10 GigE IP Mini-Converters

SMPTE 2110 IP Transmit/Receive

Installation and Operation Guide

AJA

VIDEO SYSTEMS

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Contacting AJA Support

When calling for support, have all information at hand prior to calling. To contact AJA for sales or support, use any of the following methods:

Telephone	+1.530.271.3190
FAX	+1.530.271.3140
Web	https://www.aja.com
Support Email	support@aja.com
Sales Email	sales@aja.com

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Chapter 1 – Introduction

Overview

AJA 10 GigE IP Mini-Converters are designed for point of use applications for encoding, transport, reception and decoding of IP based video sources. Rugged, compact and fanless, the 10 GigE IP Mini-Converters provide the bridge between Baseband and IP video for a range of applications, such as sending and receiving video over IP from remote facilities in post production, source monitoring, digital signage, and video walls. 10 GigE IP Mini-Converters ease the cost of extensive monitoring distribution in a facility.

The 10 GigE IP Mini-Converter Transmitters take baseband HDMI or SDI input and encode the data as SMPTE 2110. The embedded audio associated with the video stream is also encoded to SMPTE 2110. Alternatively, analog audio can be encoded and sent with the video stream instead.

The 10 GigE IP Mini-Converter Receivers decode SMPTE 2110 and format the data for either HDMI or SDI output. The audio associated with the video stream is extracted, synchronized, and then embedded into the HDMI or SDI signal as well as output on a stereo analog RCA audio output.

All UltraHD rates (23.98, 24, 25, 29.97, 30, 50) can be received only by the IPR-10G2-HDMI.

The IPR-10G2-HDMI can provide RGB (rather than YCbCr) to a compatible monitor if the monitor or other sink device indicates this availability via EDID.

Pre-Built System Configuration Modes for IPR-10G2

There is a set of pre-built system configuration modes, or "system modes," available from the System Mode control on the Config page of the IPR-10G2 web UI. These pre-built System Modes are designed to save you time so that you can get your unit up and running quickly.

Each System Mode is built for a specific type of use case, taking into account factors such as network conditions, protection requirements, timing, and latency considerations.

Please see *"System Modes" on page 41* for more detailed information.

NOTE: *The System Modes are available only for the IPR-10G2-SDI and IPR-10G2-HDMI units; they are not needed on the IPT-10G2-SDI and IPT-10G2-HDMI units since the transmitter's functionality is simpler.*

On a high level, the five pre-built System Modes are described as follows:

PTP Low Latency

• Appropriate under ideal network conditions
• Fastest method of moving data through the device (does not require signal processing)
• Provides the least amount of packet-level and frame-level protection
• Remote sender and AJA IPR-10G2 receiver are locked to PTP

PTP Protected

• Provides the highest amount of packet-level and frame-level protection, including redundancy support with ST 2022-7
• Maximum latency due to longer signal processing chain
• Remote sender and AJA IPR-10G2 receiver are locked to PTP

Gateway

• Bridges between PTP and Reference Video timed domains
• Provides frame-level protection
• Moderate latency due to signal processing chain

Gateway Protected

• Bridges between PTP and Reference Video timed domains
• Provides the highest amount of packet-level and frame-level protection, including redundancy support with ST 2022-7
• Maximum latency due to longer signal processing chain

Asynchronous

• Intended as a setup environment or troubleshooting and demo tool
• Not for production
• When unable to lock to PTP or when experiencing problems with Reference In, uses Video In to verify that video is being received from source address
• Provides frame-level protection (no packet-level protection)
• Moderate latency due to signal processing chain

Advanced

Unlike the five pre-built System Modes just described, each of which are "safe," Advanced Mode does not guard against a user applying contradictory settings that could provide unpredictable results.

Characteristics of Advanced Mode include the following:

- For custom configurations
- Has no native default settings
- Can be used to iterate and expand upon the five pre-built System Modes described above
- Provides free-range access to:
  - Video Clock Mode
  - Packet Protection Mode
  - Frame Sync Mode
  - System Mode
  - Audio Sample Rate Converter
- When selected, Advanced Mode will retain the settings of the previously selected System Mode, and the user may proceed to customize settings as desired. This means that any of the System Modes can be modified using Advanced Mode and then saved as a Preset on the Presets screen.

NOTE: *When working with Advanced Mode, if the configuration settings become problematic, you can always "revert" to one of the five pre-built System Modes to get the unit running again with established internally compatible settings.*

10 GigE IP Mini-Converters Features

IPT-10G2-SDI

- SMPTE ST 2110 audio, video transmitter including support for ST 2022-7
- Essence support: SMPTE 2110-10, 2110-20, 2110-30
- Rugged, quiet, fanless design
- 2x 10 GigE SFP+ cages for media LAN with status light (for media transport, control, and timing input), SFP+ modules not included)
- 1x 1 GigE RJ45 socket for control LAN with status light
- Complete control interface on any web browser from a built-in web server
- Customizable control with AJA REST API
- Control supported over dedicated management Ethernet port and in-band over media ports
  - NMOS Rx discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
  - Ember+ control (no discovery, control only)
  - AJA REST API control (discovery via SSDP or MDNS)
  - LLDP (Link Layer Discovery Protocol)
- 1x 3G-SDI Input
- 1x 3G-SDI Loop Out
- Support for HD up to 1080 60p, YCbCr 4:2:2
- Concealment of errors due to packet loss
- Full 10-bit pixel processing pipeline
- Embedded SDI audio input (up to eight channels)
- 2x RCA analog audio input

- 1x BNC Reference Out, allowing incoming baseband sources to be locked to PTP timing
- Frame Sync
- 1x mini-USB port for initial network configuration with AJA eMini-Setup software (alternative setup method)
- 5-year international warranty and support

IPT-10G2-HDMI

- SMPTE ST 2110 audio, video transmitter including support for ST 2022-7
- Essence support: SMPTE 2110-10, 2110-20, 2110-30
- Rugged, quiet, fanless design
- 2x 10 GigE SFP+ cages for media LAN with status light (for media transport, control, and timing input), SFP+ modules not included)
- 1x 1 GigE RJ45 socket for control LAN with status light
- Complete control interface on any web browser from a built-in web server
- Customizable control with AJA REST API
- Control supported over dedicated management Ethernet port and in-band over media ports
  - NMOS Rx discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
  - Ember+ control (no discovery, control only)
  - AJA REST API control (discovery via SSDP or MDNS)
  - LLDP (Link Layer Discovery Protocol)
- Dedicated HDMI transmitter with full size (standard type A) HDMI 1.4b (24/30-bits per pixel) input up to HD 60p, 4:2:2, 10-bit, YCbCr
- Concealment of errors due to packet loss
- Full 10-bit pixel processing pipeline
- Embedded SDI audio input (up to eight channels)
- 2x RCA analog audio input
- 1x BNC Reference Out, allowing incoming baseband sources to be locked to PTP timing
- Frame Sync
- 1x mini-USB port for initial network configuration with AJA eMini-Setup software (alternative setup method)
- 5-year international warranty and support

IPR-10G2-SDI

- SMPTE ST 2110 audio, video receiver including support for ST 2022-7
- Essence support: SMPTE 2110-10, 2110-20, 2110-30
- Rugged, quiet, fanless design
- 2x 10 GigE SFP+ cages for media LAN with status light (for media transport, control, and timing input), SFP+ modules not included)
- 1x 1 GigE RJ45 socket for control LAN with status light
- Complete control interface on any web browser from a built-in web server
- Customizable control with AJA REST API
- Control supported over dedicated management Ethernet port and in-band over media ports
  - NMOS Rx discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
  - Ember+ control (no discovery, control only)
  - AJA REST API control (discovery via SSDP or MDNS)

- USB Keyboard Control for Recalling Presets
- 2x 3G-SDI Output (mirrored)
- Support for HD up to 1080 60p, YCbCr 4:2:2
- Concealment of errors due to packet loss
- Full 10-bit pixel processing pipeline
- Embedded SDI audio output (up to eight channels)
- 2x RCA analog audio output
- 1x BNC Reference for analog/tri-level reference input, allowing baseband output to be locked to the facility baseband clock (instead of PTP)
- 1x mini-USB port for initial network configuration with AJA eMini-Setup software (alternative setup method)
- 5-year international warranty and support

IPR-10G2-HDMI

- SMPTE ST 2110 audio, video receiver including support for ST 2022-7
- Essence support: SMPTE 2110-10, 2110-20, 2110-30
- Rugged, quiet, fanless design
- 2x 10 GigE SFP+ cages for media LAN with status light (for media transport, control, and timing input), SFP+ modules not included)
- 1x 1 GigE RJ45 socket for control LAN with status light
- Complete control interface on any web browser from a built-in web server
- Customizable control with AJA REST API
- Control supported over dedicated management Ethernet port and in-band over media ports
  - NMOS Rx discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
  - Ember+ control (no discovery, control only)
  - AJA REST API control (discovery via SSDP or MDNS)
- USB Keyboard Control for Recalling Presets
- Dedicated HDMI receiver with full size (standard type A) HDMI 1.4b (24/30-bits per pixel) output up to HD 60p, 4:2:2, 10-bit, YCbCr/RGB, or UltraHD 30p,4:2:2, 10-bit, YCbCr, or UltraHD 50p, 4:2:0, 8-bit, YCbCr
  - ST 2022-7 is supported up to HD 1080p (UltraHD not supported)
- Concealment of errors due to packet loss (error concealment functionality supported up to 1080p 60, UltraHD not supported)
- Full 10-bit pixel processing pipeline (except for UHD p50)
- Embedded HDMI audio output (up to eight channels)
- 2x RCA analog audio output
- 1x BNC Reference for analog/tri-level reference input, allowing baseband output to be locked to the facility baseband clock (instead of PTP)
- 1x mini-USB port for initial network configuration with AJA eMini-Setup software (alternative setup method)
- 5-year international warranty and support

Abbreviated Feature Comparison Chart for v2.3

Model	UltraHD Support	Reference Functions	System Modes	2022-7 support	RGB 4:4:4 10-bit
IPT-10G2-SDI		Ref Out		Up to 1080 p60	
IPT-10G2-HDMI		Ref Out		Up to 1080 p60	
IPR-10G2-SDI		Ref In	Supported	Up to 1080 p60	
IPR-10G2-HDMI	Up to UHD p50	Ref In	Supported	Up to 1080 p60	Up to 1080 p60

Workflow Diagrams and I/O Connections

Figure 1. Example Workflow Diagram for the IPT-10G2-SDI

Figure 2. IPT-10G2-SDI Connections

2 Channel Unbalanced Analog Audio Input (RCA Jacks)

Input SDI Connector 1

Output SDI Connector 2

Reference Out BNC

USB Port

+5-16 VDC Power Input

Control LAN

Ready LED

Lock LED

Link/Act LED 1

SFP+ Cage for 10 Gbps Ethernet

SFP+ Cage for 10 Gbps Ethernet

Link/Act LED 2

Figure 3. Example Workflow Diagram for the IPT-10G2-HDMI

HD Camera or Other HDMI Source*

Ref In

1x HDMI

Black Burst/ Tri-level sync based on PTP clock

Ref Out

Media Server

10 GigE Input/Output

10 GigE Switch

IPT-10G2-HDMI
HDMI TO IP

HD (up to 60p)

Redundant IP Feeds

HD HDMI Remote Monitor

1x HDMI

IPR-10G2-HDMI

HD (up to 60p) Input/Output
Redundant IP feeds

PTP Generator

Figure 4. IPT-10G2-HDMI Connections

2 Channel Unbalanced Analog Audio Input (RCA Jacks)

Input HDMI Connector

Reference Out BNC

USB Port

+5-16 VDC Power Input

Control LAN

Ready LED

Lock LED

Link/Act LED 1

SFP+ Cage for 10 Gbps Ethernet

SFP+ Cage for 10 Gbps Ethernet

Link/Act LED 2
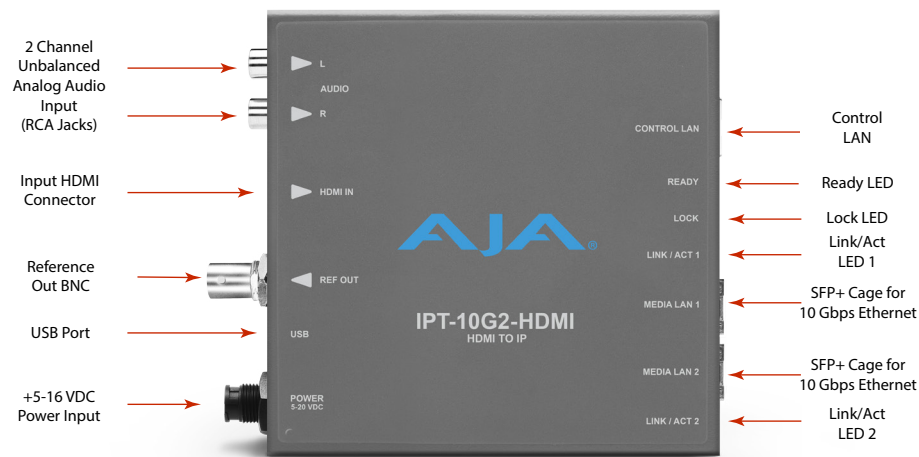
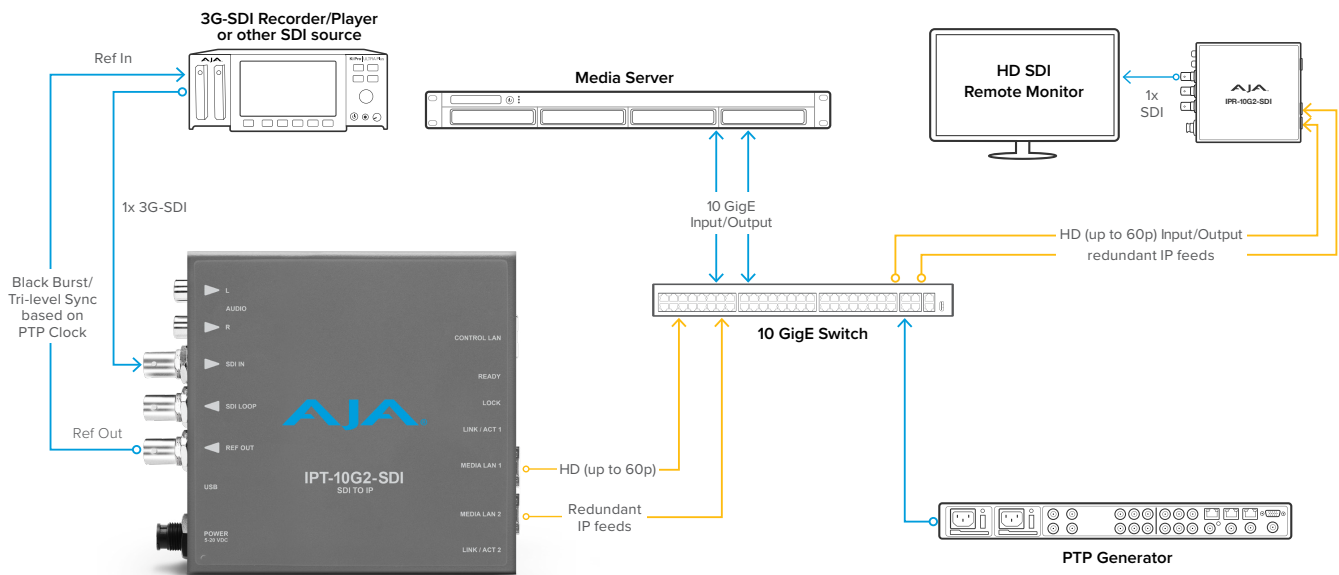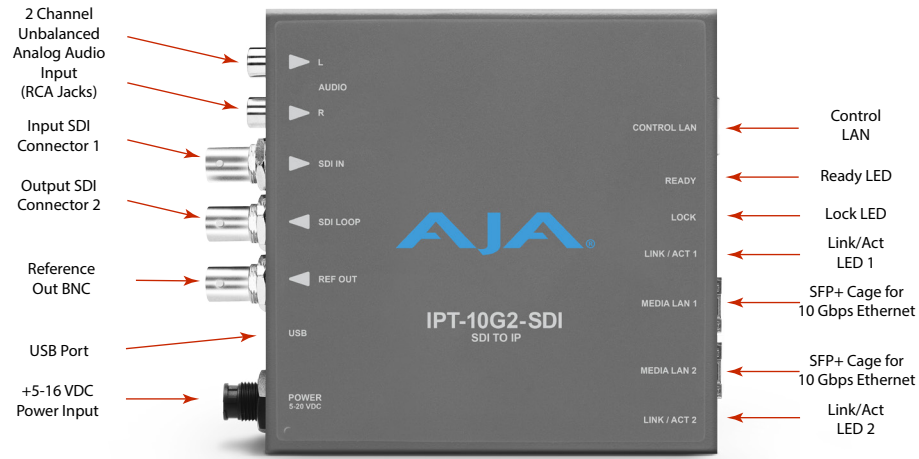*Figure 5. Example Workflow Diagram for the IPR-10G2-SDI*
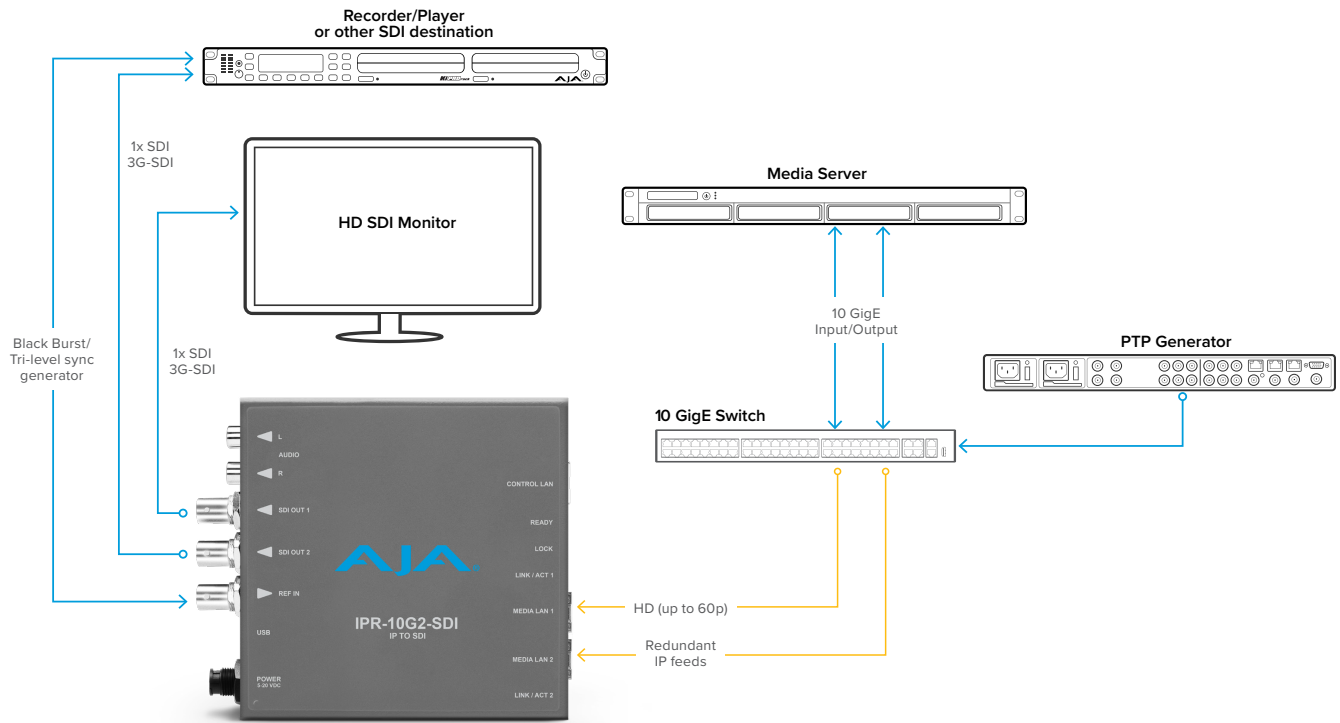
Figure 6. IPR-10G2-SDI Connections

