FS

The Power to Convert

AJA® VIDEO SYSTEMS

Because it matters.™

FS

AJA's FS family of frame synchronizing converters deliver power and flexibility for up/down/cross conversion in just 1RU of space. Align mismatched signal types, including computer DVI signals, to establish a consistent format for post production or broadcast.

The Power to Convert

With support of all broadcast video formats, the FS family make matching up disparate video and audio systems simple with comprehensive analog and digital I/O, up/down/cross conversion and frame synchronization.

AJA's FS family brings the full power of our hardware conversion expertise in compact 1RU rack units that offer unrivaled flexibility.

Delivering AJA's industry standard up/down/cross conversion technology for the highest quality images, FS units are ideal for high-density applications such as mobile trucks and packed machine rooms, able to replace multiple hardware units in a single rack slot. The widest range of conversion possibilities makes them perfect for converting disparate sources to a common format, or handling whatever formats the production environment might throw at you. Easy to use and fully networkable via buit in 10/100/1000MB Ethernet ports, FS1 and FS2 are easily integrated into a facility and can be rapidly configured by any computer on the network via a standard web browser. FS units also accept automation control from external GPI commands.

With flexible I/O support, FS1 can simultaneously work with SD and HD video - as well as converting between both. FS2 adds the ability to process two independent streams of 3G/HD/SD 10-bit broadcast-quality video, including high-quality image scaling capabilities and two independent groups of 16-channel AES audio, opening a new world of conversion possibilities.

Built to the exacting standards of all AJA hardware, FS frame synchronizers are backed by our world-class support network, 5-year international warranty and advanced exchange service.

FS

Digital and analog I/O flexibility

FS frame synchronizers are loaded with comprehensive I/O that lets them handle the widest range of analog and digital signals - and convert between them.

Perfect for use in all broadcast and post production environments, FS units feature Dual HD/SD-SDI inputs and outputs, comprehensive multi-channel audio connections and I/O for analog video equipment, including HD and SD component. FS2 also features HDMI I/O with support for 3D output, and a Fiber connectivity option.

AJA hardware conversion technology

AJA's hardware conversion technology ensures the highest image quality for your productions. Key conversion features include:

- SD/HD up/down-conversion
- SD/SD aspect ratio conversion
- HD/HD cross-conversion (720p/1080i)
- Up/down/cross-conversion with both the input and converted formats on SD/HD SDI outputs (both synchronized)
- HD cross-conversion with simultaneous down-converted SDI output
- Closed Caption conversion (CEA-608/CEA-708 standards)
- AFD conversion or pass-through (user-selectable)

Remote configuration and control

FS units are network ready and support SNMP monitoring and web-based remote control. Units can be connected to any Ethernet network via the built-in 10/100/1000MB Ethernet port, allowing control and configuration of multiple FS units from any web browser on a connected computer. Configurations can be saved and applied to multiple units, ensuring consistency and quick configuration in large installs.

To integrate smoothly with the existing automation of a facility, both FS1 and FS2 can also receive external GPI commands to trigger a variety of functions, from freezing an input source to switching between saved presets.

FS1

Only **$3,495** US MSRP*

Find a Reseller

FS1 is a powerful and flexible frame synchronizer and high quality converter that helps you work with mismatched signal types to establish a consistent format for post production or broadcast.

Universal Frame Synchronizer/Converter

Powerful functionality in a compact, easy-to-use package.

Featuring a flexible input, output, and control architecture, the FS1 Universal SD/HD Audio/Video Frame Synchronizer and Converter can simultaneously work with both HD and SD video all in full 10-bit broadcast quality video and 24-bit audio.

