KUMO

Series Manual

Installation and Operation Guide

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AJA VIDEO SYSTEMS

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Chapter 1 – Introduction

Overview

KUMO compact SDI routers are small and cost-effective, yet robust and reliable. All KUMO routers support full-broadcast specifications over SD-SDI, HD-SDI, and 3G-SDI. A KUMO-12G router also supports single connector 12G-SDI. Additionally, KUMO routers support SDI related protocols such as 270Mb/s DVB-ASI and Canon 3G-SDI RAW. KUMO routers are re-clocking, non-blocking, and ready for any broadcast, production, or post production environment. Running Embedded Linux, KUMO routers support powerful HTTP control and monitoring. Each KUMO product contains an internal web server that allows immediate installation, configuration, and operation without requiring additional software. It offers a powerful user interface via any standard web browser. KUMO SDI routers are available in seven configurations:

- KUMO 1604 - sixteen SDI inputs and four outputs
- KUMO 1616 - sixteen SDI inputs and sixteen outputs
- KUMO 1616-12G - supports single connector 12G-SDI, sixteen SDI inputs and sixteen outputs
- KUMO 3232 - supports thirty-two SDI inputs and thirty-two outputs
- KUMO 3232-12G - supports single connector 12G-SDI, thirty-two SDI inputs and thirty-two outputs
- KUMO 6464 - sixty-four SDI inputs and sixty-four outputs

- KUMO 6464-12G - supports single connector 12G-SDI, sixty-four SDI inputs and sixty-four outputs

Because of their compact sizes, KUMO SDI routers are ideal for space-sensitive applications such as mobile sports trucks, edit suites, corporate video installations, or live theatrical A/V rigs.

KUMO Features

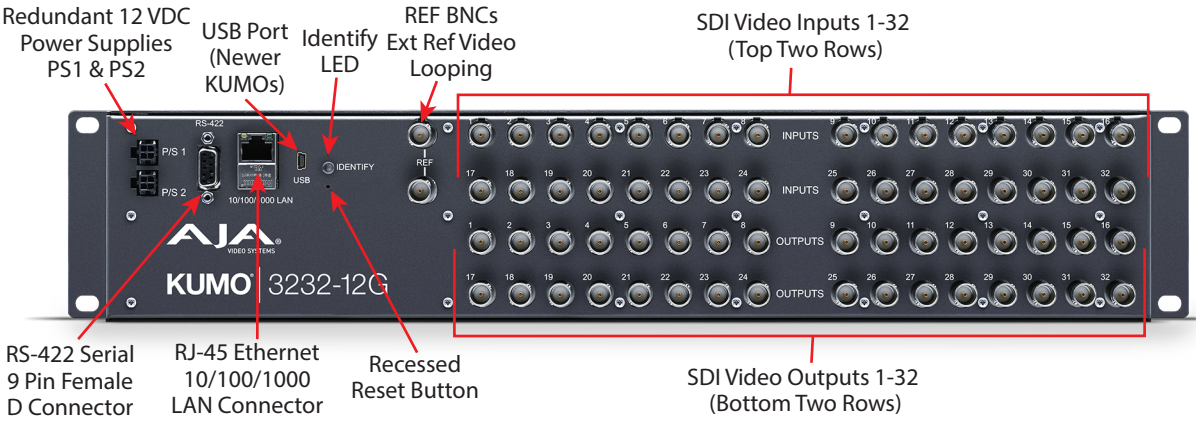
The KUMO routers offer the following features for ease of use in a broad range of SDI applications and workflows:

- KUMO 1604, 1616, and 3232 support for SD-SDI, HD-SDI, 3G-SD (SMPTE 259M/292M/424M)
- KUMO 1616-12G, 3232-12G, and 6464-12G support for SD-SDI, HD-SDI, 3G-SDI, 6G-SDI and 12G-SDI (SMPTE-259/292/424/2081/2082)
- KUMO v3.0 and above firmware supports dual and quad mode routing, allowing users to group together Sources and Destinations for multiple cable applications like Dual Link, Quad HD, Quad split monitors, and even 8K video
- KUMO v4.3 and above firmware supports Salvos, controlled from the KUMO router WebUI and the KUMO CP2 panel
- KUMO v4.9 and above firmware supports KUMO 6464-12G serial # 1RT901000 and higher
- Automatic coax cable equalization and re-clocking
- Supports all embedded VANC and HANC ancillary information, including embedded audio
- Reference input via BNC, passive loop, PAL/NTSC color black or Tri-level sync
- Output switch timing per SMPTE RP 168 when using an external reference
- 10/100/1000 Ethernet LAN
- Embedded Linux OS with internal web server for WebUI control
- USB port for use with eMini-Setup for network configuration
- User authorization to restrict access via WebUI
- Optional KUMO CP hardware 32 pushbutton remote control panel via Ethernet
- Optional KUMO CP2 hardware 64 pushbutton remote control panel via Ethernet
- 1RU form factor for KUMO 1604, 1616, and KUMO CP, 2RU for 3232 and KUMO CP2, 4RU for KUMO 6464
- Power loss recovery to the last operational state, both router and control panel
- Redundant power supply (optional), isolated power inputs
- Twenty user Preset 'registers' are managed through the WebUI for storing and recalling user-changeable parameters, including for:
  - Configuration (Switching Mode, Crosspoint Map, Source Button Settings, Destination Button Settings)
  - Salvos (Crosspoints, Name, Location/Order)
  - Control Panel (Delegation Buttons, Display Intensity, Enabled/Disabled Buttons, Alarm (Normal or Suppressed)
  - Excluded from Presets (Network settings, other presets on the device, user authentication and password, UPnP Host setting, auto configure setting)

CAUTION: *KUMO routers switch SDI signals in a manner compliant with SMPTE RP 168-2009. Because KUMO routers (or any similar router) switch the SDI stream without de-serializing, the switch point can cause a temporary anomaly in the SDI stream. This can cause downstream equipment, depending on the characteristics of the SDI receiver(s), to react to the switch (for example, a monitor "glitch or roll"). It is also possible that switching anomalies can appear on one or more outputs in the same group in the Dual and Quad modes and in Salvos. This effect occurs regardless of the relative timing of the SDI signals being switched, or any reference input connected to the router.*

KUMO Router Connections

Figure 1. KUMO Rear Panel Connections (3232 shown, other models similar)



PS1 & PS2 Power Connectors

Power to the KUMO unit is supplied by an external power supply module that accepts a 110-240VAC, 50/60Hz power input and supplies +12 VDC to KUMO via connector PS1 or PS2. One power supply is provided, and it may be connected to either of the two power connectors. An optional second power supply can provide redundancy to help protect against outages.

NOTE: The KUMO 6464-12G router requires an 84W power supply (KUMO-84W-PWR). All other KUMO routers and control panels can use a 60W power supply (KUMO-PWR).

IMPORTANT: The power connector has a latch, similar to an Ethernet connector. Depress the latch (facing the outside edge of the KUMO device) before disconnecting the power cable from the unit.

Power Loss Recovery

If KUMO experiences a loss of power, when power is restored the router returns to the previous state of all Source to Destination crosspoints, and all configured Source and Destination names are retained. If a KUMO control panel configured with a KUMO router loses power, when power is restored the control panel's configuration is retained, and button tallies will return to their previous states.

RJ-45 Ethernet Connector

The RJ-45 Ethernet connector allows you to connect KUMO to a 10/100/1000 Ethernet LAN using CAT5 cable and access KUMO's built in web server. Multiple configurations are possible, including standalone control, a local LAN, or a WAN. This also allows control over the network using GVG Native Protocol.

Identify LED

The Identify LED lights when you use the WebUI to identify the KUMO unit you are controlling.

Reset Button

The Reset button (pinhole) below the LED allows a safeboot reset of the unit as explained in *"SAFEBOOT Reset" on page 54*.

REF BNC Connector

The REF BNC connector is the input for synchronizing the crosspoint switch timing of KUMO to your house video signals. Apply an analog NTSC, PAL, or Tri-level sync signal to this input. Be sure to terminate the second BNC with a 75 Ohm terminator, or if you loop to other equipment terminate the last connected device.

When reference is present, KUMO will switch at the SMPTE RP 168 designated switch point with respect to the reference input. If no reference is present, the KUMO will switch based on its internal clock.

Video Inputs and Outputs

Depending on your KUMO model, up to 64 SDI video inputs and outputs can be connected to the video input and output BNC connectors.

Normal Mode

In Normal mode, each input and output BNC routes an individual signal.

Dual and Quad Modes

In Dual mode, inputs and outputs use adjacent pairs of BNCs for each routed signal. In Quad mode, four adjacent BNCs are used for each routed signal. See *"Mode Selection" on page 27*.

RS-422 Connector

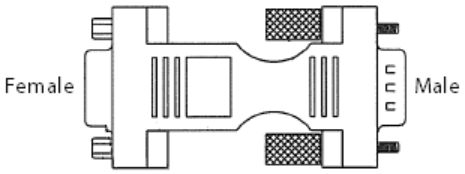
KUMO routers include a RS-422 female DB-9 connector for making serial connections to other equipment. This control connection enables interoperability with other devices, including those that use GVG Native Protocol. See *"RS-422 Control Specifications (Routers)" on page 92* for more information.

Older Model RS-422 Adapter

Older KUMO 1604, 1616, and 3232 routers (serial numbers ending in -R0) needed an RS-422 adapter for proper serial control operation (*Figure 2*). This adapter was shipped with those older model routers. Be aware of this fact if your facility has a mixture of older and newer KUMO routers that use RS-422 control.

NOTE: KUMO routers with serial numbers ending in -R1 or higher do NOT require the adapter, and KUMO 6464 models do NOT require the adapter.

Figure 2. RS-422 Adapter

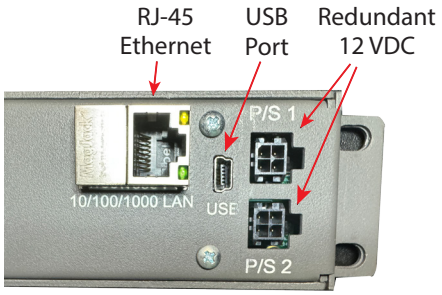


KUMO Control Panel (CP) Connections

Similar to the KUMO routers, a KUMO CP or CP2 has an RJ-45 Ethernet connector, a USB port, and PS1 and PS2 power supply connectors.

NOTE: CP and CP2 have no BNC connectors nor RS-422 ports.

Figure 3. CP Rear Cable Connections



KUMO Control and Monitoring

The KUMO routers and control panels (CPs) user-interface ('WebUI') provides powerful remote setup, control and monitoring, with:

- Zero-configuration Bonjour Protocol and support for UPnP networking protocols
- Remote web-browser-based 'WebUI' control interface via Ethernet
- Optional KUMO CP (32 button) and KUMO CP2 (64 button) hardware control panels, each unit able to control up to four KUMO routers

NOTE: The 32 button KUMO CP hardware Control Panel can be used with a KUMO 6464 router operating in Normal mode, but can only control the first 32 Sources and Destinations. The KUMO CP can be used to fully control a KUMO 6464 that is operating in Dual or Quad mode. Control of the KUMO 6464 router in all modes is available via the KUMO CP2 64 button hardware panel, WebUI, Ethernet control, and RS-422.

- GVG Native Protocol built-in to allow serial or LAN interconnection (one RS-422 or up to 32 Ethernet) and interoperability with other equipment. Specifically, KUMO can be controlled by the SMS 7000 portion of the GVG Native Protocol.

NOTE: For details, refer to: "GVG Native Protocol Support" on page 91.

Default Network Settings

KUMO routers and control panels ship with DHCP enabled, making system operation possible simply by connecting the KUMO device's Ethernet cabling.

In addition, temporary default static IP addresses can be activated for initial KUMO system configuration. See *"KUMO Temporary Static IP Address" on page 15*.

In This Manual

Chapter 1: Introduction - lists features and gives a general description of the product.
(This chapter.)

Chapter 2: Installation - details KUMO installation, connections, and networking configuration options.
See *"Installation" on page 12.*

Chapter 3: Web-Based User Interface (WebUI) - provides complete instructions for controlling and monitoring the KUMO Router from a computer.
See *"KUMO Routers & WebUI" on page 24.*

Chapter 4: KUMO Remote Control Panel (CP) - details the configuration and operation of the optional KUMO CP and CP2 Control Panels.
See *"KUMO Control Panels & WebUI" on page 56.*

Chapter5: eMini Setup - host initial configuration software using USB.
See *"eMini-Setup" on page 66.*

Appendix A: Specifications - lists technical specifications for the products.

Appendix B: Safety and Compliance information.

Appendix C: Warranty and Liability

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Chapter 2 – Installation

Overview

KUMO SDI routers are easy to set up and use. All of the steps for KUMO installation and configuration are documented in this chapter, summarized as follows:

1. Install the chassis in an appropriate rack. If you are mounting multiple KUMO units, try to place them visually in the same area so if you communicate with them via a network attached computer, you can use the KUMO's Identify feature to flash the corresponding LED of the unit you're communicating with. Ensure you have an Ethernet cable routed to where the KUMO will be placed.
2. Assemble the Ethernet network connections to a closed network or LAN using Cat 5 Ethernet cable and any required switches and hubs.
3. Connect the KUMO power adapter to power on the KUMO device, connecting the Adapter power cord to mains AC.
4. If necessary, configure device network settings for operation in your facility.
5. Cable the system SDI video Source and Destination equipment and reference signals.

WARNING: ***Do not defeat the safety purpose of the grounding-type plug.***

6. (Optional) Connect a second KUMO power adapter, also (ideally) connecting its power cord to a different mains AC than the first power adapter.

CAUTION: *To meet safety regulations for leakage current when using redundant power supplies, connect the KUMO dual power supplies to separate branch circuits.*

7. If operating with Dual Link or Quad Link signals, select the appropriate KUMO operating mode.

What's In The Box?

When you unpack your AJA KUMO SDI device, you'll find the following components:

- KUMO SDI router or KUMO control panel
- USB adapter cable
- AC adapter and AC power cord

Please save all packaging for shipping KUMO should you wish to do so when moving or sending it in for service.

KUMO Chassis Installation

Space Requirements

When planning equipment locations and mounting methods, take into account the size of the chassis. KUMO devices are designed for EIA 19" equipment rack mounting. See *"Appendix A Specifications"* for exact dimensions of each router model.

Plan adequate space for cable routing from the back of the router chassis. Ensure that SDI video cable connectors will not be stressed and that cables are not bent or crimped in the process.

Cooling Requirements

When rack mounting or stacking multiple KUMO chassis, ensure there is adequate airspace for cooling around the KUMO units. Note the location of cooling vents on all equipment next to the KUMO and ensure none are obstructed.

Power Requirements

- Input Voltage: 110-240VAC, 50/60Hz
- 60W or 84W AC adapter provided
- Optional redundant power supply

CAUTION: *KUMO is designed to take advantage of its chassis to aid in cooling. It is common and expected for the densely populated chassis to have a warm front panel in normal, active operating conditions.*

WARNING: ***Do not open the chassis. There are no user-serviceable parts inside. Opening the chassis will void the warranty unless performed by an AJA service center or licensed facility.***

WARNING: ***Remove the brick power supply AC line cord(s) from mains power when moving the unit.***

Physical Equipment Setup

1. Connect power supplies (one, or two for redundancy) to KUMO routers and control panels.

NOTE: The KUMO 6464-12G router requires an 84W power supply (KUMO-84W-PWR). All other KUMO routers and control panels can use a 60W power supply (KUMO-PWR).

2. Connect Source and Destination SDI equipment (this step can be deferred).
3. Connect network:
   - Direct Connection: connect a KUMO router to a KUMO CP (if used), or to a Mac or PC, via an Ethernet Cable.
   - LAN Connection: connect a KUMO router (and a KUMO CP if used) to a hub or switch and connect a PC or Mac to the same LAN via a hub or switch.

NOTE: KUMO devices are compatible with both CAT 5/6 straight-through and cross-over Ethernet cables—they automatically detect whichever is used.

4. Proceed to your desired network configuration method using one of the procedures presented later in the chapter.

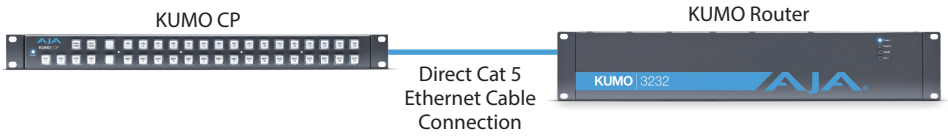
Quick Start Configuration

Default Auto Configure KUMO Router and Control Panel

If you purchased a KUMO control panel along with a KUMO router, the easiest way to get your system operating is to simply direct connect them with a single Ethernet cable and power up both units.

KUMO devices are compatible with both Cat 5 straight-through and cross-over Ethernet cables. The KUMO CP will use an Auto Configure function to set itself up to operate with the KUMO router it is directly connected to. The KUMO CP panel buttons will light and, if SDI BNC connections have been made, you will be able to route Sources to Destinations.

Figure 4. KUMO Router Direct Connection to KUMO CP



The KUMO CP Auto Configure assigns Router Select Button 1 to the attached router.

NOTE: A KUMO CP that has had its network settings configured previously will not use automatic configuration to find a directly connected KUMO router. However, you can force the KUMO CP to enter into Auto Configuration Mode by pressing the **RTR 1** *and* **SHIFT DEST** *buttons simultaneously for four seconds.*

DHCP on an Existing Network

NOTE: KUMO devices are shipped from the factory with DHCP configured by default.

An easy way to get your new KUMO routers configured on your network is to simply connect them to an existing network with a DHCP server. When the KUMO devices reset during power up, each KUMO will see the DHCP server and automatically be given compatible IP network settings. If auto discovery is configured on a computer on that network, that computer will be able to find and control the KUMO router via a web browser (see below).

Computer Auto Discovery

Computers can support network auto discovery, which makes the network configuration process easy. Two methods of connecting using this technique are described below.

Older macOS Configuration with Safari Browser Using Bonjour

MacOS Safari browser versions 10 and earlier have Bonjour functionality built-in, which can be used to auto-detect and connect to an Ethernet device like a KUMO Router.

NOTE: Apple removed Bonjour support from Safari versions 11 and higher.

To find a KUMO router using Bonjour on a supported version of Safari:

1. Ensure the KUMO to be controlled is powered up and connected via Ethernet (directly to a Mac or via LAN).
2. Start Safari browser on a Mac.
3. Click on the top menu Bookmark->Bonjour->Webpages drop-down and click on a listed AJA KUMO router or control panel.

NOTE: If Bonjour is not visible in the Bookmark drop-down, go to Safari->Preferences->Advanced and check the "Include Bonjour in the Bookmarks menu" checkbox.

4. Safari will display the KUMO web user-interface, which you can use to control and configure that KUMO device.

Windows PC Configuration using UPnP

If your Windows PC supports UPnP protocols (most do) and UPnP network discovery service is enabled (refer to your Microsoft Windows documentation), you can control KUMO routers by simply selecting one from a device list:

1. Ensure the KUMO to be controlled is powered up and connected via Ethernet (directly to the PC or via LAN).
2. Use your Windows Control Panel or File Explorer to go to Computer->Network.
3. Look at the list under "Other Devices"—double click a KUMO's name to launch your Windows PC's default browser.
4. The browser will display the KUMO web user-interface, which you can use to control and configure that KUMO device.

Network Configuration via USB

KUMO devices equipped with USB ports can configured for network operation using AJA's eMini-Setup utility program. The general procedure is:

1. Acquire eMini-Setup from the AJA website and install the eMini-Setup application onto a computer.
2. Connect the KUMO USB port to that computer's USB port with the supplied USB cable.
3. Launch the eMini-Setup application.
4. Go to the Network tab where the IP address settings are displayed. You can use the existing DHCP assigned IP address, or it can be changed manually.

See *"Chapter 5 eMini-Setup" on page 66* for additional information.

KUMO Temporary Static IP Address

KUMO devices also offer a hardware initiated factory default static IP address, allowing a direct and fail-safe way to connect via a computer connected to KUMO either directly or via a LAN connection. The computer you use will need to be set to a static IP address that is compatible with the KUMO temporary IP address. Once connected, the KUMO device's network settings can be reconfigured to work with your facility network. The KUMO default static IP address is temporary and is intended only to allow an initial connection.

NOTE: All KUMO routers and control panels have the same temporary static IP address, so more than one device set to this default cannot reside on the same network simultaneously. Work with only one device at a time.

Table 1. KUMO Device Temporary Static IP Address Values

Device	IP address	Subnet Mask
KUMO Router and KUMO CP	192.168.101.1	255.255.255.0

NOTE: The default static address is temporary and will be disabled the next time KUMO restarts. Any changes in the Network configuration will be saved upon restart.

To set KUMO to its temporary static IP address:

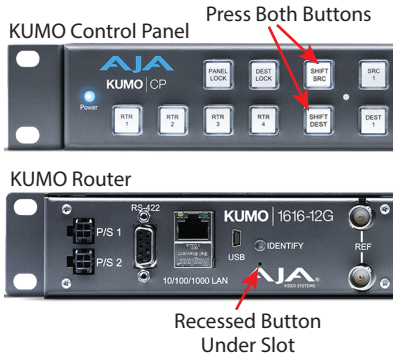
1. Power up the KUMO device and wait for it to boot normally.
2. Set the KUMO device to its static IP address:
   - For a KUMO router, insert a straightened paper clip or similar device into the reset slot on the rear and hold for five seconds and then release. The KUMO

will restart with the default IP. When the KUMO router default IP is set the Identify LED will blink.

- For a KUMO CP/CP2, press and hold the **SHIFT SRC** and **SHIFT DEST** buttons on the panel for five seconds and then release. When the KUMO CP default IP is set, the Source and Destination buttons will flash alternately.

NOTE: If a KUMO webpage on a computer is open when that KUMO device is reset, the information displayed on the webpage is not updated automatically.

Figure 5. KUMO Router and KUMO CP Default Static IP Setting



IMPORTANT: Be sure to record your computer's existing TCP/IP settings before the next step so that you can return the computer to normal operation after this procedure.

3. Configure your computer to 192.168.101.X. Do not use .1 at the end of the address to avoid duplicate IP addresses.
4. Start a web browser and enter 192.168.101.1 as the web address. This is the KUMO temporary static IP address.
5. Once you've connected using the static IP, you can then enter a desired network configuration using the KUMO device's NETWORK tab.

Network Configuration In Depth

A LAN is a shared network that includes other Ethernet devices all attached via a hub or digital switch. LANs may be divided into zones separated by software or hardware routers. Routers may also be used to connect the LAN to an outside wide area network (WAN) such as the Internet. Devices on a LAN have IP addresses which may be fixed and permanent, or dynamically assigned by the network (DHCP with DNS server).

NOTE: Once connected and properly configured, the KUMO router can then be controlled by a web browser or one or more KUMO CP control panels. KUMO and KUMO CP are equipped with zeroconf (Bonjour) and support UPnP networking protocols but initially start up as DHCP active devices. If you are operating on a DHCP server, KUMO will take an assigned IP address and appear on the network.

CAUTION: *When attaching KUMO to a standard static IP LAN, you must configure KUMO components with a new, unique IP address. You should first talk to your network administrator and find out how it should be connected (TCP/IP Static IP or DHCP). Your IT department will be able to supply the information you need to install KUMO on a LAN*

KUMO uses TCP/IP network communications and Ethernet connections (a 10/100/1000 Ethernet port) for crosspoint control, status monitoring, and software updates. KUMO devices have an internal HTTP web server that works with a standard web browser on a Mac or PC. An Ethernet cable can also be used to connect an optional KUMO CP (control panel) directly to a KUMO router for operation without a computer.

KUMO devices are compatible with both Cat 5 straight-through and cross-over Ethernet cables—they automatically detect whichever is used.

KUMO's internal HTTP networking software supports three levels of network control:

- Closed KUMO network – uses Default Auto Configure (KUMO CP), or Bonjour (Mac or PC).
- Auto Configured LAN – employs a Bonjour or UPnP enabled computer/ browser to automatically connect devices and enables the KUMO WebUI.
- Standard TCP/IP network – employs DHCP or Static IP addressing and allows the KUMO web-based UI and an unlimited number of KUMO routers and up to 32 KUMO CP control points.

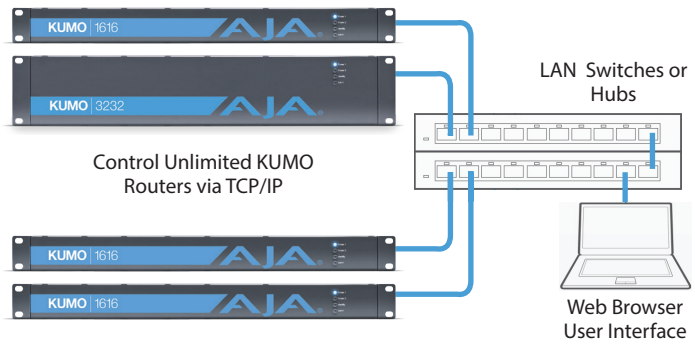
Once connected, you can use a web browser to:

- Configure any TCP/IP settings
- Select and name KUMO routers and control panels
- Assign a KUMO panel to be able to control specific KUMO routers
- Name Sources and Destinations
- Make Source to Destination assignments (signal routing)
- Change router operating mode (Normal, Dual Mode, Quad Mode)
- Set a variety of operational and monitoring options

LAN Connection Using a Hub or Switch

In a LAN connection, connect one or more KUMO routers to your LAN or closed network using Cat 5 Ethernet cable and an Ethernet hub or switch; then power up the equipment.

Figure 6. KUMO Routers on LAN with Web Browser UI



Setup and Control Methods

Regardless of direct connection or LAN connection, KUMOs can be controlled over a network by connecting to KUMO's internal web server with a standard web browser on a Mac or PC. To do this you first need to establish a network connection between the computer and the KUMO to be controlled. There are various methods supported for doing this depending on the operating system and/or web browser being used.

When using KUMO in a DHCP or Static IP addressed network, it is best to select and maintain a consistent network scheme. If you use a mix of DHCP and Static IP addresses, inconsistent performance can result. The most stable operation is achieved when all IP addressing is either DHCP or Static.

Setup and Control from a Browser on macOS

Safari Browser: Type in KUMO Static IP Address

KUMO offers a factory default static IP address. The default static IP address is temporary and is intended only to allow an initial connection. Once you've connected using the static IP, you can then change that KUMO's IP address to one compatible with your network, using KUMO's NETWORK tab.

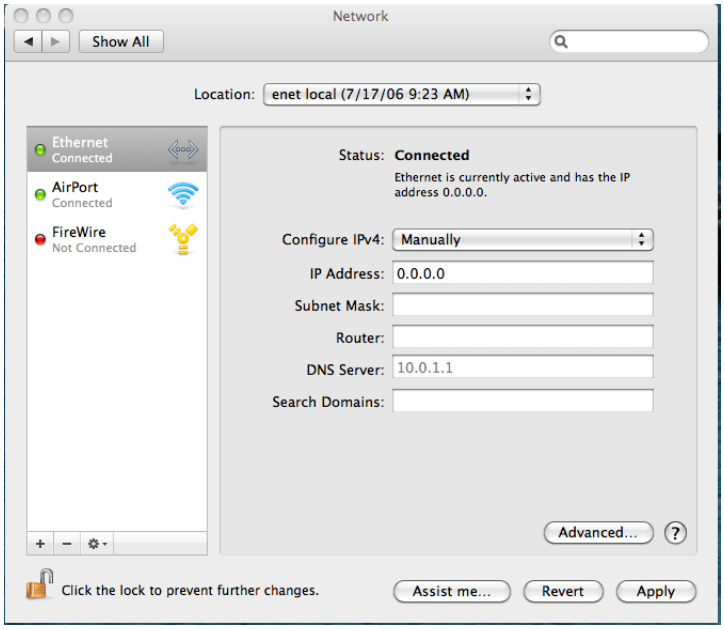
NOTE: The default static address is temporary and will be disabled the next time KUMO restarts. Any changes in the Network configuration will be saved upon restart.

1. Set the KUMO to its factory default IP address. See *"KUMO Temporary Static IP Address" on page 15* for this procedure.
2. Configure your computer to communicate on the 192.168.101.X subnet as shown below:

IMPORTANT: First record existing TCP/IP settings so that you can return your computer to normal operation after this procedure.

A. Go to your System Preferences>Network and select Ethernet and Configure: Manually.

Figure 7. Mac Network Setup Screen (System Preferences -> Network)



B. Input the address information shown below:
   - IP Address: 192.168.101.X (do not use .1 in the last octet).
   - Subnet Mask: 255.255.255.0

C. Click Apply.

3. Ensure the KUMO device to be controlled is connected to the Mac via Ethernet (directly or via LAN).

4. Start Safari and enter 192.168.101.1 as the web address. This is the KUMO temporary static IP address.
5. Once you've connected to KUMO's web interface, reconfigure KUMO's network parameters as desired using the KUMO device's NETWORK tab.
6. Restore your computer to its normal network settings using this procedure and the IP addresses you recorded earlier.

Setup and Control from a Browser on Windows

The easiest methods of setting up a controlling a KUMO device from a PC running Windows are:

- Setup and Control from a Browser on Windows using UPnP
- Setup and Control from a Browser on Windows using a Static IP Address

Windows: Using UPnP (Universal Plug and Play)

This method was covered earlier in this chapter.

See *"Windows PC Configuration using UPnP" on page 15*.

