

# FS3

## Installation & Operation Guide

Version 1.1

Published: October 1, 2015



Because it matters.®

**AJA**  
VIDEO SYSTEMS



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# Notices

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## Contacting Support

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When calling for support, have all information at hand prior to calling.

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*Support Email:* [support@aja.com](mailto:support@aja.com)

*Sales Email:* [sales@aja.com](mailto:sales@aja.com)



# Chapter 1: Introduction

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## Overview

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The new FS3 combines AJA's industry-proven frame synchronization with high-quality 4K up-conversion technology to seamlessly integrate SD and HD signals into 4K workflows. AJA's adaptive scaling algorithms, paired with our well-known conversion technology ensures your up-converted images will have the maximum quality possible. You can input SD or HD resolution SDI via BNC or Fiber, and output up-converted 4K video to multiple BNC and Fiber outputs simultaneously. FS3 also includes the industry-proven features included in AJA frame synchronizers such as up, down, cross-conversion of SD, HD, and 3G-SDI formats, RGB color correction, region of interest scaling, extensive audio controls and routing, web UI control, GPI triggers and more, making it an extremely versatile tool that can support a variety of production requirements.

Synchronizing diverse formats is a critical part of a broadcast, mobile or post-production environment. FS3 syncs to analog SD blackburst, HD tri-level sync, or to the incoming SDI signal. FS3 also provides integer frame rate conversion (3:2, 1:2, 2:1).

The growth of 5.1 and 7.1 audio has increased the number of audio channels that must be managed in a production. FS3 accepts embedded SDI audio on all four SDI inputs (two coax and two optional fiber), and has an internal 64x64 audio matrix that allows routing of all embedded audio channels. Besides audio level, phase, and delay controls, FS3 also provides for 5.1 or 7.1 mixdown to stereo.

## Video Features

- Video format converter, that accepts SD, HD or 3G SDI video and up-converts the signal to UHD (3840x2160) or 4K (4096x2160), and also up/down/cross converts SD, HD, and 3G-SDI.
- The FS3 handles a wide variety of video output formats, including 4K/UHD Quadrant (Square Division) and Two Sample Interleave (2SI). See ["Video Input" on page 92](#) for a complete list. Also see ["Appendix D: About SDI Video Formats on page 109"](#) for background information.
- Multiple mirrored outputs: three for Quad SDI, six for Dual SDI, and twelve for Single SDI.
- Video proc amp and color correction.
- Frame synchronizer.
- User-specified custom format conversion and scaling with variable crop, size, aspect, position, and Region of Interest parameters.
- Sidebar keying over black or matte.
- Closed captioning support.



- Active Format Description (AFD) support.
- Reverse Telecine.
- Looping reference input with flexible genlock.

## Audio Features

- Embedded SDI audio (up to 64 in/out), with flexible audio routing. Any or all embedded audio inputs can be directed to any or all embedded audio outputs. The same embedded audio is carried on the mirrored video outputs.
- Level and Phase, controls for every audio channel, and Delay controls for all SDI audio channel pairs.
- 5.1 and 7.1 mix down to stereo.
- Supports pass-thru of synchronous non-PCM audio (Dolby E, Dolby D, etc).

## Other Features

- Built-in front panel control via scrolling alphanumeric and graphical menu.
- Front panel LED status indicators for at-a-glance system monitoring.
- Linux operating system supporting full network compatibility, including Web-based remote control over 10/100/1000 Ethernet via an internal web server.
- Two fully redundant power supplies standard.
- Five-year international warranty with unlimited technical support.

## FS3 Control

---

FS3 operation can be monitored and changed in a number of ways. Feature sets in each of the control methods vary, although the front panel and web browser interfaces offer many of the same features.

### Front Panel Control

The FS3 front panel offers the most direct control, ideal for use in machine rooms or wherever quick changes and status checks must be made. The buttons and knobs control menus in the display, allowing you to fully configure the system according to your purposes. You can control inputs, outputs, processing paths, keying, and much more.

### Remote Web Browser Control

The FS3 internally contains an optimized web server that allows remote monitoring and parameter setting via an Ethernet 10/100/1000 network-attached computer running a web-browser. Networks can be closed local area networks, a direct computer-to-FS3 cross-over cable, or for greatest flexibility, exposed through a firewall to a broadband WAN. From a network-connected computer you can communicate with one or more FS3 devices, even getting them to identify themselves via LEDs on the front and rear panel.

### GPI Inputs and Outputs

General Purpose Inputs and Outputs are available on the FS3 back panel to provide contact closure control. Using the inputs, an external contact closure activates a specified function on the FS3. Using the outputs, specific FS3 functions can produce a contact closure to activate any desired function on external equipment. The functions to be activated by an input or that can activate an output are set using the front panel and browser menus.



## SNMP Interface Monitoring

SNMP offers remote network monitoring of alarm conditions.

## Optional FS3 Features

### Fiber I/O

The FS3 supports optional AJA Optical Fiber I/O modules as follows:

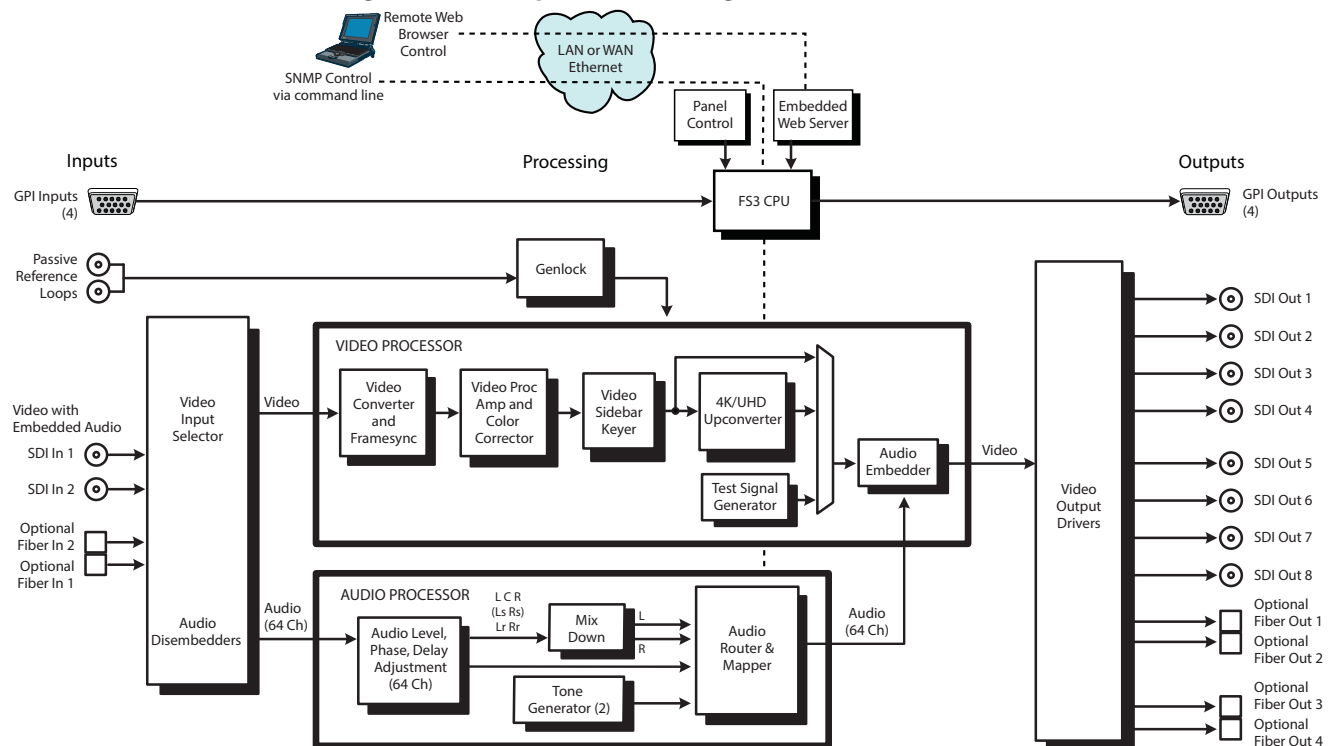
- Single Input, LC connector
- Single Input SC connector
- Single Output LC connector
- Single Output SC connector
- Dual Input LC connectors
- Dual Output LC connectors

FS3's Fiber I/O supports the 3G/HD/SD SDI protocol. Only AJA modules are supported; use of other manufacturers' modules is not supported and may void the warranty.

## Technical Description

The FS3 features an incredibly flexible architecture, offering a powerful Video Processor for video conversion and processing, a separate Audio Processor, and input and output video and audio signal routing.

**Figure 1. FS3 Simplified Block Diagram**





## Video Processor

The Video Processor performs format conversion, frame synchronization, signal processing, and keying operations. Conversion is done with very high quality scalars. De-interlacing is performed with high quality motion-adaptive processing including diagonal filters. The Processing Amplifier and Color Corrector supports video signal adjustment with standard Proc Amp controls and RGB color correction.

## Audio Processor

The FS3 can accept and route any embedded audio input to the logical SDI1 thru SDI4 outputs. Audio on SDI1 thru SDI4 outputs is duplicated on SDI5 thru SDI8 and Fiber1 thru Fiber4 outputs.

Channel mapping allows different individual audio input channels to be routed to different individual logical outputs. Any embedded audio input can be routed to any embedded audio logical output using channel mapping.

An internal mixer is available that permits mixing down five inputs (5.1) or seven inputs (7.1) to a left/right stereo mix.

FS3 does not perform digital audio sample rate conversion. The Dolby 5.1 and similar schemes of digital encoded audio are passed unaltered, provided the input is genlocked to the FS3 output.

### About Embedded Audio Routing

The FS3 can disembed a set of 16 channels (8 pairs) of embedded digital audio from each SDI input. Each set of audio channels are embedded into each logical SDI1-SDI4 portion (SDIn) of the SDI signal.

When not using the FS3 channel mapping feature, each set of 16 audio channels are routed together, from one SDIn source to one SDIn destination. Exactly which FS3 physical output connector carries which set of embedded audio can vary, depending on the FS3 configuration.

## Operation Overview

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### About Inputs and Outputs

In general, to use the FS3 for video up-conversion, first select an Output Video Format (with the VIDEO PROC, Video Output Format Menu) that is compatible with the current FS3 genlock source (see ["About Reference and Genlock Source"](#) below), then select an Input port (with the VIDEO PROC, Input menu). The FS3 will automatically determine the selected input video format and convert it to the selected Output Video Format. The converted video is routed to the FS3 output ports, duplicating the signal on all complete sets of available connectors.

### About Reference and Genlock Source

A genlock source being used by the FS3 for reference must be compatible with the FS3 video output format. These signals are compatible when they are both in the same frame rate family (59.94/29.97/23.98, or 50/25, or 60/24).

The FS3 can be configured to operate with one of a variety of references, including genlock to the signal from the Reference input connector, genlock to the current video input signal, or Free Run. Your choice of reference needs to meet your individual facility requirements, and must be accounted for when you configure the FS3 video output format.



## Sidebar Video Keying

The FS3 can be configured to perform sidebar keying (useful when converting with different image aspect ratios). Sidebar keying black or matte is available.

## Retained Settings

The FS3 stores the current value of each operational parameter in Flash memory so that the system returns to the same state after a power cycle.

The FS3 also stores independent values for many settings, so that if the unit is configured for one operation, changed to a different operation, and then returned to that prior operation, the settings for that prior operation are restored.

For example, changing the Video Input selection automatically selects new values for Proc Amp parameters and RGB Proc Amp parameters. This is referred to as Source Memory. Each video source remembers its own Proc Amp settings.

Similarly, changing the Output Format selection automatically selects new values for H & V timing parameters. This is referred to as Output Timing Memory. Each Output Format mode remembers its own H & V timing settings.

As another example, Output Format Mapping stores the Output Format selected for any of the frame rates. That Mapped Output Format is recalled if the frame rate selection is changed.

Forty different presets are available that can be used to restore the FS3 to a previous state. Many parameters can be individually reset to factory values using individual menus, or the entire FS3 can be reset to defaults (with the PRESET, Factory Preset menu).

## In This Manual

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**Chapter 1: Introduction** provides an overview and a list of box contents.

**Chapter 2: Controls, Indicators, and Connections** describes controls, indicators, and connections.

**Chapter 3: Installation and Configuration** provides complete instructions for installing and configuring the FS3.

**Chapter 4: Display Menus** explains how to use the controls and display menus.

**Chapter 5: Browser Control** explains how to use the FS3 remotely via a web browser on a network-attached computer.

**Chapter 6: SNMP** discusses FS3 support of SNMP.

**Appendix A: Specifications** presents a list of technical specifications for the product.

**Appendix B: Pinouts** explains the rear panel connector pinouts.

**Appendix C: Safety & Compliance** provides regulatory compliance statements, advisories and warnings.

**Appendix D: About SDI Formats** provides a basic history of some of the SDI standards.

**Warranty**

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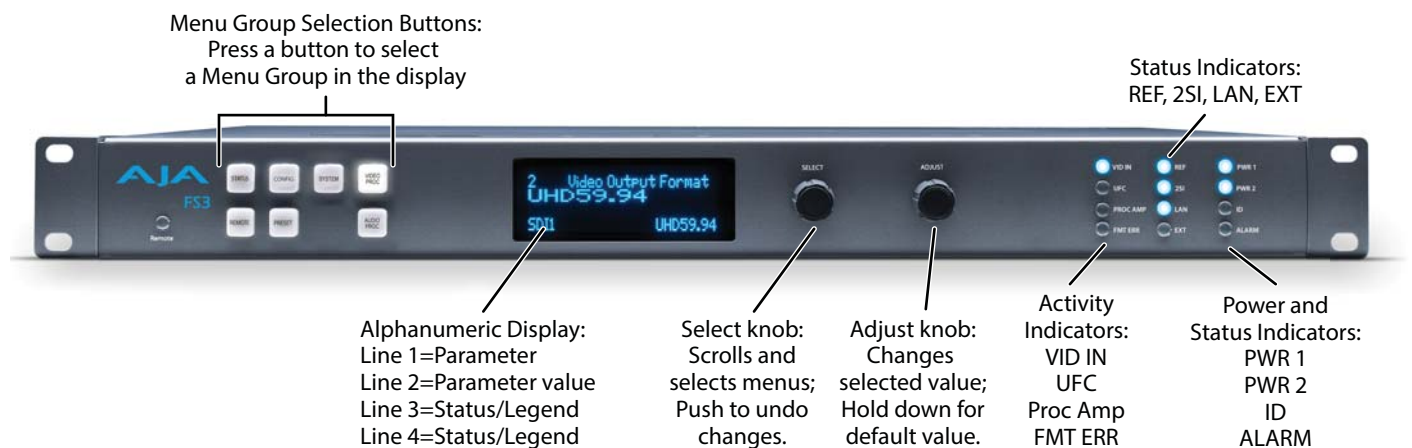
# Chapter 2: Controls, Indicators, and Connections

## Overview

The controls, indicators, and connectors illustrated and described in this chapter allow you to connect, operate, and monitor the FS3 system and to troubleshoot problems if you encounter them. Becoming familiar with the front and rear panels also simplifies system installation, setup, and operation.

## Front Panel Description

**Figure 2. AJA FS3 Front Panel Controls and Indicators**



## Alphanumeric Display

The FS3's control system is designed to be quick and easy to use. The four-line alphanumeric display shows menus that are numbered and grouped by function. The menu groups are easily accessed using pushbuttons which correspond one-to-one with the groups (one button per menu group). The menu lines, which are 23 characters wide, display the following information:

- **First line**—parameter number and name.
- **Second line**—the editable value set for a parameter.
- **Third and fourth lines**—current status, labels, or prompts.

**Figure 3. Four Lines of the Front Panel Display When you edit a parameter containing**

```
1 Param number & name
2 Current value setting
3 Legend, info or prompt
4 Legend, info or prompt
```

*multiple values, such as the IP address, the value currently being edited blinks.*



- Operational Summary** The seven front panel pushbuttons allow you to select display menu groups. The two knobs allow you to change menus and set parameters within the menu groups. These functions can be summarized as follows:
- Select a menu group: Press one of the seven pushbuttons.
  - Scroll through menus in a group: Turn *SELECT*.
  - Edit a menu parameter: Stop *SELECT* on the menu.
  - Change a parameter value: Once the parameter is selected with *SELECT*, turn *ADJUST* to set the value. Changes are applied immediately.
  - To edit a multiple part parameter, such as the IP address, push the *ADJUST* knob momentarily (the value blinks). To save the whole parameter after editing, push *ADJUST* momentarily again.
  - Coarse adjust a value (for use with parameters that have more than 10 selections):
    - 10x speed - Hold down the menu group button (the button turns blue) and turn *ADJUST*. The values will change in 10x increments.
    - 100x speed (available for extremely wide-range parameters, like Audio Delay) - After enabling 10x speed above, momentarily release and press that group button a second time (the button turns light blue). Turning *ADJUST* will now change the value in 100x increments.
  - Undo a change (restore previous setting): Push *SELECT* momentarily.
  - Reset to factory default: Hold down *ADJUST* for 4 seconds.

## Pushbuttons

The general rules of Menu Group button operation are:

- Press one of the Menu Group buttons to access the associated menu group. The *SELECT* and *ADJUST* knobs control the display menus.
- The selected Menu Group button lights and the other buttons go low tally
- Each menu group returns to the last menu changed when you select the button. After a reboot, each group displays the last menu selected.
- Hold down a button (turns blue) to make coarse adjustments using the *ADJUST* knob. Release the button to make fine adjustments. See [page 16](#).

The following text briefly lists the functions accessed by each pushbutton:

- STATUS** Displays the Status Menu Group, which shows current machine status and error conditions:
- Video Input and status
  - Caption status
  - Reference and Genlock status
  - Output status
  - Power and Temperature status
  - System Name display
  - Alarms
- REMOTE** Displays the Remote Menu Group, which lets you select how to control the FS3:
- Control by local front panel only, remote sources only, or local and remote
  - Authentication
  - GPI input and output behavior
- CONFIG** Displays the Config Menu Group, which lets you configure the FS3 for your environment:



- System Name setting
- IP settings, MAC address
- SNMP settings
- Alarm control
- Hidden Menus, Screen Saver, and Display intensity
- Fan speed
- System serial number and software version
- System reboot

**PRESET** Displays the Reg Menu Group, which accesses the memory registers:

- Store, Recall, and edit the names of Presets
- Factory Preset (defaults)

**SYSTEM** Displays the System Menu Group, which lets you change or enable video and audio input and system functions:

- Video input format settings, including 3G setup
- Genlock reference source selection
- Output frame rate selection

**VIDEO PROC** Displays the Menu Groups that access Video Processor video input, format, conversion, and video processing selections and adjustments:

- Input source selections
- Output format and mode
- Loss of input selection
- H and V timing and delay settings
- Background fill selection
- Up-convert mode, aspect, edge
- High and low frame rate output settings
- Matte adjustments
- Proc amp and color corrector
- Custom Size and Position and ROI settings
- Legalizer settings
- Active Format Descriptor (AFD) settings
- Caption translation selection
- Input scan format settings (PsF or interlaced)
- SD line 21 blanking selection
- Test pattern and freeze output settings

**AUDIO PROC** Displays the Audio Proc Menu Group, used to control the adjustable audio parameters:

- Audio level, phase, and delay settings
- Embedded audio out settings
- 5.1 and 7.1 Mix Down adjustments
- Audio source selections
- Global output selection
- Output mapping controls



## Control Knobs

These are the general rules of *SELECT* and *ADJUST* knob operation:

- SELECT** Turning the *SELECT* knob performs these actions:
- Turn *SELECT* in either direction to scroll through the menus.
  - Stop on a menu to enter that menu for editing.
  - Turn *SELECT* within a menu to scroll through multiple parameters.
  - Pause on a parameter to select it for editing. For multiple fields in a parameter, use *SELECT* to move through the fields (after pressing *ADJUST* to enter field editing mode).
  - Push *SELECT* momentarily to undo and restore the previous setting.
- ADJUST** Turning the *ADJUST* knob performs these actions:
- Turn *ADJUST* to change the values of a selected parameter.
  - In most cases, leaving a value in place for a moment sets that value.
  - To perform special actions, such as recalling a register, push the knob to confirm the displayed value. Display line 4 indicates such special actions.
  - Some parameters having multiple fields, such as *IP Address* require you to push the *ADJUST* knob to select a field, and push again to save changes.
  - Hold down the knob to reset a value to the factory default; for multiple field values, all fields are reset to the default.
  - When the *STATUS* button is selected, pressing *ADJUST* returns the user to the last mode and menu selected before *SYSTEM* -> *STATUS* was selected.

**Table 1. *SELECT* and *ADJUST* Knob Operation Summary**

Function	Knob Action
Scroll through menus. Scroll through parameters in a multiparameter menu. Scroll through numerals or letters in a parameter.	Turn <i>SELECT</i> backwards or forward.
Enter edit mode for a menu. Enter edit mode for a parameter. Enter edit mode for values, numerals, or letters. Advance to the next value, numeral, or character to edit.	Turn and stop <i>SELECT</i> on the item to edit. (For some multiple parameter menus, push <i>ADJUST</i> so that the selected parameter blinks.)
Increment/decrement a value.	Turn <i>ADJUST</i> .
Coarse adjust a value.	10x speed - Hold down button (turns blue) and turn <i>ADJUST</i> . - or - 100x speed - Hold down button (turns blue), momentarily release and press button again (turns light blue) and turn <i>ADJUST</i> .
Reset a value to the factory default value. Set a number to the default value (typically zero).	Hold down <i>ADJUST</i> .
Take (commit) a change to an edited parameter.	Automatic for most parameters. For multiple field parameters, push <i>ADJUST</i> momentarily to save.
Abandon (undo) a change before committing.	Push <i>SELECT</i> momentarily.
Take (commit) a special action, such as a preset recall.	Push <i>ADJUST</i> momentarily.



## LED Indicators

Indicators on the front panel are multi-state LEDs that light when a condition is present. The indicators and the conditions that cause them to light are as follows:

- REMOTE** A multicolor LED that indicates the current control mode:
  - Green = Local Only (front panel control only)
  - Red = Remote Only (remote browser or panel control only)
  - Amber = Local + Remote (front panel and remote control both enabled)
- VID IN (blue)** An active video input signal is detected.
- UFC (blue)** The Universal Format Converter has been changed from the default setting.
- PROC AMP (blue)** The Proc Amp has been changed from the default setting.
- FMT ERR (blue)** The selected input and output formats are incompatible.
- REF (blue)** The REF connector has an external reference video source applied.
- 2SI (blue)** The processor's output scan format is set to Two Sample Interleave (2SI).
- LAN (blue)** The FS3 is connected to an operational local area network. This indicator lights momentarily when web browser selections are changed.
- EXT (blue)** Flashes when a GPI has initiated a change in the system.
- PWR 1/2 (blue)** Power Supply 1 or 2 is operational and receiving power. Both PWR 1 and PWR 2 LEDs must be lit to indicate redundant power is available.
- ID (blue)** Blinks on and off when you right-click on an FS3 system name and choose Identify in the web interface Network list. This action helps identify which system you're controlling when multiple units are operated from a single computer. The ID LEDs on the front and rear panels perform the exact same function. No matter which side of a rack you're facing, you'll be able to see one of the LEDs.
- ALARM (red)** An alarm event has been detected. Press the STATUS button for information. The Alarm LED may light because of a disconnected or failed power supply, other hardware failure, video incompatibilities, or loss of reference. (Any of these conditions may be suppressed using the Alarm Suppress parameters.)

## Incompatibility Alarms

The FS3 produces signal incompatibility alarms for a number of reasons. For example, incompatible conversion alarms can occur because the FS3 cannot convert between frame rate families (59.94/29.97/23.98, or 50/25, or 24).

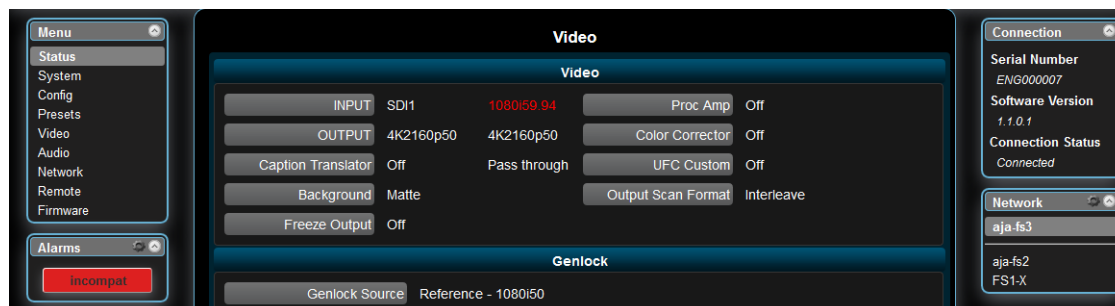
**Example Alarms** Video incompatibilities that the FS3 may detect include the following examples:

**Table 2. Video Incompatibility Examples**

Video Incompatibility Detected	Alarm Status screen will show			Video Status screen will show		
Genlock Source is set to "Reference", but no Reference signal is detected. In this example the cable has been disconnected.	IN	SDI 1	OK	IN	SDI 1	1080i59
	BKGD	Matte	OK	BKGD	Matte	
	GEN	Ref	No Ref	GEN	Ref	No Input
	OUT1		1080i59	OUT1		UHDp59
Reference signal format is not compatible with selected Output Format. In this example the reference signal is 50 Hz but output is 59.94 Hz.	IN	SDI 1	OK	IN	SDI 1	1080i59
	BKGD	Matte	OK	BKGD	Matte	
	GEN	Ref	incompat	GEN	Ref	1080i50
	OUT		1080i59	OUT1		UHDp59

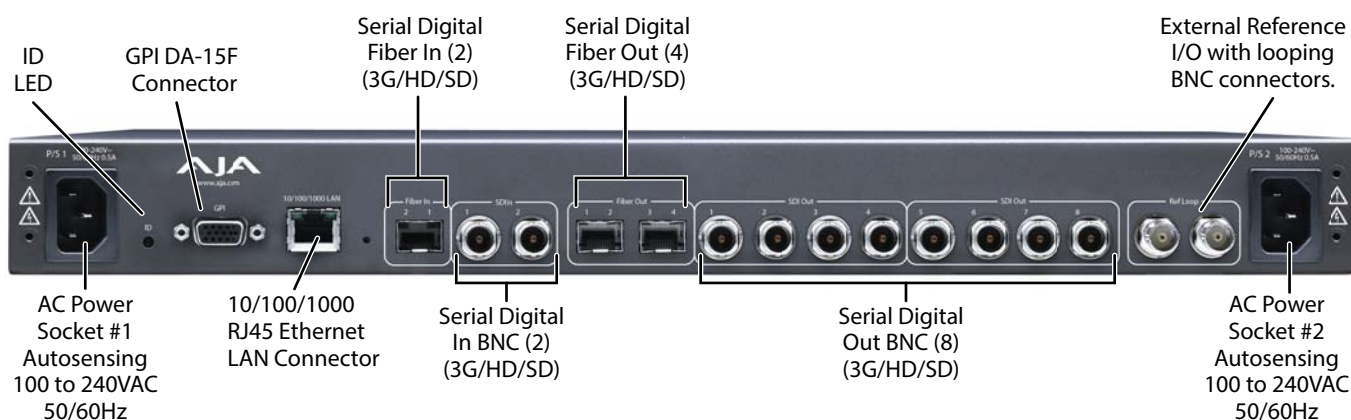


**Figure 4. Web page example of un-supported signals alarm.**



## Rear Panel Description

**Figure 5. AJA FS3 Rear Panel**



## Connectors

The rear panel connectors are summarized below and described in detail in the next section:

**P/S 1 and P/S 2** Two 3-pin sockets provide AC power to the two independent power supplies. The supplies are autosensing for 100–240 VAC, 50/60 Hz. Only one connection is required for operation, but both connectors must be plugged into AC power for redundant power protection.

**GPI** The GPI DA-15F connector provides connection to external equipment or circuits via an isolated TTL-compatible interface. Four GPI inputs and four outputs are available. See [“GPI Pinouts” on page 96](#).

Using the *REMOTE* menu group, you can program the actions of the GPI inputs and outputs individually. Contact closures on the inputs can trigger a wide variety of FS3 functions. Alarms or loss of video can trigger the GPI outputs.

**10/100/1000 LAN** This RJ45 connector provides an Ethernet 10/100/1000 port for connection directly to a computer or to a LAN through an Ethernet hub or switch.

**SDI (BNC) In/Out** Digital video with embedded audio. Two SDI input and eight SDI Output BNCs. 10 bit 3G SDI is supported. Up-converted signals are replicated on each set of additional BNC outputs (two quad BNC signal sets, four dual BNC sets, or 8 single BNCs).



**SDI (Fiber) In/Out (optional)** Two optional Single-Mode Optical Fiber SFP input modules support single- or dual-channel Fiber Input and/or Output. 3G SDI protocol is supported. Only AJA Optical Fiber SFP modules are supported—use of other manufacturer's modules is not supported and may void warranty. Up-converted signals are replicated on each set of additional Fiber outputs (one quad fiber set, two dual fiber sets, or four single fibers).