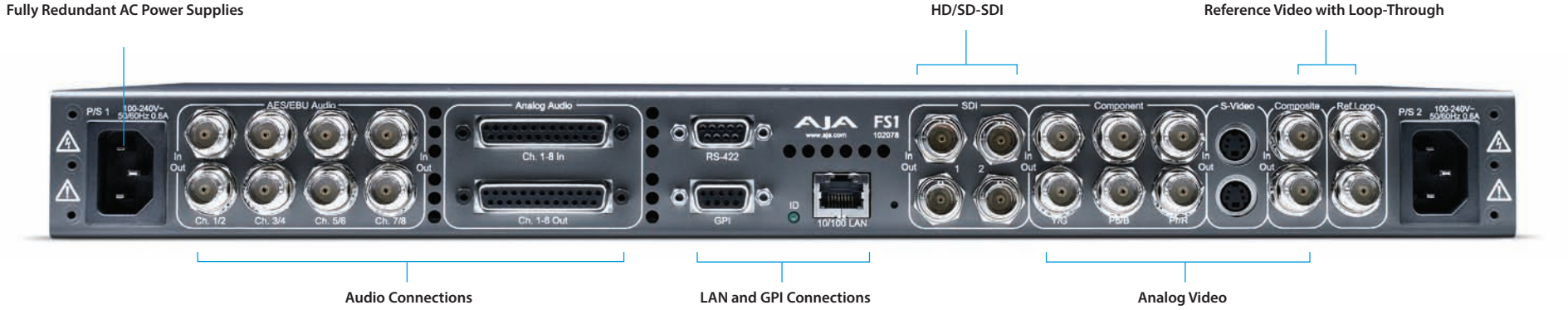
Supporting virtually any input or output, analog or digital, HD or SD, FS1 can up-or down-convert between SD and HD, and provide simultaneous HD and SD outputs. Up, down, cross conversion between HD formats is also supported, with simultaneous output of both formats.

For audio, FS1 supports 8-channel AES, balanced analog, or 16-channel embedded audio with full flexibility and audio processing controls. You can choose from any of the 4 groups of embedded audio for 8-channel output via AES or analog audio.

FS1 also supports closed captioning and the conversion of closed captioning between SD and HD formats—including full conversion of CEA-608 captions to the CEA-708 standard.

** Pricing is for US only. International pricing will vary. Please contact a local AJA Reseller for pricing details.*

Connections



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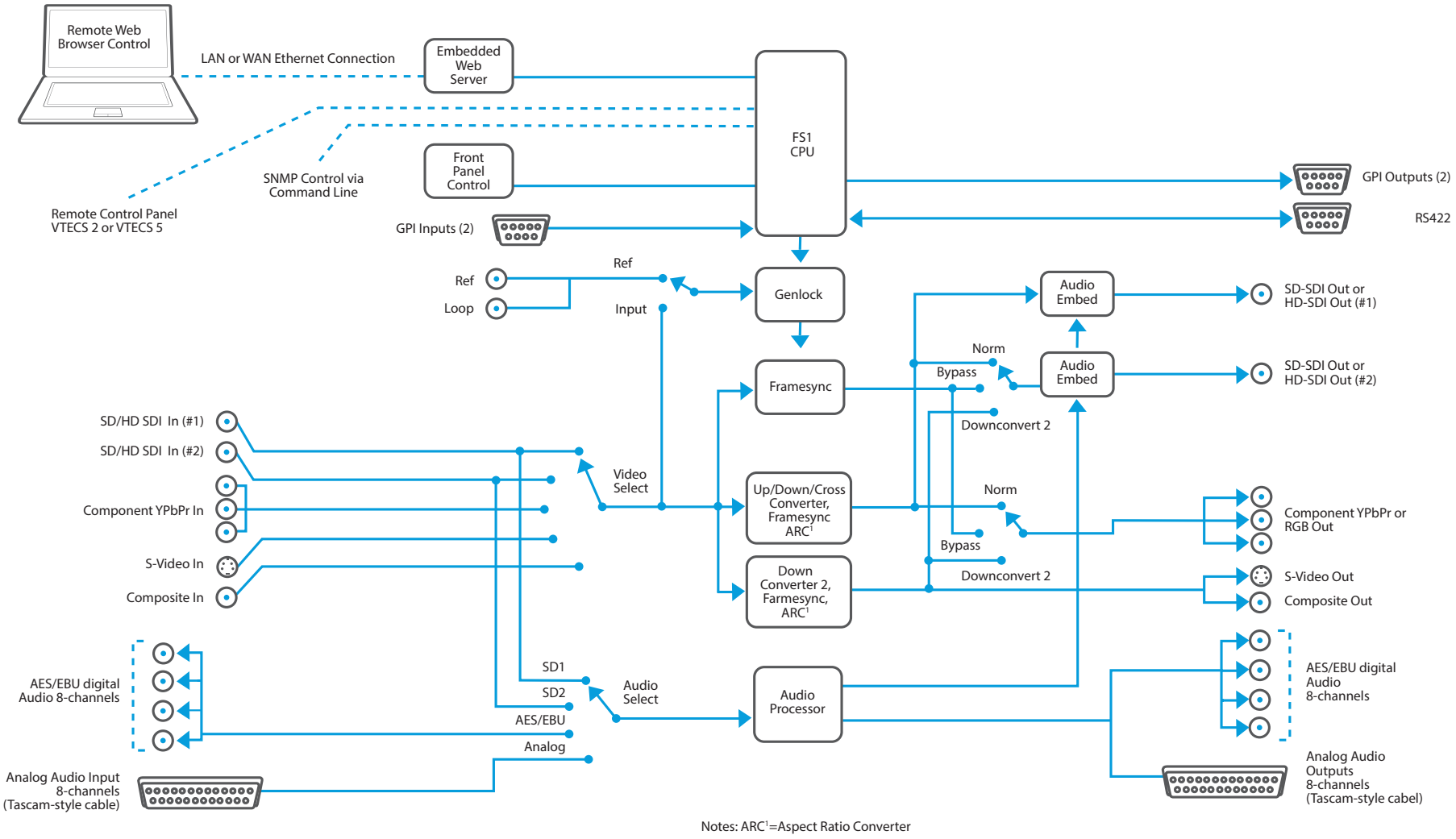
Architecture