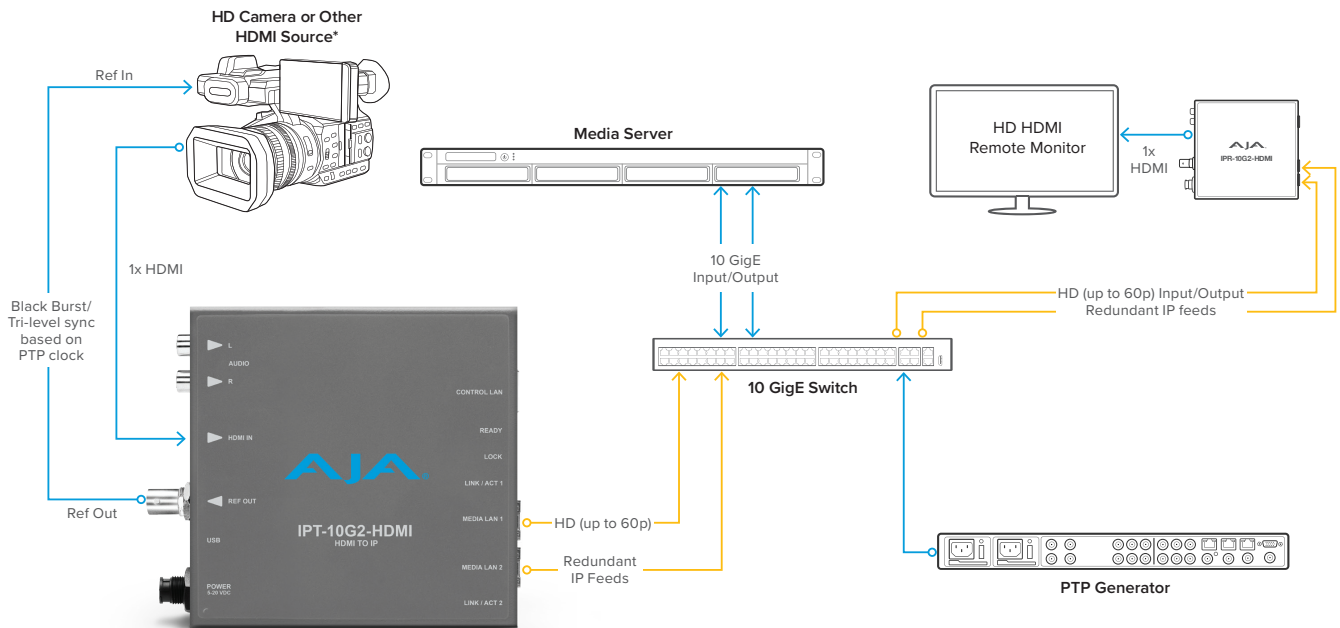Figure 7. Example Workflow Diagram for the IPR-10G2-HDMI
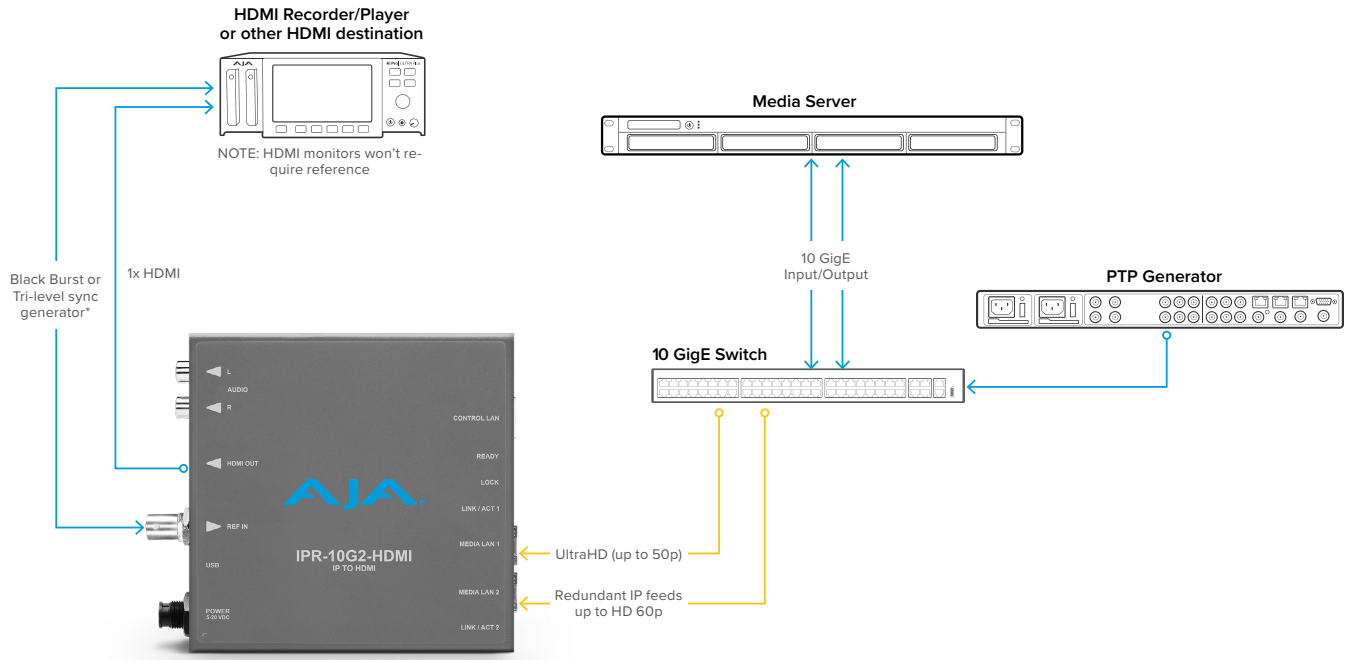
Figure 8. IPR-10G2-HDMI Connections

Simplified Block Diagrams and Logic Diagrams

Figure 9. IPT-10G2-SDI/HDMI Simplified Block Diagram

IPT-10G2-SDI / IPT-10G2-HDMI
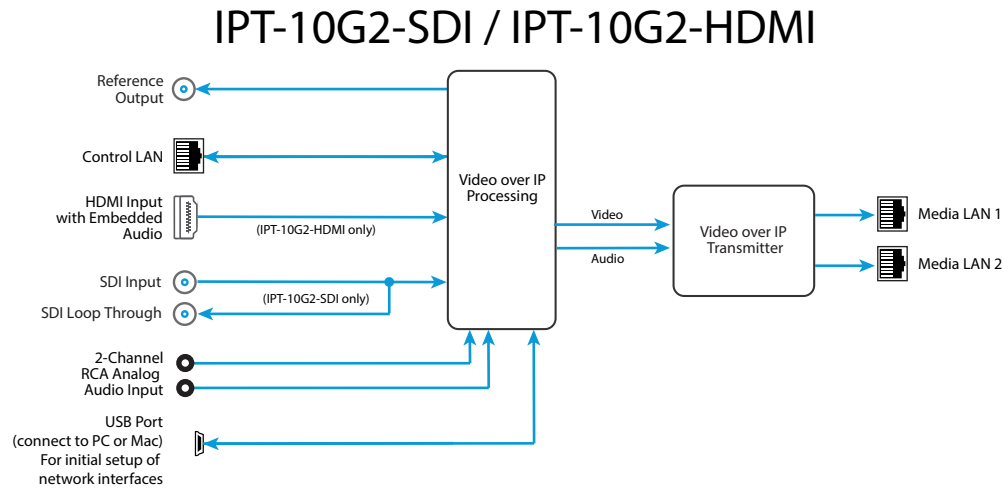
Figure 10. IPR-10G2-SDI/HDMI Simplified Block Diagram

IPR-10G2-SDI / IPR-10G2-HDMI

Figure 11. IPR-10G2-SDI/HDMI Simplified Logic Diagram

IPR-10G2-SDI / IPR-10G2-HDMI
Simplified Logic Diagram

Frequently Asked Questions

To access responses to freqently asked questions about the 10 GigE IP Mini-Converters, please use the following links:

- https://www.aja.com/products/ipt-10g2-sdi#support
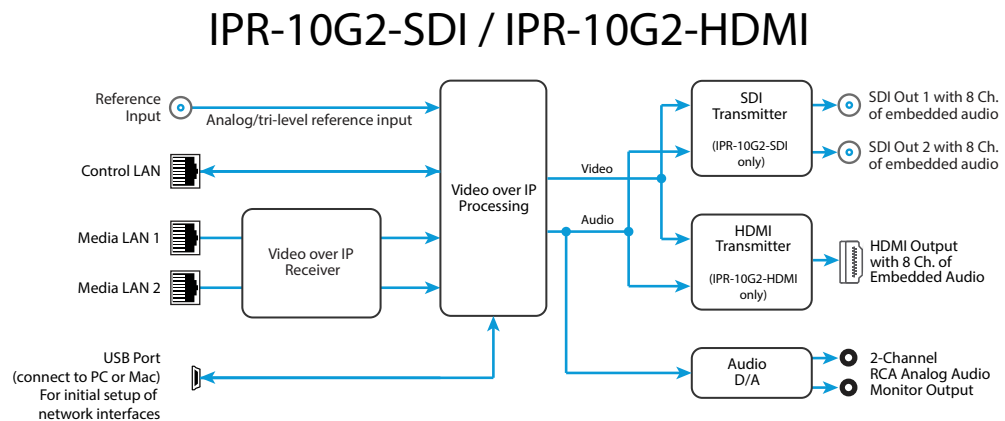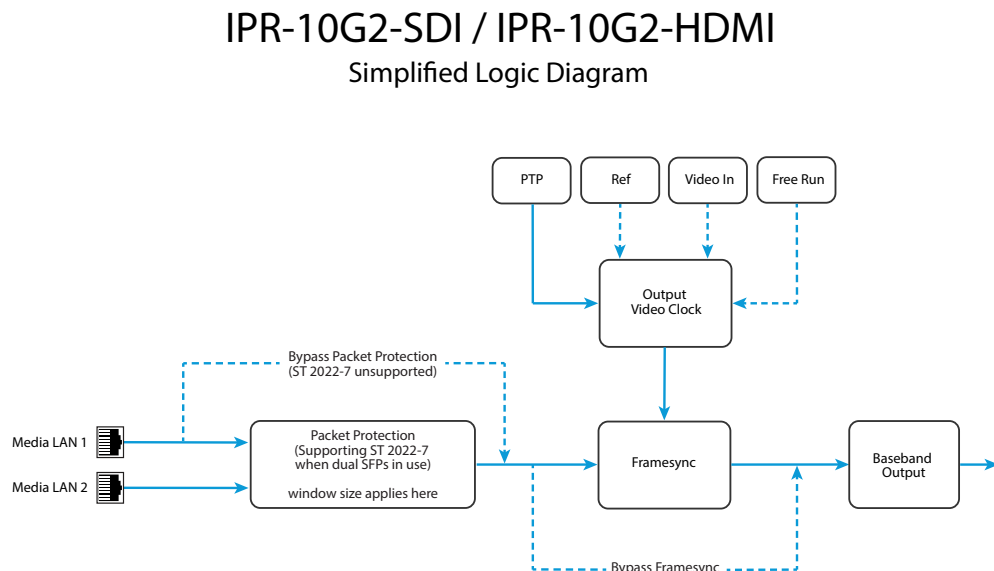- https://www.aja.com/products/ipt-10g2-hdmi#support
- https://www.aja.com/products/ipr-10g2-sdi#support
- https://www.aja.com/products/ipr-10g2-hdmi#support

System Requirements

Remote computer configuration and control is accomplished using the 10 GigE IP Mini-Converters' internal web server. A macOS X or Windows computer with a web browser installed is all that is required. Additionally, initial configuration using eMini-Setup will require a USB port between the host computer and the 10 GigE IP Mini-Converter.

NOTE: *Chrome and Firefox are the preferred web browsers for control on Windows. Safari is the preferred web browser for control on macOS. Other web browsers may work, but AJA cannot guarantee consistent operation for all web browsers or web browser versions.*

Control LAN, Ready, Link/Act, and Lock LED Behavior

The Control LAN LED illuminates to indicate a link. Blinking indicates activity.

The Ready LED illuminates green when the unit has finished powering up and is ready to use.

The Link/Act LED 1 and Link/Act LED 2 behavior is as follows:

- Off - No SFP+ module present
- Red - SFP+ module present, no link
- Green - Link is up
- Green flash - Link is up and there is Tx or Rx activity

The Lock LED behavior is as follows:

- Off - No Precision Time Protocol (PTP) is detected
- Red - A PTP error is detected
- Yellow and flashing - Locking Phase 1
- Yellow - Locking Phase 2
- Green and flashing - Locking Phase 3
- Green - Signal is locked

NOTE: *Achieving locked status may take 5 or more minutes depending on network jitter behavior. The output of the unit will still function during the locking period.*

Installation Overview

Detailed instructions are provided in *"Chapter 2 – eMini-Setup" on page 18* and *"Chapter 3 – 10 GigE IP Mini-Converters Web Interface" on page 27.*

As an overview, however, there are two methods available for initial setup for 10 GigE IP Mini-Converters:

1. Using a web browser on the host computer connected to the same network as the 10 GigE IP Mini-Converter, or

2. Using the AJA eMini-Setup application running on the host computer that is directly connected to the 10 GigE IP Mini-Converter via USB.

Initial Setup By Web Browser

NOTE: *Chrome and Firefox are the preferred web browsers for control on Windows. Safari is the preferred web browser for control on macOS. Other web browsers may work, but AJA cannot guarantee consistent operation for all web browsers or web browser versions.*

10 GigE IP Mini-Converters require a network connection for initial configuration, control and firmware updates. 10 GigE IP Mini-Converters are shipped from the factory with DHCP enabled, and support automatic network discovery via SSDP and MDNS.