**Ref Loop** The Reference Loop BNCs accept an Output timing reference signal. The reference can be analog SD blackburst or HD tri-level sync. Examples of permissible reference video input signals:

- 525 Color Black
- 625 Color Black
- 1080i Tri-level Sync
- 720p Tri-level Sync

The 2 BNCs are a passive loop: one BNC is for the Input, and the remaining BNC can be connected to another piece of equipment in the reference chain or terminated.

*NOTE: For proper operation the input Reference signal must be stable and properly terminated using a 75-ohm terminator on either the unused loop connector or the last piece of downstream equipment to which the Ref Video is connected.*



# Chapter 3: Installation & Configuration

## Installation Overview

The installation and set up of an FS3 is very simple. Plug both AC supply cords into AC mains power (separate branch circuits for redundancy), connect the LAN connector to a LAN, WAN or local computer with a web-browser, and then connect source and destination video and audio equipment.

**NOTE:** *The AJA FS3 should be plugged into grounded 3-wire 100-240 VAC 50/60 Hz power outlets before you make connections to other equipment. The FS3 is equipped with autosensing power supplies. The AC cords provide a path to ground for accidental static discharge to protect system equipment. The unit has two fully independent and redundant power supplies and will operate with one or both AC power cords plugged into the unit. However, fault-tolerance exists only if both power supplies are connected and plugged into separate branch circuits. Then if power is lost on a branch or one of the supplies, the unit will continue to operate on the remaining circuit and power supply.*



### Warning!

To meet safety regulations for leakage current and to ensure redundancy in the event that a branch circuit breaker shuts off a branch, connect the dual power supplies to separate branch circuits.

## Installation Summary

All the steps of installation and configuration are documented in this chapter and are summarized as follows:

1. Unpack the shipping box, removing the FS3 and two power cords.
2. Install any physical options, such as fiber optic I/O modules.
3. Mount the physical chassis as desired: front rack, rear rack, or desk mount. If you are mounting multiple FS3 units, try to place them visually in the same area so you can use an attached computer to turn on and see the *ID* LED of the FS3 you're communicating with. For physical installation details, see ["FS3 Chassis Installation" on page 24](#).
4. Connect the two FS3 power cords to mains AC. For redundancy, use both power supplies and connect them to separate branch circuits so that the FS3 will continue to operate even if a circuit breaker opens on one branch.
5. If you plan to use remote control, connect your computer to the FS3 directly using an Ethernet cable, or connect both the computer and the FS3 to a local area network through an appropriate hub or router. Also set the FS3 IP address in the menus, and then use a computer to test (ping) the FS3 over the network connection to verify communication. For details, see ["Networking" on page 25](#).
6. Install a web browser on your computer, if not already present, for accessing the FS3 web pages. You can access the pages simply by entering the FS3 IP address in the browser address field. See ["Web Browser Control" on page 28](#) for details.
7. Connect the FS3 to system audio and video sources, including VTRs, monitors, DVD players, video switchers, etc. For details, see ["System Cabling" on page 30](#).
8. Test the FS3 with all of your devices to verify everything is working.

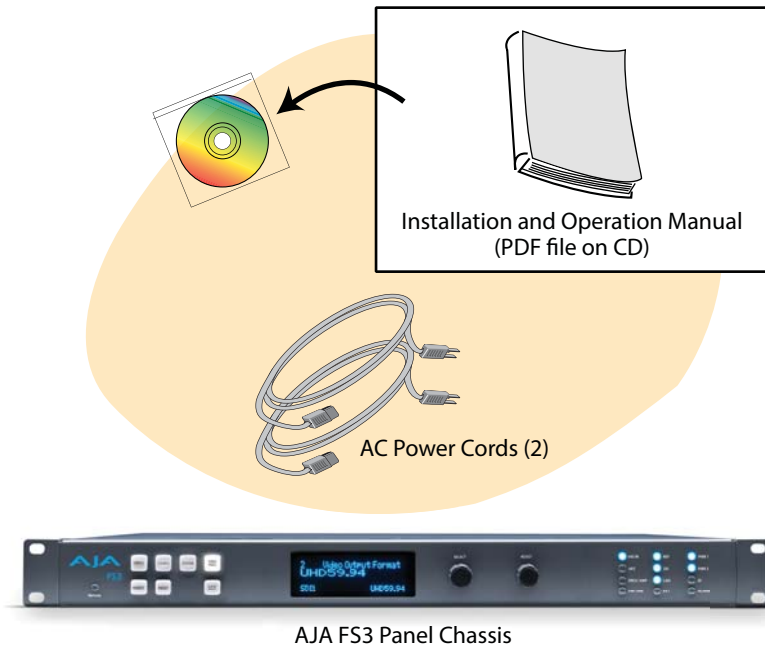


# Unpacking

## Shipping Box Contents

An FS3 chassis is shipped with two AC power cords, a user manual CD, and any late-breaking news bulletins (if applicable). Chassis rackmount brackets are provided as part of the chassis with screws.

**Figure 6. Shipping Box Contents**



As you unpack the shipping box, carefully examine the contents. Ensure you received everything and that nothing was damaged during shipment. If you find any damage, immediately notify the shipping service and supply them with a complete description of the damage. AJA will repair or replace damaged items.

If you find shipping damage, contact your AJA dealer or distributor for details on how to have your FS3 repaired or replaced.

**NOTE:** *Save packing materials and the shipping box. If your FS3 ever requires service or you move your system, use the packaging materials and box for safe shipment.*

## Installing Optional Fiber Optic I/O Modules

The optional AJA Fiber Optic I/O modules are purchased separately from the FS3. These AJA fiber modules work with the FS3:

- Single-channel LC connector modules
- Single-channel SC connector modules
- Dual-channel LC connector modules



**Caution!**

Only AJA fiber optic I/O option modules may be inserted into the FS3 Fiber slots. DO NOT USE fiber modules from other manufacturers; they will damage the FS3 connectors and circuits.

Install the optional fiber I/O modules by inserting them into the rectangular holes marked *Fiber* on the back panel with the electrical connectors facing downward. Press gently but firmly until the modules seat in the inside connectors. For additional installation and operation details, see the instructions provided with the fiber modules.

## FS3 Chassis Installation

---

The following information will help you install the FS3 chassis correctly.

### Physical Requirements for Mounting the Chassis

You can mount the FS3 chassis in two ways:

- Rackmounting—attach the FS3 (rear or front mounted) to a standard 19-inch wide equipment rack. The chassis occupies only one vertical rack unit.
- Desktop—lay it on a horizontal flat surface.

### Chassis Dimensions

When planning the equipment location, consider the chassis dimensions:

- Height—1 rack unit, 1.75 inches (4.5 cm)
- Depth—16 inches (40.65 cm)
- Width—17.5 inches (44.45cm)
- Weight—7.85 pounds, 3.56 kilograms

### Cabling and Cooling Requirements

Observe these precautions when placing your FS3:

- Plan adequate space for cable routing from the back of the chassis. Ensure that cable connectors are not stressed and cables are not bent or crimped.
- When rack mounting or stacking multiple FS3 chassis, ensure adequate airspace for cooling around the FS3 units. Note the location of cooling vents on all equipment next to the FS3 and ensure none are obstructed.

**NOTE:** *FS3 units can be stacked vertically without limit as long as there is an adequate supply of cool air around the FS3 vents.*

### Power Requirements

**NOTE:** *FS3 units can be stacked vertically without limit as long as there is an adequate supply of cool air around the FS3 vents.*

requires the following input voltage and power.

- Input Voltage—Chassis: autosensing 100VAC to 240VAC, 50/60Hz, fully redundant with both power supplies diode isolated.
- Power Consumption—55 Watts, 60 Watts with FRC option (70 Watts maximum)



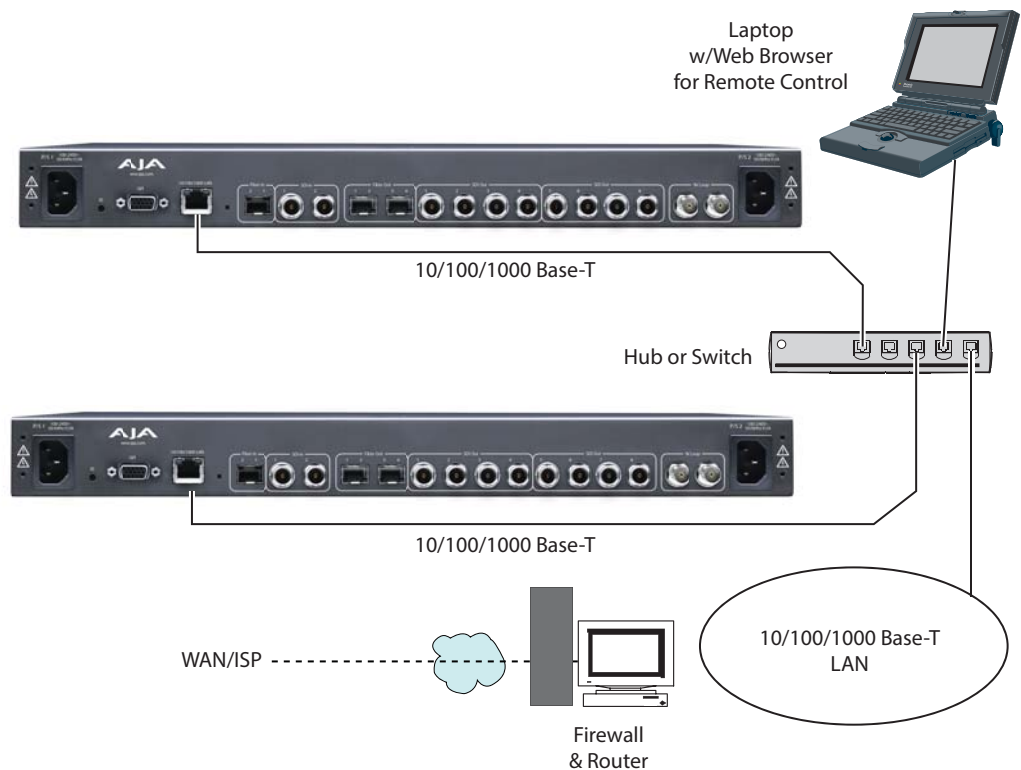
## Networking

You can network the FS3 directly to a laptop or other desktop computer using a single Ethernet cable (straight or cross-over), or connect it to a local area network (LAN). In either case, the FS3 connects via its 10/100/1000 Base-TX Ethernet connector. A LAN is a shared network that includes other Ethernet devices all attached via a hub or digital switch. LANs may be divided into zones separated by software or hardware routers. Routers may also be used to connect the LAN to an outside wide area network (WAN) such as the internet.

Devices on a LAN have IP addresses which may be fixed and permanent or dynamically assigned by the network (DHCP). When attaching the FS3 to a LAN, talk to your network administrator to find out how they want it connected (static IP or DHCP). Your IT department will be able to supply the information you need to install the FS3 on a LAN.

The following illustration shows a network connection example; your installation may differ.

**Figure 7. Network Example, Two FS3s on a LAN, with Laptop for Remote Control**



### FS3 Default Network Settings

The FS3 ships from the factory set for DHCP networking, and can be manually reset to the following default network settings:

IP Address	192.168.0.2
Subnet Mask	255.255.255.0
Gateway	192.168.0.1



The following instructions summarize ways to configure the FS3 to communicate with a computer directly or over a network.

## Networking Using DHCP or Default Static IP

The FS3 factory default configuration automatically looks for a DHCP server to issue an IP address. If your network includes a DHCP server, plug the FS3 into the network and connect with the unit as follows:

1. Press the *CONFIG* button.
2. Turn the *SELECT* knob to navigate to config parameter 2.2. Note on a piece of paper the DHCP-supplied IP address shown.
3. With your laptop or desktop computer connected to the same LAN as the FS3 and DHCP enabled, type the IP address you noted into the browser address field and press *Enter*. You should now see the FS3's browser *Status* screen.

If the FS3 cannot get an address from the network DHCP server, the FS3 will automatically use a preset factory static IP address of 192.168.0.2. You can access the FS3 using the default static address as follows:

1. Set your computer's IP address to whatever address you prefer in the 192.168.0 (class C) network.
2. Set the computer's Subnet mask to 255.255.255.0 (most PCs default to the proper netmask when the address is set).
3. Set the gateway address, if used, to match the FS3 default: 192.168.0.1. Alternatively, change the FS3 gateway address to match your gateway:
  - A. Press *CONFIG*, turn *SELECT* to 2.4 *Default Gateway*, push and then turn *ADJUST* to change the first group of digits.
  - B. Turn *SELECT* to advance to the next set of numbers, and turn *ADJUST* to set these numbers.
  - C. Continue using *SELECT* and *ADJUST* to set the full address.
  - D. When finished, push *ADJUST* momentarily to save the address.
4. Run a browser on the computer and type "192.168.0.2" (the factory static IP address). You should now see the FS3's browser status screen.

When you can access the FS3 screens, see "[Browser Remote Control](#)" on page 73 for details about configuring the FS3 using a browser.

## Networking the FS3 Using Your Own Static IP

If you don't want to use DHCP or the default static IP address, you can set your own static IP address:

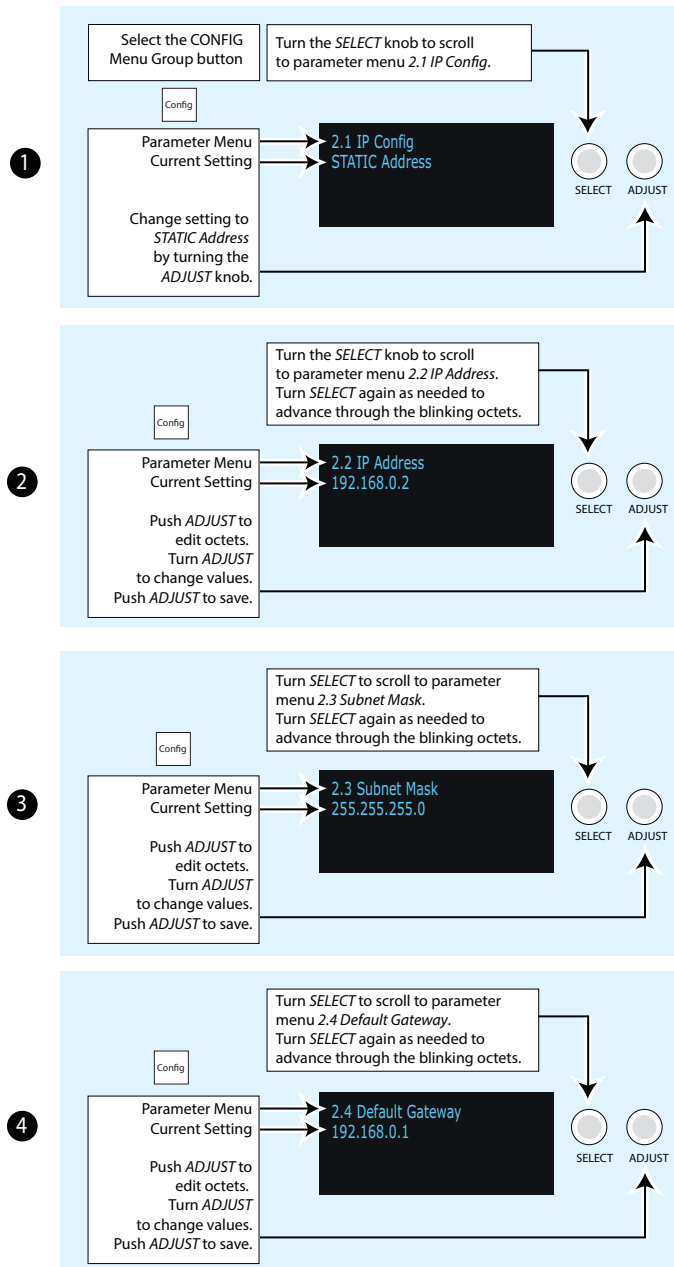
1. Select the *CONFIG* button and use the *SELECT* knob to navigate to parameter 2.1 *IP CONFIG*. Use the *DJUST* knob to select *Static*.
2. Turn *SELECT* to navigate to parameter 2.2 *IP ADDRESS*. The display shows the default static IP address: 192.168.0.2.
3. Change the IP address as follows.
  - A. Push the *DJUST* knob momentarily so that the first octet (set of numbers) blinks, and then turn *ADJUST* to change the numbers.
  - B. Turn *SELECT* to advance to the next set of numbers, and turn *ADJUST* to set these numbers.
  - C. Continue using *SELECT* and *ADJUST* to set the full address.
  - D. When finished, push *ADJUST* momentarily to save the address.



4. Turn *SELECT* to advance to 2.3 *Subnet Mask*. Use the *SELECT* and *ADJUST* knobs as in the previous step to set the desired subnet mask.
5. Turn *SELECT* to advance to 2.4 *Default Gateway*. Use the *SELECT* and *ADJUST* knobs as in the previous step to set the desired gateway address.
6. Run a browser on the computer and type in the IP address you set for the FS3. You should now see the FS3's *Status* screen.

When you can access the FS3 screens, turn to [“Browser Remote Control” on page 73](#) for details about configuring the FS3 using a browser.

**Figure 8. Setting FS3 Static IP Address**





## Using Ping to Test the Network Connection

If you have connected the FS3 to a computer and set up the IP address and still do not see the FS3 screens in your browser, you can ping the network to verify the connection. Simply run the Ping utility from a Mac OS X or Windows PC computer attached directly or on the same LAN as the FS3 as described below:

### Mac Ping Procedure

1. Find the Utilities Folder inside of the Applications Folder.
2. Locate the "Terminal" utility application and double-click it.
3. On the FS3, select the *STATUS* button and go to System Status menu (with the FS3 name) to read the unit's currently configured IP address.

**NOTE:** *The IP address reported on the CONFIG menu is a database entry, which occasionally may not be the address the unit is using. The STATUS menu always shows the correct value.*

4. At the Mac terminal prompt, enter *ping* and the IP address noted in [Step 3](#). For example: `ping 192.168.0.2`
5. If successful, the ping utility will respond that packets were sent, received and how long it took. For example:  
`64 bytes from 192.168.0.2: icmp_seq=0 ttl=64 time=0.590 ms`
6. If unsuccessful, check the FS3 network settings and resolve the problem with your IT administrator.

### Windows PC Ping Procedure

1. From the Start button, select the All Programs menu.
2. Select Accessories/Command Prompt from the All Programs list.
3. On the FS3, select the *STATUS* button and go to System Status menu (with the FS3 name) to read the unit's currently configured IP address.
4. In the PC *Command Prompt* utility, enter *ping* and the IP address noted in step 3. For example: `ping 192.168.0.2`
5. If successful, the ping utility will respond that packets were sent, received and how long it took. For example:  
`64 bytes from 192.168.0.2: icmp_seq=0 ttl=64 time=0.590 ms`
6. If unsuccessful, check the FS3 network settings and resolve the problem with your IT administrator.

## Web Browser Control

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To control the FS3 from a web browser on a network attached computer, enter the FS3 IP address as a URL in the browser. For example, if the FS3 IP address were "90.0.6.31", you would then type into the web browser: `http://90.0.6.31`. This topic is explained in greater detail in *Chapter 5: Browser Remote Control*.

**NOTE:** *The webUI (browser GUI) will keep up with most changes initiated at the front panel. However, the webUI may not reconnect (displays "Disconnected") when network changes are initiated at the FS3 front panel. To manually reconnect, type the new IP address into the browser, or click the browser Refresh button. Sometimes the browser caches the old FS3 address. If you can't get the browser to connect, try clearing the Browser history to clear the cache, and then enter the new address again.*



# Software Update Installation

Although the FS3 comes from the factory pre-installed with software, it may not be as up-to-date as software posted on our AJA website. This topic describes the steps required to update the software in your AJA FS3.

## Download the Latest Software

Current and past releases of FS3 software are available on the World Wide Web from AJA's website. To get the software, point your browser to the FS3 support page, which will contain helpful FS3 information and links to the updates:

<https://www.aja.com/en/family/fs>

Once you're at the update page, you can select FS3 software files to download to your Mac or PC for upgrading your local FS3 machine.

## Unpack the Software

FS3 software update files are "ZIP" files that you can open with a number of standard and third party file compression applications. The software image that you'll install on the FS3 is a file with a name like FS3\_ver\_1.0.0.0.bin or similar.

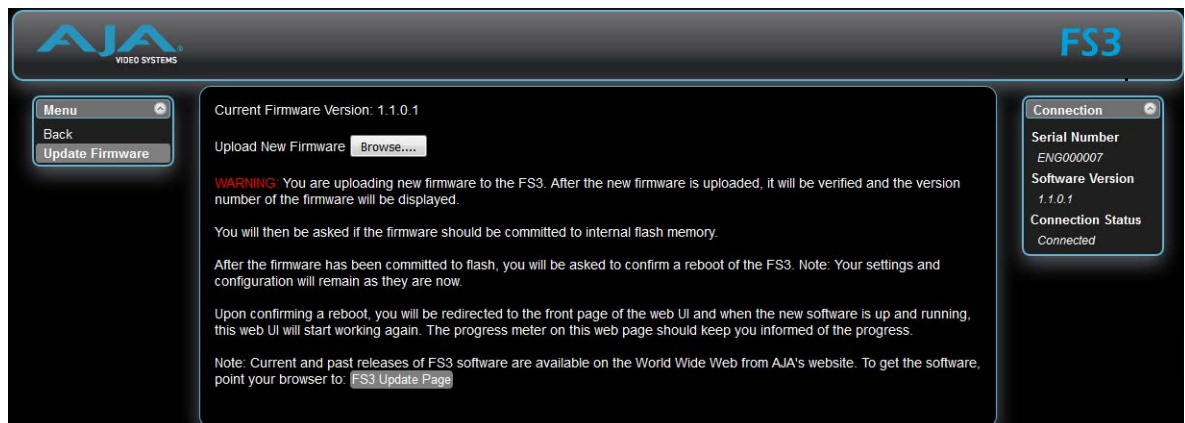
*NOTE: Depending on your PC or Mac operating system settings, the ".bin" extension may not be visible to you in a file directory.*

## Uploading and Installing the Software to the FS3

Uploading and installing the software update requires a PC or Mac that can "see" the FS3 via its Ethernet connection. Follow this procedure to install the software:

1. Point your browser at the FS3's upgrade page by clicking on the *Firmware* link at the bottom of the navigation box on the left-hand side of any FS3 web page. The FS3 web pages are discussed in "[Chapter 5: Browser Remote Control on page 73](#)".

**Figure 9. Update Firmware Browser Screen.**



2. Click the *Browse...* button to find and select the downloaded file. For example: *FS3\_ver\_1.1.0.1.bin* contained in the file downloaded from AJA.
3. Click *OK* when asked if you want to *Upload Firmware*. The file uploads to the FS3 and is tested for validity. Incomplete, corrupted, or non-FS3 files are rejected. Wait for the procedure to complete—it will take only a few minutes. Progress bars show upload progress.
4. Click *Commit Uploaded Firmware* when prompted after the upload is finished. Progress bars show progress as the file is written to flash memory.



5. Click *Restart FS3 with New Firmware* to restart the FS3. This will take the FS3 offline for a minute or two. During the restart, progress is shown in the connection area in the upper right corner of the FS3 *Status* screen. After restart, the FS3 will be running the new software.
6. Once these steps are complete, the FS3 will be running the software, and the *Software Version* on the *Status* screen shows the new version number. Check that the new software is running by bringing up the FS3 web page again; the software version is displayed at the top of all FS3 web screens. If the FS3 did not update successfully, run through the update steps again.

**NOTE:** *The configuration of the FS3 prior to the upgrade is preserved. The unit returns to service exactly as it was before the upgrade.*

If there is a power outage or glitch during the software download, the FS3 will boot the older software version and you can restart the upgrade process. This happens because the FS3 has been designed with a safety feature where an internal “safe” copy of the previous software is retained in the event the updating process fails.

## System Cabling

### System Video/Audio Cable Connections

When installing your system, you’ll make video and audio input/output connections. These connectors are explained individually in *Chapter 2*.

### GPI Connections

The FS3 has four GPI inputs and four GPI outputs. The GPI inputs and outputs are electrically isolated from the power and ground on the FS3 frame. Electrical isolation is provided for up to four pieces of external equipment.

See [“GPI Pinouts” on page 96](#) for information on how to wire the GPI connector to work with external devices that you want to use to control the FS3 or that you want the FS3 to control.

## Stand Alone Tests

The stand alone tests can be performed without a computer, using the FS3 front panel controls and rear connections.





The following procedures assume the FS3 is at factory defaults (taken from a newly opened box). If not set to defaults, the FS3 may behave differently.

## First Power Up

The following workflow powers up the FS3 and demonstrates some example alarms.

- Setup**
- Ensure the FS3 is completely disconnected (all video, audio, network, and power connector ports are empty).

- Procedure**
1. Connect both FS3 power cords to mains AC and allow time for the unit to boot up. Observe the front panel LEDs.
    - The ALARM LED will light red, indicating an alarm condition, and the REF LED will be off. By default the FS3 is configured to operate genlocked to an external reference signal.
  2. Press the front panel *STATUS* button, then turn the *SELECT* knob to view various Status menus.
    - The Status menus will report No Input for the Video Processor video inputs (the ports are disconnected), and the *GEN* (Genlock) parameter will report *Ref* (configured for external reference) but will also report *No Input* or *No Ref*.

Video Format Status screen			Video Format Alarm Status screen		
IN	SDI 1	No Input	IN	SDI 1	Incompat
BKGD	Black		BKGD	Black	
GEN	Ref	No Input	GEN	Ref	No Ref
OUT1		UHD59	OUT1		UHD59

3. Connect a 1080i59.95 HD tri-level sync reference signal to one of the FS3 Ref Loop BNCs.
  - The REF LED will light blue, indicating the FS3 is genlocked to an external reference signal.
  - The Status menu *GEN* parameters will report *Ref* and indicate the format of the incoming reference signal or *OK*.
  - The front panel ALARM LED will still be lighted red, however, because the FS3 is not receiving a compatible video input. No Input and Incompat will be reported for SDI 1.

Video Format Status screen			Video Format Alarm Status screen		
IN	SDI 1	No Input	IN	SDI 1	Incompat
BKGD	Black		BKGD	Black	
GEN	Ref	1080i59	GEN	Ref	OK
OUT1		UHD59	OUT1		UHD59

4. Connect a 1080i59.95 SDI video source to the SDI 1 input BNC.
  - The front panel ALARM LED will go off, indicating no alarm condition exists



- The front panel will report 1080i59 and an OK status for SDI 1.

Video Format Status screen			Video Format Alarm Status screen		
IN	SDI 1	1080i59	IN	SDI 1	OK
BKGD	Black		BKGD	Black	
GEN	Ref	1080i59	GEN	Ref	OK
OUT1		UHD59	OUT1		UHD59

5. Disconnect one of the power cords, leaving the other attached.
  - The ALARM LED will light red, and the PWR LED of the power supply with the removed cord will turn off.
6. Reconnect the power cable. The ALARM LED will turn off and the PWR LED will light.

This workflow confirms the FS3 powers up successfully and reports reference and power supply alarms.

**NOTE:** FS3 Reference, Power Supply, and Video Format alarms can be disabled, if desired.

## Internal Test Signals to All Outputs

This workflow generates bars and tone and sends them to all the FS3 outputs. This example uses the SDI 1-4 output connectors and a UHD video and embedded audio monitor. In the following procedures, where the terms *select* and *adjust* are used, turn the front panel *SELECT* and *DJUST* knobs.

- Setup**
- Connect the FS3 SDI 1-4 output connectors to a UHD capable display equipped with embedded audio monitoring.

- Procedure**
1. Press the *VIDEO PROC* button.
    - Select *4 Output Mode*, and adjust to *Test Pattern*.
    - Select *21 Test Pattern* and adjust to *75% Bars*.
  2. Press the *AUDIO PROC* button.
    - Select *21 Global Audio Out* and adjust to *Sig Gen 1KHz*.

You should now be able to see and hear the test signals on the UHD display, and on any other devices connected to the FS3 outputs.

This workflow confirms the FS3 generates and outputs video and audio.

## FS3 Processing Examples

In the following procedures, your exact actions depend on which FS3 interface you are using. Where the terms *MENU NAME*, *select* and *adjust* are used:

- On the front panel interface, press the indicated Menu Group Selection button and then turn the *SELECT* and *ADJUST* knobs to choose the parameter and change the setting. The Front Panel menu numbers are included in the procedures.
- On the web browser interface, use your mouse to select the name of the Menu Screen and then choose the parameter and setting using the drop down list or slider. Menu numbers are not present on the FS3 web pages.



## HD to UHD 4-Link Quadrant 59.94

The following workflow demonstrates up-converting an HD SDI input to a UHD SDI 4-Link Quadrant (Square Division) output. This example uses a 1080i 59.94 input and reference, and generates a UHDp59.94 output.

- Setup**
- Ensure the FS3 is receiving a valid reference signal. Connect a 1080i59.95 HD tri-level sync signal to one of the Ref Loop BNC connectors, and terminate the other Ref Loop BNC connector (either with a terminator or by connecting to terminated equipment). Once connected the FS3 front panel REF LED will light.
  - Connect a 1080i59.94 HD SDI signal to the SDI1 input on the rear of the FS3. Once connected the FS3 front panel VID IN LED will light.
  - Connect the four FS3 SDI1-4 video output connectors to a compatible UHD monitor.