Notes: ARC[1]=Aspect Ratio Converter

Tech Specs

Video Formats

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

Video Input Digital

- Dual SD/HD SDI, SMPTE-259/292/296, 8- or 10-bits
- Single Link 4:2:2 (1 x BNC each)

Video Input Analog

- HD component YPbPr, SMPTE-274 (3 x BNC)
- 12-bit A/D, 2x oversampling
- SD Component (3 x BNC)
- SMPTE/EBU N10, Betacam 525 line, Betacam 525J
- 12-bit A/D, 4x oversampling
- +/- .25 dB to 5.5 MHz Y Frequency Response
- +/- .25 dB to 2.5 MHz C Frequency Response
- .5% 2T pulse response
- <2 ns Y/C delay inequity
- SD Composite/YC (S-Video)
- 12-bit A/D, 4x oversampling

Video Output Digital

- Dual SD/HD SDI, SMPTE-259/292/296, 8- or 10-bits
- Single Link 4:2:2 (1 x BNC each)

Video Output Analog

- HD component YPbPr/RGB, SMPTE-274 (3 x BNC)
- 12-bit D/A, 2x oversampling
- SD Component (3 x BNC)
- SMPTE/EBU N10, Betacam 525 line, Betacam 525J
- 12-bit D/A, 4x oversampling
- +/- .25 dB to 5.5 MHz Y Frequency Response
- +/- .25 dB to 2.5 MHz C Frequency Response
- .5% 2T pulse response
- <2 ns Y/C delay inequity
- SD Composite/YC (S-Video)
- 12-bit D/A, 4x oversampling

Audio Input Digital

- 16-channel, 24-bit SDI embedded audio, 48kHz sample rate, Synchronous
- 8-channel, 24-bit AES/EBU audio, 48kHz sample rate, Synchronous or Non-synchronous, Internal sample rate conversion (4 x BNC)
- +12 dBu, +15 dBU, +18 dBu, +24 dBu (Full Scale Digital)
- +/- 0.2 dB 20Hz to 20kHz Frequency Response

Audio Input Analog

- 8-channel, 24-bit A/D analog audio, 48kHz sample rate, balanced (8 x XLR via 25-pin breakout cable)
- +12 dBu, +15 dBU, +18 dBu, +24 dBu (Full Scale Digital)
- +/- 0.2 dB 20Hz to 20kHz Frequency Response

Audio Ouput Digital

- 16-channel, 24-bit SDI embedded audio, 48kHz sample rate, Synchronous
- 8-channel, 24-bit AES/EBU audio, 48kHz sample rate, Synchronous or Non-synchronous, Internal sample rate conversion (4 x BNC)