To Set Up the Unit with a Web Browser

1. Connect the 10 GigE IP Mini-Converter Control Port to the intended network with an Ethernet cable.

2. The intended network's DHCP Server will assign an IP address and the 10 GigE IP Mini-Converter will join that network.

3. Locate and connect to the AJA 10 GigE IP Mini-Converter.

Windows PC Host

A. Open Windows Explorer.

B. Navigate to the Network.

C. Click on the Network to enumerate network devices.

D. Search for either "IPT-10G2," "IPR-10G2," or the device's Serial Number.

E. Double-click on the intended 10 GigE IP Mini-Converter. The host machine web browser will launch and display the web UI for the device.

macOS Host

A. Go to System Preferences > Sharing and turn on File Sharing.

B. Open the Finder Window.

C. Navigate to Shared > All…

D. Click on All… to enumerate network devices.

E. Search for either "IPT-10G2," "IPR-10G2," or the device's Serial Number.

F. Double-click on the intended 10 GigE IP Mini-Converter. The host machine web browser will launch and display the web UI for the device.

NOTE: *If the above does not work, then you will need to download and install an MDNS browser to assist with discovering network devices on a macOS host.*

Initial Setup By AJA eMini-Setup

1. Acquire AJA eMini-Setup (version 2.1) from the AJA website for either macOS or Windows:

   https://www.aja.com/family/software#eminisetup

2. Install eMini-Setup:

   A. Unzip the Installer.

   B. Run the .dmg file on macOS or the .msi file on Windows.

3. Connect Power to your AJA Ethernet equipped Converter.

4. Connect the USB config cable to the computer running eMini-Setup.

5. Open eMini-Setup and configure the device's network settings.

NOTE: DHCP is enabled by default, and if the device is connected to a DHCP server the IP address field will populate.

6. Enter the IP address into a browser window. The web UI for your AJA device will display.

7. Use the web UI to fully configure and control your AJA Device.

Hardware Installation

Temperature of Unit

The 10 GigE IP Mini-Converters pack an unprecedented feature set into the mini converter box. As a result, the unit uses approximately 13 watts of power. It will be very warm to the touch, which is normal. The unit is engineered to operate across the full temperature range, from 0 to 40 degrees C.

Access to Air for Proper Cooling

For highest reliability, the mini converters rely on convection cooling instead of using a built-in fan. Therefore, when installing the units, mount in a location where they have access to air for proper cooling. Do not stack the 10 GigE IP Mini-Converters with other mini converters or other powered equipment.

Number of LAN Connections

Three LAN connections to the unit are not necessarily required on an ongoing basis. If it is desirable for your installation, after the 10 GigE IP Mini-Converter is set up, you can access all control parameters through one of the Media LANs with the appropriate network configuration. See *"Networking Option – Using Only the Media LAN Port for Control and Media Settings" on page 27* for more information.

Settings Retained

The current 10 GigE IP Mini-Converter's configuration settings are retained even when powered off, so subsequent installations for an identical decoding or encoding session can be done with the following simple steps:

1. Apply power to the 10 GigE IP Mini-Converter.

2. Connect the unit to your network using the Control LAN, Media LAN 1 and Media LAN 2 and connect the unit's inputs and outputs.

REST API Documentation

AJA's REST automation API provides a platform from which you can issue commands to an AJA device's internal web server, allowing remote systems the ability to control AJA embedded or networked devices. With this control framework, you can build integration and automation scripts, using any scripting language, allowing you to take full advantage of the device's functionality.

This documentation is available at the following link:

https://gitlab.aja.com/pub/rest_api

Chapter 2 – eMini-Setup

Overview

This chapter describes using the eMini-Setup application to initially communicate with and configure a 10 GigE IP Mini-Converter over a direct USB connection. Once configured, the IP Mini-Converter 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 built-in web server.

NOTE: *The eMini-Setup application is only used to setup selected Ethernet capable AJA devices, and cannot be used to connect to or setup other AJA Mini-Converters.*

The general procedure is:

1. Acquire eMini-Setup from the AJA website and install the eMini-Setup application onto a computer.

2. Connect the IP Mini-Converter to that computer's USB port.

3. Launch the eMini-Setup application.

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

5. You can also use eMini-Setup to load firmware to the device, although this can also be done quickly and easily using the web browser interface.

Acquiring eMini-Setup

AJA's eMini-Setup application is available for download from the AJA website.

To download the latest eMini-Setup package, which includes the eMini-Setup application and documentation:

1. Go to:

    https://www.aja.com/family/software#eminisetup

2. Click the link corresponding to the version you want to download for Mac or Windows.

NOTE: *IPT-10G2-SDI and IPT-10G2-HDMI require eMini-Setup version 2.1 or later. IPR-10G2-SDI and IPR-10G2-HDMI require eMini-Setup version 2.0 or later.*

eMini-Setup Documentation

Included with the eMini-Setup download is the AJA device's *Installation and Operation Guide*, which can be accessed from the eMini-Setup UI via the Help/ Manual drop-down menu. This manual includes eMini-Setup information.

Documentation can also be accessed directly from the Mac eMini-Setup installer in the Documentation folder.

Documentation included with the eMini-Setup application is the version available at the time of distribution. However, AJA's documentation can be updated regularly, so newer versions may exist.

To download just the latest documentation, go to:

https://www.aja.com/family/ip-converters

Click the support button and open the Manuals link.

Installing eMini-Setup
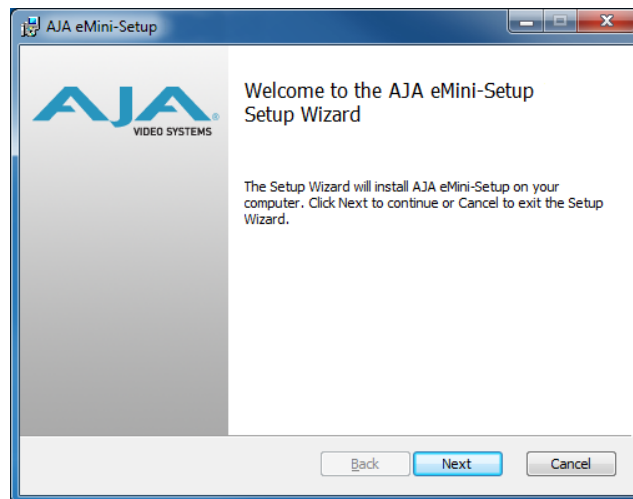
PC Installation

To install eMini-Setup on a Windows PC:

1. Download the application from the AJA website. See *"Acquiring eMini-Setup" on page 18*.

2. Open the AJA_eMini-Setup_win.zip file.

3. Double-click on the AJA_eMini-Setup.msi file.

4. The Setup Wizard will guide you through the installation.

Figure 12. eMini-Setup PC Wizard

5. Click Next to begin. Answer the questions in the subsequent dialogues, including device software installation if displayed. When finished, an AJA eMini-Setup shortcut will be installed on the desktop, and you will be able to locate the eMini-Setup application in the AJA folder in the Programs listing.

NOTE: *If the eMini-Setup application already exists on the PC, a different Setup Wizard appears.*

Figure 13. eMini-Setup Wizard, Re-installation
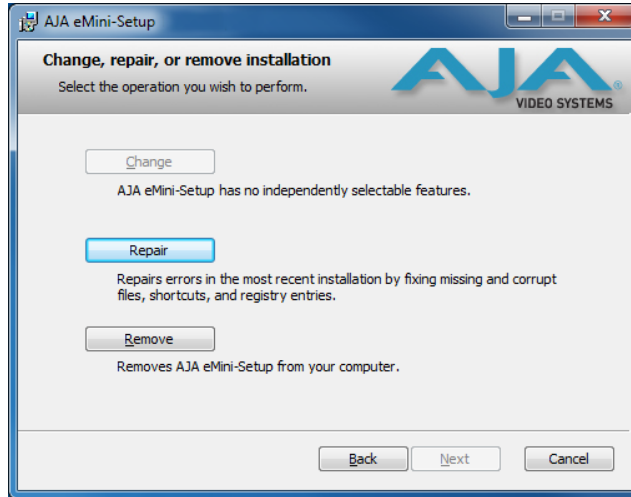
With this screen you can **Repair** (reinstall) or **Remove** (uninstall) eMini-Setup on the PC.

Mac Installation

To install the application on a Mac:

NOTE: Mac computers must be Intel-based (G5, G4 and earlier models will not work with eMini-Setup).

1. Download the application from the AJA website. See *"Acquiring eMini-Setup" on page 18*.
2. Unzip the file.
3. Double-click on the AJA eMini-Setup.dmg file.
4. Answer the prompt and a utility program will be launched.

Figure 14. eMini-Setup Mac Installer
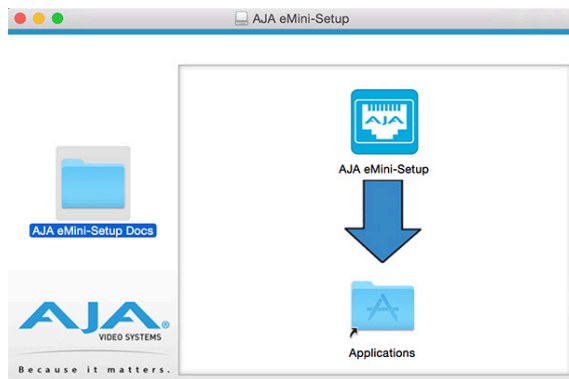
5. To complete the installation drag the "AJA eMini-Setup" icon to the Applications folder.

Running eMini-Setup

Connect your Ethernet capable AJA device to the PC or Mac via the supplied USB cable, and then connect the external power supply (supplied) to that AJA device.

PC Startup

To run eMini-Setup on a PC, double-click on the AJA eMini-Setup icon on your desktop, or open the AJA folder in the program list and click on the AJA eMini-Setup application located inside the eMini-Setup folder.

Figure 15. Launching eMini-Setup on a PC
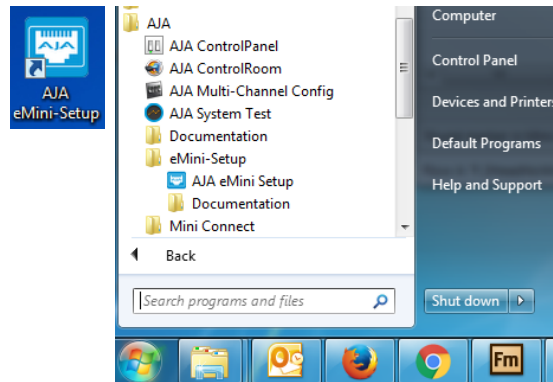
Mac Startup

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.

Operating eMini-Setup

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

Figure 16. Example eMini-Setup Screen
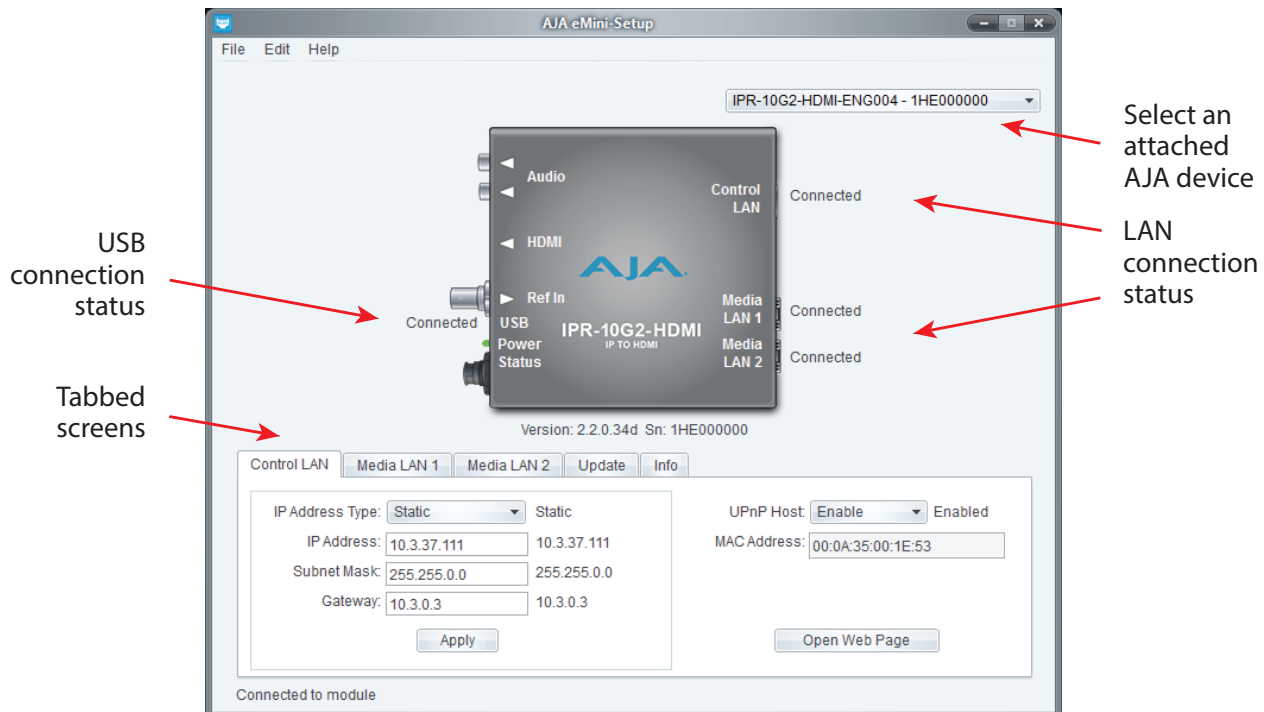
Selecting an AJA device from the pull down menu on the upper right causes eMini-Setup to connect to the selected AJA device.

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.

A status field at the bottom of the screen shows if the eMini-Setup application is connected and communicating with an AJA device.

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 LAN Tab Screen

Figure 17. eMini-Setup Control LAN Tab Screen
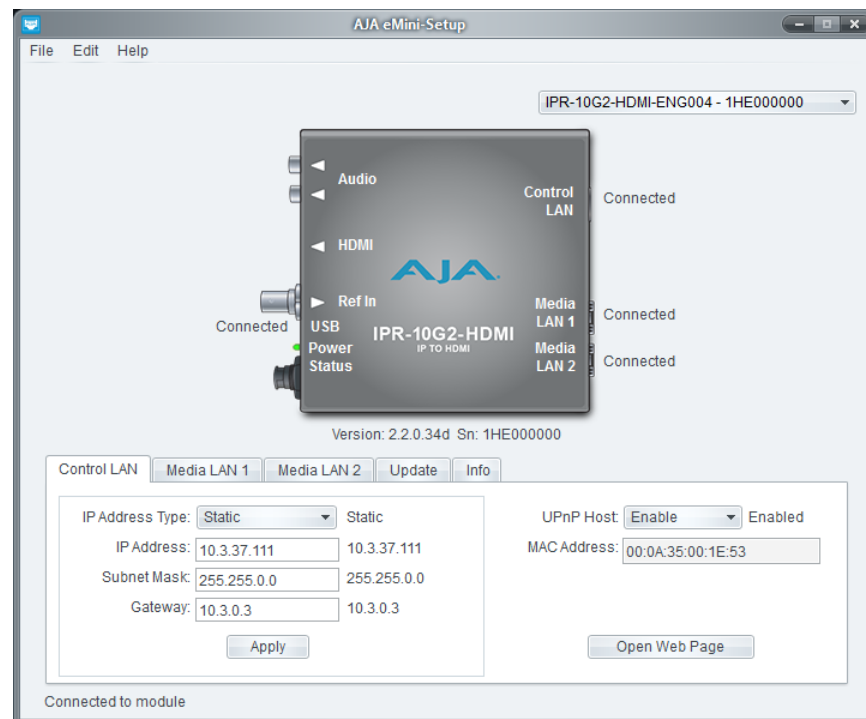
Use this Control LAN tab to change the network setup on the connected AJA device. You must click the Apply button to initiate any network configuration changes.

IP Address Type - Choose from DHCP (default) or Static IP Address.

NOTE: *A basic setup would be to run an Ethernet cable directly between the device and your laptop and set both the computer and IPR to sequential static IP addresses. This provides a rapid way to set up to access the web user interface.*

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

Subnet Mask - The current Subnet Mask is displayed. A different subnet mask can be entered.