Windows Browser: Type in KUMO Static IP Address

KUMO offers a factory default static IP address. The default static IP address is temporary and is intended only to allow an initial connection. Once you've connected using the static IP, you can then enter a desired network configuration using KUMO's NETWORK tab.

NOTE: The default static address is temporary and will be disabled the next time KUMO restarts. Any changes in the Network configuration will be saved upon restart.

1. Set the KUMO to its factory default IP address, using the rear Reset button (KUMO Router) or SHIFT Buttons (KUMO CP). See *"KUMO Temporary Static IP Address" on page 15* for this procedure.
2. Configure your computer's IP address and Subnet Mask using the standard Windows IP configuration steps appropriate for your installed Windows version.

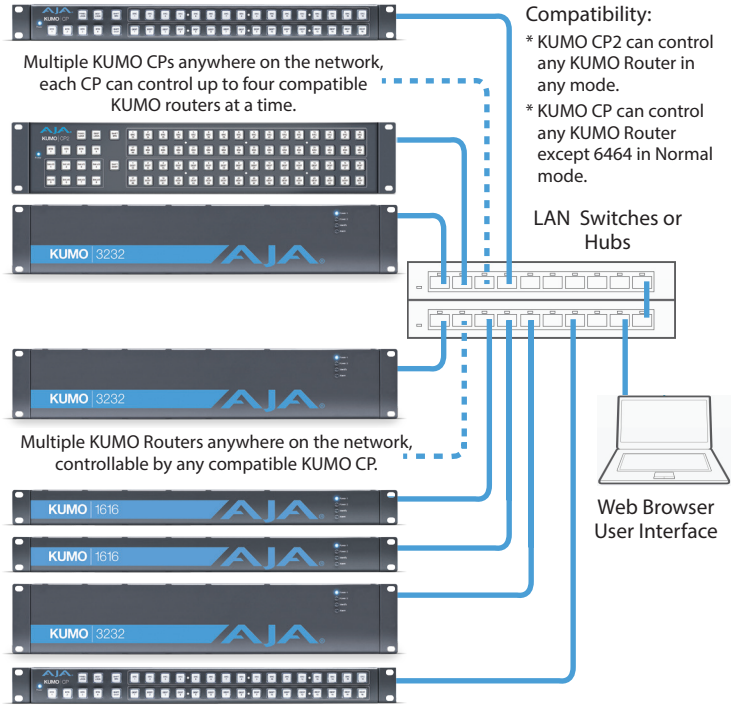
IMPORTANT: Record your computer's existing TCP/IP settings. You will later need to restore these original settings so that you can return your computer to normal operation after this procedure.

- IP Address: 192.168.101.X (do not use .1 in the last octet)
- Subnet Mask: 255.255.255.0

3. Connect the Windows PC to KUMO's RJ-45 port (either direct or through your LAN)
4. Point your web browser to 192.168.101.1 as the web address. This is the KUMO temporary static IP address.
5. Once you've connected to KUMO's web interface, reconfigure KUMO's network parameters as desired using the KUMO device's NETWORK tab.
6. Restore your computer to its normal network settings using this procedure and the IP addresses you recorded earlier.

Larger System Control Configurations

Figure 8. Multiple KUMO Routers and KUMO CPs with Web Browser UI Control.



NOTE: The 32 button KUMO CP hardware Control Panel can be used with a KUMO 6464 router operating in Normal mode, but can only control the first 32 Sources and Destinations. The KUMO CP can be used to fully control a KUMO 6464 that is operating in Dual or Quad mode. Control of the KUMO 6464 router in all modes is available via the KUMO CP2 64 button hardware panel, WebUI, Ethernet control, and RS-422.

If the KUMO will be attached to a WAN, talk to your IT administrator and obtain the details on how to configure the KUMO (DHCP or static IP).

TCP/IP Network Connection

KUMO supports traditional TCP/IP networking through DHCP or Static IP addressing.

IMPORTANT: When using KUMO in a DHCP or Static IP addressed network, it is best to select and maintain a consistent network scheme. If a mixture of DHCP and Static IP addresses are used, inconsistent performance can result. The most stable operation is achieved when all IP addressing is either DHCP or Static.

Default DHCP Configuration

DHCP is the default initial configuration routine for KUMO devices. If you start up on a DHCP network, KUMO will accept assigned IP addresses. After DHCP initialization, use your zeroconf browser to view the KUMO web page and view the assigned IP address.

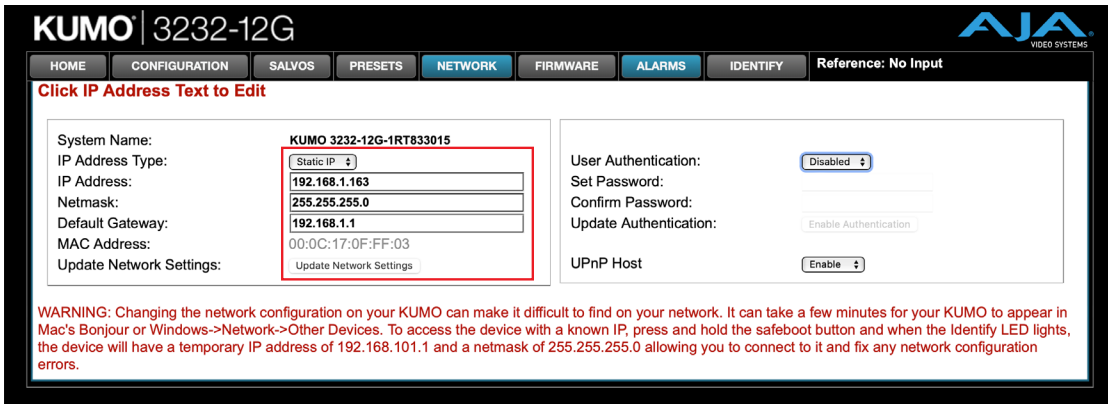
Static IP Configuration

If your IT administrator prefers an assigned IP address that is fixed (called a “Static IP), you will need to set network parameters using the KUMO UI NETWORK Screen where you will enter:

- IP address type—Static IP
- A unique IP address
- The Netmask and Default Gateway IP address (your LAN’s router that does the network's routing)

You will need to press the Enter key on the keyboard for every field changed. Press the **Update Network Settings** button when all fields are complete.

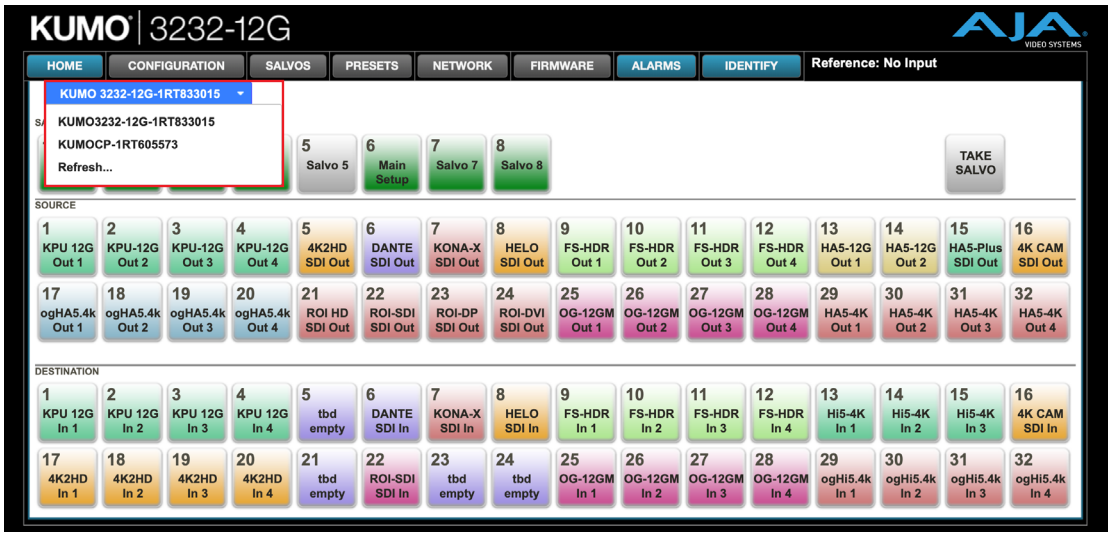
Figure 9. KUMO 3232-12G User Interface Network Tab



Select KUMO Device to Control in WebUI

Each KUMO device has a built in web server that generates a web page, or "WebUI". KUMO devices see each other on the network and list those other KUMO devices in their WebUI. From the HOME Screen, use the pulldown menu in the upper left to see all of the KUMO devices present on the local LAN and select the router you want to control, or select the KUMO CP you want to use.

Figure 10. KUMO Device Selection



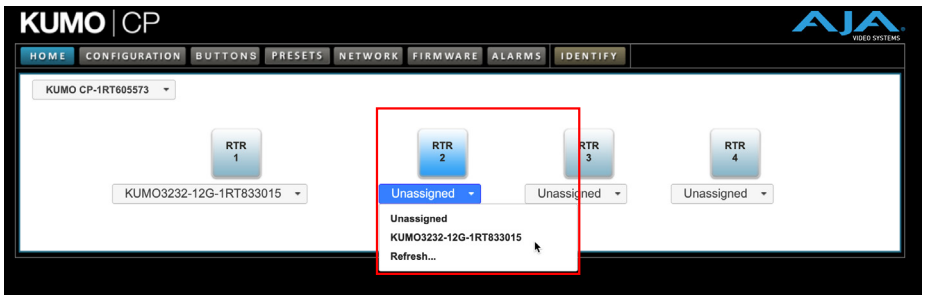
Assign KUMO CP and CP2 to Control KUMO Routers

With multiple KUMO routers and KUMO control panels on the same network, you can assign which routers are able to be controlled by a control panel by configuring the four Router Select buttons located on the front of the panel.

Figure 11. KUMO CP Front Panel Router Select Buttons

On the KUMO control panel WebUI, go to the HOME Screen, click on the box below the RTR button, and select the KUMO router from the drop-down list.

Figure 12. KUMO CP WebUI Router Button Assignment



Identify a Specific KUMO Device on the Network

IDENTIFY Tab

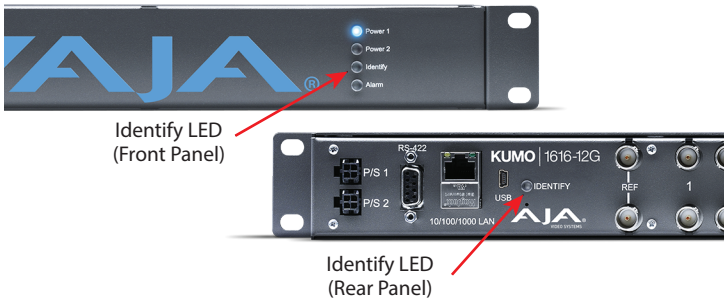
Click on the **IDENTIFY** tab to find the physical location of the currently controlled KUMO router or control panel.

Figure 13. KUMO 3232-12G (click to activate Identify LEDs)

The WebUI IDENTIFY tab will alternate between blue and gray background color in Identify mode. Click again to turn the Identify function off.

- On a KUMO router, the Identify LEDs on both the front and back will flash, enabling quick physical location of the router in a populated rack of equipment.

Figure 14. KUMO Router Identify LEDs



- On a KUMO Control Panel (CP), the Identify LED on the back panel will flash, and the Source and Destination button rows on the CP front panel will flash alternately.

Figure 15. KUMO CP Identify LED on rear panel

Chapter 3 – KUMO Routers & WebUI

Router WebUI

An optimized web server inside the KUMO Router allows you to remotely monitor and adjust parameter settings via a network-attached computer running a web browser.

Figure 16. KUMO WebUI HOME Screen

In this chapter a KUMO 3232-12G is used as the WebUI example. Other AJA router models such as KUMO 1616-12G or KUMO 6464-12G will have different numbers of buttons in the WebUI corresponding to their respective different numbers of SDI signal connections. However, they will all otherwise operate in the exact same way (provided the same KUMO firmware version is installed).

Router Navigation Bar

The KUMO WebUI provides a navigational bar of tabs for access to control screens and the Identify feature:

- HOME – control surface tab for salvo/Source/Destination selections
- CONFIGURATION – custom naming for Sources and Destinations, Destination lock control, and mode selection
- SALVOS – Salvo configuration
- PRESETS - Store/Recall/Import/Export/Erase KUMO parameters
- NETWORK – IP settings for LAN/WAN operation and enabling authentication
- FIRMWARE – update menu for KUMO firmware from AJA
- ALARMS – log of service failures and allows alarms to be suppressed
- IDENTIFY – activates the Identify LEDs for easy location of a KUMO hardware device (especially when many devices are used)

Figure 17. KUMO Navigation Bar

Click any of the first seven tabs to jump to that screen. To the right of the IDENTIFY tab you will see the format of the Reference Video signal being used (if present).

NOTE: *Depending upon the nature and extent of advance planning and backups, use of the KUMO Presets feature can be used restore at least some of the buttons after their being reset by a change in switching mode (as well as the saved Crosspoint Matrix). See .*

Router HOME Screen

Device Selection

From the HOME Screen (*Figure 18 on page 25*), you can use the pulldown menu in the upper left to see all of the KUMO devices present on the local LAN and select the one you want to control or monitor.

Figure 18. KUMO WebUI Home Screen showing Select Device menu

HOME Screen Controls

On the HOME screen (or Tab) immediately below the KUMO selection menu are the Salvo buttons, below them the Source (input) buttons, and below them the Destination (output) buttons.

Figure 19. KUMO WebUI Home Screen showing a Take

NOTE: *Using the CONFIGURATION Tab, you can hide Destination buttons that you do not want to control from this screen (see "Hide" on page 30).*

Performing a Take

Clicking on any Destination button will highlight it, and its currently assigned Source button will also be highlighted. In the example shown above, the FS-HDR destination is assigned to a 4K Camera Source. See *"KUMO WebUI Home Screen showing a Take" on page 25.*

NOTE: A WebUI button "highlight" is a somewhat subtle shift of the "shine" in white (from top to center of the button), while that button's "drop-shadow" slightly darkens.

1. Select the router you wish to control with the device drop down menu (if not already selected).
2. Press the desired Destination button. It will illuminate (highlight). Notice there may be a Source button (other than your desired source), already highlighted (due to a previous action such as Take, Salvo Take or Load Preset).
3. Press the desired Source button. When you do so, any previous Source assignment (if any) will end and that button un-highlighted. The Source will be routed to the selected Destination and the new Source button will also illuminate (highlight).

NOTE: Sources for locked Destinations cannot be changed without first unlocking.

Control Panel and WebUI Button Sync

If you perform a Take using the physical buttons on a linked KUMO Control Panel, you will see the virtual buttons in the linked Router WebUI highlight to match the button Take.

Similarly after you perform a Take in the WebUI, when you choose the same Destination button on a linked KUMO CP, the corresponding Source as chosen and highlighted in the WebUI will light the corresponding CP button.

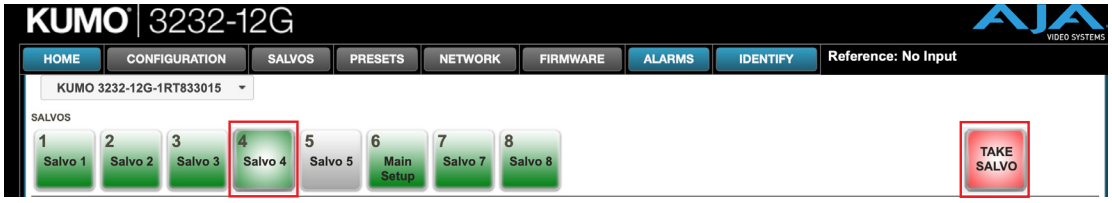
Taking a Salvo

Up to eight salvos can be configured on a KUMO router. Each salvo can route any number of Sources to any number of Destinations, including the same Source to multiple Destinations. Paths not included in a salvo remain unchanged. Configured Salvo buttons are colored green on the HOME Screen. See *"Router SALVOS Screen" on page 30* to learn how to configure salvos.

Performing a Salvo Take is a two-stage process. First you arm the salvo (select which one), and then you Take the salvo.

1. Go to the KUMO router HOME Screen and select the router you wish to control with the drop down menu (if not already selected).
2. Press the desired configured Salvo button. The TAKE SALVO button on the right will be colored red.
3. Press the **TAKE SALVO** button. All Sources configured in that Salvo # will be routed to their Destinations.

Figure 20. Performing a Salvo Take



NOTE: Salvos do not change locked Destinations.

NOTE: For detailed information about how a Salvo Take affects a current router switching Crosspoint Matrix, see "Example Salvo Takes: Before and After Crosspoint Matrix" on page 33.

Router CONFIGURATION Screen

From the CONFIGURATION screen you can select the operating mode (Normal, Dual, Quad), change the Source and Destination names and the colors of the buttons, as well as Lock/Unlock and Hide/Unhide Destination buttons.

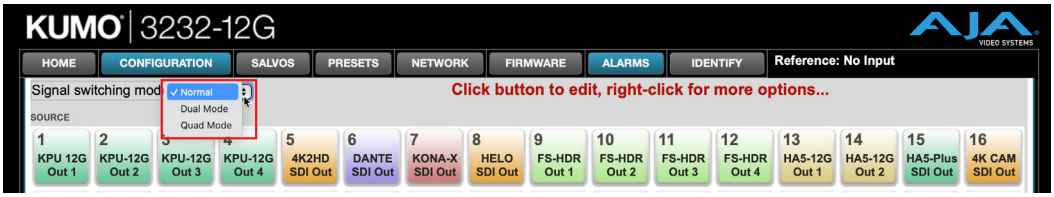
Select Signal Switching Mode

Click on the **Signal switching mode** drop down list to select Normal, Dual, or Quad operating mode. When Dual or Quad mode is selected, the number of Source and Destination buttons will be reduced to match that configuration.

IMPORTANT: Changing the router configuration operating mode (Normal, Dual, or Quad) resets the KUMO 6464-12G Long Cable settings. See "Long Cable (KUMO 6464-12G model only)" on page 30.

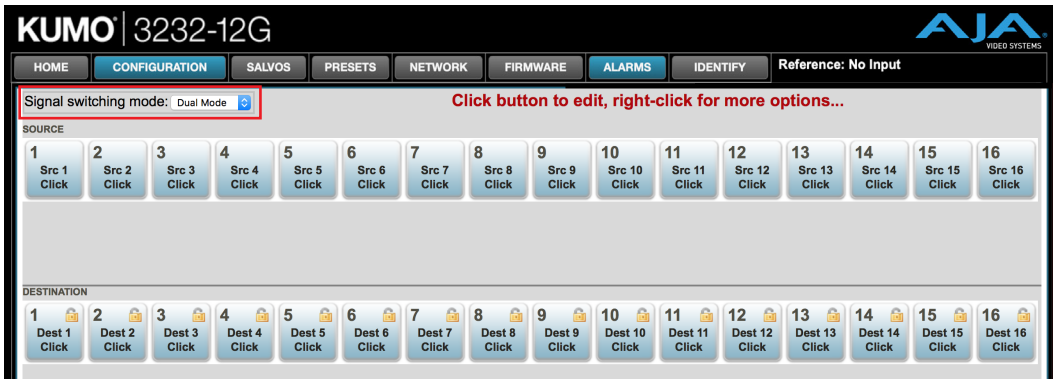
IMPORTANT: If you had previously configured the buttons (text, color, etc.), when you first select either Dual or Quad switching mode, those button setups will be reset and replaced with the factory defaults for Dual or Quad Mode respectively.

Figure 21. KUMO 3232-12G CONFIGURATION Tab Select Switching Mode



Mode Selection

Figure 22. KUMO 3232-12G Dual Mode Reduced Sources and Destinations



For the Dual switching mode to work as expected, BNC connectors must be cabled using the Dual switching scheme as shown below:

Figure 23. KUMO 3232-12G (Rear Panel) Dual Mode SDI Connector Groups

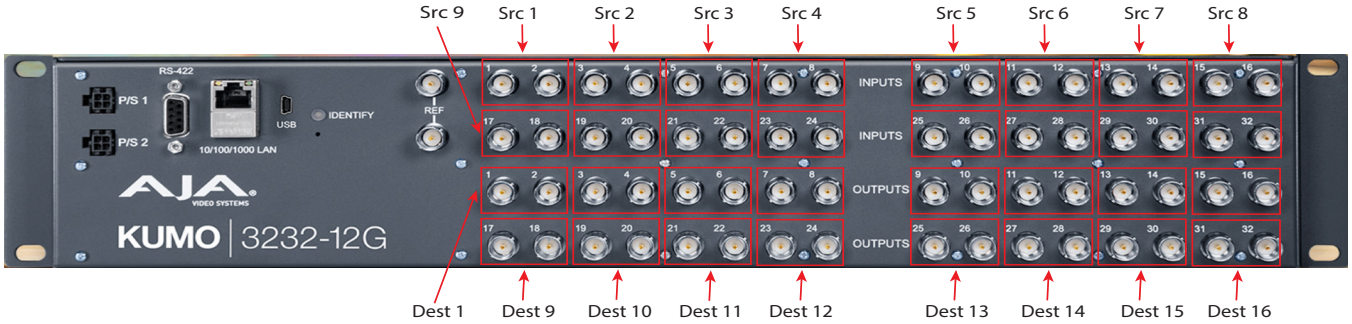


Figure 24. KUMO 3232-12G Quad Mode Reduced Sources and Destinations

For the Quad switching mode to work as expected, BNC connectors must be cabled using the Quad Switching cable scheme as shown below:

Figure 25. KUMO 3232-12G (Rear Panel) Quad Mode SDI Connector Groups

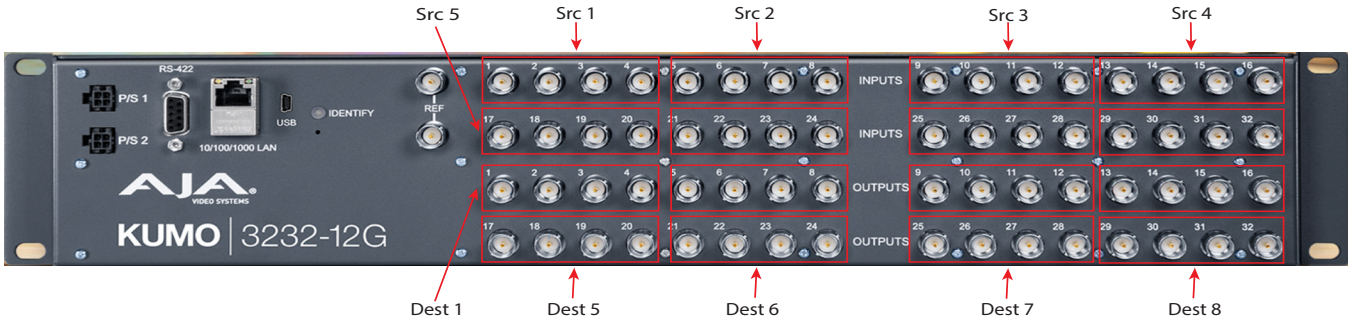


Table 2. Dual and Quad Mode BNC Connectors and Signal

Dual Mode					**Quad Mode**	
BNC #	**Signal**	**BNC #**	**Signal**		**BNC #**	**Signal**
1-2	1	33-34	17		1-4	1
3-4	2	35-36	18		5-8	2
5-6	3	37-38	19		9-12	3
7-8	4	39-40	20		13-16	4
9-10	5	41-42	21		17-20	5
11-12	6	43-44	22		21-24	6
13-14	7	45-46	23		25-28	7

Dual Mode					Quad Mode	
BNC #	**Signal**	**BNC #**	**Signal**		**BNC #**	**Signal**
15-16	8	47-48	24		29-32	8
17-18	9	49-50	25		33-36	9
19-20	10	51-52	26		37-40	10
21-22	11	53-54	27		41-44	11
23-24	12	55-56	28		45-48	12
25-26	13	57-58	29		49-52	13
27-28	14	59-60	30		53-56	14
29-30	15	61-22	31		57-60	15
31-32	16	63-64	32		61-64	16

Button Settings

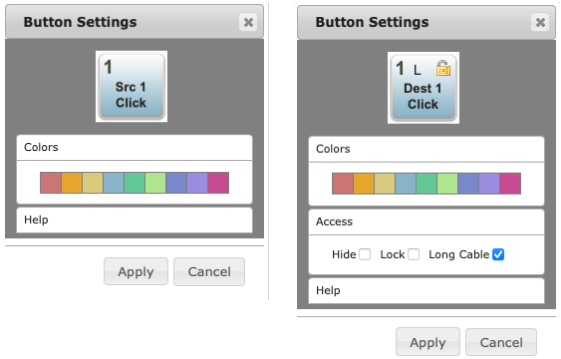
In the Configuration screen you can click on any button to access the Button Settings panel. In the panel, assign a custom name and button color. For Destinations, access settings are also available.

Click on the **Apply** button to commit your changes, or **Cancel** to exit the pane without making any changes.

Color Settings

The colored boxes allows you to pick a color from the settings panel to color code the button backgrounds. The selected color is set for both the static state color and the High Tally (rollover/active) state.

Figure 26. Source and Destination Button Color Settings



Access Settings

Access settings permit you to hide or lock individual Destinations. On KUMO 6464-12G routers individual Destination's cable length can also be specified up to serial # 1RT900545. Any KUMO 6464-12G starting at serial# 1RT901000 and higher will automatically manage cable length.

Figure 27. Button Access Settings

Hide

You can hide selected Destinations from display on the HOME Screen by activating the Hide box. This setting applies only to the local browser.

Lock

If you want to lock any of the Destinations from Source changes, activate the Lock box for the desired Destination.

NOTE: This lock is a universal lock for all KUMO devices controlling the selected Destination. It is tallied throughout the network and can be released from other KUMO control devices on the network.

Long Cable (KUMO 6464-12G model only)

IMPORTANT: The Long Cable setting only applies to KUMO 6464-12G model up to serial # 1RT900545. Serial #s 1RT901000 and higher automatically adjust for cable lengths and this setting is not utilized.

For the KUMO 6464-12G with serial # up to 1RT900545, the additional SDI output setting increases interoperability with downstream equipment when short output cables are used. The setting is available for each individual output. The default setting is L (for long cable) and can be set to S (for short cable), which may improve performance when the output cable is 10m or less of Belden 1694A or equivalent.

NOTE: Changing the router configuration operating mode (Normal, Dual, or Quad) resets the KUMO 6464-12G Long Cable settings. These settings will need to be manually re-configured to match the actual cable lengths used by each output port in the new operating mode.

Reset to Factory Defaults

The "Reset to Factory Defaults" button can be used to return all router user settings to factory defaults.

Router SALVOS Screen

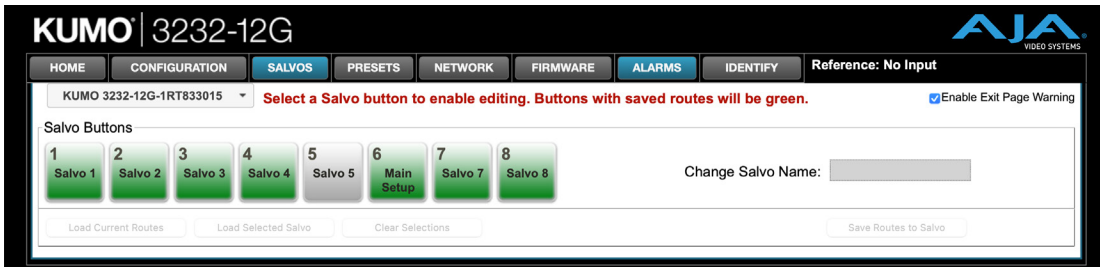
Salvos Configuration

The SALVOS Screen lets you configure up to eight Salvos for the selected KUMO router. Each Salvo can route any number of Sources to any number of Destinations in the Router, including the same Source to multiple Destinations.

NOTE: Crosspoints not included in a Salvo remain unchanged after that Salvo Take.

When you first select the Salvo screen the eight Salvo buttons are shown. Buttons with currently configured Salvos are colored green.