**NOTE:** *Alternatively, you can monitor each UHD quadrant at full resolution on a standard SDI monitor by connecting each of the four outputs individually.*

**Procedure** If the FS3 has factory default settings, the UHD signal should be present on the four BNC output connectors. If not, check the following:

1. **SYSTEM** menu:
  - Select 5 *Genlock Source*, and adjust to *Reference*.
  - Select 6 *Output Frame Rates*, and adjust to 59.94/23.98.
2. **VIDEO PROC** menu:
  - Select 1 *Input*, and adjust to *SDI1* (factory default).
  - Select 2 *Video Output Format*, and adjust to *UHD59.94* (factory default).
  - Select 3 *Output Scan Format* and adjust to *Quadrant* (factory default).
  - If necessary, select 4 *Output Mode* and adjust to *Normal* (factory default).

## SD to 4K 4-Link 2SI 50 with Sidebar Matte

The following workflow demonstrates converting an SD SDI input to a 4K SDI 4-Link 2SI (Two Sample Interleave) output with a matte sidebar. This example uses a 625i 50 input, 1080i 50 reference, and generates a 4Kp50 output.

- Setup**
- Ensure the FS3 is receiving a valid reference signal. Connect a 1080i50 HD tri-level sync signal to one of the Ref Loop BNC connectors, and terminate the other Ref Loop BNC connector (either with a terminator or by connecting to terminated equipment). Once connected the FS3 front panel REF LED will light.
  - Connect a 625i SD SDI signal to the SDI1 input on the rear of the FS3. Once connected the FS3 front panel VID IN LED will light.
  - Connect the four FS3 SDI1-4 video output connectors to a compatible 4K monitor.

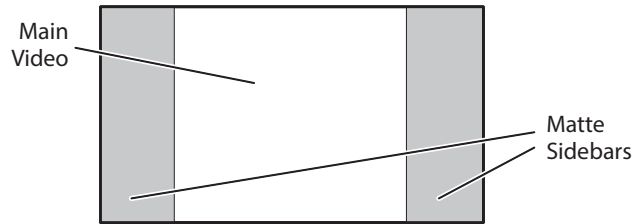
**NOTE:** *Alternatively, you can monitor the entire raster of the 2SI signal at lower resolution on a standard SDI monitor by connecting just one of the four outputs.*

- Procedure**
1. **SYSTEM** menu:
    - If necessary, select 5 *Genlock Source*, and adjust to *Reference* (factory default).
    - Select 9 *Output Frame Rates*, and adjust to 50/25.
  2. **VIDEO PROC** menu:
    - If necessary, select 1 *Video Input*, and adjust to *SDI1*.
    - Select 2 *Video Output Format*, and adjust to *4K1080p50*.
    - Select 3 *Output Scan Format* and adjust to *Interleave*.



- If necessary, select *4 Output Mode* and adjust to *Normal (factory default)*.
- Select *7 Background Fill* and adjust to *Matte*.
- If necessary, select *8 Upconvert Mode* and adjust to *4x3 Pillar* (factory default).

You should now see the processed sidebar image on the SDI monitor.

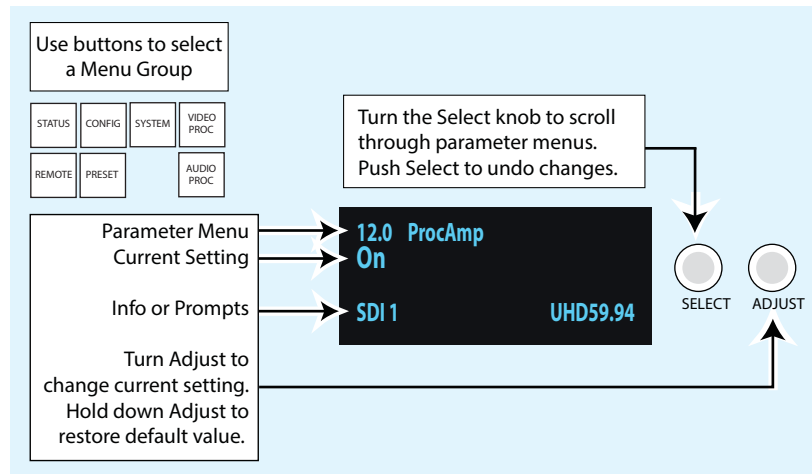


- Select *11.3 Matte Hue* and adjust to different degree settings. You should see the sidebar color hue change as you adjust.
- If vertical black bars exist between the matte and up-converted image, you can go to *9 Sidebar Edge* and adjust the matte to the edge of the image.

This workflow confirms the FS3 up-converts incoming video with sidebar matting.



# Chapter 4: Display Menus



## Overview

The FS3 can be controlled in two different ways: (1) direct control using the front panel buttons, knobs, and display menus, (2) remote control using a web browser. This chapter describes the first, using the front panel controls, which is the most direct way to configure and use an FS3. The other method, using a computer, is described in the next chapter.

In *Chapter 2* we discussed the panel controls overall, so please read and understand that material first. In this chapter we discuss each of the Parameter Menus and their use. These are the topics covered:

- [“Menu Operation Examples” on page 36](#)
- [“STATUS Menu Group” on page 38](#)
- [“REMOTE Menu Group” on page 39](#)
- [“CONFIG Menu Group” on page 42](#)
- [“PRESET Menu Group” on page 45](#)
- [“SYSTEM Menu Group” on page 46](#)
- [“VIDEO PROC Menu Group” on page 48](#)
- [“AUDIO PROC Menu Group” on page 64](#)

## Parameter Menus

The FS3 display presents five major types of menu pages:

- Status pages—present status information that cannot be changed.
- Simple parameter menus—contain a parameter number and name on line 1 and its current value setting on line 2. The line 2 value can be changed using *SELECT* and *ADJUST*. Example: *Output Format*.
- “Take action” parameter menus—contain a parameter number and name on line 1, and the value to “take” on line 2. A “take” prompt may appear on line 3. The line 2 value can be changed using *SELECT* and *ADJUST*, and the take or switch to the new value occurs when you press *ADJUST* momentarily. Examples: *Preset Save/Recall*.



- Multiple field parameter menus—contain a parameter number and name on line 1 and its current value setting on line 2, consisting of multiple letter or number fields that must each be set individually. The line 2 fields can be changed using *SELECT* and *ADJUST*. Example: *IP Address*.
- Hidden parameter menus—a “parent” menu exists that, when that parent parameter is turned on, can display “child” menus of related parameters. When the Hidden Menus parameter is set to Hide Inactive, these child menus are hidden when the parent parameter is off. Some menu names contain a decimal (dot) number and zero, which indicates there are a group of related parameters. Example: 12.0 ProcAmp is the parent menu of the 12.1 through 12.4 child menus.

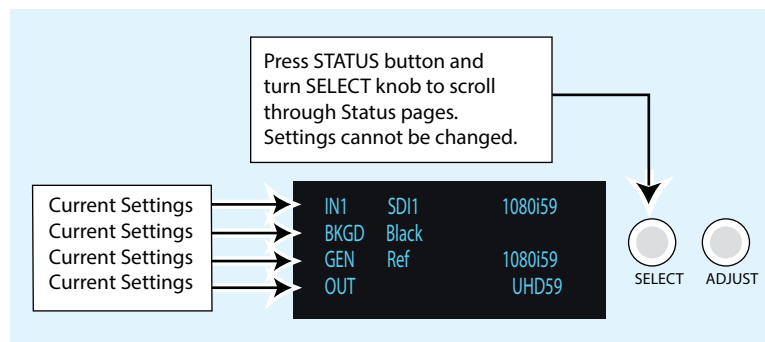
## Menu Operation Examples

The following examples demonstrate typical menu operation. After this section, each Menu Group is described in detail.

### Status Pages

These steps explain how to surf the *STATUS* menus.

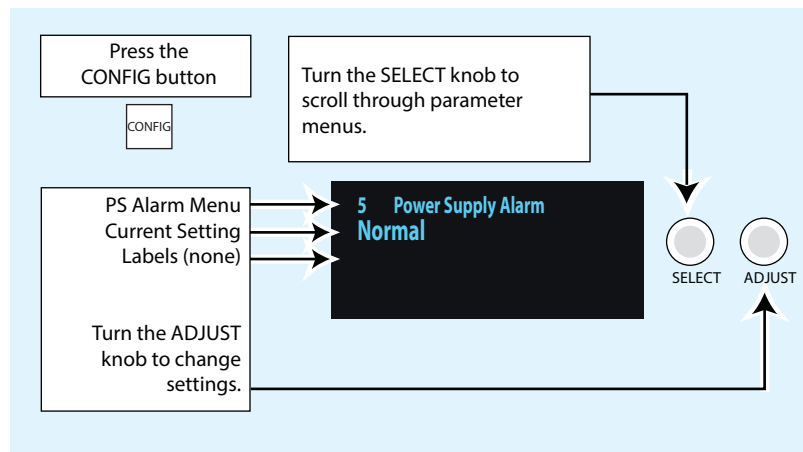
1. Press the *STATUS* Menu Group button.
2. Turn the *SELECT* knob clockwise and counter-clockwise to display the *Status* pages. The display scrolls through the pages as you turn the knob. The *Status* displays simply show the status of important FS3 operational parameters.



### Simple Menus: Config Format Alarm Filters

These steps explain how to surf and change simple menus, such as the Power Supply Alarm Filters.

1. Press the *CONFIG* Menu Group button.
2. Turn the *SELECT* knob to access menu *Power Supply Alarm*. The default alarm setting is *Normal*.



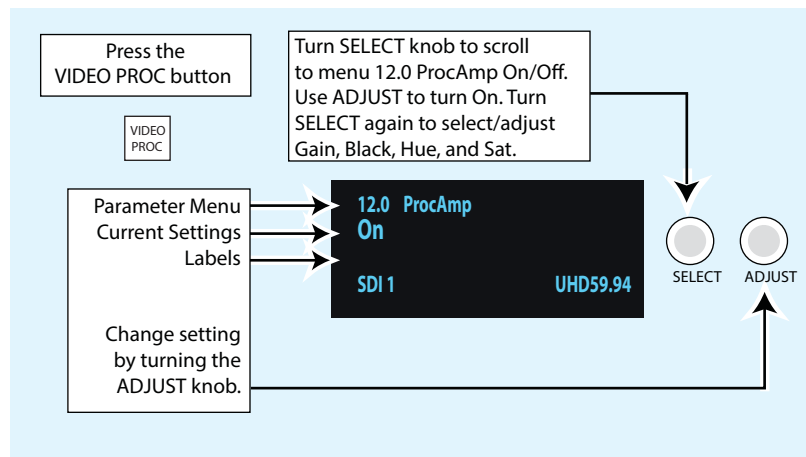


3. Turn the *ADJUST* knob one click clockwise to change the setting to *Suppress*, which turns off the alarm so that it will never come on.
4. Turn the *SELECT* knob clockwise again to access menu *Video Format Alarm*.
5. Now change the *Video Format Alarm* setting, using the *ADJUST* knob.
6. Continue by turning *SELECT* to access the *Reference Alarm* setting. Change the settings using the *ADJUST* knob, if you wish.

## Hidden Parameter Menus: Video ProcAmp

These steps explain how to surf and change hidden parameter menus, such as the *Video ProcAmp* settings. When the *CONFIG* menus *Hidden Menus* parameter is set to *Hide Interactive*, some function submenus are hidden when that function is not active.

1. Press the *VIDEO PROC* Menu Group button.
2. Turn the *SELECT* knob as necessary to display menu *ProcAmp*.
3. Turn the *ADJUST* knob to change the value setting from *OFF* (default) to *ON*.



**NOTE:** When *ProcAmp* is *OFF*, turning the *SELECT* knob skips hidden menus and goes directly to the next feature menu. When *ProcAmp* is *ON*, the hidden menus are revealed, such that turning the *SELECT* knob shows the associated *ProcAmp* control sub-menus.

4. Turn the *SELECT* knob clockwise to access menu *ProcAmp Gain* and set the Gain as desired using the *ADJUST* knob.
5. Turn the *SELECT* knob one click clockwise to advance to the *ProcAmp Black* menu. Turn *ADJUST* to set the black level.
6. Turn the *SELECT* knob clockwise again one click to advance to the *ProcAmp Hue* menu. Turn *ADJUST* to set the hue.
7. Turn the *SELECT* knob clockwise again one click to advance to the *ProcAmp Sat* menu. Turn *ADJUST* to set the saturation.

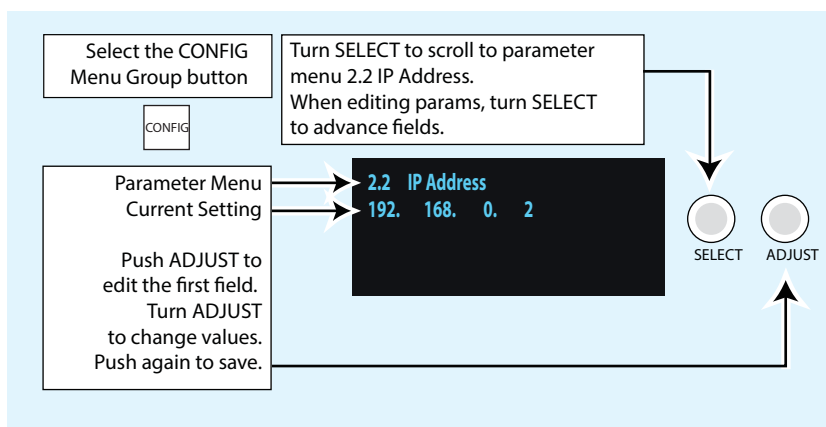
## Multiple Field Parameters: IP Address

These steps explain how to surf and change multiple field parameter menus, such as the *IP Address* settings, where there are multiple fields to set within the value.

1. Press the *CONFIG* Menu Group button. The *Config* menus appear.
2. Turn the *SELECT* knob clockwise to access the *IP Config* menu. Turn the *ADJUST* knob to change the setting to *Static Addr*. This setting allows you to manually set the IP address in the following steps.
3. Turn the *SELECT* knob clockwise one click to access menu *IP Address*. The current IP address appears on the second line.



4. Push the *ADJUST* knob momentarily to highlight the first field, which is the octet (group of numbers) to the left of the first period. The numbers blink to indicate they are ready for editing.
5. Turn the *ADJUST* knob to change the blinking field value.
6. Turn the *SELECT* knob to highlight the next field, a group of numbers to the right of the first period. The field will blink when they are ready for editing.
7. Turn the *ADJUST* knob to change the blinking field value. For faster (10x) adjustment of wide-ranging values, hold down *CONFIG* and turn *ADJUST*.
8. Repeat this process of selecting fields and changing them until all fields have been changed as desired.
9. Push the *ADJUST* knob quickly to confirm all settings. Alternatively, you can scroll counterclockwise back through the fields, stopping on any of them to change them. They must be blinking before they can be changed.



- Other Actions**
- To begin editing the first field in the parameter, push *ADJUST* momentarily.
  - To confirm (save) edits, push the *ADJUST* knob momentarily again. This saves the edits and exits the edit mode.
  - To undo edits to all of the fields before the changes are confirmed, push the *SELECT* knob. This returns all fields to their previous settings.
  - To reset the entire parameter to the factory default value, push in and hold down the *ADJUST* knob for at least 4 seconds.

## STATUS Menu Group

The *Status* Menu Group contains a series of *Status* display pages that you can scroll using the *SELECT* knob. The various *Status* pages are actually just displays, not menus, since they don't include menu numbers or editable values. The *ADJUST* knob doesn't affect the *Status* display pages.

### Vid Format Status

This menu shows the current primary video settings for the Video Processor.

Display			Description
IN	Input Source	Format	Selected video input source and format.
BKGD	Backgd Source		Selected Background video source.
GEN	Genlock Source	Format	Selected Genlock source and format.
OUT		Format	Selected video output format.



## Vid Format Alarm Status

This menu shows the Video Processor alarm status. Absence of alarm shows as *OK*. If selections are incompatible, the status of the affected signal shows *incompat*.

Display			Description
IN	Input Source	Status	Video input source alarm status.
BKGD	Backgd Source	Status	Selected Background video source alarm status.
GEN	Genlock Source	Status	Selected Genlock source alarm status.
OUT		Status	Selected output format/alarm status.

## Power/Temp Alarm

This menu shows the power supply status of the FS3 and the temperature status. If a power supply is unplugged, the display top line indicates *PS OFF* or *PS Error*.

Display			Description
PS1 Alarm	Status		Displays the state of the PS1 power supply (OK or ERROR).
PS2 Alarm	Status		Displays the state of the PS 2 power supply (OK or ERROR).
TmpAlarm	Status		Displays a temperature alarm if the FS3 overheats.

## Caption Status

This menu shows what type of closed caption data is selected and whether closed caption data is present on the selected video input.

Display		Description
Vid CC	Caption Type & Presence	Selected caption type (SD/HD/Invalid) and presence (Detected/Not detected/Pass through).

## System Status

This menu shows the FS3's System Name, IP address and mask, and version number.

Display			Description
	System Name		Displays the System Name as set in <i>Config</i> menu 1.
IP addr	value		Shows the IP address.
IP Mask	value		Shows the IP mask.
Version	value		Shows the software version number.

**NOTE:** The IP parameters shown here on the *STATUS* menu group *System Status* menu are the actual settings of the Ethernet interface, as read from the interface. The *CONFIG* menu group IP configuration parameters show the values the FS3 is supposed to use to configure the interface (they are read from memory). If there is ever a discrepancy between the two, the *STATUS* screen is the more correct.

## REMOTE Menu Group

The *REMOTE* Menu Group lets you set up how you want the FS3 to be controlled. Control options include the front panel, a remote computer running a browser, and GPI inputs and outputs.

**NOTE:** The *Remote Menu Group* parameters available on the front panel interact with the browser parameters available on an attached computer, and vice versa. For example, once the *Remote Control* parameter is set to 'Local Only' from either the browser or front panel, all future settings will only be able to be changed from the front panel. The opposite is true if set to 'Remote Only'. However the *Remote Control* parameter is always available from the front panel, regardless of how it is set.



## 1 Remote Control

This parameter determines whether the FS3 panel responds to controls locally from the front panel, from a network attached computer with a web browser, or both. The selected mode is indicated by the color of the *REMOTE* LED.

Local + Remote (default)	Control from the front panel, a remote control panel, or a network-attached browser. The <i>REMOTE</i> LED lights amber.
Local Only	Control only from the front panel (browsers cannot change parameters). The <i>REMOTE</i> LED lights green.
Remote Only	Control only from a network attached browser or remote control panel. The <i>REMOTE</i> LED lights red.

### 1.1 Authentication

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

When you select *Login* via the front panel parameter, you must then go to the browser interface to perform a login each time you access the FS3. The browser presents the login screen first, requiring you to log in before you can access any other browser screens. The password is initially set to the default value, but you can change it using the Remote browser screen.

The default password is *password*.

**NOTE:** *If authentication is used, it provides only a minimum security safeguard against unauthorized use of the FS3. The authentication mechanism is simple and does not provide robust security.*

Disabled (default)	Disables the requirement for a login password. No password is needed.
Login	Login is required via the web browser interface before changes can be made. After selecting Login, depending on the browser a new browser window may be necessary (i.e. just a page refresh or reload may not get rid of the login page).

### 2.1–4 GPI IN 1–4 Response

The setting of this parameter determines what happens when a GPI trigger is received at the FS3's *GPI* Inputs (1–4). A GPI Trigger is defined as a TTL low voltage level (0 to 0.8V with respect to its isolated ground pin). The GPI interface pinout and specifications are



discussed in [“GPI Pinouts” on page 96](#). Input video sources selected by GPI trigger remain selected until the trigger is released. GPI Inputs light the front panel EXT LED when triggered.

No Action (default)	Performs no action.
PRESET 1–10	Recalls the specified PRESET configuration.
Freeze	Freezes the current video frame at its outputs. Freezing stops when the GPI trigger is released.
SDI1 In	Selects SDI1 as the video input.
SDI2 In	Selects SDI2 as the video input.
SDI 1-2 DLink	Selects Dual-Link mode for the SDI input.
Fiber1 In	Selects Fiber1 as the video input.
Fiber2 In	Selects Fiber2 as the video input.
Fbr 1-2 DLink	Selects Dual-Link mode for the Fiber input.
ARC Off	Turns Off aspect ratio conversion.
ARC LTBX	Converts 16:9 anamorphic video to letterbox.
ARC H CP	Converts 16:9 anamorphic video to 4:3 standard (H crop—crops left and right edges of video).
ARC PLBX	Converts 4:3 standard video to 16:9 anamorphic (pillarbox).
ARC V CP	Converts letterbox video to 16:9 anamorphic (V crop).
ARC 14x9	Converts 16:9 anamorphic video to 14:9 cropped.
UC 4x3 PB	Up-converts SD source to 4x3 pillarbox.
UC 14x9 PB	Up-converts SD source to 14x9 pillarbox.
UC FLSCR	Up-converts SD source to full screen.
UC LB FUL	Up-converts SD source from letterbox to full.
UC WDZM	Up-converts SD source to a wide zoom.

### 3.1–4 GPI 1–4 OUT

The setting of this parameter determines whether certain FS3 events will generate a GPI trigger output at GPI outputs 1, 2, 3, or 4. The GPI interface pinout is presented in [“GPI Pinouts” on page 96](#).

No Action (default)	Does not trigger a GPI output regardless of event.
Alarm	Generates a GPI out trigger if an internal alarm condition occurs.
No Video	Generates a GPI out trigger if no video is detected at the input.
No Ref	Generates a GPI out trigger if no video is detected at the Ref input.

## Interaction of Presets and GPIs

If you use a GPI input trigger to recall a preset, the recall changes the *GPI IN Response* setting to whatever *GPI IN Response* setting the preset contains. As the following examples explain, this feature offers both the power of serial recalls and the possibility of triggering a recall that changes *GPI IN Response* to something unintended.

### Example of a Serial Recall

The advantage of using *GPI IN Response* with presets is that you can trigger a series or even a looping series of preset recalls. For example, suppose *GPI IN 1 Response* in Preset 1 is set to Preset 2, and *GPI IN Response* in Preset 2 is set to Preset 1. Triggering the GPI will toggle between the two presets.

### Example of an Unintended Recall

Suppose you trigger *GPI IN 1* while the current *GPI IN 1 Response* parameter is set to Preset 1. This recalls Preset 1 as expected. However, suppose Preset 1 contains a stored *GPI IN 1 Response* setting of *No Action*. If you trigger GPI IN 1 later, expecting to recall Preset 1 again, the FS3 instead performs *No Action*. To prevent unexpected changes in the *GPI IN Response* parameters, set these parameters as desired before storing presets; in the example, set *GPI IN 1* to Preset 1 before you store Preset 1.



# CONFIG Menu Group

The *CONFIG* Menu Group includes parameters for setting up the FS3's network, system name, SNMP, alarm, and screen saver configurations.

## 1 System Name

This parameter defines a unique name for the FS3. This same name is used both when displaying systems via the web interface and when displaying the FS3's screen saver.

Variable	Set the system name, up to 20 characters. <i>Default:</i> aja-fs3
----------	---

### Name Entry Procedure

Set the name as follows:

1. Push *ADJUST* momentarily to enter character editing mode.
2. Turn *SELECT* to advance the blinking cursor to each character.
3. Turn *ADJUST* to scroll through the choices for each character. These characters are allowed: A through Z (uppercase), a through z (lowercase), numerals, hyphen (-), period (.), and space (blank). Leave the desired character selected and advance to the next one.
4. Push *ADJUST* to save and activate the name after all characters are defined.
  - To abandon changes before saving, push *SELECT*.
  - To return to the default name at any time, hold down *ADJUST*.

**NOTE:** To eliminate trailing characters to shorten an existing system name, overwrite them with a hyphen (-) or space.

## 2.1 IP Config

This parameter determines the type of TCP/IP network configuration used by the FS3. Consult your network administrator about how to set this value.

DHCP ( <i>default</i> )	Select automatic IP address assignment from the LAN DHCP server. If the FS3 cannot find a DHCP server, it fails over to the static IP address.
Static Addr	Assign a static IP address manually (using the following parameter menus). The factory default static IP address: 192.168.0.2

## 2.2 IP Address

This parameter determines the static IP address used by the FS3 for TCP/IP networking. Consult your network administrator about how to set this value.

IP Address variable	If <i>IP Config</i> is set to <i>DHCP</i> dynamic addressing (default), the IP Address is set automatically by the network's DHCP server. If <i>IP Config</i> is set to <i>Static Addr</i> , manually enter an IP address. If <i>IP Config</i> is set to <i>DHCP</i> and there is a DHCP failure, the IP address is set to the static IP address. The factory default static IP address is 192.168.0.2.
---------------------	---

### Octet Value Entry Procedure

Set the octets (numbers between periods) values as follows:

1. Push *ADJUST* momentarily to enter edit mode.
2. Turn *SELECT* to select the octet you want to edit, indicated by blinking.
3. Turn *ADJUST* to enter the new value.
  - If you need to revert to the previous setting (undo changes), push *SELECT*.
4. Push *ADJUST* momentarily to save and activate the new setting.



- If you want to revert to the default value, hold down *ADJUST* for 4 seconds.

## 2.3 Subnet Mask

This parameter determines the subnet mask used by the FS3 for TCP/IP networking. Consult your network administrator about how to set this value.

Subnet Mask variable	Enter a subnet mask compatible with your LAN. This is only needed for Static IP configurations. If 2.1 is set to DHCP, the Subnet Mask is set by the DHCP server and cannot be changed by the user. If 2.1 is set to <i>Default Addr</i> , the default <i>Subnet Mask</i> is 255.255.255.0
----------------------	--

## 2.4 Default Gateway

This parameter determines the gateway or router used on your LAN for TCP/IP networking. Consult your network administrator about how to set this value.

Without a properly configured default gateway (whether you have a router/gateway or not), the FS3 will be unable to see other FS units on the network, although you may still be able to control this unit via a web browser. Also, without a proper gateway defined, the discovery feature on the *Network* web page will fail to list other FS units on the network.

Gateway Address variable	Enter the address of the gateway or router used to connect the FS3 to the network. <i>Default</i> : 192.168.0.1
--------------------------	---

## 3 MAC Address (view only)

Selecting this parameter allows you to view the MAC address. The MAC address is a unique value associated with the FS3's internal network adapter. MAC addresses are also known as hardware addresses or physical addresses. MAC addresses uniquely identify an Ethernet adapter on a LAN.

MAC address format: MM:MM:MM:SS:SS:SS

The value is 12-digit hexadecimal, where the first half identifies the manufacturer and the second half identifies the unique serial number.

## 4 SNMP Menu Parameters

The following parameters are used to setup the FS3 SNMP (Simple Network Management Protocol) feature.

- 4.0 SNMP Enable
- 4.1 SNMP Trap Destination 1
- 4.2 SNMP Trap Port 1
- 4.3 SNMP Trap Destination 2
- 4.4 SNMP Trap Port 2

Refer to "[Chapter 6: SNMP on page 89](#)" for a description of SNMP and how the FS3 supports it.

## 5 Power Supply Alarm

This parameter controls how the FS3 alarm responds to power supply disconnection or failure. If the FS3 will be connected using only one power cord and supply, you can suppress the alarm. Changes to this setting are automatically saved.

Normal (default)	Alarm triggers if either internal power supply experiences a failure or is disconnected from mains power.
Suppress	Alarm will not be triggered by a power supply failure or disconnection from power.



## 6 Video Format Alarm

When set to *Normal* (default), an alarm is triggered whenever the selected input video signal format is incompatible with the selected output format. You can suppress the *Format Alarm* if you wish. The front panel FMT ERR LED lights when format errors are detected even if this parameter is set to *Suppress*. Changes to this setting are automatically saved.

Normal (default)	Alarm triggers if the format of the selected input video signal is incompatible with the selected output format.
Suppress	Alarm will not be triggered by a format incompatibility.

## 7 Reference Alarm

This parameter controls how the FS3 responds when the Video Processors has a format that is incompatible with the Reference video signal. When set to *NORMAL*, the alarm triggers if the Reference signal is not detected or is incompatible with the processor format. You can suppress the Reference alarm if you wish. Changes to this setting are automatically saved.

Normal (default)	Alarm triggers if the reference signal is not detected or is incompatible with the processor format.
Suppress	Alarm will not be triggered by reference errors.

**NOTE:** For proper operation the Input reference signal must be stable and properly terminated using a 75-ohm terminator on either the unused loop connector or the last piece of downstream equipment to which the Ref Video is connected.

## 8 Hidden Menus

This parameter lets you choose whether to hide or show inactive menus.

Hide Inactive (default)	Hides menus that are not in use.
Show All	Shows all menus, even those that are not in use.

## 9 Screen Saver

This parameter lets you choose the menu screen saver.

On (AJA Logo) (default)	AJA logo screen saver is displayed
Off	The screen saver is not displayed.
System Name	Screen saver displays the system name.

## 10 Display Intensity

This parameter determines the brightness of the alphanumeric display and front panel LEDs.

Variable	Dim or brighten the alphanumeric display and activity indicator LEDs in steps from 1 (dim) to 8 (brightest). Default: 6
----------	---

## 11 Fan Speed

This parameter determines the speed (and sound level) of the FS3's internal cooling fans. To prevent system damage, this setting may be overridden temporarily, and the fan can be set to a higher speed if the system detects very high internal temperatures. Changes to this setting are automatically saved

Variable	Changes the fan speed in steps from 1 (slow) to 10 (fast). Default is 10.
----------	---

## 12 Serial Number

This parameter displays the FS3's unique serial number.




