FS4

Installation & Operation Guide

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

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FAX: +1.530.271.3140

Web: http://www.aja.com

Support Email: support@aja.com

Sales Email: sales@aja.com

Chapter 1: Introduction

Overview

FS4 is AJA's flagship frame synchronizer and converter, offering incredible versatility and connectivity in a sleek and compact 1RU frame for all your 4K/UltraHD/2K/HD/SD conversion needs. Offering huge flexibility and the power to adapt to meet the needs of rapidly changing environments, FS4 offers two modes to deal with your 2K/HD/SD multichannel needs as well as your 4K/UltraHD pipelines.

In Four Channel Mode, FS4 can be used as four separate Frame Synchronizers/Format Converters for 2K/HD/SD projects with separate color correction and proc amp controls for each.

In Single Channel Mode you can handle a complete 4K/UltraHD/2K/HD/SD feature set including up, down, cross-conversion, 2SI compatibility and unparalleled video connectivity with I/O options for 4K/UltraHD including Quad 1.5Gb, Dual 3Gb, Quad 3Gb and 6Gb, 12Gb over optional SFP modules.

FS4's extensive digital video connectivity is only matched by its expansive digital audio flexibility. The growth of 5.1 and 7.1 audio has increased the number of audio channels that must be managed in a production as well as needing to create stereo mixdowns from 5.1 and 7.1 sources. The MADI standard provides a convenient way to transport large numbers of audio channels along a single cable, simplifying the cabling demands for broadcasters, mobile trucks and production. FS4 supports both fiber and coax connections with 128-channel MADI input and output. An internal 277x208 audio matrix allows full routing of MADI, mixdowns and all audio coming from SDI, fiber and AES sources for an incredible amount of audio processing capability in a single box.

Video Features

- Support for two modes: Four-channel 2K/HD/SD or Single-channel 4K/UltraHD/2K/HD/SD workflow support
- 4K/UltraHD/2K/HD/SD video processing and up, down, cross-conversion; easily frame sync any camera feed for UltraHD production
- Full range of I/O options for 4K/UltraHD include Dual 3Gb, Quad 3Gb, 6Gb, 12Gb over a range of SDI and optional SFP choices
- Single-link, dual-link, quad link conversion
- Automatic link timing alignment for dual and quad link SDI inputs
- Frame Synchronization
- Genlock to external loop through reference or SDI input
- YCbCr, 4:2:2, 10-bit
- HDMI monitoring output

- Frame Rate Conversion (3:2, 1:2, 2:1, but not for 4K/UHD converted to 4K/UHD)
- Quadrant and Two Sample Interleave (2SI) mapping conversion
- De-interlacing and Interlacing
- Video Proc Amp controls
- 3:2 cadence detection and removal for interlaced inputs and 3:2 cadence generation on interlaced outputs
- Built in Test Pattern Generators
- Crop/Fill controls
- Matte generators for background fill
- Closed caption conversion (CEA-608/CEA-708)
- Adjustable output timing and delay

Audio Features

- 48kHz, 24 bit audio (20 bit for SD)
- Balanced AES I/O (16 ch input, 16 ch output)
- MADI I/O (128 ch input, 128 ch output, via BNC and Fiber)
- Embedded Audio (4x16 ch I/O in Four Channel Mode)
- 277x208 routable mono audio matrix
- Audio Sample Rate Conversion available on all audio inputs
- Independent level, phase, delay controls for each audio channel
- 5.1 and 7.1 to Stereo mixdown processors

Other Features

- Simple operation, redesigned menu structure and quick access to features via front panel buttons or web UI
- Built in web server. Supports remote status and control and remote software updates
- Presets
- Redundant power
- Configurable Alarms
- EIA 19" Rack mountable 1RU frame, offering space, power and cost efficiencies ideal for outdoor broadcast trucks, post production or broadcast settings
- Five-year international warranty with unlimited technical support.

FS4 Control

FS4 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 FS4 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 FS4 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 straight computer-to-FS4 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 FS4 devices, and you can identify the one you are connected to via LEDs on the FS4's front and rear panels.

GPI Inputs and Outputs

General Purpose Inputs and Outputs are available on the FS4 back panel to provide contact closure control. Using the inputs, an external contact closure activates a specified function on the FS4. Using the outputs, specific FS4 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.

Technical Description

The FS4 features an incredibly flexible architecture, offering powerful Video Processors for video conversion and processing, a separate Audio Processor, and input and output video and audio signal routing. The FS4 has two completely separate operating modes, selected with a menu parameter and then rebooting the unit.

Four Channel Mode

In Four Channel Mode four independent HD/SD Video Processors are available, Frame synchronization, genlock, and up, down and cross conversion is available for a variety of video inputs and outputs. This mode also allows each Video Processor to use any one of the other Video Processor's video as a background or sidebar key.

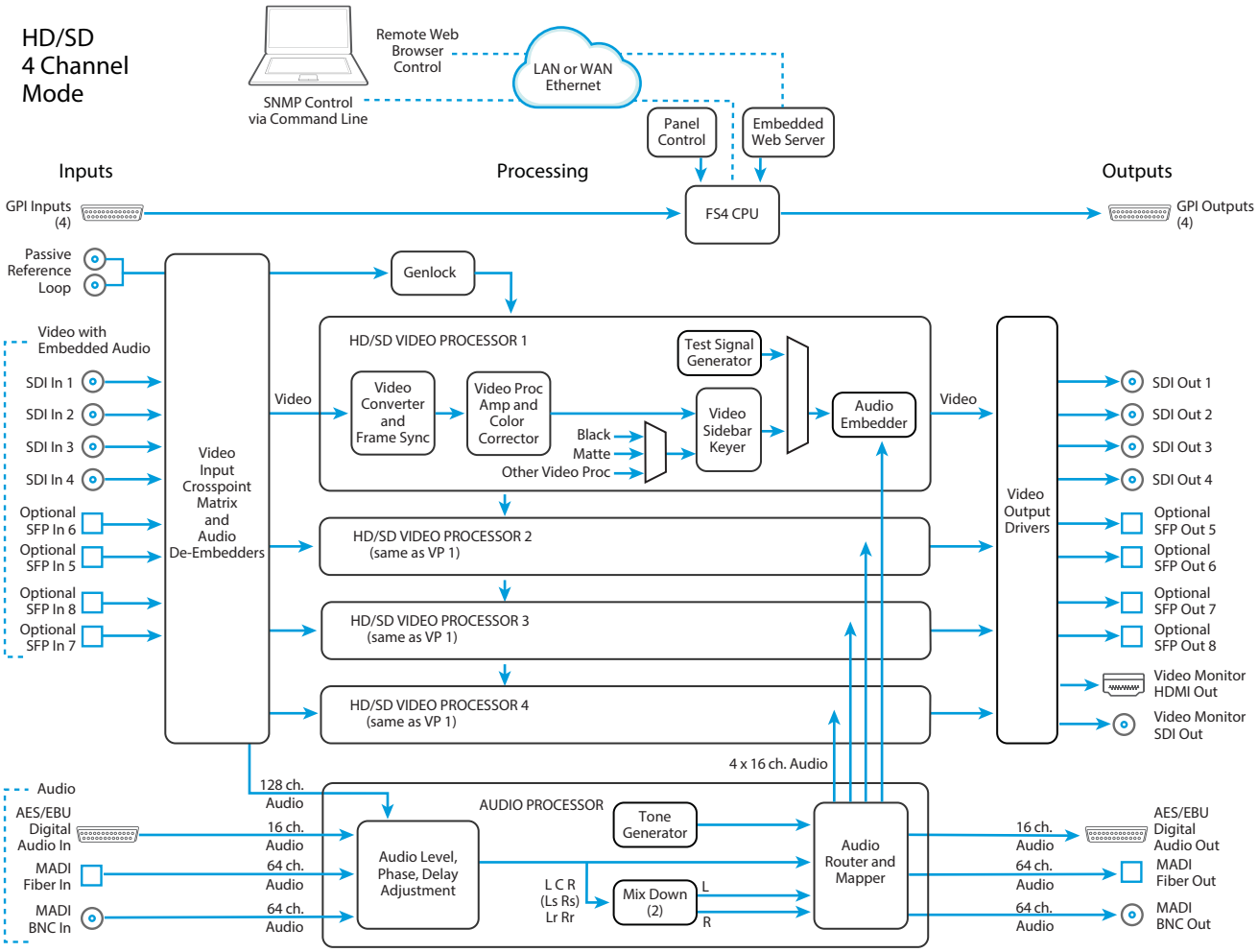
Each Video Processor routes its output to dedicated SDI output ports, depending on the transport configuration. For single link transport the output of Video Processor 1 is sent to SDI Out 1 and SDI Out 5 (for use with an optional SFP module). For dual link transport, the output of Video Processor 1 is routed to the SDI Out 1 and SDI Out 2 pair, and also to the SDI Out 5 and SDI Out 6 pair. In addition, any Video Processor output can be routed to the monitor BNC and HDMI outputs.

Four Channel Mode supports frame rate conversion within the same "family" of frame rates. These families are:

- 59.94/29.97/23.98
- 50/25
- 60/30/24

Audio processing is available for all input audio, and audio can be routed to any of the Video Processors for embedding, and to any of the audio output connectors.

Figure 1. FS4 Simplified Block Diagram, Four Channel Mode



Single Channel Mode

In Single Channel Mode a single 4K/UHD capable Video Processor is available. allowing up, down, and cross conversion between a variety of 4K, Ultra HD, 3G, HD, and SD video formats.

The same processed output signal is sent to all the FS4 output connectors, depending on transport configuration. For example, when in Quad Link mode, the same signal is routed to the SDI Out 1-4 connectors, and also to the SDI Out 5-8 connector.s (for use with optional SFP modules). In Dual Link mode four copies of the processed video are routed to the SDI Out 1 & 2 pair, SDI Out 3 & 4, SDI Out 5 & 6 and SDI Out 7 & 8. The Video Processor output is also available on the monitor BNC and HDMI ports, and will be downconverted if necessary.

In Single Channel Mode only matte and black sidebar keying is available. Scale, Position, Crop, and ROI are also available in Single Channel Mode for all formats except when both the input and output formats are 4K/UltraHD.

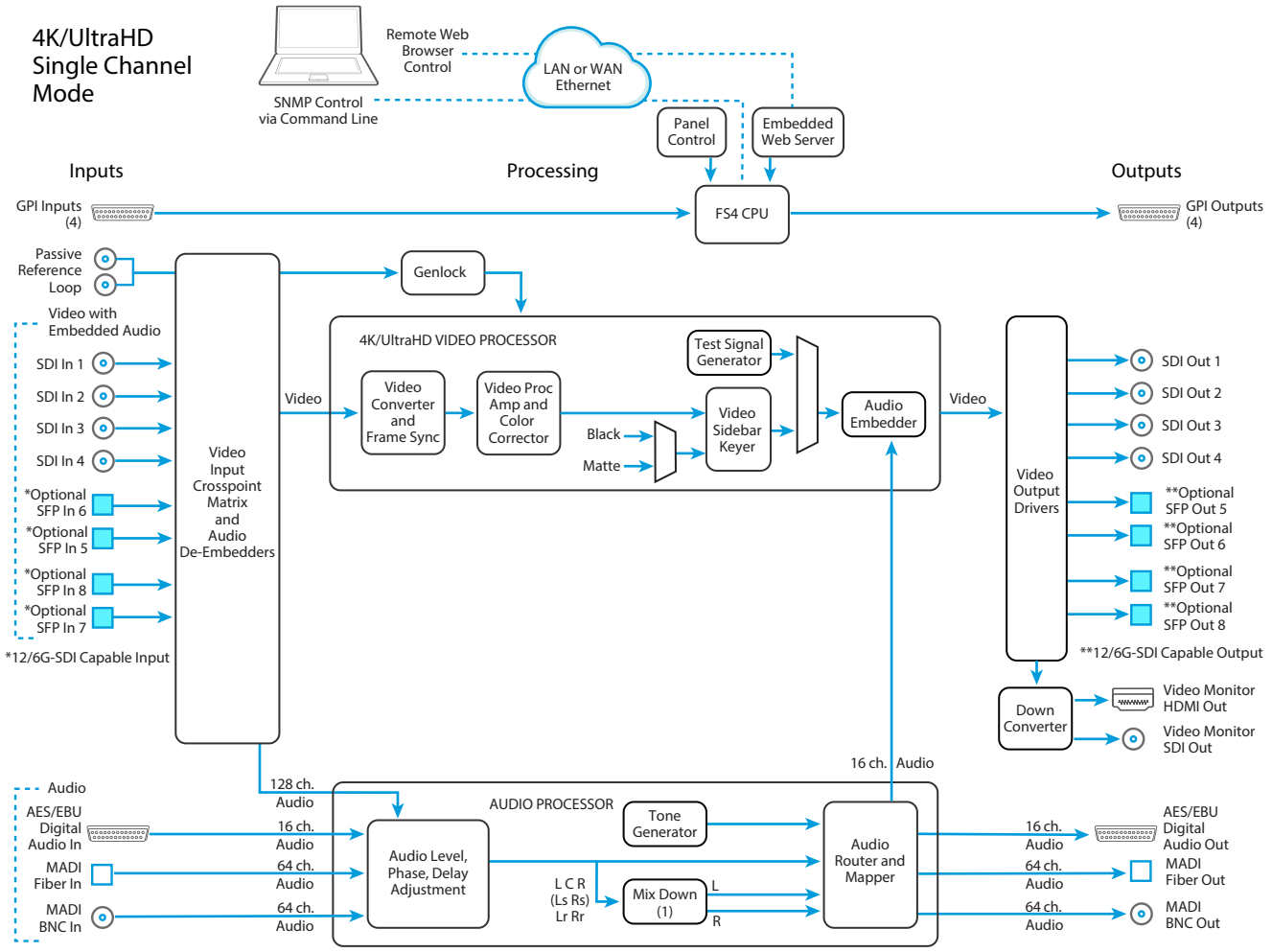
Single Channel Mode frame rate conversion within the same “family” of frame rates are supported for HD/SD signals, and for up and down format conversion only to or from 4K/UltraHD signals. These frame rate families are:

- 59.94/29.97/23.98
- 50/25
- 60/30/24

However, when the FS4’s input and output are both 4K or UltraHD, the frame rates must be the same even within the same family. For example, if the FS4 receives UltraHD 59.94, when it is configured for UltraHD output, that frame rate must also be 59.94.

Audio processing and routing in Single Channel Mode is similar to Four Channel Mode,

Figure 2. FS4 Simplified Block Diagram, Single Channel Mode



Video Processor(s)

Each Video Processor performs format conversion, frame synchronization, signal processing, and keying operations. Conversion is done with very high quality scalers. 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-style color correction.

The FS4 can embed 16 channels of audio from any of the audio inputs to each complete video output. On multiple link outputs, the audio is embedded on the first link. When signals are duplicated on multiple outputs, the same embedded audio is present on the first link of all the duplicated outputs.

Audio Processor

The Audio Processor accepts AES, MADI and embedded SDI audio and performs high quality sample rate conversions as required. Full audio channel mapping supports any mixture of inputs to outputs.

Dolby 5.1 and similar schemes of non-PCM digital encoded audio can be passed unaltered, provided the input is genlocked to the FS4 output.

Internal mixers are available that permit mixing down five inputs (5.1) or seven inputs (7.1) to a left/right stereo mix. Two Mixdown mixers are available in Four Channel Mode, and one Mixdown mixer is available in Single Channel Mode.

Optional FS4 Features

SFP I/O

All FS4's SFP I/O ports support up to 3G SDI data rates. In addition, in Single Channel mode the FS4's SFP ports 5 through 8 In and Out also support 12G and 6G SDI, when equipped with a compatible SFP module.

The FS4 supports optional AJA Optical SFP I/O modules as follows:

- Single Input, LC connector (up to 3G)
- Single Input SC connector (up to 3G)
- Single Output LC connector (up to 3G)
- Single Output SC connector (up to 3G)
- Dual Input LC connectors (up to 12G)
- Dual Output LC connectors (up to 12G)
- Dual CWDM
- Dual HD-BNC connector (up to 3G)
- Dual Output HD-BNC connector (up to 3G)

Only AJA SFP modules are supported; use of other manufacturers' modules is not supported and may void the warranty.

Operation Overview

About Inputs and Outputs

In general, to use the FS4 for video conversion, select a Video Processor Channel, select an Output Format that is compatible with the current FS4 reference signal (see *"About Reference and Genlock Source"* below), and then select an Input port. The FS4 will automatically determine the selected input video format and convert it to the selected Output Video Format. The converted video is routed to the FS4 output ports.

About Reference and Genlock Source

A source being used by the FS4 for reference must be compatible with the FS4 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 60/30/24).

The FS4 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 an FS4 video output format.

Retained Settings

The FS4 stores the current value of each operational parameter in non-volatile memory so that the system returns to the same state after a power cycle. Most of the settings for Single Channel mode are stored separately from those for Four Channel Mode, and vice-versa. These separate settings for each mode can be changed only when operating in that mode.

The FS4 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.

Presets can also be used to restore the FS4 to a previous state. Many parameters can be individually reset to factory values using individual menus, or the entire FS4 can be reset to defaults (with the PRESET, Factory Preset menu). Presets for Single Channel mode are separate from those for Four Channel Mode. Preset changes made in one mode will not affect settings for the other mode.

In This Manual

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 unit.

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

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

Chapter 6: SNMP discusses 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.

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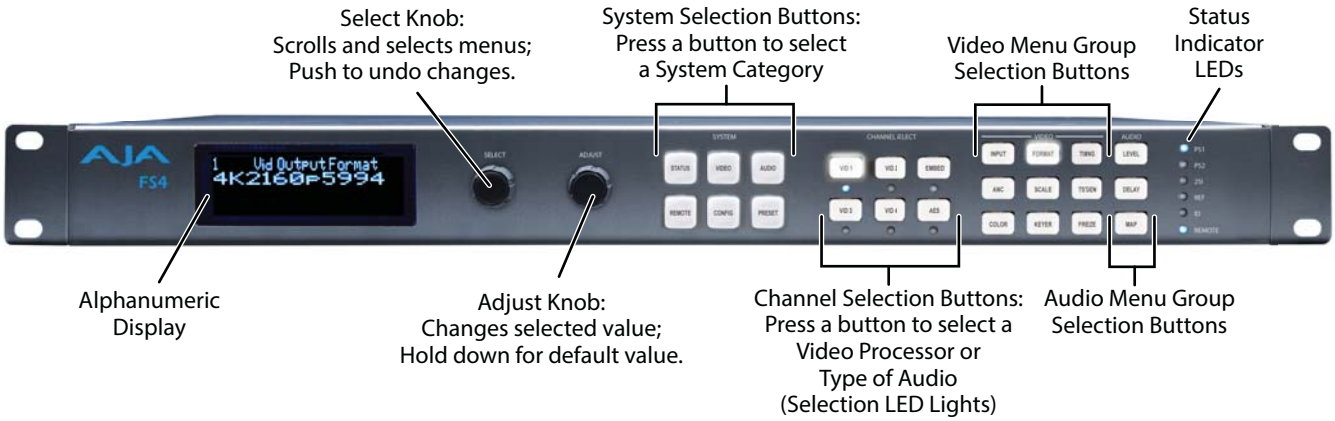
Chapter 2: Controls, Indicators, and Connections

Overview

The controls, indicators, and connectors illustrated and described in this chapter allow you to connect, operate, and monitor the FS4 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



Front Panel Layout and Operation

The FS4's front panel control system is designed to be quick and easy to use. The alphanumeric display on the left shows status and parameter information. SELECT and ADJUST knobs provide fast menu scrolling, parameter selection and adjustment. Status LEDs on the right report important system information.

The buttons on the front panel operate interactively. At the center of the panel are System Selection buttons, which provide direct access to parameter menus that control basic FS4 operation (like setting the output frame rate or selecting Single or Four Channel Mode). In addition, the STATUS button brings up menus that report FS4 status information, and the PRESET button displays Preset selection menus for rapid reconfiguration. When a System Selection button is pressed, the parameter menu that was last selected from that group will be displayed. Pressing any of these buttons de-selects all other SYSTEM buttons, CHANNEL SELECT buttons, VIDEO menu group buttons, and AUDIO menu group buttons to the right.

The four VID1-4 Channel Selection buttons to the right allow immediate access to separate parameter menus for each Video Processor (when in Four Channel Mode). The button for the currently selected Video Processor is illuminated. In Single Channel Mode pressing any of the four buttons will light the VID1 button, indicating that single Video Processor is selected for control. After a Video Processor has been selected, the nine VIDEO Menu Group buttons on the right are activated. The VIDEO Menu Group button that was last selected for that Video Processor will be illuminated, and the alphanumeric display will show the last selected parameter menu for that Video Menu Group.

Similarly, the EMBED and AES Channel Select buttons selects either Embedded or AES audio, and activates the three AUDIO Menu Group buttons to the far right. The last selected AUDIO Menu Group button for that audio type will be illuminated and its last selected parameter menu will be displayed. Pressing an Audio Channel Select button deselects the Video Channel Select button, and vice-versa.

This design allows rapid menu access, reducing the number of menus to scroll through, and time is saved when button presses automatically return to their last selected menus.

Operational Summary

To change FS4 operational parameters with the front panel controls:

1. Select a system component and menu group for the alphanumeric display:
   - For overall system control, press one of the six SYSTEM buttons,
   - For control of a Video Processor, press one of the four VID1-4 Channel Select buttons and then press one of the VIDEO Menu Select buttons,
   - For Embedded audio control, press the EMBED button and then press one of the AUDIO Menu Select Buttons,
   - For AES or MADI audio control, press the AES button and then press one of the AUDIO Menu Select Buttons.
2. Scroll through menus in a group: Turn *SELECT*.
3. Edit a menu parameter: Stop *SELECT* on the menu, then turn *ADJUST* to set the value. Changes are applied immediately.

Multiple Part Parameter Editing

To edit a multiple part parameter, such as an IP address,:

1. Push the *ADJUST* knob momentarily (the value blinks).
2. To save the whole parameter after editing, push *ADJUST* momentarily again.

Coarse Adjust Editing

To coarse adjust a value (for use with parameters that have more than 10 selections):

- 10x speed - Hold down the SYSTEM or currently active CHANNEL SELECT button (the button turns dark blue) and turn *ADJUST*. The values will change in approximately 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 approximately 100x increments.

Undo a Change

To restore a previous setting:

- Push *SELECT* momentarily.

Reset to Factory Default:

To return to the factory default of a parameter:

- Hold down *ADJUST* for 4 seconds.

Alphanumeric Display

The four-line alphanumeric display shows either status menus that can be scrolled through but not altered, or parameter adjustment menus that are numbered and grouped by function, whose parameters can be altered.

Status Menus

Status menus generally have a feature on the left, and the current status or setting for that feature next to it. Information can generally be shown in two columns, three columns, or four columns (two columns side by side).

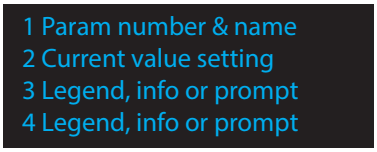
Figure 3. Status Menu Front Panel Displays

Parameter Menus

Parameter menu lines 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 4. Four Lines of the Front Panel Display



When you edit a parameter containing multiple values, such as the IP address, the value currently being edited blinks.

Control Knobs

The general rules of *SELECT* and *ADJUST* knob operation are:

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.

Button Menus

The general functions accessed by the front panel buttons are listed below:

System Buttons

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 FS4:

- Control by local front panel only, remote sources only, or local and remote
- Authentication
- GPI input and output behavior

VIDEO Displays the System Video Menu Group, which lets you change or enable system wide video functions:

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

CONFIG Displays the Config Menu Group, which lets you configure the FS4 for your environment:

- System Name setting
- FS4 Mode (Single Channel or Four Channel)
- 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

AUDIO Displays the System Audio Menu Group, which lets you change or enable system audio functions:

- MADI Output mode
- Audio Input Sample Rate Conversion (Embedded, AES, MADI
- 5.1 and 7.1 Mixdown
- Global Audio Output
- Reset Channel Mapping (Embedded, AES, MADI)

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

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

Channel Select Buttons

VID1-4 Selects which Video Processor the nine VIDEO buttons will access menus for control. In Single Channel Mode any button can be pressed.

Blue = A valid video source is present.

Red = An invalid video source is detected (unless the alarm has been suppressed, in which case the LED will be turned off).

Off = No video is present, or invalid video is detected and the alarm is suppressed.

NOTE: The FS4 operating mode can be determined by the VID 1-4 button tallies. In Four Channel Mode all four LEDs light, with the selected Video Processor high tally. In Single Channel Mode only the VID1 button tally is low tally or high tally.

EMBED Selects Embedded Audio for control by menus accessed by the three AUDIO Menu Group buttons.

Blue = Valid embedded audio is present on any video source.

Off = No embedded audio is detected.

AES Selects AES and MADI for control by menus accessed by the three AUDIO Menu Group buttons.

Blue = Valid AES or MADI audio is present.

Off = No AES or MADI audio is detected.

Video Menu Group Buttons

INPUT
- Input source selections
- Loss of input selection
- Reverse Telecine
- Input scan format settings (PsF or interlaced)
- Input Image Mapping (Four Channel Mode only)

ANC
- Active Format Descriptor (AFD) settings
- Caption translation selection
- SD line 21 blanking selection

COLOR
- Proc amp and color corrector
- Legalizer settings

FORMAT
- Output format
- Link Configuration
- SD Aspect Ratio
- Up and Down Convert settings
- Output Image Mapping (Single Channel Mode only)

SCALE
- Custom Size and Position and ROI settings

KEYER
- Background fill selection
- Sidebar Edge
- Matte adjustments

TIMING
- H and V timing and delay settings

TSTGEN • Test Pattern settings

FREEZE • Freeze Output setting

Audio Menu Group Buttons

LEVEL • Audio level and phase settings

DELAY • Audio delay settings

MAP • Output mapping controls

Status 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:

PS1/PS2
- Blue = Power Supply 1 or 2 is operational and receiving power. Both PS1 and PS2 LEDs must be lit blue to indicate redundant power is available.
- Red = Power supply is not receiving power or not operating within 10% of nominal value (unless the alarm has been suppressed, in which case the LED will be turned off).
- Off = Power supply alarm is suppressed and nominal power is not being received.

2SI
- Blue = (Single Ch only) The processor's output mapping is set to 2SI (2 Sample Interleave).
- Off = In Single Channel Mode the processor's output mapping is set to Quadrant (Square Division). In Four Channel Mode this LED is always off.