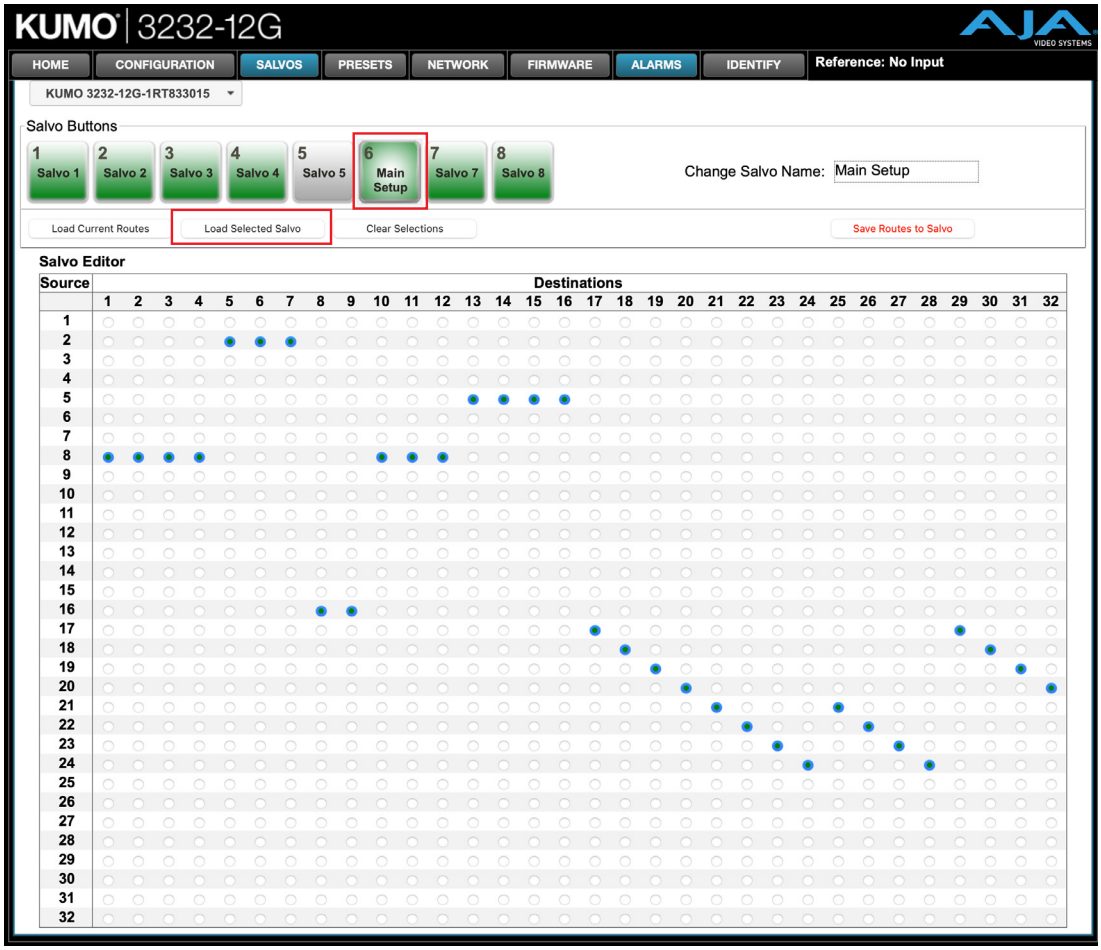
Figure 28. Initial (collapsed) KUMO Salvos Screen



If the SALVOS Tab is not expanded to show the Salvo Editor matrix, then click on any Salvo button to expand the Screen. The Salvo Editor appears below the Salvo buttons. Sources are listed vertically and Destinations are listed horizontally.

A Salvo is configured by clicking on whichever desired Source/Destination Crosspoint toggles.

Figure 29. KUMO Salvos Screen with Router Table in the Salvo Editor



Salvo Select Buttons

At the top of the Salvos screen are eight Salvo select buttons. Configured buttons are colored green, and the button for the currently selected salvo is highlighted.

Clicking on one of the eight **Salvo Select** buttons selects that Salvo for configuration. The next step is typically to click **Load Selected Salvo** for editing.

Enable Exit Page Warning

Click the **Enable Exit Page Warning** checkbox to enable/disable the display of a warning message appearing before you leave the SALVO configuration screen without first Saving.

Change Salvo Name

You can enter a name into this field for the selected salvo.

NOTE: Salvo names should be unique.

Load Current Routes

Click to load the current KUMO crosspoint status into the table below. All crosspoints that have been set will be displayed.

Click **Load Current Routes** to show the Routers currently active switching Matrix.

Load Selected Salvo

Click to clear any current configuration from the router table and load the crosspoint paths from the currently selected salvo into the table.

Clicking **Load Selected Salvo** button loads the Salvo Crosspoints into the Salvo Editor in the WebUI.

Clear Selections

Click to clear all the paths from the router table.

Save Routes To Salvo

After configuration, click on this button to save the selected salvo.

NOTE: If you leave the page without first saving, all the changes made to the selected Salvo in the Salvo Editor will be lost.

IMPORTANT: There is no change in the KUMO Router's active switching Matrix until a **Take** *or a* **Salvo Take** *action is made on the HOME Page (or using a linked CP button). Loading, Editing and Saving Salvos on the Salvos Tab Screen alone, makes no changes in the Router's active signal routing configuration.*

Salvo Configuration Procedure

1. Go to the KUMO router HOME Screen and select the router you wish to control with the drop down menu (if not already selected).
2. Go to the Salvos screen and select the **Salvo** to be configured.
3. If you want to edit the name of the **Salvo**, click on its name in the field on the right, type in a new unique name, and press the Enter key to save the name. Clicking outside the field will undo any typed changes.
4. Edit the routing matrix as desired, according to the equipment connected and their intended uses. **Sources** are listed vertically, and **Destinations** listed horizontally.

- Clicking on any individual Crosspoint in the Matrix sets that Source-to-Destination route.
- Clicking on the empty box below the left Source column header creates a one to one (diagonal) salvo in the router table.
- Clicking on any Source number applies that same Source to all the Destinations.

Some important "rules" governing how a **Salvo Take** is applied to a current routing matrix may be summarized as follows:

- No **Destination** can have more than one **Source** routed to it at the same time;
- A given **Source** can be routed to any number of **Destinations**; and
- Unassigned i.e. "empty" routing Crosspoints in a Salvo Take do not replace or overtake (i.e. "erase") Crosspoints with preexisting Source/Destination assignments.

5. Click the **Save Routes To Salvo** button to save the current router table to that salvo.

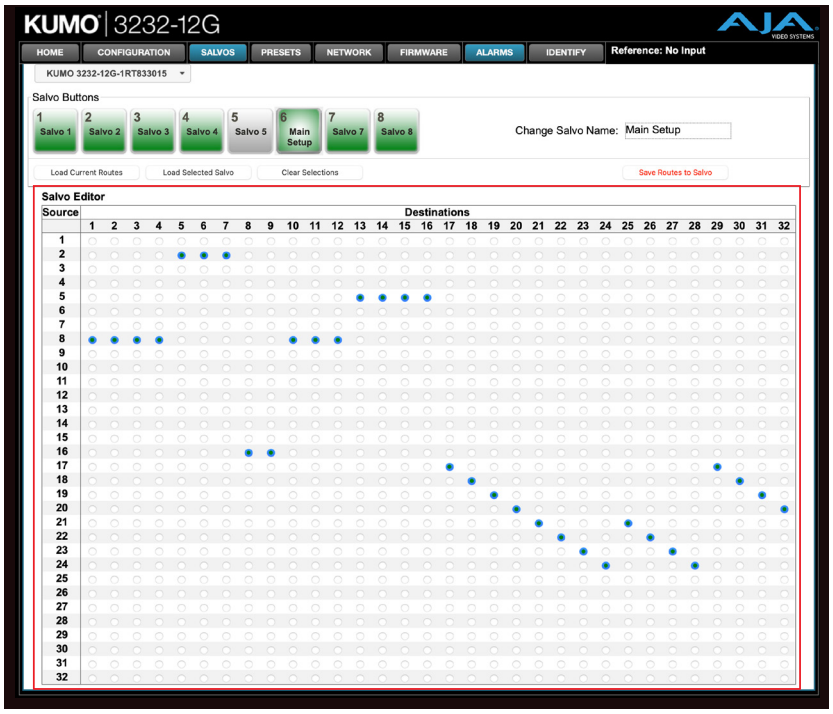
Example Salvo Takes: Before and After Crosspoint Matrix

To illustrate how a **Salvo Take** affects the Crosspoint Matrix, we provide the following scenario. Starting from a typical set of Source/Destination Crosspoints in a KUMO 3232 Router, we progressively apply a series of four simple Salvo Takes: Salvos #1-#4.

We will examine the resulting Crosspoint Matrix after each Salvo Take. Our example is designed to illustrate how a Salvo Take "overtakes" or "merges" its designated Crosspoints into an existing active Crosspoint Matrix, as a result of the Salvo Take rules. By illustrating the 'before' and 'after' state of the graphical Crosspoint Matrix through the several Takes, by way of example the implications of using Salvos should be made clear.

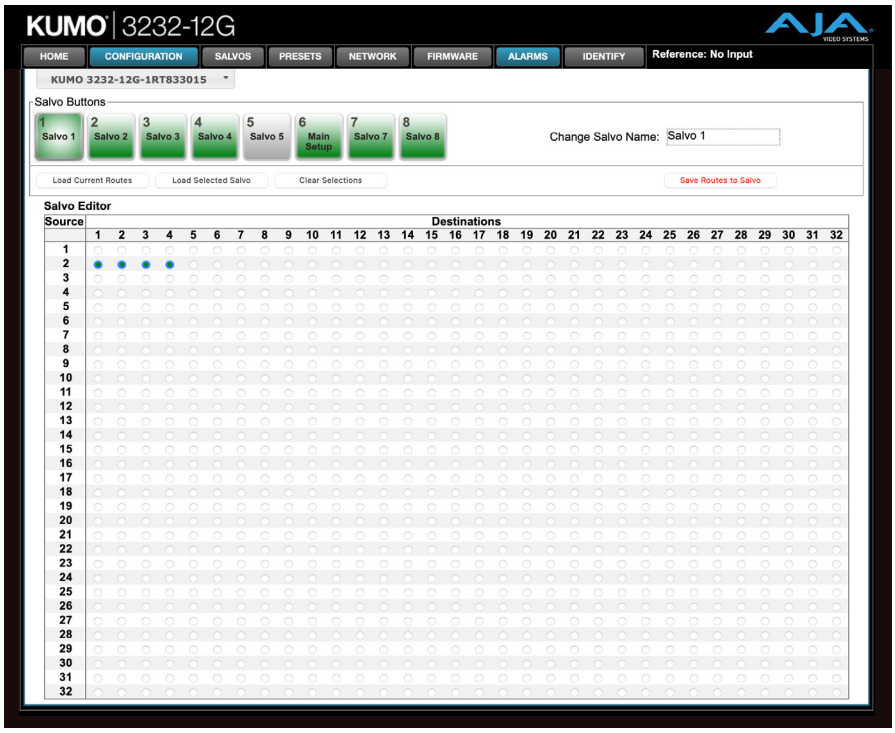
Below we show a typical state of routing connections for a KUMO 3232-12G router having a mix of several different kinds of connected equipment. The nature of the particular attached equipment does not need to be considered for us to benefit from the example, (presuming they all meet KUMO compatibility specifications). We do assume that the Router is operating in Single Switching Mode, and is not operating in either the Dual or Quad Mode of switching.

Figure 30. KUMO Router showing Loaded Current Routes in Salvo Editor



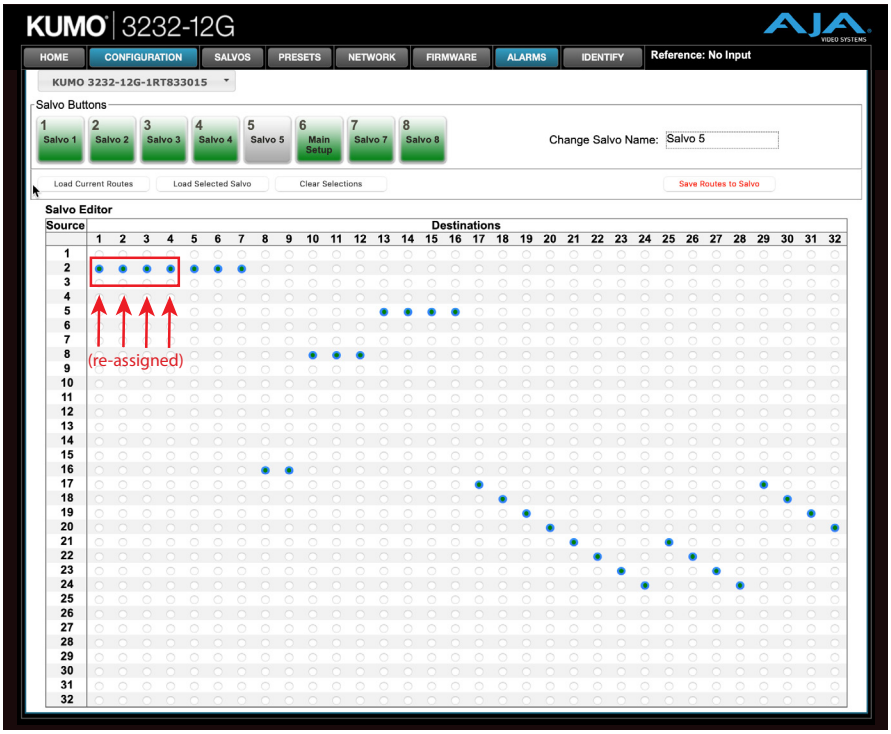
Below we show the example Salvo 1, a simple case of four destinations from Source 2.

Figure 31. Salvo 1 Example



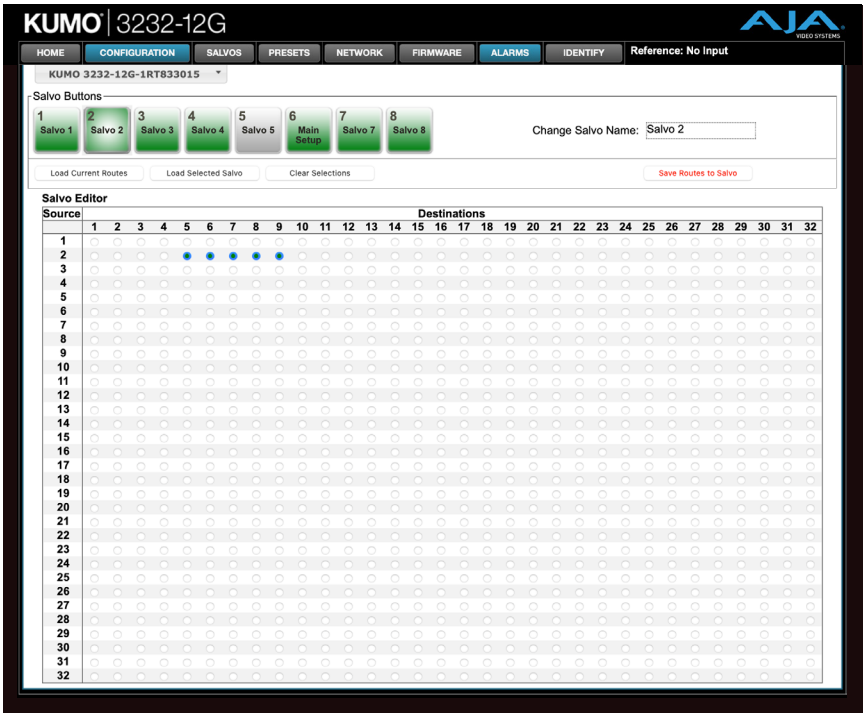
Below we show the result of this Salvo 1 Take, over the starting connections. Notice how all four of the previous Source 8 Destinations were overtaken by the Salvo 1 reassignment of connections from Source 2.

Figure 32. Result of Salvo 1 Take over example starting connections



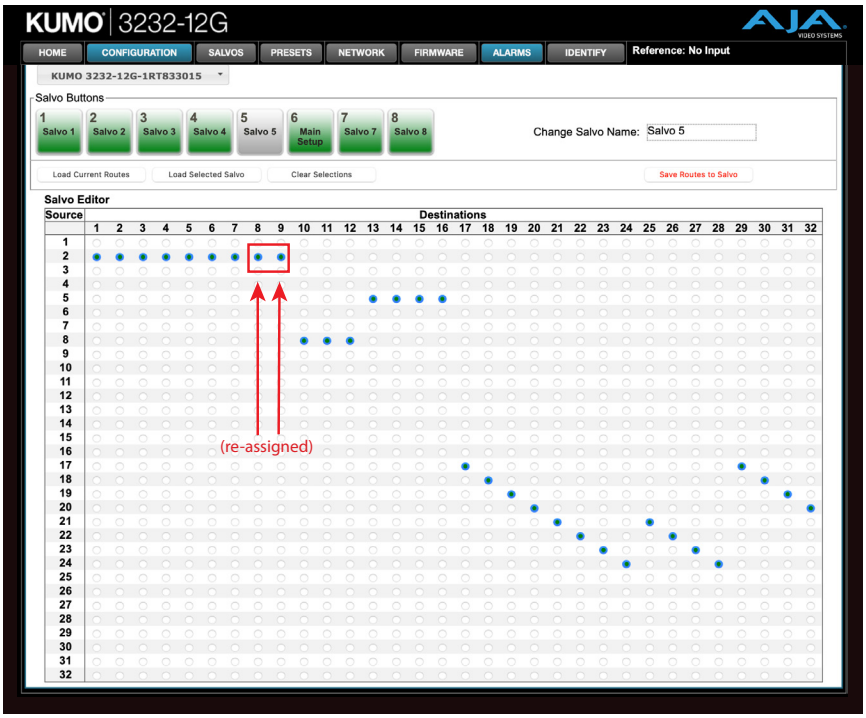
Below we show an example Salvo 2, a simple case of five destinations all from Source 2.

Figure 33. Salvo 2 Example



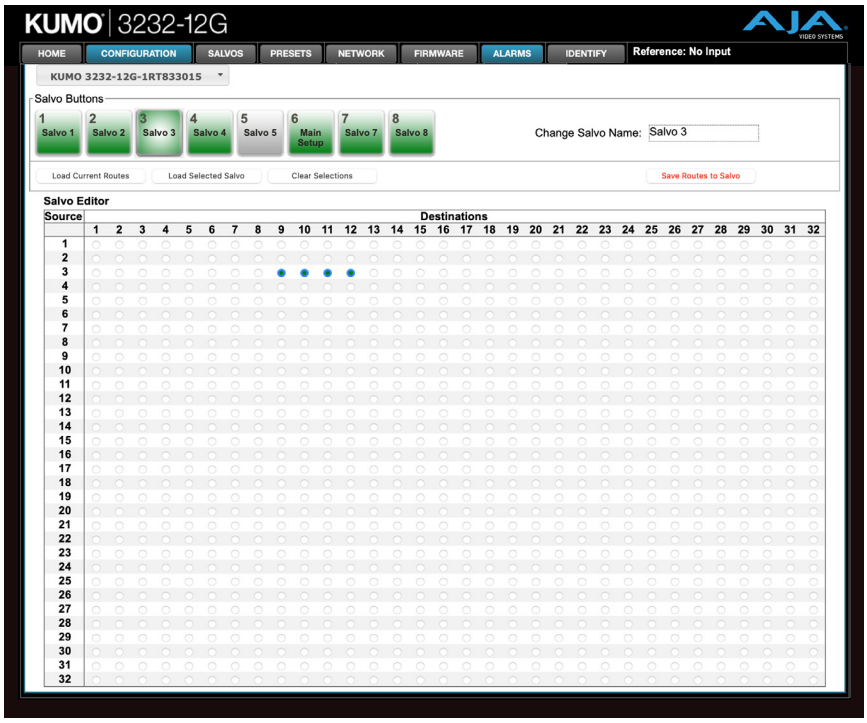
Below we show the result of this Salvo 2 Take, over the previous connections. Notice how Source 2 Destinations 1-7 remain unchanged. The Source 16 previous Destinations 8 and 9 were overtaken by the Salvo 2 Destination reassignments for Source 2 for those two Destinations.

Figure 34. Result of the example Salvo 2 Take



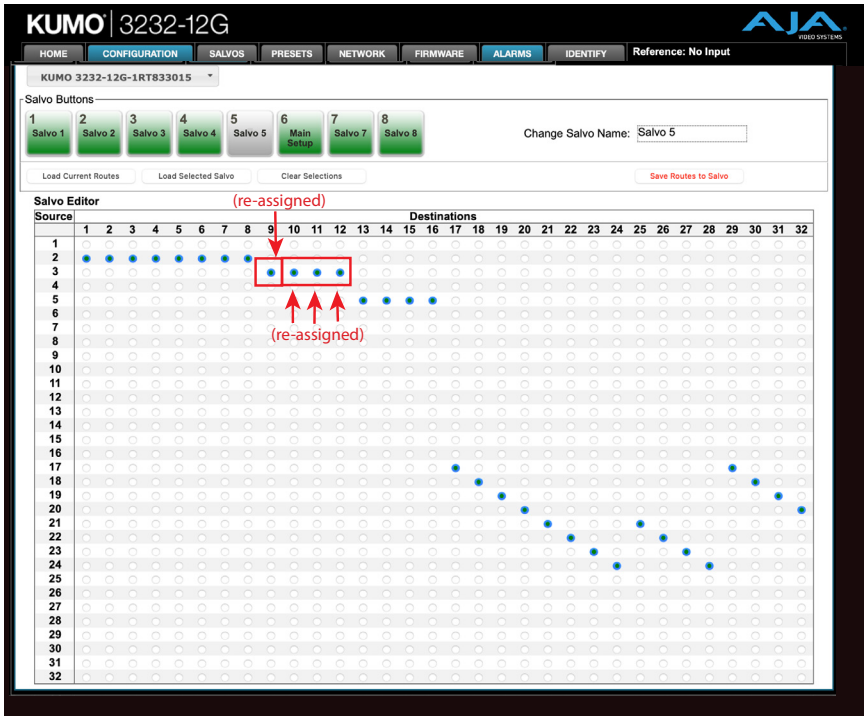
Here is an example Salvo 3, a simple case of four connection points all from Source 3.

Figure 35. Salvo 3 Example



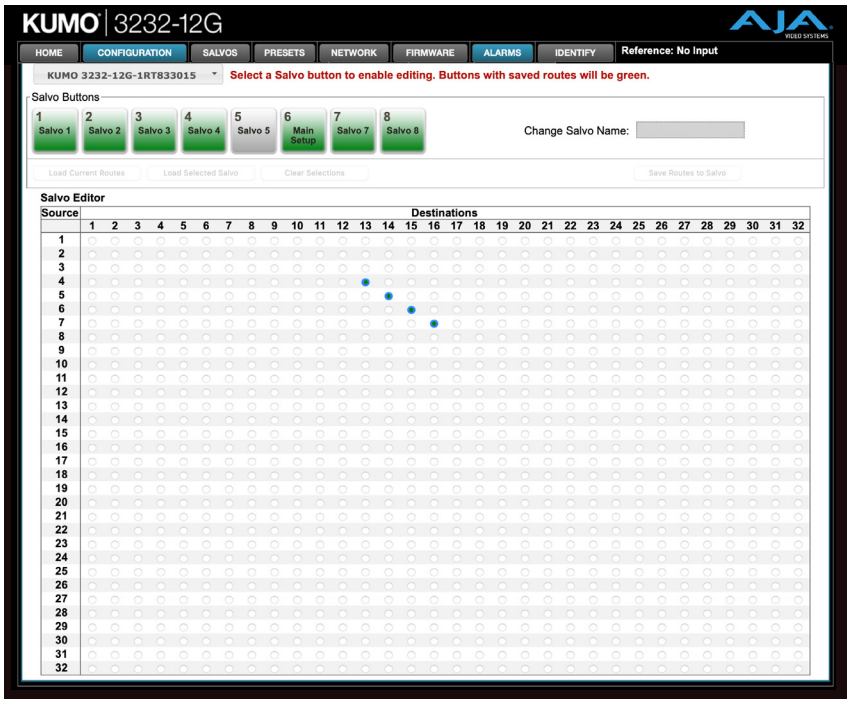
Below we show the result of a Salvo 3 Take, over the previous connections. Notice how Source 2 Destinations 1-8 remain unchanged. The Source 2 previous Destination 9 was overtaken by the Salvo 3 Destination assignments for Source 3. Destinations 10-12 previously from Source 8 were overtaken by Salvo 3 destinations reassigned to Source 3.

Figure 36. Result of the example Salvo 3 Take



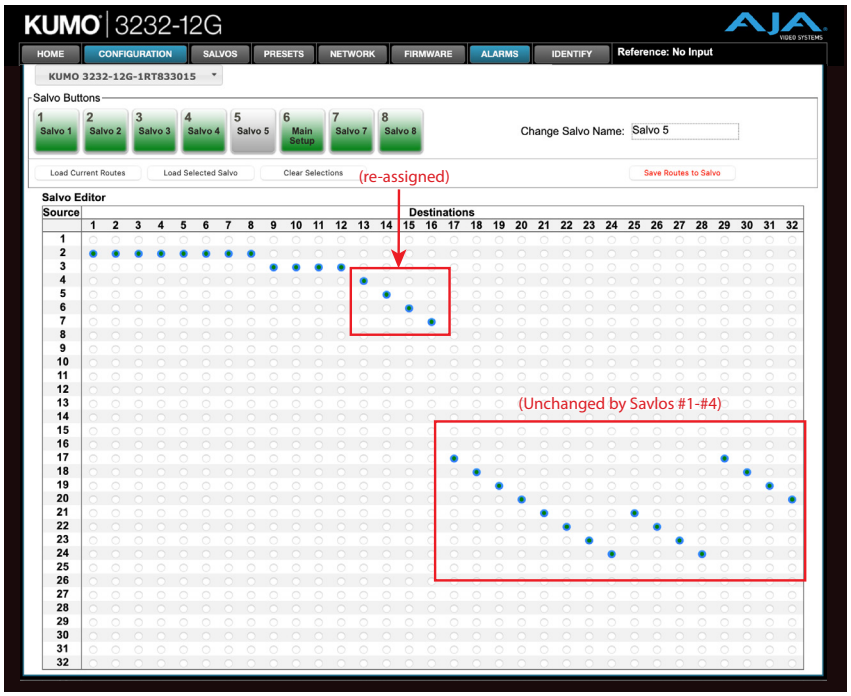
Finally we provide an example Salvo 4, a case of four connection points spread over four adjacent Sources.

Figure 37. Salvo 4 Example



Below we show the result of the Salvo 4 Take into the previous routing Crosspoint Matrix as it was after the Salvo 3 Take. Notice that after the Salvo 4 Take Destinations 1-12 remain unchanged. The previous Destinations 13-16 all from Source 5 are overtaken by the Destinations 13-16 however from Sources 4-7.

Figure 38. Result of the example Salvo 4 Take



Notice that in this particular example none of the Destinations #17-32 were affected by any of the Salvo #1-#4 Takes, because none of those Salvos contained any assigned Crosspoints for the #17-32 Destinations.

Viewing the Current (Active) KUMO Routing Matrix

You may examine your currently assigned KUMO routings, i.e. the Router 'Crosspoint Matrix' (also known as the 'Active Configuration') as it is currently active at any time, (for example to confirm the results after a Salvo Take):

1. Select the KUMO Router's Salvo Tab.
2. Click on any 'Salvo (n)' button #1-#8 to expand the Salvo control window.
3. Click on the 'Load Current Routes' button to examine the state of the Routing matrix.

Router PRESETS Screen

The KUMO Presets Screen (opened by the PRESETS Tab) provides for up to twenty (20) Presets to **Store**, **Recall**, **Export**, **Import** or **Erase** KUMO Router. The Presets Screen allows you to save Preset configurations into separate memory 'registers', and recall a Preset whenever needed.

NOTE: Presets may be named however desired, with only a few character limitations (see "Preset Naming" on page 48).

Benefits of Using Presets

There are many advantages of using Presets with KUMO devices, including:

- Duplicating device configuration data from one KUMO Router to another KUMO Router, or from one KUMO CP to another KUMO CP.
- Leveraging the power of a KUMO Router even further by supporting the instant total reconfiguration of inter-equipment signal flows, enabling multiple diverse studio, live event and broadcast applications without moving any physical cables.
- Sharing names from an already configured Preset to multiple panels and routers provides an efficient method to scale control naming easily.
- Exporting presets to a host PC provides the capability to fully restore a KUMO device configuration after an accidental **Erase Preset**, **Erase All Presets**, **Recall Factory Settings,** or other unintentional device misconfiguration.

IMPORTANT: Especially for KUMO 3232 or KUMO 6464 Series routers with many connected devices and often having complex Salvos, Presets can save significant time compared to re-entering all of the user settings manually.

Presets Parameter Data

KUMO Presets provide Store/Recall/Import/Export/Erase for most user-changeable settings and parameters of KUMO Series devices. Below we identify exactly which parameters are and are not, stored in Presets:

Salvos - Everything managed on Salvos Screen:

- Eight Salvos
- Each Salvo Configuration: crosspoints, name, location/order, etc.

Configuration - All parameters including:

- Switching mode: single, dual, quad
- Crosspoint map: all Source/Destination routings
- Source Button Settings: name, color, etc.
- Destination Button Settings: name, color, etc.