**13 Software Version** This parameter displays the FS3's software version number.

**14 Reboot** This parameter lets you reboot the FS3. Press and hold in both front panel knobs simultaneously to reboot.

During reboot, the display shows *[Rebooting]*, goes dark momentarily, and then shows the percentage of progress as the system reboots. Rebooting takes a couple of minutes.

**PRESET Menu Group**

The *PRESET* Menu Group provides the means of saving, editing the names of, and loading FS3 presets. A preset is a set of all System, Video, Audio, and most Config parameters as they were set at the time the preset was stored.

	<p><b>Caution!</b></p> <p>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.</p>
---	--

During recall, the display reads, *Recalling* until the recall is finished. On recall completion, the displays shows the success or failure: *Recalled*, *Failed*, or *Empty*. A failed or empty recall does not recall anything and leaves the FS3 as it was. (Preset registers are empty until you store something in them.)

During a store, the display reads *Storing* until the store is finished. On store completion, the display shows *Complete* or *Failed*. A failed store does not store anything and leaves the preset register as it was. To retry a failed store, turn *SELECT* to another preset number and then back to the desired preset number.

**1 Factory Preset** This parameter recalls a read-only Factory Preset.

Factory Recall	Recalls factory values for all <i>System</i> , <i>Video</i> , <i>Audio</i> , and most <i>Config</i> parameters. Push <i>ADJUST</i> momentarily to perform (take) the recall. The display reports "Loading" and "Complete" during the recall. User preferences, network settings, and existing Presets are not affected by recalling the Factory Preset.
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## 1.1-1.40 Presets #1-#40

These parameters let you recall, edit the name of, and store an FS3 preset configuration for the selected storage register. Forty storage registers are available.

Preset #1–#40	Shows the currently selected preset register number. Turn <i>SELECT</i> choose the desired register. Then turn <i>ADJUST</i> to choose Recall, Edit Name, or Store for the selected register.
[Preset Name]	Shows the name of the selected preset register, which can be edited.
Recall	Recalls that preset. Push <i>ADJUST</i> momentarily to perform (take) the recall. The display reports “Loading” and “Complete” during the recall.
Edit Name	Enables editing the name of the preset register. Push <i>ADJUST</i> to enable editing (blinking character), use the <i>SELECT</i> and <i>ADJUST</i> knobs to edit the name and then press <i>ADJUST</i> to save the edited preset register name.
Store	Stores the current set of all <i>System</i> , <i>Video</i> , <i>Audio</i> , and most <i>Config</i> parameters to the selected preset register.

## Video with Audio Routing

Presets can be used to coordinate audio and video routing. Store and name presets that match the desired audio inputs to each desired video input, and use those presets to select the video inputs, causing the configured audio to follow.

## Interaction of Presets and GPIs

Triggering presets using GPI inputs offers considerable power but also requires some care to avoid unexpected results. If you plan to trigger presets using GPIs, please see the information about the [“Interaction of Presets and GPIs” on page 41](#).

## SYSTEM Menu Group

The *SYSTEM* Menu Group includes parameters for setting up various FS3 system related features (video formats, audio level standards, etc).

### 1 SDI1 3G Detect

This parameter configures 3G operation of the SDI 1 video input.

Auto Detect (default)	Automatically detects presence of 1080p50/60 or Dual Stream video.
1080p50/60	Configures the SDI1 input for 1080p50/60 (single) video.
Dual Stream	Configures SDI 1 for Dual Stream 3G video (uses SDI 1 and SDI 2 in Input Crosspoint matrix).

In *Auto Detect* mode, the hardware looks for SMPTE 352 Payload ID ANC data on the video inputs to determine whether there are two independent 1080i signals (Dual Stream) or a single 1080p50/60 signal. If there is no SMPTE 352 data, the default is to assume *1080p50/60* (single), but you can manually instruct the FS3 to always assume either *1080p50/60* or *Dual Stream* by selecting one of those choices.

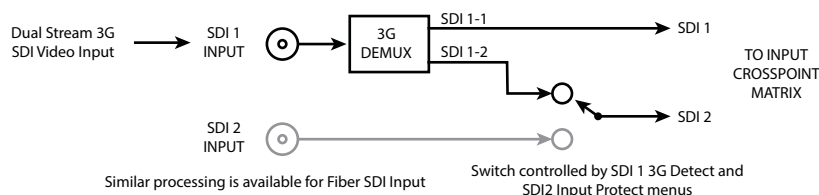
In *1080p50/60* mode, the system always assumes that the input is a single 1080p50/60 signal (even if there is SMPTE 352 data to the contrary).

**NOTE:** *The 50/60 text in the menu and description above actually refers to 50/59.94 video. The FS3 does not support 30 or 60 frame rate video.*



In *Dual Stream* mode, the system always assumes (even if there is SMPTE 352 data to the contrary) that the input consists of two multiplexed independent 3G video streams. The signals are demuxed as shown.

**Figure 10. Dual Stream 3G Mode Schematic**



## 2 SDI2 Input Protect

This parameter allows you to protect Input SDI 2 from being taken by a *Dual Stream* selection made with *SDI1 3G Detect* above.

Normal (default) Dual Stream	SDI2 cannot be used by Dual Stream 3G SDI video on SDI Input 1. Allows SDI2 to be used by a Dual Stream 3G SDI input present on SDI 1.
---------------------------------	---

In the *Normal* setting (default), the SDI 2 video signal always comes from the SDI 2 physical input. Choosing *Auto Detect* or *Dual Stream* in *SDI1 3G Detect* does not switch away from the physical input.

In the *Dual Stream* setting, the FS3 assumes both channels of Dual Stream 3G video are muxed onto a single wire at the SDI1 input. The SDI 2 video signal is then taken internally from the SDI 1 Stream 2 signal instead of the SDI2 In connector.

The following table shows the selections and their results. In the table, SDI1-1 and SDI1-2 are the two muxed streams entering the SDI1 Input.

SDI-3G Detect Setting	SDI2 Input Protect Setting	1 Video Input Setting	Resulting Input to Crosspoint Matrix
(Dual Video signal) <i>Dual Stream</i> setting, or <i>Auto Detect</i> with ANC Dual Stream data	Dual Stream	SDI1	SDI1-1
		SDI2 (unused)	SDI1-2
	Normal	SDI1	SDI1-1
		SDI2	SDI2
(Single Video signal) <i>1080p 50/60</i> setting, or <i>Auto Detect</i> with ANC 1080p data, or <i>Auto Detect</i> with no ANC data	Dual Stream	SDI1	SDI1
		SDI2	SDI2
	Normal	SDI1	SDI1
		SDI2	SDI2

## 3 Fiber1 3G Detect

This parameter configures 3G operation of the Fiber 1 video input, using settings similar to ["1 SDI1 3G Detect" on page 46](#).

## 4 Fiber2 Input Protect

This parameter allows you to protect Input Fiber 2 from being taken by a *Dual Stream* selection, using settings similar to ["2 SDI2 Input Protect" on page 47](#).



## 5 Genlock Source

This parameter selects the source of reference video used for genlock, either automatically or explicitly.

Reference (default)	Use the signal on the <i>Ref</i> connector as the genlock source.
Input	Use the input signal as the genlock source.
Free run	Free run mode (FS3 syncs to its own timebase, not locked to an external source).

## 6 Output Frame Rates

This parameter selects the HD video frame rate associated with the video standard.

59.94/23.98 (default)	Select 59.94/23.98 if your desired rate is either 59.94 or 23.98.
50/25	Select 50/25 if your desired rate is either 50 or 25 (PAL).
24	Select 24 if your desired rate is 24.

**NOTE:** Changing the Frame Rates selection automatically selects a new value for “2 Video Output Format” on page 49. Each Frame Rates selection remembers its own Output Format settings.

## VIDEO PROC Menu Group

The following descriptions explain the Video Proc Menu Groups. The Video Proc menu displays are formatted as follows

Display	Description
MENU # TITLE PARAMETER VALUE	Menu number and title. Currently selected parameter value for this menu.
INPUT                      FORMAT	Video Processor Input                      Output Format

The currently selected Input video source and output video format is reported on the bottom line of each menu.

## Video Input and Output

These parameters perform input video source selection for the Video Processor.

### 1 Input

SDI1 ( <i>default</i> )	Select SDI1 as the input source.
SDI2	Select SDI2 as the input source.
SDI DualLink	Select SDI DualLink, linking both SDI inputs as the input source.
Fiber1	Select Fiber1 as the input source.
Fiber2	Select Fiber2 as the input source.
Fiber DualLink	Select Fiber DualLink, linking both Fiber inputs as the input sources.

**Source Memory** Changing the Video Input selection automatically selects new values for Proc Amp parameters and Color Corrector (RGB) parameters. Each video source remembers its own Proc Amp and Color Corrector settings. This is referred to as Source Memory.

**Dual Link** Dual Link referred to here is 1080p50/59.94 on two 1.5 Gb HD-SDI connections. Selecting Dual Link as the Video Input will allocate both SDI Inputs for Dual Link use. The Fiber inputs operate the same way.



**2 Video Output Format** This parameter defines the output format of the Video Processor. Available choices depend on the frame rate selection.

Follow INPUT ( <i>default</i> )	Follow the format of the selected video input.
Follow REF	Follow the format of the reference input (Ref).
525i/625i<frame rate>	Select 525i/625i SD as the output.
720p<frame rate>	Select 720p HD as the output.
1080i<frame rate>	Select 1080i HD as the output.
1080PsF<frame rate>	Select 1080PsF HD as the output.
1080p<frame rate>	Select 1080p HD as the output.
2K1080p<frame rate>	Select 2K1080p HD as the output.
UHD<frame rate>	Select UHD video as the output.
4K1080p<frame rate>	Select 4K video as the output.

**Output Format Selection Constraint** Available frame rates depend on System menu *“6 Output Frame Rates” on page 48* parameter setting.

**Output Timing Memory** Changing the Output Format selection automatically selects new values for H & V timing parameters (see *“Timing and Delay” on page 49*). Each Output Format mode remembers its own H and V timing settings.

**Output Format Mapping** The Output Format selection is remembered for each of the frame rates. If you change the Output Frame Rate (*“6 Output Frame Rates” on page 48*), the Output Format setting associated with the newly selected frame rate is recalled.

**3 Output Scan Format** The parameter sets the structure of the 4K or UHD output video. The image can be divided into four quadrants (Square Division [SQD] format, see SMPTE 425-3, Appendix B), or interleaved (2-Sample Interleaved [2SI] format, see SMPTE 425-3, Section 8).

Quadrant (default)	The output is Quadrant format.
Interleave	The output is Interleaved format. The front panel 2SI LED will light when selected.

**4 Output Mode** The parameter sets the final video output to normal video or the test pattern generator. Alarms occur if conflicting video formats are selected.

Normal (default)	Normal video is output.
Test Pattern	The output is the test pattern generator.

**NOTE:** Normal output can be a version of its currently selected input, a Sidebar or Letterbox display, a Freeze of last good video, or Black, depending on the current configuration.

**5 Loss of Input** This parameter selects the automatic action that occurs if the video input is lost. The *Black* selection (default) cuts the video to black. The *Freeze* selection freezes video on the last available good frame.

Black (default)	Switches to black if input video is lost.
Freeze	Freezes on the last available good video frame if input is lost.

**Timing and Delay** These parameters adjust Video Processor horizontal and vertical output timing in reference to the genlock source already selected, and permits adding up to 6 full frames of output delay.

**NOTE:** Unlike most knob-adjustable parameters, on the front panel menu this parameter automatically wraps around from the maximum value to 0 (and vice versa).



**Output Timing Memory** Independent horizontal and vertical timing values are kept for all available output formats.

**Output Timing Ranges** The table below lists the output timing ranges for various video frame rates.

**Table 5. Output Timing Ranges**

Output Frame Rate	Horizontal		Vertical	
	Min	Max	Min	Max
UHD23.98	0	2749	-562	562
UHD24	0	2749	-562	562
UHD25	0	2639	-562	562
UHD29.97	0	2199	-562	562
UHD50	0	2639	-562	562
UHD59.94	0	2199	-562	562
4K1080p23.98	0	2749	-562	562
4K1080p24	0	2749	-562	562
4K1080p25	0	2639	-562	562
4K1080p29.97	0	2199	-562	562
4K1080p50	0	2639	-562	562
4K1080p59.94	0	2199	-562	562
1080i50	0	2639	-562	562
1080i59.94, 1080i60	0	2199	-562	562
1080p23.98, 1080p24	0	2749	-562	562
1080p25	0	2639	-562	562
1080p29.97, 1080p30	0	2199	-562	562
1080p50	0	2639	-562	562
1080p59.94, 1080p60	0	2199	-562	562
1080psf23.98, 1080psf24	0	2749	-562	562
1080psf25	0	2639	-562	562
1080psf29.97, 1080psf30	0	2199	-562	562
2Kx1080p23.98, 2Kx1080p24	0	2749	-562	562
2Kx1080p25	0	2639	-562	562
2Kx1080p29.97, 2Kx1080p30	0	2199	-562	562
2Kx1080p50	0	2639	-562	562
2Kx1080p59.94, 2Kx1080p60	0	2199	-562	562
525i59.94, 525psf29.97	0	857	-262	262
625i50, 625psf25	0	863	-312	312
720p23.98, 720p24	0	4124	-375	375
720p25	0	3959	-375	375
720p29.97, 720p30	0	3299	-375	375
720p50	0	1979	-375	375
720p59.94, 720p60	0	1649	-375	375



**6.1 Output Timing H** When adjusting the horizontal timing (H), this parameter specifies a number of pixels to offset, from zero to full line width. Adjustment range increments from 0 to the width of the line in pixels. The maximum value varies, depending on the format already chosen.

Variable	Adjustment range increments from 0 to the width of the line in pixels. The maximum varies, depending on the format chosen. Default: 0
----------	--

**6.2 Output Timing V** When adjusting the vertical timing (V), this parameter specifies a number of lines to offset, moving the screen up to a half a frame up or down.

Variable	Adjustment range increments from half a frame up to a half a frame down in single line increments. The maximum varies, depending on the format already chosen. Default: 0
----------	--

**6.3 Frame Delay** This parameter adjusts Video Processor output timing.

Variable	Adjusts output delay from 0 to 6 frames in one frame increments. Default: 0
----------	--

This delay amount is in addition to the nominal video delay, which is:

- HD/SD video, two frames at low frame rates (23.98, 24, 29.97) or four frames at high frame rates (50, 59.94).
- UHD/4K video, three frames at low frame rates (23.98, 24, 29.97) or six frames at high frame rates (50, 59.94).

## Background Fill

This parameter selects the background source used to fill any part of the processor output raster not filled with video from the main input video. For example, when the Video Output Mode selection is Sidebars, this parameter selects the video source for the Sidebars.

### 7 Background Fill

Black (default)	Selects black as the background fill video.
Matte	Selects matte as the background fill video.

## Upconvert

These parameters select the type of up-conversion the Video Processor performs on the selected input.

*NOTE: Any Custom Size/Pos values will be applied on top of these Upconvert settings.*

*NOTE: When converting from 2K, the selections do not precisely describe the resulting picture. For example, 4x3 pillar is not precisely 4x3, and 14x9 is not precisely 14x9. However, picture scaling is such that the visual effect closely resembles an SD-to-HD up-convert.*



**8 Upconvert Mode** This parameter selects the type of up-conversion performed by the Video Processor.

4x3 Pillar (default)	Results in 4x3 image at center screen with black sidebars.
14x9 Pillar	Results in 14x9 image, zoomed slightly to fill a 14x9 image with sidebars.
Full Screen	Anamorphic full screen display.
LB to Full	Image is zoomed to fit the full screen (letterbox).
Wide Zoom	Using a combination of zoom and stretch, the image is sized to fit a 16x9 screen (this can introduce a small aspect ratio change).

**AFD and Up-conversion** Active Format Description (AFD) codes are carried in the vertical ancillary (VANC) portion of HD SDI video signals, specified in SMPTE 2016 as follows: “AFD information is intended to guide DTV receivers and/or intermediate professional video equipment regarding the display of video of one aspect ratio on a display of another aspect ratio.”

FS3 AFD processing (passing, removing, and re-inserting) occurs based on the setting of parameter “AFD” on page 58.

*Auto AFD* mode fully defines the size, position, and aspect ratio of the output raster. Thus, when in *Auto AFD* mode, any *Custom Size/Pos* settings are ignored, and those menus are hidden. Likewise, when in *Auto AFD* mode, any *Region Of Interest* settings are ignored, and those menus are hidden.

## Sidebars

The parameter adjusts the sidebar position where the center video meets the pillarbox background video on both sides. The underlying hardware feature is the same as *Custom Right Crop* and *Custom Left Crop*. This is effectively an extra handle on the *Left Crop* and *Right Crop* parameters.

The *Crop* and *Sidebar Edge* controls are additive; increasing *Sidebar Edge* (making the sidebars larger and the center-video smaller), equates to setting *Left* and *Right Crop* values to smaller percentages. The *Sidebar Edge* can be set to 0 through +128. A value of 0 produces a 4:3 center. Positive values produce wider sidebars (and a narrower center).

## 9 Sidebar Edge

0 (default)	Defaults to 0. Select a width value from 0 through +128 to expand or shrink the sidebars, which are filled with Background video (4 Background Fill). Selecting a larger value causes the center picture to become narrower while the sidebars expand.
0 to +128 (Variable)	

## Frame Rate Output

UHD and 4K video can have high frame rates (50, 59.94) or low frame rates (23.98 - 29.97). These two settings control whether these types of video will be output as Level A or Level B, or as Quad or Dual link.

### 10.1 Cfg Hi Frm Rate Out

3G Lvl A (default)	UHD/4K video outputs with frame rates of 50 or 59.94 fps are output as Quad-Link 3G-SDI Level A
3G Lvl B-DL	UHD/4K video outputs with frame rates of 50 or 59.94 fps are output as Quad-Link 3G-SDI Level B

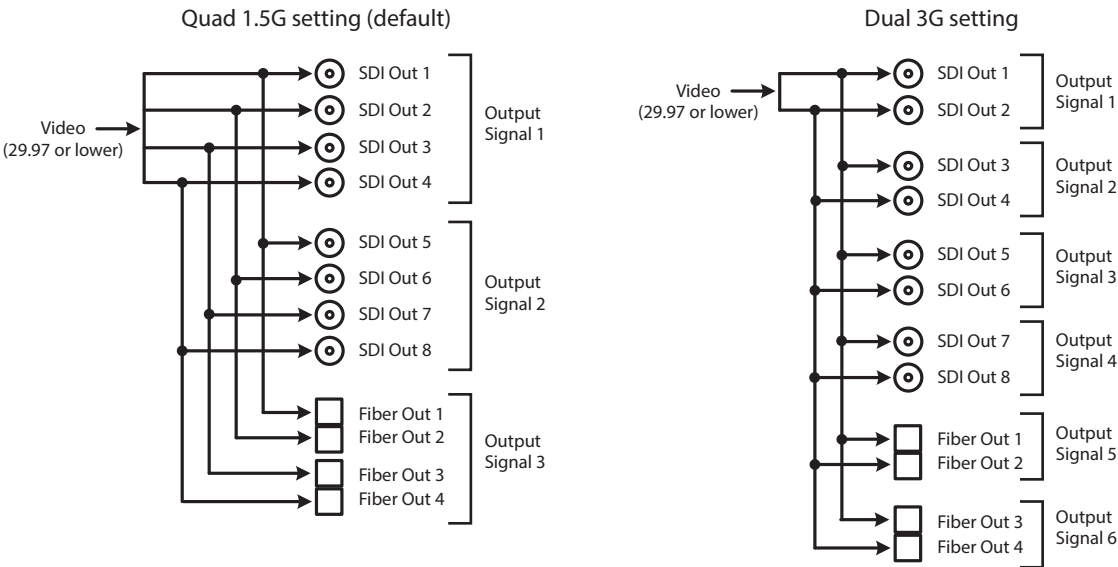


10.2 Cfg Lo Frm Rate Out

Quad 1.5G (default)	UHD/4K video outputs with frame rates of 23.98, 24, 25, or 29.97 fps are output as Quad-Link 1.5G-SDI
Dual 3G	UHD/4K video outputs with frame rates of 23.98, 24, 25, or 29.97 fps are output as Dual-Link 3G-SDI Level B

For low frame rate signals, the number of duplicated output signals and the connectors used for each signal, depends on this setting. When set to *Quad 1.5G* four connectors are used for each of the three output signals. When set to *Dual 3G* two connectors are used for each of the six output signals.

Figure 11. Duplicated Video DA Outputs



Matte of Background Fill

11.1 Matte Luma This parameter determines the Matte Luma level of the background fill.

50% (default)	Sets the matte luminance level to the default 50% value.
0–100% (Variable)	Sets the matte luminance level from 0–100%.

11.2 Matte Chroma This parameter determines the Matte Chroma level of the background fill.

50% (default)	Sets the matte chrominance level to the default 50% value.
0–100% (Variable)	Sets the matte chrominance level from 0–100%.

11.3 Matte Hue This parameter determines the Matte Hue of the background fill.

0 degrees (default)	Sets the matte hue to the default 0 degrees (red).
0–359 degrees (Variable)	Sets the matte hue to a value between 0 and 359 degrees.

NOTE: On the front panel, as you turn the Matte Hue ADJUST knob the values wrap from 359 back to 0 degrees.



## Proc Amp Controls (YUV)

**12.0 Proc Amp (YUV)** This parameter turns the Proc Amp *On* and *Off* for signals composed of YUV components. When it is *On*, you can set additional parameters to control video *Gain*, *Black Level*, *Hue*, and *Saturation*.

Off (default) On	Sets the YUV Proc Amp to Off. Sets the YUV Proc Amp to On.
---------------------	---

**Source Memory** Independent Proc Amp parameter values are kept for each input format.

**12.1 Proc Amp Gain** This parameter adjusts the video gain from 0 to 1.5 times luma in 0.01 steps

Variable	Adjusts Proc Amp Gain from zero to 1.5 in 0.01 steps. <i>Default (unity): 1.0</i>
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**12.2 Proc Amp Black** This parameter adjusts the video black level from -20 IRE to +20 IRE in 0.5 steps.

Variable	Adjusts Proc Amp Black level from -20 IRE to +20 IRE in 0.5 steps. <i>Default (unity): 0 IRE</i>
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**12.3 Proc Amp Hue** This parameter adjusts the video color hue through 360 degrees (color wheel) in 1 degree steps.

Variable	Adjusts Proc Amp Hue from -179 to +180 in steps of 1 degree. <i>Default (unity): 0 degrees</i>
----------	---

**12.4 Proc Amp Sat** This parameter adjusts the video color saturation from black and white to 1.5 times chroma in steps of 0.01.

Variable	Adjusts Proc Amp Saturation from 0 (black & white) to 1.5 (Chroma) in steps of 0.01. <i>Default: 1.0</i>
----------	---

## Color Corrector (RGB)

**13.0 Color Corrector (RGB)** This parameter turns the RGB Color Corrector *On* and *Off*. When it is *On*, you can set additional parameters to control RGB video *Gain*, *Black Level*, and *Gamma*. When set to *Off*, all RGB Color Corrector settings are programmed for unity (or bypass).

Off (default) On	Sets the RGB Color Corrector to Off. Sets the RGB Color Corrector to On, enabling the following Color Corrector parameters.
---------------------	--

**Source Memory** Independent RGB Color Correct parameter values are kept for each input format.

**13.1 Color Red Gain** This parameter adjusts the *RGB Red Gain*.

Variable	Adjusts Red Gain from zero to 1.5 in 0.01 steps. <i>Default (unity): 1.0</i>
----------	---



### 13.2 Color Red Black Level

This parameter adjusts the *RGB Red Black* level.

Variable	Adjusts Red Black level from -20 IRE to +20 IRE in 0.5 steps. <i>Default (unity): 0 IRE</i>
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### 13.3 Color Red Gamma

This parameter adjusts the *RGB Red Gamma*.

Variable	Adjusts Red Gamma level from -1.0 to +1.0 in 0.01 steps. <i>Default (unity): 0</i>
----------	---

### 13.4 -13.6 Color Green

This set of parameters adjusts the Gain, Black Level, and Gamma for color Green, same as Color Red described above.

### 13.7-13.9 Color Blue

This set of parameters adjusts the Gain, Black Level, and Gamma for color Red Blue, same as Color Red described above.

## Custom Conversion Settings

The custom settings determine the image size and shape for Upconvert Mode if you choose the *Custom* selection for those modes.

Custom settings are stored separately for each Conversion Mode. Values for each of the Upconvert Modes and SD Aspect Ratio modes (excluding OFF), plus no conversion (or HD CrossConvert), are independently stored.

**NOTE:** *If Custom Size/Pos is On and any of the following parameter are not set to unity, the front panel UFC LED lights.*

### 14.0 Custom Size/Pos

This parameter turns custom image settings *On* or *Off*.

When Hide Inactive is on, the *Custom Size/Position* controls are only displayed when *Custom Size/Pos* is *On*. When *Custom Size/Pos* is *Off*, modified parameters are skipped in the menu system, and the UFC hardware is programmed for unity.

This menu is also not displayed when Active Format Description (AFD) is in control of the Conversion Mode.

Off (default) On	Sets this parameter and related custom size/pos parameters to off. Enables this parameter and related custom size/position parameters.
---------------------	---

### 14.1 Custom Size

This parameter changes the H and V size of the output picture by the specified percentage (%) while maintaining the current aspect ratio.

100% (default) 10% to 200%	Maintains 100% picture size for the selected format. Enables changing the picture size.
-------------------------------	--

### 14.2 Custom Aspect

This parameter changes the H/V aspect ratio of the output picture while maintaining the current V size (Aspect < 0) or H size (Aspect > 0).

0.000 (default) -0.500 to +0.500	Maintains the normal 100% aspect ratio for the selected format. Enables changing the aspect ratio.
-------------------------------------	---

### 14.3 Custom H Position

This parameter changes the H position of the output picture.

0% (default) -100% to +100%	Maintains the normal horizontal position of the selected format. Enables changing the horizontal position.
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**14.4 Custom V Position** This parameter changes the V position of the output picture.

0% (default) -100% to +100%	Maintains the normal 100% vertical position of the selected format. Enables changing the vertical position.
--------------------------------	--

**14.5 Custom Left Crop** This parameter changes the Left picture crop position.

100% (default) +10.0% to +100.0%	Maintains the normal left side position of the selected format. Enables changing the left side position.
-------------------------------------	---

**14.6 Custom Right Crop** This parameter changes the Right picture crop position.

100% (default) +10.0% to +100.0%	Maintains the normal right side position of the selected format. Enables changing the right side position.
-------------------------------------	---

**14.7 Custom Top Crop** This parameter changes the Top picture crop position.

100% (default) +10.0% to +100.0%	Maintains the normal top position of the selected format. Enables changing the top position.
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**14.8 Custom Bottom Crop** This parameter changes the bottom picture crop position.

100% (default) +10.0% to +100.0%	Maintains the normal bottom position of the selected format. Enables changing the bottom position.
-------------------------------------	---

## Region of Interest (ROI)

The *Region of Interest* parameters select a portion of the input picture that will be used for scaling and/or positioning. The selected area can then be scaled to a standard pillarbox or letterbox size and shape (*On Square*), or it can be set to a full screen input image (*On Full*).

**NOTE:** *On Full* may cause image distortion if it is used to expand an odd-shaped region of interest to full screen.

The *ROI Setup* mode allows you to preview the edges of your selected *Region Of Interest* as you set it up. After selecting the desired region using the Setup Cursor, you can take the region to air by setting *Region Of Interest* to *On Square* or *On Full*.

The *Setup* mode is not required to operate the ROI feature. The edges of the Region Of Interest can also be adjusted while in *On Square* or *On Full* modes

**15.0 Region of Interest** This parameter turns the Region of Interest settings *On* or *Off*. When enabled, the *ROI Left*, *Right*, *Top*, and *Bottom* controls define the rectangular shape and position of the ROI.

Off (default) Setup On Square On Full	Turns off the ROI feature. Enables ROI cursor. Enables ROI and sets video to a pillarbox or letterbox shape. Enables ROI, and expands the ROI area to full screen.
--	---

Interactions occur between ROI settings and other parameters:

- The *Region of Interest* menu is not displayed when *Active Format Description (AFD)* is in control of the Conversion Mode.
- *Custom Size and Position* settings work interactively with ROI, but *Custom Crop* settings are disabled. *Custom Size/Pos* is also temporarily disabled while in the *ROI Setup* mode.



**15.1 ROI Left** This parameter sets the left boundary of the ROI.

Variable (default=100%)	Sets ROI left boundary to 10-100% of full screen in 0.1% increments. For 1% increments, hold down the Video button.
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**15.2 ROI Right** This parameter sets the right boundary of the ROI.

Variable (default=100%)	Sets ROI right boundary to 10-100% of full screen in 0.1% increments. For 1% increments, hold down the Video button.
-------------------------	--

**15.3 ROI Top** This parameter sets the top boundary of the ROI.

Variable (default=100%)	Sets ROI top boundary to 10-100% of full screen in 0.1% increments. For 1% increments, hold down the Video button.
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**15.4 ROI Bottom** This parameter sets the bottom boundary of the ROI.