REF
- Blue = The FS4 is operating with a valid reference.
- Red = A reference alarm condition exists (unless the alarm has been suppressed, in which case the LED will be turned off).

ID Blinks blue on and off when you right-click on an FS4 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 same function. No matter which side of a rack you're facing, you'll be able to see one of the LEDs.

REMOTE This multicolor LED indicates the current control mode:
- Blue= Local Only (front panel control only)
- Red = Remote Only (remote browser or panel control only)
- Purple = Local + Remote (front panel and remote control both enabled)

Incompatibility Alarms

The FS4 produces signal incompatibility alarms for a number of reasons. For example, incompatible conversion alarms can occur because the FS4 cannot convert between frame rate families (59.94/29.97/23.98, or 50/25, or 60/30/24).

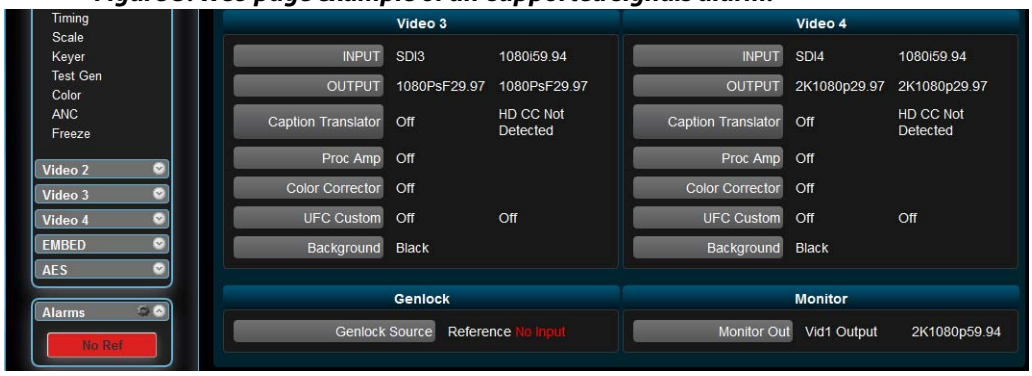
Example Reference and Video Incompatibility Alarms

Video incompatibilities that the FS4 may detect include the following examples:

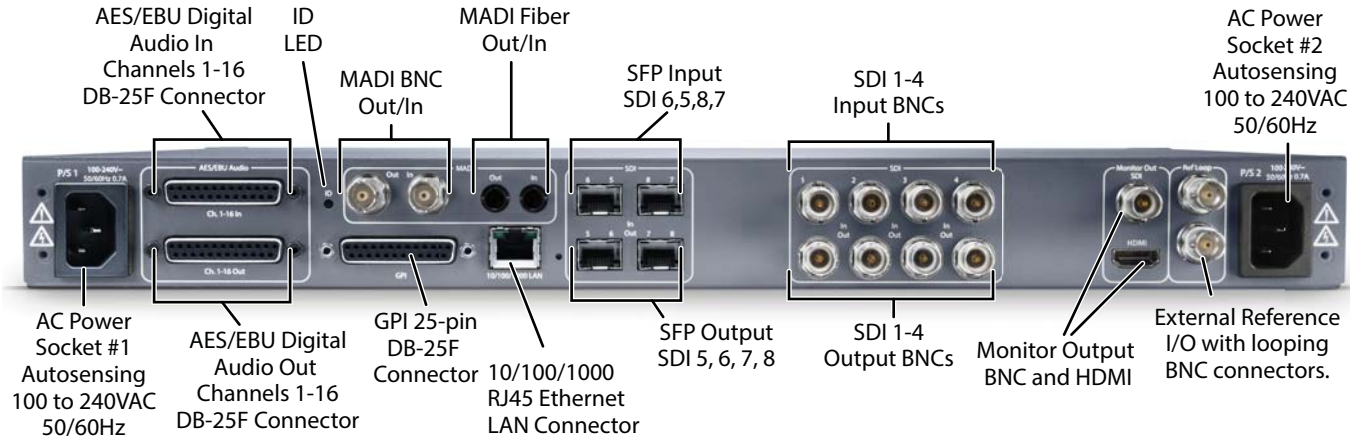
Table 1. Video Incompatibility Examples

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 BKGD GEN OUT1	SDI 1 Matte Ref	OK OK No Ref 1080i59	IN BKGD GEN OUT1	SDI 1 Matte Ref	1080i59 No Input 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 BKGD GEN OUT	SDI 1 Matte Ref	OK OK incompat 1080i59	IN BKGD GEN OUT1	SDI 1 Matte Ref	1080i59 1080i50 UHDp59

Figure 5. Web page example of un-supported signals alarm.



Rear Panel Description



Connectors

The FS4 rear panel connectors are summarized below:

P/S 1 and P/S 2 Two IEC-60320 3-pin grounded connectors 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.

AES/EBU Digital Audio Two GPI DB-25F connectors provide input and output of 16 channels of balanced digital audio. See *"Audio Connection Pinouts" on page 123*.

MADI BNC 64 channel MADI output and input, on separate BNC connectors.

MADI Fiber 64 channel MADI output and input, on separate Multi-Mode fiber ST connectors.

GPI The GPI DB-25F 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 122*.

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 FS4 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.

SFP In/Out (optional) All FS4's optional SFP I/O ports support up to 3G SDI operation. In addition, in Single Channel mode the FS4's SFP ports 5 through 8 In and Out also support 12G and 6GSDI, when equipped with a compatible SFP module.

SDI In/Out Digital video with embedded audio. Four SDI input and Four SDI Output BNCs. 10 bit 3G SDI is supported. The input and output signals carried on each BNC connector varies, depending on the link configuration and format selection.

Monitor Output Two Monitor output connectors are available, BNC (SDI) and HDMI, which output the same video and audio. In Four Channel Mode you can select which Video Processor output is sent to both of these Monitor output connectors. Single Channel Mode always passes the unit's single output to these connectors, and 4K/UltraHD signals are automatically downconverted to HD.

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 FS4 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 FS4 should be plugged into 3-wire 100-240 VAC 50/60 Hz power (autosensing) before you make connections to other equipment. 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 FS4 and two power cords.
2. Install any physical options, such as SFP I/O modules.
3. Mount the physical chassis as desired: front rack, rear rack, or desk mount. If you are mounting multiple FS4 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 FS4 you're communicating with. For physical installation details, see *"FS4 Chassis Installation" on page 28*.
4. Connect the two FS4 power cords to mains AC. For redundancy, use both power supplies and connect them to separate branch circuits so that the FS4 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 FS4 directly using an Ethernet cable, or connect both the computer and the FS4 to a local area network through an appropriate hub or router. Also set the FS4 IP address in the menus, and then use a computer to test (ping) the FS4 over the network connection to verify communication. For details, see *"Networking" on page 29*.
6. Install a web browser on the computer, if not already present, for accessing the FS4 web pages. You can access the pages simply by entering the FS4 IP address in the browser address field. See *"Web Browser Control" on page 31* for details.
7. Connect the FS4 to system audio and video sources, including VTRs, monitors, DVD players, video switchers, and audio mixers. For details, see *"System Cabling" on page 33*.
8. Test the FS4 with all of your devices to verify everything is working.

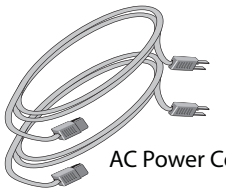
Unpacking

Shipping Box Contents

An FS4 chassis is shipped with two AC power cords 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

AJA FS4 Panel Chassis



AC Power Cords (2)

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 FS4 repaired or replaced.

NOTE: Save packing materials and the shipping box. If your FS4 ever requires service or you move your system, use the packaging materials and box for safe shipment.

Installing Optional SFP I/O Modules

The optional AJA SFP I/O modules are purchased separately from the FS4. Install the optional SFP I/O modules by inserting them into the rectangular cages on the back panel with the electrical connectors facing downward. Press gently but firmly until the modules seat in the inside connectors.

You must remove any connected fiber or coaxial cables from the SFP modules before you remove the modules from the FS4. Pull down the SFP lever to free the module before you withdraw the module from the cage.

For additional installation and operation details, see the instructions provided with the SFP modules.

FS4 Chassis Installation

The following information will help you install the FS4 chassis correctly.

Physical Requirements for Mounting the Chassis

You can mount the FS4 chassis in two ways:

- Rackmounting—attach the FS4 (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 FS4:

- 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 FS4 chassis, ensure adequate airspace for cooling around the FS4 units. Note the location of cooling vents on all equipment next to the FS4 and ensure none are obstructed.

NOTE: FS4 units can be stacked vertically without limit as long as there is an adequate supply of cool air around the FS4 side vents.

Power Requirements

The FS4 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 (70 Watts maximum)

Networking

You can network the FS4 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 FS4 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 FS4 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 FS4 on a LAN.

FS4 Default Network Settings

The FS4 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 topics discuss two ways to set up the unit to communicate over a TCP/IP network connection: via DHCP or via a static IP address.

Networking Using DHCP or Default Static IP

The FS4 factory default configuration automatically looks for a DHCP server to issue an IP address. If your network includes a DHCP server, plug the FS4 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 *3.2*. 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 FS4 and DHCP enabled, launch a web browser, type the IP address you noted on the FS4's display into the browser address field and press *Enter*. You should now see the FS4's browser *Status* screen.

If the FS4 cannot get an IP address from the network DHCP server, the FS4 will automatically use a preset factory static IP address of 192.168.0.2. You can access the FS4 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 FS4 default: 192.168.0.1. Alternatively, change the FS4 gateway address to match your gateway:
   A. Press *CONFIG*, turn *SELECT* to *3.4 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 FS4's browser status screen.

When you can access the FS4 screens, see *"Browser Remote Control" on page 88* for details about configuring the FS4 using a browser.

Networking the FS4 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 *ADJUST* knob to select *Static*.
2. Turn *SELECT* to navigate to parameter *3.2 IP ADDRESS*. The display shows the default static IP address: 192.168.0.2.
3. Change the IP address as follows.
   A. Push the *ADJUST* 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 *3.3 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 *3.4 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 FS4. You should now see the FS4's *Status* screen.

When you can access the FS4 screens, turn to *"Browser Remote Control" on page 88* for details about configuring the FS4 using a browser.

Using Ping to Test the Network Connection

If you have connected the FS4 to a computer and set up the IP address and still do not see the FS4 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 FS4 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 FS4, select the *STATUS* button and go to System Status menu (with the FS4 name) to read the unit's currently configured IP address.

NOTE: The STATUS menu always shows the FS4's current IP address. The IP address on the CONFIG menu is a database entry, which occasionally may not be the address the unit is using.

4. At the Mac terminal prompt, enter *ping* and the IP address noted in *Step 3*. For example: ping 192.168.0.2 (and press Return)
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 FS4 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 FS4, select the *STATUS* button and go to System Status menu (with the FS4 name) to read the unit's currently configured IP address.

NOTE: The STATUS menu always shows the FS4's current IP address. The IP address on the CONFIG menu is a database entry, which occasionally may not be the address the unit is using.

4. In the PC *Command Prompt* utility, enter *ping* and the IP address noted in step 3. For example: ping 192.168.0.2 (and press Return)
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 FS4 network settings and resolve the problem with your IT administrator.

Web Browser Control

To control the FS4 from a web browser on a network attached computer, enter the FS4 IP address as a URL in the browser. For example, if the FS4 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 FS4 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 FS4 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 FS4 comes from the factory pre-installed with software, it may not be as up-to-date as software posted on the AJA website. This topic describes the steps required to update the software in your AJA FS4.

Download the Latest Software

Current and past releases of FS4 software are available on the World Wide Web from AJA's website. To get the software, point your browser to the FS4 support page, which will contain helpful FS4 information and links to the updates:

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

Once you're at the update page, you can select FS4 software files to download to your Mac or PC for upgrading your local FS4 machine.

Unpack the Software

FS4 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 FS4 is a file with a name like *FS4_ver_1.0.0.0.bin* or similar.

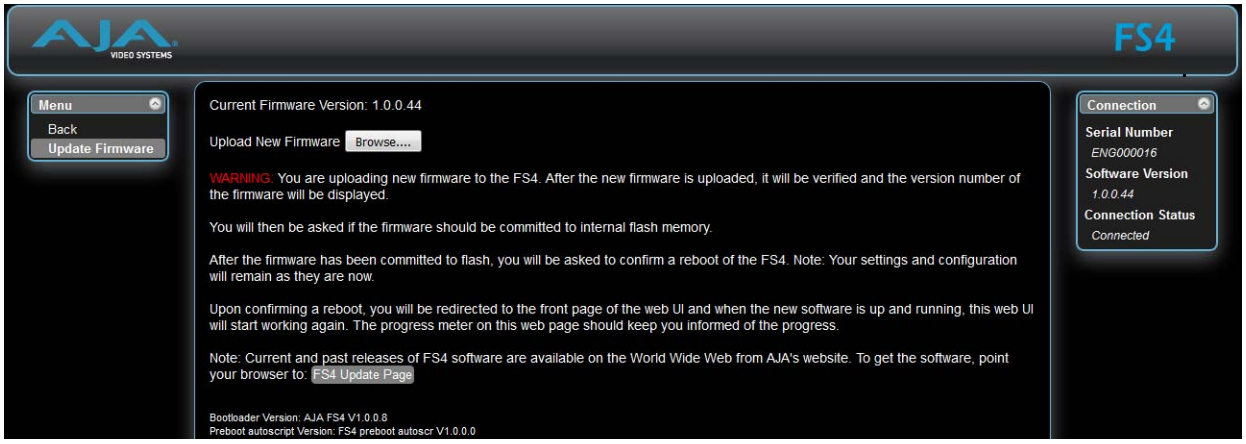
NOTE: *Depending on your PC or Mac operating system settings, the ".bin" extension may not be visible to you in a file directory.*

Uploading and Installing the Software to the FS4

Uploading and installing the software update requires a PC or Mac that can "see" the FS4 via its Ethernet connection. Follow this procedure to install the software:

1. Point your browser at the FS4's upgrade page by clicking on the *Firmware* link at the bottom of the navigation box on the left-hand side of any FS4 web page. The FS4 web pages are discussed in *Chapter 5*.

Figure 7. Update Firmware Browser Screen.



2. Click the *Browse...* button to find and select the downloaded file. For example: *FS4_ver_1.0.0.10.bin* contained in the file downloaded from AJA.
3. Click *OK* when asked if you want to *Upload Firmware*. The file uploads to the FS4 and is tested for validity. Incomplete, corrupted, or non-FS4 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 FS4 with New Firmware* to restart the FS4. This will take the FS4 offline for a minute or two. During the restart, progress is shown in the connection area in the upper right corner of the FS4 *Status* screen. After restart, the FS4 will be running the new software.
6. Once these steps are complete, the FS4 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 FS4 web page again; the software version is displayed at the top of all FS4 web screens. If the FS4 did not update successfully, run through the update steps again.

NOTE: The configuration of the FS4 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 FS4 will boot the older software version and you can restart the upgrade process. This happens because the FS4 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*.

Four Channel Mode Configuration Examples

In Four Channel Mode each Video Processor can receive a different video signal and independently process that signal. All incoming embedded audio, even on inputs not routed to a Video Processor, are disembedded and sent to the Audio Processor.

NOTE: In the following examples, U, V, W, X, Y, and Z represent different complete signals, which may be carried on one or more connectors.

Four Channel Mode Input Examples

Figure 8. Four Channel Mode, Four BNC Inputs

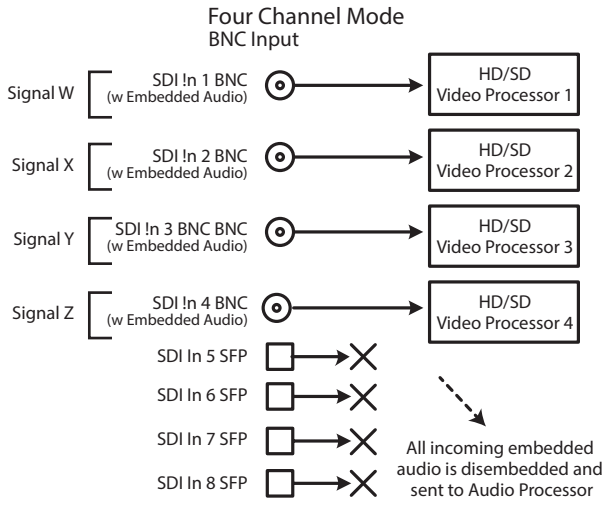


Figure 9. Four Channel Mode, Four SFP Inputs

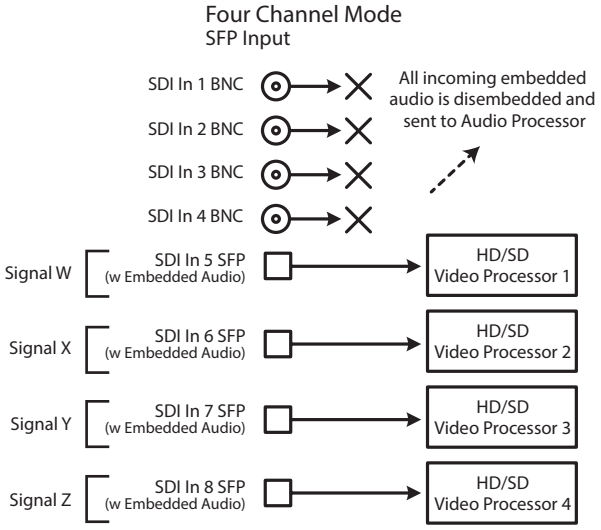


Figure 10. Four Channel Mode, BNC and SFP Inputs

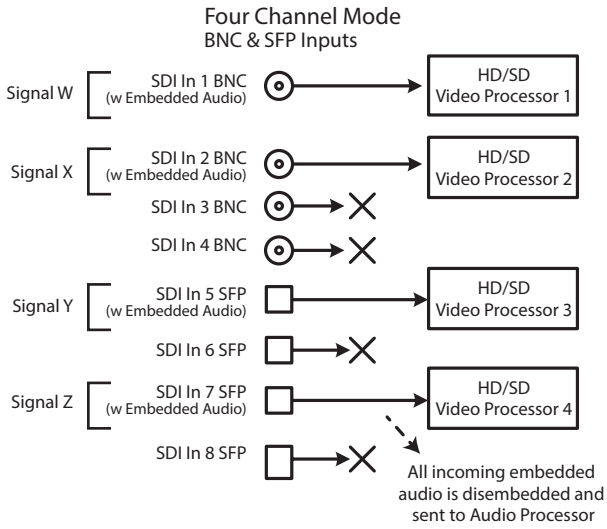
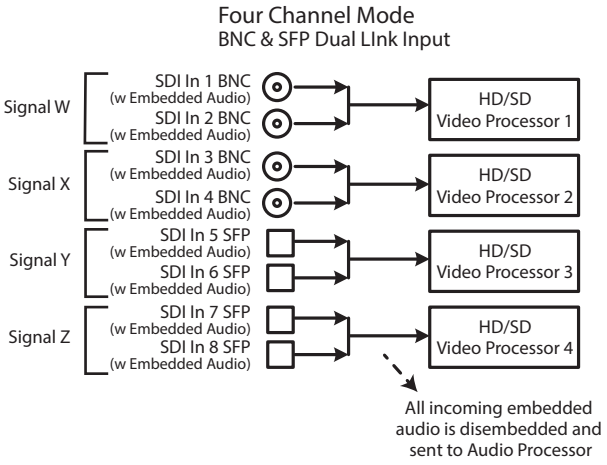
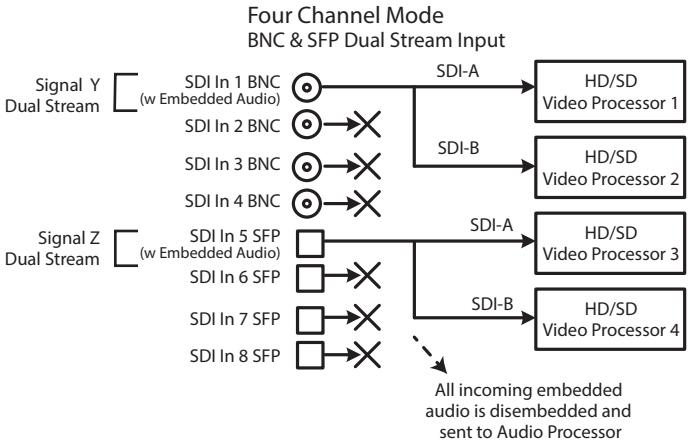


Figure 11. Four Channel Mode, Dual Link Inputs



For Dual Stream input, two independent video image signals are transported over a single link (SDI-A and SDI-B). Each video image requires a separate Video Processor, so a total of two Dual Stream signals can be received for processing. Sixteen channels of embedded audio can be carried on each video signal, so up to 64 embedded audio channels can be routed to the FS4 Audio Processor (*Figure 12*).

Figure 12. Four Channel Mode, Dual Stream Inputs



Four Channel Mode Output Examples

In Four Channel Mode each Video Processor can output a different processed video signal. Depending on configuration, output signals can be duplicated on additional available output connectors.

The video output signal from each Video Processor can also carry embedded audio on the first link of that signal. When video signals are duplicated, the first link of that duplicated video signal will also carry that same embedded audio.

Figure 13. Four Channel Mode, Single Link Outputs

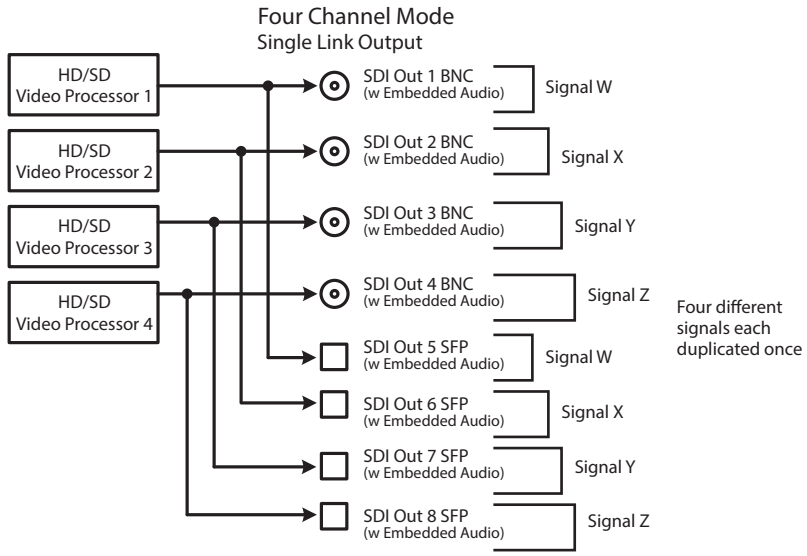
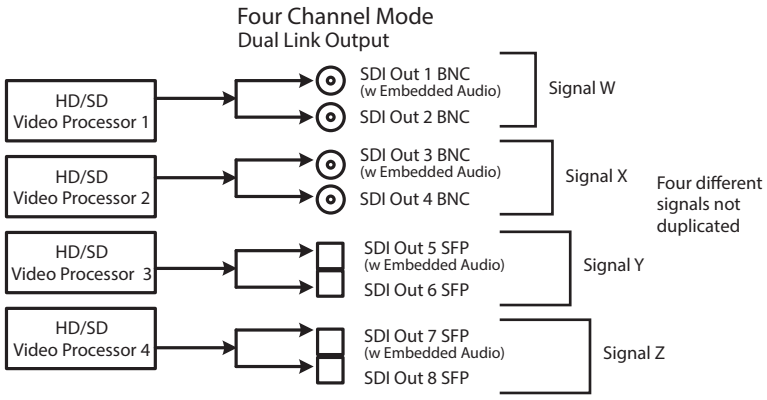


Figure 14. Four Channel Mode, Dual Link Outputs

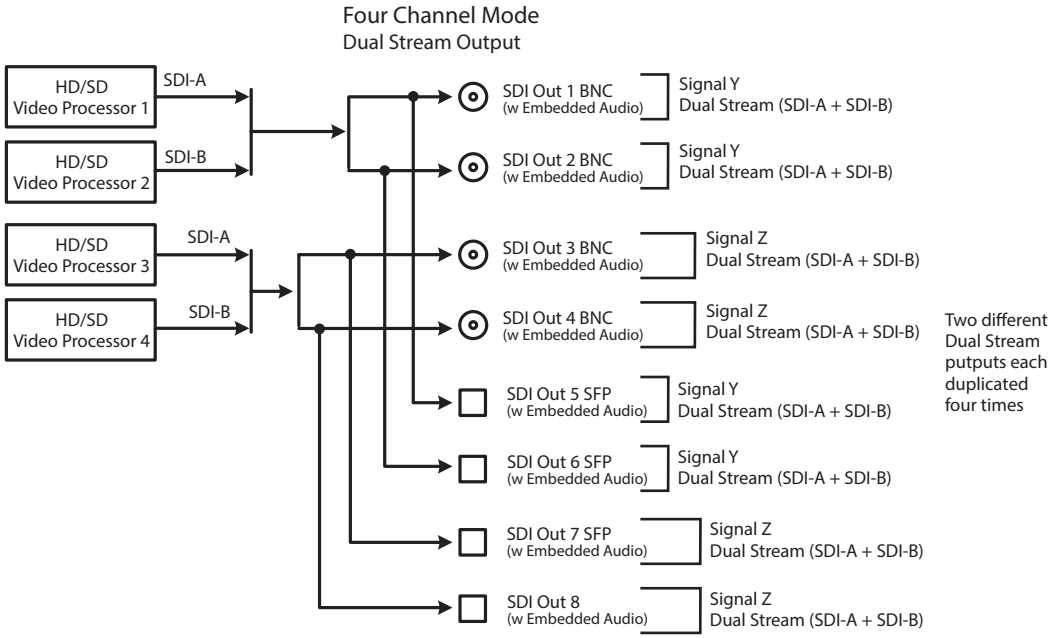


For Dual Stream output, video images from two Video Processors can feed a single output connector, so two different Dual Stream signals can be output. A Dual Stream signal carries two video images (SDI-A and SDI-B).

The FS4 can also be configured to route only the Dual Stream SDI-A or SDI-B video image signal to an output connector.

Sixteen channels of embedded audio can be carried on each video signal, so each Dual Stream output can carry up to 32 embedded audio channels (*Figure 15*).

