds
- Permanent
- Off

Position:

Select where on the screen the title is displayed:

- Top Left
- Top Center
- Top Right
- Middle Left
- Middle Center
- Middle Right
- Bottom Left
- Bottom Center
- Bottom Right

OPERATION

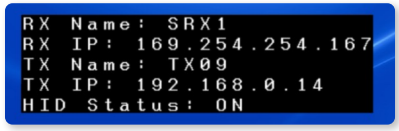
Content

Choose how much information is included in the title:

- **Min Details:** Only show the connected Transmitter

- **Med Details:** Show the connected Transmitter and Receiver, and if HID is connected.

- **Max Details:** Show the Connected Transmitter and Receiver, their respective IP addresses, and if HID is connected.



Favorites

The **Favorites** menu toggles whether Favorites are Enabled or Disabled.

OPERATION

Operation

The **Operation** menu provides the following options:

- **Restart Tx:** Power-cycle the Transmitter
- **Restart Rx:** Power-cycle the Receiver
- **DB Refresh:** Refresh data from the Controller

Info

The **Info** menu provides information about the Receiver:

- Name
- IP Address
- MAC Address
- Firmware version
- Internal Temperature
- Video Resolution

Neous IP Matrix Controller UI

The Neous IP Matrix Controller has an on-board user interface that allows monitoring and initial setup of the IP Matrix.

Login

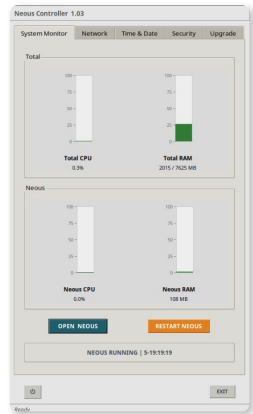
Upon booting up the Controller, the operating system will ask for a username and password. The default login credentials are as follows:

- Default username: admin
- Default password: Neous12_

Upon successfully logging in, the Controller UI will open, displaying a window with four tabs:

- **System Monitor:** View the Neous IP Matrix's memory usage; start or restart the Matrix Management Server.
- **Network:** View and edit information about the connected network.
- **Time & Date:** View and edit the time and date for the Neous Matrix.
- **Security:** Edit the Neous Matrix's security settings; view the security log.

System Monitor



The **System Monitor** tab displays the following information:

- **Total CPU:** How much of the Controller's CPU is being used in total
- **Total RAM:** How much of the Controller's RAM is being used in total
- **Neous CPU:** How much of the Controller's CPU is being used by Neous
- **Neous RAM:** How much of the Controller's RAM is being used by Neous
- **Neous Running:** How long the Neous IP Matrix has been active

In addition, this tab has two buttons for the Neous IP Matrix Management Server:

- **Open Neous:** Open the IP Matrix Management Server.
- **Restart Neous:** Restart the IP Matrix Management Server.

OPERATION

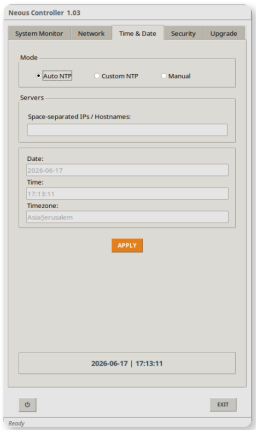
Network

From the **Network** tab, view or edit the following information:

- **Hostname:** Edit the name of the Neous Management Server.
- **Mode:** Determine how network information is assigned:
  - **DHCP:** Assign the network information automatically using the Controller's built-in DHCP server.
  - **Static IP:** Enter the following information manually:
    - IP Address
    - Netmask
    - Gateway
    - DNS Server
  - **DHCP Server:** Use an external DHCP server to assign the network information. This can be used for network switches that do not support DHCP.
- **Link Status:** Displays if the Controller is connected to a Network Switch:
  - **Link Down:** No Network Switch is Connected.
  - **Link Up: No IP:** A Network Switch is connected, but no IP address is assigned.
  - **Link Up: IP (xxxx)**: A Network Switch is connected, and an IP address is assigned.

Time & Date

From the **Time & Date Tab**, adjust how the Controller sets the time and date for the Neous IP Matrix:



Mode:

- **Auto NTP:** Use an automatic Network Time Protocol.
- **Custom NTP:** Use a customized Network Time Protocol.
- **Manual:** Enter the time, date, and time zone manually.