Variable (default=100%)	Sets ROI bottom boundary to 10-100% of full screen in 0.1% increments. For 1% increments, hold down the Video button.
-------------------------	---

## Video Legalizer

These parameters allow adjustment of signal levels to meet legal broadcast requirements.

**16.0 Video Legalizer** This parameter determines the Video Legalizer mode. When set to *Off*, the Video Legalizer is not enabled, and the following clip controls are not active. In *YUV* mode, the *White Clip*, *Black Clip*, and *Chroma Clip* controls are enabled and clip any luma/chroma that exceed the set limits. In *RGB* mode only the *White Clip* and *Black Clip* controls are active and limit the R, G, and B values to those settings. RGB mode requires the video to pass through the RGB Proc Amp to be converted to and from RGB.

Off (default) YUV RGB	Disables the Video Legalizer. Enables the Video Legalizer to clip YUV to legal levels. Enables the Video Legalizer to clip RGB to legal levels.
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**16.1 Legalizer White Clip** When the Video Legalizer mode is *YUV* or *RGB*, this parameter limits the white level so that it does not exceed the adjusted limit. Limit can be set from +80 IRE to +120 IRE.

Variable	Adjusts white clip level from +80 IRE to +120 IRE in 0.5 steps. Default (unity): 100 IRE
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**16.2 Legalizer Black Clip** When the Video Legalizer mode is *YUV* or *RGB*, this parameter limits the black level to the adjusted limit. Limit can be set from -10 IRE to +20 IRE,.

Variable	Adjusts black level limit from -10 IRE to +20 IRE in 0.5 steps.
Default (unity): 0 IRE	

**16.3 Legalizer Chroma Clip** When the Video Legalizer mode is *YUV*, this parameter limits the maximum chroma level to the adjusted limit. The limit can be set from +60% to +140%,.

Variable	Adjusts chroma clip level from +60% to +140% in 0.5 steps.
Default (unity): 100 IRE	



## AFD

These parameters determine if and where the Video Processor will insert a SMPTE 2016 Active Format Descriptor (AFD) packet into its output video. The inserted AFD code does not affect the Video Processor's up-conversion, but it may affect downstream video processing if the signal is later downconverted.

**17.1 AFD Out** These determines whether the Video Processor inserts an AFD packet into the output video.

OFF (default)	The FS3 does not insert an AFD code into the output.
Auto	If there is no AFD code on the input video, a "Full Frame" (8) code is inserted. If the FS3 is up-converting, the appropriate AFD code will be chosen based on the Upconvert Mode.
>16:9	Always inserts a "Box > 16:9 (center)" AFD code (4), which indicates that the image has an aspect ratio greater than 16:9 as a vertically centered letterbox within the 16:9 frame.
Full Frame	Always inserts a "Full Frame" AFD code (8), which indicates that the image is full frame, with an aspect ratio that is 16:9.
Pillarbox	Always inserts a "4:3 (center)" AFD code (9), which indicates that the image has a 4:3 aspect ratio as a horizontally center pillarbox image within the 16:9 frame.
Letterbox	Always inserts a "16:9 (with complete 16:9 image protected)" AFD code (10), which indicates that the image is full frame, with a 16:9 aspect ratio and all image areas are protected.
14:9	Always inserts a "14:9 (center)" AFD code (11), which indicates that the image has a 14:9 aspect ratio as a horizontally centered pillarbox within the 16:9 frame.
4:3 Alt 14:9	Always inserts a "4:3 (with alternate 14:9 center)" AFD code (13), which indicates that the image has a 4:3 aspect ratio and with an alternative 14:9 centered pillarbox image within the 16:9 frame.
16:9 Alt 14:9	Always inserts a "16:9 (with alternative 14:9 center)" AFD code (14), which indicates that the image has a 16:9 aspect ratio with an alternative 14:9 center within the 16:9 frame.
16:9 Alt 4:3	Always inserts a "16:9 (with alternative 4:3 center)" AFD code (15), which indicates that the image has a 16:9 aspect ratio with an alternative 4:3 center within the 16:9 frame.

**17.2 AFD VANC Output Lines** This parameter determines which video output lines have AFD VANC inserted on the output.

10 (default)	Adds AFD VANC to line 10.
9–42	Select which line other than 10 will have AFD VANC added.

## Closed Captioning

This parameter translates closed captioning from the SD CEA-608 format on line 21 to the HD CEA-708 format and inserts it into the output video stream.

*NOTE: This parameter interacts with parameter 20 SD Line 21 Blanking; see the explanation for that parameter also.*



## 18 Caption Xlator

Off (default)	When Off, caption translation is not performed.
On	When set to On, the FS3 will automatically translate incoming line 21 captions to CEA-708 format and insert the VANC packets into the converted video stream. This is a complete translation from CEA-608 format to CEA-708 format (including the embedded SD captions).

In standard definition video (525i/59.94), closed captioning data is encoded and sent on line 21 of both fields, using a format defined by the Consumer Electronics Association standard, CEA-608. This is traditionally called "line 21", "SD", or "608" captioning, and is used for analog composite, analog component, and serial digital (SDI) video.

In high definition video, closed captioning is encoded and sent as Vertical Ancillary (VANC) packets in SDI video, using a format defined by the Consumer Electronics Association standard CEA-708 (there is no equivalent for analog HD video). This is traditionally called "HD," "DTV," or "708" captioning. The data formatting and encoding for 708 captions is very different from the data contained in 608 (SD) captioning, reflecting the added features and capabilities available with the CEA-708 standard.

When the Caption Translator is on, the FS3 up-converter automatically translates incoming line 21 captions to CEA-708 format and inserts the VANC packets into the converted HD video stream. This is a complete translation from CEA-608 format to CEA-708 format (including the embedded SD captions).

## Input Scan and PSF

This parameter determines how the Deinterlacer handles interlaced vs. PsF inputs. Normally, this control will only be used to indicate that a 1080PsF25 input is PsF and not interlaced.

**Auto** When Auto is selected, the system will look for clues in the source's SMPTE 352 (Payload ID) data and respond accordingly. If there is no SMPTE 352 information, the system will assume that 23.98/24 fps sources are PsF, and 25/29.97/30 fps sources are interlaced.

**Progressive** When Progressive is selected, the system will assume that all sources are PsF (even if there is SMPTE 352 data to the contrary).

**Interlaced** When Interlaced is selected, the system will assume that all sources are interlaced (even if there is SMPTE 352 data to the contrary)

## 19 Input Scan Format

Auto (default)	Deinterlacer detects input source payload ID data and sets the processing format accordingly.
Progressive	Assumes all input sources are progressive.
Interlaced	Assumes all input sources are interlaced.

## SD Line 21 Closed Caption Blanking

This parameter determines whether the FS3 blanks line 21 closed captioning data prior to video processing of an SD 525i video input. (Line 21 normally occurs at the top of the raster in the overscan area of video, so the presence of captioning data or blanking does not interfere with the visible SD or up-converted video.)



## 20 SD Line 21 Blanking

**Blank** In Blank mode, the FS3 copies and remembers the contents of SD line 21 and then blanks those lines before transformation to ensure captioning data does not get included in the transformed video. If parameter 18 Caption Xlator is On, the copied caption gets translated into an HD caption and inserted into the transformed output (and if the caption translator is Off, the output does not contain caption data). This is the setting to use if the SD input includes a caption and you want to retain it at the output (parameter 18 Caption Xlator must be On), or you want to blank it at the output (18 Caption Xlator must be Off).

**Pass** In Pass mode, the FS3 does not blank line 21 of the SD video input and passes the unaltered video to the Video Processor for transformation. This is the setting to use if there is no captioning data present on line 21 of a 525i video input.

**Auto blank** In Auto Blank mode, the FS3 automatically detects presence or absence of line 21 caption data on the SD input. If no line 21 caption is present, the FS3 passes the video unaltered. If line 21 data is detected, the FS3 copies the data, blanks line 21, and reinserts translated captioning on the transformed output if parameter 18 Caption Xlator is On. If the Caption Translator is Off, the output will not contain captioning. This is the setting to use if your SD input video sometimes contains captions and other times does not, or if you are uncertain which setting to use.

Blank (default)	This setting copies caption data and blanks 525i input video Line 21 caption data before conversion, and may or may not include that data (see above).
Pass	Passes input video unaltered to the converter and to the outputs.
Auto blank	Automatically detects caption data on SD input, passing unaltered video if no line 21 caption is present, and reinserting caption data if 18 Caption Xlator is On.

## Test Pattern

This parameter selects the video source for the Test Pattern Generator. The pattern generator is turned off and on using Output parameter ["4 Output Mode" on page 49](#).

### 21 Test Pattern

75% Bars (default)	Sets the test pattern to 75% bars.
Ramp	Sets the test pattern to ramp.
Flat Field	Sets the test pattern to flat field chroma.
Black	Sets the test pattern to black.
100% Bars	Sets the test pattern to 100% bars.

## Freeze Output

This parameter tells the FS3 to freeze the current video frame on all outputs. This may be useful either for testing or in case of loss of the input source.

### 22 Freeze Output

Off (default)	Normal operation. The FS3 outputs video from the input.
On	The FS3 captures and freezes the most current video frame and displays it on the outputs as long as this parameter is set to On.



The freeze feature can be controlled not only by the front-panel and web browser interface, but also by a GPI input. When a GPI input is causing the freeze condition, the EXT lamp will be lit on the front-panel.

## Reverse Telecine

### About Reverse Telecine and Film Cadence (3:2 and 2:3:3:2)

Film cadence is a way to convert film frame rates (24 fps) to i59.94 interlaced field rate video suitable for broadcast, commonly employed by telecine equipment when converting film to video. This requires a 4/5 conversion ratio. For 3:2 pulldown cadence, the most common, two fields are duplicated for every four input frames, with a resulting 2:3:2:3 field output pattern. 3:2 pulldown outputs four fields of original input, then one duplicate field, then four more original fields, and then another duplicate field. This provides the smoothest motion, but results in two of the five video output frames being “dirty”, having fields from different original frames. Another commonly used film cadence is 2:3:3:2, which has only one “dirty” frame but results in motion that is slightly less smooth. Many other more exotic film cadences exist, but they are rarely used.

Film cadence removal reverses pulldown (Reverse Telecine), and can turn interlaced video originally sourced from film with pulldown back to 23.98 progressive frame rate video, removing the duplicated fields. This can be useful for post-production facilities that have a need to accurately re-edit this type of material.

### FS3 Reverse Telecine Conditions

The FS3 converter can perform film cadence removal under the following conditions:

- Input signal must be either 525i59.94 or 1080i59.94.
- Input signal must have consistent 3:2 or 2:3:3:2 pulldown.
- Output format selected must be either p23.98 or PsF23.98.
- The Reverse Telecine parameter must be set to Auto.
- PsF supported output>

Under the conditions above, the FS3 will automatically detect the type of film cadence (3:2 or 2:3:3:2), identify and remove the duplicate fields, and perform motion detection and de-interlacing processing to create high quality output with clean frames.

**NOTE:** *Approximately 10 incoming frames are required before film cadence can be detected and correctly processed. If the cadence pattern changes (for example, the source pulldown video may have been edited) that same approximately 10 frame interval is required after the discontinuity to detect and process the new cadence pattern.*

## 23 Reverse Telecine

Off (default)	Film cadence detection is disabled. This setting should remain Off unless you are processing interlaced pulldown input.
Auto	3:2 and 2:3:3:2 pull down field removal is enabled for interlaced video sources.



**24 Downconvert Mode** This parameter selects the type of downconversion performed by the Video Processor. This parameter is in effect only when the input is HD (720p, 1080i, or 1080p) and the output format is SD (525i or 625i), or when the input is 2K (2048 x 1080) and the output is HD (720p, 1080i, or 1080p). See the following Downconvert Illustrations for examples.

Crop ( <i>default</i> )	Image is cropped to fit new screen size.
Anamorphic	HD image is converted to full-screen SD with a 16x9 aspect ratio (anamorphic).
14:9	Image is reduced slightly with aspect ratio preserved. Black is added top and bottom, and the left and right sides are cropped.
Auto AFD	Automatically selects the best Downconvert mode based on the input video's Active Format Description (AFD) code. If the input video is not carrying an AFD VANC code, the Downconverter defaults to the mode specified in parameter menu <a href="#">"17.1 AFD Out" on page 58</a> .
Letterbox	Image is reduced with black top and bottom added to image area, with the aspect ratio preserved.

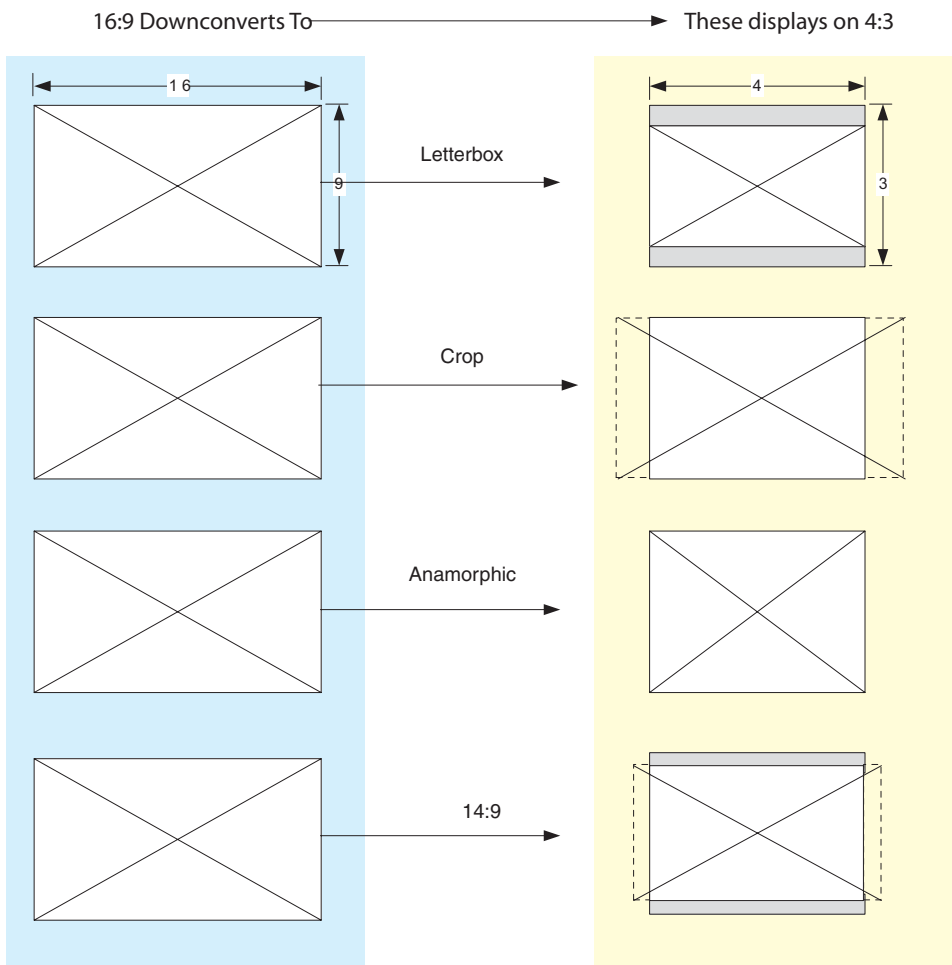
Active Format Description (AFD) codes are carried in the vertical ancillary (VANC) portion of HD SDI video signals, specified in SMPTE 2016 as follows: "AFD information is intended to guide DTV receivers and/or intermediate professional video equipment regarding the display of video of one aspect ratio on a display of another aspect ratio."

In the FS3 Downconverter, the AFD code on the video input can be used to guide the Downconverter in choosing which mode to use to best display the important content of the input 16:9 HD video on the 4:3 SD output. For example, if the input AFD code is 10 (Full Frame), it means that the input video has important picture information throughout the full 16:9 frame, so the Downconverter should use Letterbox mode to be sure none of the content is cropped off. An AFD code of 9 (Pillarbox) says that the input video only has content within the center 4:3 area of the picture (usually because it originally came from an Upconverted SD signal) so the Downconverter Crop mode would be the best choice. There are 16 possible HD AFD codes, of which eight are in common use. The FS3 does not process or use SD AFD codes.

FS3 AFD processing (passing, removing, and re-inserting) occurs based on the setting of parameters ["24 Downconvert Mode" on page 62](#), and ["AFD" on page 58](#).



*Auto AFD* mode fully defines the size, position, and aspect ratio of the output raster. Thus, when in *Auto AFD* mode (Output Format set to an SD format, with an HD video input, and *Downconvert Mode* set to *Auto AFD*), any *Custom Size/Pos* settings are ignored, and those menus are hidden. Likewise, when in *Auto AFD* mode, any *Region Of Interest* settings are ignored, and those menus are hidden.



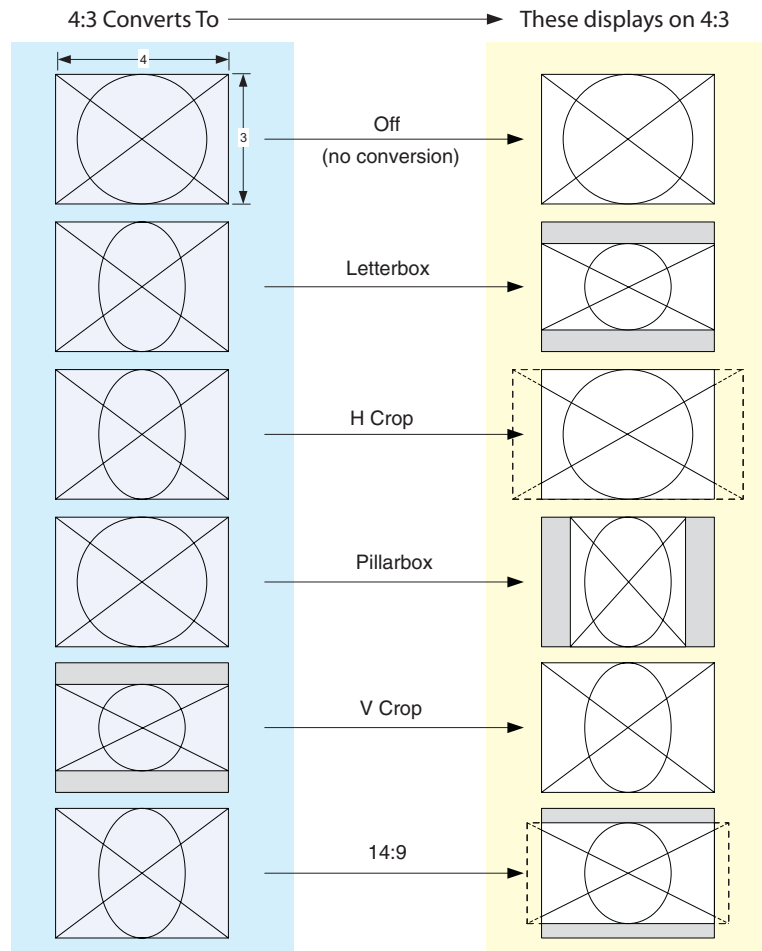
### SD Aspect Ratio

This parameter selects the type of SD-to-SD Aspect Ratio Conversion (ARC) performed on an incoming selected SD source. This parameter is in effect only when the input and output are both SD (525i or 625i). (In Europe 16:9 anamorphic video is also known as “wide screen” video.)

### 25 SD Aspect Ratio Convert

Off (default) Letterbox H Crop  Pillarbox V Crop 14:9	Turns aspect ratio conversion Off. Converts 16:9 Anamorphic video to Letterbox video. Converts 16:9 Anamorphic video to 4:3 Standard video (crops left and right edges of video). Converts 4:3 Standard video to 16:9 Anamorphic video. See <a href="#">“Sidebars” on page 52</a> for edge adjustment. Converts Letterbox video to 16:9 Anamorphic video. Converts 16:9 Anamorphic video to 14:9 Cropped video.
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## AUDIO PROC Menu Group

The following descriptions explain the Audio Proc Menu Groups, which allows you to make adjustments to the audio inputs to the FS3 audio processor, and to control audio routing.

The Audio Proc Menus are formatted as follows

Display	Description
MENU # TITLE	Menu number and title.
PARAMETER VALUE	Currently selected parameter value for this menu.
PARAMETER VALUE	Higher range parameter value, when required.



## 1.0 SDI1 Level

This parameter selects the Audio Level Mode for all 16 SDI1 audio input channels. The default Unity setting applies 0.0. db gain to all the input channels

Unity (default)	All 16 SDI1 audio input channels are set to 0.0 dB. Individual channel adjustment menus are hidden.
Adjust	Each of the 16 SDI1 audio input channel adjusted values are applied to the audio processor, and the individual channel adjustment menus become available.

When Adjust mode is selected:

- After selecting an individual channel adjustment menu, the *ADJUST* knob changes the value shown by 0.5 dB (up or down) for each knob detent.
- The range of adjustment is -18.0dB to +18.0dB.
- Switching from Unity to Adjust will apply the individual level values that were set in the Adjust mode to the input for each of the channels. Switching from Adjust to Unity will apply unity (0.0dB) to all channels.

### 1.1-1.16 SDI 1 Channel Levels

When Adjust is selected above, individual SDI 1 audio channel menus become available, permitting +/- 18.0 dB level adjustment to each input channel.

## 2.0 SDI1 Phase

This parameter selects the Audio Phase Mode for all 16 SDI1 audio input channels The default Unity setting applies normal (non-inverted) phase to all the input channels.

Unity (default)	All 16 SDI1 audio input channels are set to Normal phase. Individual channel adjustment menus are hidden.
Adjust	Each of the 16 SDI1 audio input Phase values (either Normal or Invert) are applied to the audio processor, and the individual channel adjustment menus become available.

When Adjust mode is selected:

- After selecting an individual channel adjustment menu, the *ADJUST* knob toggles the Phase value shown between Normal and Invert. When Invert is selected the phase of the audio input on that channel will be inverted.

Switching from Unity to Adjust will apply the individual Phase values that were set in the Adjust mode to the input for each of the channels. Switching from Adjust to Unity will apply unity (Normal) to all channels.

### 2.1-2.16 SDI 1 Channel Phase

When Adjust is selected above, individual SDI 1 audio channel menus become available, permitting inverting the phase of each input channel.

## 3.0 SDI1 Delay

This parameter selects the Audio Delay Mode for the eight SDI1 audio input channel pairs. Delay operates on channel pairs only. Delay cannot be adjusted on any single channel. Channel pairs are grouped as: Channel 1 and 2, Channel 3 and 4,..., Channel 15 and 16. The default Global setting applies the currently set Global delay value to all eight input channel pairs. The factory default Global setting is 0 seconds delay, but whatever value the user changes this setting to will be applied when Global is selected.

Global (default)	All eight SDI1 audio input channel pairs are set to the current Global delay value. Individual channel adjustment menus are hidden.
Channel Pair	Each of the eight SDI1 audio input channel pairs delay values are applied to the input of each channel pair, and the channel pair adjustment menus become available.



When Channel Pair mode is selected:

- Each of the individual eight SDI1 audio input channel pair delay values are applied to the input delay of each channel pair.
- The range of delay is -16ms (-768 samples) to +256ms (+12288 samples). 48 samples = 1 millisecond.

Switching from Global to Channel Pair will apply the individual delay values that were set for each individual channel pair. Switching from Channel Pair to Global will apply the same currently set Global delay value to all the channel pairs.

### 3.1 SDI 1 Delay Global

When Global is selected above, the individual SDI 1 audio channel pair menus are hidden.

SDI 1 Delay Global	The <i>ADJUST</i> knob sets the Global delay value. Adjustment range is -768 to +12288 in units of samples where 48 samples = 1 millisecond. The Front Panel displays the delay in milliseconds and as fractions of milliseconds in units of samples.
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### 3.1-3.8 SDI 1 Channel Pair Delay

When Channel Pair is selected above, eight individual SDI 1 audio channel pair menus become available, permitting adjusting the delay of each input channel pair.

- Delay adjustment range is -768 to +12288 in units of samples where 48 samples = 1 millisecond. The Front Panel displays the delay in milliseconds and as fractions of milliseconds in units of samples.

## 4.0/5.0/6.0 SDI 2 Level, Phase, Delay

See descriptions for SDI 1:

- [“1.0 SDI1 Level” on page 65](#)
- [“2.0 SDI1 Phase” on page 65](#)
- [“3.0 SDI1 Delay” on page 65](#)

## 7.0/8.0/9.0 Fiber1 Level, Phase, Delay

See descriptions for SDI 1:

- [“1.0 SDI1 Level” on page 65](#)
- [“2.0 SDI1 Phase” on page 65](#)
- [“3.0 SDI1 Delay” on page 65](#)

## 10.0/11.0/12.0 Fiber2 Level, Phase, Delay

See descriptions for SDI 1:

- [“1.0 SDI1 Level” on page 65](#)
- [“2.0 SDI1 Phase” on page 65](#)
- [“3.0 SDI1 Delay” on page 65](#)

## 13.0 Mix Down Mode

This parameter activates the Mix Down mixer, and selects either 5.1 or 7.1 mix down mode.

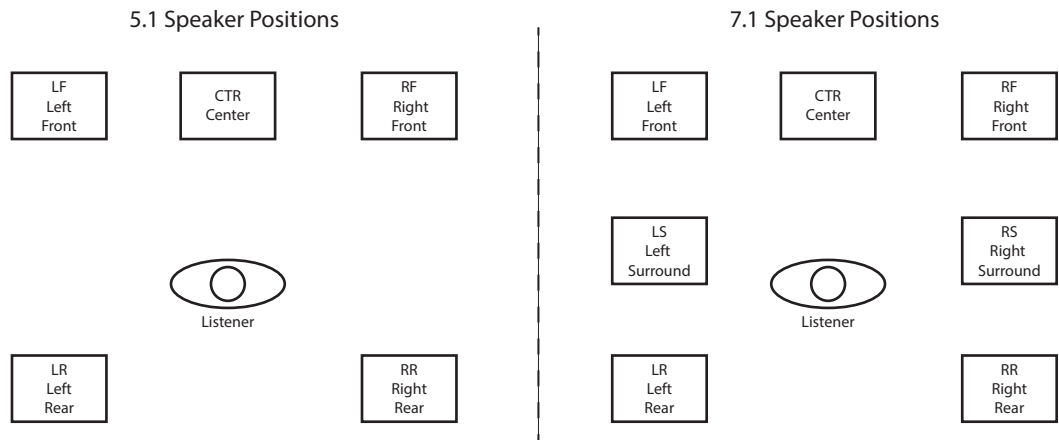
Off (default)	Mix down feature is turned off.
5.1 Channel	Selects 5.1 mix down mode.
7.1 Channel	Selects 7.1 mix down mode.



When set to 5.1 or 7.1 Channel Mode, additional menus follow that are used to select the source of the incoming multi-channel audio, adjust the levels of each of the incoming channels to the Left and Right outputs, and adjust the gain of the Left and Right output channels.

**About Mix Down Mode** Multi-channel audio uses more than two speakers to represent the sound field.

**Figure 12. Multi-Channel 5.1 and 7.1 Speaker Positions**



Multi-channel audio, typically embedded in an SDI signal, can be passed through the FS3 converter unchanged. The multi-channel sound can also be mixed down to stereo, using the two Mix Down Modules built into the FS3 audio processor.

The default 5.1 to 2 ch. mix-down equation is:

$$\text{Left Ch Output} = \text{LF} + (-3\text{dB} * \text{CTR}) + (-3\text{dB} * \text{LR})$$

$$\text{Right Ch Output} = \text{RF} + (-3\text{dB} * \text{CTR}) + (-3\text{dB} * \text{RR})$$

The default 7.1 to 2 ch. mix-down equation is:

$$\text{Left Ch Output} = \text{LF} + (-3\text{dB} * \text{CTR}) + (-3\text{dB} * \text{LS}) + (-3\text{dB} * \text{LR})$$

$$\text{Right Ch Output} = \text{RF} + (-3\text{dB} * \text{CTR}) + (-3\text{dB} * \text{RS}) + (-3\text{dB} * \text{RR})$$

These default settings can be adjusted using the front panel menus or web interface.

**NOTE:** *The LFE channel is not used in the stereo mix down output, but is passed through the FS3 audio routing matrix.*



**13.1 Mix Down Input** When 5.1 Channel or 7.1 Channel is selected above, this parameter selects the source of the multi-channel audio coming into that mixer.

SDI 1(default) SDI 2 Fiber 1 Fiber 2	Selects the indicated source. The channel assignments are as follows. All unused channels are muted: Input Ch 1 - Left Front Input Ch 2 - Right Front Input Ch 3 - Center Input Ch 4 - Left Rear Input Ch 5 - Right Rear Input Ch 6 - LFE (not used in mix down output) Input Ch 7 - Left Surround (mute in 5.1 mode) Input Ch 8 - Right Surround (mute in 5.1 mode)
Sig Gen 1KHz Sig Gen 400Hz	Routes the indicates signal generator to all the active multi-channel inputs.
Map	This parameters activates a series of related menus to map a specific input channel to each of the 5 or 7 mixer input channels.

**13.2 - 13-8 Mix Down Input Mapping (LF, RF, CTR, LR, RR, LS, RS)** When Map is selected above, these menus permit the mapping of any FS3 audio input channel or signal generator to any of the mixer inputs (L Front, R Front, Center, L Rear, R Rear, and in 7.1 mode L Surround and R Surround). Each mixer input can also be turned Off (muted). Default setting is Off.