Gateway - The current Gateway address is displayed. A different gateway address can be entered.
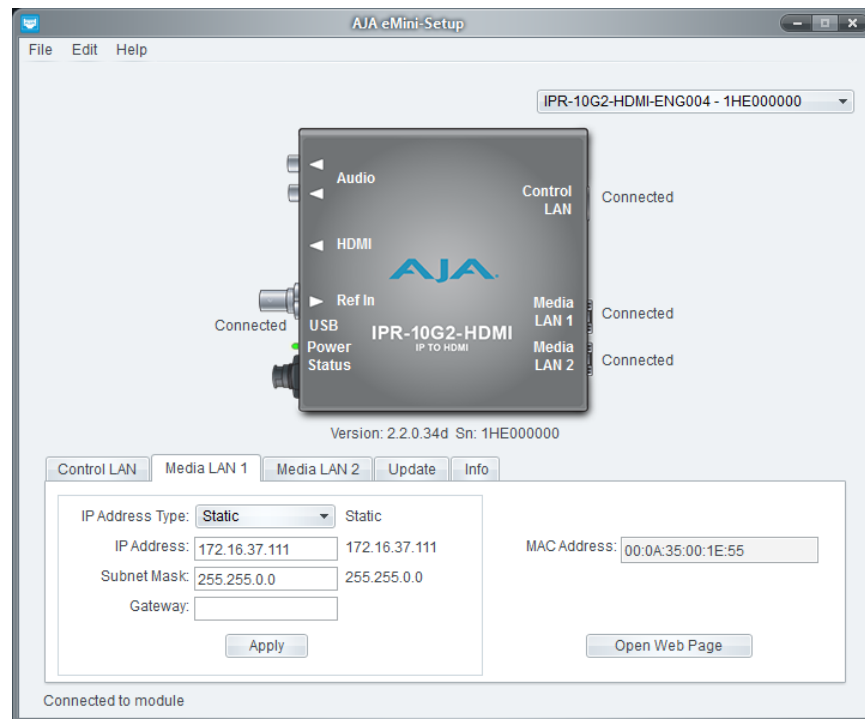
UPnP Host - Choose from Enable or Disable to control whether the AJA device makes itself visible for Windows network browsing.

MAC Address - This is the permanent MAC address of the Control LAN Ethernet port of the AJA device.

Open Web Page - Opens the IP Mini-Converter's web interface in a web browser.

Media LAN 1 Tab Screen

Figure 18. eMini-Setup Media LAN 1 Tab Screen

Use this Media LAN 1 tab to change the corresponding media network setup on the connected AJA device. You must click the Apply button to initiate any network configuration changes.

IP Address Type - Choose from DHCP or Static IP Address.

NOTE: *If you intend to directly connect an IPT to an IPR, then you will need to use sequential static IP addresses for both units (Transmit and Receive).*

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

Subnet Mask - The current Subnet Mask is displayed. A different subnet mask can be entered.

Gateway - The current Gateway address is displayed. A different gateway address can be entered. On the Media LAN, the gateway may be left blank. (A gateway is required on the Control LAN).

MAC Address - This is the permanent MAC address of the Media LAN Ethernet port of the AJA device.

Open Web Page - Opens the IP Mini-Converter's web interface in a web browser.

Media LAN 2 Tab Screen

Figure 19. eMini-Setup Media LAN 2 Tab Screen

Use this Media LAN 2 tab to change the corresponding media network setup on the connected AJA device. You must click the Apply button to initiate any network configuration changes.

IP Address Type - Choose from DHCP or Static IP Address.

NOTE: If you intend to directly connect an IPT to an IPR, then you will need to use sequential static IP addresses for both units (Transmit and Receive).

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

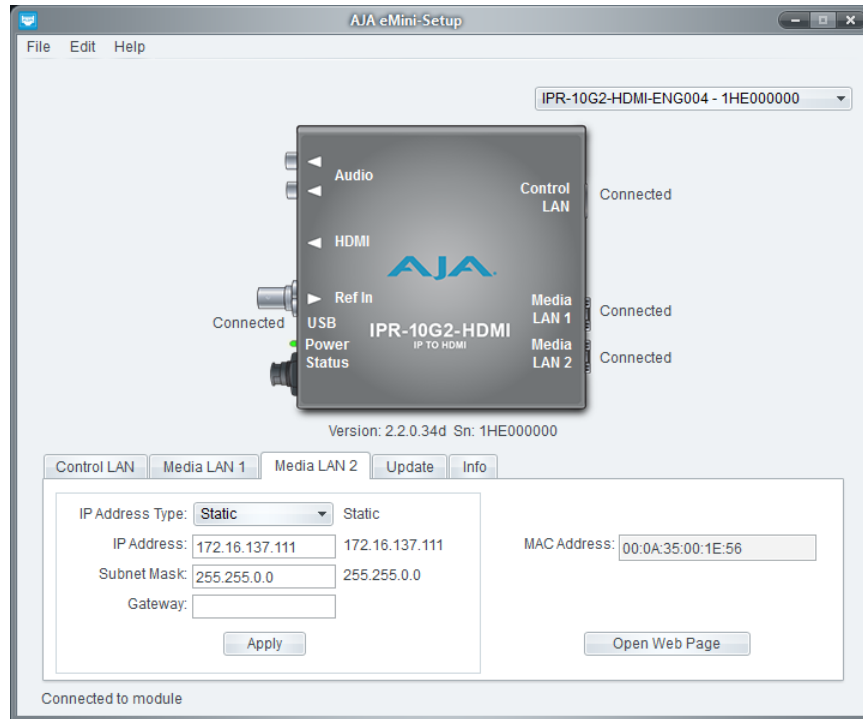**Subnet Mask** - The current Subnet Mask is displayed. A different subnet mask can be entered.

Gateway - The current Gateway address is displayed. A different gateway address can be entered. On the Media LAN, the gateway may be left blank. (A gateway is required on the Control LAN).
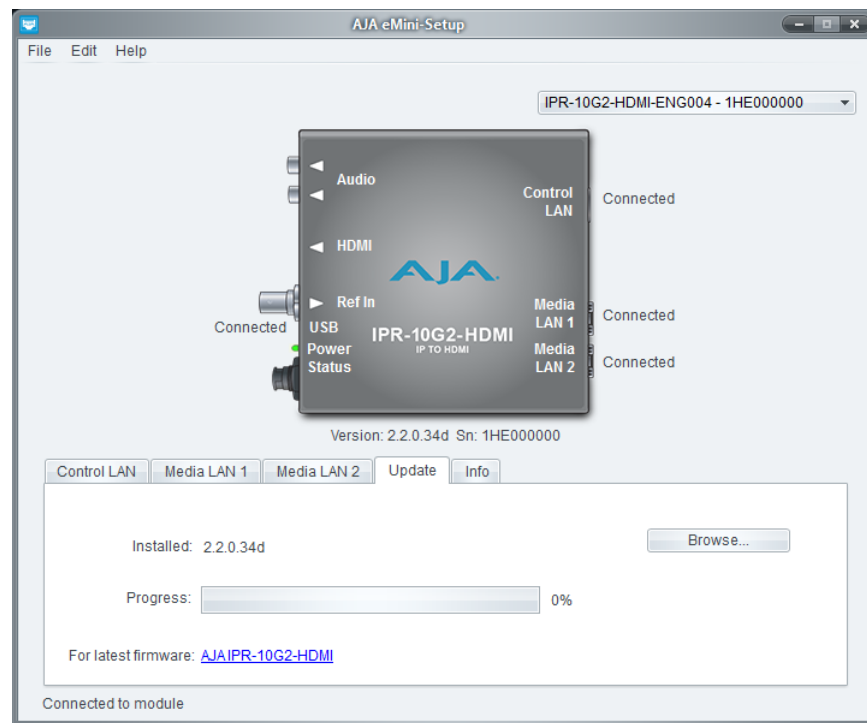
MAC Address - This is the permanent MAC address of the Media LAN Ethernet port of the AJA device.

Open Web Page - Opens the IP Mini-Converter's web interface in a web browser.

Update Tab Screen

Figure 20. eMini-Setup Update Tab Screen

Use this Update tab to install new firmware.

Installed - This field shows the version of the firmware currently installed.

Browse - This button opens a navigation window, allowing you to select the firmware and load that version of firmware into the AJA device's non-volatile memory.

Progress - This indicator bar shows the progress of firmware installation.

Firmware Update Procedure

1. Check the AJA website for new firmware.

2. If new software is found, download it and uncompress the file archive (.zip).

3. Connect the device to a Mac or PC via a USB port on the computer.

4. Click the Update tab. Click the Browse button. Navigate to the firmware (.ajas extension), open it, and confirm the update. Progress will be shown via the "Progress" bar.

5. After the update, the AJA device must be rebooted by clicking on the Reboot button in the prompt window.

See also: *"Firmware Screen" on page 54* regarding the process of working with firmware with the IP Mini-Converter's Web UI.

Info Tab Screen

Figure 21. eMini-Setup Info Tab Screen
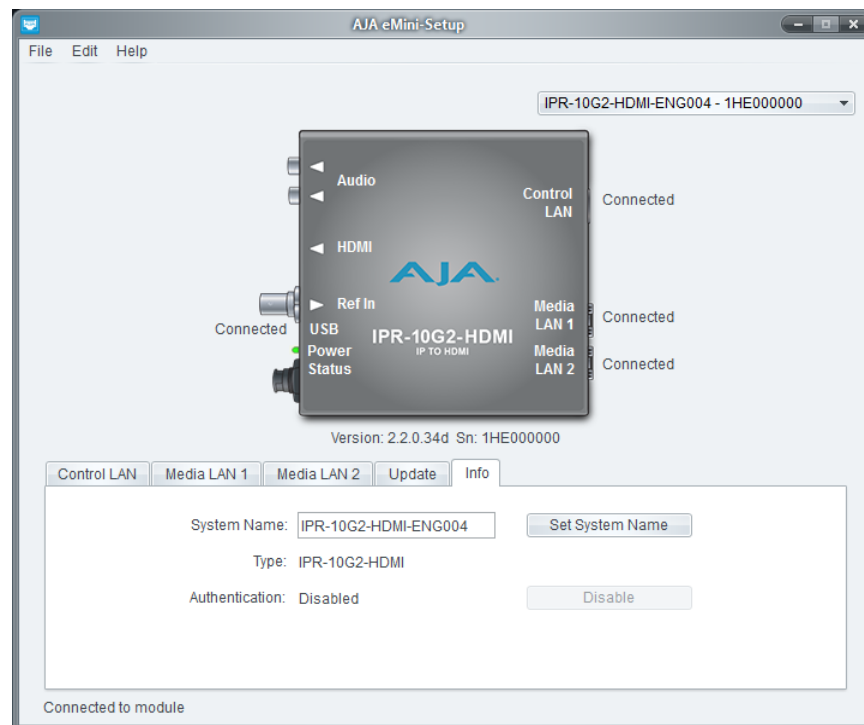
This tab provides basic information about the connected AJA device. This information is mostly useful when calling AJA Support for service or technical support.

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.

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 the Disable button.

Chapter 3 – 10 GigE IP Mini-Converters Web Interface

Overview

Once you have established network connectivity with the 10 GigE IP Mini-Converter, you can further configure and more fully control the unit through its web interface. Subsequently, eMini-Setup is no longer required to interface with the unit.

NOTE: *It is often best to remove the USB connection once you have acquired the web interface. This prevents accidentally using eMini-Setup to change parameters already set via the web UI.*

Remote Control Overview

An optimized web server in the 10 GigE IP Mini-Converter allows remote control and parameter setting adjustments via a browser client running on a network wired computer. The network can be a closed local area network, a direct connection between a 10 GigE IP Mini-Converter and a computer, or even exposed through a firewall to a WAN.

Each 10 GigE IP Mini-Converter uses a standard RJ-45 connector for the Control LAN connection, and two SFP+ cages for the 10 Gbps Ethernet Media LAN connections.

NOTE: *Safari is the preferred web browser for control on the Mac, and additionally Chrome and Firefox on Windows. Other web browsers may work, but AJA cannot guarantee consistent operation for all web browsers or web browser versions.*

To connect to the 10 GigE IP Mini-Converter, attach the unit to your network and enter its Control Network IP address into the web browser. If authentication has been configured, you may need to enter a password.

Networking Option – Using Only the Media LAN Port for Control and Media Settings

To reduce facility cabling to the 10 GigE IP Mini Converter, it is an option to setup your network connection through an Ethernet switch via the Media LAN ports (rather than using the dedicated Control Port). This means that you will have just one or two cables to the unit, instead of two or three.

To implement this approach, follow these general steps:

1. Note the IP address of the unit's Media LAN 1 or Media LAN 2 port. This should be a static IP address.

2. Connect the controlling computer's Ethernet port that is being used to control the unit into an Ethernet switch. This requires disconnecting the Ethernet cable from the Control LAN port of the unit.

3. Connect the Media LAN port of the unit into the Ethernet switch.

4. Connect the source of the Media IP stream into the Ethernet switch.

5. Set the controlling computer's Ethernet port that is being used to control the 10 GigE IP Mini-Converter to DHCP.

6. From the controlling computer, point a web browser to the IP address noted in step 1. The 10 GigE IP Mini-Converter's web user interface displays in the browser.

Web Browser via Ethernet

General Screen Information

All IP Mini-Converter web screens have certain areas and controls in common. Vertical and horizontal scroll bars appear when information extends past the border of a panel.

The round blue Up/Down arrow button on each panel and many status parameters opens and closes that pane or set of parameters.

Menu Panel

On the left of each screen is a Menu panel listing all the available screens. Click any of these links to jump to that screen.

Alarms Panel

Alarms are displayed in a panel on the left side of each screen. Clicking on the arrow opens or closes this panel to show or hide the alarms. Hovering the mouse over an alarm (red) or warning (yellow) may provide additional detail about the condition.

Connections Panel

On the right side of every screen is a Connection panel listing information for the connected IP Mini-Converter.

Network Panel

Also on the right is a Network pane that lists other IP Mini-Converters on the network. The gear icon opens the Network Screen, the same as selecting Network from the Menu Panel. Right-clicking on the name of an IP Mini-Converter in this list allows you to turn on the Identify feature, which will blink all four of the Ethernet LEDs of that device at a 1 second rate.

Parameters and Information

The rest of the screen displays all the parameter selections and information available for the selected IP Mini-Converter screen.

Figure 22. Overview of Web Browser User Interface

Menu of Screens: Click one to display that screen.

S/N, software version and connection status

Alarms appear here

Selections and Information
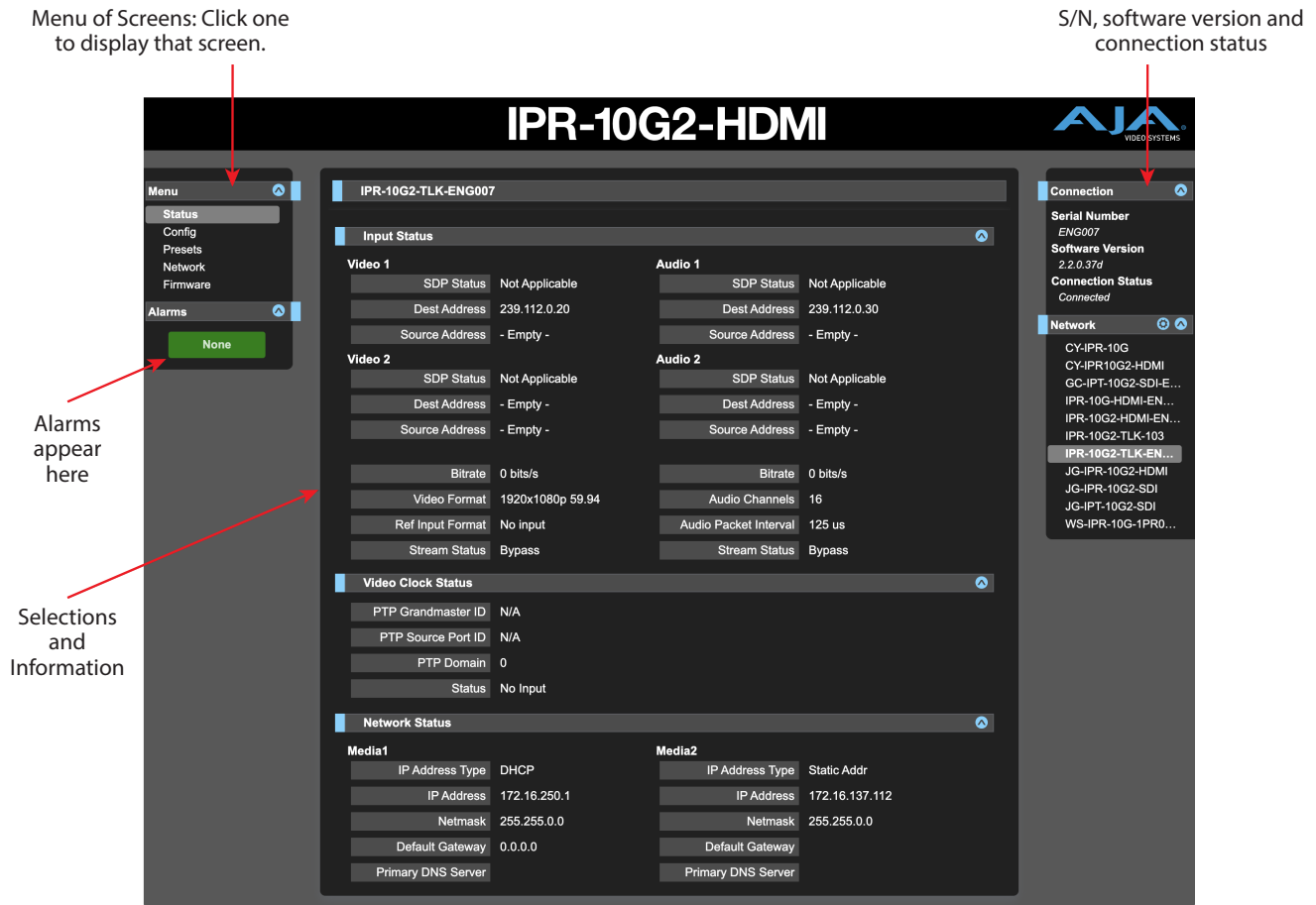
Dynamic Controls

- Hovering the mouse on a parameter name displays a brief description of its function.
- From the Config Screen, right clicking on the parameter name resets just that parameter to its factory default.
- For values with sliders, fine control is achieved using the arrow keys on the keyboard to move the slider the minimum amount. The numeric value can also be clicked on to enter a specific value.