Once the time and date are set, click **Apply** to apply these settings to the Matrix.

OPERATION

Security

The **Security** tab provides the following functions:

Operation:

- **Apply:** Encrypt all HID and video traffic traveling between Endpoints. Secure the communication pathways between the Endpoints and the Server using authentication protocols.
- **Cancel:** Stop all security operations.
- **New Keys:** Create new encryption keys for all connected units.

Note: All secure units that are not connected will lose connectivity if this option is selected, as indicated by the warning notification when this option is selected.

Log:

- View the most recent security events.
- **Clear Log:** Erase the information in the Log.

Upgrade

The **Upgrade** tab allows administrators to perform software updates directly from the controller interface.

- To perform an update, connect a USB drive containing a .deb file.
- If the file does not appear in the 'Select' field, click the **Refresh** button.
- Select the .deb file, then click **Upgrade**.

Appendix A: Management Server Redundancy Guide

This guide describes a practical cold-standby redundancy mechanism for the Neous Management Server using image backup and restore.

Overview

The redundancy mechanism consists of two stages:

- **Stage 1 - Backup Creation:** Create a full disk image of a fully configured and verified Neous Management Server.
- **Stage 2 - Restore and Standby Deployment:** Restore the image to a second PC that will act as a standby Management Server.

Key Principle

The backup image should only be created after the Management Server is fully deployed, configured, tested, and confirmed operational.

Required Equipment

PCs

- **Primary PC:** The Neous IP Matrix Controller with the active, configured Neous Management Server.
- **Standby PC:** The destination system that will receive the restored image.

USB Drives

- **Rescuezilla Boot USB:** A USB drive containing the Rescuezilla boot image.
- **Backup Storage USB:** A second USB drive with at least 64 GB capacity to store the Management Server image.

Stage 1: Backup Creation

Prerequisites

Complete all deployment and configuration tasks on the primary Management Server:

1. Install the operating system.
2. Install the Neous Management software.
3. Configure networking, certificates, and system settings.
4. Verify that the server is fully operational.
5. Confirm all required functionality works correctly.

Important Note: Create the image only after the system is fully configured and validated. The backup image becomes the master recovery point for future restores.

APPENDIX

Backup Procedure

1. Insert both USB drives into the configured Management Server:
   - Rescuezilla Boot USB
   - Backup Storage USB (minimum 64 GB)
2. Restart the PC.
3. Boot from the Rescuezilla USB drive.
4. In the Rescuezilla interface, select Backup.
5. Choose the internal system drive of the configured PC as the Source.
6. Choose the 64 GB USB drive as the Destination.
7. Proceed through the wizard and start the backup.
8. Wait for the process to complete.

Expected Result

When finished, the destination USB drive contains a complete image that is identical to the working Management Server. This image can be used to rapidly restore another PC to the same operational state.

Stage 2: Restore and Standby Deployment

Restore Procedure

1. Connect both USB drives to the standby PC:
   - Rescuezilla Boot USB
   - USB drive containing the Management Server image
2. Boot the standby PC from the Rescuezilla USB drive.
3. In the Rescuezilla GUI, select Restore.
4. Choose the USB drive containing the Management Server image.
5. Select the image to restore.
6. Choose the standby PC's internal drive as the restore target.
7. Start the restore process.
8. Wait for the restore to complete.
9. Remove the USB drives and reboot the standby PC.

Expected Result

The restore process typically takes approximately 4-7 minutes.

After rebooting, the standby PC will operate as a fully functional Neous Matrix Controller identical to the primary system.

APPENDIX

Network and Failover Behavior

Standby Operation

After the restore is completed, connect the standby PC to the same network as the primary Management Server.

Under normal operation:

- The primary Management Server remains active.
- The standby server remains available as a recovery system.
- If the primary server fails, the standby server can take over operations.

Operational Notes

- This is a cold-standby redundancy solution, not an active-active cluster or sync in real-time solution.
- To avoid network conflicts, ensure that both servers are configured with different IP addresses.
- Depending on the network design, this may require controlling IP addresses, hostnames, or service activation during failover.