Figure 15. Four Channel Mode, Dual Stream Outputs



Four Channel Mode Conversion Examples

Figure 16. Four Channel Mode, Four Conversions

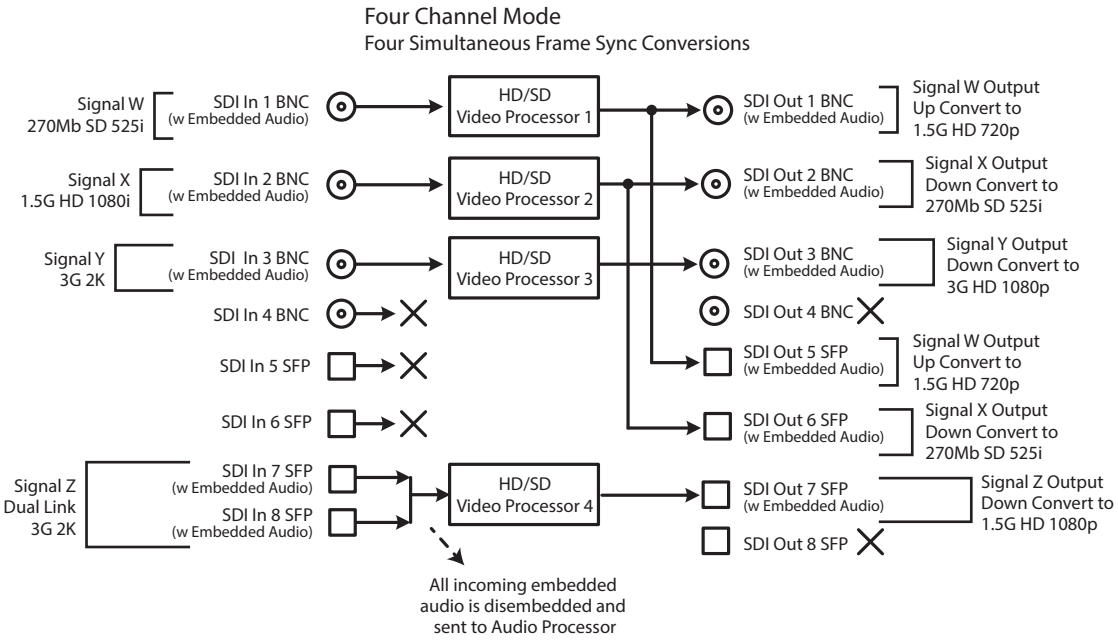


Table 5. FS4 Menu Settings for Figure 16

Channel Select Button	Video Button	Menu Name	Setting
VID1	INPUT	1 Input	SDI1
VID1	FORMAT	1 Output Format	720p 5994
VID1	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA
VID2	INPUT	1 Input	SDI2
VID2	FORMAT	1 Output Format	525i 5994
VID2	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA
VID3	INPUT	1 Input	SDI1
VID3	FORMAT	1 Output Format	1080P 5994
VID3	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA
VID4	INPUT	1 Input	SDI7/8 DualLink
VID4	FORMAT	1 Output Format	1080P 5994
VID4	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA

Figure 17. Four Channel Mode, Dual Stream Inputs Separated

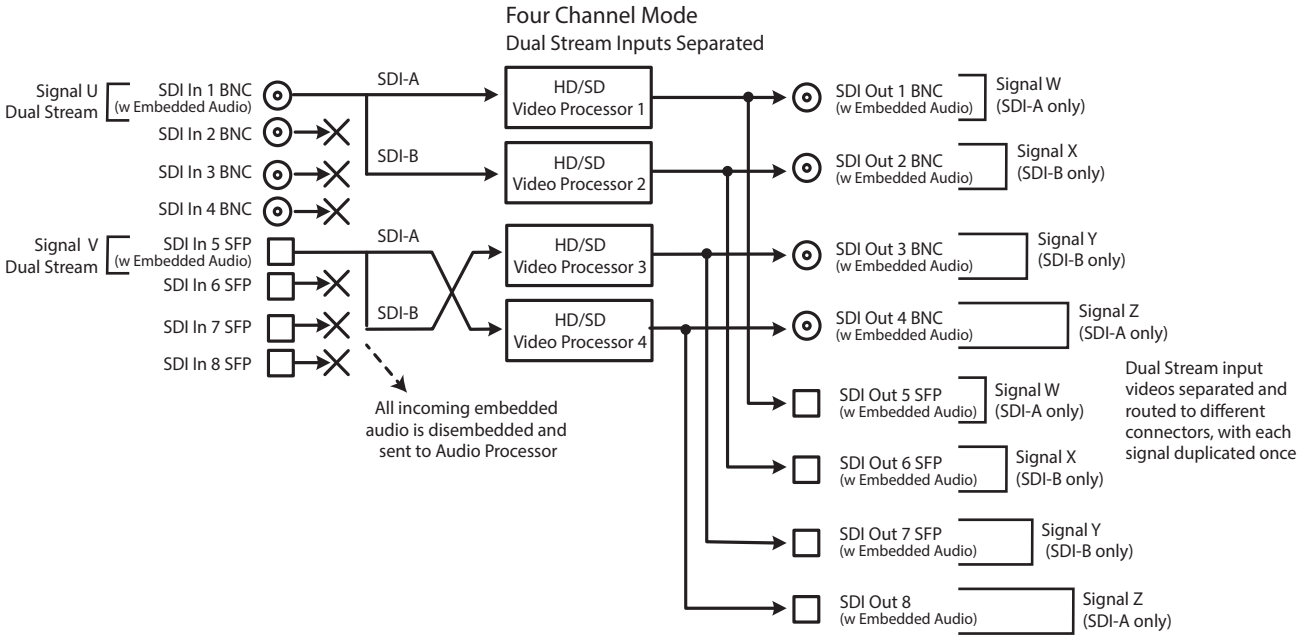


Table 6. FS4 Menu Settings for Figure 17

System Button		Menu Name	Setting
VIDEO		4.1 SDI1 3G Detect	Dual Stream
VIDEO		4.2 SDI2 Input Protect	Dual Stream
Channel Select Button	**Video Button**	**Menu Name**	**Setting**
VID1	INPUT	1 Input	SDI1
VID1	FORMAT	1 Output Format	Follow Input
VID1	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA
VID2	INPUT	1 Input	SDI2
VID2	FORMAT	1 Output Format	Follow Input
VID2	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA
VID3	INPUT	1 Input	SDI6
VID3	FORMAT	1 Output Format	Follow Input
VID3	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA
VID4	INPUT	1 Input	SDI5
VID4	FORMAT	1 Output Format	Follow Input
VID4	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA

Single Channel Mode Configuration Examples

Single Channel Mode has one 4K/UltraHD Video Processor, and all incoming video is routed to that processor. All incoming embedded audio, even on inputs not routed to the Video Processor, are disembedded and sent to the Audio Processor.

Single Channel Mode Input Examples

Figure 18. Single Channel Mode, 1-4 Quad Link BNC Input

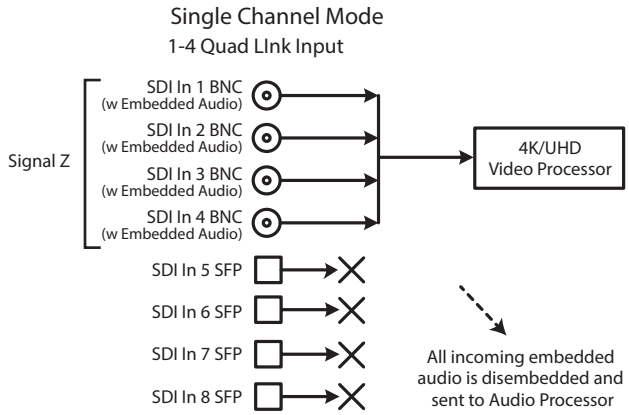


Figure 19. Single Channel Mode, 5-8 Quad Link SFP Input

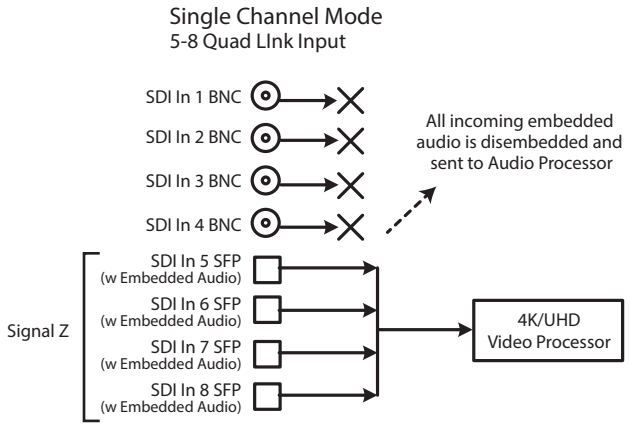


Figure 20. Single Channel Mode, Dual Link Input

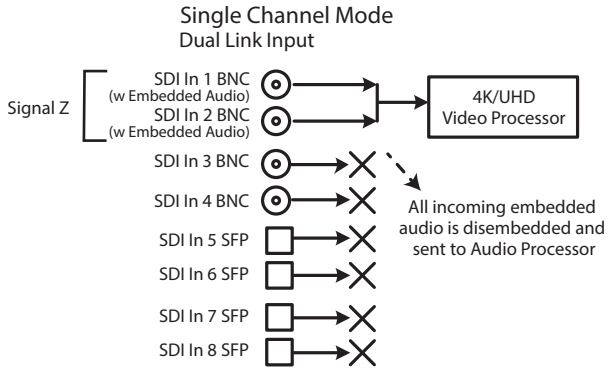
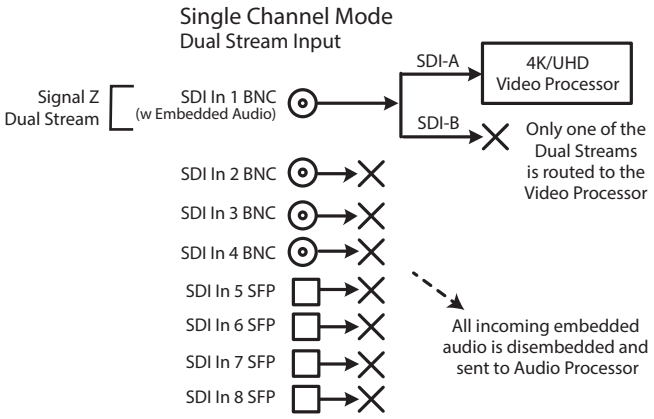


Figure 21. Single Channel Mode, Dual Stream Input



Single Channel Mode Output Examples

In Single Channel Mode, depending on configuration, output signals can be duplicated on additional available output connectors.

The video output signal from the Video Processor can also carry embedded audio on the first link of that signal. When video signals are duplicated, the first link of that duplicated video signal will also carry that same embedded audio.

Figure 22. Single Channel Mode, Quad Link Outputs

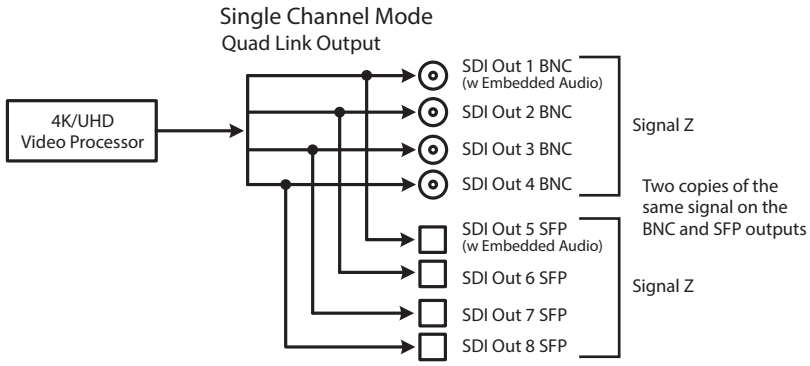


Figure 23. Single Channel Mode, Single Link Outputs

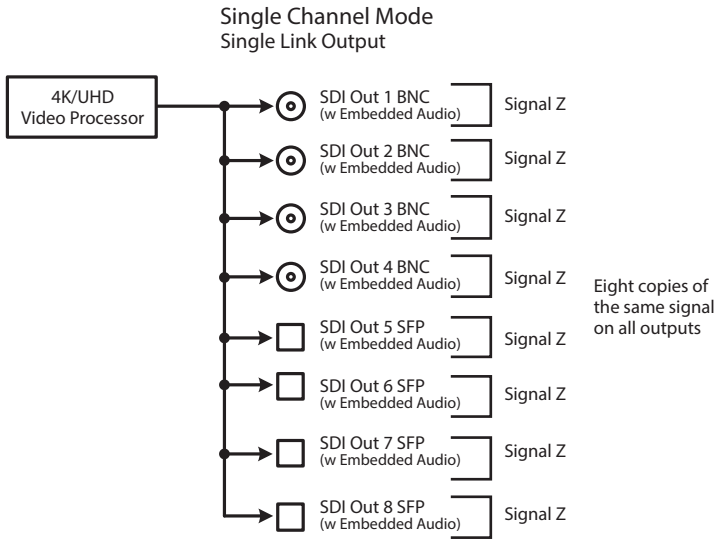
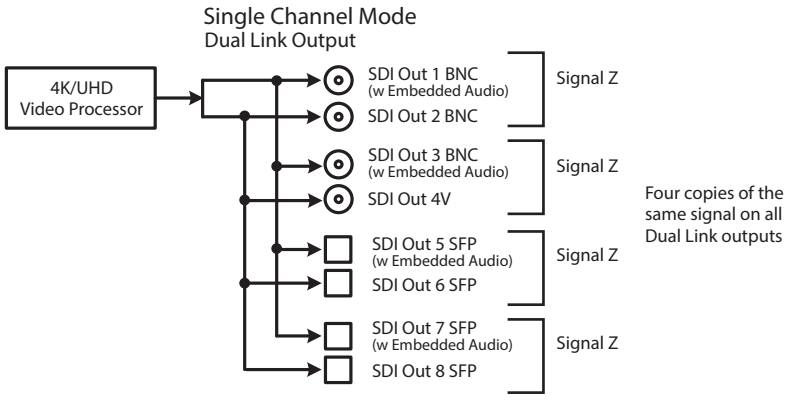
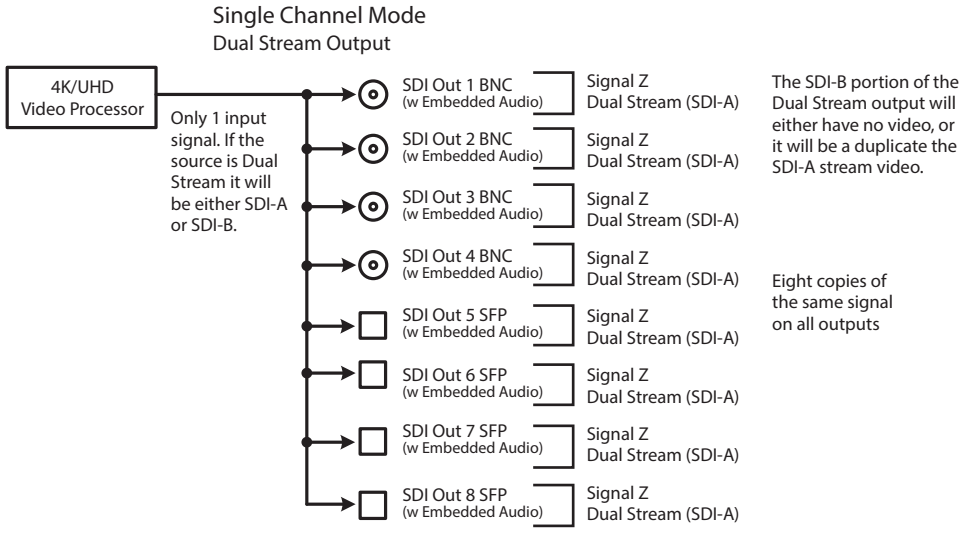


Figure 24. Single Channel Mode, Dual Link Outputs



Because Single Channel Mode has only one Video Processor, two different video output images cannot be created. When configured for Dual Stream output in Single Channel Mode, the SDI-B portion of the output signal will either have no video, or will be a copy of the SDI-A stream (*Figure 25*).

Figure 25. Single Channel Mode, Dual Stream Outputs



Single Channel Mode Conversion Examples

Figure 26. Single Channel Mode, Down Conversion

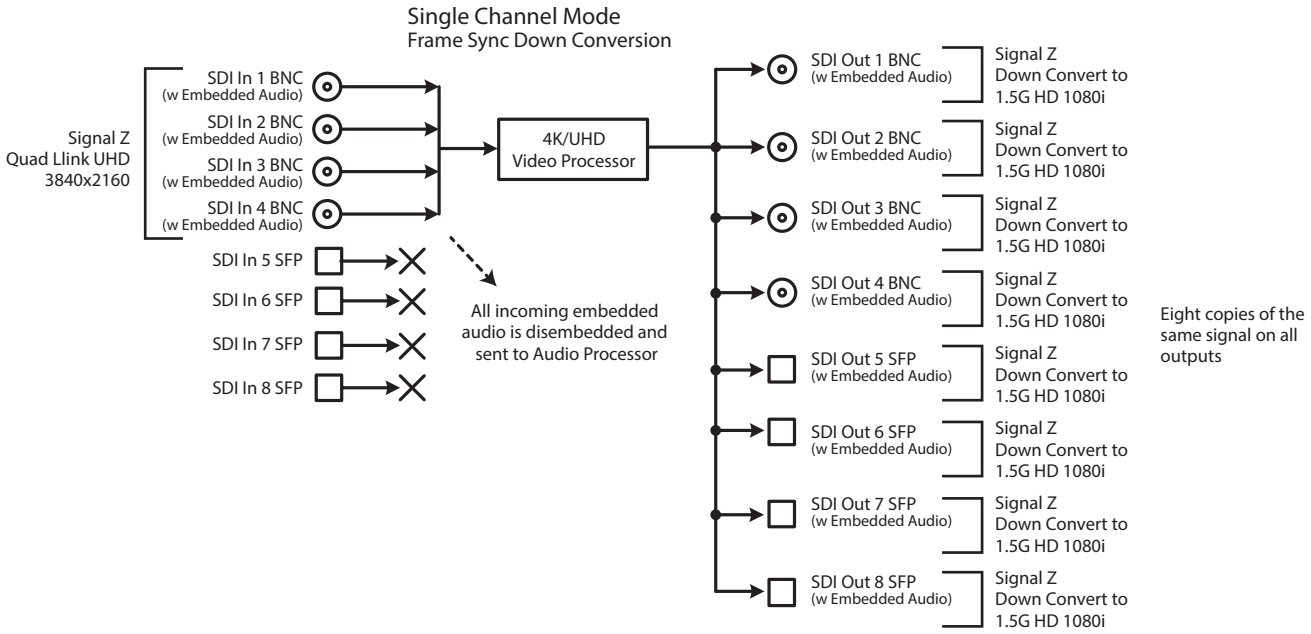


Table 7. FS4 Menu Settings for Figure 26

Channel Select Button	Video Button	Menu Name	Setting
VID1	INPUT	1 Input	1-4 QuadLink
VID1	FORMAT	1 Output Format	1080i5994
VID1	FORMAT	2.0 Link Cfg SDI1	Sngl Link LvlA

Figure 27. Single Channel Mode, Up Conversion

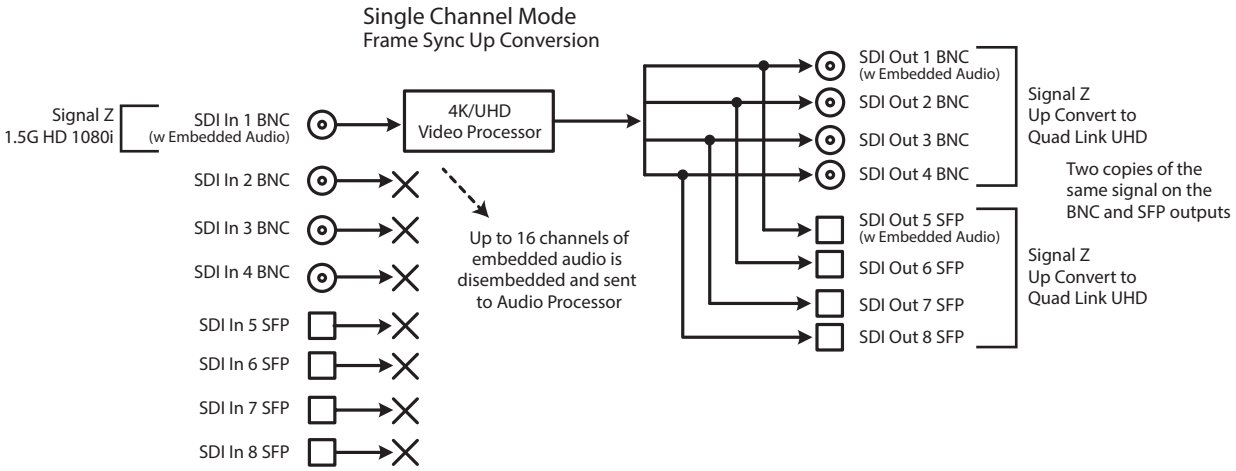


Table 8. FS4 Menu Settings for Figure 26

Channel Select Button	Video Button	Menu Name	Setting
VID1	INPUT	1 Input	SDI1
VID1	FORMAT	1 Output Format	UHD2160p5994
VID1	FORMAT	2.0 Link Cfg SDI1	QuadLink LvlA

GPI Connections

The FS4 has four GPI inputs and four GPI outputs. The GPI inputs and outputs are electrically isolated from the power and ground on the FS4 frame. Electrical isolation is provided for up to four pieces of external equipment.

See *"GPI Pinouts" on page 122* for information on how to wire the GPI connector to work with external devices that you want to use to control the FS4 or that you want the FS4 to control.

Stand Alone Tests

The stand alone tests can be performed without a computer, using the FS4 front panel controls and rear connections. The following procedures assume the FS4 is at factory defaults (taken from a newly opened box). If not set to defaults, the FS4 may behave differently.

NOTE: FS4 units are configured at the factory to operate in Four Channel Mode.

First Power Up

The following workflow powers up a default FS4 and demonstrates some example alarms.

Setup

- Ensure the FS4 is completely disconnected (all video, audio, network, and power connector ports are empty).

Procedure

1. Connect both FS4 power cords to mains AC and allow time for the unit to boot up. Observe the front panel LEDs.

- The REF LED will light red, indicating an alarm condition. By default the FS4 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 menu for Video Processor 1 will report *No Input* for IN1, the port is disconnected), and the *GEN* (Genlock) parameter will report *Ref* (configured for external reference) but will also report *No Input*.

Video Format Status screen			**Video Format Alarm Status screen**		
IN1	SDI 1	No Input	IN1	SDI 1	OK
BKGD	Black	1080i59	BKGD	Black	OK
GEN	Ref	No Input	GEN	Ref	No Ref
OUT1		1080i59	Rate		59/29/23

3. Connect a 1080i59.94 HD tri-level sync reference signal to one of the FS4 Ref Loop BNCs, and connect a 75 ohm terminator to the other Ref BNC.
   - The REF LED will light blue, indicating the FS4 is genlocked to reference.
   - The Status menu *GEN* parameters will report *Ref* and indicate the format of the incoming reference signal or *OK*.
   - However, because the FS4 is still not receiving a compatible video input, *No Input*, will be reported for IN1.

Video Format Status screen			**Video Format Alarm Status screen**		
IN1	SDI 1	No Input	IN1	SDI 1	OK
BKGD	Black	1080i59	BKGD	Black	OK
GEN	Ref	1080i59	GEN	Ref	OK
OUT1		1080i59	Rate		59/29/23

4. Connect a 1080i59.94 SDI video source to the SDI 1 input BNC.
   - The front panel will report 1080i59 and an OK status for SDI 1.

   This indicates no alarm condition exists.

Video Format Status screen			**Video Format Alarm Status screen**		
IN1	SDI 1	1080i59	IN1	SDI 1	OK
BKGD	Black	1080i59	BKGD	Black	OK
GEN	Ref	1080i59	GEN	Ref	OK
OUT1		1080i59	OUT1		1080i59

5. Disconnect one of the power cords, leaving the other attached.
   - The front panel PWR LED will light red for the power supply with the removed cord.
   - The PS status will report PS1 (or 2) OFF
6. Reconnect the power cable. The PWR LED for that power supply will light blue and the power supply status will report OK.

This workflow confirms the FS4 powers up successfully and reports reference and power supply alarms.

NOTE: FS4 Reference, Power Supply, and Video Format alarms can be disabled, if desired. This will prevent the LEDs from going red, but will not affect SNMP or front panel status displays.

Chapter 4: Display Menus

Overview

The FS4 is generally controlled using two different methods: (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 FS4. The other method, using a computer, is described in the next chapter. A third method of FS4 control, using external GPI contacts, is described in various locations in this manual.

FS4 Modes, System Parameters, and Video Parameters

The FS4 also operates in two distinct modes, either Four Channel Mode or Single Channel Mode. Menu parameters settings made in one mode may or may not affect the operation of FS4 when it is set to the other mode. For example, in Single Channel Mode, setting Output Image Mapping to 2SI will not affect operations in Four Channel Mode, because that parameter only affects 4K or UltraHD formats that are not available in Four Channel mode. However, changing the IP Address Type (DHCP, Static) will affect FS4 operation in both modes regardless of the mode in which that parameter was adjusted.

In general, settings made for FS4 system operation, like IP address, Output Frame Rate, Genlock, etc. affect operation in both Four Channel and Single Channel mode. These front panel menu settings are accessed via the three System buttons (VIDEO, CONFIG, and AUDIO).

The Channel Select AES menus (and associated LEVEL and DELAY menu parameters for AES and MADI), also affect the FS4 in both operating modes. Separate MAP parameters for audio routing, however, are saved for each Video Processor, so changing mapping in one operating mode will not affect mapping in the other mode.

The Channel Select EMBED menus provide LEVEL, DELAY, and MAP menu parameters for embedded SDI audio. Because both operating modes use the same SDI inputs, adjustment to these parameters affects both modes.

Video parameter settings in the Channel Select VID1-4 menus (and associated VIDEO submenus) apply to only the current FS4 operating mode. In Four Channel Mode, each VID channel accesses separate settings for only that channel, allowing four different conversions to take place simultaneously. In Single Channel Mode, only one set of video parameters exists that apply to that single channel. Changing video parameters in Four Channel Mode will not affect any video settings stored in Single Channel Mode.