Status Screen

IPT-10G2-SDI

Figure 23. IPT-10G2-SDI Status Screen 1 of 2
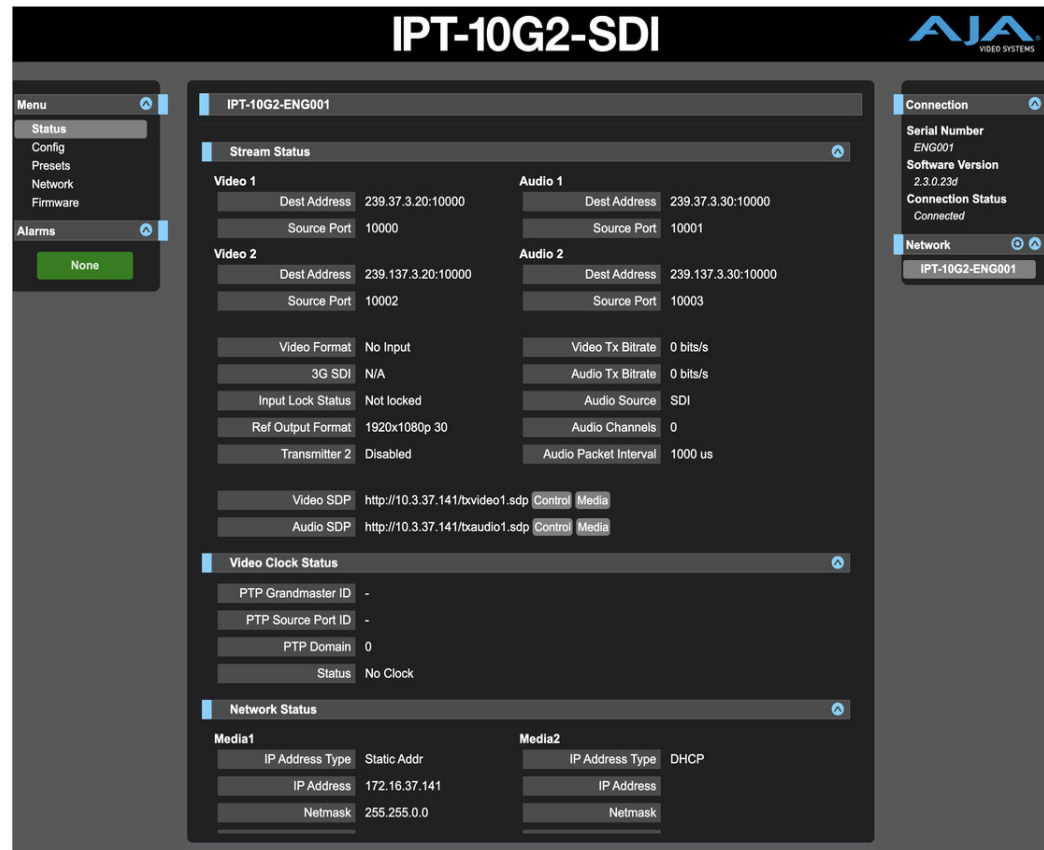
The IPT-10G2-SDI Status screen reports the current status and settings for:

- Stream Status
- Video Clock Status
- Network Status
- NMOS Status
- Firmware Status

Each group of parameters can be expanded or collapsed.

Link Layer Discovery Protocol (LLDP)

Under the Network Status area of the Status Screen, for network switches that support LLDP, the Chassis ID and the Port ID of the first switch encountered upstream in the path from the IP Mini-Converter device to the network will be displayed in the LLDP Chassis ID and LLDP Port ID fields.

That first upstream switch, in turn, displays the LLDP information (Chassis ID and Port ID) of the downstream IP Mini-Converter.

Figure 24. IPT-10G2-SDI Status Screen 2 of 2

IPR-10G2-HDMI

Figure 25. IPR-10G2-HDMI Status Screen 1 of 2

The IPR-10G2-HDMI Status screen reports the current status and settings for:

- Input Status
- Video Clock Status
- Network Status
- NMOS Status
- Firmware Status

Each group of parameters can be expanded or collapsed.

Link Layer Discovery Protocol (LLDP)

Under the Network Status area of the Status Screen, for network switches that support LLDP, the Chassis ID and the Port ID of the first switch encountered upstream in the path from the IP Mini-Converter device to the network will be displayed in the LLDP Chassis ID and LLDP Port ID fields.
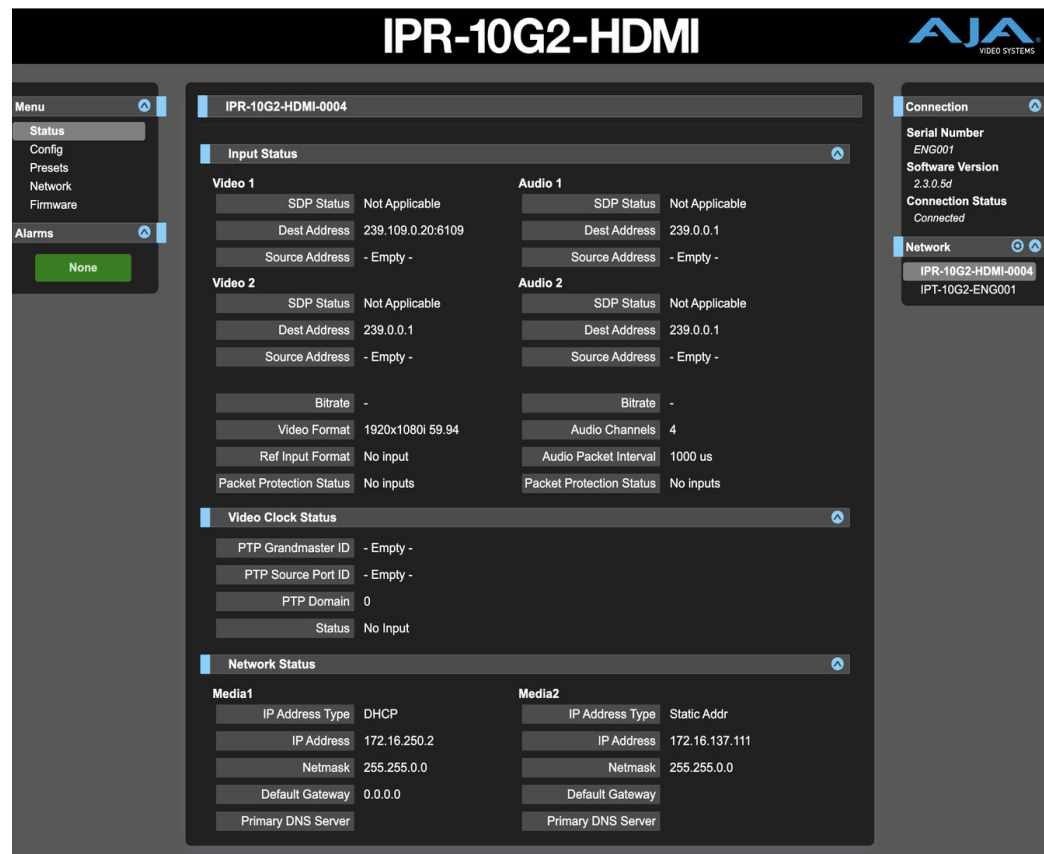
That first upstream switch, in turn, displays the LLDP information (Chassis ID and Port ID) of the downstream IP Mini-Converter.

Figure 26. IPR-10G2-HDMI Status Screen 2 of 2

Config Screen

This section describes the Config Screen for the IPT-10G2-SDI followed by the Config Screen for the IPR-10G2-HDMI.

IPT-10G2-SDI

The IPT-10G2-SDI Config Screen, shown in three parts, has the parameters required for the general operation of the IPT-10G2 units.

Figure 27. IPT-10G2-SDI Config Screen 1 of 3

System Name

Defines a name for the system and gives it a unique identifier. This name is used when displaying systems through the web interface.

User Authentication

Enable or disable user password authentication for the web interface.

Identify LED

Enables flashing of the Ethernet LEDs on the unit.

UPnP Host

Enable or disable network discovery using Universal Plug and Play.

IGMP Version

Select the Internet Group Management Protocol Version. AJA supports IGMP v2 and v3.

NOTE: *It is important to know which version of IGMP is in use on your network. Selecting the wrong IGMP version may cause long delays in processing multicast subscriptions. See your network engineer for more information.*

PTP Domain

NOTE: *Applicable only if PTP is selected for Video Output Clock Selection.*

The PTP Domain field is for the ID of the PTP Source Port. While it is possible that there could be multiple PTP domains, most implementations will use "0". If unsure, consult with your network administrator. Possible values range from 0 to 127.

PTP Preferred Grandmaster ID

NOTE: Applicable only if PTP is selected for Video Output Clock Selection.

There can be multiple Grandmaster IDs. However, most of the time, it will be automatically determined. Typically, it is the same as the Ethernet address for the port of the Grandmaster.

Example of a PTP Grandmaster ID:

- 08-00-11-FF-FE-22-04-D6

PTP Grand Master Capable

NOTE: Applicable only if PTP is selected for Video Output Clock Selection.

For local demonstration purposes only, the IPT-10G2-SDI and IPT-10G2-HDMI can act as a grandmaster in network environments where there is not one already present, such as during basic testing, or setting up a PoC or demonstration.

CAUTION: *Do not enable this control unless you have first checked with your network administrator.*

Disable - Disables the PTP Grand Master capability.

Enable - Enables the PTP Grand Master capability.

Frame Sync Mode

Enabling Frame Sync Mode is recommended when you are using a source device that does not have a Reference Input (such as an HDMI camera, for example). A source device without a Reference Input cannot be locked to PTP before its signal arrives at the IPT-10G2-SDI and IPT-10G2-HDMI.

However, by enabling Frame Sync Mode, the incoming baseband video packets are conditioned by the Frame Sync and timed for the ST 2110 network, adding 1 to 2 frames of latency before being sent out.

Enable - Incoming baseband video packets are timed and sent out after being conditioned by the Frame Sync.

Bypass - Incoming baseband video packets bypass the Frame Sync.

NOTE: If your source device has a Reference Input, you do not need to enable Frame Sync Mode. Instead, you can lock to PTP by using the IPT-10G2-SDI's or IPT-10G2-HDMI's Reference Output. This provides the unit with the ability to lock cameras, tape decks, Ki-Pro, Kona, or other sources to PTP timing. See for details.

Video Dest IP Address 1

Enter the destination IP address of the video packets.

Video Destination Port 1

Enter the UDP destination port of the video packets.

Video Source Port 1

Enter the UDP source port of the video packets.

Figure 28. IPT-10G2-SDI Config Screen 2 of 3

Audio Dest IP Address 1

Enter the destination IP address of the audio packets.

Audio Destination Port 1

Enter the UDP destination port of the audio packets.

Audio Source Port 1

Enter the UDP source port of the audio packets.

Transmitter 2

Enable or disable transmitter 2.

Video Dest IP Address 2

Enter the destination IP address of the video packets.

Video Destination Port 2

Enter the UDP destination port of video packets.

Video Source Port 2

Enter the UDP source port of the video packets.

Audio Dest IP Address 2

Enter the destination IP address of the audio packets.

Audio Destination Port 2

Enter the UDP destination port of the audio packets.

Audio Source Port 2

Enter the UDP source port of the audio packets.

Ref Output Format

NOTE: The Ref Output Format control is displayed only when the Frame Sync Mode control is set to Bypass.

The IPT-10G2-SDI and IPT-10G2-HDMI generate an analog/tri-level reference output synchronized to the PTP clock in your facility. When converting baseband video to ST2110, connect your traditional video source to this reference output to lock it to the facility PTP timing prior to bringing it into the IPT-10G2-SDI or IPT-10G2-HDMI for conversion. This provides the unit with the ability to lock cameras, tape decks, Ki-Pro, Kona, or other sources to PTP timing.

Additionally, the IPT-10G2-SDI and IPT-10G2-HDMI can fulfill the function of a PTP to analog black/tri-level reference converter device, which some applications will require.

Select one of the following video reference output formats:

- NTSC 525i
- PAL 625i
- 1280x720p 50
- 1280x720p 59.94
- 1280x720p 60
- 1920x1080i 48
- 1920x1080i 50
- 1920x1080i 59.94
- 1920x1080i 60
- 1920x1080p 23.98
- 1920x1080p 24
- 1920x1080p 25
- 1920x1080p 29.97
- 1920x1080p 30

Ref Output H Offset

NOTE: The Ref Output H Offset control is displayed only when the Frame Sync Mode control is set to Bypass.

Select the horizontal reference offset in pixels (range -2750 pixels to +2750 pixels). To set the value, use one of three methods:

1. Click and drag the slider control, or

2. Click the slider control to select it, then use the left/right or up/down arrow keys on your keyboard, or

3. Click the pixels text to select it, then enter a numerical value using your keyboard.

Ref Output V Offset

NOTE: The Ref Output V Offset control is displayed only when the Frame Sync Mode control is set to Bypass.

Select the vertical reference offset in pixels (range -1125 lines to +1125 lines).

To set the value, use one of three methods:

1. Click and drag the slider control, or

2. Click the slider control to select it, then use the left/right or up/down arrow keys on your keyboard, or

3. Click the lines text to select it, then enter a numerical value using your keyboard.

Figure 29. IPT-10G2-SDI Config Screen 3 of 3

Audio Source

Select one of the following audio sources:

- SDI
- Analog
- Disabled

Audio Delay

Use the Audio Delay control as needed to synchronize audio and video signals. Select a fixed number of milliseconds to delay audio output by relative to the video.

0 to 85 Milliseconds - To set the value of the audio delay setting, use one of three methods:

1. Click and drag the slider control, or

2. Click the slider control to select it, then use the left/right or up/down arrow keys on your keyboard, or

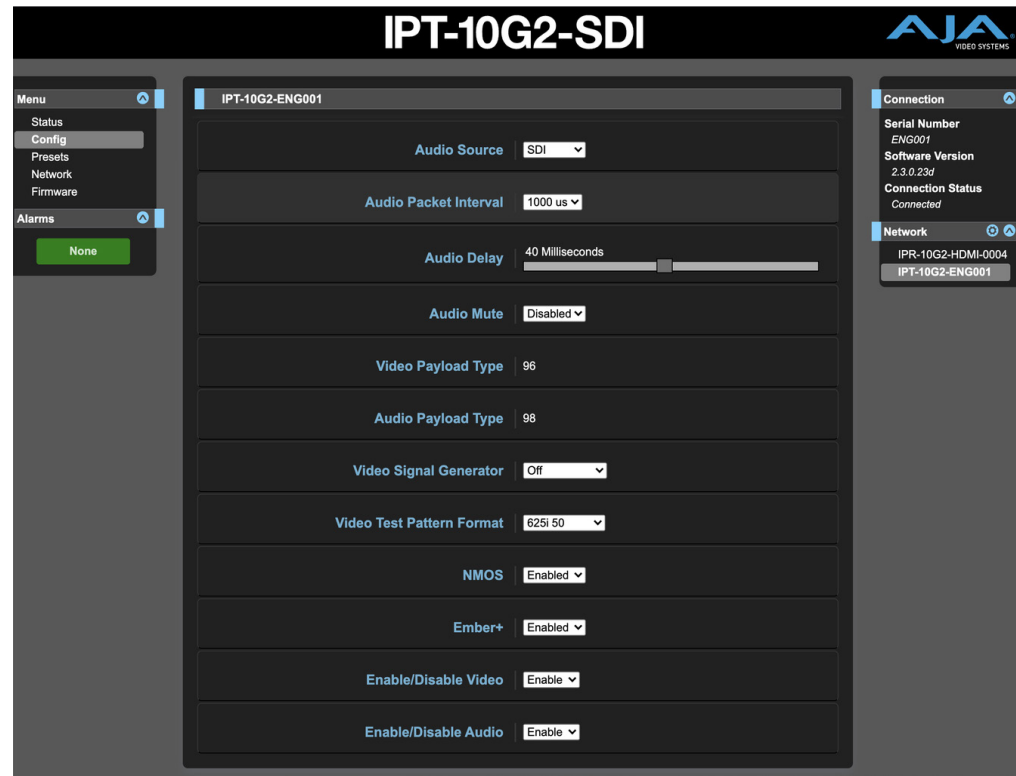3. Click the Milliseconds text to select it, then enter a numerical value using your keyboard.