Audio Ouput Analog

- 8-channel, 24-bit D/A analog audio, 48kHz sample rate, balanced (8 x XLR via 25-pin breakout cable)
- +12 dBu, +15 dBU, +18 dBu, +24 dBu (Full Scale Digital)
- +/- 0.2 dB 20Hz to 20kHz Frequency Response

Up-Conversion

- Hardware 10-bit
- Anamorphic: full-screen
- Pillar box 4:3: results in a 4:3 image in center of screen with black sidebars
- 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 full screen
- Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting can introduce a small aspect ratio change

Down-Conversion

- Hardware 10-bit
- Anamorphic: full-screen
- Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
- Crop: image is cropped to fit new screen size

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Tech Specs *(Continued)*

Cross-Conversion

- Hardware 10-bit
- 1080i to 720p
- 720p to 1080i
- 720p to 1080PsF

SD to SD Aspect Ratio Conversion

- Letterbox: This transforms SD anamorphic material to a letterboxed image.
- H Crop: Will produce a horizontally stretched effect on the image; transforms anamorphic SD to full frame
- SD Pillarbox: Will produce 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: Will transform SD letterbox material to an anamorphic image.

Timecode

- SDI RP188 via SDI BNC

Reference Input

- Analog Color Black (1V) or Composite Sync (2 or 4V)
- Looping, non-terminating.

Network Interface

- 10/100 Ethernet (RJ-45)
- Embedded web server for remote control
- VTECS™ protocol for Remote Control Panel

User Interface

- Alphanumeric display, with dedicated buttons

Control

- GPI in/out, 9-pin D-connector
- Pinout is as follows:

1	GPI IN 1
2	GPI IN 2-
3	GPI OUT 1
4	GPI OUT 2
5	Chassis ground
6	I/O GROUND 1
7	I/O GROUND 2
8	I/O GROUND 1-
9	I/O GROUND 1

- RS-422, Sony 9-pin protocol (reserved for future use)
- 9-pin D-connector pinout is as follows:

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

Physical

- Width: 17.25" (43.81cm)
- Depth: 12.5" (31.75cm)
- Height: 1RU, 1.75" (4.44cm)
- Weight: 6.5lb (2.94kg)
- Power: 100-240 VAC 50/60Hz (Dual, redundant power supplies), 25W typical; 30W max. 15A max.
- Operating temperature: 0 to 40 degrees C
- Relative humidity: 0 to 90%, non-condensing

Input/Output Combinations

Input	Possible Output Formats		
525i59.94	525i59.94	720p59.94	1080i59.94
720p59.94	525i59.94	720p59.94	1080i59.94
1080i59.94	525i59.94	720p59.94	1080i59.94
1080pSF23.98	1080pSF23.98	1080i59.94	525i59.94
625i50	625i50	1080i50	720p50
720p50	625i50	1080i50	720p50
1080i50	625i50	1080i50	720p50
1080pSF24	1080pSF24	1080i60	Input
1080i60	1080i60	720p60	Input
720p60	720p60	1080i60	

Notes:

1. In the case of 1080pSF/23.98 input - and when 1080i59.94 (or 525) is selected as an output format, the FS1 automatically does 3:2 pulldown to get the correct frame rate.
2. When passing 24 or 60 framerate video, output is high definition.

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FS2

Only **$4,995** US MSRP*

Find a Reseller

With dual-channel conversion and frame synchronizing in a slim 1RU space, FS2 can do the work of two separate devices or combine both processors together for maximum flexibility.

A World of Conversion Possibilities

Double your conversion capacity and still have room to spare.

Offering huge flexibility and the power to adapt to meet the needs of rapidly changing environments, FS2 offers unprecedented conversion and frame synchronization power in a 1RU space.

Capable of simultaneously working with two independent streams of 3G/HD/SD 10-bit broadcast-quality video and two independent groups of 16-channel AES audio, each FS2 video channel supports virtually any input or output: analog component or composite, 3G/HD/SD-SDI, Dual Link (1.485 Gb), Fiber and HDMI I/O. A Fiber I/O option allows fiber cable runs of up to 10 kilometers to be connected directly to the FS2 without the need for separate fiber to SDI conversion. Each video processing channel can be individually cropped and resized using AJA's image scaling technology for the best possible quality when incorporating non-standard image sizes.