This approach provides a simple, fast, and reliable disaster-recovery mechanism without requiring clustering software, replication services, or additional licenses.

The standby server is restored from a known-good image and can be brought online quickly when needed.

Appendix B: Networking and Deployment Guide

Fundamentals

Purpose

This guide provides recommendations for planning, deploying, and maintaining a reliable Neous network. It is meant for AV system integrators, IT administrators, network architects, and commissioning engineers.

Scope

The guide covers the network architecture, switch requirements, multicast operation, addressing, deployment models, and best practices for enterprise-grade AV-over-IP installations.

Neous Overview

Neous is built on Software-Defined Video over Ethernet (SDVoE) technology using BlueRiver Endpoints. A typical system includes:

- Managed Ethernet switches
- A Neous IP Matrix Controller PC with the Neous Matrix Management Server
- Neous Transmitter (Tx) Endpoints
- Neous Receiver (Rx) Endpoints

High-quality audio/video is transported using multicast over 10GbE Ethernet.

Architecture

The Controller manages Endpoint discovery and routing. Transmitter Endpoints encode HDMI sources into Ethernet streams. Receiver Endpoints subscribe to multicast streams and decode them for display. The network must provide deterministic multicast forwarding with minimal packet loss and jitter.

Why 10GbE?

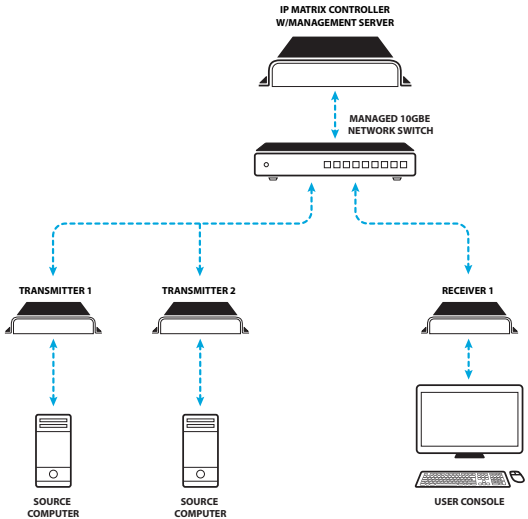
The Neous IP Matrix uses minimal compression and has no delays in video. Therefore, every Neous Endpoint should connect to a managed 10GbE switch. Oversubscription should be avoided in production deployments.

Best Practices

- For optimal performance and reliability, perform the following:
- Used manage switches.
- Enable Internet Group Management Protocol (IGMP) Snooping v2.
- Enable Fast Leave.
- Disable unknown multicast flooding.
- Validate all cabling.
- Keep firmware current.
- Use Dynamic Host Configuration Protocol (DHCP) reservations or static RFC1918 addresses.

APPENDIX

Example Single Switch Topology



Network Requirements & Cabling

Minimum Network Requirements

Requirement	Recommendation
Access Network	Managed 10GbE Ethernet
Switch	Layer 2 minimum, Layer 3 recommended for large deployments
IGMP	IGMP Snooping v2 enabled
Fast Leave	Enabled
Unknown Multicast	Filtered/Blocked
DHCP	Recommended
Cabling	Cat6A or better
Uplinks	100GbE preferred between switches

APPENDIX

Cabling Recommendations

Copper:

- Cat6A up to 100 m
- Factory-certified patch cords

Fiber:

- OM4 multimode for short distances
- OS2 single-mode for long distance

Inter-Switch Connectivity:

- QSFP28 Direct-Attach Cables (DAC) for short rack-to-rack connections
- Active Optical Cables (AOC) for medium distances
- Fiber-optic cables for a long-distance backbone

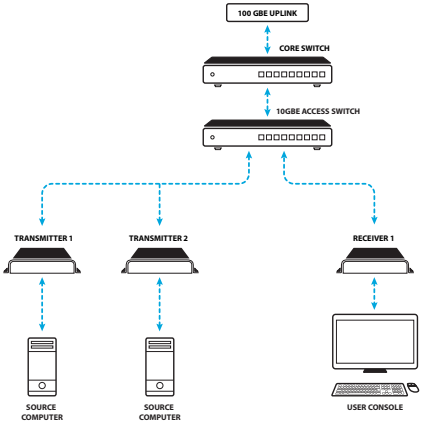
Bandwidth Planning

Video Format	Approx. Bandwidth
1080p60 4:4:4	~3.2 Gbps
4K30	~6.4 Gbps
4K60	~8.6-9.1 Gbps

Recommended Network Design

- Avoid oversubscription.
- Use non-blocking switches.
- Validate all cabling before deployment.
- Reserve bandwidth for control traffic.
- Separate management traffic where appropriate.