NOTE: One exception is in the REMOTE Menu Group. The Remote Control setting (Local, Remote) affects both Four Channel and Single Channel mode, but separate sets of GPI In and GPI Out settings exist for each operating mode. Single Channel Mode has only one set. Separate GPI inputs and outputs are needed for the different functionality available in these two modes.

Presets and FS4 Operating Mode

Independent sets of FS4 Presets exist for Four Channel and Single Channel mode. Forty presets are available in each mode, each can be given a different name, and storing or recalling a preset in Four Channel mode will not affect FS4 operation in Single Channel mode.

Caution!

In Four Channel Mode, each Preset saves all the settings for all four channels. Storing and recalling a Preset will affect all the settings for all four channels in that mode. Care must be taken to establish a policy for the use of FS4 Presets, especially if the FS4 is operated in Four Channel mode and the different channels have different users.

Parameter Menus

The FS4 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: 1.0 ProcAmp is the parent menu of the 1.1 through 1.4 child menus.

NOTE: In this chapter, menus unique to an FS4 operating mode will be indicated as (4Ch only) or (SingleCh only). Other menus are identical in both Four Channel and Single Channel modes.

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 Menu Group display pages.

System Status

This menu shows the FS4's System Name, IP address and mask, and version number.

Display		Description
System Name		Displays the System Name as set in *Config* 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 STATUS menu always shows the FS4's current Ethernet settings. The parameters shown on the CONFIG Menu Group IP configuration menu may not display the values the unit is currently using.

Vid 1/2 I/O

(4Ch only) This menu shows the current primary video settings for Video Processors 1 and 2.

Display			Description
IN1	Input Source	Format	Selected (physical) video 1 input & detected format.
OUT1	Output Source	Format	Selected video output 1 format & selected audio input used on output.
IN2	Input Source	Format	Selected (physical) video 2 input & detected format.
OUT2	Output Source	Format	Selected video output 2 format & selected audio input used on output.

Vid 3/4 I/O

(4Ch only) Same as Vid 1/2 I/O status menu, except for Video Processors 3 and 4.

Vid I/O

(SingleCh only) This menu shows the current primary video settings for Video Processor.

Display			Description
IN	Input Source(s)	Format	Selected (physical) video 1-4 inputs & detected format.
GEN	Genlock Source	Status	Selected Genlock source and format.
OUT	Format	AudIn	Selected video output format & selected audio input used on output
Vid CC		Status	Closed Caption status (

Vid 1 Format

(4Ch only) This menu shows the current primary video settings for Video Processor 1.

Display			Description
IN1	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.
OUT1		Format	Selected video output format.

Vid 2-4 Format

(4Ch only) Same as Vid 1 Format menu, except for Video Processors 2-4.

Vid 1 Alarm

(4Ch only) This menu shows the Video Processor 1 alarm status. Absence of alarm shows as *OK*. If selections are incompatible, the status of the affected signal shows *Incompat*.

Display			Description
IN1	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.
Rate		Status	System Output Frame Rate (59/29/23.98, 50/25, 60/30/24)

Vid 2-4 Alarm

(4Ch only) Same as Vid 1 Alarm menu, except for Video Processors 2-4.

Vid Alarm

(Single Ch only) This menu shows the Video Processor 1 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(s)	Status	Video input source alarm status.
GEN	Genlock Source	Status	Selected Genlock source alarm status.
Rate		Status	System Output Frame Rate (59/29/23.98, 50/25, 60/30/24)

SDI Input

This menu shows the status of all eight SDI inputs.

Display				Description
SDI1	Status	SDI5	Status	Statuses for SDI inputs 1-8: (Format, No Input, No SFP)
SDI2	Status	SDI6	Status	
SDI3	Status	SDI7	Status	
SDI4	Status	SDI8	Status	

Monitor Output

This menu shows the status of the monitor outputs (BNC and HDMI).

Display		Description
Monit	Status	Output selected for monitoring (Vid1-4 Out)
Fmt	Status	Output format.
Crop	Status	Crop status (Off, On).

AES Input

This menu shows the status of all eight AES channel pair inputs. Each can carry a stereo digital audio signal.

Display				Description
AES1	Status	AES5	Status	Statuses for AES inputs 1-8: (Present, No Input)
AES2	Status	AES6	Status	
AES3	Status	AES7	Status	
AES4	Status	AES8	Status	

MADI In/Out

This menu shows the status of the MADI audio inputs and outputs.

Display			Description
BNC In	Mode	Status	BNC input mode (56ch, 64ch), status (Present, No Input)
BNC Out	Mode		BNC output mode
Fib In	Mode	Status	Fiber input mode, status
Fib Out	Mode		Fiber output mode.

Power/Temp Alarm

This menu shows the power supply status of the FS4 and the temperature status. If a power supply is unplugged, the display 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 FS4 overheats.

Caption Status

(4Ch only) 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
Vid1 CC Caption Type & Presence Vid2 CC Caption Type & Presence Vid3 CC Caption Type & Presence Vid4 CC Caption Type & Presence	For Video Processors 1-4, selected caption type (SD/HD/Invalid), and presence (Detected/Not detected/Pass Thru).

REMOTE Menu Group

The REMOTE Menu Group lets you set up how you want the FS4 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 FS4 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 *REMOTE* LED lights purple.
Local Only	Control only from the front panel (browsers cannot change parameters). The *REMOTE* LED lights blue.
Remote Only	Control only from a network attached browser or remote control panel. The *REMOTE* 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 FS4. 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 FS4. 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 FS4'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 122*. Input video sources selected by GPI trigger remain selected until the trigger is released.

Caution!

GPI Inputs can be used to trigger Presets. 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.

In Four Channel Mode, each FS4 Video Processor can be programmed to perform an action on each of the four GPI Inputs. This means the same GPI input trigger could cause different actions on each channel. In Single Channel Mode, each GPI input can only trigger one action on that Video Processor.

Caution!

In Four Channel Mode, each Preset saves all the settings for all four channels. Storing and recalling a Preset will affect all the settings for all four channels in that mode. Care must be taken to establish a policy for the use of FS4 Presets, especially if the FS4 is operated in Four Channel mode and the different channels have different users.

NOTE: In the table below, Vid<n> indicates which Video Processor will perform the action in Four Channel Mode, and V1-V4 is displayed on the FS4 front panel. In Single Channel Mode Vid appears on the front panel, because only one Video Processor is available.

No Action (default)	Performs no action.
PRESET 1–10	Recalls the specified PRESET configuration for the current FS4 operating mode.
Vid<n> Freeze	Freezes the current video frame at its outputs. Freezing stops when the GPI trigger is released.
Vid<n> SDI1 In	Selects SDI1 as the video input.
Vid<n> SDI2 In	Selects SDI2 as the video input.
Vid<n> SDI1.2 D	Selects Dual-Link mode as the video input.
Vid<n> SDI3 In	Selects SDI3 as the video input.
Vid<n> SDI4 In	Selects SDI4 as the video input.
Vid<n> SDI3.4 D	Selects Dual-Link mode as the video input.
Vid<n> SDI1-4 Q	Selects Quad-Link mode as the video input (Single Ch only)
Vid<n> SDI5 In	Selects SDI5 (SFP) as the video input.
Vid<n> SDI6 In	Selects SDI6 (SFP) as the video input.
Vid<n> SDI5.6 D	Selects Dual-Link mode as the video input.
Vid<n> SDI7 In	Selects SDI7 (SFP) as the video input.
Vid<n> SDI8 In	Selects SDI8 (SFP) as the video input.
Vid<n> SDI7.8 D	Selects Dual-Link mode for the SDI input.
Vid<n> SDI5-8 Q	Selects Quad-Link mode as the video input (Single Ch only)
Vid<n> ARC Off	Turns Off aspect ratio conversion.
Vid<n> ARC LTBX	Converts 16:9 anamorphic video to letterbox.
Vid<n> ARC H CP	Converts 16:9 anamorphic video to 4:3 standard (H crop—crops left and right edges of video).
Vid<n> ARC PLBX	Converts 4:3 standard video to 16:9 anamorphic (pillarbox).
Vid<n> ARC V CP	Converts letterbox video to 16:9 anamorphic (V crop).
Vid<n> ARC 14X9	Converts 16:9 anamorphic video to 14:9 cropped.
Vid<n> DC Crop	Downconverts source to cropped 4x3 picture.
Vid<n> DC ANA	Downconverts source to anamorphic picture.
Vid<n> DC 14X9	Downconverts source to 14x9 picture.
Vid<n> DC AuAFD	Downconverts source automatically using the best mode for the input video Active Format Description (AFD) code.
Vid<n> DC LTBX	Downconverts source to letterbox picture.
Vid<n> UC 4X3PB	Upconverts source to 4x3 pillarbox.
Vid<n> UC14X9PB	Upconverts source to 14x9 pillarbox.
Vid<n> UCFLSCR	Upconverts source to full screen.
Vid<n> UC LBFUL	Upconverts source from letterbox to full.
Vid<n> UC WDZM	Upconverts source to a wide zoom.
Vid<n> UC Custom	Upconverts source to a Custom size.

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 FS4 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.

3.1–4 GPI 1–4 OUT

The setting of this parameter determines whether certain FS4 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 122*.

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.

VIDEO Menu Group

The VIDEO Menu Group includes parameters for setting up various FS4 system related features (video formats, audio level standards, etc.

1 Output Frame Rate

This parameter selects the system output video frame rate family associated with the video standard.

59/29/23 (default) 50/25 60/30/24	Selects the desired output frame rate family.

NOTE: Changing the Output Frame Rate selection automatically selects a new value for "1 Output Format" on page 72. Each Frame Rates selection remembers its own Output Format settings.

2 Genlock Source

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

Reference (default)	Use the signal on the *Ref* connector as the genlock source.
Free run	Free run mode (FS4 syncs to its own timebase, not locked to an external source)
Input	Use the selected SDI input signal as the genlock source.
SDI<n>	

3.1 Mon 2K Crop

This parameter selects whether to crop 2K HDMI monitor output rasters to 1920 wide (and has no effect on the SDI monitor output).

Off (default)	No cropping occurs on the Monitor Outputs.
Crop	Left and right sides of the Monitor Outputs are cropped to 1920.

3.2 HDMI RGB Range

This parameter selects the output range for the HDMI monitor output (and has no effect on the SDI monitor output). *Full* allows a range of 0-255 and *SMPTE* limits the range to 16 to 235 (see note for details).

Full (default)	Selects an HDMI output range of 0-255.
SMPTE	Selects an HDMI output range of 16-235.

3.3 Monitor Map

(Single Ch only) This parameter selects which Video Processor output will be sent to the Monitor output. The same video and embedded audio is sent to both the BNC and HDMI connectors.

VID1 Output (default) VID2 Output VID3 Output VID4 Output	Selects which Video Processor's output appears on the Monitor Outputs.

4.1 SDI1 3G Detect

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

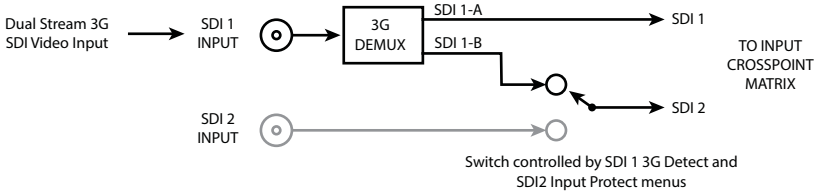
Auto Detect (default)	Automatically detects presence of 1080p50/60 or Dual Stream video.
1080p50/60	Configures the SDI1 input for 1080p50/60 (single) video.
Dual Stream	Configures SDI 1 for Dual Stream 3G video (uses SDI 1 and SDI 2 in Input Crosspoint matrix).

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 1.5G 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 FS4 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).

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

Figure 28. Dual Stream 3G DEMUX Schematic



See *"Figure 12. Four Channel Mode, Dual Stream Inputs on page 36"* and *"Figure 21. Single Channel Mode, Dual Stream Input on page 41"* for more information.

4.2 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)	SDI2 cannot be used by Dual Stream 3G SDI video on SDI Input 1.
Dual Stream	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 FS4 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 B signal instead of the SDI2 In connector.

The following table shows the selections and their results. In the table, SDI1-A and SDI1-B 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
3G-LvlB-DS signal *Dual Stream* setting, or *Auto Detect* with ANC Dual Stream data	Dual Stream	SDI1	SDI1-A
		SDI2	SDI1-B
	Normal	SDI1	SDI1-A
		SDI2	SDI2
3G-LvlA signal *1080p 50/60* setting, or *Auto Detect* with ANC 1080p data, or *Auto Detect* with no ANC data	Dual Stream	SDI1	SDI1
		SDI2	SDI2
	Normal	SDI1	SDI1
		SDI2	SDI2

See *"Figure 12. Four Channel Mode, Dual Stream Inputs on page 36"* and *"Figure 21. Single Channel Mode, Dual Stream Input on page 41"* for more information.

4.3, 4.5, 4.7 SDI3/5/7 3G Detect

This parameter configures 3G operation of the SDI 3, 5, and 7 video input, using settings similar to *"4.1 SDI1 3G Detect" on page 54*.

4.4, 4.6, 4.8 SDI4/6/8 Input Protect

This parameter allows you to protect Input SDI 4, 6, and 8 from being taken by a *Dual Stream* selection, using settings similar to *"4.2 SDI2 Input Protect" on page 54*.

5.1 VidProc Bypass

(4Ch only) This parameter routes the input signal assigned to each video processor to the output of that video processor (e.g. - Vid1 outputs are SDI1 and SDI5). All video processor input SDI signals must be locked to each other and the Genlock Source must be set to one of the SDI inputs assigned to a video processor input.

Off (default)	Video Processor(s) operate normally.
On	Video Processor(s) are bypassed.

CONFIG Menu Group

The CONFIG Menu Group includes parameters for setting up the FS4's network, system name, SNMP, alarm, and screen saver configurations.

1 System Name

This parameter defines a unique name for the FS4. This same name is used both when displaying systems via the web interface and when displaying the FS4's screen saver.

Variable	Set the system name, up to 20 characters. *Default:* aja-fs4

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 FS4 Mode

Selects whether the FS4 will operate in Four Channel or Single Channel mode. Pressing the *ADJUST* knob at the "Change Mode?" prompt will reboot the FS4 in the other operating mode. During reboot, the display shows *[Rebooting]*, goes dark momentarily, and then shows the percentage of progress as the system reboots. Reboot should take no longer than 90 seconds. This parameter has no default setting (is only be used to change to the other mode) and is not saved in Presets.

HD/SD	After reboot the FS4 will operate in Four Channel (HD/SD) mode.
4K/UHD	After reboot the FS4 will operate in Single Channel (4K/UHD) mode.

3.1 IP Config

This parameter determines the type of TCP/IP network configuration used by the FS4. Consult your network administrator about how to set this value.

DHCP (default)	Select automatic IP address assignment from the LAN DHCP server. If the FS4 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 FS4 factory default static IP address is 192.168.0.2.

3.2 IP Address

This parameter determines the static IP address used by the FS4 for TCP/IP networking. Consult your network administrator about how to set this value.

IP Address variable	If *IP Config* is set to *DHCP* dynamic addressing (default), the IP Address is set automatically by the network's DHCP server. If *IP Config* is set to *Static Addr*, manually enter an IP address. If *IP Config* is set to *DHCP* 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.

3.3 Subnet Mask

This parameter determines the subnet mask used by the FS4 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 *IP Config* is set to DHCP, the Subnet Mask is set by the DHCP server and cannot be changed by the user. If *IP Config* is set to *Default Addr,* the default *Subnet Mask* is 255.255.255.0

3.4 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 FS4 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 FS4 to the network. *Default:* 192.168.0.1

3.5 MAC Address (view only)

Selecting this parameter allows you to view the MAC address. The MAC address is a unique value associated with the FS4'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 Enable Parameters

The following parameters are used to setup the FS4 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 113"* for a description of SNMP and how the FS4 supports it.

About FS4 Alarms

The following FS4 alarm parameters affect how the front panel LEDs and Web UI report error conditions. When suppressed, front panel LEDs will not light red, and the Web UI will not report that particular error status. Suppressed alarms do not affect the information reported on the FS4 front panel Status menus, and does not affect SNMP messaging.

5.1, 5.2 Power Supply 1-2 Alarm

These parameters control how the FS4 alarm responds to a power supply disconnection or failure. If the FS4 will be connected using only one power cord, you can suppress the alarm, which only changes the color of the front panel LED for the disconnected power supply.

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 Vid Format Alarm

(Single Ch only) When set to *Normal* (default), an alarm is triggered (the Channel Select LED of that video processor [VID1 - Vid4] will light red) whenever the selected input video signal format for that Video Processor is incompatible with the selected output format. You can suppress the *Format Alarm* if you wish.

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.

6.1-6.4 Vid1-4 Format Alarm

(4Ch only) Same as Vid 1 Format Alarm menu, except for Video Processors 1-4.

7 Reference Alarm

This parameter controls how the FS4 responds when the Video Processors has a format that is incompatible with the Reference video signal. When set to *NORMAL,* the alarm triggers (the REF LED on the FS4 front panel will light red) if the Reference signal is not detected or is incompatible with the processor format. You can suppress the Reference alarm is you wish.

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 FS4's internal cooling fans. For long term reliability, the fan speed should be set as high as possible, only lowering the speed if fan noise is a concern. At 25C (77F) ambient temperature any speed setting (1 to 10) provides adequate cooling. At 40C (104F) ambient, a fan speed of 5 or higher is recommended. The FS4 also has built-in thermal protection that will increase the fan speed automatically if necessary.

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

12 Serial Number

This parameter displays the FS4's unique serial number. Please reference this number if you contact AJA customer support.

13 Software Version

This parameter displays the FS4's software version number.

14 Reboot

This parameter lets you reboot the FS4. 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. Reboot should take no longer than 90 seconds.

AUDIO Menu Group

The following descriptions explain the AUDIO Menu Group, which allows you to make adjustments to the FS4's sample rate converters, Mix Down Modes, and some other system wide settings.

1 MADI Output Mode

This parameter controls the number of MADI channels sent to both the MADI BNC and Fiber output connectors, 64 or 56.

If the FS4 receives 56 channels and is set to output 64 channels, active silent channels 57 to 64 are added to the output. When the FS4 receives 64 channels and is set to output 56 channels, channels 57 to 64 are dropped on the output.

64ch (default)	Sixty four audio channels selected for MADI output.
56ch	Fifty six audio channels selected for MADI output. MADI output channels 57-64 will not be available.

2.1-2.8 SDI 1-8 SRC Mode

These parameters control the use of sample rate converters for the incoming SDI embedded audio. This setting affects all 16 embedded audio channels for that SDI input, if present.

Auto (default)	The system decides how to handle sample rate conversion. PCM uses SRC, compressed data doesn't use SRC.
On	Sample rate conversion is always performed on the inputs.
Off	Sample rate conversion is never performed on the inputs.

In *Auto* mode, normal PCM audio passes through the Sample Rate Converters and gets converted, as appropriate. If any of the active input signals are non-PCM the SRC is turned off for all audio inputs.

2.9 AES SRC Mode

These parameters control the use of sample rate converters for the incoming AES audio. This setting affects all 16 AES input channels.

Auto (default)	The system decides how to handle sample rate conversion. PCM uses SRC, compressed data doesn't use SRC.
On	Sample rate conversion is always performed on the inputs.
Off	Sample rate conversion is never performed on the inputs.

NOTE: For SRC, all AES channels must be synchronous to AES1 (channel pair 1&2), or to the lowest numbered AES pair if AES1 is not present.

2.10 MADI BNC SRC Mode

These parameters control the use of sample rate converters for the incoming MADI BCN audio. This setting affects all 64 MADI BNC input channels

Auto (default)	The system decides how to handle sample rate conversion. PCM uses SRC, compressed data doesn't use SRC.
On	Sample rate conversion is always performed on the inputs.
Off	Sample rate conversion is never performed on the inputs.

In *Auto* mode, normal PCM audio passes through the Sample Rate Converters and gets converted, as appropriate. If any of the active input signals are non-PCM the SRC is turned off for all audio inputs.

2.11 MADI Fiber SRC Mode

These parameters control the use of sample rate converters for the incoming MADI Fiber audio. This setting affects all 64 MADI Fiber input channels

Auto (default)	The system decides how to handle sample rate conversion. PCM uses SRC, compressed data doesn't use SRC.
On	Sample rate conversion is always performed on the inputs.
Off	Sample rate conversion is never performed on the inputs.

In *Auto* mode, normal PCM audio passes through the Sample Rate Converters and gets converted, as appropriate. If any of the active signal pairs are non-PCM the SRC is turned off for all audio inputs.

3.0 Mix Down 1 Mode

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

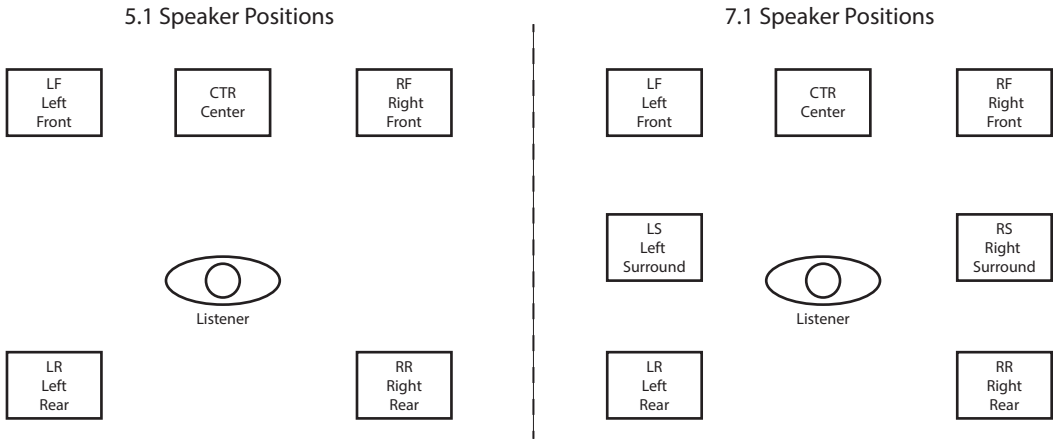
Off (default)	Mix down feature is turned off.
5.1 Channel	Selects 5.1 mix down mode.
7.1 Channel	Selects 7.1 mix down mode.

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 level of each of the incoming channels routed to the Left and Right output channels, and adjust the level 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 29. Multi-Channel 5.1 and 7.1 Speaker Positions



Multi-channel audio, typically embedded in an SDI signal, can be passed through the FS4 converter unchanged. The multi-channel sound can also be mixed down to stereo, using the two Mix Down Modules built into the FSI-X Audio Processor.

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

Left Ch Output = LF + (-3dB * CTR) + (-3dB * LR)

Right Ch Output = RF + (-3dB * CTR) + (-3dB * RR)

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

Left Ch Output = LF + (-3dB * CTR) + (-3dB * LS) + (-3dB * LR)

Right Ch Output = RF + (-3dB * CTR) + (-3dB * RS) + (-3dB * 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 FS4 audio routing matrix.

The Mix Down outputs are available as inputs to the FS4 audio matrix and can be mapped to any audio output.

3.1 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 2-8	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.

3.2 - 3-8 Mix Down Input Mapping (LF, RF, CTR, LR, RR, LS, RS)

When Map is selected above, these menus permit the mapping of any FS4 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.

3.9 - 3.14 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 FS4 audio routing matrix.

3.16 - 3.17 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).

3.0 Mix Down 2 Mode

(4Ch only) Same as Mix Down 1 Mode menu and related sub-menus, except for the Mix Down 2 mixer.

7 Mix Down Reset

This parameter resets all of the mix down levels (five or seven input, two output) for the selected mixer to the factory defaults. Turn the ADJIUST knob to select the mixer. Two mixers are available in Four Channel Mode, and only one mixer is available in Single Channel mode. After selecting a mixer, press ADJ. An "Are you sure" prompt is displayed. Pressing *ADJUST* again resets that mixer...

Mix Down 1 Mix Down 2 (4Ch only)	Resets the Mix Down 1 mixer levels to default settings. Resets the Mix Down 2 mixer levels to default settings.

8 Global Audio Output

This parameter allows routing the same source or set of sources to all the FS4 audio 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 SDI2-8 (4Ch only) AES.EBU MADI BNC MADI Fiber	The selected source channels are routed to all the FS4 audio output channels.
Sig Gen 1KHz Sig Gen 400Hz Mute	The selected tone or mute is routed to every FS4 audio output channel.
Mix Down 1 L:R Mix Down 2 L:R (4Ch only)	The stereo output of Mix Down module is routed to all the FS4 audio output channels. The Left mixer channel goes to FS4 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: No Global Map source is available.

9 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 SDI2-8 (4Ch only) AES.EBU MADI BNC MADI Fiber	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.

PRESET Menu Group

The PRESET Menu Group provides the means of saving, editing the names of, and loading FS4 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. .

	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.

	Caution! In Four Channel Mode, each Preset saves all the settings for all four channels. Storing and recalling a Preset will affect all the settings for all four channels in that mode. Care must be taken to establish a policy for the use of FS4 Presets, especially if the FS4 is operated in Four Channel mode and the different channels have different users.

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 FS4 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 *System*, *Video*, *Audio*, and most *Config* parameters. Push *ADJUST* for four seconds to perform the recall. The display reports "Factory values" during the recall. User preferences, network settings, and existing Presets are not affected by recalling the Factory Preset.

1.1-1.40 Presets #1-#40

These parameters let you recall, edit the name of, and store an FS4 preset configuration for the selected storage register. Forty storage registers are available.

Preset #1–#40	Shows the currently selected preset register number. Turn *SELECT* choose the desired register. Then turn *ADJUST* 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 *ADJUST* 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 *ADJUST* to enable editing (blinking character), use the *SELECT* and *ADJUST* knobs to edit the name and then press *ADJUST* to save the edited preset register name.
Store	Stores the current set of all *System*, *Video*, *Audio*, and most *Config* 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 52*.

Video Select Buttons VID1-VID4

As described in *"Operational Summary" on page 19*, the VID1, VID2, VID3 and VID4 front panel buttons select a Video Processor channel. When selected, the nine Video buttons on the right are used to select a category of menus.

Table 9. Video Menu Group Buttons activated with Channel Select buttons.

INPUT	**FORMAT**	**TIMING**
ANC	**SCALE**	**TSTGEN**
COLOR	**KEYER**	**FREEZE**

Single Channel Mode has one Video Processor, to which all the parameter settings in these menu groups apply. Four Channel Mode has four Video Processors. Changes to Video Select Button parameter settings only apply to the currently selected Video Processor, whose VID1-4 button will be illuminated.