Audio Mute

Enable or disable audio mute.

Video Payload Type

Enter a value to specify the video payload type.

Audio Payload Type

Enter a value to specify the audio payload type.

Video Signal Generator

You can output a test video signal to validate video signal connections. Select Off or Test Pattern.

Off - No video signal is generated.

Other choices

- 100% Bars
- 75% Bars
- Ramp
- Multi Burst
- Line Sweep
- Check Field
- Flat Field
- Multi Pattern
- Black
- White
- Linear Ramp
- Slant Ramp

Test Pattern - Color bars with a moving gray line are generated in the currently selected video format and sent to the Video Output.

NOTE: *The Test Pattern is supported only in 1080p and 1080i formats.*

Video Test Pattern Format

Determines the video format output from the system's internal test signal generator. Select from the following options:

- 525i 59.94
- 625i 50
- 720p 50
- 720p 59.94
- 1080i 50
- 1080i 59.94
- 1080p 23.98
- 1080p 24
- 1080p 25
- 1080p 29.97
- 1080p 30
- 1080p 50
- 1080p 59.94
- 1080p 60
- 2160p 23.98
- 2160p 24
- 2160p 25
- 2160p 29.97

- 2160p 30
- 2160p 50

NMOS

Enable or disable network discovery for the device.

NMOS uses the address of the unit's internal web server for communications. When the unit boots up, it actively scans the network for an NMOS registry using MDNS/DNS. If it finds one, it tells the NMOS registry what it is and what its capabilities are.

If the unit does not find an NMOS registry, it continues to announce itself through MDNS so that it can be discovered. Once discovered, it registers itself with whatever has discovered the unit through MDNS.

Ember+

Enable or disable Ember+ network discovery for the device.

Enable/Disable Video

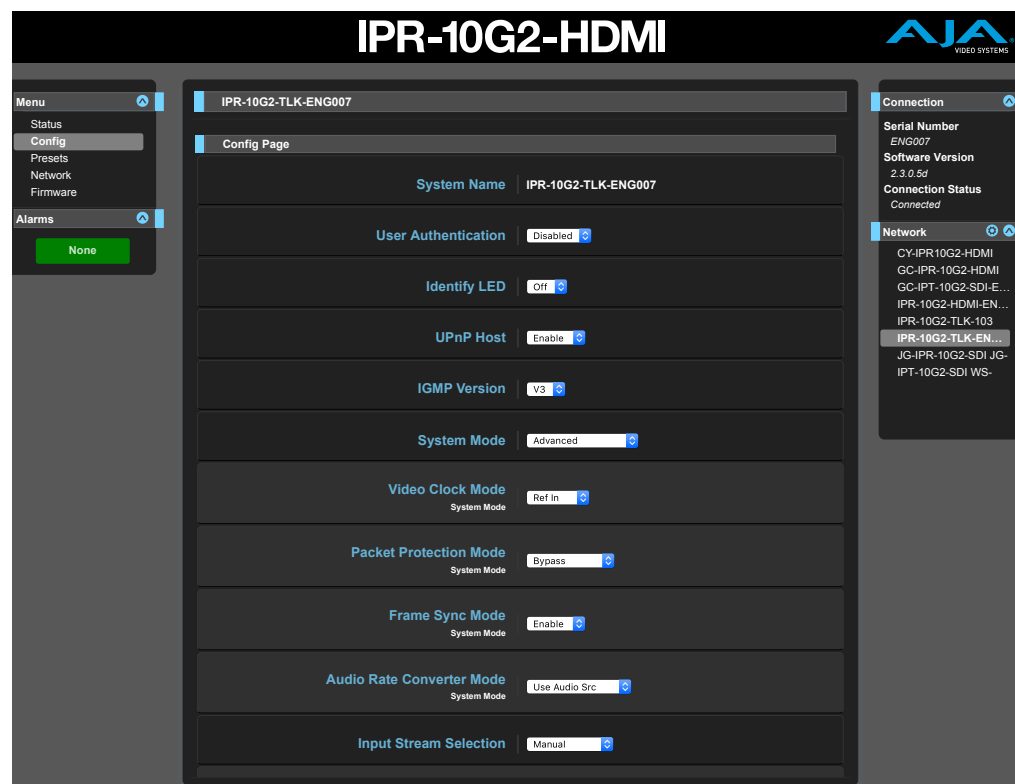Enable or disable video for the device.

Enable/Disable Audio

Enable or disable audio for the device.

IPR-10G2-HDMI

The IPR-10G2-HDMI Config Screen, shown in three parts, has the parameters required for the general operation of the IPR-10G2 units.

Figure 30. IPR-10G2-HDMI Config Screen 1 of 3

System Name

Defines a name for the system and gives it a unique identifier. This name is used when displaying systems through the web interface.

User Authentication

Enable or disable user password authentication for the web interface.

Identify LED

Enables flashing of the Ethernet LEDs on the unit.

UPnP Host

Enable or disable network discovery using Universal Plug and Play.

IGMP Version

Select the Internet Group Management Protocol Version. AJA supports IGMP v2 and v3.

NOTE: *It is important to know which version of IGMP is in use on your network. Selecting the wrong IGMP version may cause long delays in processing multicast subscriptions. See your network engineer for more information.*

System Modes

There is a set of pre-built system configuration modes, or "system modes," available from the System Mode control on the Config page of the IPR-10G2 web UI. These pre-built System Modes are designed to save you time so that you can get your unit up and running quickly.

NOTE: *The System Modes are available only for the IPR-10G2-SDI and IPR-10G2-HDMI units; they are not needed on the IPT-10G2-SDI and IPT-10G2-HDMI units since the transmitter's functionality is simpler.*

Each System Mode is built for a specific type of use case, taking into account factors such as network conditions, protection requirements, timing, and latency considerations.

NOTE: *The choice of System Mode will impact which controls are available. Multiple variations of controls are possible on the Config page.*

The following tables present the core characteristics for each pre-built System Mode.

Table 1. PTP Low Latency System Mode characteristics

System Mode 1	PTP Low Latency
Description	PTP environment Lowest protection* Near-zero latency**
Video Clock Mode	PTP
Packet Protection Mode	Bypass
Frame Sync Mode	Bypass
Audio Sample Rate Converter	Bypass
Transmitter Requirements	Narrow transmitter only
Latency Expected	0 frames (~4 video lines)

Table 2. PTP Protected System Mode characteristics

System Mode 2	PTP Protected
Description	PTP environment Greatest protection* Maximum latency**
Video Clock Mode	PTP
Packet Protection Mode	Enabled
Frame Sync Mode	Enabled
Audio Sample Rate Converter	Bypass
Transmitter Requirements	Can accept wide transmitter
Latency Expected	Packet protection window size +2 frames

Table 3. Gateway System Mode characteristics

System Mode 3	Gateway
Description	Gateway environment No packet protection* Medium latency**
Video Clock Mode	Ref In
Packet Protection Mode	Bypass
Frame Sync Mode	Enabled
Audio Sample Rate Converter	Enabled
Transmitter Requirements	Can accept wide transmitter
Latency Expected	2 frames

Table 4. Gateway Protected System Mode characteristics

System Mode 4	Gateway Protected
Description	Gateway environment Greatest protection* Maximum latency**
Video Clock Mode	Ref In
Packet Protection Mode	Enabled
Frame Sync Mode	Enabled
Audio Sample Rate Converter	Enabled
Transmitter Requirements	Can accept wide transmitter
Latency Expected	Packet protection window size +2 frames

Table 5. Asynchronous System Mode characteristics

System Mode 5	Asynchronous
Description	Setup/demo/troubleshooting environment No packet protection Low latency**
Video Clock Mode	Video In
Packet Protection Mode	Bypass
Frame Sync Mode	Enabled
Audio Sample Rate Converter	Enabled

System Mode 5	Asynchronous
Transmitter Requirements	Can accept wide transmitter
Latency Expected	2 frames

*Protection against loss or degradation of picture. Low protection does not necessarily mean picture loss or degradation will result, as this would depend on the network architecture and numerous other factors.

**The term *latency* is referring to latency on the network. The network in this context refers to the IP Mini Converters end-to-end — from video into IP Transmitter to video out of IP Receiver, including IP switches along the way.

Unlike the five pre-built System Modes just described, each of which are "safe," the Advanced Mode, described below, does not guard against a user applying contradictory settings that could provide unpredictable results.

NOTE: When working with Advanced Mode, if the configuration settings become problematic, you can always "revert" to one of the five pre-built System Modes to get the unit running again with established internally compatible settings.

Table 6. Advanced System Mode characteristics

System Mode 6	Advanced
Description	User defined
Video Clock Mode	User defined
Packet Protection Mode	User defined
Frame Sync Mode	User defined
Audio Sample Rate Converter	User defined
Transmitter Requirements	Based on user selections
Latency Expected	Based on user selections

Video Clock Mode

Select which clock source you want to use for the video output. The clock selection determines whether or not you need to use the Frame Sync in order to have glitch-free output.

PTP - PTP is recommended. Ideally, both the IPR-10G2 and the video source would use PTP.

Video In - Use the input signal as the clock source. If you do not have PTP available, Lock to Input is the next recommended choice and it allows for a glitch-free video output.

Freerun - Selecting Free Run requires that you use Frame Sync in order to prevent output glitches.

Ref In - If the Reference In source is synchronized with the Grand Master PTP, you will not need to use the Frame Sync. On the other hand, if the Referrence In is unrelated to the PTP, such as if it is from an independent sync generator, you will need to use Frame Sync in order to prevent output glitches. New Reference Input support for IPR-10G2-HDMI and IPR-10G2-SDI provides users with the ability to lock the local baseband output to the timing of the baseband environment at the destination.

PTP Domain

NOTE: Applicable only if PTP is selected for Video Output Clock Selection.

Select the PTP domain from values ranging from 0 to 127. This should match the PTP domain configured on the PTP Grandmaster clock on the network.

PTP Preferred Grandmaster ID

NOTE: Applicable only if PTP is selected for Video Output Clock Selection.

In most situations, this field should left blank.

If multiple PTP Grandmasters are present on the same domain on the network, the device will automatically select a PTP Grandmaster to lock to. However, if you prefer a specific PTP Grandmaster, then set this field to the ID of the preferred Grandmaster.

Example of a PTP Grandmaster ID:
- 08-00-11-FF-FE-22-04-D6

PTP Grand Master Capable

NOTE: Applicable only if PTP is selected for Video Output Clock Selection.

For local demonstration purposes only, the IPR-10G2-HDMI and IPR-10G2-SDI can act as a grandmaster in network environments where there is not one already present, such as during basic testing, setting up a PoC or demonstration.

CAUTION: *Do not enable this control unless you have first checked with your network administrator.*

Disable - Disables the PTP Grand Master capability.

Enable - Enables the PTP Grand Master capability.

Packet Buffer Window Size (ms)

Window size in milliseconds for packet buffering.

Packet Protection Mode

With Packet Protection Mode, the IPR-10G2 will accept signals from both Media LAN 1 and Media LAN 2, allowing for hitless media switching in the event that one of the signals is interrupted.

Single Stream - When set to Single Sream, the IPR-10G2 will accept one signal from Media LAN 1 only. If packets are out of order, they will be rearranged into the correct order. Note that hitless protection is not part of Single Stream mode.

Dual Stream - When set to Dual Stream, hitless media protection is enabled. Two identical copies of the same stream are accepted from Media LAN 1 and Media LAN 2. Both streams are compared packet by packet. If one stream is missing a packet, it will be taken from the other stream to make sure that one good stream comes through properly.

Bypass - When set to Bypass, the IPR-10G2 takes the media stream from Media LAN 1. The stream bypasses the entire hitless protection block.

Hitless Window Size (ms)

NOTE: Applicable only if Hitless Media Support is enabled.

Set the amount of time in milliseconds that the unit will look for redundant packets to decide to accept or reject them for hitless media switching.

To determine the hitless window size, consider any delay between the signals, expected jitter, along with any other sources of potential delay between signals.

Possible values range from 1 to 50. The actual range is determined by the signal's frame rate, raster size and other factors.

Frame Sync Mode

Frame Sync Mode can be enabled for synchronizing frames to the timing source you are using.

Enable - Frame Sync Mode is enabled.

Bypass - Frame Sync Mode is disabled.

Audio Rate Converter Mode

In cases where there are either missing audio packets or the audio clock is not synchronous with the timing source, the audio rate converter can match the output audio rate to the local clock. Select either of the following options:

- Use Audio Src
- Bypass Audio Src

Figure 31. IPR-10G2-HDMI Config Screen 2 of 3

Input Stream Selection

Select SDP, Manual or NMOS/Ember.

SDP - The SDP method greatly simplifies the configuration process for the Input Stream Selection fields. Selecting SDP causes the following four fields to display:

- **SDP URL Video** - Enter the SDP URL Video string. For example: *http://172.16.0.109/txch2v.sdp*
- **SDP URL Audio** - Enter the SDP URL Audio string. For example: *http://172.16.0.109/txch2a1.sdp*
- **SDP URL Video 2** - Enter the SDP URL Video string. For example: *http://172.16.0.109/txch2v.sdp*

- **SDP URL Audio 2** - Enter the SDP URL Audio string. For example: *http://172.16.0.109/txch2a1.sdp*

The strings entered into the **SDP URL Video** and **SDP URL Audio** fields point to SDP files that are created by the source that is transmitting the video signal.

The SDP files contain all required configuration parameters for the following **Input Stream Selection** fields:

- Video Input Format
- Audio Channels
- Audio Packet Interval
- Video Destination Address
- Video Source Address
- Audio Destination Address
- Audio Source Address.
- Video 2 Destination Address
- Video 2 Source Address
- Audio 2 Destination Address
- Audio 2 Source Address

Manual - When Manual is selected, you must enter configuration parameters manually into the following **Input Stream Selection** fields:
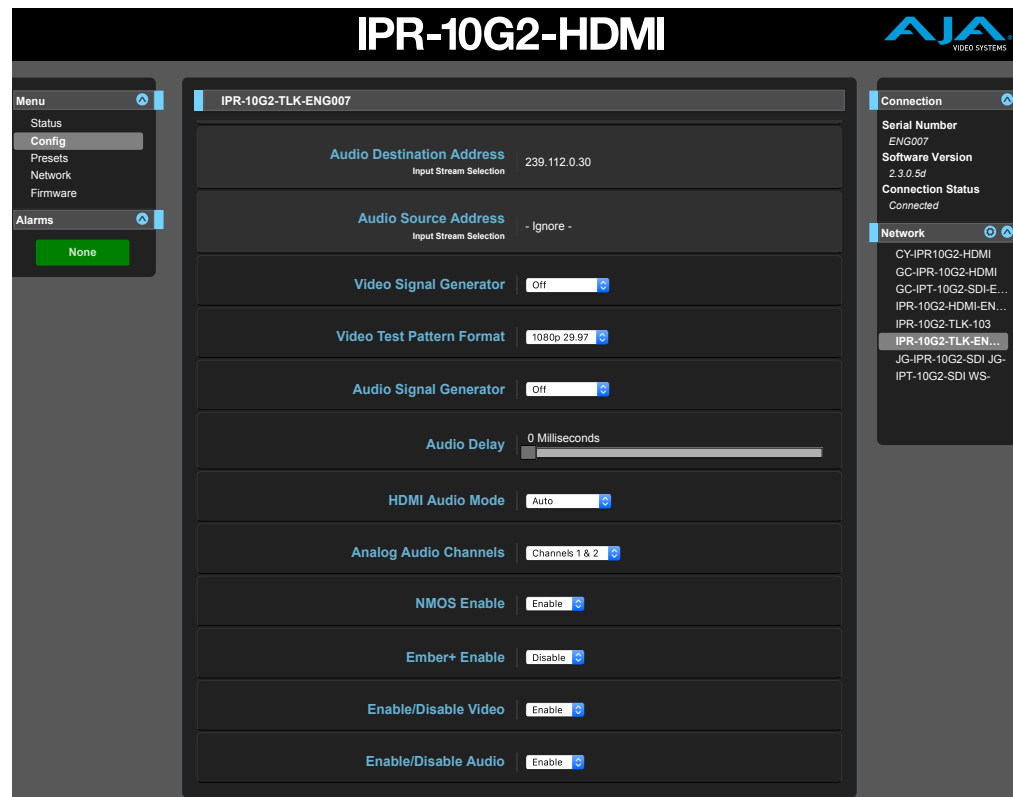
- Video Input Format
- Audio Channels
- Audio Packet Interval — Select the time interval between packets transmitted by the audio transmitter. The receivers support audio packet intervals of 1 millisecond or 125 microseconds.
- Video Destination Address — The IP address corresponding to where the video stream is being sent. In multicast mode, this is the multicast IP address of the ST 2110 stream. In unicast mode, this is the unicast IP address of the media port on the receiver. The Video Destination Address is almost always required on a receiver (IPR-10G2-HDMI, IPR-10G2-SDI). Additionally, the destination UDP port of the stream may also be specified by appending it with a colon to the destination address.
    - For example: 239.0.0.1:10000
- Video Source Address — The unicast IP address of the media port on the sending device, such as an IPT-10G2-HDMI or IPT-10G2-SDI. This field should be left blank in most situations. It is useful only in setups where multiple transmitters are transmitting to the same multicast destination address and IGMPv3 is in use to subscribe to the stream from a specific source.
- Audio Destination Address — This is the audio stream equivalent of the Video Destination Address.
- Audio Source Address — This is the audio stream equivalent of the Video Source Address.
- Video 2 Destination Address
- Video 2 Source Address
- Audio 2 Destination Address
- Audio 2 Source Address

NMOS/Ember - When NMOS/Ember is selected, input stream selection occurs through network discovery and communication with facility automation.