Topology Concept



APPENDIX

Multicast, IGMP & IP Addressing

Why Multicast?

SDVoE distributes audio and video using IP multicast. A transmitter sends one stream, and multiple receivers subscribe to it using Internet Group Management Protocol (IGMP). This minimizes bandwidth consumption compared to separate unicast streams.

IGMP Snooping

IGMP Snooping must be enabled on every switch carrying SDVoE traffic. It ensures multicast traffic is forwarded only to ports with interested receivers.

Fast Leave

Enable Fast Leave (Immediate Leave) to quickly stop forwarding multicast when a Receiver unsubscribes. This reduces unnecessary traffic and improves switching performance.

Unknown Multicast Filtering

Disable flooding of unknown multicast traffic. Unregistered multicast should be filtered or dropped to prevent excessive bandwidth usage and unintended Endpoint behavior.

IGMP Querier

Although SDVoE Endpoints periodically transmit unsolicited IGMP reports, configuring an IGMP Querier is recommended for stable production deployments.

DHCP and Link-Local Addressing

Endpoints request an IPv4 address using DHCP. If no DHCP server is available, they automatically assign themselves an address in the 169.254.0.0/16 link-local (APIPA) range while continuing periodic DHCP discovery. Production systems should use DHCP reservations or static RFC1918 addresses.

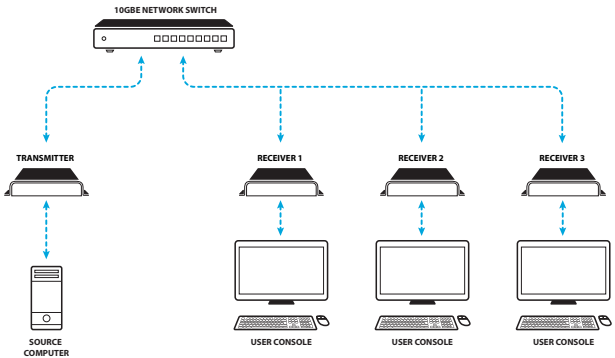
Best Practices

For optimal performance and reliability, perform the following:

- Enable IGMP Snooping v2 on every switch.
- Enable Fast Leave.
- Filter all unknown multicasts.
- Configure an IGMP Querier.
- Keep the Control Server and Endpoints on reachable IP networks.
- Validate multicast operations during commissioning.

APPENDIX

Example Multicast Flow



Only Receivers that join the multicast group receive the stream.

Recommended Switches & Deployment Models

Selecting the Right Switch

The network switch is the foundation of a reliable SDVoE deployment. Choose a managed switch that supports 10GbE access, multicast optimization, and sufficient uplink bandwidth.

Recommended Netgear Platforms

Family	Typical Deployment	Key Features	Recommendation
M4300	Meeting rooms / SMB	10GbE, Layer2/3, IGMP	Small & medium
M4350	Enterprise AV	10GbE, 100GbE uplinks, IGMP+, LACP	Recommended for most Neous deployments
M4500	Core/Aggregation	High density, Layer3, PIM-SM	Large enterprise / campus

Deployment Models

Small Meeting Room

- One M4300 Switch
- Up to 24 Tx/Rx Endpoints
- Single Virtual Local Area Network (VLAN)