INPUT Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

1 Input

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

SDI1 (4Ch default)	Select SDI1 as the input source.
SDI2-8	Selects either SDI2 through SDI8 as the input source.
1/2, 3/4, 5/6, 7/8 DualLink	Selects SDI 1/2, or SDI 3/4, or SDI 5/6 or SDI 7/8 DualLink as the input source, linking both SDI inputs.
1-4 Quad Link (Single Ch default)	(Single Ch only) Select SDI 1-4 SDI QuadLink as the input source, linking all four of the inputs
5-8 Quad Link	(Single Ch only) Select SDI 5-8 SDI QuadLink as the input source, linking all four of the inputs.

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 1080p50/59.94/60 on two 1.5 Gb HD-SDI connections, or 4K/UltraHD low frame rate video on two 3 Gb connections. Selecting Dual Link as the Video Input will allocate both SDI Inputs for Dual Link use. The SFP inputs operate the same way.

Quad Link Quad Link referred to here is 4K/UltraHD on four 1.5 Gb HD-SDI connections, or 4K/UltraHD high frame rate video on four 3 Gb connections. Selecting Quad Link as the Video Input will allocate all four SDI Inputs for Quad Link use. The SFP inputs operate the same way.

See *"System Video/Audio Cable Connections" on page 33* for more information about FS4 signal routing.

2 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.

3 Reverse Telecine

This parameters can be used to control film cadence detection.

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

About Reverse Telecine and Film Cadence

Film cadence is a way to convert film frame rates to interlaced field rate video suitable for broadcast, commonly employed by telecine equipment when converting film to video (for example, converting from 24 frames to 60 interlaced fields, or 23.98 frames to 59.94 fields). 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 the original two input frames, then one duplicate field, then four more fields of the next two input frames, 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 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.

FS4 Reverse Telecine Conditions

The FS4 converter can perform film cadence removal under the following conditions:

- Input signal must be 525i59.94, 1080i59.94 and output format selected must be p23.98 or PsF23.98, OR the input signal must be 1080i60 and output format p24 or PsF24.
- Input signal must have consistent 3:2 pulldown.
- The Reverse Telecine parameter must be set to Auto.

Under the conditions above, the FS4 will automatically 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.

4 Input Scan Format

This parameter determines how the Deinterlacer handles interlaced vs. PsF inputs.

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.

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)

ANC Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

1.1 AFD Out

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 conversion, but it may affect downstream video processing if the signal is later converted.

Off (default)	The FS4 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 FS4 is converting, the appropriate AFD code will be chosen based on the convert mode (see *"6 Upconvert Mode" on page 75* and *"7 Downconvert Mode" on page 76*).
>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.

1.2 AFD VANC Output Lines

This parameter determines which video output lines have AFD VANC inserted on the output.

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

1.3 Downconvert AFD dflt

This parameter selects what occurs when the Downconvert Mode parameter has been set to “Auto AFD” (see *“7 Downconvert Mode” on page 76*) and no AFD codes are detected at the selected input source.

Hold Last (default)	Hold the last setting.
Crop	Image is cropped to fit new screen size.
Anamorphic	HD image is converted to full-screen SD with a 16x9 aspect ratio (anamorphic).
14x9	Image is reduced slightly with aspect ratio preserved. Black is added top and bottom, and the left and right sides are cropped.
Letterbox	Image is reduced with black top and bottom added to image area, with the aspect ratio preserved.

2 Caption Xlator

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.

Off (default)	When Off, caption translation is not performed.
On	When set to On, the FS4 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).

NOTE: This parameter interacts with parameter SD Line 21 Blanking, see below.

In standard definition video (525i59.94 or 625i50), 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 FS4 Upconverter 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).

3 SD Line 21 Blanking

This parameter determines whether the FS4 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 Upconverted video.).l

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.

Blank In Blank mode, the FS4 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 FS4 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 FS4 automatically detects presence or absence of line 21 caption data on the SD input. If no line 21 caption is present, the FS4 passes the video unaltered. If line 21 data is detected, the FS4 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

COLOR Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

1.0 Proc Amp Enable (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.

1.1 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. *Default (unity):* 1.0

1.2 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. *Default (unity):* 0 IRE

1.3 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. *Default (unity):* 0 degrees

1.4 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. *Default:* 1.0

2.0 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.

2.1 Color Red Gain

This parameter adjusts the *RGB Red Gain*.

Variable	Adjusts Red Gain from zero to 1.5 in 0.01 steps. *Default (unity):* 1.0

2.2 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. *Default (unity):* 0 IRE

2.3 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. *Default (unity):* 0

2.4 -2.6 Color Green

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

2.7-2.9 Color Blue

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

3.0 Video Legalizer

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

3.1 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

3.2 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	

3.3 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	

FORMAT Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

1 Output Format

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

Follow Input (default) Follow Ref <format><frame rate>	Match the output format to the incoming video format. Match the output format to the current Reference input. Select this format and frame rate as the output format.

Output Format Selection Constraint

Available frame rates depend on System menu *"1 Output Frame Rate" on page 53* parameter setting.

Output Timing Memory

Changing the Output Format selection automatically selects new values for H & V timing parameters (see *"1 Output Frame Rate" on page 53*). 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 (*"1 Output Frame Rate" on page 53*), the Output Format setting associated with the newly selected frame rate is recalled.

See *"System Video/Audio Cable Connections" on page 33* for more information about FS4 signal routing.

2.0 Link Config SDI1, 2, 3, 4

(4Ch only) These parameters determine how 1080p50/60 signal transport is configured for the Video Processor output BNC connectors. The menu names and parameters available depend on the currently selected Video Processor. For example, if Video Processor 1 is selected, the menu title will be 2.0 Link Cfg SDI1 identifying the primary output BNC connector used by that Video Processor. For Video Processor 2 the menu title will be 2.0 Link Cfg SDI2, etc.

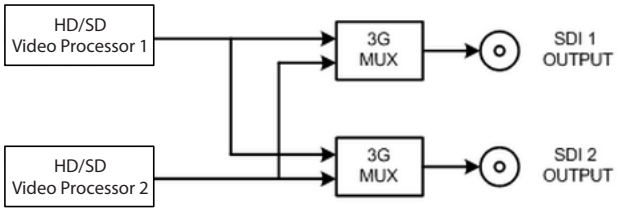
Sngl Link LvlA (default)	Sets the output transport to 3Gb Level A (single connector).
Dual Link	Sets the output transport to 1.5Gb Dual Link (two connectors, ST 372).
Sngl Link LvlB	Sets the output transport to 3Gb Level B-DL (single connector). When Level B is selected a sub menu becomes available to choose the Video Processor(s).

2.1 Level B SDI1, 2, 3, 4

(4Ch only) When Single Link Level B has been selected above, the parameters on the menu below become available for the selected Video Processor.

VID1	Vid1 (default) Vid1 + Vid 2	Selects only the Vid 1 Processor signal for output. Select both the Vid1 and Vid2 Processor signals for output (Dual Stream).
VID2	Vid2 (default) Vid1 + Vid 2	Selects only the Vid 2 Processor signal for output. Select both the Vid1 and Vid2 Processor signals for output (Dual Stream).
VID3	Vid3 (default) Vid3 + Vid 4	Selects only the Vid 3 Processor signal for output. Select both the Vid3 and Vid4 Processor signals for output (Dual Stream).
VID4	Vid4 (default) Vid3 + Vid 4	Selects only the Vid 4 Processor signal for output. Select both the Vid3 and Vid4 Processor signals for output (Dual Stream).

Figure 30. Dual Stream 3G MUX Schematic



See *"Figure 15. Four Channel Mode, Dual Stream Outputs on page 37"* for more information.

2.0 Link Config SDI1-4

(Single Ch only) These parameters determine how 1080p50/60 signal transport is configured for the Video Processor output BNC connectors.

QuadLnk Lvl A (default)	Sets the output transport to Quad Link Level A (four connectors).
QuadLnk LvlB	Sets the output transport to Quad Link Level B-DL (four connectors).
Sngl Lnk LvlA	Sets the output transport to 3Gb Level A (single connector).
Dual Link	Sets the output transport to 1.5Gb Dual Link (two connectors)
Sngl Lnk LvlB	Sets the output transport to 3Gb Level B-DL (single connector).

See *" Single Channel Mode Output Examples on page 41"*

3.0 Link Config SDI5-8

(Single CH only) These parameters determine how 1080p50/60, 6Gb, and 12Gb signals are formatted for the Video Processor SFP output ports.

QuadLnk Lvl A (default)	Sets the output transport to Quad Link Level A (four connectors).
QuadLnk Lvl B	Sets the output transport to Quad Link Level B-DL (four connectors).
Sngl Lnk LvlA	Sets the output transport to 3Gb, 6Gb, or 12Gb Level A (single connector).
Dual Link	Sets the output transport to 1.5Gb or 3Gb Dual Link (two connectors)
Sngl Lnk LvlB	Sets the output transport to 3Gb Level B-DL (single connector).

NOTE: 6Gb and 12Gb signal output requires compatible SFP modules.

See *" Single Channel Mode Output Examples on page 41"*

4 Output Image Mapping

(Single Ch only) This parameter sets the structure of the UHD or 4K output video. The image can be divided into four quadrants (Square Division [SQD] format, see SMPTE 425-3, Appendix B), or interleave (2 Sample Interleave [2SI] format (see SMPTE 425-5, Section 8).

Quadrant (default)	The output is Quadrant format (Square Division).
Interleave	The output is Two Sample Interleave format. The front panel 2SI LED will light when selected.

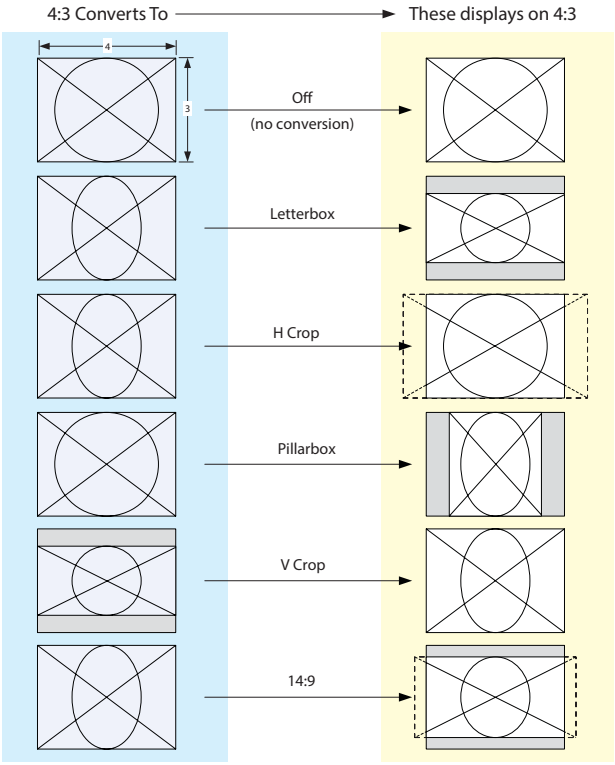
5 SD Aspect Ratio

This parameter selects the type of SD-to-SD Aspect Ratio Conversion (ARC) performed on an incoming selected SD source input. This parameter has an effect only when the input and output are both SD (525i or 625i).

Off (default)	No ARC conversion will be performed.
Letterbox H Crop Pillarbox V Crop 14x9	Selects the indicated ARC conversion.

NOTE: Any Custom Size/Pos values (only available in Four Channel Mode) will be applied on top of this settings.

Figure 31. SD Aspect Ratio Conversion Illustrations



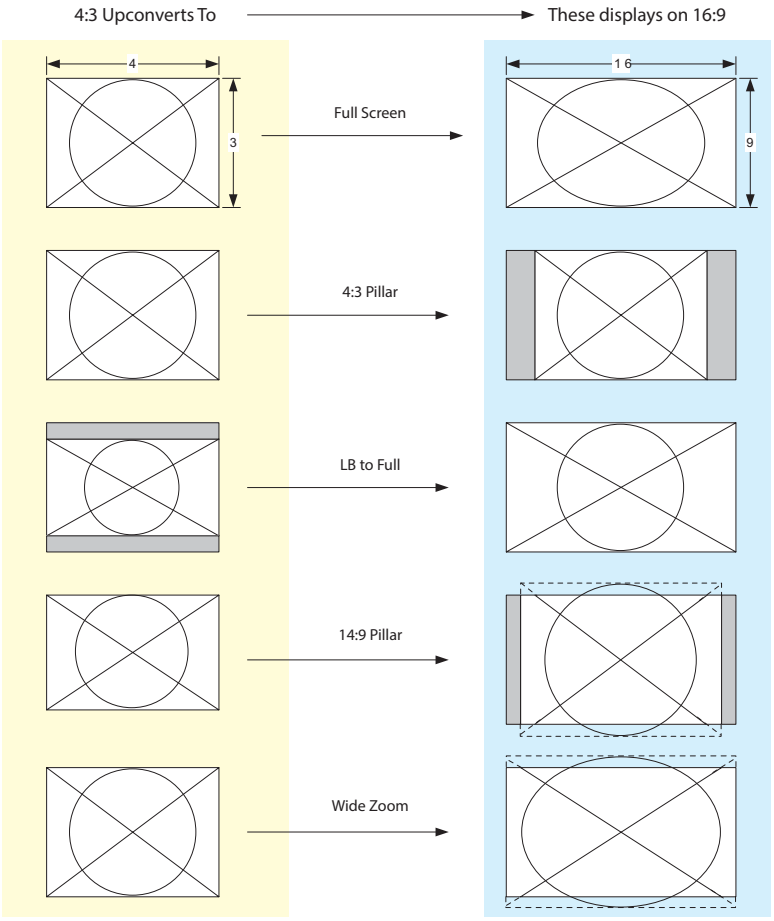
6 Upconvert Mode

These parameters select the type of upconversion the Video Processor performs on the selected input. This parameter has an effect only when the input has a narrower aspect ratio than the output (SD > HD, HD > 2K). 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 upconvert.

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).

NOTE: Any Custom Size/Pos values (only available in Four Channel Mode) will be applied on top of this settings.

Figure 32. Upconvert Illustrations



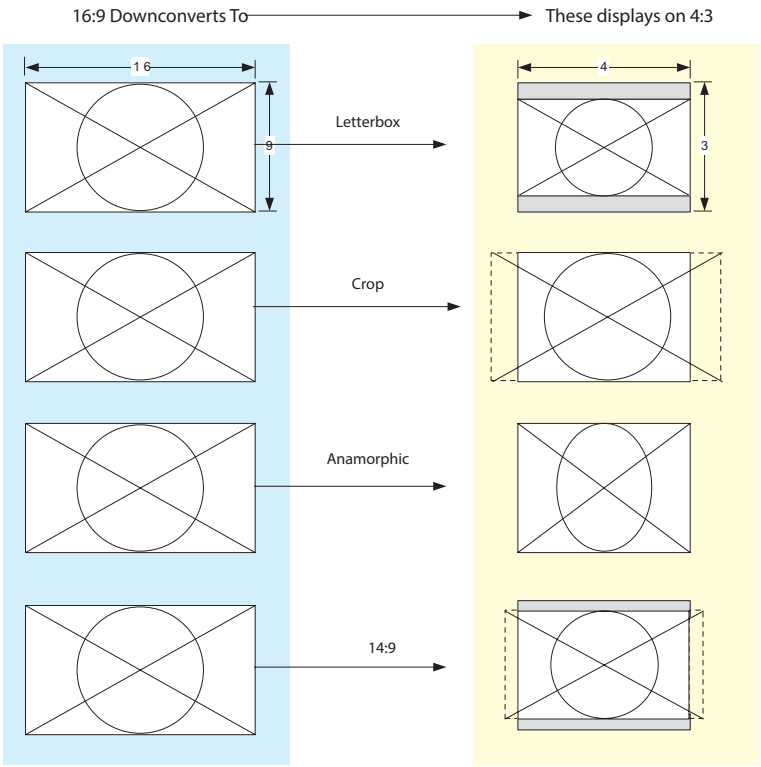
7 Downconvert Mode

These parameters select the type of down conversion the Video Processor performs on the selected input. This parameter has an effect only when the input has a wider aspect ratio than the output (HD > SD, 2K>HD). When down converting from 2K, the selections do not precisely describe the resulting picture. For example, 14x9 is not precisely 14x9. However, picture scaling is such that the visual effect closely resembles an HD-to-SD downconvert.

Crop (default)	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 the *Downconvert AFD Dflt* menu. With this selection any Custom Size/Pos settings and Region Of Interest settings are ignored.
Letterbox	Image is reduced with black top and bottom added to image area, with the aspect ratio preserved.

NOTE: Any Custom Size/Pos values (only available in Four Channel Mode) will be applied on top of this settings EXCEPT when Downconvert Mode is set to Auto AFD.

Figure 33. Downconvert Illustrations



AFD and 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." Because *Auto AFD* mode fully defines the size, position, and aspect ratio of the output raster, any *Custom Size/Pos* settings and any *Region Of Interest* settings are ignored, and those menus are hidden. FS4 AFD processing (passing, removing, and re-inserting) occurs based on the setting of parameter *"1.1 AFD Out" on page 68*.

SCALE Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

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.

1.0 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.

NOTE: The Custom Size/Pos feature is not available in Single Channel Mode if both the inputs and outputs are UltraHD/4K.

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

1.1 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.

1.2 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.

1.3 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.

1.4 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.

1.5 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.

1.6 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.

1.7 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.

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

NOTE: The ROI feature is not available in Single Channel Mode if both the inputs and outputs are UltraHD/4K.

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

2.0 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)	Turns off the ROI feature.
Setup	Enables ROI cursor.
On Square	Enables ROI and sets video to a pillarbox or letterbox shape.
On Full	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.

2.1 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.

2.2 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.

2.3 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.

2.4 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.

KEYER Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

1 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.

Black (default)	Selects black as the background fill video.
Matte	Selects matte as the background fill video.
Vid 1, 2, 3, 4 (4Ch only)	Select the output of another Video Processor as background fill video.

2 Sidebar Edge

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).

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)	

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.

TIMING Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

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).

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

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

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 10. 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

Table 10. Output Timing Ranges (continued)

Output Frame Rate	Horizontal		Vertical	
	Min	Max	Min	Max
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

3 Frame Delay

This parameter adjusts Video Processor output timing.

Variable	Adjustment output timing from 0 to 6 frames in one frame increments. Default: 0

NOTE: This delay amount is in addition to the FS4's default video latency. In Four Channel Mode and in Single Channel Mode with no Ultra-HD/4K up or down conversion, this default latency is nominally two frames at low frame rates (23.98/24/25/29.97/30 fps) or four frames at high frame rates (50/59.94/60 fps). In Single Channel Mode with UltraHD/4K up or down conversion being performed this default latency is nominally 3 frames at low frame rates or five frames at high frame rates.

TSTGEN Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

1 Test Pattern Gen

This parameter turns selects whether test pattern is output by that Video Processor.

Off (default) On	Normal video is output (no 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, Black, or a Freeze of last good video, depending on the current configuration.

2 Test Pattern

This parameter selects the type of test pattern output if Test Pattern Gen is on.

75% Bars (default)	Sets the test pattern to 75% color bars.
Flat	Sets the test pattern to flat field gray.
Black	Sets the test pattern to black.
100% Bars	Sets the test pattern to 100% color bars.

FREEZE Menu Group

IMPORTANT: In Four Channel Mode, the settings in this menu group apply only to the selected Video Processor (VID1- VID 4).

1 Freeze Output

This parameter tells the FS4 to freeze the current video frame on the Video Processor output. This may be useful either for testing or in case of loss of the input source.

Off (default)	Normal video is output (no freeze).
On	The FS4 captures and freezes the most current video frame and displays it on the outputs as long as this parameter is set to On.

NOTE: Normal output can be a version of its currently selected input, a Sidebar or Letterbox display, Black, or a Test Pattern, depending on the current configuration.

Audio Select Buttons EMBED, AES

IMPORTANT: These parameters are NOT affected by the selection of Single or Four Channel Mode.

As described in *"Operational Summary" on page 19*, the EMBED and AES front panel buttons select categories of audio.

- EMBED selects SDI embedded audio for control. The FS4 supports 16 embedded audio channels for each video channel.
- AES selects both AES and MADI audio for control, each with their own set of parameter menus. The FS4 supports up to 16 AES channels (eight pairs), and up to 64 MADI audio channels.

When the EMBED or AES button is selected, the three Audio buttons on the right are used to select a category of parameter menus.

Table 11. Audio Menu Group Buttons Activated with EMBED, AES Buttons

LEVEL
DELAY
MAP

LEVEL Menu Group

IMPORTANT: The settings in this menu group apply to the currently selected audio category (EMBED or AES/MADI). These settings are shared with both Four Channel and Single Channel modes.

The LEVEL menus provide Level and Phase adjustments for SDI Embedded, AES, MADI BNC, and MADI Fiber input audio.

EMBED Level Menus

When EMBED is selected, the following SDI Embedded Audio menus are available.

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 SDI1 Level Ch 1

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

2.0-8.0 SDI2-8 Level

Same as 1.0 SDI1 Level menu, except for SDI inputs 2 through 8, and similar level adjust submenus are available.

9.0 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.

9.1-9.16 SDI 1 Phase

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

10.0 - 16.0 SDI2-8 Phase

Same as 9.0 SDI1 Phase menu, except for SDI inputs 2 through 8, and similar phase adjust submenus are available.

AES/MADI Menus

When AES is selected, Level and Phase parameter menus for AES and MADI input audio are displayed. These menus are the similar to those used for Embedded Audio SDI1 Level and Phase.

1.0 AES Level Sixteen AES Level menus (and related submenus) are available.

2.0 MADI BNC Level Sixty four MADI BNC Level (and related submenus) are available.

3.0 MADIFIB Level Sixty four MADI Fiber Level (and related submenus) are available.

NOTE: For level adjustment information, see "1.0 SDI1 Level" on page 84.

4.0 AES Phase Sixteen AES Phase menus (and related submenus) are available.

5.0 MADI BNC Phase Sixty four MADI BNC Phase (and related submenus) are available

6.0 MADIFIB Phase Sixty four MADI Fiber Phase (and related submenus) are available.

NOTE: For Phase adjustment information, see "9.0 SDI1 Phase" on page 84.

DELAY Menu Group

IMPORTANT: The settings in this menu group apply to the currently selected audio category (EMBED or AES/MADI). These settings are shared with both Four Channel and Single Channel modes.

The DELAY Menu Group provides delay adjustments for SDI Embedded, AES, MADI BNC, and MADI Fiber input audio. Delay adjustments are applied to audio channel pairs.

EMBED Delay Menus

When EMBED is selected, the following SDI Embedded Audio menus are available.

1.0 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 -128 to +12288 in units of samples where 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.

1.1 SDI 1 Delay Global

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

SDI 1 Delay Global	The *ADJUST* knob sets the Global delay value. Adjustment range is -128 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.

1.1-1.8 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 -128 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.

2.0 - 8.0 SDI2-8 Delay

Same as 1.0 SDI1 Delay menu, except for SDI inputs 2 through 8, and similar delay adjust submenus are available.

AES/MADI Delay Menus

When AES is selected, Delay parameter menus for AES and MADI input audio are displayed. These menus are the similar to those used for Embedded Audio SDI1 Delay.

1.0 AES Delay

Sixteen AES Level menus (and related submenus) are available.

2.0 MADI BNC Delay

Sixty four MADI BNC Level (and related submenus) are available.

3.0 MADIFIB Delay

Sixty four MADI Fiber Level (and related submenus) are available.

NOTE: For level adjustment information, see "1.0 SDI1 Delay" on page 85.

MAP Menu Group

IMPORTANT: The settings in this menu group apply to the currently selected audio category (EMBED or AES/MADI). These settings are NOT shared with both Four Channel and Single Channel modes.

The MAP menus provide FS4 audio routing controls. Any audio input can be routed to any audio output, except the Monitor output embedded audio always matches the monitored video.

About Audio Routing

The following menus control the FS4'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. Channel mapping allows different individual audio channels to be routed to different individual outputs.

See *"System Video/Audio Cable Connections" on page 33* for more information about FS4 signal routing.

1.0 Vid 1 Audio Out

This parameter selects the audio input sources for the selected FS4 Video Processor's audio output channels. The factory default for each output is the corresponding input: i.e. SDI1 to SDI1, SDI2 to SDI2, etc.

SDI1 - 8 AES/EBU MADI BNC MADI Fiber	The selected source channels are routed to the corresponding output channels.
Mix Down 1 L:R	The stereo output of the Mix Down 1 Module is routed to the output channels 1 and 2. The other channels are muted.
Mix Down 2 L:R	(4Ch only) The stereo output of the Mix Down 2Module is routed to the 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 of the selected Video Processor.
Map	The currently configured mapping is applied to each output channel of the selected Video Processor. Channel mapping menus for each output become available.

When set to SDI1-8, AES/EBU, or MADI:

- The selected source channels are routed to the corresponding output channels. 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.

1.1-1.16 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: -SDI1-8 Ch 1 - Ch 16 -AES Ch 1-16 -MADI BNC 1-64 -MADI Fiber 1-64 -Mix Down 1 L -Mix Down 1 R -Mix Down 2 L (4Ch only) -Mix Down 2 R (4Ch only) -Sig Gen 1kHz -Sig Gen 400Hz -Mute

2.0-4.0 SDI2-4 Audio Out

See *"1.0 Vid 1 Audio Out" on page 87*

Chapter 5: Browser Remote Control

Remote FS4 Control Via a Web Browser

The FS4 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 FS4 cable connection
- Broadband wide area network (WAN) with the firewall opened for the FS4 (not recommended since anyone on the internet can then access the FS4)

Internally the FS4 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 FS4 IP address in the browser's address field.

By default, the FS4 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 *STATUS* Menu Group as follows:

1. Press the *STATUS* button on the FS4 front panel.
2. Turn the *SELECT* knob until you reach status display with the FS4 name at the top.
3. Enter the IP address shown in the IP Addr field.

When the browser successfully connects to the FS4, the main *Status* screen 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 FS4, or make the FS4 match your computer.

General Web Browser Screen Description

The webpage screens are different, depending on the current FS4 operating mode. All FS4 screens share some 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. Collapse/expand buttons on the upper right of each menu lets you open and close that menu’s selection list.