FS2 can be used as two separate Frame Synchronizers/Format Converters, or the two channels can be linked with the internal FS2 keyer to do the work of three or more devices - for example HD sidebar keying where both the video and background graphics are upconverted and combined.

FS2 can up or down convert between SD, HD, and 3G HD (1080p50/60), and cross convert between HD formats including 3G HD. Additionally, FS2 has full input and output signal routing, allowing any I/O port to be assigned to either processing channel.

For audio, FS2 has two audio processors, each supporting 16-channel AES/EBU digital audio, 16-channel embedded audio, and 8-channel balanced analog audio with a variety of controls for maximum flexibility. The output of each processor can be embedded in its respective video processor output (SDI, Fiber, or HDMI), or sent to the AES or balanced outputs. For 3G and Dual Link inputs, the audio processors can have access to all 32 channels. A Dolby decoding option adds the ability to extract encoded Dolby audio as part of the signal path without the need for specialized equipment.

FS2 supports closed captioning and the conversion of closed captioning between SD and HD formats - including full conversion between CEA-608 and CEA-708 caption standards.

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FS2

Connections

Status
Displays current machine status and/or error conditions.

Alphanumeric Display
Displays status information and Control information

Power and Status LEDs
Shows the AC power status and any alarm conditions.

Remote
Displays remote control menu.

Video and Audio select Buttons

Select and Adjust Buttons
Select Parameters and adjust their values.

Activity LEDs
Displays at-a-glance the settings and current FS1 conditions.

Fully Redundant AC Power

Digital Video Connections: Fiber, SDI, and HDMI

Reference
Passive Reference Loop – Color Black or Tri-Level Sync

Audio Connections

LAN and Control Connections

Analog Video Connections

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FS2

Nicholas Appleton, VP of Operations/Engineer for TL Mobile Television

TL Mobile Goes the Distance with AJA FS2

"We love that the AJA FS2 packs so much functionality into a single rack unit...All at a price point that's lower than the competition with the reliability and support that goes hand in hand with all of AJA's products."

Nicholas Appleton is the VP of Operations/Engineer for TL Mobile Television, based in Springfield, MO. In his own words, he describes how FS2 has become an invaluable part of his workflow.

"TL Mobile Television is a Springfield, MO-based mobile truck operator working with a broad range of clientele including ESPN and Fox. Our 53-foot HD Digital Expando is almost always on the road covering sporting events in the mid-and southwest.

As VP of Operations/Engineer for TL Mobile, it's often my job to make sure that everything is running as smoothly as possible. We provide all of the equipment that a crew would need to broadcast a sporting or entertainment event along with two or three on-site engineers. We've been using AJA products at TL Mobile as long as we've been in business, since 1997. We use AJA equipment primarily for conversion purposes, and have had many different Mini-Converters from AJA over the years.

We were recently introduced to the AJA FS2 dual channel universal frame synchronizer/format converter by our local distributor. We already have several AJA FS1s on our truck, and with the FS2, we're getting the added benefit of dual channel features in a 1RU design. Without AJA converters we wouldn't have the flexibility to adjust to the constant changing demands of a live production environment.

One of our favorite things about the FS2 is that we can IP into them so they're all listed in our truck computer and we don't have to go to each device individually to change settings. It's really convenient to just be able to log in and see all of our devices right there—this holds true for our FS2s and our FS1 units as well. We added the FS2s a few months ago and they've been working hard on the truck primarily on projects for ESPN sports.