Control Panel - Parameters including:

- Router assignment to Delegation Buttons
- Display intensity
- Enabled/Disabled buttons
- Alarm configurations i.e. Normal or Suppressed

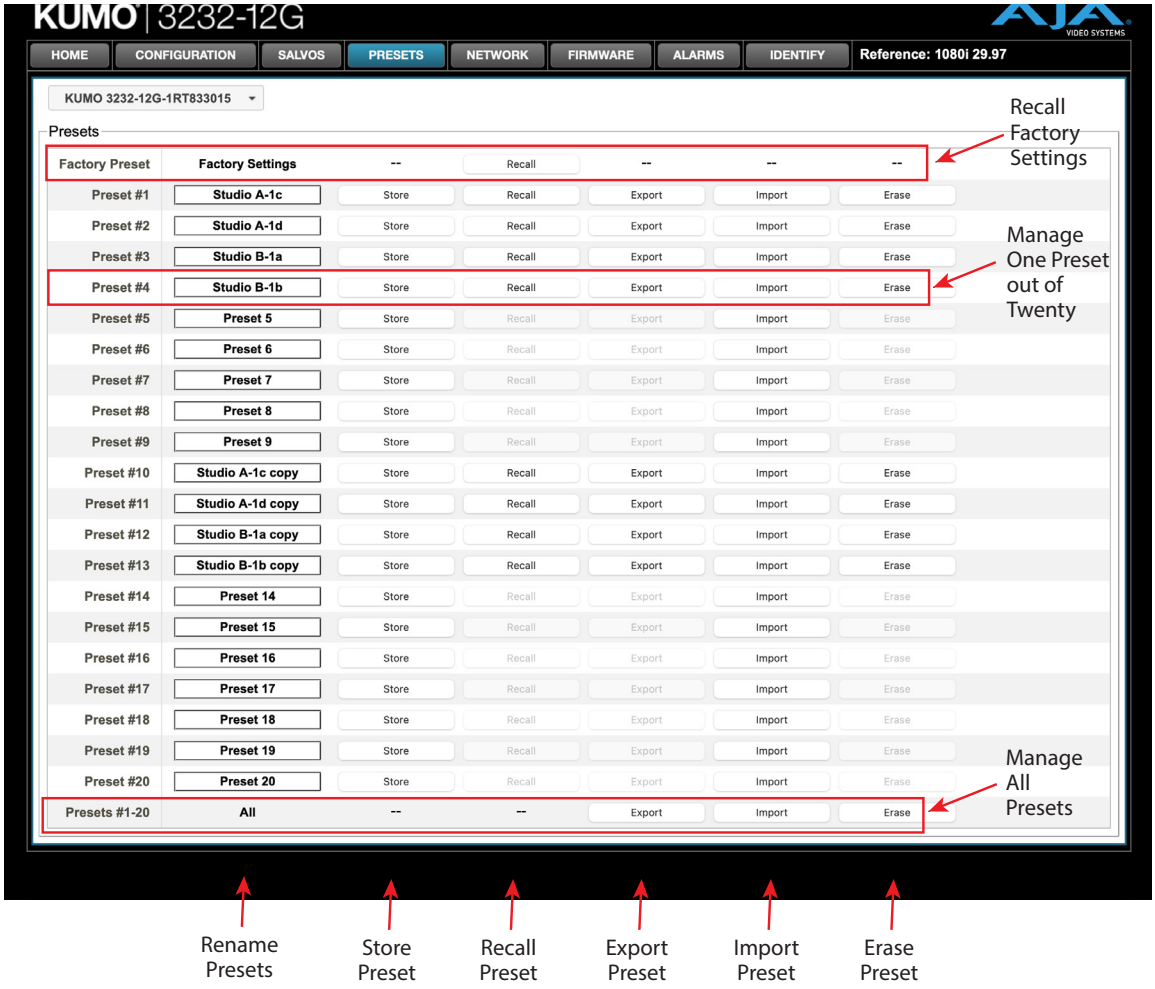
Excluded from Presets

The following parameters and settings are *not* stored in a KUMO Preset:

- Network settings
- Other Presets stored on the device
- User Authentication settings, including Password
- UPnP Host setting
- Auto Configure setting

Presets Screen Controls

Figure 39. KUMO 3232-12G Presets Screen



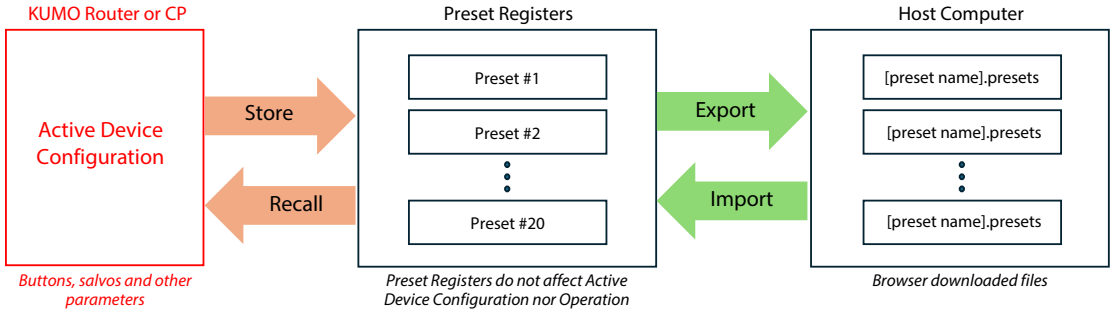
NOTE: Presets that have not yet been Stored have their Recall, Export and Erase functions disabled and are greyed-out.

Presets Functional Block Diagram

Presets are Stored from, or Recalled to the Active Device Configuration. Presets are Exported to, and Imported from files on the host computer, with a name format of: '[presetname].preset'. There are 20 Preset Registers, however there is no limitation on the number of Exported Preset files on the host computer (except storage space). Router or CP power-off (or host computer shut-off) will not erase either the Active Device Configuration nor the Preset Registers from the KUMO; those will be fully restored once the router or CP device is again powered-on.

CAUTION: *The Active Device Configuration and Preset Registers are subject to the **Erase** and **Recall Factory Settings** functions which will overwrite previous user data.*

Figure 40. KUMO Presets Functional Block Diagram



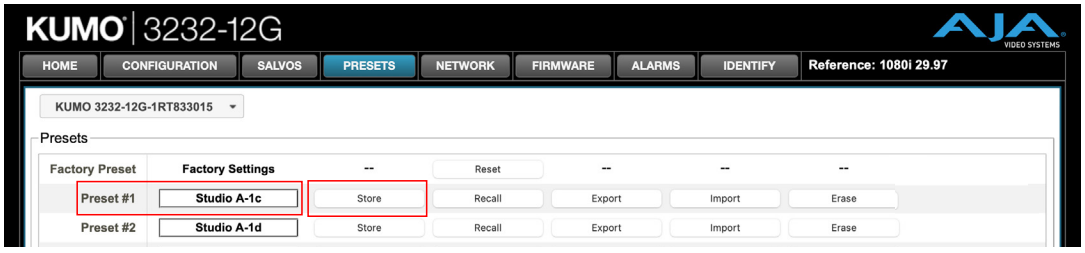
Store Button

The **Store** button lets you save the current AJA Router or CP's Active Configuration into the Preset Register with the associated name and number. A Preset is a set of all of the device parameters as they were set at the time the Preset was stored. Only editable parameters are saved in the Presets. Non-editable parameters are not saved. Note that Stored Preset Registers have no affect on device configuration nor operation until they are explicitly Recalled.

To Store a Preset:

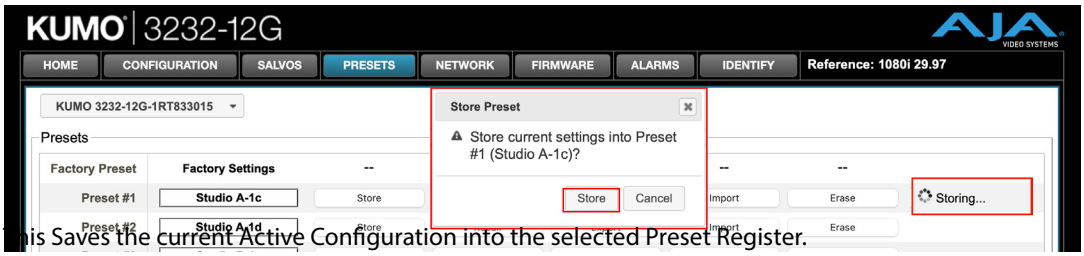
1. Complete editing any parameters to be included in the stored Preset.
2. Click the **Store** button for the desired Preset; (#1 in this example).

Figure 41. KUMO 3232-12G Store Preset #1



3. Click the Store Preset dialog window's **Store** button to confirm selection.
4. The '**Storing**...' message will flash for a few seconds.

Figure 42. KUMO 3232-12G Confirm Store Preset #1



This Saves the current Active Configuration into the selected Preset Register.

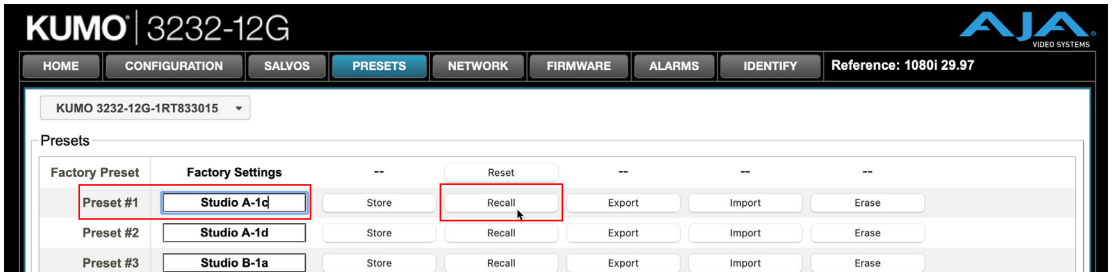
Recall Button

The **Recall** button recalls the saved Preset configuration into the router or CP's Active Configuration.

To Recall a Preset:

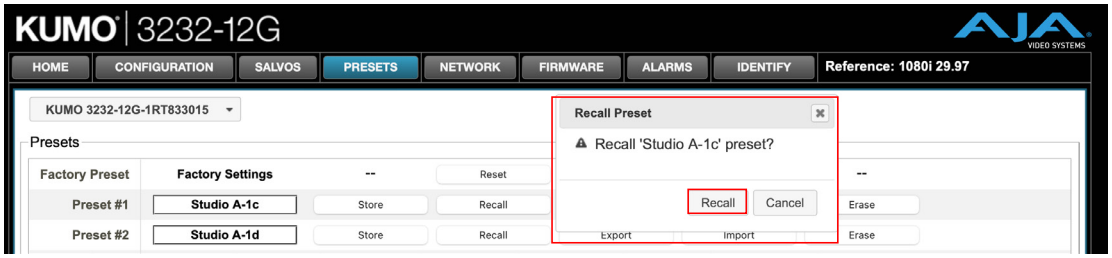
1. Click the **Recall** Button for the desired Preset.

Figure 43. KUMO 3232-12G Recall Preset #1



2. Click the Recall Preset dialog window's **Recall** button to confirm selection.

Figure 44. KUMO 3232-12G Confirm Recall Preset #1



The KUMO Router or CP Active Device Configuration loaded with the Preset and all of its configuration data.

CAUTION: When you **Recall** a Preset Configuration, the recalled Preset immediately replaces the system's existing (active) configuration. All previous settings are lost unless you first Store them in another Preset or **Export** the Preset to a file.

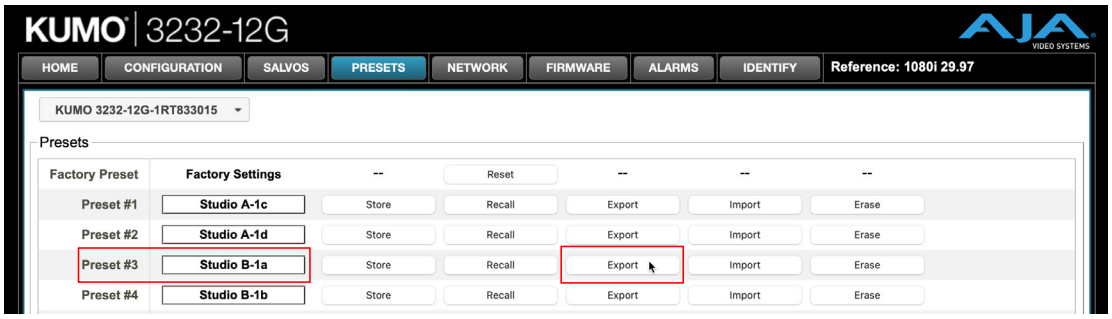
Export Button

The **Export** buttons export a stored Preset from a KUMO Router or CP device. Export saves the associated Preset contents to a file on your computer. The file name is the same as the Preset Name with the suffix ".presets". If you export multiple Presets to the same file name, a number is automatically appended to the filename so it is unique for data safety.

To Export a Preset:

1. Click the **Export** button for the Preset that you would like to export.

Figure 45. KUMO 3232-12G Export Preset #3

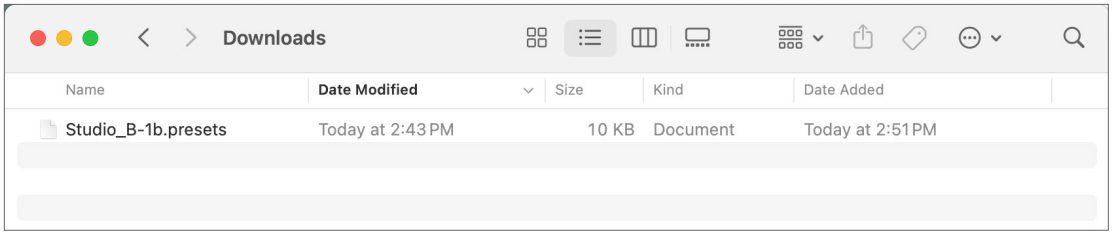


There is no Confirmation Step for Export. Exported Preset data is safe from accidental overwrite because export filenames are automatically made unique when needed.

IMPORTANT: KUMO will never erase any exported Preset files; that can only be done manually by the user in the host computer's directory.

2. The Router or CP **Exports** the Preset to the computer location that is the browser's specified default download directory.

Figure 46. KUMO 3232-12G Exported Preset #3 file in Downloads folder



Import Button

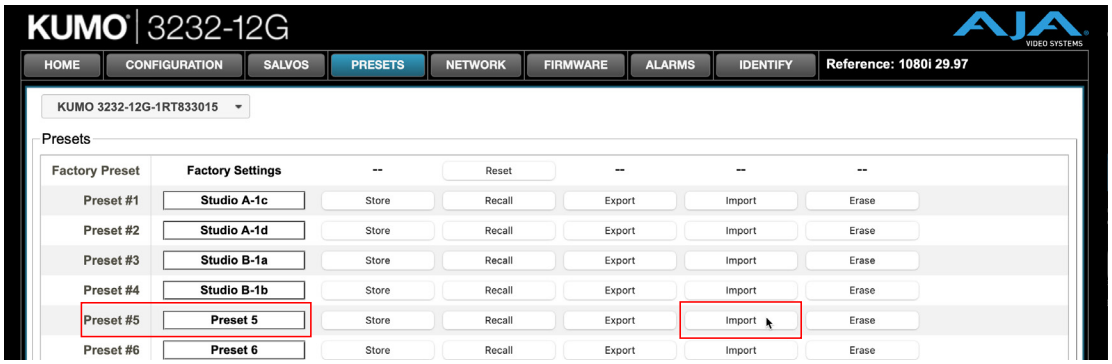
The **Import** buttons Import a stored Preset from a local host computer. Import lets you browse for and import a Preset file on your computer into the Preset register associated with the selected button. A dialog box warns you that the operation will overwrite the current Preset contents with the file contents. You can only import Presets from a KUMO Series device.

NOTE: Presets from other types of AJA devices cannot be imported into a KUMO Series Router or CP. These include such as the HELO Plus, FS-HDR, KiPro GO and KiPro 12G.

To Import a Preset:

1. Click the **Import** button for the Preset that you would like to import.

Figure 47. KUMO 3232-12G Import Preset #5



2. Select the Preset file that you wish to **Import**.

3. Click the **Upload** button.

Figure 48. KUMO 3232-12G Browse to a Preset file to Import

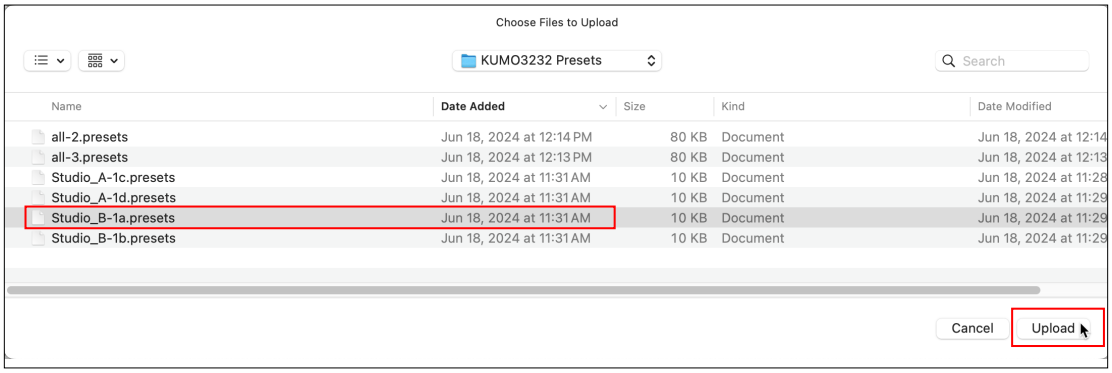
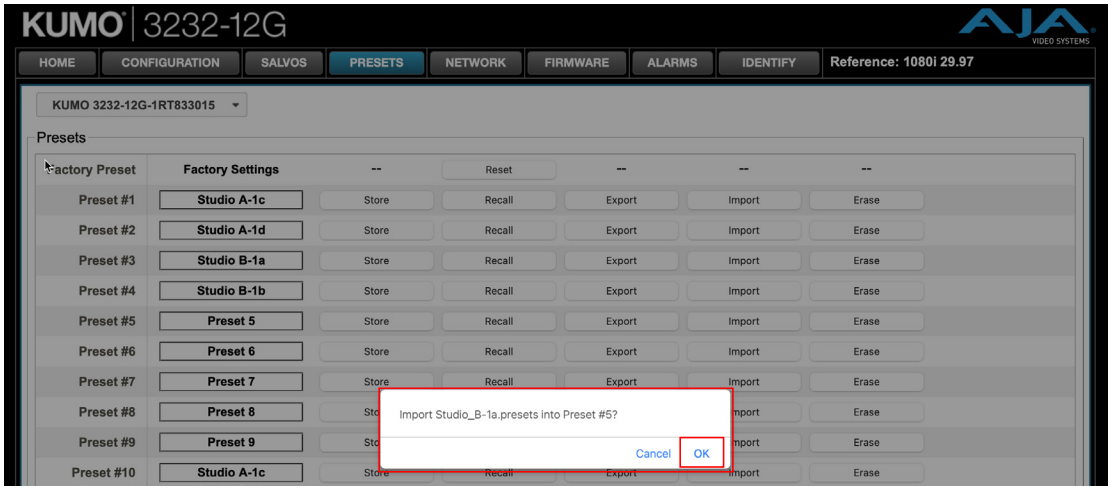


Figure 49. KUMO 3232-12G Confirm Import of a stored Preset file into Preset #5



4. Click OK.
5. The chosen Preset file is loaded into the selected Preset Register.

Special Case Import Situations

There are some special situations when importing from one type of KUMO device to other, where the device loads the file but does not Recall it, until the user explicitly allows that. We list these cases below.

Import Preset into Router of different format

In the WebUI, a WARNING popup may appear: "The Preset you are importing is from a different router format. Do you wish to proceed?"

- If **Proceed** is chosen, the Preset is imported and the pop-up closes.
- If **Cancel** is chosen, the Preset is not Imported and the popup closes.

IMPORTANT: KUMO 6464-12G is the exception with its long/short output settings.

Import Preset into Router of different size

In the WebUI, a WARNING popup may appear: "The Preset you are importing is from a router of a different size. Do you wish to proceed?"

- If **Proceed** is chosen, the Preset is imported and pop-up closes.
  - When a small router Preset is loaded into a larger router, the Preset will partially populate.
  - When a large router Preset is loaded into a smaller router, the Preset will load as much as it can.
- If **Cancel** is chosen the Preset is not imported and the popup closes.

Import Preset into Control Panel (CP) of different size

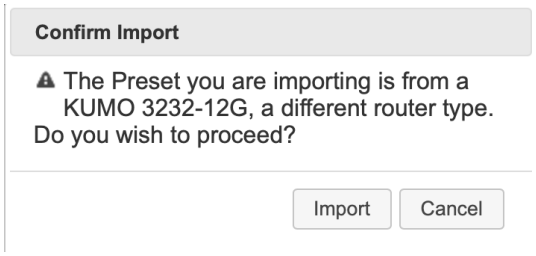
In the WebUI, a WARNING popup may appear: "The Preset you are importing is from a different Control Panel size. Do you wish to proceed?"

- If **Proceed** is chosen, the preset is imported and pop-up closes.
  - When a small Control Panel Preset is loaded into a larger Control Panel, the Preset will partially populate.
  - When a large Control Panel Preset is loaded into a smaller Control Panel, the Preset will load as much as it can.
- If **Cancel** is chosen the Preset is not imported and the popup closes.

Attempting to Import Preset from Router to CP or vice-versa

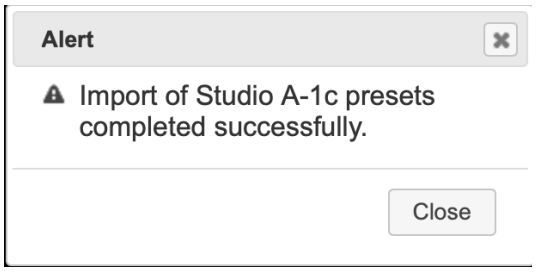
1. Click the **Import** button for the Preset Register that you would like to import a Preset file into.
2. Browse to a Preset file on the host computer.
3. A popup window appears:

Figure 50. Import Preset Warning



4. Click the **Cancel** button to prevent the Preset from being imported and the popup closes.
5. Click the **Import** button. The 'Importing...' message appears over the WebUI.
6. After Importing, the following popup appears:

Figure 51. Preset Import Successful



7. Click Close.

The Preset name now shows the Imported Preset name, and the **Recall**, **Export** and **Erase** buttons are active.

CAUTION: *By default, if the recalled Preset has a name or crosspoint ('XPT') route that aligns with the product it's being applied on, it will overwrite it. If the Preset does not have a name or XPT for the product it's being applied on, the previous state of name/XPT remains. If you do this type of Preset Import and are uncertain of the result, please contact AJA Support for additional detailed information.*

Erase Preset

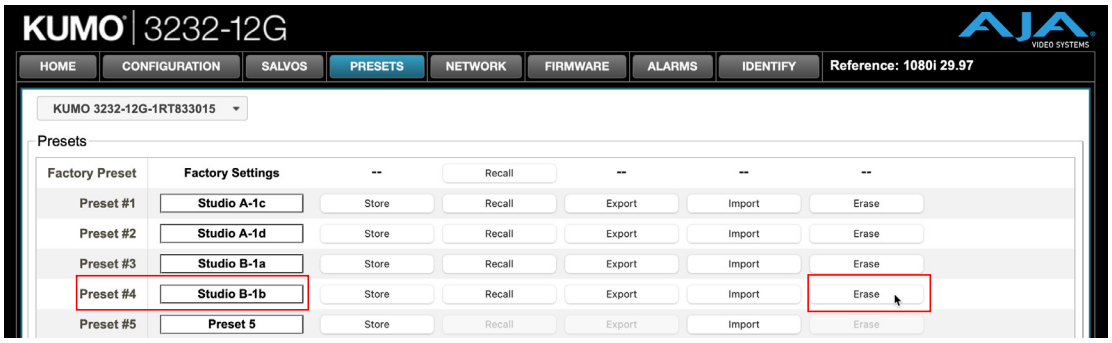
The Erase buttons erase the data in that Preset, making it known as "blank."

NOTE: After Erasing, that Blank Preset's Recall, Export and Erase buttons are disabled and greyed-out in the WebUI. To restore those buttons, first Store the Preset.

To Erase a Preset:

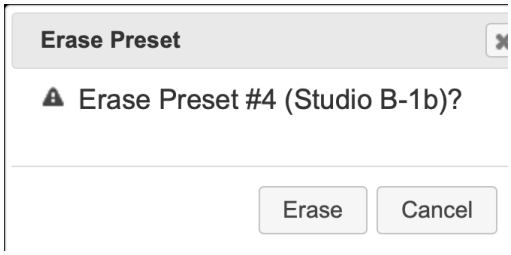
1. Click the **Erase** button for the Preset Register that you would like to erase.

Figure 52. KUMO 3232-12G Erase Preset #4 ('Studio B-1b')



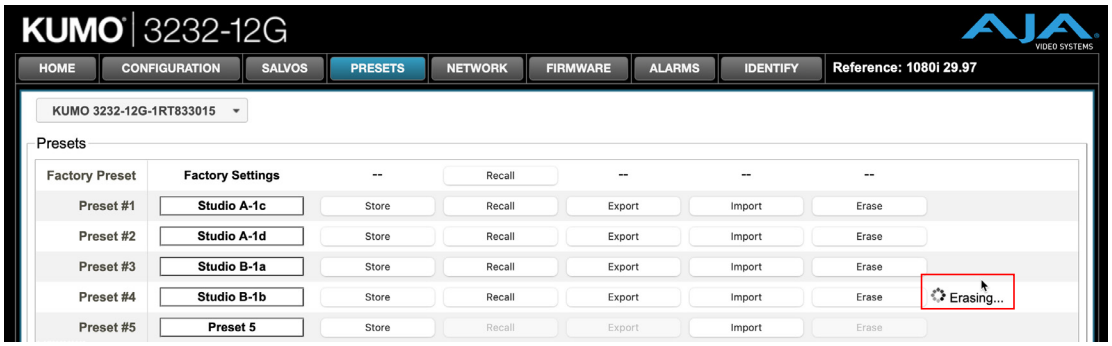
2. Click **Erase** to confirm selection.

Figure 53. KUMO 3232-12G Erase Preset #4 ('Studio B-1b')?



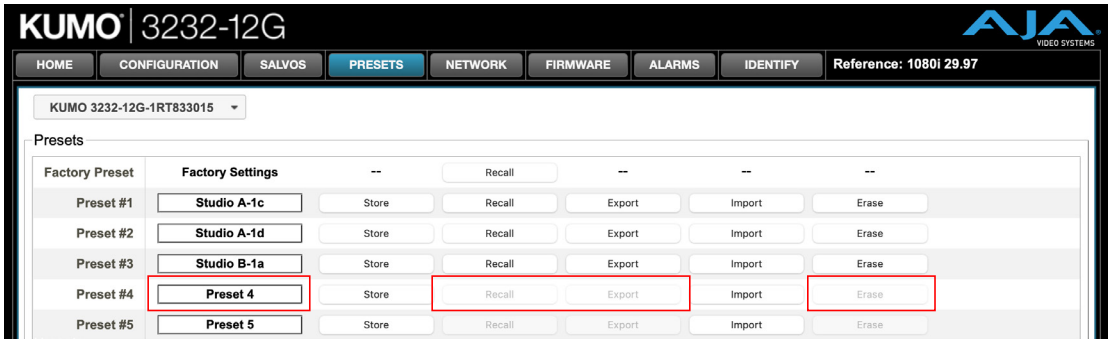
3. In the WebUI you will see the "Erasing..." message appear next to the Preset, still showing its user-created name.

Figure 54. KUMO 3232-12G Erasing Preset #4 ('Studio B-1b')



4. After Erasing, the Preset name is restored to the default ('Preset #4' in this example), and the **Recall**, **Export**, and **Erase** buttons are disabled and greyed-out.

Figure 55. KUMO3232-12G After Erasing Preset #4



5. The Preset #4 Register has been cleared. Preset #4 is now considered 'Blank' (along with Preset 5 in this example, which was previously also Blank.)

NOTE: This function does not clear the current active settings, but rather clears the settings in the Preset Register. This is useful for example when the device is used for a temporary or client event, and it is desired to erase one or all presets to prevent subsequent unauthorized uses.

Export Presets 1–20 (All)

Export All lets you save the contents of all (up to 20) Presets to a file on your computer. The file gets exported to the default download location specified in your browser options with the name "all.presets". If you export multiple files, a number (n) is appended to ensure a unique file name for data safety.

CAUTION: ***Export all Presets*** *does not separately export the current router settings for the active switching matrix, unless that is first Stored into a Preset or Salvo.*

Import Presets 1–20 (All)

Import All lets you browse for and import a previously exported all.presets(n) file from your computer. A dialog box warns you that the operation will overwrite all 20 current Preset contents in the device with the contents stored in the file.

Erase Presets 1–20 (All)

Erase All erases all data from all the presets. A dialog box warns you that the operation will erase all 20 current Presets in the 20 Preset 'registers'.

WARNING: *Before performing either an* ***Erase All Presets*** *or* ***Import All Presets*** *action, first* ***Export*** *any custom user-configured Presets you desire to save (or* ***Export All Presets)*** *to files on your computer. Failure to do so before a* ***Erase All Presets*** *action will result in loss of all user-configured settings.*

Recall Factory Settings

The Factory Preset erases all Presets and restores the device to factory default settings.

CAUTION: *Before loaning the device to someone, or returning it as a rental, consider doing a* **Recall Factory Settings** *to clear the device of any possibly sensitive information.*

WARNING: *Before **Recall Factory Settings** action, first **Export** any custom user-configured Presets you desire to save (or **Export All Presets)** to files on your computer. Failure to do so before a **Reset to Factory Settings** action will result in loss of all user-configured settings.*

Preset Naming

Each Preset has a Factory Name and an Editable Name. Factory Names include: "Preset #1, Preset #2..." etc. To change a Preset Editable Name, click in the name's text field, type a new name, and press **Enter** to save the name.

NOTE: Preset file names must not be more than twenty characters in length.

To abort the renaming, after entering text, you can click the mouse anywhere outside of the edit box to exit without changing the name.

Preset Naming Schemes

Below we suggest one of many possible strategies for using and naming KUMO CP Presets used with KUMO Routers. The KUMO CP control panel is convenient for remote control of either KUMO3232 or KUMO1616 class routers. Furthermore, one CP can switch between remote control of up to four (4) connected Routers.