Alarms

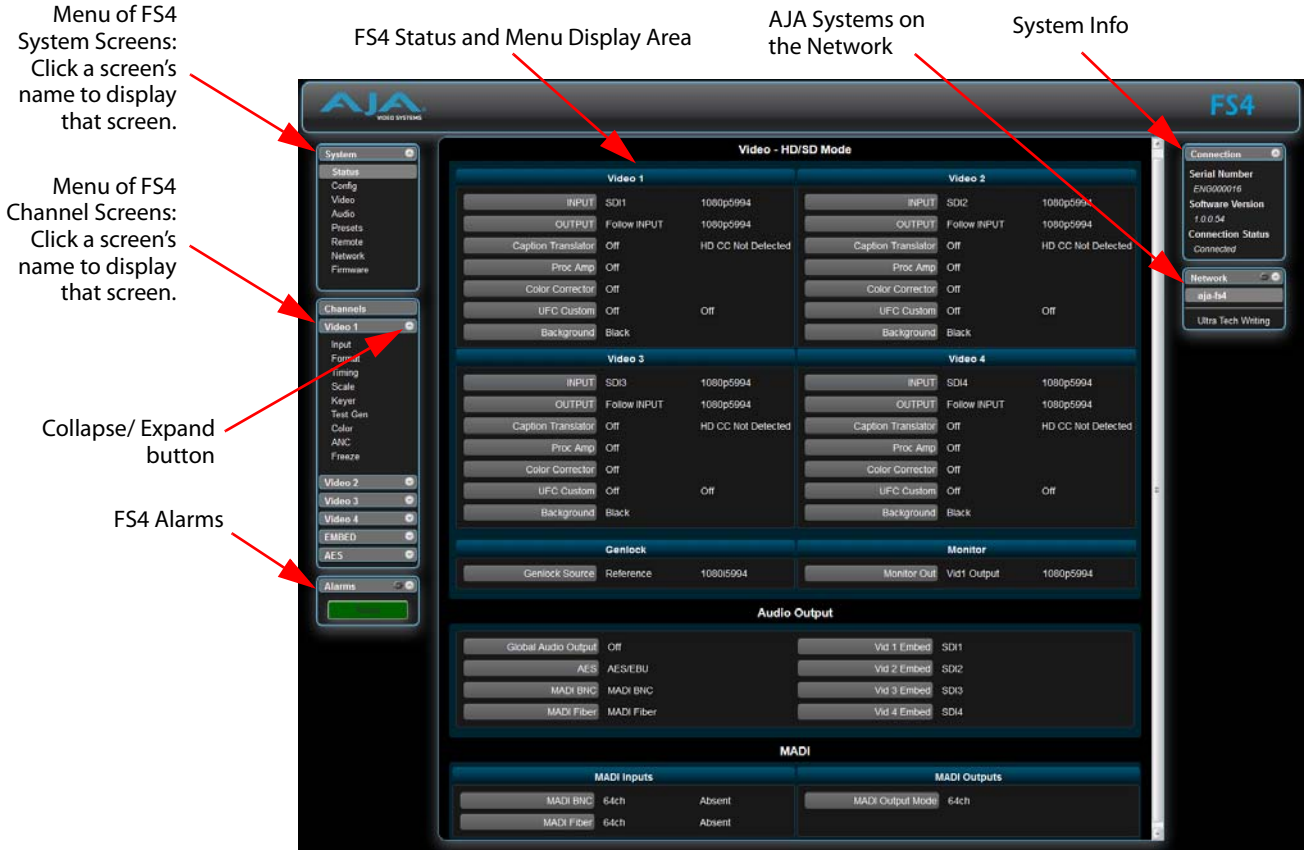
The lower left side of the screen shows alarms that alert you to possible problem conditions, such as disconnected or failed power supplies and video format incompatibilities.

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 FS4 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 FS4 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 FS4 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 34. FS4 Web Interface, Main Status Screen, Four Ch Mode



Controlling Multiple FS4s

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 FS4 you are controlling. Clicking on any of the listed systems will bring up the *Status* screen of that device.

NOTE: The FS4 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 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

FS4 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).

Caution!
Recall Factory Preset changes the settings for both Single Channel and Four Channel FS4 operating modes to their factory default values.

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 FS4 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.

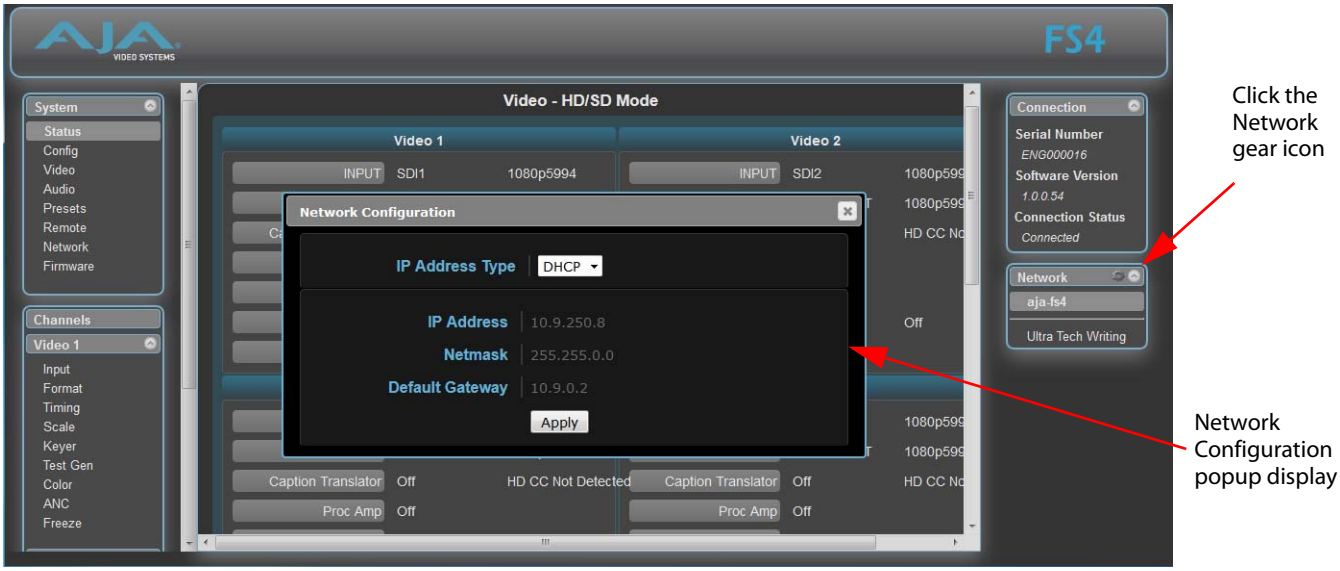
Screen Descriptions

Now that you have had an introduction to how the FS4 browser works and how to navigate the screens, each screen and its settings are described in detail (click to jump).

- *"Network Pane and Network Configuration Screen" on page 91*
- *"Alarm Configuration Screen" on page 93*

- *"Status Screen" on page 94*
- *"Config Screen" on page 96*
- *"Video Screen" on page 98*
- *"Audio Screen" on page 99*
- *"Presets Screen" on page 100*
- *"Remote Screen" on page 102*
- *"Firmware Screen" on page 103*
- *"Video Channel Screens" on page 103*
- *"AES (and MADI) Audio Channel Screens" on page 111*

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 FS4 network settings.

The *Network Configuration* screen allows you to view and change your FS4's network settings and then click *Apply* to activate them.

See *"Networking" on page 29 for* detailed setup instructions for connecting the FS4 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 FS4. *DHCP* enables the FS4 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 FS4 cannot find a DHCP server, it fails over to the static IP address.
Static Addr	Assign a static IP address manually. The factory default static IP address: 192.168.0.2

IP Address

IP Address determines the static IP address used by the FS4 for TCP/IP networking. (Networking is discussed in *Chapter 3, Network Connection*.) Consult your network administrator about how to set this value.

Variable	If *IP Address Type* is set to *DHCP*, the IP address is set automatically by the network DHCP server and cannot be entered here. If *IP Address Type* is set to *Static*, enter an IP address compatible with your LAN here. Also enter a netmask and default gateway address in the following two parameters. Click *Apply* when you are ready to apply all three entries to change the FS4's network addressing. If *IP Address Type* is set to *DHCP* 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

Netmask

Netmask determines the subnet mask used by the FS4 for TCP/IP networking.

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

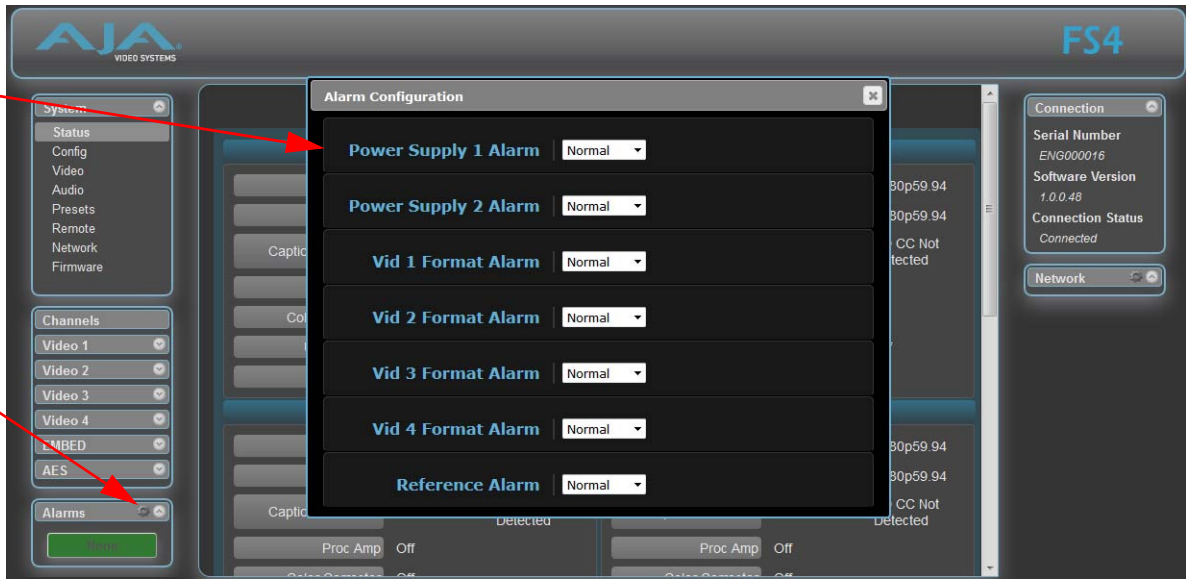
Default Gateway

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

Without a properly configured default gateway (whether you have a router/gateway or not), the FS4 will be unable to see other AJA FS devices on the network, although you may still be able to control this FS4 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	Enter a default gateway or router address. This is only needed for Static IP configurations. The factory *Default Gateway* is 192.168.0.1. If *IP Address Type* is set to DHCP, the Default Gateway is set by the DHCP server and cannot be changed by the user.

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 *"5.1, 5.2 Power Supply 1-2 Alarm" on page 58*)
- Video Format Alarm (see *"6 Vid Format Alarm" on page 58*)
- Reference Alarm (see *"7 Reference Alarm" on page 58*)

Status Screen

Figure 35. Status Screen Top, Four Channel Mode

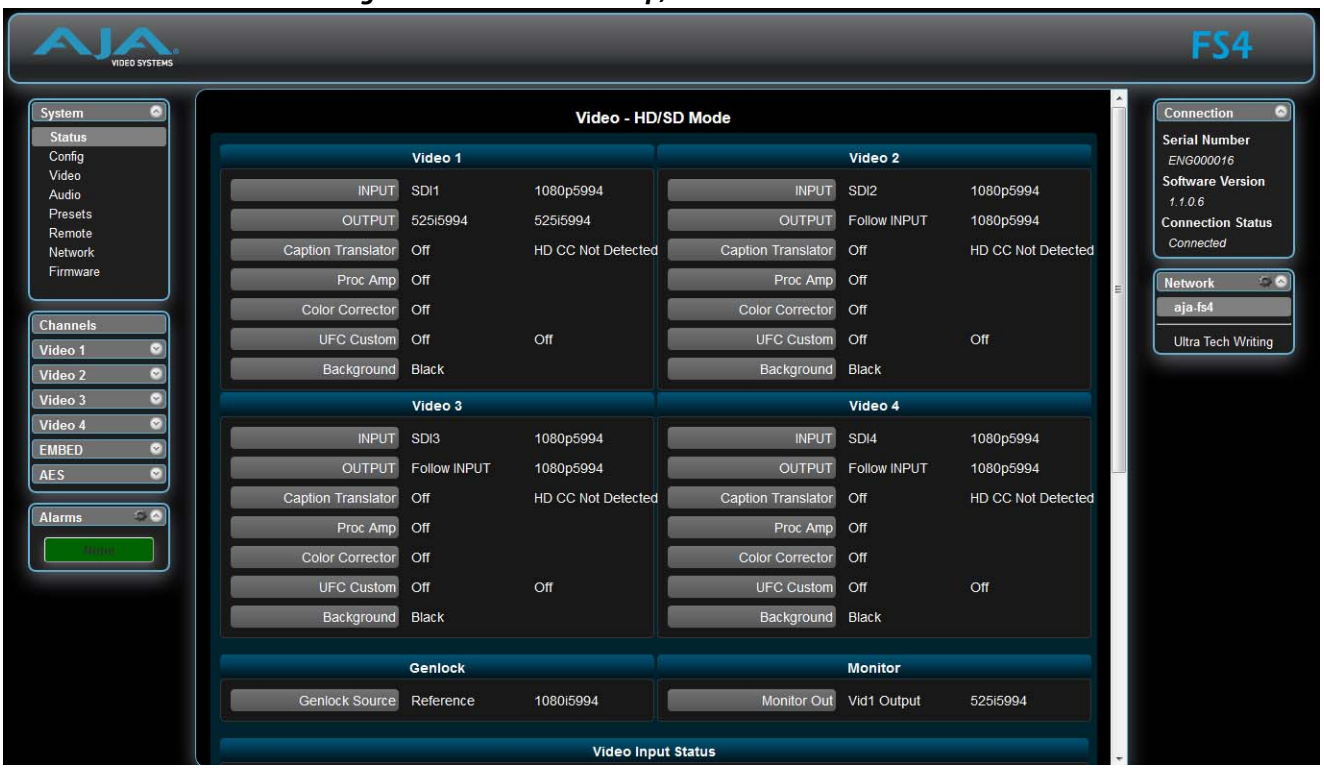
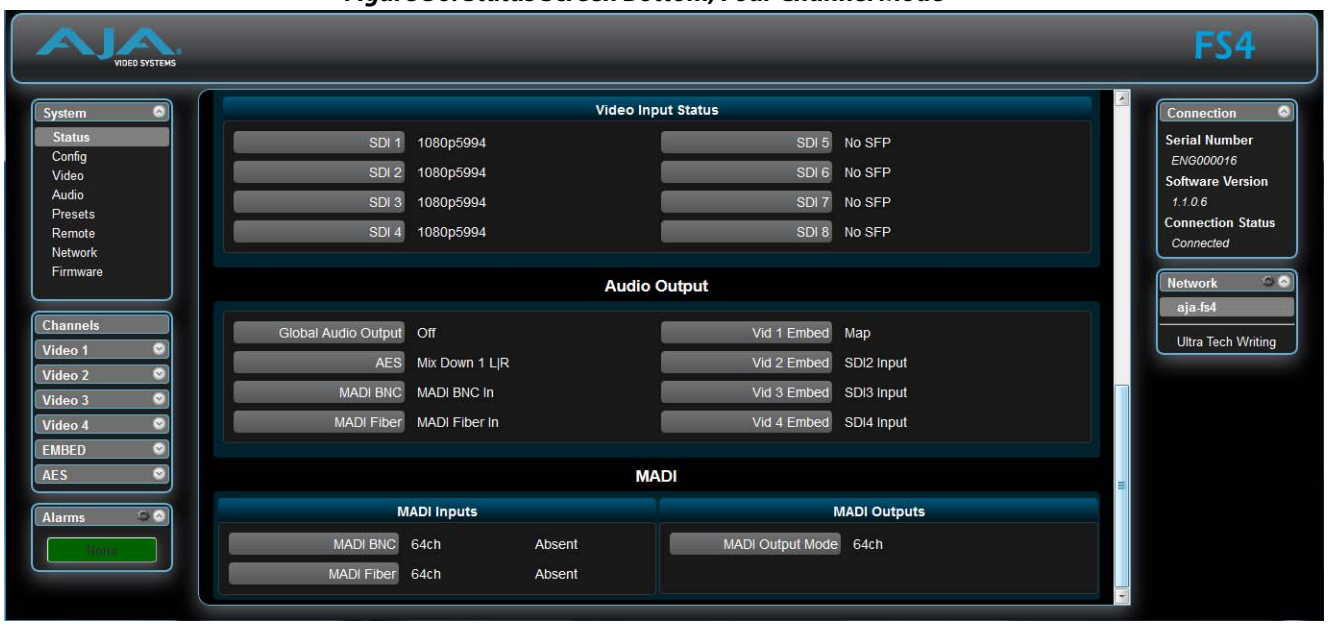


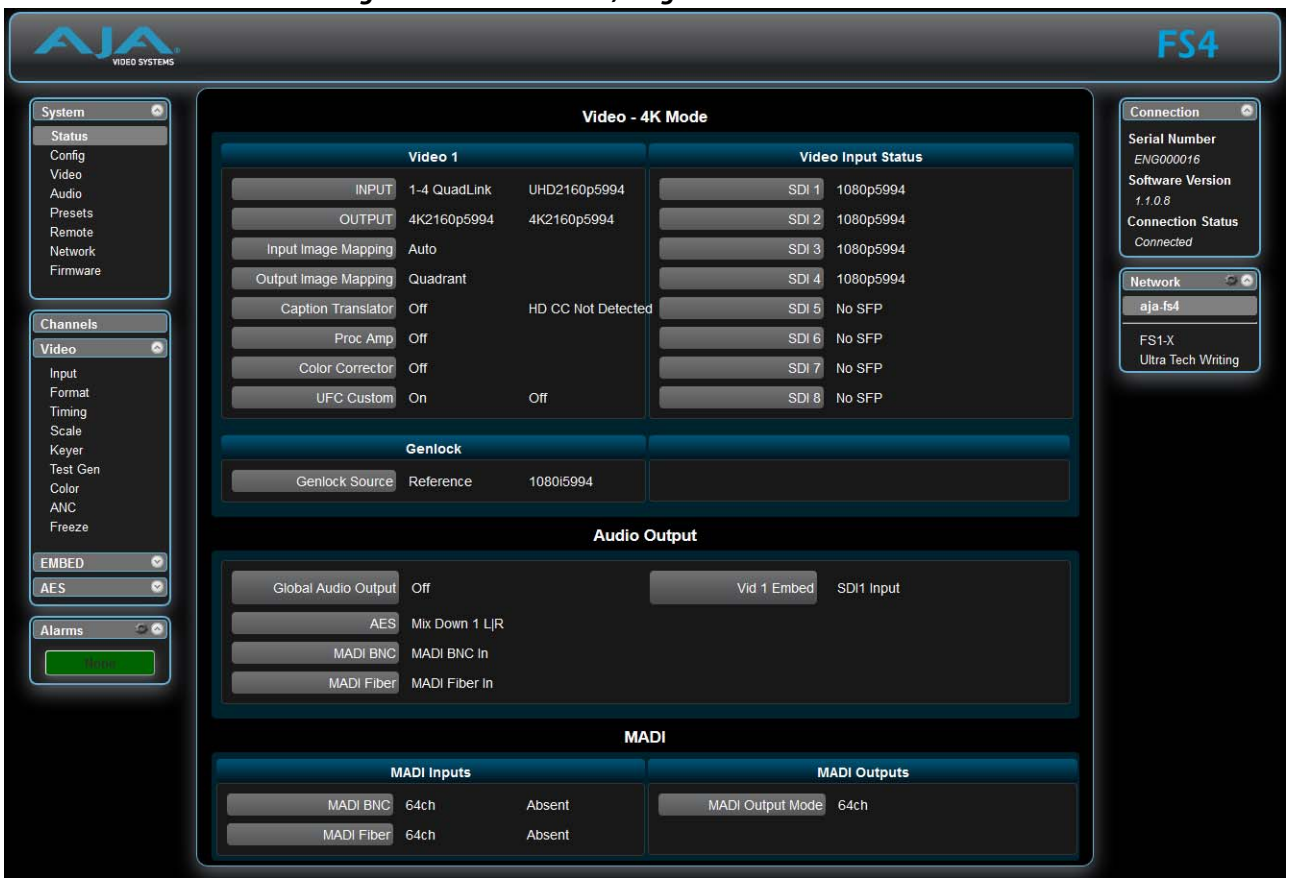
Figure 36. Status Screen Bottom, Four Channel Mode



The Status screen displays overall FS4 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.

Video 1-4	INPUT OUTPUT Caption Translator Freeze Output Proc Amp Color Corrector UFC Custom Background	Shows the input source and format. Shows the output video selection and format. Shows the caption selection and caption signal presence. Shows whether Freeze Output is On or Off. Shows whether the Proc Amp is On or Off. Shows whether the Color Corrector (RGB) is On or Off. Shows whether Custom conversion, AFD, and ROI are On or Off. Shows the current background signal (Black or Matte).
Genlock	Genlock Source	Shows the source of the genlock reference, and its format.
Video Input Status	SDI 1 - 8	Shows the status of each Video input (BNCs and SFPs).
Audio Output	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 FS4 audio outputs. When set to Off, the other Audio Outputs display their selected value, otherwise only the Global Audio Output setting is displayed.
	AES MADI BNC MADI Fiber Vid1-4 Embed	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.

Figure 37. Status Screen, Single Channel Mode

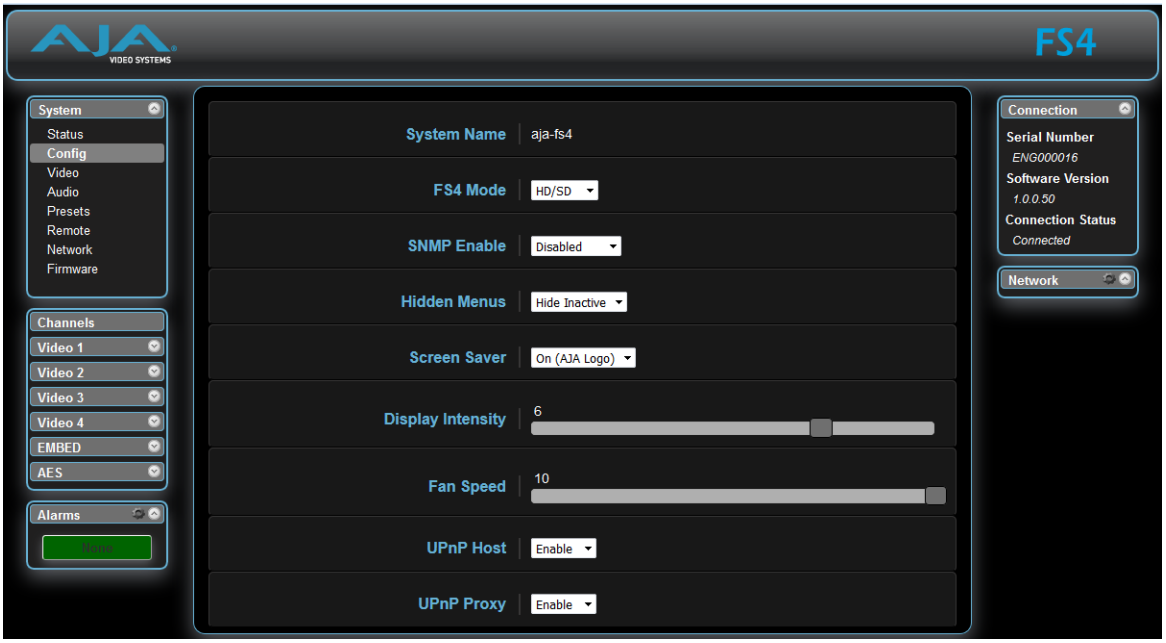


The Status screen in Four Channel Mode is the same as Single Channel Mode, except:

- Status information for only Video 1 is displayed (no Vid Proc 2, 3, or 4)
- Input and Playback Image Mapping statuses are displayed.
- Background Video status is not displayed (can only be Black or Matte)
- Audio Vid 2-4 Embed parameters are not displayed
- The following additional items are displayed:

Video 1	Input Image Mapping Output Image Mapping	Shows either Auto, Quadrant or 2SI. Shows either Quadrant or 2SI.

Config Screen



The *Config* screen includes functions to name the FS4, select the FS4 operating Mode, 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 FS4 system. To change the System Name, click on and drag the cursor across the displayed name, and type in a new name. Hit enter when finished or click outside the name control to cancel. The System Name is the same for both the Four Channel and Single Channel modes of operation.

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.

FS4 Mode

Selects whether the FS4 will operate in Four Channel or Single Channel mode. A confirm dialog displays a warning that a reboot of the FS4 system will occur.

HD/SD	After reboot the FS4 will operate in Four Channel (HD/SD) mode.
4K/UHD	After reboot the FS4 will operate in Single Channel (4K/UHD) mode.

SNMP Parameters

The following parameters are used to setup the FS4 SNMP (Simple Network Management Protocol) feature.

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

Refer to *"Chapter 6: SNMP on page 113"* for a description of SNMP and how the FS4 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.

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.

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

Fan Speed

This parameter determines the speed (and sound level) of the FS4's internal cooling fans.

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

UPnP Host

UPnP Host enables the FS4 to be discovered by a Windows network.

Enable (default)	Enables the FS4 to be discovered by a Windows network.
Disable	Disables Windows network discovery of the FS4.

When this parameter is enabled, you can view the FS4 on a Windows Network by clicking these selections in Windows: *Computer* > *Network* (in left pane). Any FS4s 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.