**13.9 - 13.14 Mix Down Input Level** In Mix Down Mode, multi-channel input channels are mixed to the Left and Right output channels. The level of each input signal sent to its mixed output can be adjusted plus or minus 18 dB, in half dB increments, using these menu controls.

The default settings are set to the basic equations above, and are listed below.

LF Level	0 dB (unity) to Left output.
RF Level	0 dB (unity) to Right output.
CTR Level	-3 dB from unity to both the Left and Right outputs.
LR Level	-3 dB from unity to the Left output.
RR Level	-3 dB from unity to the Right output.
LS Level (7.1 mode only)	-3 dB from unity to the Left output.
RS Level (7.1 mode only)	-3 dB from unity to the Right output.

*NOTE: The LFE channel is not used in the stereo mix down output, but is passed through the FS3 audio routing matrix.*

**13.16 - 13.17 Mix Down Output Lft Rt Level** The level of the Left and Right mixer output signal can be adjusted plus or minus 18 dB, in half dB increments, using these menu controls. Default is 0 dB (unity).

**15 Mix Down Reset** This parameter resets all of the mix down levels (five or seven input, two output) for the mixer to the factory defaults.

Choose Mixer	After turning the <i>ADJUST</i> knob, a message is displayed “MIX DOWN Press Adj sets default”. After pressing the <i>ADJUST</i> knob, an “Are you sure?” message is displayed. Pressing <i>ADJUST</i> again resets the Mix Down mixer to defaults.
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# 16 Embedded Audio Out

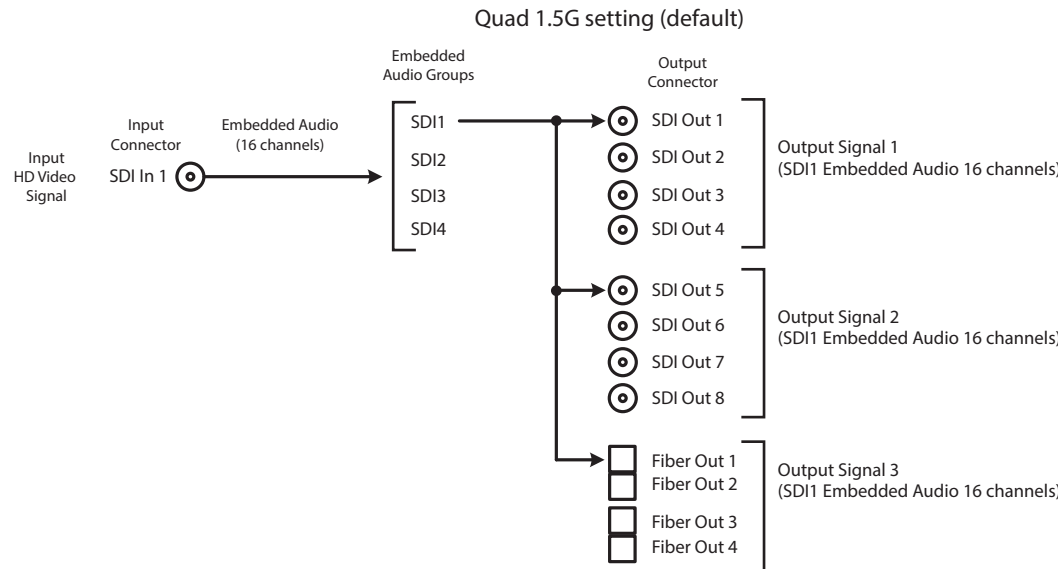
This parameter selects whether or not audio is embedded in the SDI1/SDI2/Fiber1/Fiber2 outputs.

On	The output of the Audio Processor is embedded in the Video Processor output.
Mute	Audio packets are embedded, but they are set for silence.
Off	No embedded audio (HANC) is generated.

## About Audio Routing

The SDI1 through SDI4 Audio Output menu titles refer to portions of the FS3 SDI embedded audio output signal (embedded audio groups), not the SDI 1-4 BNC connectors. The selected input source audio is routed to all the corresponding FS3 output connectors. As the simplest example, if the FS3 receives an HD signal carrying a single group of 16 embedded audio channels and up-converts that signal to a four link output, all the audio will be carried on the first output connector of each of the three output signals (BNC1, BNC 5, Fiber 1). See [Figure 13](#).

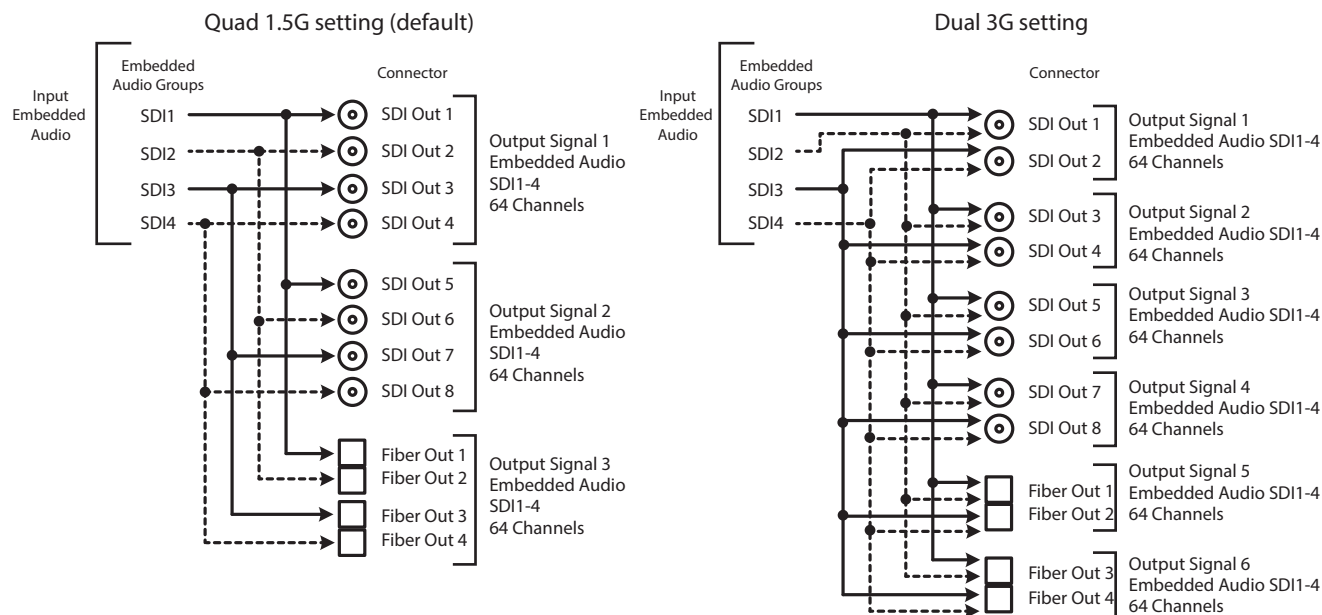
Figure 13. Embedded Audio Input and Output



4K and UHD video can carry four groups of 16 channels (64 total) of embedded audio. The FS3 can receive up to 64 audio channels, 16 on each input connector, and can route these incoming audio channels to the embedded audio outputs, via the internal embedded audio groups, called SDI1-SDI4. For example if the FS3 is generating a quad-link 1.5G SDI output signal, and all four of the internal audio groups have 16 channels of audio, the unit can output all 64 embedded audio channels on all three outputs. In this case the SDI1-4 internal groups of embedded audio roughly correspond to the output connector numbers. See the left side of [Figure 14](#).



**Figure 14. Embedded Audio Output Routing**



However, when the FS3 is generating a dual link 3G output signal, the embedded audio group numbers no longer match the output connectors. See the right side of [Figure 14](#).

Finally, when the FS3 is outputting a single link SD or HD-SDI signal, the same embedded audio is present on all 12 output connectors.

The following menus control the FS3's audio routing. The general routing procedure using the front panel is to select the menu of the audio output with the *SELECT* knob, and then select the input source you wish to route to that output with the *ADJUST* knob. Embedded audio is routed in groups of 16 channels (8 pairs) when not using channel mapping.

Channel mapping allows different individual audio input channels to be routed to different individual logical outputs. Any embedded audio input can be routed to any embedded audio logical output using channel mapping.

## 17.0 SDI1 Audio Output

This parameter selects the audio input sources for the SDI1 group of embedded audio channel outputs.



The factory default for each output is the numerically corresponding input: i.e. SDI1 to SDI1, SDI2 to SDI2, SDI3 to Fiber 1, and SDI4 to Fiber 2.

SDI1 SDI2 Fiber1 Fiber2	The selected source's embedded audio channels are routed to the SDI1 embedded output channels group.
Mix Down L:R	The stereo output of the Mix Down Module is routed to the SDI output channels 1 and 2. The other channels are muted.
Sig Gen 1KHz Sig Gen 400Hz Mute	The selected tone or mute is routed to every output channel.
Map	The currently configured mapping is applied to each output channel. Channel mapping menus for each output become available.

When set to SDI1, SDI2, Fiber1, or Fiber2:

- The selected source channels are routed to the corresponding embedded audio output channels group. For example, SDI1 input Ch n to SDI1 output Ch n, where n = 1 thru 16.

When set to Mix Down

- The stereo output of the Mix Down Module is routed to audio channels 1 and 2 of the SDI output. The other channels are muted.

When set to Sig Gen 1KHz, Sig Gen 400Hz or Mute:

- The selected source (tone or silence) is routed to every output channel.

When set to Map:

- The mapped source is routed to each output channel according to the last configured mapped source for each channel in the output.
- The following channel map menus become available via the *SELECT* knob.

## 17.1-17.16 SDI1 Output Channel

When Map is selected, each listed source can be mapped to each output channel of the currently selected output menu.

SDI1 Output Ch 1 through SDI1 Output Ch 16	Select the source to route to the selected output from the following sources: -SDI1 Ch1 - Ch16 -SDI2 Ch1 - Ch16 -Fiber1 Ch1 - Ch16 -Fiber2 Ch1 - Ch16 -Mix Down L - R -Sig Gen 1kHz -Sig Gen 400Hz -Mute
--	--

## 18.0-20.0 SDI2-4 Audio Out

See ["17.0 SDI1 Audio Output" on page 70](#)



## 21 Global Audio Output

This parameter allows routing the same source or set of sources to all the FS3 outputs. The rules used for Audio Out apply if the number of outputs do not match the number of inputs.

Off (default)	No Global output configuration is imposed. When Off all other AUDIO OUTPUT menus are enabled and displayed.
SDI1 SDI2 Fiber1 Fiber2	The selected source channels are routed to all the FS3 output channels.
Sig Gen 1KHz Sig Gen 400Hz Mute	The selected tone or mute is routed to every FS3 output channel.
Mix Down L:R	The stereo output of Mix Down module is routed to all the FS3 output channels. The Left mixer channel goes to FS3 output channel 1 and the Right mixer channel goes to output channel 2. If the output has more than two channels (i.e. embedded SDI), mute (silence) is routed to the higher numbered output channels.

**NOTE:** When any Global Output other than Off has been selected, and Hidden Menus is set to Hide Inactive, no other AUDIO OUTPUT menu group menus will be accessible (they are hidden).

**NOTE:** No Global Map source is available.

## 22 Reset Mapped Output

This parameter resets the selected output map to the factory default values

Choose a Map (default)	Prompt for selecting an Output to map.
SDI1 SDI2 Fiber1 Fiber2	After selecting an output, press ADJUST to reset that output to the factory default mapping (i.e. SDI1 to SDI1, SDI2 to SDI2, etc.).
All	Sets all outputs to their factory default mappings.



# Chapter 5: Browser Remote Control

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## Remote FS3 Control Via a Web Browser

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The FS3 web interface consists of a built-in optimized web server that provides control via a web browser running on a network-attached computer. The browser screens are presented and described on the following pages, organized as they appear in the browser.

- Supported browsers**
- Chrome (all platforms)
  - Firefox (all platforms)
  - Safari (OSX, Mobile)
  - Internet Explorer (versions 10 and higher)

Other browsers are likely to work but are not guaranteed.

- Supported RJ45 Ethernet network connections**
- Closed local area network (LAN)
  - Straight computer to FS3 cable connection
  - Broadband wide area network (WAN) with the firewall opened for the FS3 (not recommended since anyone on the internet can then access the FS3)

Internally the FS3 senses and adapts to either a “straight-through” CAT 5 Ethernet cable or null-modem (crossover) cable using standard RJ45 connectors. No setup or strapping is needed to adapt to the cable.

**Browser connection** For browser access, enter the FS3 IP address in the browser's address field.

By default, the FS3 is set to automatically connect to your network's DHCP server to get an IP address and other network configuration data. You will find the IP address in the *CONFIG* Menu Group as follows:

1. Press the *CONFIG* button on the FS3 front panel.
2. Turn the *SELECT* knob until you reach parameter *IP Address*.
3. Enter the IP address shown in the browser address field.

When the browser successfully connects to the FS3, the main *Status* screen shown on the next page is displayed. If the browser fails to connect, make sure *CONFIG* settings for *IP*, *Subnet*, and *Gateway* match the network setup of the browser host. You can either make the computer match the FS3, or make the FS3 match your computer.

### General Web Browser Screen Description

The main Status screen appears below. All FS3 screens have common elements:

- Menu** On the left of each screen is a navigational list of the available screens. Click any of these items to jump to that screen.
- Alarms** The lower left side of the screen shows alarms that alert you to possible problem conditions, such as disconnected or failed power supplies and video format incompatibilities.

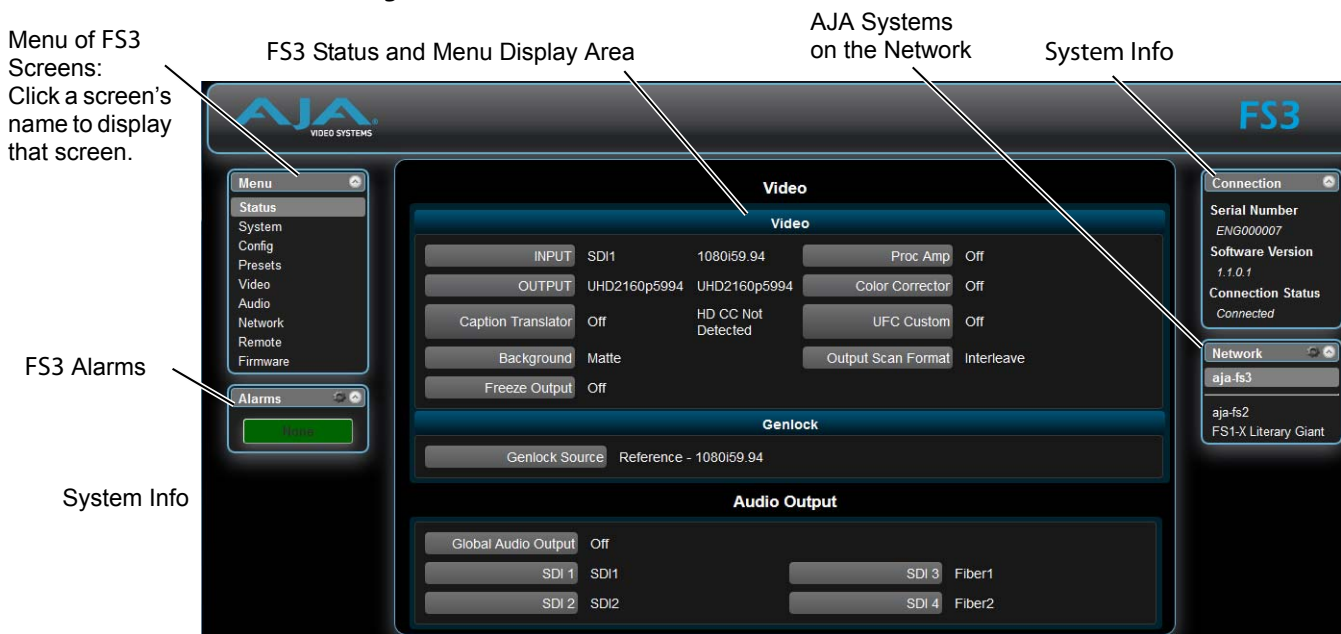


**Status and Menu Display** In the center of each screen you'll find the main display showing the status and menu selections for the screen you are viewing. The content of FS3 web screens closely mirrors the parameter menus displayed on the front panel. On all menus except Status, if you hover the cursor over any parameter, the equivalent front panel parameter number is displayed.

**Connection** The right side of the screen lists FS3 system details, including system serial number, installed software version, and connection status. This information is useful if you ever have to call AJA Technical Support for help.

**Network** The right side of the screen lists AJA systems on the network. The network panel is divided into two sections by the white line- above the line will be a list of FS3 models on the network- below the line will be a list of other AJA devices (such as Cion and other FS models) If you right-click any system in the list and select Identify, the ID LEDs on the unit will blink to identify it. Click on Identify again to stop the blinking. Another way to identify systems is to notice which system's EXT front panel LED flashes when you change any setting from a remote control device, such as the web browser.

Figure 15. FS3 Web Interface, Main Status Screen



**Controlling Multiple FS3s** From any screen, you can see at-a-glance all of the AJA devices present on the same local LAN as well as the current FS3 you are controlling. Clicking on any of the listed systems will bring up the *Status* screen of that device.

*NOTE: The FS3 you control may be running a different software version, so screens may look different. It's a good idea to have all your devices running the most current software and the same version. Also, if the Default Gateway (parameter 2.4) is not configured properly, other AJA devices will not be visible. If the display shows no devices found, check the gateway setting.*

**Resetting Values To Factory Default Settings** FS3 web browser screens feature many user controls that can be reset to factory default values by simply “right-clicking” on the parameter label. When you right-click, the browser displays a *Reset to Factory* popup that if clicked will cause the parameter to be reset.



**NOTE:** *This reset procedure only works with computers that allow right-clicking. Some computers may not permit this operation.*

You can perform a global reset to factory values of all System, Video, Audio, and most Config parameters (the same set of parameters acted on by a Preset Recall).

To perform a global reset:

1. Go to the *Presets* screen.
2. Click on the *Recall* button in the *Factory Preset* row.

User preferences, network settings, and existing Presets are not affected by recalling the Factory Preset.

## Drop Down Parameter Operation

Most parameters available on the browser are selected from a drop-down list. The currently active parameter is displayed. Click on the down arrow symbol next to the parameter to display the list and select an alternative value. The FS3 will immediately operate with the new setting.

## Slider Operation

Some screens contain slider controls for setting values. To set a value, you can click on a slider to select it and then use the mouse to drag the slider to the position you desire. For fine tuning, while the slider is selected (highlighted by a blue border), use the keyboard left and right arrow keys to change the value one unit at a time. Or you can enter the value directly by clicking on the number displayed above the slider, type in your number then hit *Enter* to have it take effect. After setting a slider's position, click on the page's background area (blue highlight turns off) to ensure the change is confirmed and saved.

## Sub-Menus

Some parameters, when activated, open sub-menus. The sub-menus are a lighter gray color and have a collapse/expand button on the parent selection. This lets you collapse the sub-menus to make it easier to configure the system. The collapsed setting only stays in effect until the user reconnects or refreshes the browser.

## Screen Descriptions

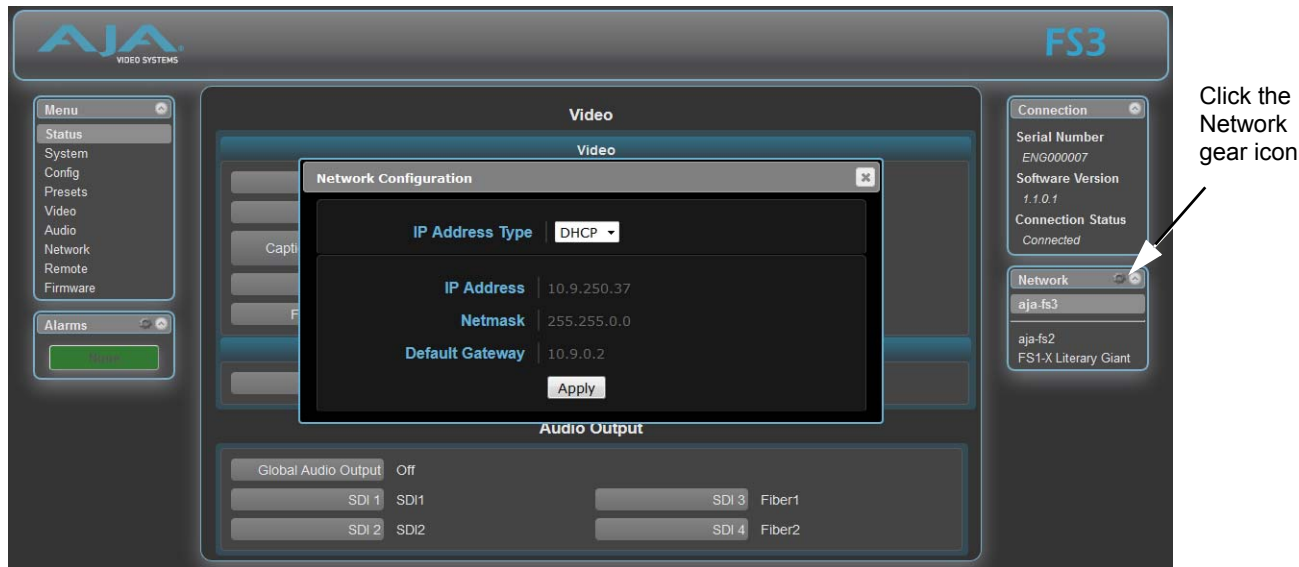
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Now that you have had an introduction to how the FS3 browser works and how to navigate the screens, each screen and its settings are described in detail. The screens are described in the order listed on main screen (click to jump):

- ["Network Pane and Network Configuration Screen" on page 76](#)
- ["Alarm Configuration Screen" on page 78](#)
- ["Status Screen" on page 79](#)
- ["System Screen" on page 80](#)
- ["Config Screen" on page 81](#)
- ["Presets Screen" on page 83](#)
- ["Video Screen" on page 85](#)
- ["Audio Screen" on page 86](#)
- ["Remote Screen" on page 87](#)
- ["Firmware Screen" on page 88](#)



# Network Pane and Network Configuration Screen



The *Network* pane on the right side of any screen lists the AJA FS devices that appear on the network. This pane includes three additional controls:

- Hover the cursor over any system name to see its IP address.
- Right-click any system and select *Identify* to blink the system *ID* LEDs.
- Click the gear-shaped icon in the *Network* pane (or select *Network* from the *Menu* list on the left side of the screen) to open the *Network Configuration* screen listing FS3 network settings.

The *Network Configuration* screen allows you to view and change your FS3's network settings and then click *Apply* to activate them.

See [“Networking” on page 25](#) for detailed setup instructions for connecting the FS3 to a network. Consult your network administrator about how to configure network settings.

## IP Address Type

*IP Address Type* determines the type of TCP/IP network configuration used by the FS3. *DHCP* enables the FS3 to connect 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)	Select automatic IP address assignment from the LAN DHCP server. If the FS3 cannot find a DHCP server, it fails over to the static IP address.
Static Addr	Assign a static IP address manually (using parameters 2.2, 2.3, and 2.4). The factory default static IP address: 192.168.0.2



## IP Address

*IP Address* determines the static IP address used by the FS3 for TCP/IP networking. (Networking is discussed in *Chapter 3, Network Connection*.) Consult your network administrator about how to set this value.

Variable	<p>If <i>IP Address Type</i> is set to <i>DHCP</i>, the IP address is set automatically by the network DHCP server and cannot be entered here.</p> <p>If <i>IP Address Type</i> is set to <i>Static</i>, enter an IP address compatible with your LAN here. Also enter a netmask and default gateway address in the following two parameters. Click <i>Apply</i> when you are ready to apply all three entries to change the FS3's network addressing.</p> <p>If <i>IP Address Type</i> is set to <i>DHCP</i> and there is a DHCP failure, the IP address is set to the static IP address. The default static IP address is 192.168.0.2</p>
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## Netmask

*Netmask* determines the subnet mask used by the FS3 for TCP/IP networking.

Variable	<p>Enter a subnet mask compatible with your LAN. This is only needed for Static IP configurations. The factory default <i>Subnet Mask</i> is 255.255.255.0</p> <p>If <i>IP Address Type</i> is set to DHCP, the Subnet Mask is set by the DHCP server and cannot be changed by the user.</p>
----------	--

## Default Gateway

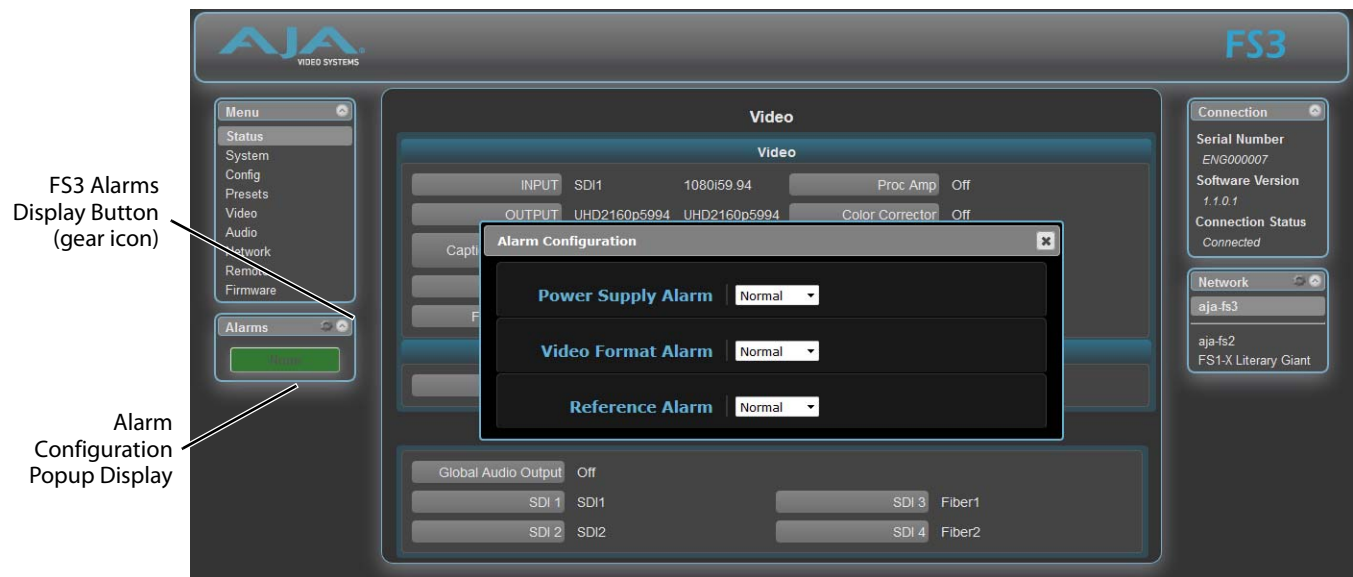
*Default Gateway* determines the gateway or router used on your LAN for TCP/IP networking.

Without a properly configured default gateway (whether you have a router/gateway or not), the FS3 will be unable to see other AJA FS devices on the network, although you may still be able to control this FS3 via a web browser. Also, without a proper gateway defined, the discovery feature on the *Network* web page will not work correctly and list other FS devices on the network.

Variable	<p>Enter a default gateway or router address. This is only needed for Static IP configurations. The factory <i>Default Gateway</i> is 192.168.0.1.</p> <p>If <i>IP Address Type</i> is set to DHCP, the Default Gateway is set by the DHCP server and cannot be changed by the user.</p>
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## Alarm Configuration Screen



You can pop open the *Alarm Configuration* display at any time and on any screen by clicking the gear button in the upper part of the *Alarms* panel.

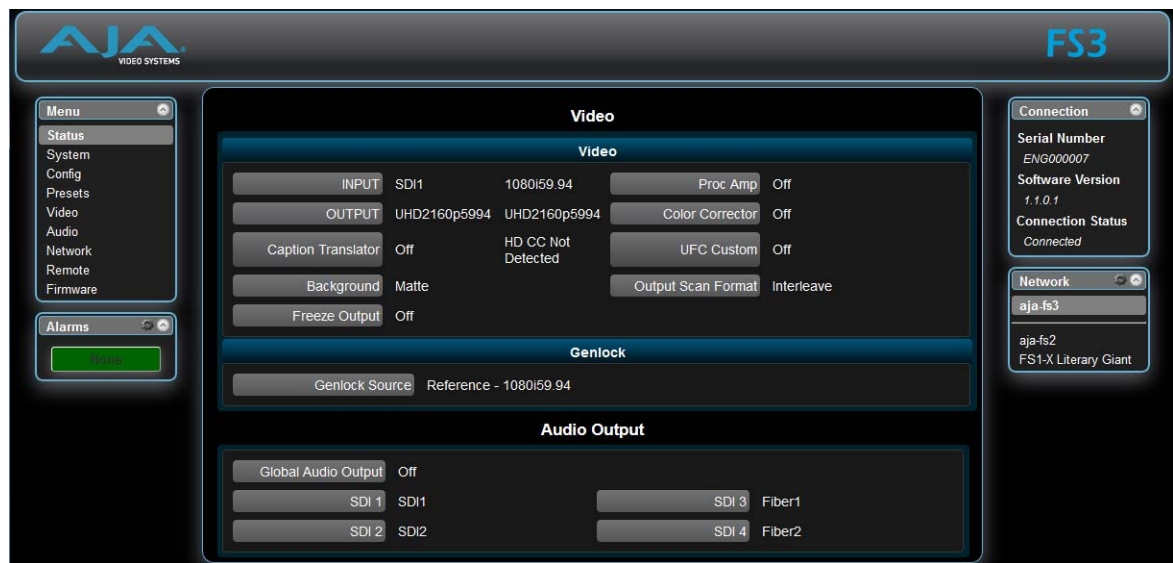
To close the window, press the ESC key, or click the X in the upper right corner.