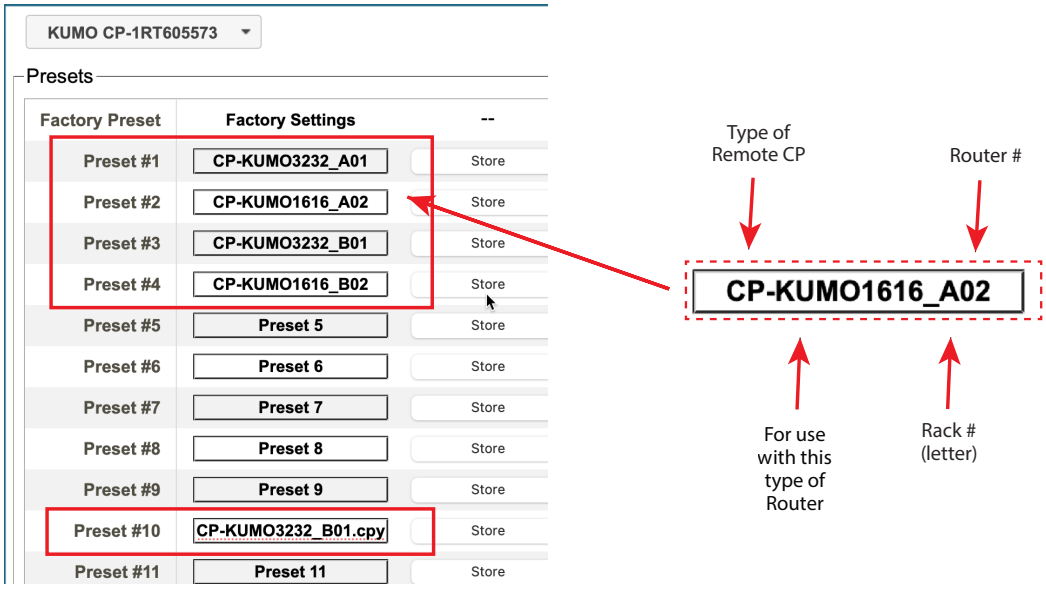
Our example scheme supports instant Recall of a unique CP configuration for each of the four different connected Routers, and the naming self-describes this.

Presets #1-4 were configured as connected to four AJA KUMO Routers (two different KUMO3232 and two different KUMO1616, located across two different racks.

The connected Router model is shown named inside the CP Preset name. In addition we include in the Preset Name a symbol or number designating the exact Rack and Router location. At Preset name start we show a prefix designating the type of control panel (CP or CP2) that created the Preset.

In Preset naming for the associated Routers, you have the option to implement a similar but 'reverse' Preset naming strategy. Do this by simply embedding the associated AJA Control Panel model type (CP or CP2 etc.) together with the CP location, into the Router Preset Name.

Figure 56. KUMO CP Presets (closeup) Example Naming



NOTE: Each facility will have its own conventions. What we show here is one possible suggestion.

For Preset #10 above we show the "clone" of a preset made by **Export** then **Import** it to another (blank) Preset. In this example we first **Export** Preset #3 to a computer file. Then we **Import** that same file into Preset #10. To flag that this was a "copy" of Preset #3 we left the Preset name the same but added a '.cpy' suffix.

Preset Data Protection

After initial configuration and **Store** of a Preset, it is recommended practice to also **Export** the Preset, for potential **Import** into other devices, and as a backup allowing for recovering from an accidental **Erase** Preset.

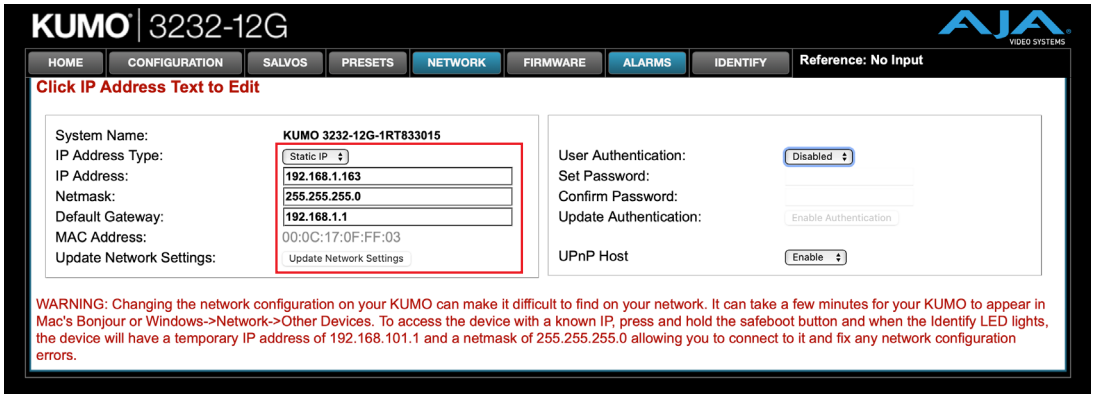
IMPORTANT: If you do not first export a Preset, and then for whatever reason that Preset is Erased from the KUMO device, that Preset user configuration data will be lost.

Router NETWORK Screen

The NETWORK Screen (opened by the NETWORK Tab) provides access to standard TCP/IP setup fields and allows you to click on the "System Name" field to change it. The MAC address is a fixed machine address composed of manufacturer identification and product serial numbers.

You can choose DHCP or Static IP with the drop down menu. When Static IP is selected the fields below are able to be edited. After changing the network type or entering Static IP information, click the **Update Network Settings** button to commit your settings.

Figure 57. KUMO 3232-12G Network Setup Screen



IMPORTANT: The KUMO WebUI does not automatically update its network data if something other than that specific browser window is used to change that KUMO's configuration.

WebUI Updating Issues

The following situations can result in the display of inaccurate data in the WebUI. We provide recovery method for each situation.

- Using the Factory Reset button.
- Using eMini-Setup to change the KUMO's network configuration such as IP address over USB.

IMPORTANT: To resume WebUI, either the previous network settings will first need to be restored, or, if a new IP address is to be used, that address will need to be entered into the web browser address field.

- Changing configuration from another browser, or even the same browser in a different tab.

IMPORTANT: Manually refresh the browser window to display the latest data.

User Authentication

This parameter enables or disables an authentication login requirement. By default this parameter is set to Disabled.

When you select **Login** as the User Authentication choice, you then must set and confirm a password. To save these settings select the **Enable Authentication** button. You can change the password using the NETWORK Screen.

When User Authentication is set to Login, you are directed to the login screen before you can access KUMO over the network. You are required to log in with a password before you can access any other KUMO screens.

NOTE: If authentication is used, it provides only a minimum security safeguard against unauthorized use. The authentication mechanism is simple and does not provide robust security.

Password Reset

You can use a password reset procedure to set the KUMO device's password back to the default value, allowing network access to the device if the password should become lost or mistakenly changed. The default password is "password".

After resetting the password, the current KUMO authentication setting itself is not changed. If authorization is enabled, after resetting the password you will need to enter "password" (the default) to gain network access.

KUMO Router Password Reset

1. For a KUMO router, insert a straightened paper clip or similar device into the reset slot on the rear, hold in for more than eight seconds and then release.
2. The Identify LED will blink, then light steadily, and then go out, indicating the password has been reset to default.

KUMO Control Panel Password Reset

1. For a KUMO CP/CP2, press and hold the two SHIFT buttons on the panel for more than eight seconds and then release.
2. The Panel Lock button will be colored red and then go out, indicating the password has been reset to default.

UPnP Host

UPnP Host enables the KUMO to be discovered by a Windows network.

Selecting **Enable** (default) allows KUMO to be discovered by a Windows network. Selecting **Disable** prevents Windows network discovery of the KUMO.

Router FIRMWARE Screen

Installing KUMO Firmware

In summary the process of installing KUMO software is comprised of downloading, unpacking, uploading, and then restarting. We detail these below.

Download Firmware

IMPORTANT: The updated KUMO6464-12G routers starting at serial# 1RT901000 are only supported with firmware version 4.9 and later.

AJA is constantly upgrading its product software ("firmware") so it is a good idea to check the AJA website often for updates and to assure optimum system performance. Go to the AJA KUMO Update web page by clicking the link at the bottom of the Firmware Screen, or:

1. Go to https://www.aja.com/nav/products-routers
2. Click on the KUMO product you wish to update.
3. Click **Downloads**.
4. Click **Software**.
5. Click to download the latest **KUMO (model#)** firmware file, and take note of the file save location.

Unpack Firmware

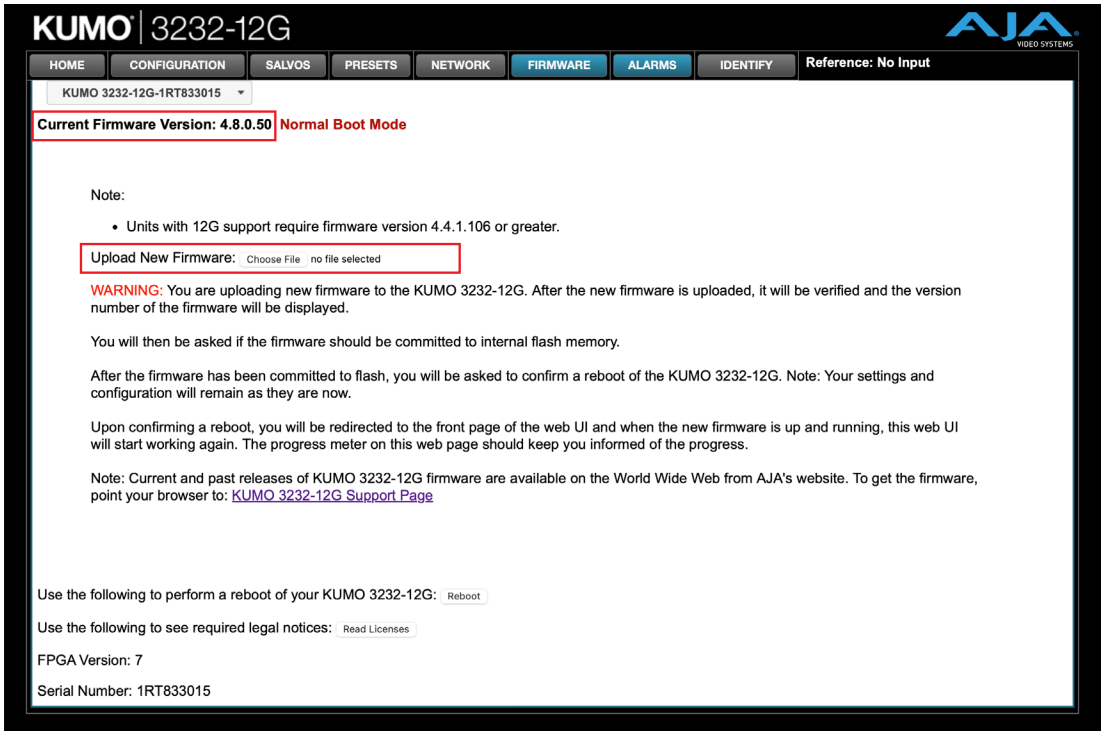
KUMO software update files are "ZIP" files, which you can open with a number of standard and third party uncompress applications. The software image that you'll install on KUMO is a file with a name similar to:

kumo_ver_4.0.0.3-1475859474.bin

NOTE: Depending on your PC or Mac operating system settings, the ".bin" extension may not be visible to you in a file directory.

6. In the KUMO device WebUI, click the **Firmware** tab.

Figure 58. KUMO 3232-12G Firmware Screen

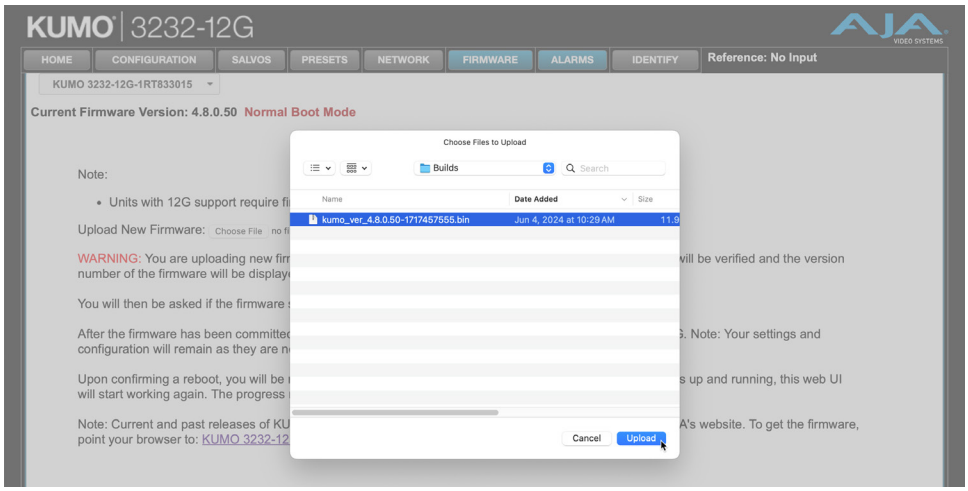


7. The **Current Firmware Version** is found under the pull-down menu. Compare that version number to the version number of the download file. If the download file is newer than the version installed, proceed to install it as shown below.

Continue with this procedure to install the software:

8. Click on the **Choose File** button to locate the downloaded KUMO firmware image file on your PC or Mac.

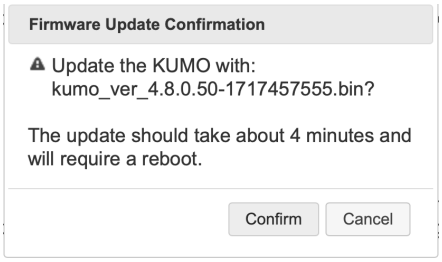
Figure 59. KUMO Firmware Screen, Choose File for Firmware



9. When you have selected a valid KUMO firmware file, click **Upload**.

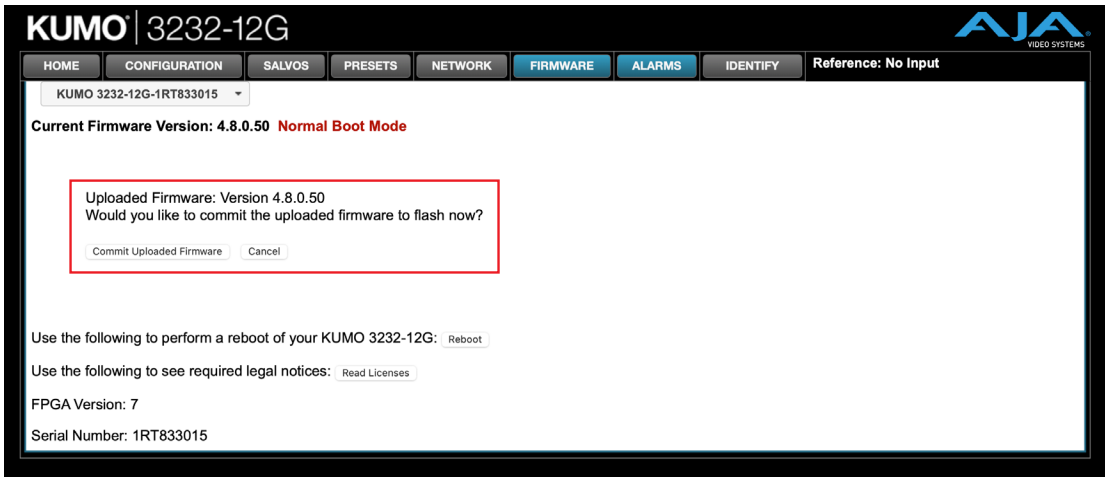
NOTE: The file you select will upload to the KUMO and be tested for validity. Incomplete, corrupted, or non-KUMO software files are rejected.

Figure 60. KUMO Firmware Screen, Confirm firmware upload



10. Click **Confirm**.

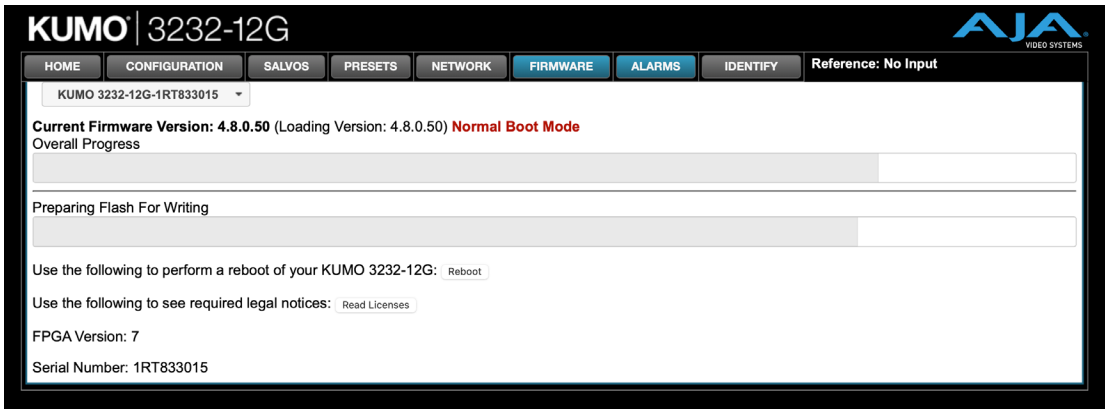
Figure 61. KUMO Firmware Screen, Commit Uploaded Firmware



11. When the upload completes you will be asked if you want to commit the firmware to flash. Click **Commit Uploaded Firmware**. The firmware will be

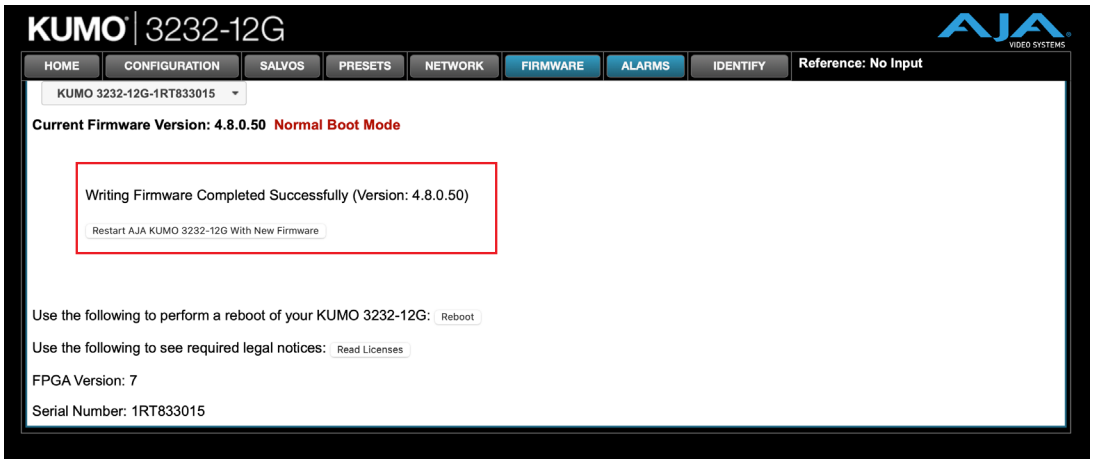
loaded to flash. Progress Bars will show for several minutes. Wait for these to complete.

Figure 62. KUMO Firmware Screen, Writing Firmware in progress



12. When done, click the **Restart AJA KUMO (name) With New Firmware** button to restart your KUMO device.

13. KUMO Firmware Screen, Success and Restart



14. After the KUMO Restart has completed, refresh the web browser used for the KUMO WebUI.

Once these steps are complete, the KUMO will be running the software you just uploaded. The configuration of the KUMO prior to the upgrade is preserved.

Verify the new software is running by bringing up the KUMO web page again. Check the Firmware page for the current version number. The restart and refresh cycle may take a couple of minutes. If the firmware version does not display the new version, perform the update steps again.

NOTE: On some browsers, the Retry page may appear even though the software upgrade was successful. If this occurs, before clicking on retry, refresh the web page and check the version number. If the new version number appears at the top of the page, the software upgrade was successful. If the old version appears, click Retry.

If there is a power outage or glitch during the software download, the KUMO will boot the older software version and the upgrade process can then be re-started by the user. This happens because the KUMO has been designed with a safety feature where an internal "safe" copy of the previous software is retained in the event the updating process fails.

SAFEBOOT Reset

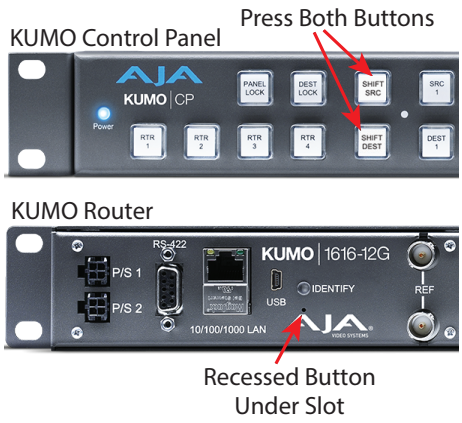
If your KUMO firmware becomes corrupted to the point of freezing the device, you can reset to a safeboot firmware image. The existing KUMO network configuration (DHCP or Static IP) is retained during safeboot. When safeboot is active you can then re-install the latest firmware via the web interface to regain full system operation.

IMPORTANT: A KUMO device running safeboot firmware is not operational other than being accessible on a network so compatible firmware can be installed.

To perform a KUMO safeboot:

1. Power down the KUMO device.
2. Engage the reset function:
   - For a KUMO router, insert a straightened paper clip or similar device into the reset slot on the rear.
   - For a KUMO CP, press and hold both the **SHIFT SRC** and **SHIFT DEST** buttons on the panel.
3. Apply power to the device, wait at least 5 seconds and then release the reset function.

Figure 63. KUMO Reset Locations

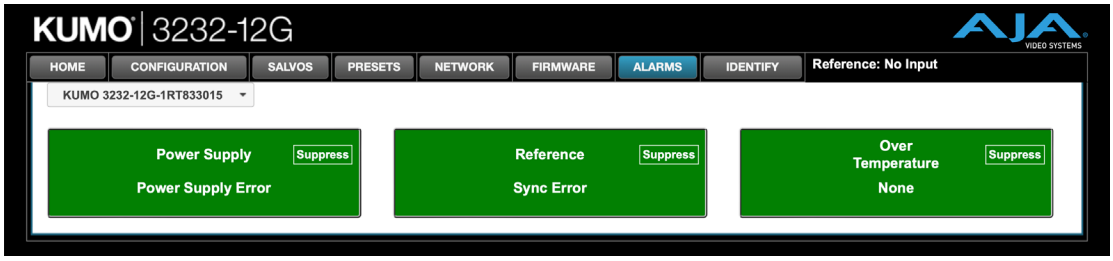


Router ALARMS Screen

KUMO reports alarms on the router front panel by lighting an Alarm LED and in the web browser UI by illuminating the border of the Alarms tab (see below). Alarms include:

- Power Supply – displays error if a redundant power supply is off-line
- Reference – displays error if no valid video reference signal is found
- Over Temperature – displays error if KUMO exceeds normal operating temperature

Figure 64. KUMO Web Interface, Alarms Screen



If you do not want any of the above conditions to report an error, click the boxed text to access the drop-down menu shown above. Select **Suppress** and click **OK** to deactivate the specific alarm.

Router IDENTIFY Tab

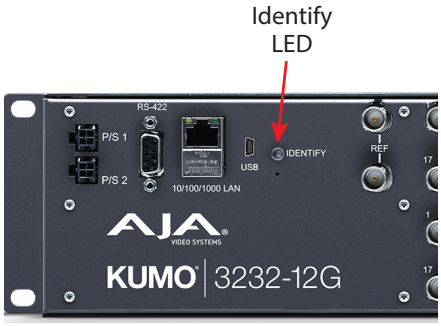
Use the WebUI **IDENTIFY** tab to find the physical location of the currently controlled KUMO Router.

KUMO 3232-12G Router IDENTIFY Tab

When the **IDENTIFY** tab is clicked:

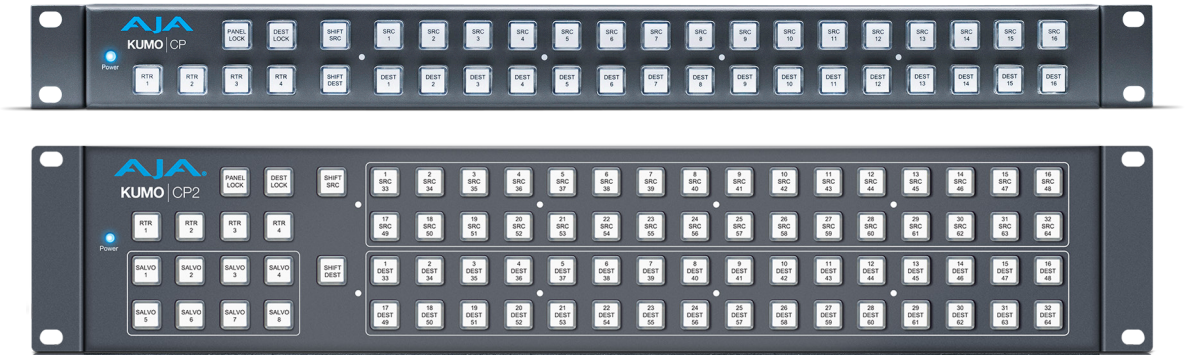
- The WebUI **IDENTIFY** Tab flashes, and
- The **Identify LED** on the Router flashes.

Figure 65. KUMO 3232-12G Identify LED



Both the WebUI's **IDENTIFY** Tab and the Router Identify LED stop flashing when the IDENTIFY Tab in the WebUI is clicked again.

Chapter 4 – KUMO Control Panels & WebUI



Overview

The KUMO hardware panels are Destination-oriented control panels allowing selection of Sources and Destinations on each of up to four KUMO routers. A KUMO control panel will connect to a single KUMO router automatically without computer/browser interface. For connection to up to four routers on a single CP, use the KUMO browser interface to assign the router select buttons to any four KUMO routers on your network.

Two KUMO hardware panels are available, the KUMO CP able to control up to 32 Sources and Destinations, and the KUMO CP2, able to control up to 64.

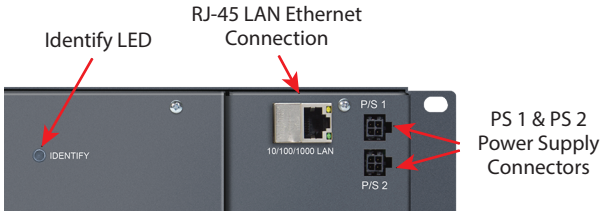
NOTE: The 32 button KUMO CP hardware Control Panel can be used with a KUMO 6464 router operating in Normal mode, but can only control the first 32 Sources and Destinations. The KUMO CP can be used to fully control a KUMO 6464 that is operating in Dual or Quad mode. Control of the KUMO 6464 router in all modes is available via the KUMO CP2 64 button hardware panel, web browser, Ethernet control, and RS-422.

KUMO Control Panel Installation and Network Configuration

Refer to *"Chapter 2 Installation" on page 12* for detailed information about KUMO hardware control panel installation and network configuration.

Connectors and Indicators

Figure 66. Control Panel Connectors and Identify LED



Power Connectors

KUMO CP provides inputs for two power supplies—one is included; a redundant supply is optional.

IMPORTANT: The power connector has a latch, similar to an Ethernet connector. Depress the latch (facing the outside edge of the KUMO device) before disconnecting the power cable from the unit.

IMPORTANT: If two PS are used, it is recommended to connect them to two different AC circuits from the AC supply panel. This will support continuity of operation, even in the event that one of the two AC circuits fails.

Ethernet Connector

An RJ-45 connector provides 10/100/1000 Ethernet connection to the internal Linux OS/web server.

CP Identify LED

To identify which KUMO Control Panel is connected, click on the Identify Tab in the WebUI. Three indicators of the specific connected CP result:

- The Identify LED on the CP Rear Panel flashes.
- The CP front rather dramatically displays alternating flashing button lights in all its sources and all its destinations.
- The Identify Tab in the WebUI also flashes. The CP front button lights, the CP Rear Panel LED and the WebUI Identify Tab all continue flashing until the Identify Tab is clicked again.

NOTE: If you find that you are connected to the wrong CP, enter the IP address for another panel and use Identify again to test the connection.

Button Key Caps

Each control panel button has a removable lens cap that allows you to customize Source and Destination names. AJA has provided a template for printing custom lens chips (we suggest using 29 lb. vellum) for button designations. The template is available at:

https://www.aja.com/support/kumo/lens_chip.zip

Using a Control Panel

Performing a Take

1. Select the router you wish to control with a Router delegation button.
2. Press the desired Destination button. It will illuminate.
3. Press the desired Source button. That Source will be routed to that Destination and the Source button will illuminate.

NOTE: Sources for locked Destinations cannot be changed.

Taking a Salvo

Up to eight salvos can be configured on a KUMO router. Each salvo can route any number of Sources to any number of Destinations, including the same Source to multiple Destinations. Crosspoints not included in a salvo remain unchanged. See *"Router SALVOS Screen" on page 30* to learn how to configure salvos.

Performing a salvo is a two stage process. First you arm the salvo, and then you take the salvo.

1. Press the desired Salvo button. The button will blink for five seconds.
2. Press that blinking Salvo button again to take that salvo.

After five seconds, the Salvo button will no longer be armed and will stop blinking. To take that salvo you will need to press the Salvo button again to rearm that salvo.