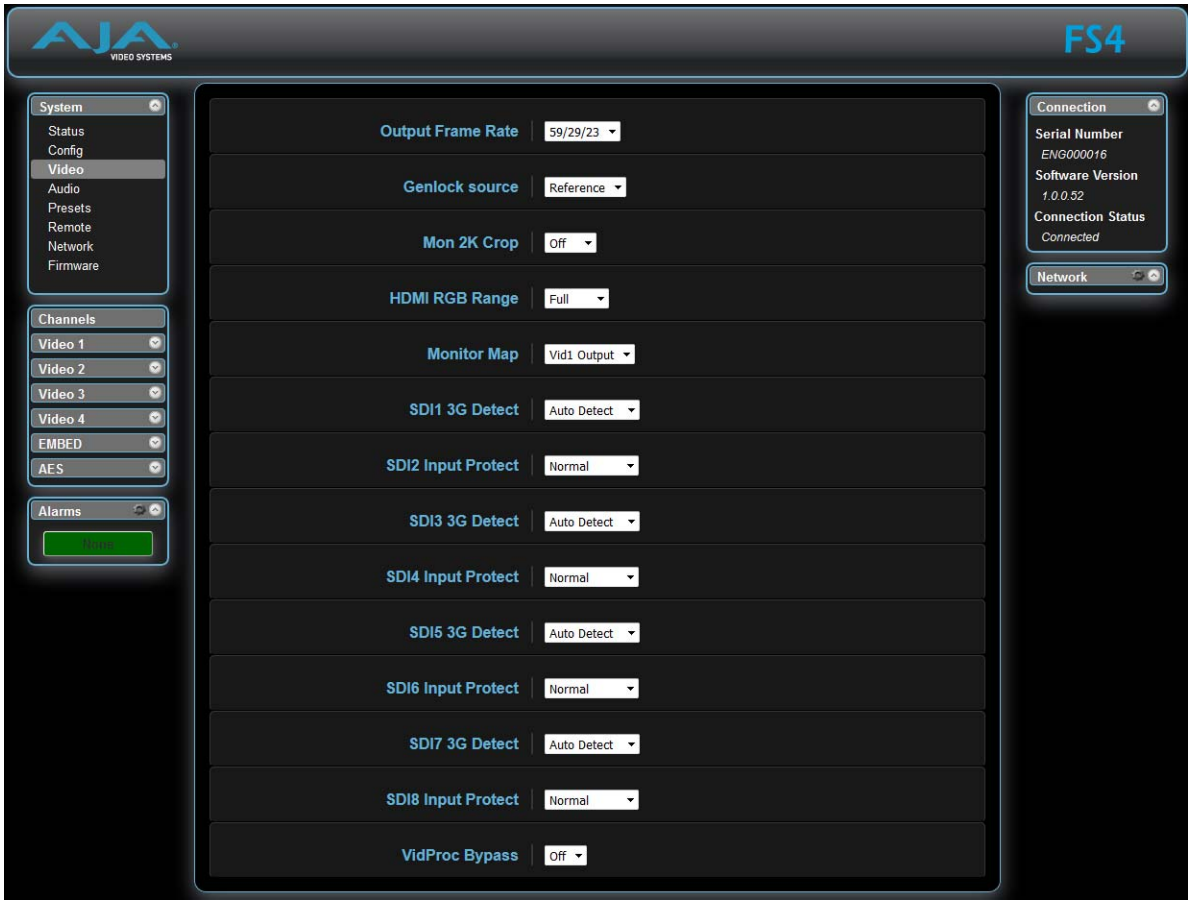
UPnP Proxy

UPnP Proxy enables the FS4 to serve as a proxy for other AJA devices, allowing them to be discovered on a Windows network through the FS4. When enabled, the FS4 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 FS4 Network window. Once the devices appear on the network, they can connect directly to other devices and computers without involving the FS4.

Enable (default)	Enables the FS4 to connect other AJA devices to the network.
Disable	Disables the FS4 from serving as a proxy for AJA devices.

Video Screen

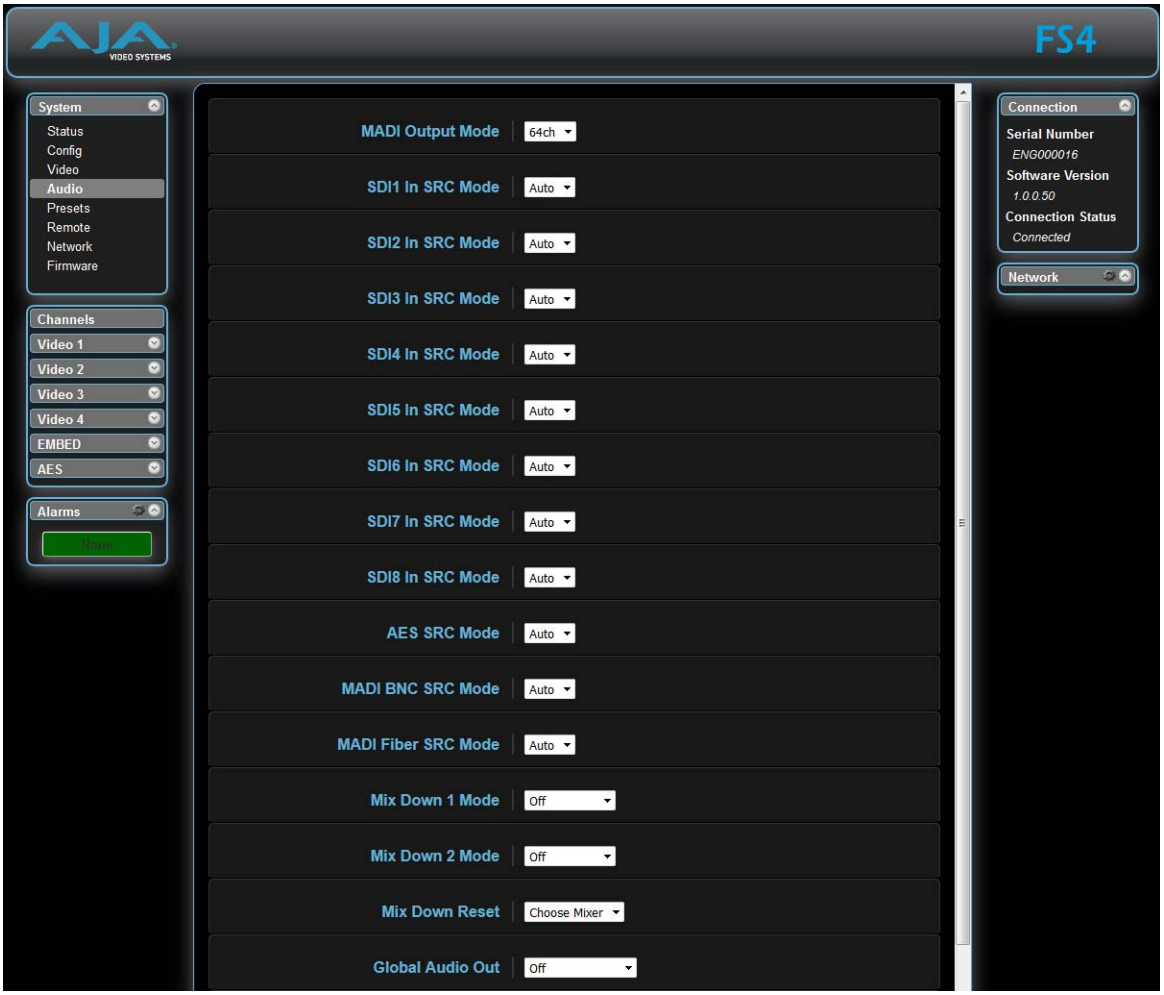


The Video screen controls the FS4's system wide video signal processing. The parameters available on the Video browser screen are essentially identical to the front panel display menus. The only difference is parameters are set using webpage controls (drop down menus, slider adjustments) instead of control knobs. Complete descriptions of these parameters are accessible using the following cross references:

- *"1 Output Frame Rate" on page 53*
- *"2 Genlock Source" on page 53*
- *"3.1 Mon 2K Crop" on page 53*
- *"3.2 HDMI RGB Range" on page 53*
- *"3.3 Monitor Map" on page 54*
- *"4.1 SDI1 3G Detect" on page 54*
- *"4.2 SDI2 Input Protect" on page 54*
- *"4.3, 4.5, 4.7 SDI3/5/7 3G Detect" on page 55*

- *"4.4, 4.6, 4.8 SDI4/6/8 Input Protect" on page 55*
- *"5.1 VidProc Bypass" on page 55*

Audio Screen

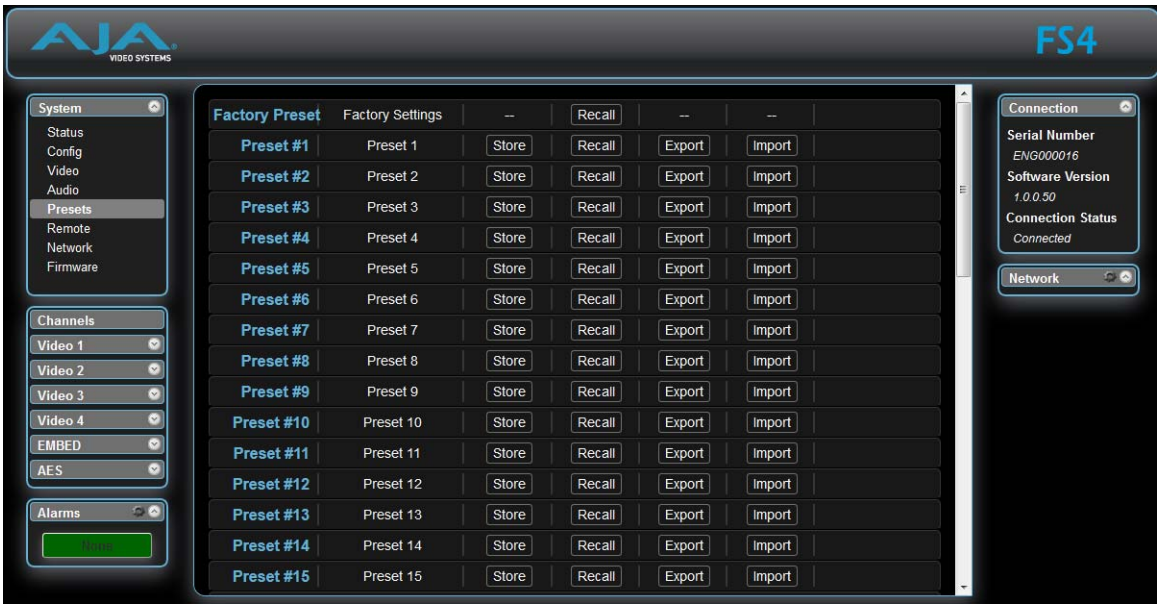


The Audio screen controls the FS4's system wide audio signal processing. The parameters available on the Audio browser screen are essentially identical to the front panel display menus. The only difference is parameters are set using webpage controls (drop down menus, slider adjustments) instead of control knobs. Complete descriptions of these parameters are accessible using the following cross references:

- *"1 MADI Output Mode" on page 59*
- *"2.1-2.8 SDI 1-8 SRC Mode" on page 60*
- *"2.9 AES SRC Mode" on page 60*
- *"2.10 MADI BNC SRC Mode" on page 60*
- *"2.11 MADI Fiber SRC Mode" on page 60*
- *"3.0 Mix Down 1 Mode" on page 61*
- *"3.0 Mix Down 2 Mode" on page 62*
- *"7 Mix Down Reset" on page 63*
- *"8 Global Audio Output" on page 63*

- *"9 Reset Mapped Output" on page 63*

Presets Screen



The *Presets* screen allows you to save FS4 Preset Configurations into 40 separate memory registers and recall the presets whenever needed. Each FS4 operating mode (Four Channel and Single Channel) has its own set of 40 presets (80 total).

	Caution! In Four Channel Mode, each Preset saves all the settings for all four channels. Storing and recalling a Preset will affect all the settings for all four channels in that mode. Care must be taken to establish a policy for the use of FS4 Presets, especially if the FS4 is operated in Four Channel mode and the different channels have different users.

The *Presets* screen also includes Export and Import functions that allow exporting one or all FS4 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 Factory Preset changes the settings for both Single Channel and Four Channel FS4 operating modes to their factory default values.

Recall The *Recall* buttons recall saved FS4 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 FS4 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 FS4.

Export Presets 1–40 (All) *Export All* lets you save the contents of all presets to a file on your computer.

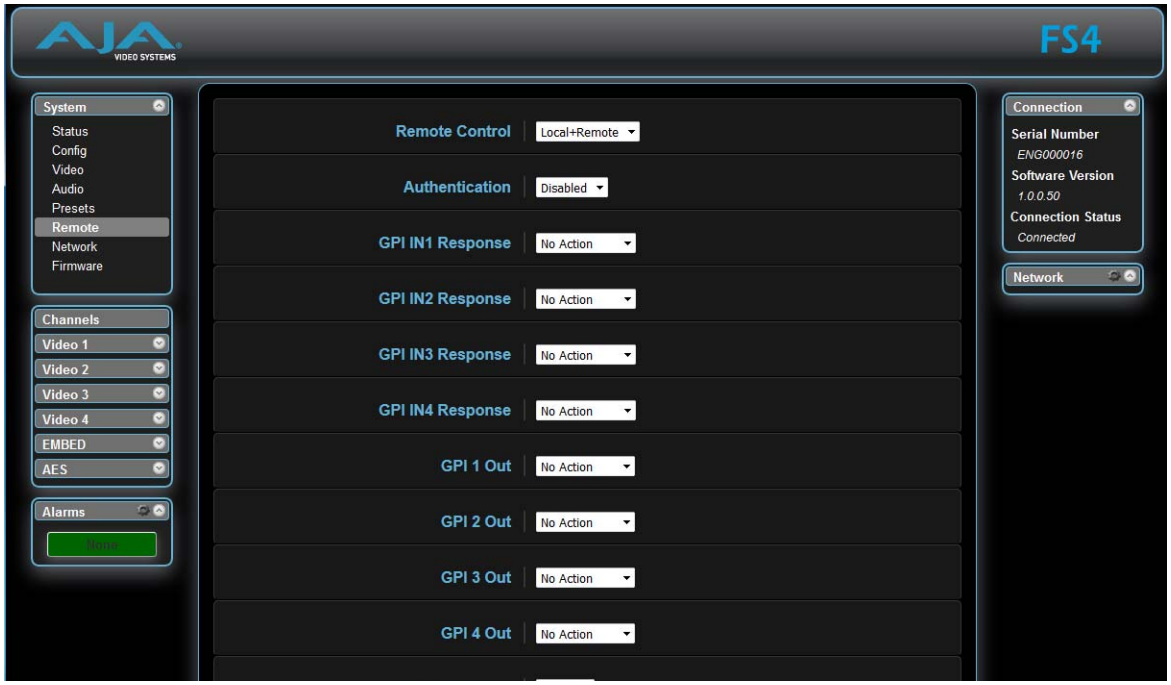
The file gets exported to the default download location specified in your browser options with the name *all.presets*. If you export multiple files, a number gets appended to ensure a unique file name.

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 52*.

Remote Screen

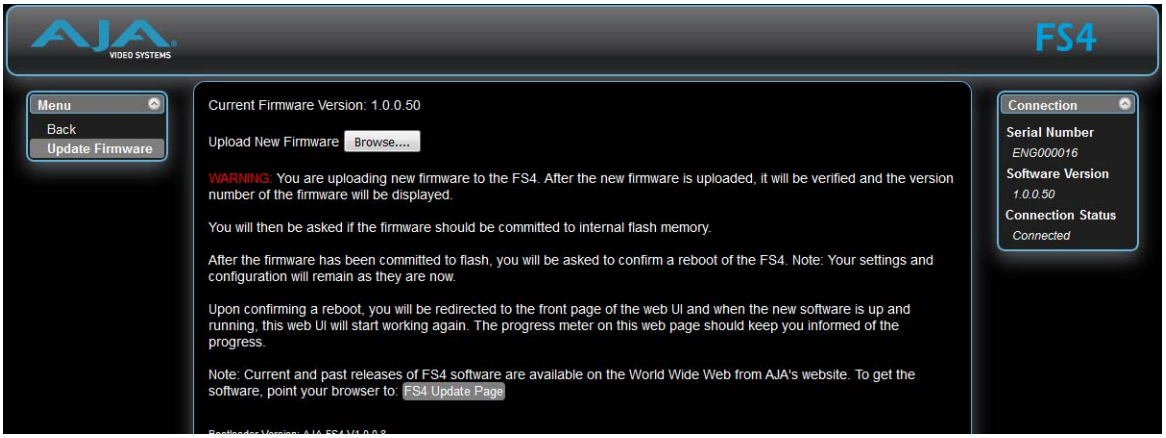


The *REMOTE* screen contains parameters that affect how the FS4 is controlled. Control options include the front panel, a remote computer running a browser, and GPI inputs and outputs.

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 50* for detailed information about FS4remote control options.

Firmware Screen



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

The *FS4 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) to locate and download the updated software. The following page provides FS4 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 FS4. See *"Software Update Installation" on page 32* for more information.

Video Channel Screens

The Video Channel screens control the FS4's video signal processing of that channel (either four or one, depending on mode). In Four Channel Mode four menu groups are selected on the left. In Single Channel Mode only one menu group is available.

The parameters available on the Video Channel 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. Select the right arrow to display the video channel of interest, and select a category (such as 'Input') to view and change related parameters.

Input Screen

Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1 Input" on page 65*
- *"2 Loss of Input" on page 66*
- *"3 Reverse Telecine" on page 66*
- *"4 Input Scan Format" on page 67*

Format Screen

Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1 Output Format" on page 72*

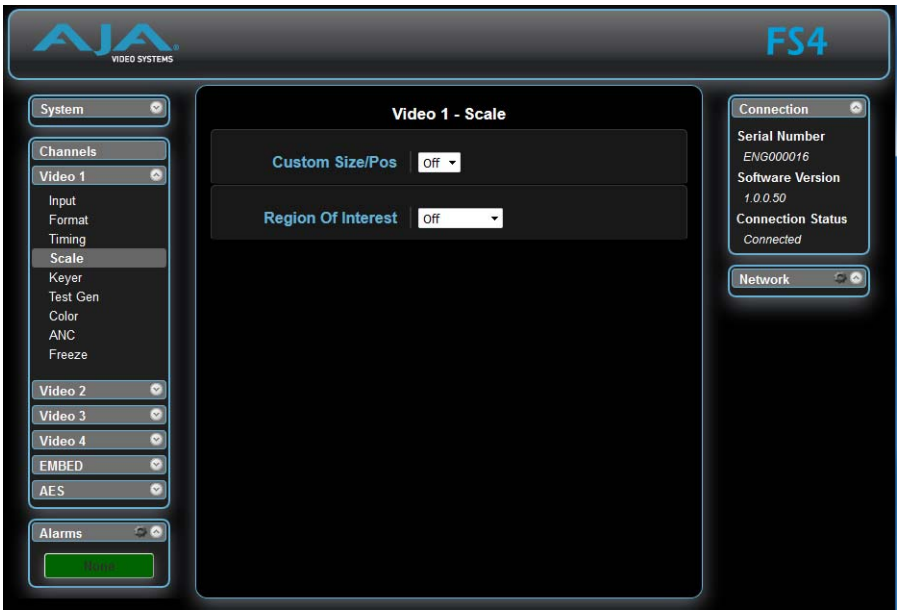
- *"2.0 Link Config SDI1, 2, 3, 4" on page 73*
- *"2.1 Level B SDI1, 2, 3, 4" on page 73*
- *"2.0 Link Config SDI1-4" on page 73*
- *"3.0 Link Config SDI5-8" on page 74*
- *"4 Output Image Mapping" on page 74*
- *"6 Upconvert Mode" on page 75*
- *"7 Downconvert Mode" on page 76*

Timing Screen

Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1 Output Timing H" on page 81*
- *"2 Output Timing V" on page 81*
- *"3 Frame Delay" on page 82*

Scale Screen

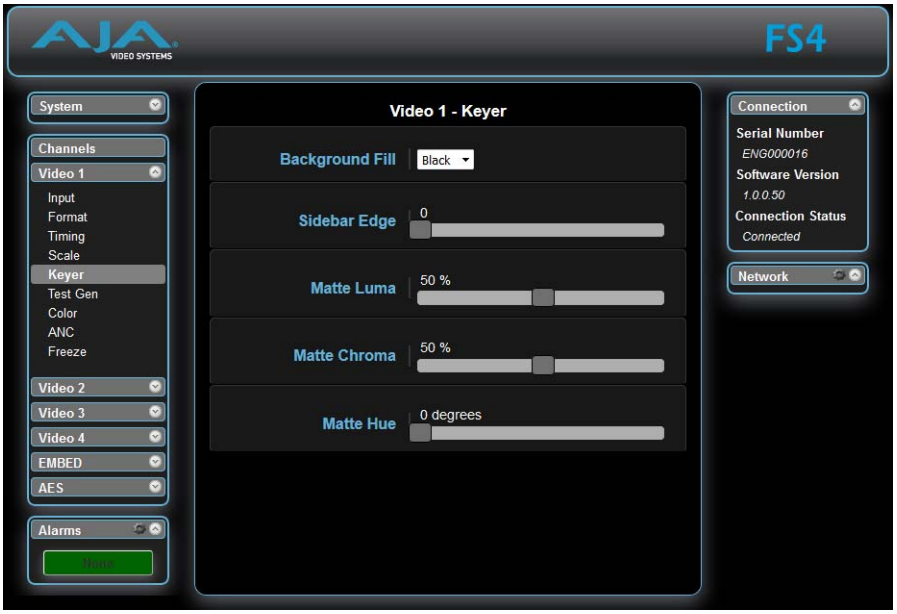


NOTE: If AFD is enabled, these parameters do not display

Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"Custom Conversion Settings" on page 77*
- *"Region of Interest (ROI)" on page 79*

Keyer Screen

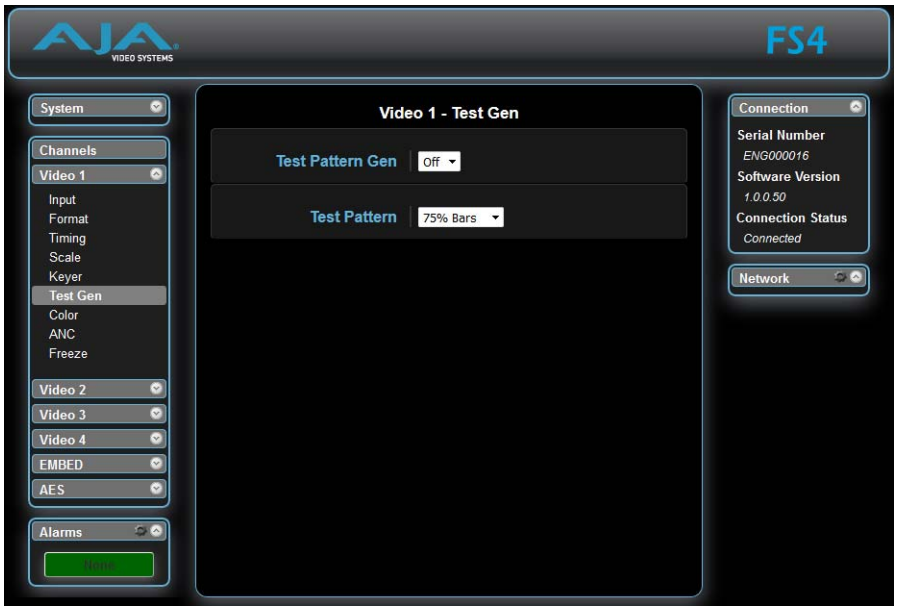


Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1 Background Fill" on page 80*
- *"2 Sidebar Edge" on page 80*

- *"11.1 Matte Luma" on page 80*
- *"11.2 Matte Chroma" on page 80*
- *"11.3 Matte Hue" on page 80*

Test Gen Screen



Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1 Test Pattern Gen" on page 82*
- *"2 Test Pattern" on page 83*

Color Screen

Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1.0 Proc Amp Enable (YUV)" on page 70*
- *"2.0 Color Corrector (RGB)" on page 71*
- *"3.0 Video Legalizer" on page 71*

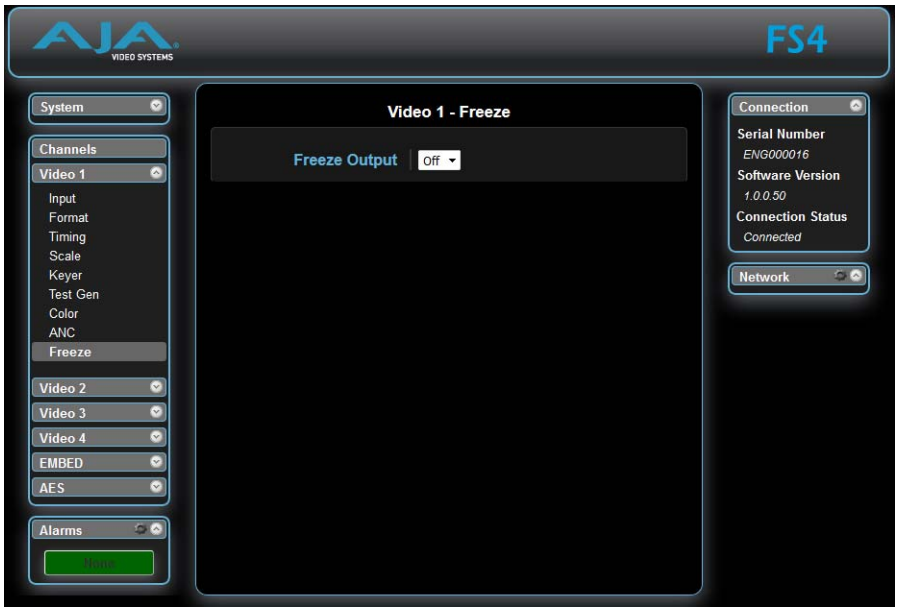
ANC Screen

Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1.1 AFD Out" on page 68*
- *"1.2 AFD VANC Output Lines" on page 68*

- *"1.3 Downconvert AFD dflt" on page 69*
- *"2 Caption Xlator" on page 69*
- *"3 SD Line 21 Blanking" on page 70*

Freeze Screen



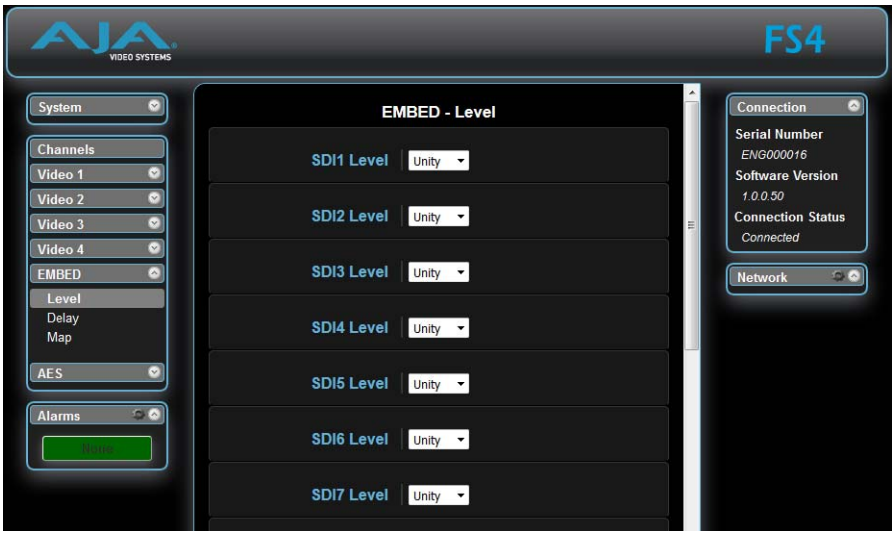
Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1 Freeze Output" on page 83*

Embedded Audio Channel Screens

The Embedded Audio Channel browser screens display Level, Delay, and Mapping controls for the Embedded audio channels. When the SDI output signal has multiple links, the audio is always embedded on the first link of the SDI output channel.