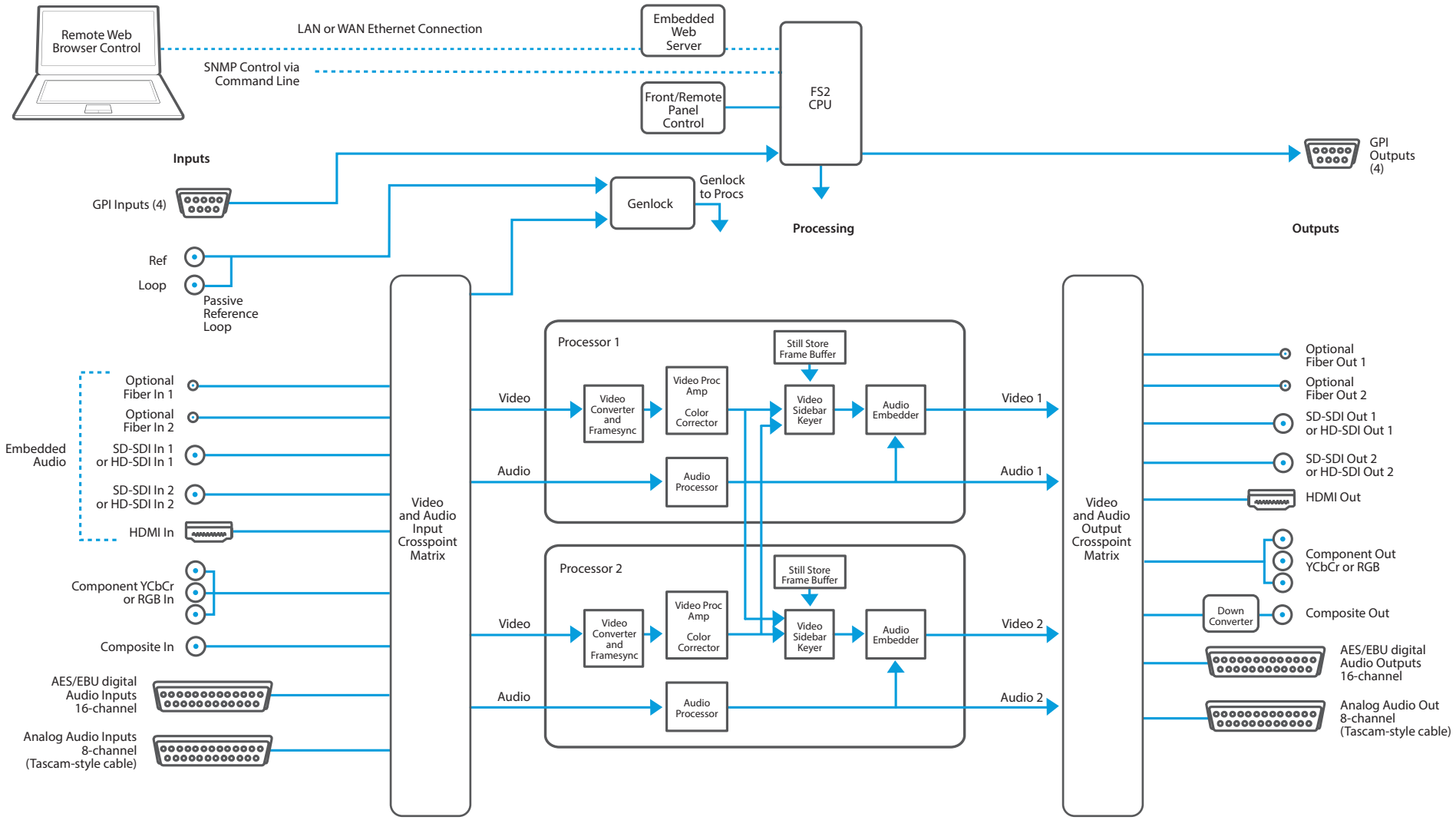
FS2 also provides a lot of power in one box—as an example, everything from cameras to switchers to tape machines to the graphics package all needs to work together seamlessly for live broadcast. In a live production environment it is hard to mix different flavors of HD, so FS2 is ideal for a simple cross-conversion solution when your final output needs to be another signal. Often our network clients want 720p for replays or other uses, but we might be working on a broadcast package where the live output to uplink needs to be 1080i because that is the standard for that network or show. We can use FS2 to do the conversion and send it to the uplink, or vice versa, to cross convert to another flavor of HD.

We also love that the AJA FS2 packs so much functionality into a single rack unit. Dual channel 10-bit up, down and cross convert between so many different SD and HD formats along with analog to digital and digital to analog audio/video conversion. All of that at a price point that's lower than the competition with the reliability and support that goes hand in hand with all of AJA's products.