The *Alarm Configuration* display provides control over these alarm settings:

- Power Supply Alarm (see [“5 Power Supply Alarm” on page 43](#))
- Video Format Alarm (see [“6 Video Format Alarm” on page 44](#))
- Reference Alarm (see [“7 Reference Alarm” on page 44](#))



# Status Screen

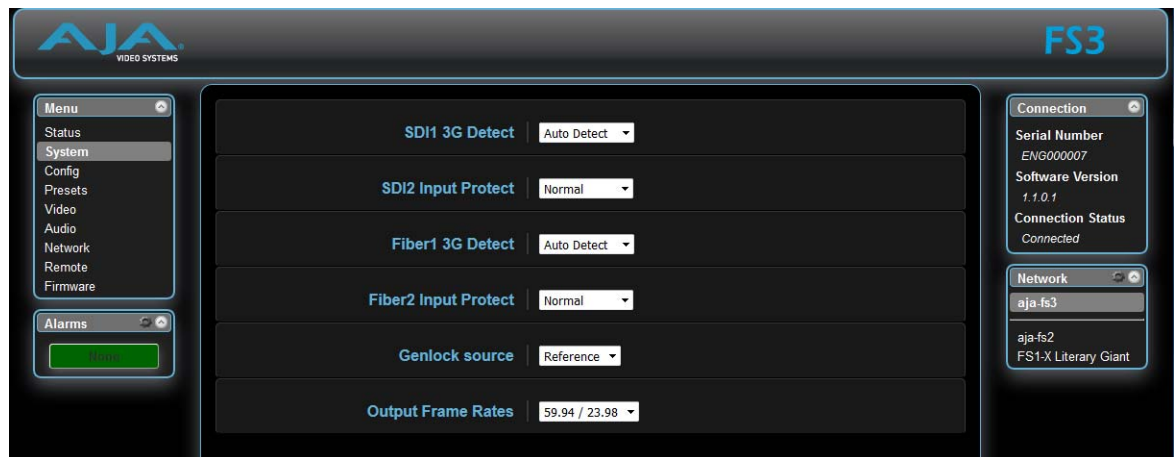


The Status screen displays overall FS3 operational status. You can right-click most video values to change them, allowing you to edit many parameters in one place. Parameters with format incompatibilities or other alarms are highlighted in red.

<b>Video</b>	INPUT	Shows the input source and format.
	OUTPUT	Shows the output video selection and format.
	Caption Translator	Shows the caption selection and caption signal presence.
	Background	Shows the current background signal (Black or Matte).
	Freeze Output	Shows whether Freeze Output is On or Off.
	Proc Amp	Shows whether the Proc Amp is On or Off.
	Color Corrector	Shows whether the Color Corrector (RGB) is On or Off.
	UFC Custom	Shows whether Custom conversion, AFD, and ROI are On or Off.
<b>Genlock</b>	Output Scan Format	Shows either Quadrant or Interleaved.
	Genlock Source	Shows the source of the genlock reference, and its format.
<b>Audio Output</b>	Global Audio Output	Right-clicking on the Global Audio Out parameter value lets you select a global output. That same audio will be sent to all the FS3 audio outputs. When set to Off, the other Audio Outputs display their selected value, otherwise only the Global Audio Output setting is displayed.
	SDI 1	Each of these settings, when visible, reports the audio that is currently being routed to that audio output. Mute and Sig Gen is reported when all of that port's outputs have that setting. Map is reported when the port's outputs are mapped.
	SDI 2	
	Fiber 1	
	Fiber 2	



## System Screen



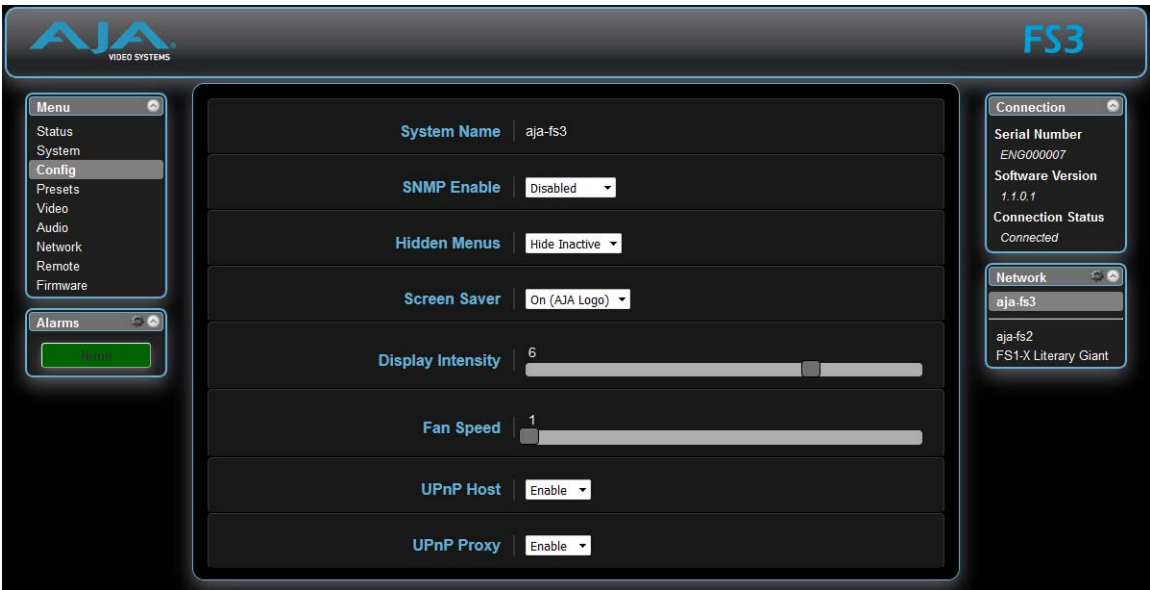
The *SYSTEM* web interface screen includes parameters for setting up various FS3 system related features (video formats, audio level standards, etc.).

The *System* screen parameters are identical to those available on the FS3 front panel. These include:

- *"1 SDI1 3G Detect" on page 46*
- *"2 SDI2 Input Protect" on page 47*
- *"3 Fiber1 3G Detect" on page 47*
- *"4 Fiber2 Input Protect" on page 47*
- *"5 Genlock Source" on page 48*
- *"6 Output Frame Rates" on page 48*



# Config Screen



The *Config* screen includes functions to name the FS3, configure SNMP, hide or show unused menus, change the front panel display brightness and fan speed, and configure UPnP.

## System Name

The System Name parameter sets the name of the FS3 system. To change the System Name, click on and drag the cursor across the displayed name, and type in a new name.

Variable	Highlight the existing name and type in a new name, up to 20 characters. Allowed characters are A-Z, a-z, numerals, hyphen, spaces, and period.
----------	---

## SNMP Parameters

The following parameters are used to setup the FS3 SNMP (Simple Network Management Protocol) feature.

- SNMP Enable
- SNMP Trap Dest 1
- SNMP Trap Port 1
- SNMP Trap Dest 2
- SNMP Trap Port 2

In addition, the following alarms may affect SNMP messages:

- Power Supply Alarm
- Over Temp Alarm
- Video Format Alarm
- Reference Alarm

Refer to "[Chapter 6: SNMP on page 89](#)" for a description of SNMP and how the FS3 supports it.



## Hidden Menus

This selection lets you choose whether to hide or show inactive menus.

Hide Inactive (default)	Hides menus that are not in use.
Show All	Shows all menus, even those that are not in use.

## Display Intensity

*Display Intensity* determines alphanumeric display and front panel LED brightness.

Variable	Use the slider to dim or brighten the alphanumeric display and activity indicator LEDs in steps from 1 (dim) to 8 (brightest). Default is 6
----------	---

## UPnP Host

*UPnP Host* enables the FS3 to be discovered by a Windows network.

Enable (default)	Enables the FS3 to be discovered by a Windows network.
Disable	Disables Windows network discovery of the FS3.

When this parameter is enabled, you can view the FS3 on a Windows Network by clicking these selections in Windows: *Computer > Network* (in left pane). Any FS3s on the network will be listed under *Other Devices* below *Computers* and *Media Devices*. If your system does not have network discovery enabled, you may need to enable it following the Windows help instructions to make network devices visible in the Windows Network window.

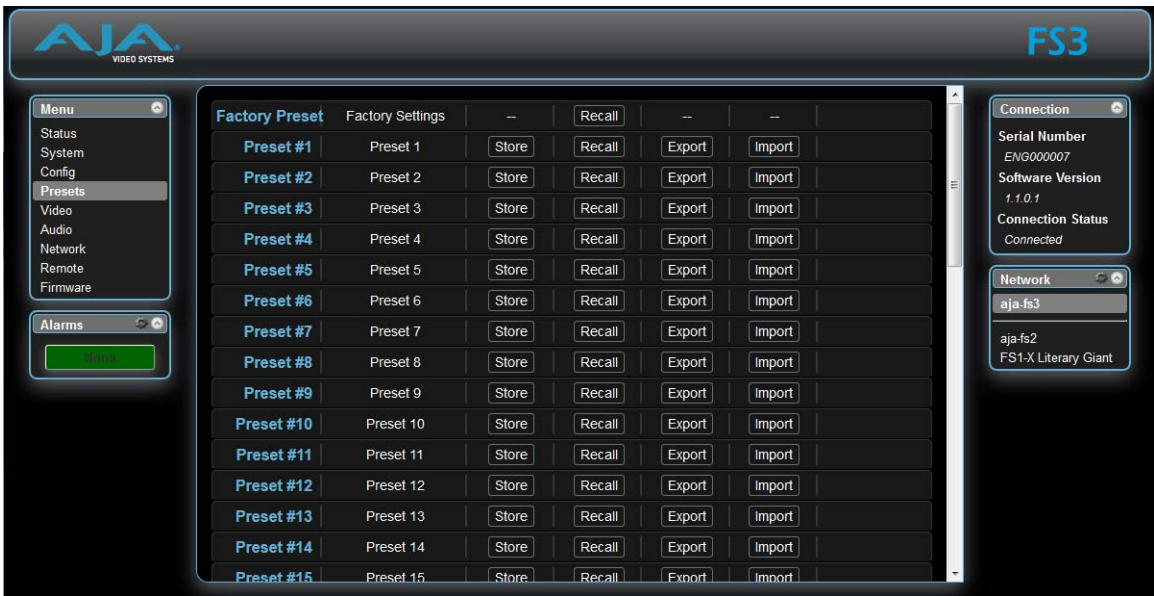
## UPnP Proxy

*UPnP Proxy* enables the FS3 to serve as a proxy for other AJA devices, allowing them to be discovered on a Windows network through the FS3. When enabled, the FS3 acts as a proxy for all the AJA devices that it is able to connect to that have not already been discovered on the network. The devices will be listed in the FS3 Network window. Once the devices appear on the network, they can connect directly to other devices and computers without involving the FS3.

Enable (default)	Enables the FS3 to connect other AJA devices to the network.
Disable	Disables the FS3 from serving as a proxy for AJA devices.



# Presets Screen



The *Presets* screen allows you to save FS3 Preset Configurations into 40 separate memory registers and recall the presets whenever needed. This screen also includes Export and Import functions that allow exporting one or all FS3 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 Preset** *Factory Preset* recalls all editable video and audio parameters to their factory default settings. Individual presets, user preferences, and Network settings, such as the IP Address, are not affected.

**Recall** The *Recall* buttons recall saved FS3 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.

**Store** The *Store* buttons let you save the current FS3 configuration into the preset register with the associated name and number. A preset is a set of all System, Video, Audio, and Output parameters as they were set at the time the preset was stored. Only editable parameters are saved in the presets. Non-editable parameters are not saved.

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.



**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 a FS3.

**Export Presets 1–40 (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.

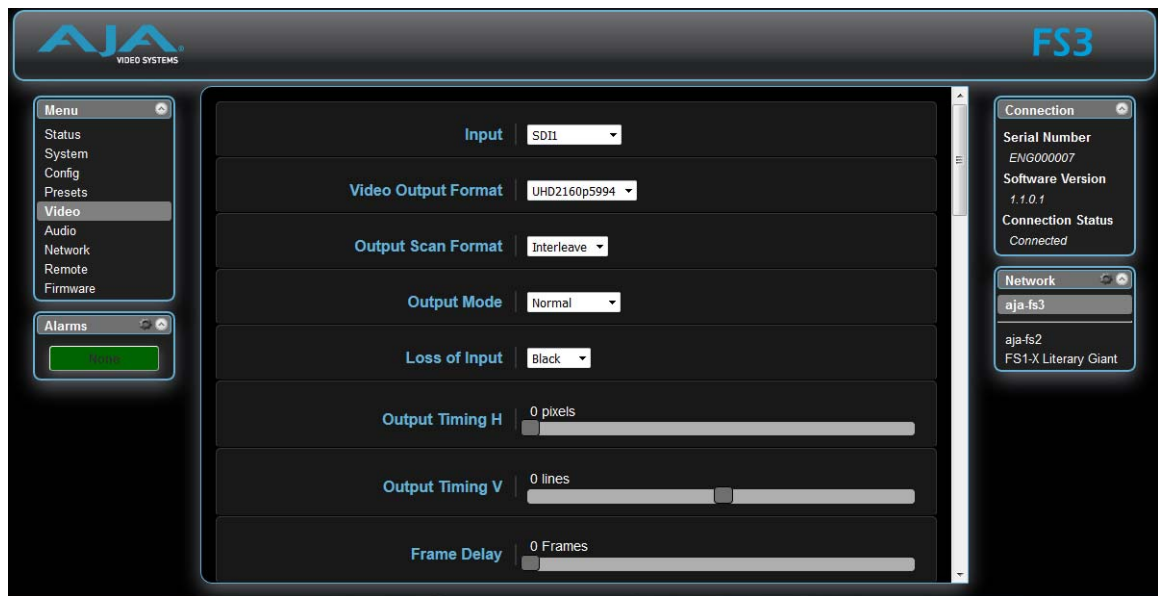
**Import Presets 1–40 (All)** *Import All* lets you browse for and import a previously exported *all.presets* file from your computer. A dialog box warns you that the operation will overwrite all 40 current preset contents with the contents stored in the file.

## Interaction of Presets and GPIs

Triggering presets using GPI inputs offers considerable power but also requires some care to avoid unexpected results. If you plan to trigger presets using GPIs, please see the information about the [“Interaction of Presets and GPIs” on page 41](#).



## Video Screen



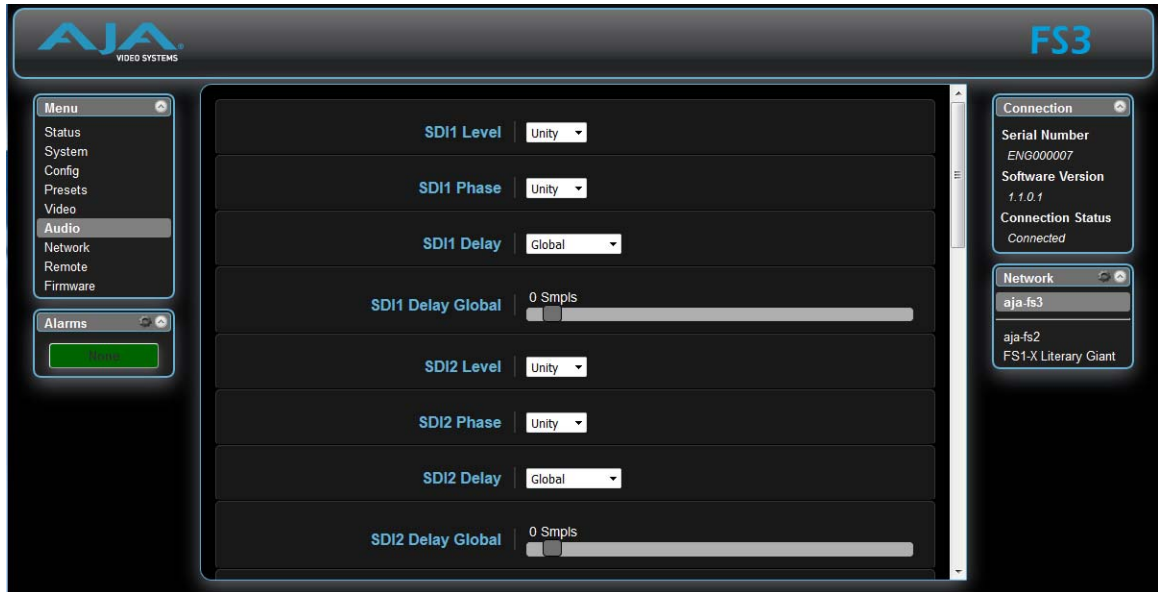
The Video screen controls the FS3's video signal processing. The parameters available on the Video browser screen is essentially identical to the front panel display menus. The only difference is parameters are set using webpage controls (drop down menus, slider adjustments) instead of control knobs. Complete descriptions of these parameters are accessible using the following cross references:

- ["1 Input" on page 48](#)
- ["2 Video Output Format" on page 49](#)
- ["3 Output Scan Format" on page 49](#)
- ["4 Output Mode" on page 49](#)
- ["5 Loss of Input" on page 49](#)
- ["Timing and Delay" on page 49](#)
- ["Background Fill" on page 51](#)
- ["Upconvert" on page 51](#)
- ["9 Sidebar Edge" on page 52](#)
- ["Frame Rate Output" on page 52](#)
- ["Matte of Background Fill" on page 53](#)
- ["Proc Amp Controls \(YUV\)" on page 54](#)
- ["Color Corrector \(RGB\)" on page 54](#)
- ["Custom Conversion Settings" on page 55](#)
- ["Region of Interest \(ROI\)" on page 56](#)
- ["Video Legalizer" on page 57](#)
- ["AFD" on page 58](#)
- ["18 Caption Xlator" on page 59](#)
- ["Input Scan and PSF" on page 59](#)
- ["20 SD Line 21 Blanking" on page 60](#)
- ["21 Test Pattern" on page 60](#)
- ["Freeze Output" on page 60](#)



- [“Reverse Telecine” on page 61](#)
- [“24 Downconvert Mode” on page 62](#)
- [“SD Aspect Ratio” on page 63](#)

## Audio Screen



The *Audio* browser screen displays the audio control selections for the audio inputs, audio signal generator, embedded audio, and audio routing.

The parameters available on the Audio browser screens are essentially identical to the front panel display menus. The only difference is parameters are set using webpage controls (drop down menus, slider adjustments) instead of control knobs.

**NOTE:** Selecting **Adjust** or **Channel Pairs** will apply whatever individual settings were previously set for the individual channels or channel pairs, and brings up individual sub-menu controls, to allow making changes to those settings. The sub-menus are a lighter gray color and have a collapse/expand button on the parent selection. This lets you collapse the sub-menus to make it easier to navigate the menu while configuring the system. The collapsed setting only stays in effect until the user reconnects or refreshes the browser.

Descriptions of these parameters are accessible using the following cross references:

- [“1.0 SDI1 Level” on page 65](#)
- [“2.0 SDI1 Phase” on page 65](#)
- [“3.0 SDI1 Delay” on page 65](#)

**NOTE:** The same basic adjustment procedures for SDI Audio Level, Phase, and Delay are also used for Fiber 1 and 2.

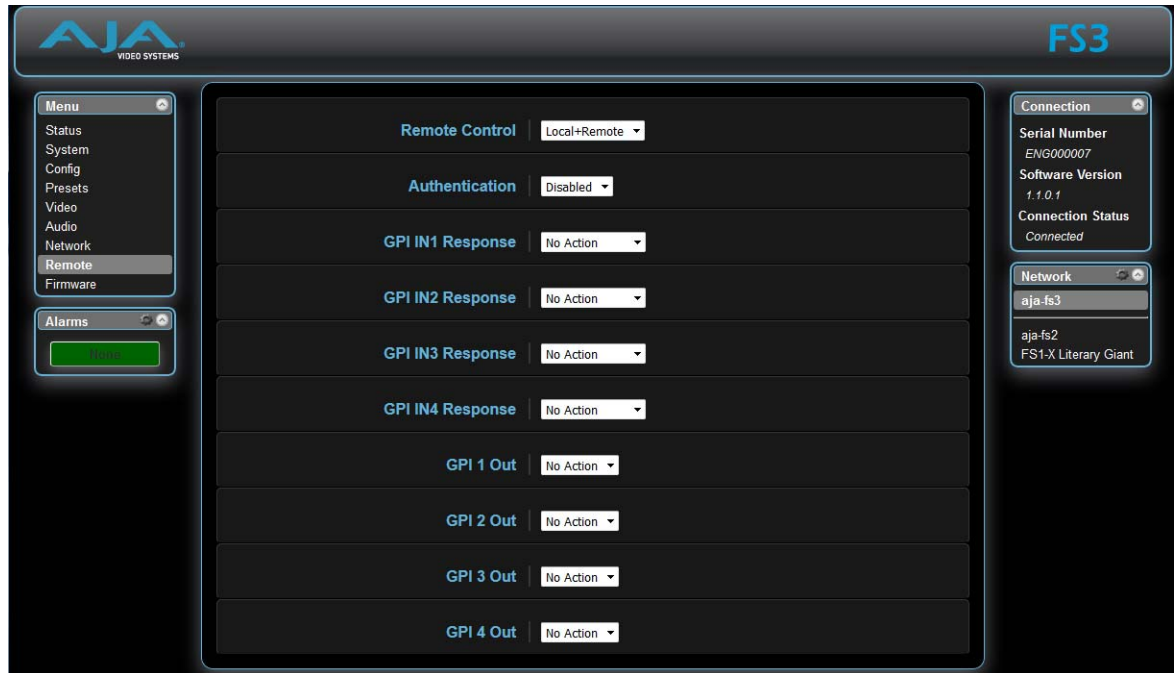
- [“13.0 Mix Down Mode” on page 66](#)
- [“15 Mix Down Reset” on page 68](#)
- [“16 Embedded Audio Out” on page 69](#)

**NOTE:** On the web browser, Selecting **Map** for any Output will apply whatever individual mappings were previously set for that item, and brings up individual sub-menu controls.



- [“17.0 SDI1 Audio Output” on page 70](#)
- [“21 Global Audio Output” on page 72](#)
- [“22 Reset Mapped Output” on page 72](#)

## Remote Screen



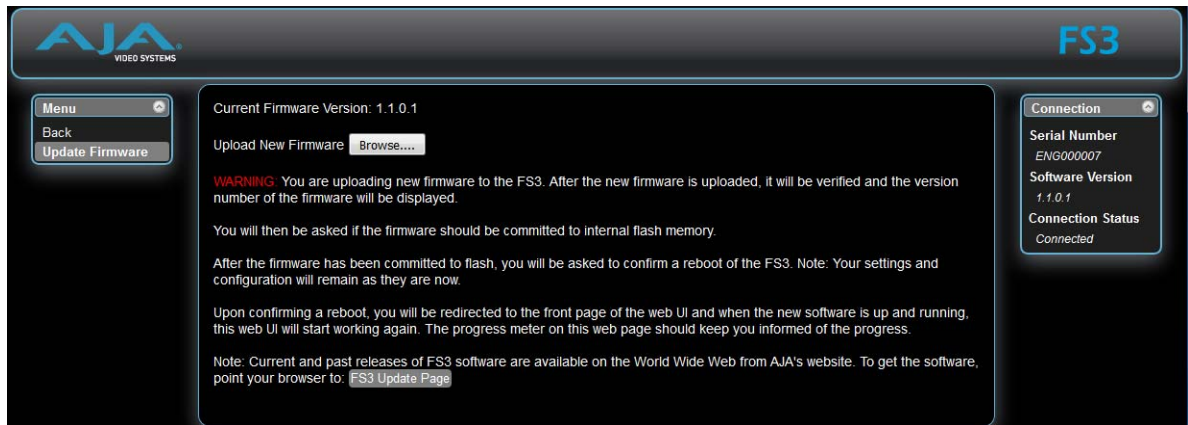
The *REMOTE* screen contains parameters that affect how the FS3 is controlled. Control options include the front panel, a remote computer running a browser, and GPI inputs and outputs.

**NOTE:** *The Remote Menu Group parameters available on the front panel interact with the browser parameters available on an attached computer, and vice versa. For example, once the Remote Control parameter is set to 'Local Only' from either the browser or front panel, all future settings will only be able to be changed from the front panel. The opposite is true if set to 'Remote Only'. However the Remote Control parameter is always available from the front panel, regardless of how it is set.*

See [“REMOTE Menu Group” on page 39](#) for detailed information about FS3remote control options.



## Firmware Screen



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

The *FS3 Update Page* link on the Firmware screen will take you to the correct AJA website page. Or you can visit the AJA website ([aja.com](http://aja.com)) to locate and download the updated software. The following page provides FS3 support information and will include links to locations where you can download updates:

<https://www.aja.com/en/family/fs>

After downloading the software update to your local drive, use the *Browse* button to locate the local software copy. Follow the prompts to load the new firmware into the FS3. See "[Software Update Installation](#)" on [page 29](#) for more information.



# Chapter 6: SNMP

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## FS3 Simple Network Management Protocol

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SNMP is defined as a “simple network management protocol” and was specified as a component of the internet protocol suite by the Internet Engineering Task Force (IETF). The FS3 can act as a *network element* that issues SNMP trap messages signaling a detected alarm condition or other system condition. A device’s trap messages are defined in an MIB (Management Information Base) file. The trap messages are sent to a server-based external NMS destination. For example, the FS3 could send a trap message if one of its redundant power supplies becomes unplugged. A client software agent that communicates with the NMS might then get a message telling the operator what has happened.

The FS3 must be configured for SNMP messaging. By default SNMP is disabled on the FS3. Besides activating SNMP, trap destinations must also be defined with fixed IP addresses.

When SNMP is enabled, one or more of these alarms may be sent by the FS3 to the client network management system (NMS) as a trap message:

- PowerSupplyAlarm (PS1 Alarm)
- PowerSupply2Alarm (PS2 Alarm)
- ReferenceAlarm (Ref Video Alarm)
- VidReferenceAlarm (VidRef Video Alarm)
- VidFormatAlarm (Vid1 Format Alarm)
- OverTemperatureAlarm (FS3 Over Temperature Alarm)

## SNMP Configuration

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FS3 SNMP configuration can be accomplished using the front panel or with the web browser computer interface (if Remote Control is enabled).

### Front Panel Screens

The FS3 front panel screens for SNMP are accessible through the CONFIG button. The direct SNMP configuration screens are:

- 4.0 SNMP Enable
- 4.1 SNMP Trap Destination 1
- 4.2 SNMP Trap Port 1
- 4.3 SNMP Trap Destination 2
- 4.4 SNMP Trap Port 2

These SNMP direct configuration parameters are described later in this chapter.

In addition, the following front panel CONFIG screens can affect SNMP alarm messaging:

- 5 Power Supply Alarm (see [page 43](#)).
- 6 Video Format Alarm (see [page 44](#)).
- 7 Reference Alarm (see [page 44](#)).



## Front Panel Octet Value Entry Procedure

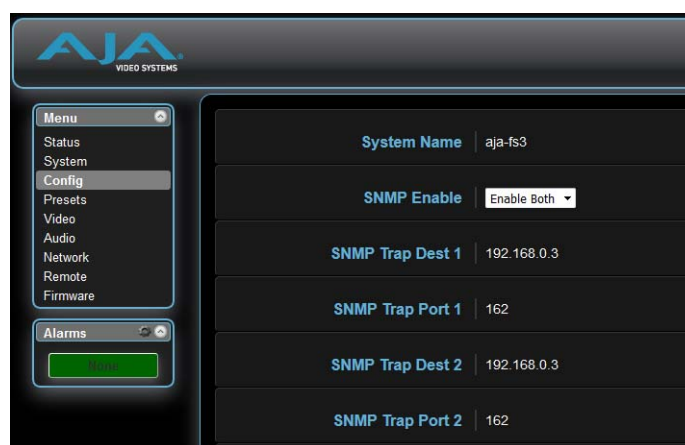
Set the octets (numbers between periods) values as follows:

1. Push *ADJUST* momentarily to enter edit mode.
2. Turn *SELECT* to select the octet you want to edit, indicated by blinking.
3. Turn *ADJUST* to enter the new value.
  - If you need to revert to the previous setting (undo changes), push *SELECT*.
4. Push *ADJUST* momentarily to save and activate the new setting.
  - If you want to revert to the default value, hold down *ADJUST* for 4 seconds.

## Web Browser

SNMP direct configuration settings are available on the Config screen of the web browser interface.

**Figure 16. Web Browser Config Screen SNMP Parameters**



## SNMP Configuration Parameters

### 4.0 SNMP Enable

The *SNMP Enable* parameter Enables or Disables SNMP messaging between the FS3 and an external client.

Disabled ( <i>default</i> )	When set to <i>Disabled</i> , the FS3 will not issue SNMP trap messages.
Enable 1	When set to <i>Enable 1</i> , the FS3 issues SNMP trap messages to Trap Destination 1 (parameter 4.1) and as defined in the MIB.
Enable Both	When set to <i>Enable Both</i> , the FS3 issues SNMP trap messages to Trap Destination 1 and 2 (parameters 4.1 and 4.3) and as defined in the MIB.