APPENDIX

Enterprise

- M4350 Access Switches
- 100GbE Uplinks
- Redundant core

Campus

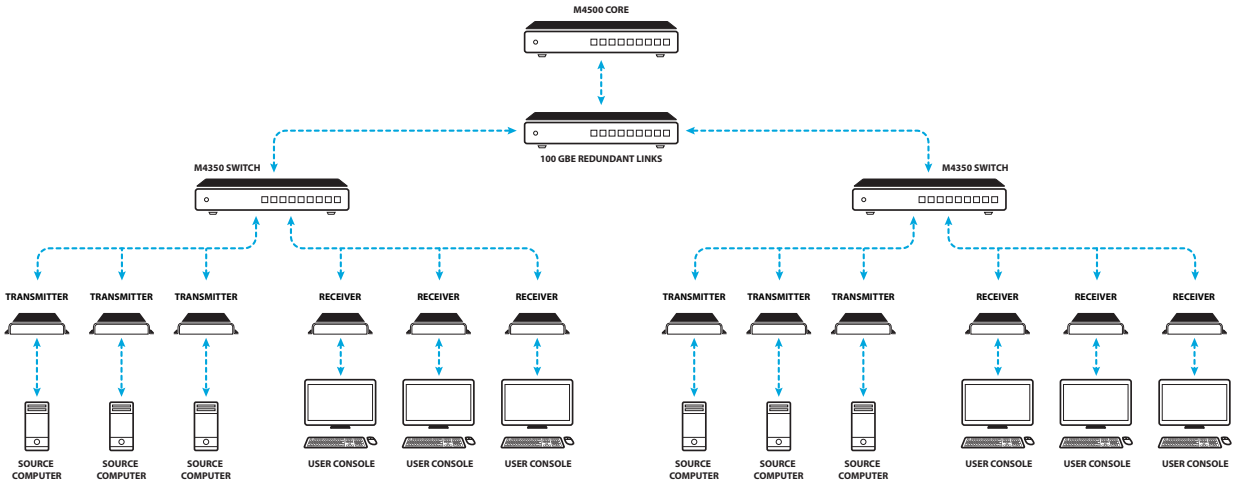
- M4500 Core
- Multiple M4350 Access Switches
- Layer 3 with Protocol Independent Multicast, Sparse Mode (PIM-SM)

Design Recommendations

- Prefer non-blocking switch architectures.
- Use 100GbE uplinks between access switches where practical.
- Use Link Aggregation Control Protocol (LACP) for resilient inter-switch connectivity.
- Separate management and AV traffic when organizational policy requires it.
- Validate multicast before production.

APPENDIX

Example Enterprise Topology



APPENDIX

Switch Configuration Best Practices

Configuration Checklist

Setting	Recommendation
IGMP Snooping	Enable on every VLAN carrying SDVoE traffic.
IGMP Version	Use IGMPv2 unless the deployment requires otherwise.
Fast Leave	Enable Immediate/Fast Leave to accelerate multicast pruning.
Unknown Multicast	Disable flooding. Drop or filter unregistered multicast.
IGMP Querier	Configure one querier per multicast domain.
LACP	Use for redundant/high-bandwidth uplinks.
Quality of Service	Avoid unnecessary traffic shaping of AV flows.
Jumbo Frames	Enable only if validated across the full path.

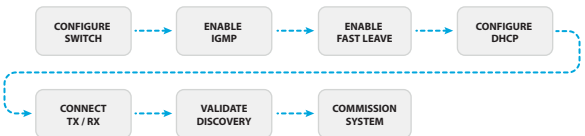
Validation Procedure

1. Verify that all 10GbE links are up.
2. Confirm Endpoint discovery.
3. Verify that multicast joins on the switch.
4. Switch the video between multiple sources.
5. Check for packet loss or excessive jitter.
6. Record the final switch configuration.

Common Misconfigurations

- IGMP Snooping is disabled.
- Unknown multicast flooding is enabled.
- No IGMP Querier is configured.
- The uplinks are oversubscribed.
- The Endpoints are placed in different, unreachable subnets.

Example Deployment Flow



APPENDIX

Enterprise Network Design & Validation

Enterprise Design Principles

Enterprise SDVoE deployments should use a hierarchical access/core architecture, non-blocking switching, deterministic multicast, and adequate uplink capacity.