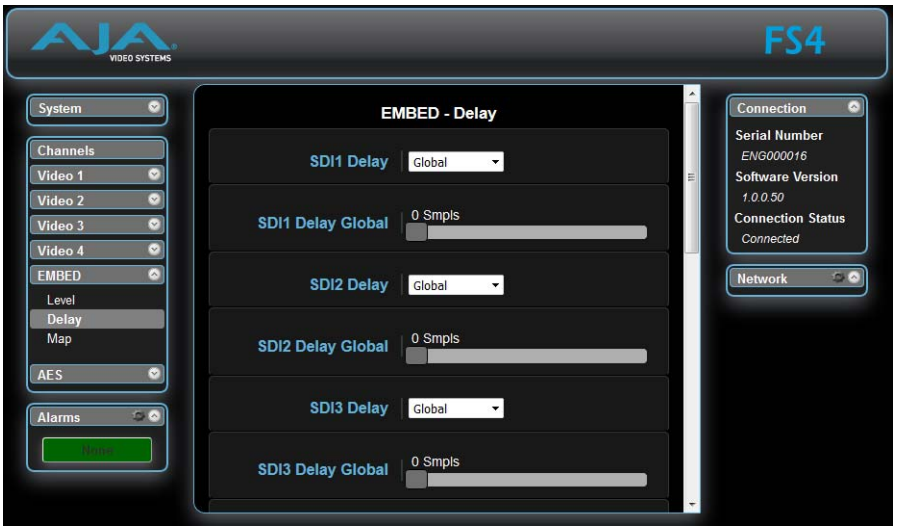
Embed Level Screen



Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"EMBED Level Menus" on page 84*

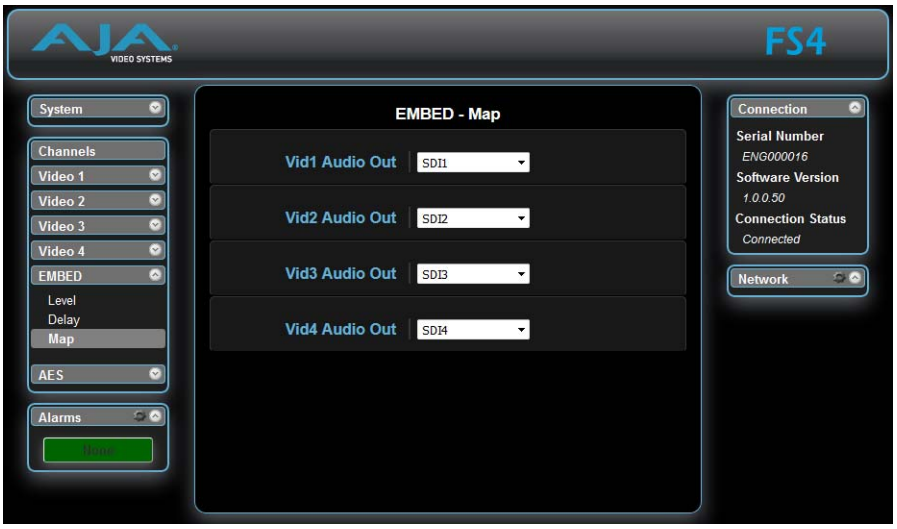
Embed Delay Screen



Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"EMBED Delay Menus" on page 85*

Embed Map Screen



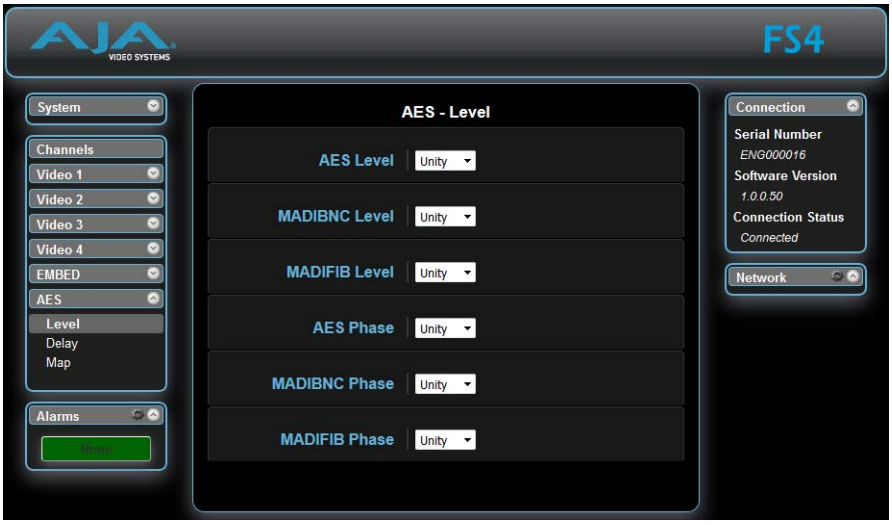
Complete descriptions of the parameters on this screen are accessible using the following cross references:

- *"1.0 Vid 1 Audio Out" on page 87*
- *"2.0-4.0 SDI2-4 Audio Out" on page 87*

AES (and MADI) Audio Channel Screens

The AES Audio Channel browser screens display Level, Delay, and Mapping controls for the AES, MADI BNC and MADI Fiber audio channels.

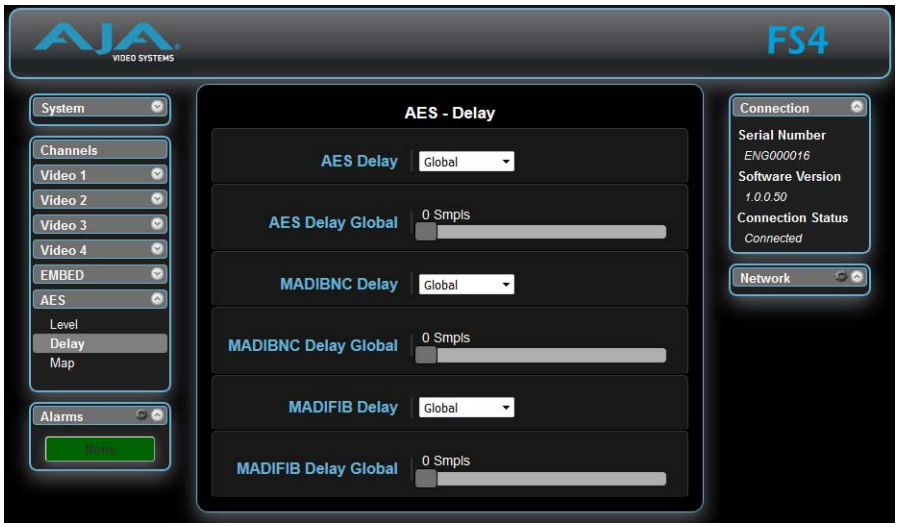
AES/MADI Level Screen



The parameters on this screen are similar to those for the Embedded Audio Channel screens, except they apply to either AES or MADI audio inputs. For more information see:

- *"EMBED Level Menus" on page 84*

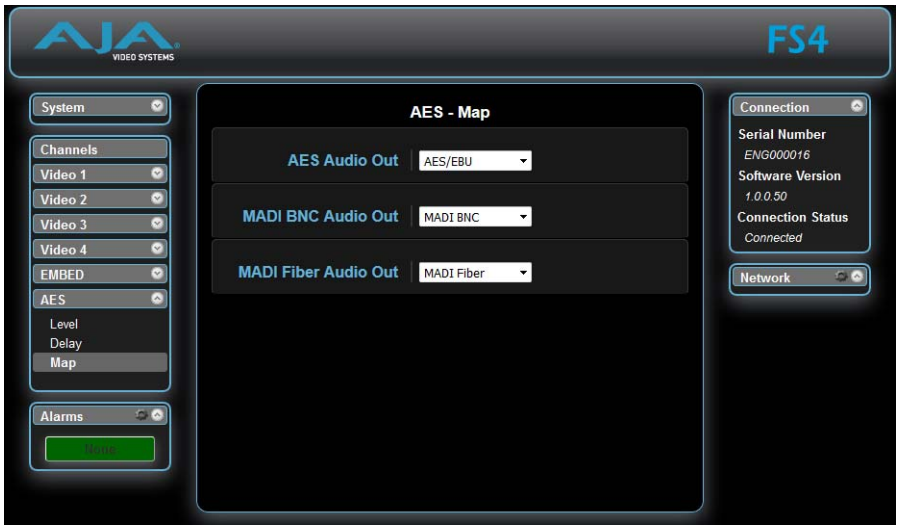
AES/MADI Delay Screen



The parameters on this screen are similar to those for the Embedded Audio Channel screens, except they apply to either AES or MADI audio inputs. For more information see:

- *"EMBED Delay Menus" on page 85*

AES/MADI Map Screen



The parameters on this screen are similar to those for the Embedded Audio Channel screens, except they apply to either AES or MADI audio inputs. For more information see:

- *"1.0 Vid 1 Audio Out" on page 87*
- *"2.0-4.0 SDI2-4 Audio Out" on page 87*

Chapter 6: SNMP

FS4 Simple Network Management Protocol

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 FS4 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 MIB (Management Information Base) files. The trap messages are sent to a server-based external NMS (Network Management System) destination. For example, the FS4 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 FS4 must be configured for SNMP messaging. By default SNMP is disabled on the FS4. 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 FS4 to the client network management system (NMS) as a trap message:

- FS4 power supply 1 Alarm
- FS4 power supply 2 Alarm
- No Reference Alarm
- Incompatible Reference Alarm
- Format incompatibility Video Proc Alarm
- Format incompatibility Video Proc 1 Alarm
- Format incompatibility Video Proc 2 Alarm
- Format incompatibility Video Proc 3 Alarm
- Format incompatibility Video Proc 4 Alarm
- Video Proc 1 Background format Alarm
- Video Proc 2 Background format Alarm
- Video Proc 3 Background format Alarm
- Video Proc 4 Background format Alarm
- Video Proc 1 Background Timing Alarm
- Video Proc 2 Background Timing Alarm
- Video Proc 3 Background Timing Alarm
- Video Proc 4 Background Timing Alarm
- Over Temp Range Alarm

SNMP Configuration

AJA MIBs

AJA provides two FS related MIB files for use with your NMS. One identifies AJA product types, and the other defines the trap messages for a specific AJA product. These MIB .txt files are included with the AJA software download package.

Front Panel SNMP Configuration

FS4 SNMP configuration can be accomplished using the front panel or with the web browser computer interface (if Remote Control is enabled).

The FS4 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.

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 Configuration

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

Figure 38. Web Browser Config Screen SNMP Parameters

SNMP Configuration Parameters

4.0 SNMP Enable

The *SNMP Enable* parameter Enables or Disables SNMP messaging between the FS4 and an external client.

Disabled *(default)*	When set to *Disabled*, the FS4 will not issue SNMP trap messages.
Enable 1	When set to *Enable 1*, the FS4 issues SNMP trap messages to Trap Destination 1 (parameter *4.1*) and as defined in the MIB.
Enable Both	When set to *Enable Both*, the FS4 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 FS4 will be sent.

IP Address	Set the desired IP address where traps will be sent (usually a client on your LAN). *Default:* 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 FS4 trap messages. *Default:* 162

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 FS4 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: FS4 Specifications

Modes of Operation

Four Channel Mode
- Four Independent 2K, HD, or SD Video Processors

Single Channel Mode
- One 4K, UltraHD, 2K, HD, or SD Video Processor

Video Formats

- (4K) 4096 x 2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (UltraHD) 3840 x 2160p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (2K) 2048 x 1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920 x 1080p 23.98, 24, 25, 29.97, 30, 50, 59.94, 60
- (HD) 1920 x 1080PsF 23.98, 24, 25, 29.97, 30
- (HD) 1920 x 1080i 50, 59.94, 60 (fields)
- (HD) 1280 x 720p 50, 59.94, 60
- (SD) 625i 50 (fields)
- (SD) 525i 59.94 (fields)
- YCbCr, 4:2:2, 10-bit

Video Input Digital

- 4 x 3G-SDI inputs, 4 x BNC
- 4 x 3G-SDI inputs, 4 x Fiber or BNC (optional SFP modules)
  - SFP fiber modules, 3G-SDI, dual LC, single LC, or single SC, SMPTE-297
  - SFP fiber module, 12G/6G-SDI, dual LC, SMPTE-297
  - SFP coax module, 12G/6G-SDI, dual HD-BNC
- 12G/6G/3G/HD/SD, SMPTE-259/292/424/2081/2082
  - Single Link 12G/6G-SDI (with optional SFP module)
  - Quad Link 3G-SDI Level A or B-DL (4 x 3G), SMPTE-425-5
  - Dual Link 3G-SDI Level B-DS (2 x 3G), SMPTE-425-3
  - Single Link 3G-SDI Level A, B-DL, or B-DS, SMPTE 425
  - Quad Link HD-SDI (4 x 1.5G)
  - Dual Link HD-SDI (2 x 1.5G), SMPTE-372
  - Single Link HD/SD
- Quadrant (Square Division) or 2SI (Two Sample Interleave) 4K/UltraHD input pixel mapping
- 8 x 1 selector feeds each video processor(s)

Video Output Digital

- 4 X 3G-SDI outputs, 4 x BNC

- 4 x 3G-SDI outputs, 4 x fiber or HD-BNC (optional SFP modules)
  - SFP fiber modules, 3G-SDI, Dual LC, Dual LC CWDM, Single LC, or Single SC, SMPTE-297
  - SFP fiber module, 12G/6G-SDI, dual LC, SMPTE-297
  - SFP coax module, 12G/6G-SDI, dual HD-BNC
- 12G/6G/3G/HD/SD, SMPTE-259/292/424/2081/2082
  - Single Link 12G/6G-SDI (with optional SFP module)
  - Quad Link 3G-SDI Level A or B-DL (4 x 3G), SMPTE-425-5
  - Dual Link 3G-SDI Level B-DS (2 x 3G), SMPTE-425-3
  - Single Link 3G-SDI Level A, B-DL, or B-DS, SMPTE 425
  - Quad Link HD-SDI (4 x 1.5G)
  - Dual Link HD-SDI (2 x 1.5G), SMPTE-372
  - Single Link HD/SD
- Quadrant (Square Division) or 2SI (Two Sample Interleave) 4K/UltraHD output pixel mapping

Monitor Output Digital

- 1 x BNC, 1 x 3G-SDI output
  - 3G-SDI/HD/SD, SMPTE-259/292/424, 10-bits
- 1 x HDMI, 1 x HD output
  - 2K/HD/SD, HDMI v1.4a
- Monitored Video Processor output (video and audio) is simultaneously output on both connectors
- 4K/UltraHD down-converted to 2K/HD
- Crop control on HDMI output

Video Processing

- Motion adaptive deinterlacer
- Proc amp controls
- Color corrector
- Legalizer
- Framerate conversion/film cadence removal/insertion (3:2, 1:2, 2:1, 2:3), except when the input or output format is 4K/UltraHD)
- Adjustable delay of 0-6 frames with H and V timing controls in lines and pixels
- Closed Caption conversion (CEA-608/CEA-708)
- AFD input detection, down-convert control, and output pass through or overwrite
- Freeze (manual or on input signal loss) to black or last good frame
- Matte generator for background fill
- Video test generator

Format Conversion

- Convert any supported input format to any supported output format, within the same frame rate family. These three families are:
  - 59.94, 29.97, 23.98
  - 50, 25
  - 60, 30, 24

Scaling

- Supported in 2K/HD/SD formats
  - Zoom in and out
  - Reposition
  - Region of Interest (ROI)

Up-Conversion

- Hardware 10-bit
- Zoom 14:9: results in a 4:3 image zoomed slightly to fill a 14:9 image with black side bars
- Zoom Letterbox: results in image zoomed to fill fullscreen
- Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting will introduce a small aspect ratio change

Down-Conversion

- Hardware 10-bit
- Anamorphic: fullscreen
- Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
- Crop: image is cropped to fit video output format

Aspect Ratio Conversion for SD to SD

- Letterbox: Transforms SD anamorphic material to a letterboxed image
- H Crop: Produces a horizontally stretched effect on the image; transforms anamorphic SD to full frame
- SD Pillarbox: Produces an image in the center of the screen with black borders on the left and right sides and an anamorphized image in the center
- V Crop: Transforms SD letterbox material to an anamorphic image

Audio Input Digital

- 48 kHz sample rate
- 8 x SDI embedded inputs (16-Channels each)

    - 128-Channels, 24-bit (20-bit SD), SMPTE-272/299
- 8 x balanced AES inputs (16-Channels), 1 x DB-25
    - 16-Channels, 24-bit, AES-3
- 2 x MADI inputs, 1 BNC, 1 x ST Fiber
    - 56 or 64 channels, 24bit, AES10 per input

Audio Output Digital

- 48 kHz sample rate
- 1 x SDI embedded output per Video Processor (16-Channels each)
    - 16-Channels (in single Video Processor mode), 24-bit (20-bit SD), SMPTE-272/299
    - 64-Channels (in four Video Processor mode), 24-bit (20-bit SD), SMPTE-272/299
- 8 x balanced AES outputs (16-Channels), 1 x DB-25
    - 16-Channels, 24-bit, AES-3
- 2 x MADI outputs, 1 BNC, 1 x ST Fiber
    - 128-Channels, 24-bit, AES-10

Audio Processing

- 277 x 208 mono audio matrix, route 1 to 1, 1 to many
    - Inputs: 128 embedded, 16 AES, 128 MADI, 2 stereo mixdowns, 3 tone generator
    - Outputs (Four Ch Mode): 16 AES, 128 MADI, 64 embedded
    - Outputs (Single Ch Mode): 16 AES, 128 MADI, 16 embedded
- Input adjustment controls for each channel
    - Gain +18 to -18 dB in 0.5 dB steps
    - Phase invert
- Input adjustment controls for each channel pair
    - Delay -16ms to +1sec in 20.8 us steps
- Two independent 5.1 or 7.1 to stereo mixdown processors with gain adjust
- High quality Sample Rate Conversion supported on all audio inputs
- SRC bypass for non-PCM audio (e.g. Dolby E, AC-3, etc)
- Audio tone generator (mute, 400 Hz, 1 kHz)

Reference Input

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

Genlock

- Lock to External Reference
- Lock to SDI input 1 thru 8
- Free run based on Temperature Compensated Crystal Oscillator

Network Interface

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

Front Panel

- Display
- Keypad with status LEDs
- Two rotary/push knobs
- Comprehensive alarm indicators

Presets

- Each mode supports 40 Presets

GPI

- 1 x 25-pin D-Connector
  - Four optically isolated GPI inputs
  - Four optically isolated GPO outputs

Size (w x d x h)

- 17.5” x 16” x 1.75” (1RU) (444.5mm x 406.5mm x 44.45mm)

Weight

- 7.9 lb (3.6 kg)

Power

- 100-240 VAC 50/60 Hz (Dual, redundant power supplies), 55W typical; 70W max

Environment

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

Appendix B: FS4 Pinouts

GPI Pinouts

General Purpose Interface Inputs and Outputs are available on the FS4 back panel to provide contact closure control. GPI Inputs can control FS4 functions, while GPI outputs can control external equipment (i.e. alarms).

Table 12. DB-25F GPI Input and Output Pinouts

Pin	Function	Pin	Function
1	NC	14	NC
2	NC	15	NC
3	NC	16	NC
4	NC	17	NC
5	NC	18	NC
6	NC	19	NC
7	GPI GND 4	20	GPI Out 4
8	GPI In 4	21	GPI GND 3
9	GPI Out 3	22	GPI In 3
10	GPI GND 2	23	GPI Out 2
11	GPI In 2	24	GPI GND 1
12	GPI Out 1	25	GPI In 1
13	Ground		

The GPI inputs and outputs are electrically isolated from power and ground on the FS4 frame. There are four inputs and four outputs. Electrical isolation is provided for up to four pieces of external equipment.

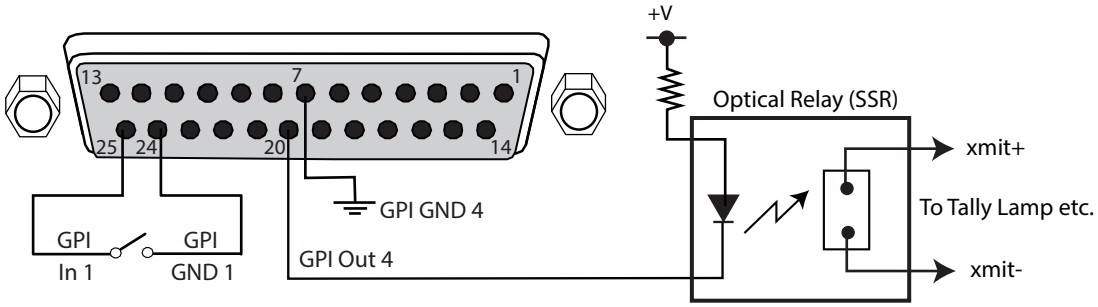
The following guidelines apply to the four GPI inputs and outputs:

- GPI In 1 and GPI Out 1 share a common isolated ground on pin 24 (GPI GND 1),
- GPI In 2 and GPI Out 2 share a common isolated ground on pin 10 (GPI GND 2).
- GPI In 3 and GPI Out 3 share a common isolated ground on pin 21 (GPI GND 3).
- GPI In 4 and GPI Out 4 share a common isolated ground on pin 7 (GPI GND 4).
- Pin 13, 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.

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.

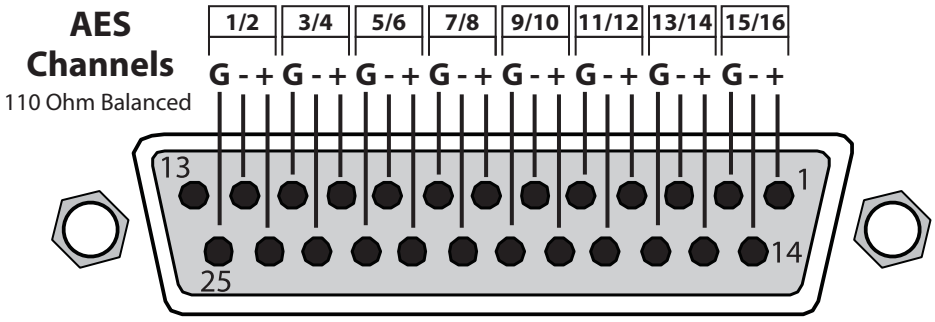
Figure 39. Typical GPI Input and Output Connections



Audio Connection Pinouts

Digital Audio

Figure 40. Digital Audio Connector Pinout



G = Ground

To MUX into unbalanced AES BNC connections, use Balun 75 ohm adapter.

The pinout scheme above is used for the AES/EBU digital audio connections. Each channel handles a pair of digital audio signals (16 total per connector). The top connector is for digital audio input channels 1-16, and the bottom connector is for digital audio output channels 1-16.

Appendix C: Safety & Compliance

Federal Communications Commission (FCC) Compliance Notices

Class A Interference Statement

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

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

FCC Caution

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

Canadian ICES Statement

Canadian Department of Communications Radio Interference Regulations

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

Règlement sur le brouillage radioélectrique du ministère des Communications

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

European Union 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 2014/30/EU.

CE 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: 2006 + A1:2009 + A2:2009, EN 61000-3-3:2008

Immunity: EN 55103-2: 2009, EN 61000-4-2:2009, EN 61000-4-3: 2006 + A1:2008 + A2:2010,
EN 61000-4-4: 2004 + A1:2010, EN 61000-4-5:2006, EN 61000-4-6:2009,
EN 61000-4-11:2004

Environments: E2, E3 and E4

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

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

	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.

Korean KCC Compliance Statement

A급 기기 (업무용 방송통신기자재) Class A (Broadcasting Communication Equipment for Office Use)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. 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.

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-3/2015.04). 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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Hazard Warning!

High Voltage. This situation or condition can cause injury due to electric shock.

Avertissement! Tension élevée. Cette situation ou condition peut causer des blessures dues à un choc électrique.

Warnung! Hochspannung. Diese Situation oder Bedingung kann zu Verletzungen durch Stromschlag führen.

¡Advertencia! Alto voltaje . Esta situación o condición puede causar lesiones debidas a una descarga eléctrica.

Aviso! Alta Tensão . Esta situação ou condição pode causar danos devido a choques elétricos.

Avviso! Alta tensione. Questa situazione o condizione può causare lesioni a causa di scosse elettriche.

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

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

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

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

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

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

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

Warning!

To meet safety regulations for leakage current, connect the dual power supplies to separate branch circuits.

¡Advertencia! Para cumplir con las normas de seguridad para la corriente de fuga, conecte las dos fuentes de alimentación para circuitos derivados diferentes.

Attention! Pour répondre aux mesures de sécurité concernant le courant de fuite, raccorder les sources d'alimentation doubles à des circuits de dérivation distincts.

Warnung! Zur Erfüllung der Sicherheitsbestimmungen bezüglich Reststrom schließen Sie bitte die zwei Netzteile an unterschiedlichen Abzweigleitungen an.

Cuidado! Para atender aos regulamentos de segurança para correntes de fuga, conecte as fontes duplas a circuitos elétricos separados.

Attenzione! Per soddisfare le norme di sicurezza sulla corrente di perdita, collegare i doppi alimentatori a circuiti derivati separati.

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, FS2, FS3 or FS4; 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 FS1-X, FS2, FS3, ou FS4; 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 FS1-X, FS2, FS3, oder FS4 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 FS1-X, FS2, FS3, o FS4; 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 umFS1-X, FS2, FS3, ou FS4; 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 FS1-X, FS2, FS3, o FS4; questi modelli sono prodotti laser di classe 1.

Warranty Information

Limited Warranty

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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