When Enabled, menus described below are available for configuration.

### 4.1 SNMP Trap Destination 1

This parameter determines the *SNMP Trap Destination* IP address where trap messages issued by the FS3 will be sent.

IP Address	Set the desired IP address where traps will be sent (usually a client on your LAN). <i>Default</i> : 192.168.0.3
------------	--



## 4.2 SNMP Trap Port 1

This parameter determines the *SNMP Trap Port 1* used for sending destination #1 trap messages. UDP Port 162 is the default used for SNMP trap messages. However, if this port is being used by another protocol or service, you can change the setting by modifying this parameter.

Variable	Select a UDP port for sending FS3 trap messages. <i>Default: 162</i>
----------	--

*NOTE: The SNMP Trap Port number does not blink when changed (as does the Trap Destination IP address); if you change the port number and exit the parameter, the port changes immediately to the new value.*

## 4.3 SNMP Trap Destination 2

This parameter determines the secondary *SNMP Trap Destination* IP address where trap messages issued by the FS3 will be sent (if desired). This parameter is similar to "[4.1 SNMP Trap Destination 1](#)" above. The default is 192.168.0.3.

## 4.4 SNMP Trap Port 2

This parameter determines the *SNMP Trap Port* used for sending destination #2 trap messages, similar to "[4.2 SNMP Trap Port 1](#)" above. Default is 162.



# Appendix A: Specifications

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## Video Input

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- Connectors** One video signal supported, over single link or two link.
- SDI, 2 x BNC
  - SDI, 2 x Fiber, dual LC SFP, optional
- Standards**
- 3G SMPTE 424/425
  - HD SMPTE 292/372/274/296
  - SD SMPTE 259/125

## Input Formats

YCbCr, 4:2:2, 10-bit

### HD Inputs

- 1 x 3Gb SDI (level A or B-DL)**
- 2048x1080p 50, 59.94
  - 1920x1080p 50, 59.94
- 2 x 1.5Gb SDI Dual Link**
- 2048x1080p 50, 59.94
  - 1920x1080p 50, 59.94
- 1 x 1.5Gb SDI**
- 2048x1080p 23.98, 24, 25, 29.97
  - 2048x1080PsF 23.98, 24, 25, 29.97
  - 1920x1080p 23.98, 24, 25, 29.97
  - 1920x1080PsF 23.98, 24, 25, 29.97
  - 1920x1080i 25, 29.97 (50, 59.94 fields)
  - 1280x720p 50, 59.94

### SD Inputs

- 1 x 270Mb SDI**
- 525i 29.97 (59.94 fields)
  - 625i 25 (50 fields)

*NOTE: Embedded audio supported.*

## Video Output

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- Connectors** One video signal supported, over single link, two link or quad link.
- SDI, 8 x BNC (quad link: 2 copies, two link: 4 copies, single link: 8 copies)
  - SDI, 4 x Fiber, dual LC SFP, optional (Quad SDI: 1 copy, Dual SDI: 2 copies, Single SDI: 4 copies)
- Standards**
- 4K/UHD SMPTE 2036-1/2048-1/425-5, Level A, B/425-3, Level C
  - 3G SMPTE 424/425
  - HD SMPTE 292/274/296
  - SD SMPTE 259/125



- Nominal Video Delay**
- HD/SD video, two frames at low frame rates (23.98, 24, 29.97) or four frames at high frame rates (50, 59.94).
  - 4K/UHD video, three frames at low frame rates (23.98, 24, 29.97) or six frames at high frame rates (50, 59.94).

## Output Formats YCbCr, 4:2:2, 10-bit

### 4K Outputs

- 4 x 3Gb SDI (level A or B-DL):** • 4096x2160p 50, 59.94
- 2 x 3Gb SDI (level B-DS):** • 4096x2160p 23.98, 24, 25, 29.97
- 4 x 1.5Gb SDI:** • 4096x2160p 23.98, 24, 25, 29.97

### UHD Outputs

- 4 x 3Gb SDI (level A or B-DL):** • 3840x2160p 50, 59.94
- 2 x 3Gb SDI (level B-DS):** • 3840x2160p 23.98, 24, 25, 29.97
- 4 x 1.5Gb SDI:** • 3840x2160p 23.98, 24, 25, 29.97

### HD Outputs

- 1 x 3Gb SDI (level A or B-DL)** • 2048x1080p 50, 59.94
- 1920x1080p 50, 59.94
- 2 x 1.5Gb SD Dual Link** • 2048x1080p 50, 59.94
- 1920x1080p 50, 59.94
- 1 x 1.5Gb SDI** • 2048x1080p 23.98, 24, 25, 29.97
- 2048x1080PsF 23.98, 24, 25, 29.97
- 1920x1080p 23.98, 24, 25, 29.97
- 1920x1080PsF 23.98, 24, 25, 29.97
- 1920x1080i 25, 29.97 (50, 59.94 fields)
- 1280x720p 50, 59.94

### SD Outputs

- 1 x 270Mb SDI** • 525i 29.97 (59.94 fields)
- 625i 25 (50 fields)

*NOTE: Embedded audio supported.*



**Test Patterns** One video test pattern generator configurable for every output format:

- 75% Bars
- 100% Bars
- Ramp
- Flat Field
- Black

## Video Reference

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- 525i 59.94 (fields) blackburst
- 625i 50 (fields) blackburst
- 720p 50, 59.94 tri-level sync
- 1080i 50, 59.94, 60 (fields) tri-level sync
- Genlock to the current video input signal
- Free run

## Video Format Conversion

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**FS3 Conversions** The FS3 can up, down, cross-convert any supported input HD/SD format to any supported 4K/UHD/HD/SD output format, as long as the input and output frame rates are of the same frame rate family. These three families are:

- 59.94/29.97/23.98
- 50/25
- 24

## Audio

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**Embedded Audio**

- SMPTE 272M (SD): 20-bit, 48KHz synchronous
- SMPTE 299M (3G/HD): 24 bit, 48KHz synchronous
- Up to 16 audio channels supported per SDI signal link (up to 64 total in/out)

*NOTE: 2048x1080p/PsF 29.97 formats support a maximum of 8 channels embedded audio.*

**Inputs and Outputs** The FS3 can accept and route any embedded audio mono channel input to any embedded audio mono channel output, including 1 to many.

- Incoming SDI embedded audio can be passed, muted, or overridden.
- 64x64 input/output digital audio mono channel matrix

**Audio Adjustments** Individual audio channels (or channel pairs) can be adjusted for:

- Level: -18 dB to +18 dB, in 0.5 dB increments
- Phase: Normal or Reverse
- Delay: -128 to +12288 samples, in single sample increments (-2.7 ms to +256 ms)
- 5.1 or 7.1 mixdown to stereo



- Signal Generator** One audio signal generator is available, selectable to the following:
- 1KHz
  - 400Hz
  - Mute

## Interfaces

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- LAN**
- 10/100/1000 automatic configuration
  - Automatic cable crossover (auto MDI-X)
  - Embedded web server
  - SNMP
- GPI**
- DB-15F: single connector provides four inputs and four outputs. See Appendix B for a connector pinout and GPI specifications.

## Physical

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- Power**
- Voltage: 100-240 VAC
  - Power Consumption: 35 Watts (40 Watts maximum)
  - Two independent power supplies, fully redundant, diode isolated.

- Dimensions**
- Width: 17.5 inches (44.45cm); 19 inches (48.26 cm) including rack ears
  - Depth: 16 inches (40.65 cm), including knobs and connectors that extend beyond the frame
  - Height: 1RU, 1.75 inches (4.44cm)

- Weight**
- 7.85 pounds, 3.56 kilograms

- Environment**
- Cooled via two internal fans and side vents.

*Operating Temperature:* 0 to 40 degrees C (32 to 104 degrees F)

*Operating Relative Humidity:* 10-90% non-condensing

*Operating Altitude:* <3,000 meters (<10,000 feet)

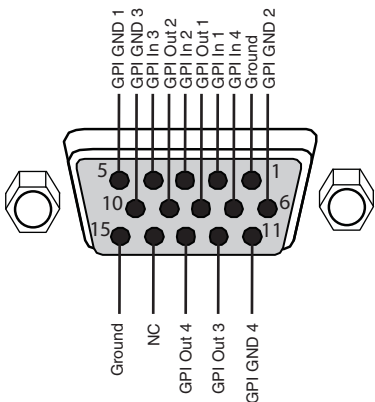
*Safe Storage Temperature  
(Power OFF):* -40 to 60 degrees C (-40 to 140 degrees F)



# Appendix B: FS3 Pinouts

## GPI Pinouts

Figure 17. GPI DE-15F Connector Pinout



Pin	Function	Pin	Function
1	Ground	9	GPI Out 2
2	GPI In 1	10	GPI GND 3
3	GPI In 2	11	GPI GND 4
4	GPI In 3	12	GPI Out 3
5	GPI GND 1	13	GPI Out 4
6	GPI GND 2	14	NC
7	GPI In 4	15	Ground
8	GPI Out 1		

The GPI inputs and outputs are electrically isolated from power and ground on the FS3 frame. There are four inputs and four outputs. Electrical isolation is provided for up to four pieces of external equipment.

The following guidelines apply to the four GPI inputs and outputs:

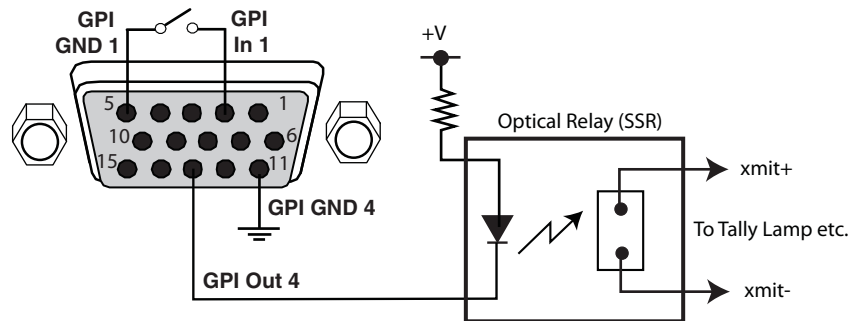
- GPI In 1 and GPI Out 1 share a common isolated ground on pin 5 (GPI GND 1),
- GPI In 2 and GPI Out 2 share a common isolated ground on pin 6(GPI GND 2).
- GPI In 3 and GPI Out 3 share a common isolated ground on pin 10(GPI GND 3).
- GPI In 4 and GPI Out 4 share a common isolated ground on pin 11 (GPI GND 4).
- Pins 1 and 15, local chassis ground, may only be used as references when isolation is not required.
- All four GPI inputs are internally pulled high through a 10K ohm resistor to an isolated +5V supply, so that a relay contact closure or any device sinking at least 0.4 mA to ground will register a logic low.
- All four GPI outputs are +5V TTL compatible, sourcing up to 6mA and sinking up to 4mA each.
- GPI Inputs light the front panel EXT LED when triggered.



The following illustration shows typical external wiring to the GPI connector. The GPI inputs require some kind of contact closure between the input pin and the input ground pin to register the logic low that triggers the GPI input.

You can connect the outputs to TTL buffers that communicate the GPI output logic levels to other devices. For example, you could use an opto-isolator controlling a relay to activate other equipment as shown below.

**Figure 18. Typical GPI Input and Output Connections**





# Appendix C: Safety & Compliance

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## Federal Communications Commission (FCC) Compliance Notices

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### 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

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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, IRELAND, ITALY, LATVIA, LITHUANIA, LUXEMBOURG, MALTA, NETHERLANDS, POLAND, PORTUGAL, ROMANIA, SLOVAKIA, SLOVENIA, SPAIN, SWEDEN, UNITED KINGDOM, ICELAND, LICHTENSTEIN, NORWAY, SWITZERLAND

### Declaration of Conformity

Marking by this symbol indicates compliance with the Essential Requirements of the EMC Directive of the European Union 2004/108/EC.



This equipment meets the following conformance standards:

- Safety:* EN 60065: 2002 + A1: 2006 + A11: 2008 + A2: 2010 + A12: 2011 (GS License)  
IEC 60065: 2001 + A1: 2005 + A2: 2010 (CB Scheme Report/Certificate)  
Additional licenses issued for specific countries available on request.
- Emissions:* EN 55032: 2012, CISPR 22: 2008, EN 55022: 2010, EN 61000-3-2: 2009, EN 61000-3-3:2008
- Immunity:* EN 55103-2: 2009, EN 61000-4-2:2009, EN 61000-4-3:2010, EN 61000-4-4:2010, EN 61000-4-5:2005, 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.
- Laser:* EN 60825-1: 2007 and EN 60825-2: 2004 +A2: 2010,  
CDRH Compliant Class 1 (TUV Cert No. 50135086)  
Also Licensed for Standards: FDA 21 CFR 1040.10 and 1040.11



**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

	<p>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.</p>
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## Korean KCC Compliance Statement

<p>A급 기기 (업무용 방송통신기자재)</p> <p>Class A (Broadcasting Communication Equipment for Office Use)</p>	<p>이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.</p> <p>As an electromagnetic wave equipment for office use (Class A), this equipment is intended to use in other than home area. Sellers or users need to take note of this.</p>
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## 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.

## Japanese Compliance Statement

1. Class A ITE

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 V-3/2014.04). 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**



**Hazard Warning**





**Caution Symbol**



## Before Operation Please Read These Instructions

	<p><b>Warning!</b> Read and follow all warning notices and instructions marked on the product or included in the documentation.</p> <p><b>Avertissement !</b> Lisez et conformez-vous à tous les avis et instructions d'avertissement indiqués sur le produit ou dans la documentation.</p> <p><b>Warnung!</b> Lesen und befolgen Sie die Warnhinweise und Anweisungen, die auf dem Produkt angebracht oder in der Dokumentation enthalten sind.</p> <p><b>¡Advertencia!</b> Lea y siga todas las instrucciones y advertencias marcadas en el producto o incluidas en la documentación.</p> <p><b>Aviso!</b> Leia e siga todos os avisos e instruções assinalados no produto ou incluídos na documentação.</p> <p><b>Avviso!</b> Leggere e seguire tutti gli avvisi e le istruzioni presenti sul prodotto o inclusi nella documentazione.</p>
	<p><b>Warning!</b> Do not use this device near water and clean only with a dry cloth.</p> <p><b>Avertissement!</b> N'utilisez pas cet appareil près de l'eau et nettoyez-le seulement avec un tissu sec..</p> <p><b>Warnung!</b> Das Gerät nicht in der Nähe von Wasser verwenden und nur mit einem trockenen Tuch säubern.</p> <p><b>¡Advertencia!</b> No utilice este dispositivo cerca del agua y límpielo solamente con un paño seco.</p> <p><b>Aviso!</b> Não utilize este dispositivo perto da água e limpe-o somente com um pano seco.</p> <p><b>Avviso!</b> Non utilizzare questo dispositivo vicino all'acqua e pulirlo soltanto con un panno asciutto.</p>





	<p><b>Warning!</b> Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.</p> <p><b>Avertissement !</b> Ne bloquez aucune ouverture de ventilation. Suivez les instructions du fabricant lors de l'installation.</p> <p><b>Warnung!</b> Die Lüftungsöffnungen dürfen nicht blockiert werden. Nur gemäß den Anweisungen des Herstellers installieren.</p> <p><b>¡Advertencia!</b> No bloquee ninguna de las aberturas de la ventilación. Instale de acuerdo con las instrucciones del fabricante.</p> <p><b>Aviso!</b> Não obstrua nenhuma das aberturas de ventilação. Instale de acordo com as instruções do fabricante.</p> <p><b>Avviso!</b> Non ostruire le aperture di ventilazione. Installare in conformità con le istruzioni del fornitore.</p>
	<p><b>Warning!</b> Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.</p> <p><b>Avertissement !</b> 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.</p> <p><b>Warnung!</b> Nicht in der Nähe von Wärmequellen wie Heizkörpern, Heizregistern, Öfen oder anderen Wärme erzeugenden Geräten (einschließlich Verstärkern) aufstellen.</p> <p><b>¡Advertencia!</b> No instale cerca de fuentes de calor tales como radiadores, registros de calor, estufas u otros aparatos (incluidos amplificadores) que generan calor.</p> <p><b>Aviso!</b> Não instale perto de nenhuma fonte de calor tal como radiadores, saídas de calor, fogões ou outros aparelhos (incluindo amplificadores) que produzam calor.</p> <p><b>Avviso!</b> Non installare vicino a fonti di calore come termosifoni, diffusori di aria calda, stufe o altri apparecchi (amplificatori compresi) che emettono calore.</p>



	<p><b>Warning!</b> 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.</p> <p><b>Avertissement !</b> 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.</p> <p><b>Warnung!</b> 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.</p> <p><b>¡Advertencia!</b> 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.</p> <p><b>Aviso!</b> 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.</p> <p><b>Avviso!</b> 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.</p>
	<p><b>Warning!</b> Disconnect the external AC power supply line cord(s) from the mains power before moving the unit.</p> <p><b>Avertissement!</b> Retirez le ou les cordons d'alimentation en CA de la source d'alimentation principale lorsque vous déplacez l'appareil.</p> <p><b>Warnung!</b> Trennen Sie die Wechselstrom-Versorgungskabel vom Netzstrom, bevor Sie das Gerät verschieben.</p> <p><b>¡Advertencia!</b> Cuando mueva la unidad desenchufe de la red eléctrica el/los cable(s) de la fuente de alimentación CA tipo brick.</p> <p><b>Advertência!</b> Remova os cabos CA de alimentação brick da rede elétrica ao mover a unidade.</p> <p><b>Avvertenza!</b> Scollegare il cavo dell'alimentatore quando si sposta l'unità.</p>



	<p><b>Hazard Warning!</b> High Voltage. This situation or condition can cause injury due to electric shock.</p> <p><b>Avertissement!</b> Tension élevée. Cette situation ou condition peut causer des blessures dues à un choc électrique.</p> <p><b>Warnung!</b> Hochspannung. Diese Situation oder Bedingung kann zu Verletzungen durch Stromschlag führen.</p> <p><b>¡Advertencia!</b> Alto voltaje . Esta situación o condición puede causar lesiones debidas a una descarga eléctrica.</p> <p><b>Aviso!</b> Alta Tensão . Esta situação ou condição pode causar danos devido a choques elétricos.</p> <p><b>Avviso!</b> Alta tensione. Questa situazione o condizione può causare lesioni a causa di scosse elettriche.</p>
	<p><b>Warning!</b> Only use attachments and accessories specified and/or sold by the manufacturer.</p> <p><b>Avertissement!</b> Utilisez seulement les attaches et accessoires spécifiés et/ou vendus par le fabricant.</p> <p><b>Warnung!</b> Verwenden Sie nur Zusatzgeräte und Zubehör angegeben und / oder verkauft wurde durch den Hersteller.</p> <p><b>¡Advertencia!</b> Utilice solamente los accesorios y conexiones especificados y/o vendidos por el fabricante.</p> <p><b>Aviso!</b> Utilize apenas equipamentos/acessórios especificados e/ou vendidos pelo fabricante.</p> <p><b>Avviso!</b> Utilizzare soltanto i collegamenti e gli accessori specificati e/o venduti dal produttore.</p>



**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 espiga 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.



	<p><b>Warning!</b> Since the Mains plug is used as the disconnection for the device, it must remain readily accessible and operable.</p> <p><b>Avertissement!</b> Puisque la prise principale est utilisée pour débrancher l'appareil, elle doit rester aisément accessible et fonctionnelle.</p> <p><b>Warnung!</b> Da der Netzstecker als Trennvorrichtung dient, muss er stets zugänglich und funktionsfähig sein.</p> <p><b>¡Advertencia!</b> Puesto que el enchufe de la red eléctrica se utiliza como dispositivo de desconexión, debe seguir siendo fácilmente accesible y operable.</p> <p><b>Aviso!</b> Dado que a ficha principal é utilizada como a desconexão para o dispositivo, esta deve manter-se prontamente acessível e funcional.</p> <p><b>Avviso!</b> Poiché il cavo di alimentazione viene usato come dispositivo di sconnessione, deve rimanere prontamente accessibile e operabile.</p>
	<p><b>Warning!</b> Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the device.</p> <p><b>Avertissement!</b> 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.</p> <p><b>Warnung!</b> Vermeiden Sie, dass auf das Netzkabel getreten oder das Kabel geknickt wird, insbesondere an den Steckern, den Steckdosen und am Kabelausgang am Gerät.</p> <p><b>¡Advertencia!</b> 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.</p> <p><b>Aviso!</b> 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.</p> <p><b>Avviso!</b> 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.</p>
	<p><b>Warning!</b> Unplug this device during lightning storms or when unused for long periods of time.</p> <p><b>Avertissement!</b> Débranchez cet appareil pendant les orages avec éclairs ou s'il est inutilisé pendant de longues périodes.</p> <p><b>Warnung!</b> Das Gerät ist bei Gewitterstürmen oder wenn es über lange Zeiträume ungenutzt bleibt vom Netz zu trennen.</p> <p><b>¡Advertencia!</b> Desenchufe este dispositivo durante tormentas eléctricas o cuando no se lo utilice por largos periodos del tiempo.</p> <p><b>Aviso!</b> Desconecte este dispositivo da tomada durante trovoadas ou quando não é utilizado durante longos períodos de tempo.</p> <p><b>Avviso!</b> Utilizzare soltanto i collegamenti e gli accessori specificati e/o venduti dal produttore, quali il treppiedi e l'esoscheletro.</p>



	<p><b>Warning!</b> 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.</p> <p><b>Avertissement!</b> 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.</p> <p><b>Warnung!</b> 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.</p> <p><b>¡Advertencia!</b> 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.</p> <p><b>Advertência!</b> 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.</p> <p><b>Avvertenza!</b> 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.</p>
	<p><b>Warning!</b> To meet safety regulations for leakage current, connect the dual power supplies to separate branch circuits.</p> <p><b>¡Advertencia!</b> Para cumplir con las normas de seguridad para la corriente de fuga, conecte las dos fuentes de alimentación para circuitos derivados diferentes.</p> <p><b>Attention!</b> Pour répondre aux mesures de sécurité concernant le courant de fuite, raccorder les sources d'alimentation doubles à des circuits de dérivation distincts.</p> <p><b>Warnung!</b> Zur Erfüllung der Sicherheitsbestimmungen bezüglich Reststrom schließen Sie bitte die zwei Netzteile an unterschiedlichen Abzweigleitungen an.</p> <p><b>Cuidado!</b> Para atender aos regulamentos de segurança para correntes de fuga, conecte as fontes duplas a circuitos elétricos separados.</p> <p><b>Attenzione!</b> Per soddisfare le norme di sicurezza sulla corrente di perdita, collegare i doppi alimentatori a circuiti derivati separati.</p>



**Warning!**

Active fiber-optic cables emit radiation invisible to the human eye. Do not look directly at the end of an active fiber-optic cable or the fiber connector on a, FS1-X or FS3; these models are Class 1 Laser Products.



**Avertissement!** Les câbles fibre optique émettent des radiations invisibles à l'oeil humain. Ne regardez pas directement l'extrémité d'un câble fibre optique ou d'un connecteur de fibre d'un FS2, FS1-X, ou FS3; ces modèles sont des produits laser de Classe 1.

**Warnung!** Glasfaserkabel emittieren im Betrieb Strahlung, die für das menschliche Auge unsichtbar ist. Nicht direkt in das Ende eines im Betrieb befindlichen Glasfaserkabels bzw. den Glasfaserkabelanschluss am FS2, FS1-X, oder FS3 schauen; diese Modelle sind Lasergeräte der Klasse 1.

**¡Advertencia!** Los cables de fibra óptica activos emiten radiación invisible al ojo humano. No mire directamente hacia el extremo de un cable de fibra óptica activo o hacia el conector de fibra óptica del FS2, FS1-X, o FS3; estos modelos están clasificados como Productos Láser Clase 1.

**Advertência!** Os cabos de fibra óptica emitem radiação invisível para o olho humano. Não olhe diretamente para a extremidade de um cabo de fibra óptica ativo ou para o conector da fibra em um FS2, FS1-X, ou FS3; esses modelos são Produtos de Laser Classe 1.

**Avvertenza!** I cavi a fibre ottiche emettono radiazioni invisibili all'occhio umano. Non guardare direttamente l'estremità di un cavo in fibra ottica attivo o il connettore in fibra su un FS2, FS1-X, o FS3; questi modelli sono prodotti laser di classe 1.



# Appendix D: About SDI Video Formats

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Serial Digital Interface (SDI) video takes many forms. A brief overview of some of its history can help to understand these different formats.

## Origins, SD and HD, 1.5G

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SDI was originally designed for Standard Definition (SD) and High Definition (HD) 4:2:2 color depth video, and was able to carry 270 Mbits (SD) or 1.485 Gbits (HD, or 1.5G) of data per second.

Because it is digital, SDI can convey other types of data, so embedded digital audio (8 channels/4 pairs for SD-SDI, 16 channels/8 pairs for HD-SDI) and other types of ancillary data were added to the specification.

## Evolution, 3G

---

When higher frame rate (1080p above 30fps) and increased color depth video was developed, the existing 1.5G data rate was exceeded. To get around that limitation, Dual Link 1.5G SDI video was defined that conveyed this data over two separate physical cables (links). Digital data can be organized in different ways for transport (data packing). For higher frame rate video with 4:2:2 color, complete video images are transmitted over both links and combined to create the higher frame rate video. A complete image (but at a lower resolution) can be monitored on either of these links. For lower frame rate video with increased color depth, the first link carries the complete image as a 4:2:2 color signal, and the second link carries the extra color information. Combining these signals creates a complete 4:4:4 video signal. In this second case, if the color is YCbCr, it is possible to monitor the entire image on just the first link (but at a lower color depth). And because two 1.5G signals are used, the total number of embedded audio channels supported grows to 32 (16 pairs).

The 3G SDI standard was subsequently created with increased carrying capacity, making it possible to convey a higher frame rate or greater color depth SDI signal over a single physical cable. The two-link data organization was retained, however, even though only one cable was used. Two of the data packing forms of 3G SDI video data organization are Level A, intended for higher frame rate video, and Level B for increased color depth video, as explained above. Another 3G SDI data packing specification exists, Dual Stream, designed to carry two independent video signals, or streams, on a single link.

## Further Evolution, 6G, 4K/UHD

---

When larger image raster sizes were developed, a means to transport data at even higher rates became necessary. These larger image sizes include Ultra High Definition (UHD) video (3840x2160 pixels developed by the video community), and the slightly wider 4K video (4096 x 2160 pixels developed by the cinema community). Each of these image rasters is four times the size of a previous standard (HD, 2K), and as with all SDI specifications several different frame rates and color depths are defined for these formats.



The method used to transport this even higher data rate is similar to the above, with one approach specifying four 1.5Gb links that require four separate cables (Quad Link 1.5G SDI). These four links are called SDI1-SDI4. With the 3G transport standard, it became possible to send these larger raster images over just two cables, the first carrying SDI1 and SDI2, the second carrying SDI3 and SDI4.

Different data packing methods are again possible. The first approach for 4K/UHD video is called Square Division (Quadrant), which divides the raster into four parts, (upper left, upper right, lower left, lower right) and transports each quadrant's data over a separate link. This, however, made it impossible to view the entire image on one link, and also caused issues when processing the divided image. Another way to pack the data is called Two Sample Interleave (2SI) which divides the image data into smaller groups of pixels from two lines. The result is four lower resolution complete images that are carried on each of the four SDI links. This makes it possible to monitor the entire image on just one of the links, though at lower resolution.

## FS3 SDI Formats

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The FS3 can create the following different types of 4K/UHD video data structures:

High Frame Rate (1080p above 30fps)

- 3G Level A (four cables, Quadrant)
- 3G Level A (four cables, 2SI)
- 3G Level B-DL (four cables, Quadrant)
- 3G Level B-DL (four cables, 2SI)

Low Frame Rate (1080p 30fps and below)

- 3G Level B-DS (two cables, Quadrant)
- 3G Level B-DS (two cables, 2SI)
- Quad 1.5G (four cables, Quadrant)
- Quad 1.5G (four cables, 2SI)

Regardless of whether Quadrant or 2SI data packing is used, each of these SDI links can carry 8 digital audio channel pairs, bringing the total number 4K and UHD embedded audio channels to 64.



# Warranty Information

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## Limited Warranty

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AJA Video Systems, Inc. (AJA Video) warrants that this product will be free from defects in materials and workmanship for a period of five years from the date of purchase. If a product proves to be defective during this warranty period, AJA Video, at its option, will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, you the Customer, must notify AJA Video of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. The Customer shall be responsible for packaging and shipping the defective product to a designated service center nominated by AJA Video, with shipping charges prepaid. AJA Video shall pay for the return of the product to the Customer if the shipment is to a location within the country in which the AJA Video service center is located. Customer shall be responsible for paying all shipping charges, insurance, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. AJA Video shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than AJA Video representatives to install, repair or service the product, b) to repair damage resulting from improper use or connection to incompatible equipment, c) to repair any damage or malfunction caused by the use of non-AJA Video parts or supplies, or d) to service a product that has been modified or integrated with other products when the effect of such a modification or integration increases the time or difficulty of servicing the product.

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