NMOS uses the address of the unit's internal web server for communications. When the unit boots up, it actively scans the network for an NMOS registry using MDNS/DNS. If it finds one, it tells the NMOS registry what it is and what its capabilities are.

If the unit does not find an NMOS registry, it continues to announce itself through MDNS so that it can be discovered. Once discovered, it registers itself with whatever has discovered the unit through MDNS.

Figure 32. IPR-10G2-HDMI Config Screen 3 of 3

Video Signal Generator

You can output a test video signal to validate video signal connections. Select Off or Test Pattern.

Off - No video signal is generated.

Other choices
- 100% Bars
- 75% Bars
- Ramp
- Multi Burst
- Line Sweep
- Check Field
- Flat Field
- Multi Pattern
- Black
- White
- Linear Ramp
- Slant Ramp

Test Pattern - Color bars with a moving gray line are generated in the currently selected video format and sent to the Video Output.

NOTE: The Test Pattern is supported only in 1080p and 1080i formats.

Video Test Pattern Format

Determines the video format output from the system's internal test signal generator. Select from the following options:

- 525i 59.94
- 625i 50
- 720p 50
- 720p 59.94
- 1080i 50
- 1080i 59.94
- 1080p 23.98
- 1080p 24
- 1080p 25
- 1080p 29.97
- 1080p 30
- 1080p 50
- 1080p 59.94
- 1080p 60
- 2160p 23.98
- 2160p 24
- 2160p 25
- 2160p 29.97
- 2160p 30
- 2160p 50

Audio Signal Generator

You can output a test audio signal to validate audio signal connections. Select Off or 400 Hz Tone.

Off - No audio signal is generated.

400 Hz Tone - A 400 Hz tone is generated on both channels of a pair and sent to the analog RCA audio outputs. Each channel pair is at a different volume. Channel pair 1/2 is the loudest. Channel pair 7/8 is the softest.

Audio Delay

Use the Audio Delay control as needed to synchronize audio and video signals.

0 to 100 Milliseconds - Use the slider control with a mouse or the right and left arrow keys on your keyboard to adjust the audio delay setting.

HDMI Audio Mode

Determine how you want the HDMI audio to function. It can auto-detect which channels are carrying the audio (either Channels 1-2 or Channels 1-8), or you can manually select which channels will carry audio. Select one of the following:

- Auto
- Channels 1-2
- Channels 1-8

Analog Audio Channels

Select which pair of analog audio channels you want to go out through the analog RCA audio outputs. Choose one of the following:

- Channels 1 & 2
- Channels 3 & 4
- Channels 5 & 6
- Channels 7 & 8

NMOS Enable

Enable or disable network discovery for the device.

NMOS uses the address of the unit's internal web server for communications. When the unit boots up, it actively scans the network for an NMOS registry using MDNS/DNS. If it finds one, it tells the NMOS registry what it is and what its capabilities are.

If the unit does not find an NMOS registry, it continues to announce itself through MDNS so that it can be discovered. Once discovered, it registers itself with whatever has discovered the unit through MDNS.

Ember+ Enable

Enable or disable network discovery for the device.

Enable/Disable Video
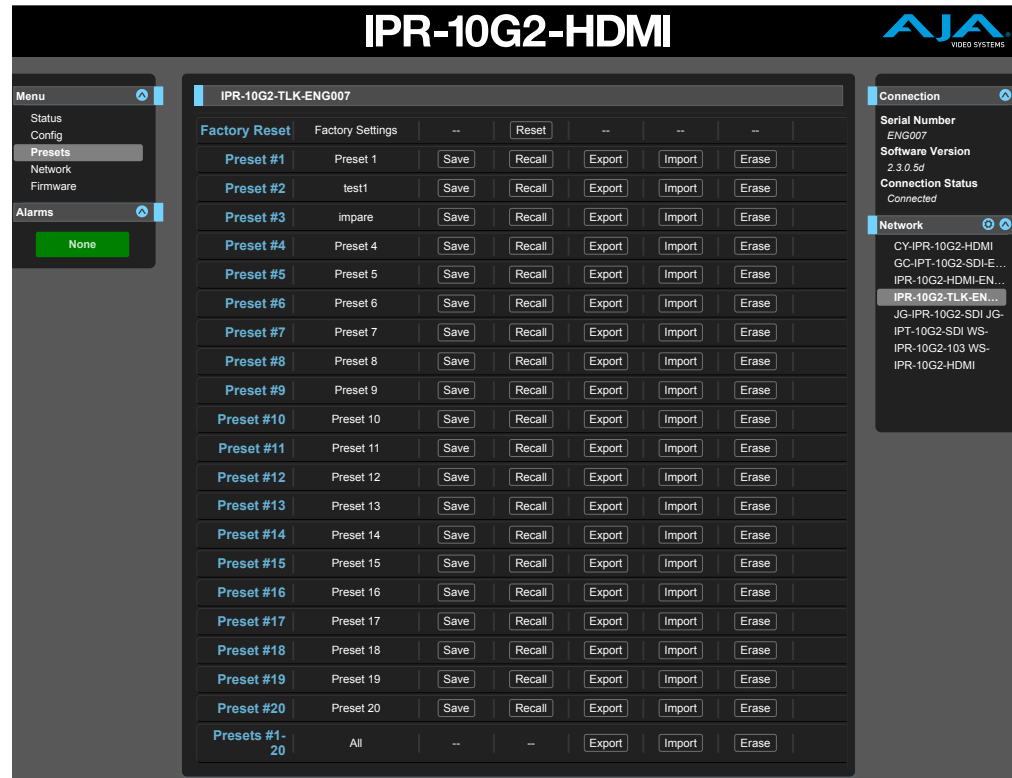
Enable or disable video for the device.

Enable/Disable Audio

Enable or disable audio for the device.

Presets Screen

Figure 33. IPR-10G2-HDMI Presets Screen

The Presets screen allows you to save Preset Configurations into 20 separate memory registers and recall the presets whenever needed.

The Presets screen also includes Export and Import functions that allow exporting one or all presets to your computer as files and importing exported preset files from your computer. A displayed message indicates successful or failed saves, recalls, exports, and imports.

Presets Screen Controls

Factory Reset - Factory Reset recalls all editable parameters to their factory default settings. Individual presets and Network settings, such as the IP Addresses, are not affected.

Recall - The Recall buttons recall the saved preset configurations.

CAUTION: *When you recall a Preset Configuration, the recalled preset immediately replaces the system's existing configuration. All previous settings are lost unless you have previously stored them in another preset configuration or an exported file.*

Save - The Save buttons let you save the current configuration into the preset register with the associated name and number. A preset is a set of all parameters as they were set at the time the preset was saved. Only editable parameters are saved in the presets. Non-editable parameters are not saved.

To change a preset name, click in the name's text field, type a new name, and press Enter to save the name. After entering text, you can click the mouse outside of the edit box to exit without changing the name.

CAUTION: *IP Mini-Converter stored presets may contain a web server access password. If you share an exported preset to someone, that person can extract the password. Before loaning the device to someone, or returning it as a rental, it is recommended that you clear the device of sensitive information.*

Export - The Export buttons save the associated preset contents to a file on your computer. The file gets exported to the default download location specified in your browser options. The file name is the same as the preset name with the suffix *.presets*. If you export multiple files for the same preset, a number gets appended to ensure a unique file name. The file size is small, usually less than 100 kilobytes.

Import - The Import buttons let 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 an IP Mini-Converter.

Erase - The Erase buttons erase the data in that preset.

Export Presets 1–20 (All) - Export All lets you save the contents of all 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 gets appended to ensure a unique file name.

Import Presets 1–20 (All) - Import All lets you browse for and import a previously exported *all.presets* file from your computer. A dialog box warns you that the operation will overwrite all 20 current preset contents 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.

USB Keyboard Control

The USB Keyboard Control, used for quickly recalling previously created device presets, is available for the IPR-10G2-SDI and IPR-10G2-HDMI.

Connect a standard USB keyboard with the USB port of the IPR-10G2 device. You can recall presets 1 through 20 by using keyboard numbers 1 through 9 to access presets 1 through 9, then keyboard letters A through K to access presets 10 through 20.

IMPORTANT: Using the Keyboard Number 0 (zero) will initiate a Factory Reset for the device.

Network Screen

Use the Network Configuration Control Tab to configure or modify settings for the Control LAN Ethernet port.

Figure 34. IPR-10G2-HDMI Network Configuration Control Tab

Use the Network Configuration Media 1 Tab to configure or modify settings for the Media 1 SFP+ cage for 10 Gbps Ethernet port.

Figure 35. IPR-10G2-HDMI Network Configuration Media 1 Tab

Use the Network Configuration Media 2 Tab to configure or modify settings for the Media 2 SFP+ cage for 10 Gbps Ethernet port.

Figure 36. IPR-10G2-HDMI Network Configuration Media 2 Tab

The Network screen allows you to view and change your IP Mini-Converter's network settings. Click Apply to activate any changes.

IP Address Type - IP Address Type determines the type of TCP/IP network configuration to be used. DHCP enables connecting to the network DHCP server, which assigns the IP Address, Netmask, and Gateway automatically. Static lets you set these parameters manually.

NOTE: If the IP Address Type is DHCP, the IP Address, Netmask, and Default Gateway are gray, indicating they are set automatically and cannot be changed unless IP Address Type is first set to Static. Changes are saved and activated upon confirmation using the Apply button.

- **DHCP** (default) - Selects automatic IP address assignment from the LAN DHCP server. If a DHCP server cannot be found, it fails over to the static IP address.
- **Static** - Assigns a static IP address manually. The factory default static IP address: 192.168.0.1.

IP Address - IP Address determines a static IP address to be used for TCP/IP networking. Consult your network administrator about how to set this value.

- If IP Address Type is set to DHCP, the IP address is set automatically by the network DHCP server and cannot be entered here.
- If IP Address Type is set to Static, enter an IP address compatible with your LAN here. Also enter a netmask and default gateway address in the following two parameters. Click Apply when you are ready to apply all three entries.
- If IP Address Type is set to DHCP and there is a DHCP failure, the IP address is set to the static IP address.

Netmask - Netmask determines the subnet mask to be used for TCP/IP networking.

- Enter a subnet mask compatible with your LAN. This is only needed for Static IP configurations. The factory default Subnet Mask is 255.255.255.0

- If IP Address Type is set to DHCP, the Subnet Mask is set by the DHCP server and cannot be changed by the user.

Default Gateway - Default Gateway determines the gateway or router used on your LAN for TCP/IP networking.

Without a properly configured default gateway (whether you have a router/gateway or not), your IP Mini-Converter will be unable to see other IP Mini-Converters on the network, although you may still be able to control this IP Mini-Converter via a web browser. Also, without a proper gateway defined, the discovery feature on the Network web page will not list other units on the network.

- Enter a default gateway or router address. This is only needed for Static IP configurations. The factory Default Gateway is 192.168.0.1.
- If IP Address Type is set to DHCP, the Default Gateway is set by the DHCP server and cannot be changed by the user.

MAC Address - Reports the connected IP Mini-Converter's Media Access Control Address.

Link State - Reports the current status of the Ethernet connection.

Firmware Screen

Figure 37. IPR-10G2-HDMI Firmware Screen
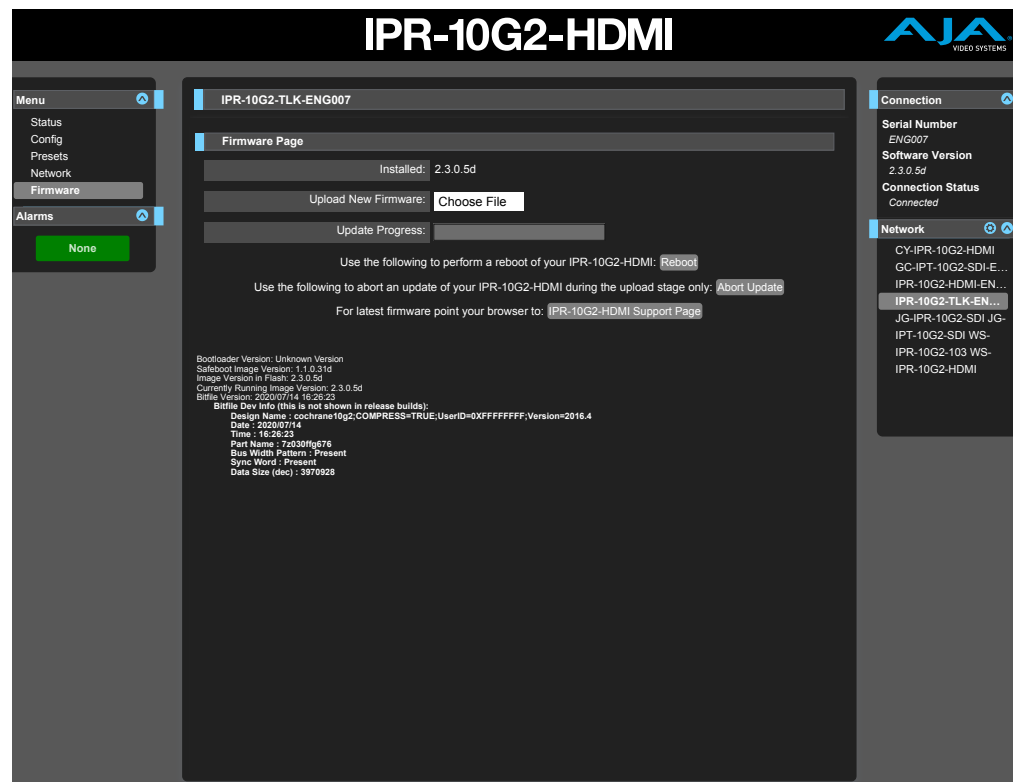
Downloading and Installing Updated Firmware

The Update Firmware screen allows you to download and install a firmware update from AJA.

To Download and Install Updated Firmware

1. Visit the AJA website (aja.com) to locate and download the updated software. The following page provides support information and will include links to locations where you can download updates:

   https://www.aja.com/family/ip-converters#support

2. After downloading the software update to your local drive, use the Browse or Choose File button to locate the local software copy.

3. Follow the prompts to load the new firmware into your unit.

4. After the firmware has finished installing, reboot the unit by disconnecting power for a few seconds, then reconnecting power.

NOTE: *You can also update the firmware using eMini-Setup. See "Firmware Update Procedure" on page 25 for details.*

Booting the 10 GigE IP Mini-Converters from the Safeboot Firmware

The 10 GigE IP Mini-Converters contain primary firmware and safeboot (secondary) firmware. To boot from the primary firmware, just cycle the unit's power.

In the event that the primary firmware becomes corrupted, you can boot the unit using the safeboot firmware.

To Boot from the Safeboot Firmware

1. Remove power from the device.

2. Using a very narrow tool, such as the end of a paper clip, press down and hold the recessed safeboot button, making sure you feel the button depress. The recessed safeboot button is located next to the Control LAN port.

Figure 38. Location of recessed safeboot button

Recessed
Safeboot
Button

3. While keeping the safeboot button depressed, apply power, then continue holding down the safeboot button for three seconds.

4. Remove the paper clip from the safeboot button. The unit will boot from the safeboot firmware. After rebooting, the message "Safeboot" displays under the Alarms heading.
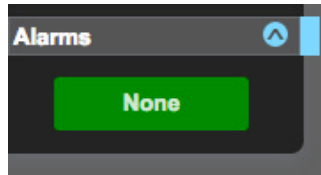
Figure 39. The Safeboot alarm message
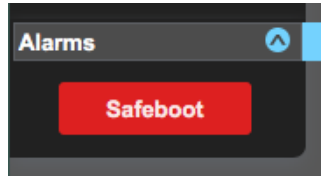
5. Finally, update the firmware as described above under *"Downloading and Installing Updated Firmware" on page 54.*

Following a successful firmware update and reboot, the message "None" displays under the Alarms heading.