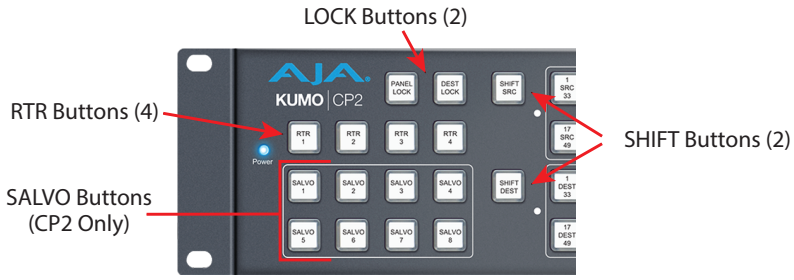
NOTE: Salvos do not change locked Destinations.

Panel Function Button Descriptions

Each KUMO Control Panel provides:

- Panel Lock – prevents Source or Destination changes from this panel.
- Destination Lock – prevents any Source change for a Destination.
- Router Delegation Buttons – (RTR 1–RTR 4) enable immediate control of the KUMO assigned to the button.

Figure 67. KUMO CP Function Buttons



Panel Lock

When you press the **PANEL LOCK** button, it lights red and all panel functions for this panel are disabled. All other KUMO devices on the network will function normally.

Destination Lock

Press the **DEST LOCK** button to prevent any changes to the KUMO Destination you are currently controlling (DEST button high tallied). The lock can be removed from any other KUMO CP or browser interface on the network.

The locked Destination button and **DEST LOCK** buttons turn red on all panels that are assigned to the KUMO you are controlling. You can select other Destinations and apply the Destination Lock function to each. All locks will tally red. To remove the lock, select the Destination and press **DEST LOCK** again.

Locked Destinations are reported on the KUMO router's browser HOME Screen with a lock icon.

Figure 68. KUMO Router Home Screen Destination Buttons

Router Delegation Buttons (RTR 1 - 4)

Use the Router delegate buttons to connect to the specific router to be controlled.

You can assign the delegate buttons to any of up to four routers in your system. To assign router/control panel delegation, access the HOME Screen for your KUMO CP.

If network communications between a control panel and router fails, the control panel's delegation button for that router will be colored pink. When communications is restored the delegation button returns to its normal color.

Shift/Reset Buttons

The SHIFT SRC and SHIFT DEST buttons serve multiple functions. They allow you to select shifted Sources and Destinations (17-32 for KUMO CP and 33-64 for KUMO CP2), and they also perform the same reset functions as the reset slot. Resets should be done only by qualified network personnel:

- Shift: Hold down **SHIFT SRC** and press a Source button to select a shifted Source, or hold down **SHIFT DEST** and press a Destination button to select a shifted Destination. When a shift button is not held down, pressing a Source or Destination button selects the unshifted Source or Destination (1-16 for KUMO CP or 1-32 for KUMO CP2).
- IP Reset: See *"KUMO Temporary Static IP Address" on page 15*.
- Password Reset: see *"Password Reset" on page 50*.
- Reset to Safeboot Firmware: See *"SAFEBOOT Reset" on page 54*.

SALVO Buttons (CP2 Only)

The eight Salvo buttons, when configured, can each be used to perform multiple Source to Destination takes using just that one button.

Performing a salvo is a two stage process. First you arm the salvo, and then you take the salvo.

1. Press the desired Salvo button. The button will blink for five seconds.
2. Press that blinking Salvo button again to take that salvo.

NOTE: Salvos do not change locked Destinations.

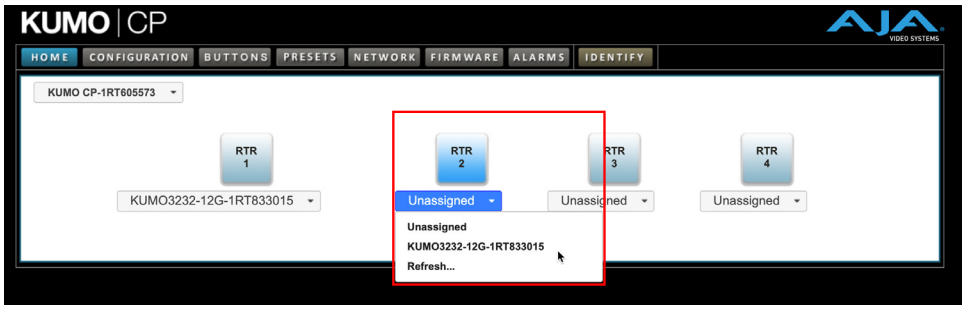
Control Panel WebUI

The KUMO Control Panels web browser interface (WebUI) provides many of the same Navigation Bar tabs as the KUMO routers. This section primarily discusses the functions unique to the Control Panel WebUI interface.

CP HOME Screen

Use the HOME Screen to assign a router to each of the four (4) available router delegation buttons. Each button has a pulldown menu that lists the active networked KUMOs available for assignment and provides an Unassign and Refresh function.

Figure 69. KUMO CP Browser Interface Home Screen



NOTE: For CP remote control for more than four Routers at once, add additional CPs.

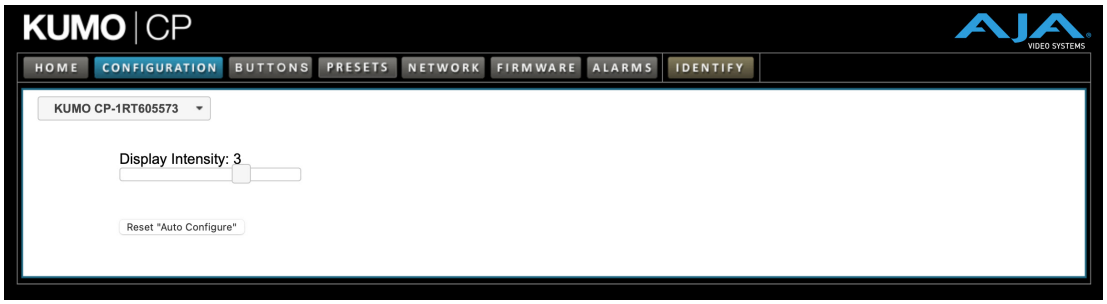
The assigned router name appears below each button. You can change the selected (currently-controlled) router on the panel by clicking the button on the HOME Screen. The panel's router delegation button will tally appropriately.

CP CONFIGURATION Screen

Using the CONFIGURATION screen, you can:

- Adjust the Display Intensity slider – select one of four button illumination levels.
- Reset "Auto Configure" – resets the Auto Configure function to automatically set up one control panel to one router. This function re-boots the panel to trigger the configuration. Upon reboot, if any other router is found on the network, it will not pair to the panel.

Figure 70. KUMO CP Browser Configuration Screen



NOTE: If a KUMO webpage on a computer is open when that KUMO device is reset or had its network configuration changed from another location (even if using a different tab in the same browser), the information displayed on that original webpage will not be updated automatically and so will display stale data.

CP BUTTONS Screen

The BUTTONS Screen lets you enable or disable the Source, Destination, and Salvo buttons on a KUMO hardware control panel

Disabling Control Panel Buttons

The v4.1 and higher KUMO firmware includes a button disabling feature, useful to uniquely configure the button operation of each KUMO CP/CP2 for specific work areas and specific workflows.

NOTE: This feature is not a router Destination or Source lock. Takes can still be performed on paths with disabled buttons, using the KUMO WebUI or another KUMO control panel.

The current KUMO CP configuration is retained after a power cycle, including any disabled Source or Destination buttons.

NOTE: Performing a KUMO CP factory reset clears the configuration. All Salvo, Source and Destination buttons are enabled after a factory reset.

Disable Buttons Procedure

1. Access the KUMO CP via its WebUI.
2. Click on the **HOME** tab and select one of the four routers.
3. Click on the **BUTTONS** tab and then click on the Source, Destination, and/or Salvo buttons you wish to disable. Enabled buttons have a green background color and disabled buttons have a gray background color.

Figure 71. KUMO CP Disabled Buttons

4. WebUI buttons that have been disabled will go blank, and the tally lights of the disabled physical buttons on the KUMO CP will go off.

Figure 72. CP Buttons (all unshifted, 1-16) showing Enabled/Disabled

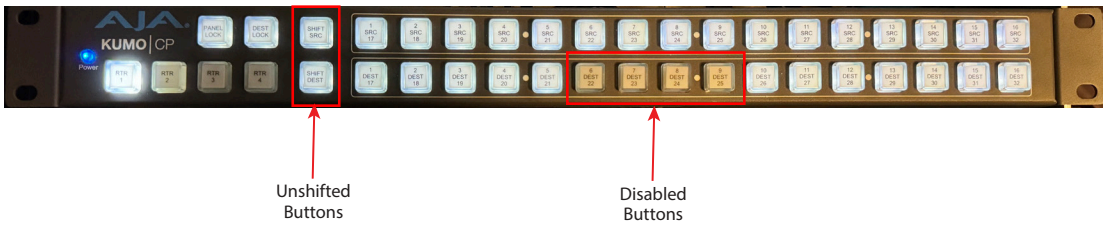
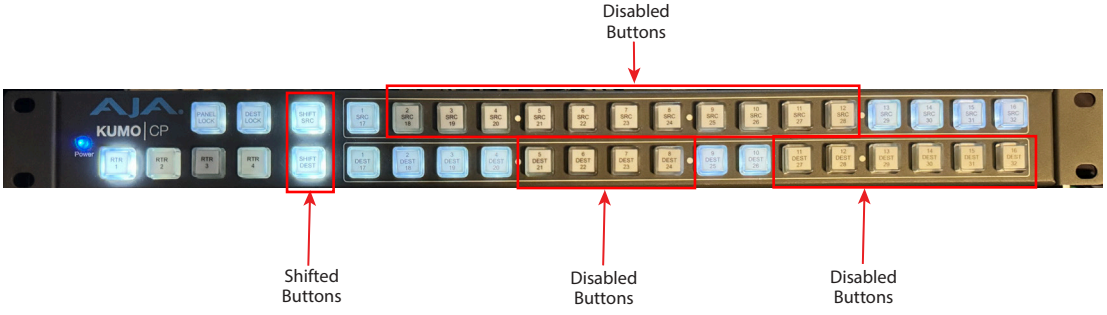


Figure 73. CP Buttons (all shifted, 17-32) showing Enabled/Disabled



CP PRESETS Screen

The PRESETS Screen (opened by the PRESETS Tab) provides for **Store**, **Recall**, **Export**, **Import** and **Erase** of KUMO CP and CP2 Control Panel user configurations. A KUMO Control Panel PRESETS Screen and its controls work in exactly the same way as a KUMO Router PRESETS Screen.

NOTE: See "Router PRESETS Screen" on page 39

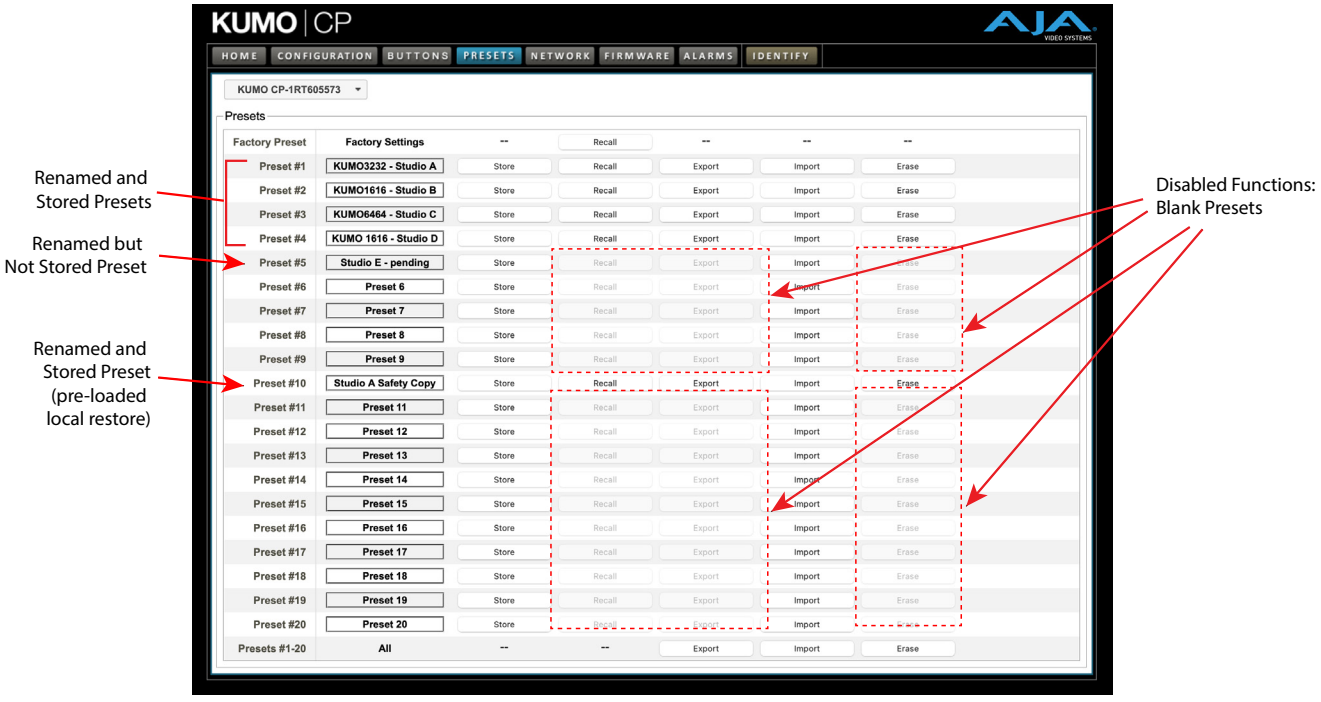
In the below example we show several Presets which have been both renamed and stored (#1-#4). An arbitrary naming scheme is shown, imagining different KUMO Routers located in different 'Studios'. Those Presets would provide for different button setups when the CP was connected to the four different Routers. Preset #5 has been renamed for a hypothetical Studio E, but that configuration (in our imaginary example) is still in development, and so it has not been Stored yet.

We also show another suggested use of a Preset (#10 below). Provided that there are blank Presets available, one can create a copy, or "clone" of an important Preset that is being experimented with. In case those experimentations go awry (or even are accidentally erased), having a local "emergency restore" Preset ready to instantly Recall with one click - and without dealing with host computer files - saves time. This is especially important if such a situation occurs while on-air. Of course, if the important Preset were also previously Exported, one can always Import it (it just takes more steps.)

NOTE: A non-Renamed Preset may be Stored; it simply keeps the default factory name.

NOTE: When a smaller CP is connected to a larger Router (as shown for Preset #3 below), the CP will control only the limited scope of buttons in the Router that it also has. We recommend only doing so when the larger Router has limited physical connections (if possible).

Figure 74. KUMO CP Presets Screen



WARNING: ***Be sure to read the Router PRESETS topic including all WARNINGS and CAUTIONS therein. Failure to do so and taking certain actions could result in the loss of some or all user configuration data for that device.***

NOTE: See "Router PRESETS Screen" on page 39.

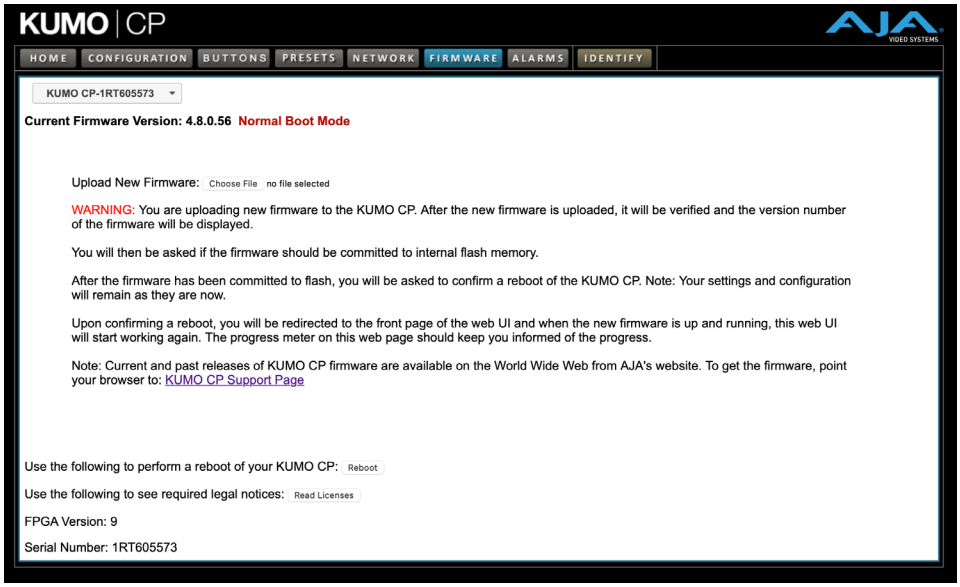
CP NETWORK Screen

The CP NETWORK Screen provides access to standard TCP/IP setup fields for network configuration. See *"Quick Start Configuration" on page 13* and *"Network Configuration In Depth" on page 16* for more information.

The CP NETWORK Screen is virtually identical to the KUMO Router NETWORK Screen. See *"Router NETWORK Screen" on page 49.*

WARNING: ***Do not Update Network Settings with 0.0.0.0 values for either IP Address or Netmask. This will disable the control panel and it will need to be returned to AJA for repair.***

Figure 75. KUMO CP Network Setup Screen



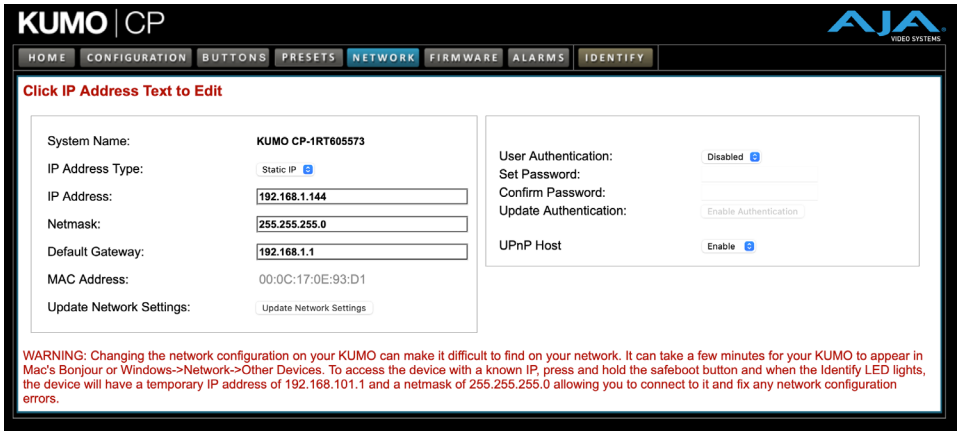
User Authentication

This parameter enables or disables an authentication login requirement. See *"User Authentication" on page 50* for more information.

CP FIRMWARE Screen

The FIRMWARE Screen is used to update the KUMO CP's firmware. The CP FIRMWARE Screen is virtually identical to the KUMO Router FIRMWARE Screen.

NOTE: See "Router FIRMWARE Screen" on page 50.



CP ALARMS Screen

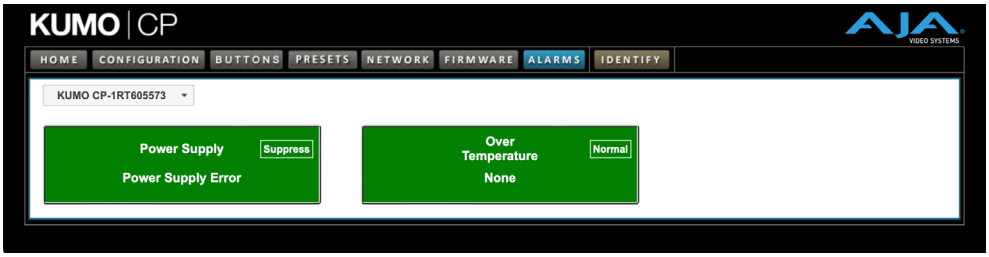
The Alarms screen reports KUMO error conditions, and allows suppressing selected error messages.

KUMO reports alarms in the WebUI by illuminating the border of the Alarms tab (see below). Alarms include:

- Power Supply – displays error if a redundant power supply is off-line
- Over Temperature – displays error if KUMO exceeds normal operating temperature

See *"Router ALARMS Screen" on page 54* for more information.

Figure 76. KUMO CP Alarms Tab



CP IDENTIFY Tab

The **IDENTIFY** tab can be used to identify a specific KUMO Control Panel on the network.

Figure 77. KUMO CP Identify Tab

To identify which KUMO Control Panel is connected, click on the Identify Tab in the WebUI.

- The Identify LED on the CP Rear Panel flashes.

Figure 78. KUMO CP Identify LED Location

- The CP front panel rather dramatically displays alternating flashing button lights in its Sources and Destinations.
- The Identify Tab in the WebUI also flashes.

The CP front button lights, the CP Rear Panel LED and the WebUI **Identify** Tab all continue flashing until the Identify Tab is clicked again.

NOTE: If you find that you are connected to the wrong CP, enter the IP address for another panel and use Identify again to test the connection.

***WARNING:* Never enter '0.0.0.0' for either the IP address or the subnet mask. Doing so may require returning the unit to the AJA factory for recovery.**

CP SAFEBOOT Reset

SAFEBOOT Reset for a KUMO CP works identical to a Router SAFEBOOT Reset.

NOTE: See "SAFEBOOT Reset" on page 54.

Chapter 5 – eMini-Setup

Overview

This chapter describes using the eMini-Setup application to initially communicate with and configure the KUMO over a direct USB connection. Once configured, the KUMO can be accessed via an Ethernet network using a web browser. Subsequently, that device can then be reconfigured over that network, using its IP address and WebUI.

We will provide step-by-step procedures in this chapter. An overview of the general process is as follows:

1. Acquire eMini-Setup, available as a free download from the AJA website.

IMPORTANT: The updated KUMO6464-12G routers starting at serial#1RT901000 are only recognized by eMini -Setup v2.4.1 and later.

2. Install the eMini-Setup application onto a computer.
3. Connect the KUMO USB port to that computer's USB port with the supplied USB cable.
4. Launch the eMini-Setup application.

NOTE: If the eMini-Setup does not find the device, check your USB cable setup. If there is a very long USB cable, try using a shorter cable. If there is a USB hub, eliminate the hub, or if unavoidable then use only a powered hub.

5. Go to the Network tab where the IP address settings are displayed. You can use the existing DHCP assigned IP address, or it can be changed manually.

Acquiring eMini-Setup

AJA's eMini-Setup application for KUMO Series Routers and Control Panels is available for download from the AJA website, under whichever KUMO device will be used. Starting from there, the process varies slightly for macOS vs. Windows, so we show the procedure for each OS separately.

NOTE: There is no universal download location for eMini-Setup.

Installing eMini-Setup

Windows Installation

To install eMini-Setup for KUMO Series Routers and Control Panels on a Windows PC:

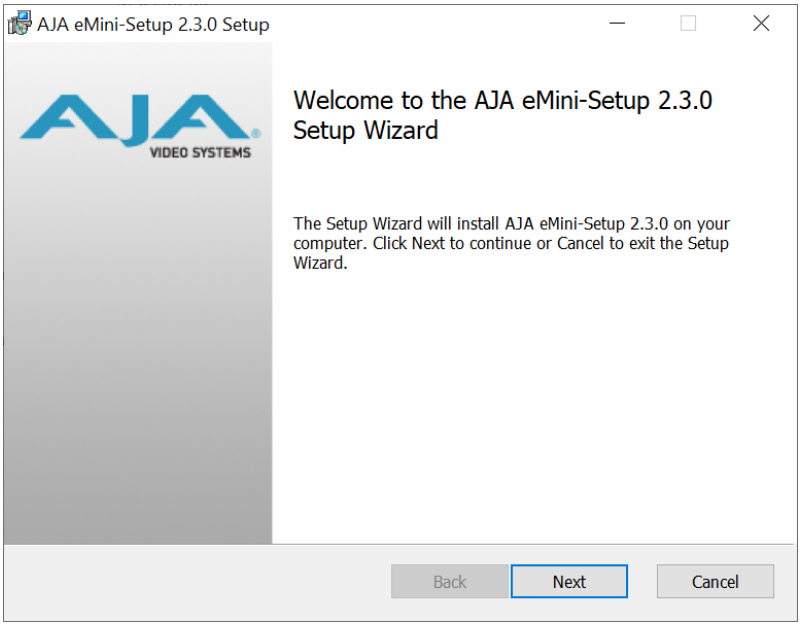
1. Start from https://www.aja.com/nav/products-routers.
1. Navigate to the relevant KUMO product page.
1. Click the Downloads button to open the Support page for your KUMO device.
2. Click on **Downloads** (located just below the KUMO product picture).

3. On the Downloads page, click on the **Windows** the icon to the right of Software.
4. Click on the download link for **AJA eMini-Setup v(n.n) for Windows** that appears.
5. Click **Download**.
6. You will see a popup to **Sign-up with AJA!**. You may choose to either sign-up and then download, or, to skip the sign-up by clicking on **Continue to Download without Sign-up**.
7. Download the appropriate **AJA eMini-Setup** installer file, which is provided as a zip archive.
8. Open the AJA_eMini-Setup_win.zip file. Doing so will result in a folder containing the eMini-Setup installer as well as the latest release notes.

NOTE: We recommend you check the release notes before you run the installer, to confirm eMini-Setup's compatibility with your computer hardware and OS version.

9. Double-click on the **AJA_eMini-Setup.msi** file to run the installer.
10. The Setup Wizard will guide you through the installation as we illustrate below.

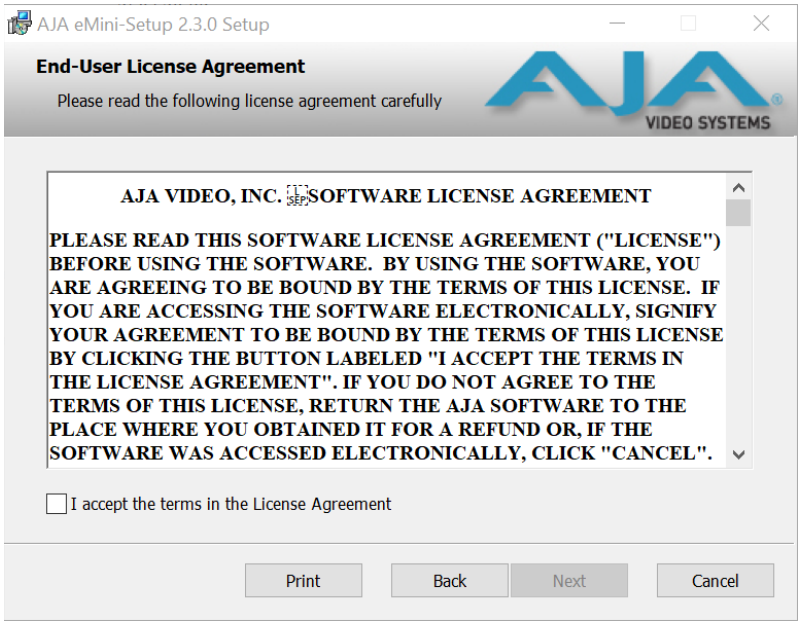
*Figure 79. eMini-Setup PC Wizard**



*NOTE: *The eMini-Setup version number shown in this chapter's figures may not reflect your actual downloaded eMini-Setup version number.*

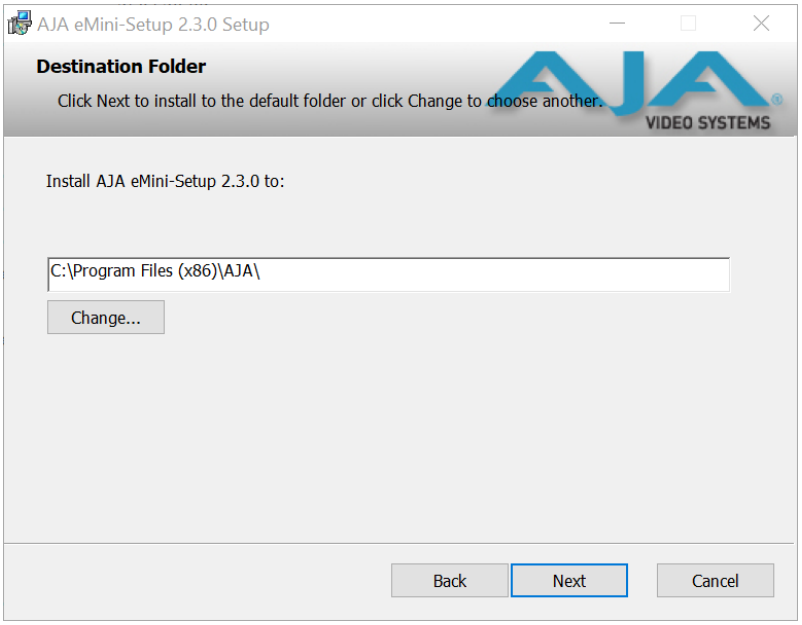
11. Click **Next** to begin the Setup Wizard.