Scenario	Topology	Recommendation
Meeting Room	Single access switch	Up to 24 Endpoints, single VLAN
Training Center	Two access switches	100GbE uplink, 20-60 endpoints
Control Room	Redundant core	Dedicated management network
Campus	Layer 3	PIM-SM with multiple VLANs

Validation Checklist

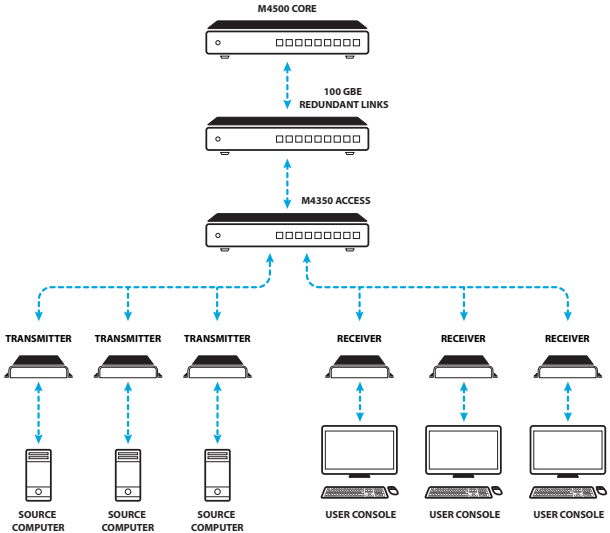
- Verify that the firmware is current.
- Validate 10GbE links.
- Confirm IGMP.
- Test Endpoint discovery.
- Verify multicast switching.
- Measure packet loss/jitter.
- Document the configuration.

Acceptance Tests

1. Power-cycle the Endpoints.
2. Switch the sources repeatedly.
3. Validate the USB/audio/control.
4. Reboot the switches.
5. Test monitor utilization.

APPENDIX

Enterprise Topology



Layer 3 Networks, VLANs, and PIM-SM

When to Use Layer 3

Layer 3 designs are recommended for large enterprise and campus deployments where multiple access switches and VLANs are required. Routing should preserve multicast delivery and minimize latency.

VLAN Design Guidelines

Topic	Recommendation
AV Traffic	Dedicated VLAN where practical
Management	Separate management VLAN
Endpoints	Consistent IP addressing
Routing	Only where required
Multicast	Support PIM-SM across routed domains

APPENDIX

PIM-SM Overview

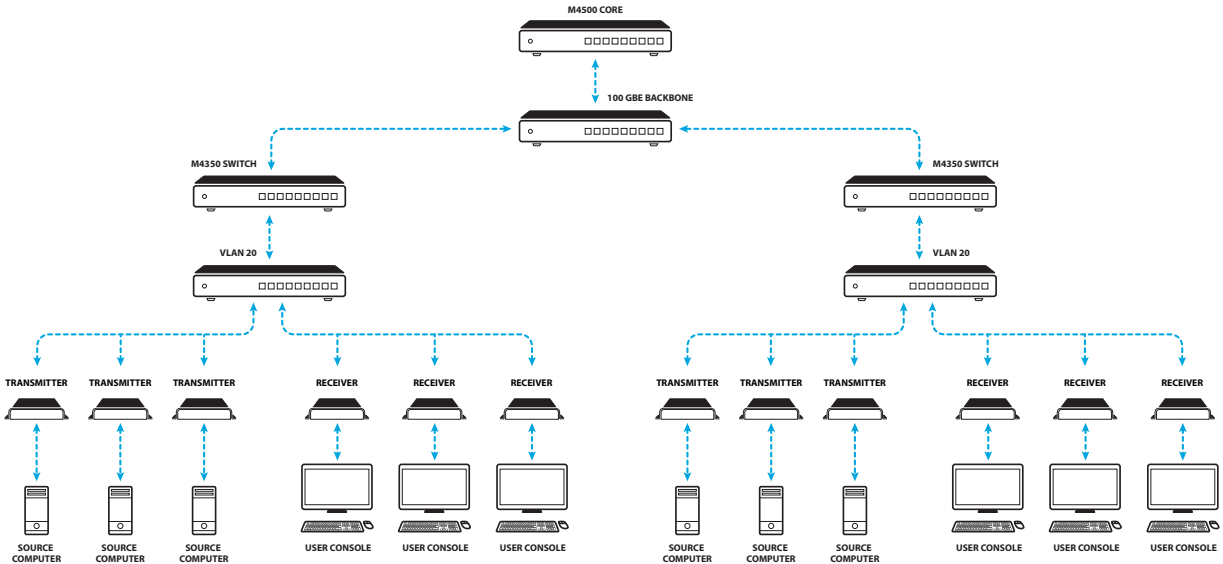
PIM Sparse Mode enables multicast routing between Layer 3 networks. Configure a Rendezvous Point (RP), enable PIM-SM on routed interfaces, and deploy an IGMP Querier where appropriate.