Figure 40. The alarm message after a successful firmware update

Appendix A – Specifications

IPT-10G2-SDI Tech Specs

Video Formats

- (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920x1080i 50, 59.94
- (HD) 1280x720p 50, 59.94, 60
- (SD) 625i 50
- (SD) 525i 59.94

Video Quality

- 10-bit, 4:2:2, uncompressed

Discovery, Registration and Control

- NMOS discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
- Ember+ control (no discovery, control only)
- AJA REST API control (discovery via SSDP or MDNS)
- LLDP (Link Layer Discovery Protocol)
- Supported over dedicated management Ethernet port and in-band over media ports

Media Transport Interfaces

- SMPTE ST 2110 (-10, -20, -21, -30)
  - 2x SFP+ Cages - SFPs not included
- Recommended 10 GigE SFP+ modules:
  - Arista Networks SFP-10G-SR Compatible 10GBASE-SR
  - Fiberstore SFP-10GSR-85 10G SFP+ 850nm
  - Finisar FTLX1471D3BCL (for single mode 1310nm)
  - Mellanox MFM1T02A-SR 850nm 10G

  NOTE: Maximum supported SFP+ power is 500 mW per SFP+ cage

Video Input Digital

- 1x 3G SDI BNC (single source, with loop through)
  - Up to 1080 60p, 4:2:2, 10-bits/pixel, YCbCr

Audio Input Digital

- Up to 8-Channel, SDI embedded audio, 24-bit per channel, 48 kHz synchronous

Audio Input Analog

- 2x RCA analog audio
  - Levels at -10 dBu (nominal)

Video Output IP

- SMPTE ST 2110
  - Single video channel output
  - SMPTE ST 2022-7 dual stream output for hitless switching
  - Tx support for Narrow, Gapped Mode

Audio Output IP

- SMPTE ST 2110
  - Up to 8 channels audio, 24-bit per channel, 48 kHz synchronous
  - 1 ms or 125 µs packet interval

Reference

- 1x BNC
  - Reference Out connector generates an analog/tri-level reference output synchronized to the PTP clock
  - Used to lock baseband sources/devices to PTP, so video arriving at the IP transmitter is properly timed

IP Clock

- PTP support compliant with PTP PTPv2 / IEEE 1588-2008
- SMPTE ST 2059-1 compliant

User Interface

- 1x RJ-45 for 10/100/1000 Base-T Ethernet
  - Web and REST clients supported for remote network setup and configuration
- 1x USB 2.0 Mini-B connector
  - AJA eMini-Setup supported for network setup and configuration via local desktop computer
- Web and REST configuration is also supported in-band over media ports

Size (w x d x h)

- 5.07" x 0.94" x 5.06" (128.8 x 23.9 x 128.4 mm)

Weight

- 0.6 lb (0.3 kg)

Power

- 5-20 VDC Regulated, 13 Watts, Power supply required (DWP-U-R1 included with purchase)

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% non-condensing
- Operating Altitude: <3,000 meters (<10,000 feet)

IPT-10G2-HDMI Tech Specs

Video Formats

- (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920x1080i 50, 59.94
- (HD) 1280x720p 50, 59.94, 60
- (SD) 625i 50
- (SD) 525i 59.94

Video Quality

- 10-bit, 4:2:2, uncompressed

Discovery, Registration and Control

- NMOS discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
- Ember+ control (no discovery, control only)
- AJA REST API control (discovery via SSDP or MDNS)
- LLDP (Link Layer Discovery Protocol)
- Supported over dedicated management Ethernet port and in-band over media ports

Media Transport Interfaces

- SMPTE ST 2110 (-10, -20, -21, -30)
  - 2x SFP+ Cages - SFPs not included
- Recommended 10 GigE SFP+ modules:
  - Arista Networks SFP-10G-SR Compatible 10GBASE-SR
  - Fiberstore SFP-10GSR-85 10G SFP+ 850nm
  - Finisar FTLX1471D3BCL (for single mode 1310nm)
  - Mellanox MFM1T02A-SR 850nm 10G

NOTE: Maximum supported SFP+ power is 500 mW per SFP+ cage

Video Input Digital

- 1x HDMI Standard Type A connector
  - HDMI v1.4b 24/30-bits per pixel
  - Up to 1080 60p, 4:2:2, 10-bit, YCbCr/RGB

Audio Input Digital

- Up to 8-Channel, HDMI embedded audio, 24-bit per channel, 48 kHz synchronous

Audio Input Analog

- 2x RCA analog audio
  - Levels at -10 dBu (nominal)

Video Output IP

- SMPTE ST 2110
  - Single video channel output
  - SMPTE ST 2022-7 dual stream output for hitless switching
  - Tx support for Narrow, Gapped Mode

Audio Output IP

- SMPTE ST 2110
  - Up to 8 channels audio, 24-bit per channel, 48 kHz synchronous
  - 1 ms or 125 μs packet interval

Reference

- 1x BNC
  - Reference Out connector generates an analog/tri-level reference output synchronized to the PTP clock
  - Used to lock baseband sources/devices to PTP, so video arriving at the IP transmitter is properly timed

IP Clock

- PTP support compliant with PTP PTPv2 / IEEE 1588-2008
- SMPTE ST 2059-1 compliant

User Interface

- 1x RJ-45 for 10/100/1000 Base-T Ethernet
  - Web and REST clients supported for remote network setup and configuration
- 1x USB 2.0 Mini-B connector
  - AJA eMini-Setup supported for network setup and configuration via local desktop computer
- Web and REST configuration is also supported in-band over media ports

Size (w x d x h)

- 5.07" x 0.94" x 5.06" (128.8 x 23.9 x 128.4 mm)

Weight

- 0.6 lb (0.3 kg)

Power

- 5-20 VDC Regulated, 13 Watts, Power supply required (DWP-U-R1 included with purchase)

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% non-condensing
- Operating Altitude: <3,000 meters (<10,000 feet)

IPR-10G2-SDI Tech Specs

Video Formats

- (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920x1080i 50, 59.94
- (HD) 1280x720p 50, 59.94, 60
- (SD) 625i 50
- (SD) 525i 59.94

Video Quality

- 4:2:2, 10-bit, YCbCr uncompressed

Discovery, Registration and Control

- NMOS discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
- Ember+ control (no discovery, control only)
- AJA REST API control (discovery via SSDP or MDNS)
- LLDP (Link Layer Discovery Protocol)
- Supported over dedicated management Ethernet port and in-band over media ports

Media Transport Interfaces

- SMPTE ST 2110 (-10, -20, -21, -30)
  - 2x SFP+ Cages - SFPs not included
- Recommended 10 GigE SFP+ modules:
  - Arista Networks SFP-10G-SR Compatible 10GBASE-SR
  - Fiberstore SFP-10GSR-85 10G SFP+ 850nm
  - Finisar FTLX1471D3BCL (for single mode 1310nm)
  - Mellanox MFM1T02A-SR 850nm 10G

NOTE: *Maximum supported SFP+ power is 500 mW per SFP+ cage*

Video Input IP

- SMPTE ST 2110
  - Single channel video input
  - SMPTE ST 2022-7 dual stream input for hitless switching
  - Rx support for Narrow/Wide, Gapped/Linear Modes

Audio Input IP

- SMPTE ST 2110
  - Up to 16-channels audio, 24-bit per channel, 48 kHz synchronous
  - 1 ms or 125 µs packet interval

*Streams with up to 16-channels are received but only the first 8 are output

Video Output Digital

- 2x 3G SDI BNC (single source, mirrored output)
  - Frame syncing to facility clock
  - Concealment of errors due to packet loss

Audio Output Digital

- Up to 8-Channel, SDI embedded audio, 24-bit per channel, 48 kHz synchronous

Audio Output Analog

- 2x RCA analog audio
  - Levels at -10 dBu (nominal)

Reference

- 1x BNC
  - Analog/tri-level reference input
  - Allows baseband output of IPR-10G2-SDI to be locked to the facility baseband clock

IP Clock

- PTP support compliant with PTP PTPv2, PTPv3 / IEEE 1588-2008
- SMPTE ST 2059-1 compliant

User Interface

- 1x RJ-45 for 10/100/1000 Base-T Ethernet
  - Web and REST clients supported for remote network setup and configuration
- 1x USB 2.0 Mini-B connector
  - AJA eMini-Setup supported for network setup and configuration via local desktop computer
- Web and REST configuration is also supported in-band over media ports

Size (w x d x h)

- 5.07" x 0.94" x 5.06" (128.8 x 23.9 x 128.4 mm)

Weight

- 0.6 lb (0.3 kg)

Power

- 5-20 VDC Regulated, 13 Watts, Power supply required (DWP-U-R1 included with purchase)

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% non-condensing
- Operating Altitude: <3,000 meters (<10,000 feet)

IPR-10G2-HDMI Tech Specs

Video Formats

- (UltraHD) 3840 x 2160p 23.98, 24, 25, 29.97, 30, 50
- (HD) 1920x1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920x1080i 50, 59.94
- (HD) 1280x720p 50, 59.94, 60
- (SD) 625i 50
- (SD) 525i 59.94

Video Quality

- Up to 1080 60p, 4:2:2, 10-bit, YCbCr/RGB uncompressed
- Up to UltraHD 30p, 4:2:2, 8-bit, YCbCr uncompressed
- Up to UltraHD 50p, 4:2:0, 8-bit, YCbCr uncompressed

Discovery, Registration and Control

- NMOS discovery and control according to standards IS-04 v1.3 and IS-05 v1.1
- Ember+ control (no discovery, control only)
- AJA REST API control (discovery via SSDP or MDNS)
- LLDP (Link Layer Discovery Protocol)
- Supported over dedicated management Ethernet port and in-band over media ports

Media Transport Interfaces

- SMPTE ST 2110 (-10, -20, -21, -30)
  - 2x SFP+ Cages - SFPs not included

- Recommended 10 GigE SFP+ modules:
  - Arista Networks SFP-10G-SR Compatible 10GBASE-SR
  - Fiberstore SFP-10GSR-85 10G SFP+ 850nm
  - Finisar FTLX1471D3BCL (for single mode 1310nm)
  - Mellanox MFM1T02A-SR 850nm 10G

NOTE: *Maximum supported SFP+ power is 500 mW per SFP+ cage*

Video Input IP

- SMPTE ST 2110
  - Single channel video input up to UltraHD
  - SMPTE ST 2022-7 dual stream input for hitless switching*
  - Rx support for Narrow/Wide, Gapped/Linear Modes

*Hitless switching via ST 2022-7 is supported up to 1080p 60 (UltraHD is not supported)

Audio Input IP

- SMPTE ST 2110
  - Up to 16-channels* audio, 24-bit per channel, 48 kHz synchronous
  - 1 ms or 125 µs packet interval

*Streams with up to 16-channels are received but only the first 8 are output

Video Output Digital

- 1x HDMI Standard Type A connector
  - HDMI v1.4b 24/30-bits per pixel
  - Frame syncing to facility clock*
  - Concealment of errors due to packet loss*

*Frame syncing and error concealment functionality supported up to 1080p 60 (UltraHD is not supported)

Audio Output Digital

- Up to 8-Channel, HDMI embedded audio, 24-bit per channel, 48 kHz synchronous

Audio Output Analog

- 2x RCA analog audio
  - Levels at -10 dBu (nominal)

Reference*

- 1x BNC
  - Analog/tri-level reference input
  - Allows baseband output of IPR-10G2-HDMI to be locked to the facility baseband clock

*Reference functionality support is up to 1080p 60 (UltraHD is not supported)

IP Clock

- PTP support compliant with PTP PTPv2, PTPv3 / IEEE 1588-2008
- SMPTE ST 2059-1 compliant

User Interface

- 1x RJ-45 for 10/100/1000 Base-T Ethernet
  - Web and REST clients supported for remote network setup and configuration

- 1x USB 2.0 Mini-B connector
  - AJA eMini-Setup supported for network setup and configuration via local desktop computer
- Web and REST configuration is also supported in-band over media ports

Size (w x d x h)

- 5.07" x 0.94" x 5.06" (128.8 x 23.9 x 128.4 mm)

Weight

- 0.6 lb (0.3 kg)

Power

- 5-20VDC Regulated, 13 Watts, Power supply required (DWP-U-R1 included with purchase)

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% non-condensing
- Operating Altitude: <3,000 meters (<10,000 feet)

Appendix B – Safety and 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 and European Free Trade Association (EFTA) Regulatory Compliance

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

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

Declaration of Conformity

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

CE This equipment meets the following conformance standards:

Safety

EN 60065: 2014 (T-Mark License),

IEC 60065: 2014 (CB Scheme Report/Certificate)

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

IEC 62368-1: 2014 (CB Scheme Certificate)

Additional licenses issued for specific countries available on request.

Emissions

EN 55032: 2012 + AC: 2013, CISPR 32: 2015, EN 61000-3-2: 2014, EN 61000-3-3: 2013

Immunity

EN 55103-2: 2009, EN 61000-4-2:2009, EN 61000-4-3:2006+A1:2008+A2:2010,

EN 61000-4-4:2004+A1:2010, EN 61000-4-5:2006, EN 61000-4-6:2009, EN 61000-4-11:2004

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..

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.

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 Operation 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! 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 energía 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! 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! 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

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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! 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.

Warning! Only use attachments and accessories specified and/or sold by the manufacturer.

Avertissement! Utilisez seulement les attaches et accessoires spécifiés et/ou vendus par le fabricant.

Warnung! Verwenden Sie nur Zusatzgeräte und Zubehör angegeben und / oder verkauft wurde durch den Hersteller.

¡Advertencia! Utilice solamente los accesorios y conexiones especificados y/o vendidos por el fabricante.

Aviso! Utilize apenas equipamentos/acessórios especificados e/ou vendidos pelo fabricante.

Avviso! Utilizzare soltanto i collegamenti e gli accessori specificati e/o venduti dal produttore.

Warranty and Liability Information

Limited Warranty on Hardware

AJA Video Systems, Inc. (AJA Video) warrants that the hardware product, not including software components, will be free from defects in materials and workmanship for a period of five years from the date of purchase. AJA Video provides a separate software warranty as part of the license agreement applicable to software components.

If the Customer brings a valid claim under this limited warranty for a hardware product (hereafter, a "product") during the applicable warranty period, AJA Video will, at its sole option and as the Customer's sole remedy for breach of the above warranty, provide one of the following remedies:

- Repair or facilitate the repair the product within a reasonable period of time, free of charge for parts and labor.
- Replace the product with a direct replacement or with a product that performs substantially the same function as the original product.
- Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

To obtain service under this warranty, the Customer must notify AJA Video of the defect before expiration of the warranty period and make suitable arrangements for the performance of service by contacting AJA Video support through the channels set forth on the support contacts web page at https://www.aja.com/support. Except as stated, the Customer shall bear all shipping, packing, insurance and other costs, excluding parts and labor, to effectuate repair. Customer shall pack and ship the defective product to a service center designated by AJA Video, with shipping charges prepaid. AJA Video shall pay to return the product to Customer, but only if to a location within the country in which the AJA Video service center is located. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR LIMITATIONS ON APPLICABLE STATUTORY RIGHTS OF A CONSUMER, SO SOME OR ALL OF THE TERMS OF THIS PARAGRAPH MAY NOT APPLY TO YOU.

Limitation of Liability

Under no circumstances shall AJA video BE LIABLE IN ANY WAY FOR ANY LOST, CORRUPTED OR DESTROYED DATA, FOOTAGE OR WORK, OR FOR ANY OTHER INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOST PROFITS, OR FOR ANY THIRD PARTY CLAIM, IN CONNECTION WITH THE PRODUCT, WHETHER RESULTING FROM DEFECTS IN THE PRODUCT, SOFTWARE OR HARDWARE FAILURE, OR ANY OTHER CAUSE WHATSOEVER, EVEN IF AJA VIDEO HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. AJA VIDEO'S LIABILITY IN CONNECTION WITH THE PRODUCT SHALL UNDER NO CIRCUMSTANCES EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCT. The foregoing limitations apply even if any remedy set forth in this LIMITED WARRANTY fails of its essential purpose. SOME JURISDICTIONS DO NOT ALLOW THE LIMITATION OF LIABILITY FOR PERSONAL INJURY, OR OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO SOME OR ALL OF THE TERMS OF THIS PARAGRAPH MAY NOT APPLY TO YOU.

Governing Law and Language; Your Rights

This limited warranty is the only warranty provided by AJA Video on the hardware product. It supersedes all prior or contemporaneous understandings regarding such subject matter. No amendment to or modification of this warranty will be binding unless in writing and signed by AJA Video. The laws of the State of California, USA will govern this warranty and any dispute arising from it. Any translation of this

Agreement is intended for convenience and to meet local requirements and in the event of a dispute between the English and any non-English versions, the English version of this warranty will govern. This limited warranty gives you specific legal rights and you may have other rights that vary from jurisdiction to jurisdiction, some of which are noted above.

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