Figure 80. Software License Agreement



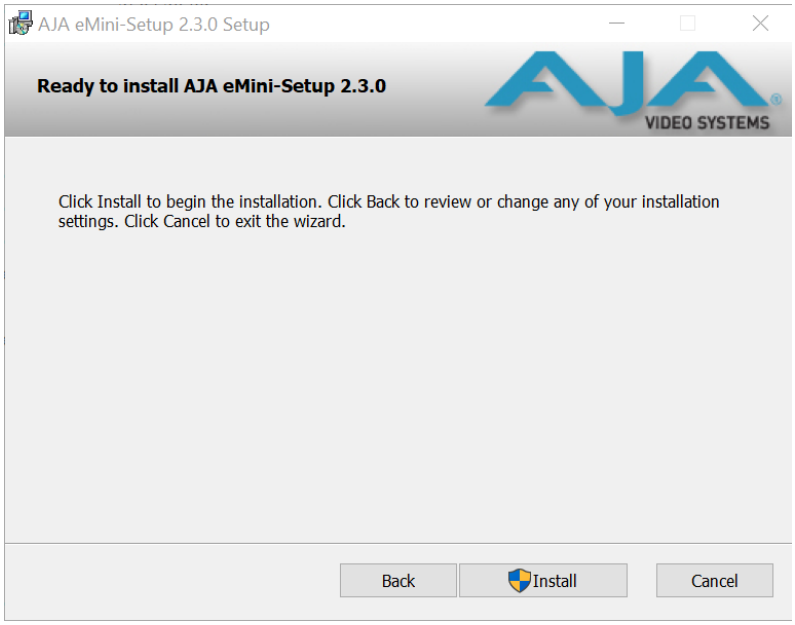
12. Check the **I Accept the terms in this License Agreement** checkbox.
13. Click **Next** to accept the software license.

Figure 81. Accept Installation Location



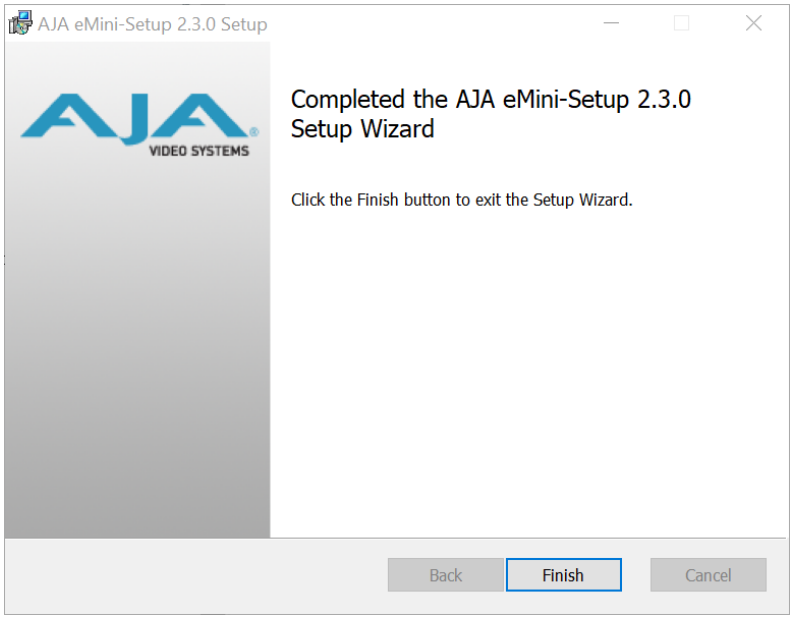
14. Click **Next** to accept the install location on your computer (after adjusting it if necessary).

Figure 82. Launch the installation



15. Click **Install**.
16. If Windows presents you with a security alert, click **Yes**.

Figure 83. Finish the installation

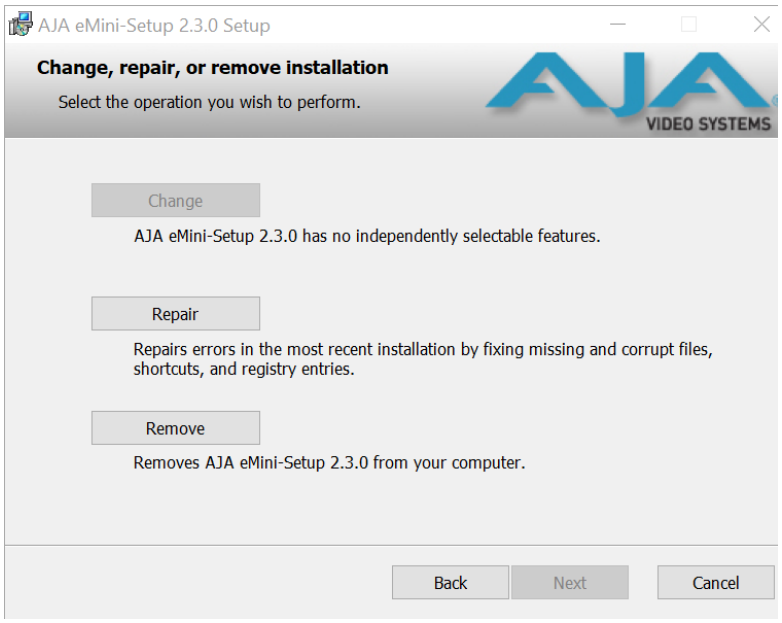


17. Click **Finish**.

NOTE: *If the eMini-Setup application already exists on the PC, the following dialog window appears. In some instances, Windows may require uninstalling an earlier version of eMini-Setup before installing a new version.*

eMini-Setup Re-Installation

Figure 84. eMini-Setup Wizard, Re-installation



With this screen you can **Repair** (reinstall) or **Remove** (uninstall) eMini-Setup on the PC.

NOTE: After initial installation and/or at other times, Windows application icons can sometimes become hidden on the desktop. Several possible solutions exist, the easiest being to right-click on the desktop, select View, and checkmark 'Show Desktop Icons'.

macOS Installation

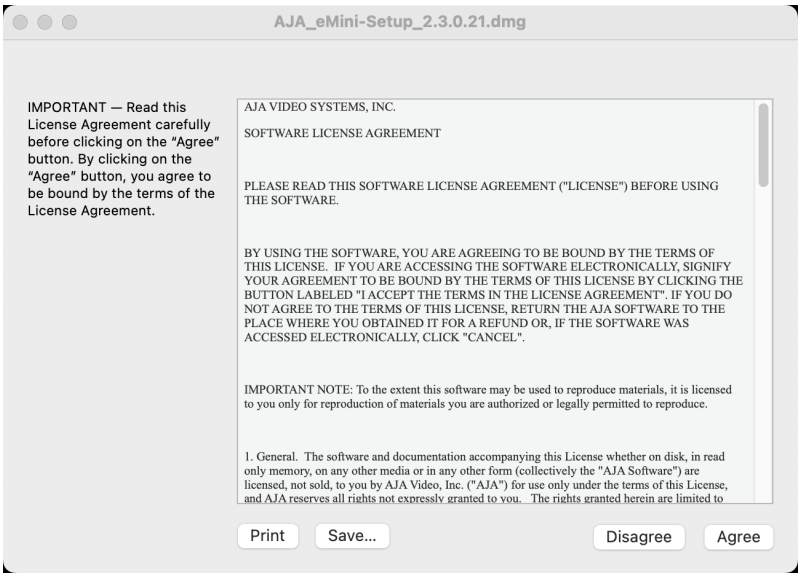
To install eMini-Setup for KUMO Series Routers and Control Panels on macOS:

1. Start from https://www.aja.com/nav/products-routers.
2. Navigate to the relevant KUMO product page.
3. Click on **Downloads** (located just below the KUMO product picture).
4. On the Downloads pane which opens, click the **macOS** icon to the right of 'Software.'
5. Click to download **AJA eMini-Setup v(n.n) for macOS**.

NOTE: The latest version may have a slightly different filename than we show here, and will show the particular version number in the filename.

6. Click **Download**.
7. You will see a popup to **Sign-up with AJA!**. You may choose to either sign-up and then download, or, to skip the sign-up by clicking on **Continue to Download without Sign-up**.
8. Download the appropriate **AJA eMini-Setup v(n.n) for (OS)** installer file.
9. After downloading on macOS, the installer application will be automatically located in your computer's "downloads" folder, inside an 'eMini-Setup v2.(n) for Mac' folder, which includes both the release notes .PDF and the application installer .dmg file. (There is no need to unzip a .zip file).
10. Double- click on the **AJA_eMini-Setup_2.(n.n.n).dmg** file to launch the installer.

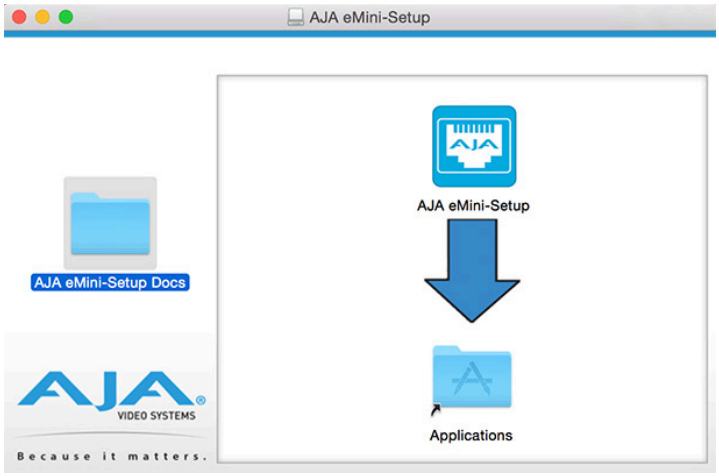
*Figure 85. Accepting the Software License**



*NOTE: *The eMini-Setup version number shown in this chapter's figures may not reflect your actual downloaded eMini-Setup version number.*

11. Click **Agree**.

Figure 86. eMini-Setup Mac Installer



12. To complete the installation drag the **AJA eMini-Setup** icon to the **Applications** folder icon.

Running eMini-Setup

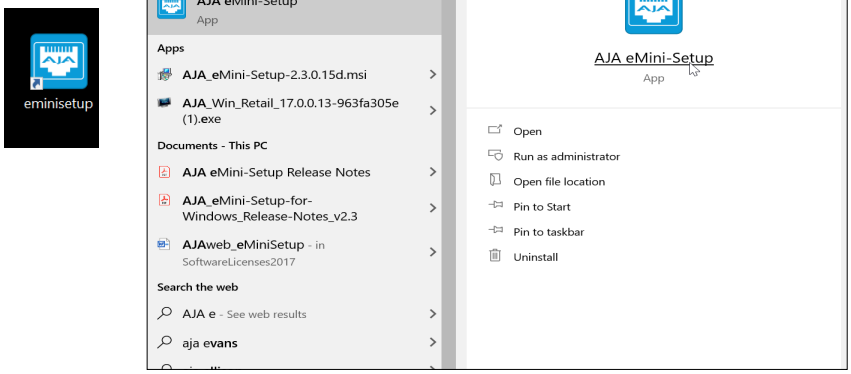
If not connected, connect your KUMO device to the PC or Mac via the supplied USB cable, and also connect the external power supply (supplied) to the KUMO.

If not already done, Acquire eMini-Setup (see *"Acquiring eMini-Setup" on page 91)* and Install the eMini-Setup application (see *"Installing eMini-Setup" on page 91)*.

Windows Startup

To run eMini-Setup on a Windows PC, double-click on the **AJA eMini-Setup** icon on your desktop. Or use the Windows Task Bar Search to enter "eMini-Setup" and the Icon to launch the installed application will appear.

Figure 87. Launching eMini-Setup application on Windows

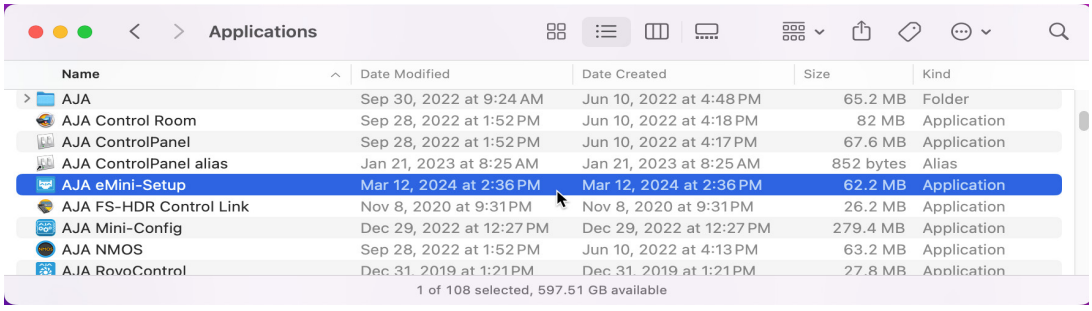


To run eMini-Setup on a Mac, open the Applications folder and locate the AJA eMini-Setup application. Double-click the application to launch it.

macOS Startup

To run eMini-Setup on a Mac, open the Applications folder and locate the AJA eMini-Setup application. Double-click the application to launch it.

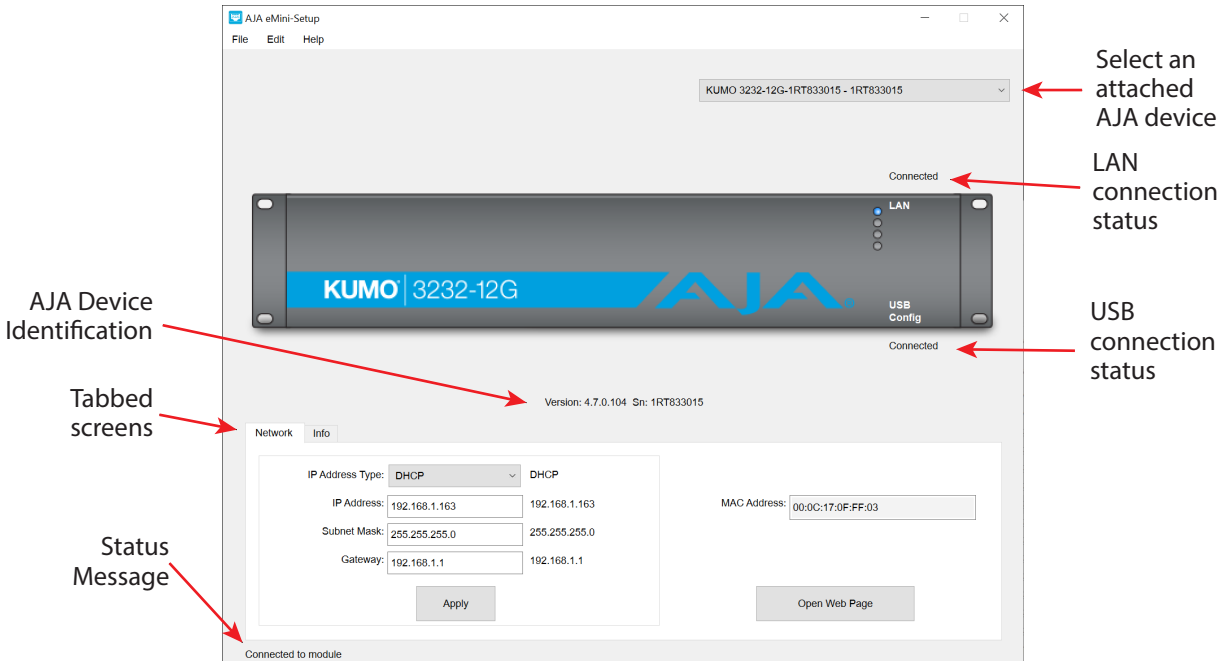
Figure 88. Launching eMini-Setup application on macOS



Operating eMini-Setup

The eMini-Setup application provides a graphical user interface for viewing settings, modifying settings, and updating firmware.

Figure 89. Example eMini-Setup Screen



AJA Device Selection

Selecting an AJA device with the pull down menu on the upper right connects eMini-Setup to that AJA device.

AJA Device Identification

- Version - The version of firmware installed in the AJA device is displayed below the graphic.
- Sn - This is the factory set unique serial number of your AJA device. If you ever call AJA Support for service, you may be asked for this number.

File Menu

The File drop-down menu on the eMini-Setup application bar has a Revert to Factory Settings menu item that allows you to change the settings back to the AJA device's factory defaults.

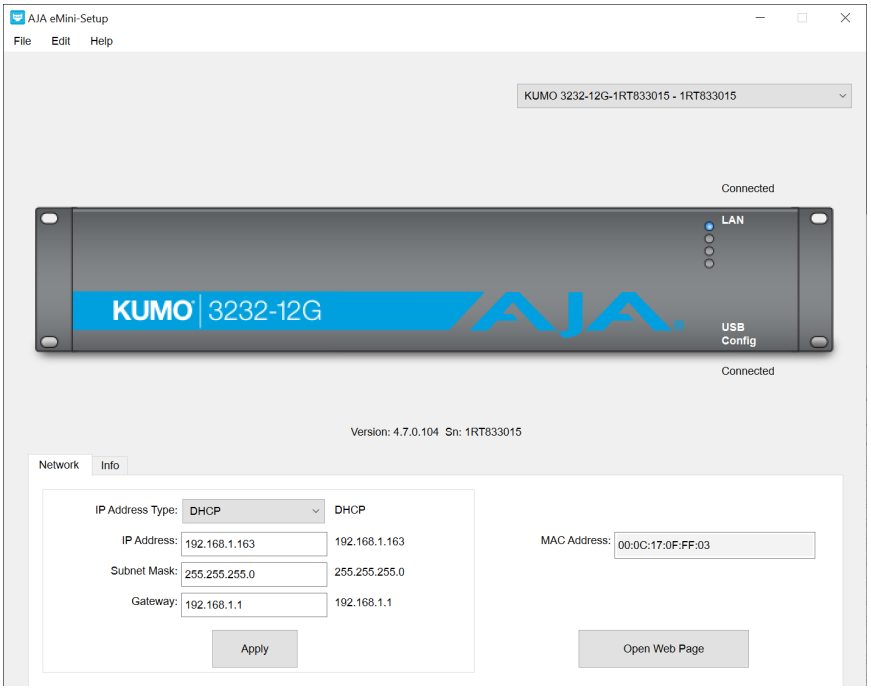
Edit Menu

The Edit drop-down menu has standard Cut, Copy and Paste functions for editing text.

Help Menu

The Help drop-down menu has a link to the AJA device's manual.

Control Network Tab Screen



This tab lets you change the network setup on the connected AJA device. You must click the **Apply** button to initiate any IP address changes.

IP Address Type

Choose from:

- DHCP
- Static IP Address.

IP Address

The current IP address is displayed when an IP Address Type of **Static** is selected. A different static IP address can be entered.

Subnet Mask

The current Subnet Mask is displayed. A different netmask can be entered.

Gateway

The current Gateway address is displayed. A different IP address can be entered.

If your KUMO needs to communicate to servers on another LAN or WAN, you have to enter the address of the computer/router that is making that external connection. If all of your devices, and the systems they need to talk to, are on a single LAN, then you can enter any unused LAN address as the Gateway here.

NOTE: Group functionality requires all participating devices have the same valid Gateway address.

UPnP Host

Select **Enable** or **Disable** to control whether the AJA device makes itself visible for Windows network browsing.

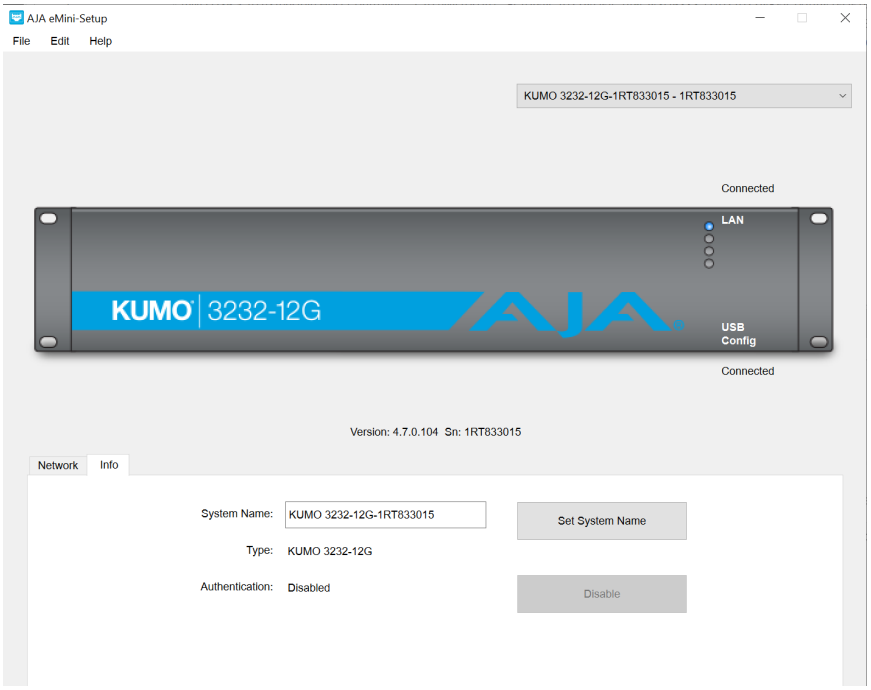
MAC Address

This is the permanent MAC address of the AJA device.

Open Web Page

After successfully configuring the KUMO's network settings and while connected to the network, clicking on this button opens the KUMO's internal web page, allowing complete remote control of the device.

Info Tab Screen



This tab provides basic information about the connected AJA device. This information is useful when calling AJA Support for service or technical support.

System Name

This field allows you to give your AJA device a unique name. This can be useful if you have several attached to a Mac/PC via USB so you can distinguish between them easily. Enter the desired name, then click Set System Name.

NOTE: International characters are fully supported in the system name.

Type

This is the factory set model name of the AJA device.

Authentication

If Authentication has been Enabled on the web browser Access tab, you can disable the security feature by clicking on the Disable button.

Appendix A – Specifications

KUMO 6464-12G Tech Specs

Video Formats

- 270 Mbps, 1.5 Gbps, 3 Gbps, 6 Gbps, 12 Gbps SDI
- 270 Mbps DVB-ASI

Video Input Digital

- 12G-SDI Inputs
- 64x 12G-SDI BNC, SMPTE-259/292/424/2081/2082

Video Output Digital

- 12G-SDI Outputs
- 64x 12G-SDI BNC, SMPTE-259/292/424/2081/2082
- Noninverting

Ancillary Data

- Passes all SDI embedded ancillary data including audio

Salvo

- Up to 8 Salvos can be configured and saved in each KUMO router

Cable Equalization

(Belden 1694A)

- 12 Gbps, up to 50m
- 6 Gbps, up to 90m
- 3 Gbps, up to 140m
- 1.5 Gbps, up to 200m
- 270 Mbps, up to 390m
- Automatic operation

Reclocking

- 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.967 Gbps, 2.970 Gbps, 5.934 Gbps, 5.940 Gbps, 11.868 Gbps, 11.880 Gbps - Auto Select

Switching Modes

- Single/Normal, Dual, and Quad link modes
- Switches in vertical blanking per SMPTE RP-168

Control Panel Compatibility

- AJA KUMO CP (First 32 I/O in Single/Normal, all I/O in Dual or Quad mode) – 1RU X-Y Ethernet control panel
- AJA KUMO CP2 (Single/Normal, Dual or Quad mode) – 2RU X-Y Ethernet control panel

Reference Input

- External, 2x BNC
- Looping, nonterminating
- Blackburst or tri-level sync

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Supports AJA KUMO Ethernet control panels, direct connect or networked
- Basic support for Grass Valley Native Protocol
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Serial Interface

- 1x DB-9 Female, RS-422
- Basic support for Grass Valley Native Protocol
- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

Size (w x d x h)

- 4RU - 17.4" x 1.55" x 7.00" (441.96 x 39.37 x 177.8 mm)

Weight

- 9.2 lbs (4.2 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 50W typical, 72W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 84W
  - Optional redundant AC adapter sold separately, KUMO-84W-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO 6464 Tech Specs

Video Formats

- 270 Mbps, 1.5 Gbps, 3 Gbps SDI
- 270 Mbps DVB-ASI

Video Input Digital

- 3G-SDI Inputs
- 64x BNC, SMPTE-259/292/424

Video Output Digital

- 3G-SDI Outputs
- 64x BNC, SMPTE-259/292/424
- Noninverting

Ancillary Data

- Passes all SDI embedded ancillary data including audio

Salvo

- Up to 8 Salvos can be configured and saved in each KUMO router

Cable Equalization

(Belden 1694A)

- 3 Gbps, up to 140m
- 1.5 Gbps, up to 200m
- 270 Mbps, up to 390m
- Automatic operation

Reclocking

- 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.966 Gbps, 2.970 Gbps - Auto Select

Switching Modes

- Single/Normal, Dual, and Quad link modes
- Switches in vertical blanking per SMPTE RP-168

Control Panel Compatibility

- AJA KUMO CP (First 32 I/O in Single/Normal, all I/O in Dual or Quad mode) – 1RU X-Y Ethernet control panel
- AJA KUMO CP2 (Single/Normal, Dual or Quad mode) – 2RU X-Y Ethernet control panel

Reference Input

- External, 2x BNC
- Looping, nonterminating
- Blackburst or tri-level sync

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Supports AJA KUMO Ethernet control panels, direct connect or networked
- Basic support for Grass Valley Native Protocol
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Serial Interface

- 1x DB-9 Female, RS-422
- Basic support for Grass Valley Native Protocol

- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

Size (w x d x h)

- 4RU - 17.4" x 1.54" x 7.00" (441.96 x 39.12 x 177.8 mm)

Weight

- 9.2 lbs (4.2 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 32W typical, 36W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO 3232-12G Tech Specs

Video Formats

- 270 Mbps, 1.5 Gbps, 3 Gbps, 6 Gbps, 12 Gbps SDI
- 270 Mbps DVB-ASI

Video Input Digital

- 12G-SDI Inputs
- 32x 12G-SDI BNC, SMPTE-259/292/424/2081/2082

Video Output Digital

- 12G-SDI Outputs
- 32x 12G-SDI BNC, SMPTE-259/292/424/2081/2082
- Noninverting

Ancillary Data

- Passes all SDI embedded ancillary data including audio

Salvo

- Up to 8 Salvos can be configured and saved in each KUMO router

Cable Equalization

(Belden 1694A)

- 12 Gbps, up to 50m
- 6 Gbps, up to 90m
- 3 Gbps, up to 140m
- 1.5 Gbps, up to 200m
- 270 Mbps, up to 390m
- Automatic operation

Reclocking

- 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.967 Gbps, 2.970 Gbps, 5.934 Gbps, 5.940 Gbps, 11.868 Gbps, 11.880 Gbps - Auto Select

Switching Modes

- Single/Normal, Dual, and Quad link modes
- Switches in vertical blanking per SMPTE RP-168

Control Panel Compatibility

- AJA KUMO CP – 1RU X-Y Ethernet control panel
- AJA KUMO CP2 – 2RU X-Y Ethernet control panel

Reference Input

- External, 2x BNC
- Looping, nonterminating
- Blackburst or tri-level sync

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Supports AJA KUMO Ethernet control panels, direct connect or networked
- Basic support for Grass Valley Native Protocol
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Serial Interface

- 1x DB-9 Female, RS-422
- Basic support for Grass Valley Native Protocol

- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

Size (w x d x h)

- 2RU - 17.4" x 1.54" x 3.50" (441.96 x 39.12 x 88.9 mm)

Weight

- 4.6 lb (2.1 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 24W typical, 25.2W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO 3232 Tech Specs

Video Formats

- 270 Mbps, 1.5 Gbps, 3 Gbps SDI
- 270 Mbps DVB-ASI

Video Input Digital

- 3G-SDI Inputs
- 32x BNC, SMPTE-259/292/424

Video Output Digital

- 3G-SDI Outputs
- 32x BNC, SMPTE-259/292/424
- Noninverting

Ancillary Data

- Passes all SDI embedded ancillary data including audio

Salvo

- Up to 8 Salvos can be configured and saved in each KUMO router

Cable Equalization

(Belden 1694A)

- 3 Gbps, up to 140m
- 1.5 Gbps, up to 200m
- 270 Mbps, up to 390m
- Automatic operation

Reclocking

- 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.966 Gbps, 2.970 Gbps - Auto Select

Switching Modes

- Single/Normal, Dual, and Quad link modes
- Switches in vertical blanking per SMPTE RP-168

Control Panel Compatibility

- AJA KUMO CP – 1RU X-Y Ethernet control panel
- AJA KUMO CP2 – 2RU X-Y Ethernet control panel

Reference Input

- External, 2x BNC
- Looping, nonterminating
- Blackburst or tri-level sync

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Supports AJA KUMO Ethernet control panels, direct connect or networked
- Basic support for Grass Valley Native Protocol
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Serial Interface

- 1x DB-9 Female, RS-422
- Basic support for Grass Valley Native Protocol
- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

Size (w x d x h)

- 2RU - 17.4" x 1.54" x 3.5" (441.96 x 39.12 x 88.9 mm)

Weight

- 4.6 lb (2.1 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 18W typical, 43.2W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO 1616-12G Tech Specs

Video Formats

- 270 Mbps, 1.5 Gbps, 3 Gbps, 6 Gbps, 12 Gbps SDI
- 270 Mbps DVB-ASI

Video Input Digital

- 12G-SDI Inputs
- 16x 12G-SDI BNC, SMPTE-259/292/424/2081/2082

Video Output Digital

- 12G-SDI Outputs
- 16x 12G-SDI BNC, SMPTE-259/292/424/2081/2082
- Noninverting

Ancillary Data

- Passes all SDI embedded ancillary data including audio

Salvo

- Up to 8 Salvos can be configured and saved in each KUMO router

Cable Equalization

(Belden 1694A)

- 12 Gbps, up to 50m
- 6 Gbps, up to 90m
- 3 Gbps, up to 140m
- 1.5 Gbps, up to 200m
- 270 Mbps, up to 390m
- Automatic operation