Design Recommendations

- Keep the multicast domains simple.
- Use high-capacity core switches.
- Use 100GbE uplinks between distribution and core.
- Document the VLAN IDs and IP subnets.
- Validate the multicast routing before production.

APPENDIX

Example Layer 3 Topology



APPENDIX

Deployment, Commissioning, and Validation

Pre-Deployment Checklist

- Verify that the switch firmware is supported.
- Validate all copper and fiber cabling.
- Confirm that the Controller's hardware is operational.
- Verify the DHCP or static IP addressing plan.
- Document the VLANs and multicast configuration.

Installation Procedure

1. Install and power the network switches.
2. Configure the multicast settings (IGMP Snooping, Fast Leave, IGMP Querier).
3. Connect the Controller and Management Server.
4. Connect the Tx Endpoints.
5. Connect the Rx Endpoints.
6. Verify Endpoint discovery.
7. Test video routing.
8. Document the final configuration.

Commissioning Tests

Test	Expected Result	Status
Endpoint Discovery	All Endpoints are visible in the Management Server	The Endpoint's indicator box shows a green dot by its name.
Video Switching	Successful between all sources	The Matrix box where the Endpoints intersect is blue with a ✓ mark.
Audio Switching	No interruption	The Matrix box where the Endpoints intersect is blue with a ✓ mark (if analog audio is supported, HDMI switches along with video).
USB Routing	Operational	The Matrix box where the Endpoints intersect is blue with a ✓ mark, with a green USB icon in the lower right corner.
Network Utilization	Within design limits	Click the pencil icon in the Endpoint's indicator box to verify the correct IP address.

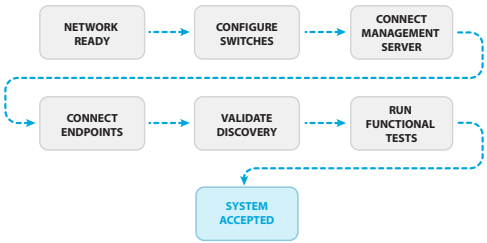
Operational Best Practices

For optimal performance and reliability, perform the following:

- Maintain the current firmware versions for the switch and Endpoints.
- Monitor switch utilization regularly.
- Archive the switch configurations.
- Keep the topology documentation up to date.
- Perform periodic validation after network changes.

APPENDIX

Commissioning Workflow



Troubleshooting, Maintenance & Operations

Common Issues

Symptom	Recommended Action
No Endpoint discovery	Check IP addressing, VLANs, DHCP, and Management Server connectivity.
No video	Verify multicast configuration, IGMP Snooping, source routing and HDMI signal.
Video artifacts	Inspect cabling, packet loss, oversubscription and switch statistics.
USB not working	Verify USB routing configuration and Endpoint pairing.
Intermittent switching	Check multicast flooding, IGMP Querier and firmware versions.

Preventive Maintenance

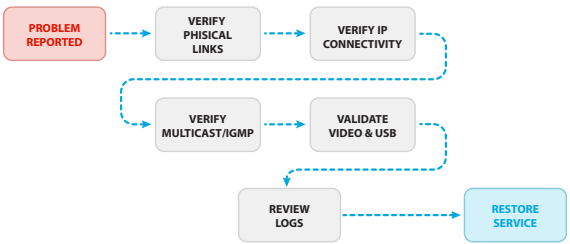
- Keep the switch and Endpoint firmware up to date.
- Back up the switch configurations after changes.
- Review switch logs periodically.
- Verify the optical modules and cabling annually.
- Monitor the CPU, memory, and port utilization on the core switches.

APPENDIX

Operational Recommendations

Maintain an up-to-date network diagram, IP address inventory, VLAN documentation, and firmware inventory. Any infrastructure changes should be validated in a maintenance window before returning the system to production.

Troubleshooting Workflow



Deployment Documentation Checklist

Prepare the following documents for deployment:

- Network topology diagram
- Switch configuration backups
- IP address plan
- VLAN allocation
- Firmware versions
- Acceptance test report

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