Reclocking

- 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.967 Gbps, 2.970 Gbps, 5.934 Gbps, 5.940 Gbps, 11.868 Gbps, 11.880 Gbps - Auto Select

Switching Modes

- Single/Normal, Dual, and Quad link modes
- Switches in vertical blanking per SMPTE RP-168

Control Panel Compatibility

- AJA KUMO CP – 1RU X-Y Ethernet control panel
- AJA KUMO CP2 – 2RU X-Y Ethernet control panel

Reference Input

- External, 2x BNC
- Looping, nonterminating
- Blackburst or tri-level sync

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Supports AJA KUMO Ethernet control panels, direct connect or networked
- Basic support for Grass Valley Native Protocol
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Serial Interface

- 1x DB-9 Female, RS-422
- Basic support for Grass Valley Native Protocol
- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

Size (w x d x h)

- 1RU - 17.4" x 1.54" x 1.75" (441.96 x 39.12 x 44.45 mm)

Weight

- 1.4 lb (0.7 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 16W typical, 18W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO 1616 Tech Specs

Video Formats

- 270 Mbps, 1.5 Gbps, 3 Gbps SDI
- 270 Mbps DVB-ASI

Video Input Digital

- 3G-SDI Inputs
- 16x BNC, SMPTE-259/292/424

Video Output Digital

- 3G-SDI Outputs
- 16x BNC, SMPTE-259/292/424
- Noninverting

Ancillary Data

- Passes all SDI embedded ancillary data including audio

Salvo

- Up to 8 Salvos can be configured and saved in each KUMO router

Cable Equalization

(Belden 1694A)

- 3 Gbps, up to 140m
- 1.5 Gbps, up to 200m
- 270 Mbps, up to 390m
- Automatic operation

Reclocking

- 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.966 Gbps, 2.970 Gbps - Auto Select

Switching Modes

- Single/Normal, Dual, and Quad link modes
- Switches in vertical blanking per SMPTE RP-168

Control Panel Compatibility

- AJA KUMO CP – 1RU X-Y Ethernet control panel
- AJA KUMO CP2 – 2RU X-Y Ethernet control panel

Reference Input

- External, 2x BNC
- Looping, nonterminating
- Blackburst or tri-level sync

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Supports AJA KUMO Ethernet control panels, direct connect or networked
- Basic support for Grass Valley Native Protocol
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Serial Interface

- 1x DB-9 Female, RS-422
- Basic support for Grass Valley Native Protocol
- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

Size (w x d x h)

- 1RU - 17.4" x 1.54" x 1.75" (441.96 x 39.12 x 44.45 mm)

Weight

- 1.4 lb (0.7 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 13W typical, 21.6W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO 1604 Tech Specs

Video Formats

- 270 Mbps, 1.5 Gbps, 3 Gbps SDI
- 270 Mbps DVB-ASI

Video Input Digital

- 3G-SDI Inputs
- 16x BNC, SMPTE-259/292/424

Video Output Digital

- 3G-SDI Outputs
- 4x BNC, SMPTE-259/292/424
- Noninverting

Ancillary Data

- Passes all SDI embedded ancillary data including audio

Salvo

- Up to 8 Salvos can be configured and saved in each KUMO router

Cable Equalization

(Belden 1694A)

- 3 Gbps, up to 140m
- 1.5 Gbps, up to 200m
- 270 Mbps, up to 390m
- Automatic operation

Reclocking

- 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.966 Gbps, 2.970 Gbps - Auto Select

Switching Modes

- Single/Normal, Dual, and Quad link modes
- Switches in vertical blanking per SMPTE RP-168

Control Panel Compatibility

- AJA KUMO CP – 1RU X-Y Ethernet control panel
- AJA KUMO CP2 – 2RU X-Y Ethernet control panel

Reference Input

- External, 2x BNC
- Looping, nonterminating
- Blackburst or tri-level sync

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Supports AJA KUMO Ethernet control panels, direct connect or networked
- Basic support for Grass Valley Native Protocol
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Serial Interface

- 1x DB-9 Female, RS-422
- Basic support for Grass Valley Native Protocol
- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

Size (w x d x h)

- 1RU - 17.4" x 1.54" x 1.75" (441.96 x 39.12 x 44.45 mm)

Weight

- 1.2 lb (0.6 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 7W typical, 9.6W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO CP2 Tech Specs

User Interface

- 80 buttons with removable overcap for lens chips
- Includes factory installed lens chip set
- High and Low button tally indication, configurable brightness
- Controls up to four KUMO routers
- Panel Lock feature
- Destination Lock feature

Router Support

- KUMO 1604
- KUMO 1616
- KUMO 3232

- KUMO 6464
- KUMO 1616-12G
- KUMO 3232-12G
- KUMO 6464-12G

Salvo

- 8 Salvos buttons can be enabled to trigger a KUMO router's configured salvos.

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Size (w x d x h)

- 2RU - 17.4" x 1.3" x 3.5" (441.96 x 33.02 x 88.90 mm)

Weight

- 2.1 lb (1.0 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 4W typical, 9.6W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

KUMO CP Tech Specs

User Interface

- 40 buttons with removable overcap for lens chips
- Includes factory installed lens chip set
- High and Low button tally indication, configurable brightness
- Controls up to four KUMO routers
- Panel Lock feature
- Destination Lock feature

Router Support

- KUMO 1604
- KUMO 1616
- KUMO 3232
- KUMO 6464 (First 32 I/O in Single/Normal Mode)
- KUMO 1616-12G
- KUMO 3232-12G

- KUMO 6464-12G (First 32 I/O in Single/Normal Mode)

Network Interface

- 1x RJ-45, 10/100/1000 Ethernet
- Embedded web server for remote control

USB Interface

- 1x Mini-USB for IP configuration using AJA eMini-Setup

Size (w x d x h)

- 1RU - 17.4" x 1.3" x 1.75" (441.96 x 33.02 x 44.45 mm)

Weight

- 1.2 lb (0.6 kg)

Power

- External power supply required
  - Enclosure: Dual, redundant, 10-14VDC regulated, 4-pin Molex, 2.5W, typical, 6W max.
  - AC adapter, included: 100-240VAC, 50/60 Hz, universal input, 60W
  - Optional redundant AC adapter sold separately, KUMO-PWR

Environment

- Safe Operating Temperature: 0 to 40 C (32 to 104 F)
- Safe Storage Temperature (Power OFF): -40 to 60 C (-40 to 140 F)
- Operating Relative Humidity: 10-90% noncondensing
- Operating Altitude: <3,000 meters (<10,000 feet)

GVG Native Protocol Support

Introduced with v2.0 firmware, KUMO provides basic support for the GVG Native Protocol, aka Series 7000 Native Protocol. GVG Native Protocol, using:

- 1 serial connection via RS-422 with a 9-pin connector
- TCP/Ethernet for up to 32 connections

For more information, refer to Grass Valley documentation at:

http://grassvalley.jp/pdf/RoutingProductsProtocolManual_2.pdf

NP Commands Supported

Background:

- BK, I; Connect, heartbeat
- BK, N; Gets system name
- BK, T; Gets software title
- BK, t; Gets protocol software
- BK, R; Gets software version
- BK, D; Clears flags associated with the QD,no_parameter command. After BK,D is sent, the next QD,no_parameter command will result in destination statuses for all destinations being returned.
- BK, d; Gets device name
- BK, F; Gets source, destination or salvo name changes
- BK, E; Sets or returns status of Level 4 Echo

Queries:

- QI, {dstIndex = 1..maxDst},{lvlIndex = 0}; Gets dest status by index and level
- Qi, {dstIndex = 1..maxDst},{lvlIndex = 0}; Gets dest status by Index and level
- QN, S; Gets all srcs by name
- QN, IS; Gets all srcs, name & index
- QN, D; Gets all dests, names
- QN, ID; Gets all dests, name & indx
- QN, L; Gets levels (hard coded as "Kumo_Lev0")
- QD, {destname}; Gets: protect {On/Off}, chop{=OFF}, {sourceName}, level{= lev0}
- Qd, {destname}; Gets: protect {On/Off}, chop{=OFF}, {sourceName}, level{= lev0}

Control:

- TD, {destname,srcname}; Takes by name
- TI, {dstIndex = 1..maxDst},{srcIndex = 1..maxSrc}; Takes by index
- TS, {salvo_name}; Takes Salvo
- PR, {destname, levelmask}; Sets lock for given dest
- UP, {destname, levelmask}; Unsets lock for given dest

RS-422 Control Specifications (Routers)

NOTE: All KUMO Routers support RS-422 control. KUMO Control Panels do not support RS-422 control.

- Baud Rate: 38400
- Parity: None
- Stop Bit: 1
- Data Bits: 8

Serial Interface

- 1x DB-9 Female, RS-422
- Grass Valley Native Protocol
- 9-pin D-connector pinout is as follows:

1	GND
2	TX-
3	RX+
4	GND
5	No Connection
6	GND
7	TX+
8	RX-
9	GND
Shell	GND

NOTE: Older KUMO 1604, 1616, and 3232 routers with a serial number ending in -R0 have different pinouts. See "Older Model RS-422 Adapter" on page 9 for more information.

Appendix B – Safety & Compliance

Federal Communications Commission (FCC) Compliance Notices

Class A Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15, Subpart B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian ICES Statement

Canadian Department of Communications Radio Interference Regulations

This digital apparatus does not exceed the Class A limits for radio-noise emissions from a digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications. This Class A digital apparatus complies with Canadian ICES-003.

Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada. Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

European Union, European Free Trade Association (EFTA) and United Kingdom Regulatory Compliance

This equipment may be operated in the countries that comprise the member countries of the European Union, European Free Trade Association and the United Kingdom. These countries, listed in the following paragraph, are referred to as The European Community throughout this document:

AUSTRIA, BELGIUM, BULGARIA, CROATIA, CZECH REPUBLIC, DENMARK, ESTONIA, FINLAND, FRANCE, GERMANY, GREECE, HUNGARY, ICELAND, IRELAND, ITALY, LATVIA, LIECHTENSTEIN, LITHUANIA, LUXEMBOURG, MALTA, NETHERLANDS, NORWAY, POLAND, PORTUGAL, REPUBLIC OF CYPRUS, ROMANIA, SLOVAK REPUBLIC, SLOVENIA, SPAIN, SWEDEN, SWITZERLAND, UNITED KINGDOM

Declaration of Conformity

Marking by these symbols indicates compliance with the Essential Requirements of the EMC Directive of the European Union 2014/30/EU.

This equipment meets the following conformance standards:

Safety

EN 62368-1: 2014 + A11 (T-Mark License)

IEC 62368-1: 2014; (CB Scheme Certificate)

Emissions

EN 55032: 2012, CISPR 32: 2015,

EN 61000-3-2: 2014, EN 61000-3-3: 2013

Immunity

EN 55035: 2017 + A11: 2020, EN 61000-4-2: 2009, EN 61000-4-3: 2006+ A1: 2008 + A2: 2010, EN 61000-4-4: 2012, EN 61000-4-5: 2014/A1: 2017, EN 61000-4-6: 2014, EN 61000-4-8: 2010, EN 61000-4-11: 2020

Environments: E2, E3 and E4

The product is also licensed for additional country specific standards as required for the International Marketplace.

Warning! This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.

Achtung! Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention! Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

The product is also licensed for additional country specific standards as required

Recycling Notice

This symbol on the product or its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste for recycling, please contact your local authority, or where you purchased your product.

Korea KCC Compliance Statement

사 용 자 안 내 문
이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정 용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

Taiwan Compliance Statement

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

This is a Class A product based on the standard of the Bureau of Standards, Metrology and Inspection (BSMI) CNS 13438, Class A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Japan Compliance Statement

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

This is a Class A product based on the standard of the VCCI Council (VCCI-32: 2016). If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

China Compliance Statement

This product has been tested to the following Chinese standards:

GB/T 9254.1-2021; GB 4943.1-2022; GB 17625.1-2022

This is to certify that the above mentioned product(s) complies with the requirements of certification rules of CQC12-045800-2022 under certificate number CQC22001369272.

Translated Warning and Caution Messages

The following caution statements, warning conventions, and warning messages apply to this product and manual.

 Warning Symbol  Caution Symbol

Before Operating Please Read These Instructions

Warning! Read and follow all warning notices and instructions marked on the product or included in the documentation.

Avertissement! Lisez et conformez-vous à tous les avis et instructions d'avertissement indiqués sur le produit ou dans la documentation.

Warnung! Lesen und befolgen Sie die Warnhinweise und Anweisungen, die auf dem Produkt angebracht oder in der Dokumentation enthalten sind.

¡Advertencia! Lea y siga todas las instrucciones y advertencias marcadas en el producto o incluidas en la documentación.

Aviso! Leia e siga todos os avisos e instruções assinalados no produto ou incluídos na documentação.

Avviso! Leggere e seguire tutti gli avvisi e le istruzioni presenti sul prodotto o inclusi nella documentazione.

Warning! Do not use this device near water and clean only with a dry cloth.

Avertissement! N'utilisez pas cet appareil près de l'eau et nettoyez-le seulement avec un tissu sec.

Warnung! Das Gerät nicht in der Nähe von Wasser verwenden und nur mit einem trockenen Tuch säubern.

¡Advertencia! No utilice este dispositivo cerca del agua y límpielo solamente con un paño seco.

Aviso! Não utilize este dispositivo perto da água e limpe-o somente com um pano seco.

Avviso! Non utilizzare questo dispositivo vicino all'acqua e pulirlo soltanto con un panno asciutto.

Warning! Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

Avertissement! Ne bloquez aucune ouverture de ventilation. Suivez les instructions du fabricant lors de l'installation.

Warnung! Die Lüftungsöffnungen dürfen nicht blockiert werden. Nur gemäß den Anweisungen des Herstellers installieren.

¡Advertencia! No bloquee ninguna de las aberturas de la ventilación. Instale de acuerdo con las instrucciones del fabricante.

Aviso! Não obstrua nenhuma das aberturas de ventilação. Instale de acordo com as instruções do fabricante.

Avviso! Non ostruire le aperture di ventilazione. Installare in conformità con le istruzioni del fornitore.

Warning! Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

Avertissement! N'installez pas l'appareil près d'une source de chaleur telle que des radiateurs, des bouches d'air de chauffage, des fourneaux ou d'autres appareils (amplificateurs compris) qui produisent de la chaleur.

Warnung! Nicht in der Nähe von Wärmequellen wie Heizkörpern, Heizregistern, Öfen oder anderen Wärme erzeugenden Geräten (einschließlich Verstärkern) aufstellen.

¡Advertencia! No instale cerca de fuentes de calor tales como radiadores, registros de calor, estufas u otros aparatos (incluidos amplificadores) que generan calor.

Aviso! Não instale perto de nenhuma fonte de calor tal como radiadores, saídas de calor, fogões ou outros aparelhos (incluindo amplificadores) que produzam calor.

Avviso! Non installare vicino a fonti di calore come termosifoni, diffusori di aria calda, stufe o altri apparecchi (amplificatori compresi) che emettono calore.

Warning! Unplug this device during lightning storms or when unused for long periods of time.

Avertissement! Débranchez cet appareil pendant les orages avec éclairsou s'il est inutilisé pendant de longues périodes.

Warnung! Das Gerät ist bei Gewitterstürmen oder wenn es über lange Zeiträume ungenutzt bleibt vom Netz zu trennen.

¡Advertencia! Desenchufe este dispositivo durante tormentas eléctricas o cuando no se lo utilice por largos periodos del tiempo.

Aviso! Desconecte este dispositivo da tomada durante trovoadas ou quando não é utilizado durante longos períodos de tempo.

Avviso! Utilizzare soltanto i collegamenti e gli accessori specificati e/o venduti dal produttore, quali il treppiedi e l'esoscheletro.

Warning! Do not open the chassis. There are no user-serviceable parts inside. Opening the chassis will void the warranty unless performed by an AJA service center or licensed facility.

Avertissement! Ne pas ouvrir le châssis. Aucun élément à l'intérieur du châssis ne peut être réparé par l'utilisateur. La garantie sera annulée si le châssis est ouvert par toute autre personne qu'un technicien d'un centre de service ou d'un établissement agréé AJA.

Warnung! Öffnen Sie das Gehäuse nicht. Keine der Geräteteile können vom Benutzer gewartet werden. Durch das Öffnen des Gehäuses wird die Garantie hinfällig, es sei denn, solche Wartungsarbeiten werden in einem AJA-Service-Center oder einem lizenzierten Betrieb vorgenommen.

¡Advertencia! No abra el chasis. El interior no contiene piezas reparables por el usuario. El abrir el chasis anulará la garantía a menos que se lo haga en un centro de servicio AJA o en un local autorizado.

Advertência! Não abra o chassi. Não há internamente nenhuma peça que permita manutenção pelo usuário. Abrir o chassi anula a garantia, a menos que a abertura seja realizada por uma central de serviços da AJA ou por um local autorizado.

Avvertenza! Non aprire lo chassis. All'interno non ci sono parti riparabili dall'utente. L'apertura dello chassis invaliderà la garanzia se non viene effettuata da un centro ufficiale o autorizzato AJA.

Warning! Refer all servicing to qualified service personnel. Servicing is required when the device has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the device, the device has been exposed to rain or moisture, does not operate normally, or has been dropped.

Avertissement! Référez-vous au personnel de service qualifié pour tout entretien. L'entretien est exigé quand l'appareil a été endommagé de quelque manière que ce soit, par exemple lorsque le cordon d'alimentation ou la prise sont endommagés, que du liquide a été versé ou des objets sont tombés dans l'appareil, que l'appareil a été exposé à la pluie ou à l'humidité, ne fonctionne pas normalement ou est tombé.

Warnung! Das Gerät sollte nur von qualifizierten Fachkräften gewartet werden. Eine Wartung ist fällig, wenn das Gerät in irgendeiner Weise beschädigt wurde, wie bei beschädigtem Netzkabel oder Netzstecker, falls Flüssigkeiten oder Objekte in das Gerät gelangen, das Gerät Regen oder Feuchtigkeit ausgesetzt wurde, nicht ordnungsgemäß funktioniert oder fallen gelassen wurde.

¡Advertencia! Consulte al personal calificado por cuestiones de reparación. El servicio de reparación se requiere cuando el dispositivo ha recibido cualquier tipo de daño, por ejemplo cable o espigas dañadas, se ha derramado líquido o se han caído objetos dentro del dispositivo, el dispositivo ha sido expuesto a la lluvia o humedad, o no funciona de modo normal, o se ha caído.

Aviso! Remeta todos os serviços de manutenção para o pessoal de assistência qualificado. A prestação de serviços de manutenção é exigida quando o dispositivo foi danificado mediante qualquer forma, como um cabo de alimentação ou ficha que se encontra danificado/a, quando foi derramado líquido ou caíram objectos sobre o dispositivo, quando o dispositivo foi exposto à chuva ou à humidade, quando não funciona normalmente ou quando foi deixado cair.

Avviso! Fare riferimento al personale qualificato per tutti gli interventi di assistenza. L'assistenza è necessaria quando il dispositivo è stato danneggiato in qualche modo, ad esempio se il cavo di alimentazione o la spina sono danneggiati, è stato rovesciato del liquido è stato rovesciato o qualche oggetto è caduto nel dispositivo, il dispositivo è stato esposto a pioggia o umidità, non funziona correttamente o è caduto.

Warning! Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

Avertissement! La sécurité de la prise polarisée ou de la prise de type mise à la terre ne doit en aucun cas être empêchée de fonctionner. Une prise polarisée a deux broches, l'une étant plus large que l'autre. Une prise de type mise à la terre a deux broches et une troisième broche pour la mise à la terre. La broche large ou la troisième broche sont fournies pour votre sécurité. Si la prise fournie ne s'insère pas dans votre prise femelle, consultez un électricien pour le remplacement de la prise femelle obsolète.

Warnung! Der Sicherheitszweck des gepolten bzw. Schukosteckers ist zu berücksichtigen. Ein gepolter Stecker verfügt über zwei Pole, von denen einer breiter als der andere ist. Ein Schukostecker verfügt neben den zwei Polen noch über einen dritten Pol zur Erdung. Der breite Pol bzw. der Erdungspol dienen der Sicherheit. Wenn der zur Verfügung gestellte Stecker nicht in Ihren Anschluss passt, konsultieren Sie einen Elektriker, um den veralteten Anschluss zu ersetzen.

¡Advertencia! No eche por tierra la finalidad del tipo de enchufe polarizado con conexión a tierra. Un enchufe polarizado tiene dos espigas, una más ancha que la otra. Un enchufe con conexión a tierra tiene dos espigas iguales y una tercera espiga que sirve para la conexión a tierra. La expiga ancha, o la tercera espiga, sirven para su seguridad. Si el enchufe suministrado no encaja en el tomacorriente, consulte con un electricista para reemplazar el tomacorriente obsoleto.

Aviso! Não anule a finalidade da segurança da ficha polarizada ou do tipo ligação terra. Uma ficha polarizada tem duas lâminas sendo uma mais larga do que a outra. Uma ficha do tipo de ligação à terra tem duas lâminas e um terceiro terminal de ligação à terra. A lâmina larga ou o terceiro terminal são fornecidos para sua segurança. Se a ficha fornecida não couber na sua tomada, consulte um electricista para a substituição da tomada obsoleta.

Avviso! Non compromettere la sicurezza della spina polarizzata o con messa a terra. Una spina polarizzata ha due spinotti, di cui uno più largo. Una spina con messa a terra ha due spinotti e un terzo polo per la messa a terra. Lo spinotto largo o il terzo polo sono forniti per motivi di sicurezza. Se la spina fornita non si inserisce nella presa di corrente, contattare un elettricista per la sostituzione della presa obsoleta.

Warning! Since the Mains plug is used as the disconnection for the device, it must remain readily accessible and operable.

Avertissement! Puisque la prise principale est utilisée pour débrancher l'appareil, elle doit rester aisément accessible et fonctionnelle.

Warnung! Da der Netzstecker als Trennvorrichtung dient, muss er stets zugänglich und funktionsfähig sein.

¡Advertencia! Puesto que el enchufe de la red eléctrica se utiliza como dispositivo de desconexión, debe seguir siendo fácilmente accesible y operable.

Aviso! Dado que a ficha principal é utilizada como a desconexão para o dispositivo, esta deve manter-se prontamente acessível e funcional.

Avviso! Poiché il cavo di alimentazione viene usato come dispositivo di sconnessione, deve rimane prontamente accessibile e operabile.

Warning! Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the device.

Avertissement! Protégez le cordon d'alimentation pour que l'on ne marche pas dessus ou qu'on le pince, en particulier au niveau des prises mâles, des réceptacles de convenance, et à l'endroit où il sort de l'appareil.

Warnung! Vermeiden Sie, dass auf das Netzkabel getreten oder das Kabel geknickt wird, insbesondere an den Steckern, den Steckdosen und am Kabelausgang am Gerät.

¡Advertencia! Proteja el cable de corriente para que no se le pise ni apriete, en especial cerca del enchufe, los receptáculos de conveniencia y el punto del que salen del equipo.

Aviso! Proteja o cabo de alimentação de ser pisado ou de ser comprimido particularmente nas fichas, em tomadas de parede de conveniência e no ponto de onde sai do dispositivo.

Avviso! Proteggere il cavo di alimentazione in modo che nessuno ci cammini sopra e che non venga schiacciato soprattutto in corrispondenza delle spine e del punto in cui esce dal dispositivo.

Warning! Disconnect the external AC power supply line cord(s) from the mains power before moving the unit.

Avertissement! Retirez le ou les cordons d'alimentation en CA de la source d'alimentation principale lorsque vous déplacez l'appareil.

Warnung! Trennen Sie die Wechselstrom-Versorgungskabel vom Netzstrom, bevor Sie das Gerät verschieben.

¡Advertencia! Cuando mueva la unidad desenchufe de la red eléctrica el/los cable(s) de la fuente de alimentación CA tipo brick.

Advertência! Remova os cabos CA de alimentação brick da rede elétrica ao mover a unidade.

Avvertenza! Scollegare il cavo dell'alimentatore quando si sposta l'unità.

Caution! To meet safety regulations for leakage current when using redundant power supplies, connect the KUMO dual power supplies to separate branch circuits.

Attention! Pour satisfaire aux réglementations sur la sécurité concernant le courant de fuite pendant l'utilisation d'appareils fournisseurs d'alimentation redondants, branchez les deux appareils fournisseurs d'alimentation KUMO à des circuits de dérivation distincts.

Achtung! Um die Einhaltung aller Sicherheitsbestimmungen bzgl. Ableitstrom beim Einsatz von redundanten Netzteilen sicherzustellen, schließen Sie die zwei KUMO-Netzteile bitte an separate Abzweigleitungen an.

¡Precaución! Para cumplir con las regulaciones de seguridad con el propósito de evitar pérdidas de corriente cuando se utiliza fuentes de alimentación múltiples, conecte las fuentes de alimentación dual KUMO a circuitos independientes.

Atenção! Para atender às regulamentações de segurança relativas à corrente de fuga ao usar fontes de alimentação redundantes, conecte as fontes de alimentação duplas KUMO para separar os circuitos derivados.

Attenzione! Per soddisfare i requisiti di sicurezza per la corrente di dispersione usando alimentatori ridondanti, collegare i doppi alimentatori KUMO per separare i circuiti derivati.

Caution! KUMO is designed to take advantage of its chassis to aid in cooling. It is common and expected for the densely populated 1616 chassis to have a warm front panel in normal, active operating conditions.

Attention! KUMO est conçu pour tirer parti de son châssis pour le refroidissement. Il est normal et attendu que le panneau frontal du très compact châssis 1616 demeure chaud dans des conditions normales de fonctionnement.

Achtung! Das Design von KUMO nutzt das Gehäuse zur Kühlung. Es ist normal und entspricht den Erwartungen, dass die Vorderseite des dicht bestückten 1616-Gehäuses bei normalen, aktiven Betriebsbedingungen warm ist.

¡Precaución! KUMO está diseñado para aprovechar el chasis para asistir en el proceso de enfriamiento. Es común y está previsto que el chasis 1616 densamente surtido de componentes tenga el panel frontal caliente en condiciones normales y activas de funcionamiento.

Atenção! O KUMO foi projetado para aproveitar seu chassi para auxiliar no resfriamento. É normal e esperado que o chassi 1616 densamente preenchido apresente um painel frontal aquecido em condições de operação normais e ativas.

Attenzione! KUMO sfrutta lo chassis per migliorare il raffreddamento. È normale per lo chassis 1616, data la concentrazione di cavi, che il panello anteriore si riscaldi durante la normale attività.

Caution! When attaching KUMO to a standard Static IP LAN, you must configure KUMO components with a new, unique IP address. You should first talk to your network administrator and find out how it should be connected (TCP/IP Static IP or DHCP). Your IT department will be able to supply the information you need to install KUMO on a LAN. Methods for assigning Static IP addressing are discussed in the KUMO Installation and Operation manual.

Attention! Lorsque vous branchez l'appareil KUMO à un réseau LAN IP fixe standard, vous devez configurer les composants KUMO avec une nouvelle adresse IP qui soit unique. Vous devez d'abord consulter votre administrateur réseau pour savoir comment connecter l'appareil (TCP/IP, IP fixe ou DHCP). Votre service informatique pourra vous fournir les informations nécessaires pour installer KUMO sur un réseau LAN. Les méthodes d'attribution des adresses IP fixes sont traitées dans le manuel d'installation et de fonctionnement de KUMO.

Achtung! Beim Anschließen von KUMO an ein standardmäßiges statisches IP-LAN müssen Sie die KUMO-Komponenten mit einer neuen, einzigartigen IP-Adresse konfigurieren. Fragen Sie bei Ihrem Netzwerkadministrator nach, wie der Anschluss erfolgen soll (TCP/IP statische IP oder DHCP). Ihre IT-Abteilung kann Ihnen zudem alle nötigen Informationen liefern, die Sie zur Installation von KUMO auf einem LAN benötigen. Die Methoden zur Zuweisung von statischen IP-Adressen werden im KUMO Installations- und Benutzerhandbuch besprochen.

¡Precaución! Cuando conecte KUMO a una LAN de IP estática estándar, deberá configurar los componentes KUMO con una dirección de IP nueva y única. Primero deberá contactarse con su administrador de red y averiguar el método de conexión (IP estática TCP/IP o DHCP). Su departamento de TI podrá suministrarle la información que necesita para instalar KUMO en una LAN. Los métodos para asignar direcciones IP estáticas se presentan en el Manual de instalación y funcionamiento de KUMO.

Atenção! Ao conectar o KUMO a uma LAN padrão de IP estático, é preciso configurar os componentes do KUMO com um novo endereço IP exclusivo. Você deve primeiro conversar com seu administrador de rede e descobrir como ele deverá ser conectado (IP estático TCP/IP ou DHCP). O seu departamento de TI estará disponível para fornecer as informações necessárias para instalar o KUMO em uma LAN. Métodos para atribuir endereços IP estático são abordados no manual de Instalação e Operação do KUMO.

Attenzione! Quando si collega KUMO a un IP LAN statico standard, occorre configurare i componenti KUMO con un nuovo indirizzo IP univoco. Per prima cosa occorre parlare con l'amministratore di rete e scoprire come effettuare la connessione (IP statico TCP/IP o DHCP). Il reparto IT potrà fornire le informazioni necessarie per installare KUMO su una LAN. I metodi di assegnazione dell'indirizzo IP statico sono illustrati nel manuale KUMO Installazione e funzionamento.

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