We first started using AJA gear in 1997 when we needed their converters to help us get from analog to digital and digital to analog back when our switcher was digital but other components in the truck were analog. Some of those original components even still live on the truck today. We continue to use AJA gear today—they helped us make the full transition over to HD and we anticipate that they'll continue to meet our future needs with products that provide best-in-class support for the latest broadcast formats. "

FS2

Architecture



FS2

Tech Specs

Video Formats

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

Video Input Digital

- Dual SD/HD/3G SDI, SMPTE-259/292/296, 8- or 10-bits
- Single Link 4:2:2 (1 x BNC each)
- Dual Fiber (SC or LC) SD/HD/3G SDI, SMPTE-259/292/296, 8- or 10-bits (optional)
- HDMI v1.3 30 bits/pixel, RGB or YUV, 2.25 Gbps, SD, HD, 1080p-50/60

Video Input Analog

- HD component YPbPr, SMPTE-274 (3 x BNC)
- 12-bit A/D, 2x oversampling
- SD Component (3 x BNC)
- SMPTE/EBU N10, Betacam 525 line, Betacam 525J
- 12-bit A/D, 4x oversampling
- +/- .25 dB to 5.5 MHz Y Frequency Response
- +/- .25 dB to 2.5 MHz C Frequency Response
- .5% 2T pulse response
- <2 ns Y/C delay inequity
- SD Composite
- 12-bit A/D, 4x oversampling

Video Output Digital

- Dual SD/HD/3G SDI, SMPTE-259/292/296, 8- or 10-bits
- Single Link 4:2:2 (1 x BNC each)
- Dual Fiber (SC or LC) SD/HD/3G SDI, SMPTE-259/292/296, 8- or 10-bits (optional)
- HDMI v1.3 30 bits/pixel, RGB or YUV, 2.25 Gbps, SD, HD, 1080p-50/60

Video Output Analog

- HD component YPbPr, SMPTE-274 (3 x BNC)
- 12-bit D/A, 2x oversampling
- SD Component (3 x BNC)
- SMPTE/EBU N10, Betacam 525 line, Betacam 525J
- 12-bit D/A, 4x oversampling
- +/- .25 dB to 5.5 MHz Y Frequency Response
- +/- .25 dB to 2.5 MHz C Frequency Response
- .5% 2T pulse response
- <2 ns Y/C delay inequity
- SD Composite
- 12-bit D/A, 4x oversampling

Audio Input Digital

- 16-channel, 24-bit SDI embedded audio, 48kHz sample rate, Synchronous
- 16-channel, 24-bit AES/EBU audio, 48kHz sample rate, Synchronous or Non-synchronous, Internal sample rate conversion (8 x XLR via 25-pin breakout cable)
- Optional Dolby E Decoding

Audio Input Analog

- 8-channel, 24-bit A/D analog audio, 48kHz sample rate, balanced (8 x XLR via 25-pin breakout cable)
- +12 dBu, +15 dBU, +18 dBu, +24 dBu (Full Scale Digital)
- +/- 0.2 dB 20Hz to 20kHz Frequency Response

Audio Ouput Digital

- 16-channel, 24-bit SDI embedded audio, 48kHz sample rate, Synchronous
- 16-channel, 24-bit AES/EBU audio, 48kHz sample rate, Synchronous or Non-synchronous, Internal sample rate conversion (8 x XLR via 25-pin breakout cable)
- Optional Dolby E Encoding (future option)

Audio Ouput Analog

- 8-channel, 24-bit D/A analog audio, 48kHz sample rate, balanced (8 x XLR via 25-pin breakout cable)
- +12 dBu, +15 dBU, +18 dBu, +24 dBu (Full Scale Digital)
- +/- 0.2 dB 20Hz to 20kHz Frequency Response

Up-Conversion

- Hardware 10-bit
- Anamorphic: full-screen
- Pillar box 4:3: results in a 4:3 image in center of screen with black sidebars
- 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 full screen
- Zoom Wide: results in a combination of zoom and horizontal stretch to fill a 16:9 screen; this setting can introduce a small aspect ratio change

Down-Conversion

- Hardware 10-bit
- Anamorphic: full-screen
- Letterbox: image is reduced with black top and bottom added to image area with the aspect ratio preserved
- Crop: image is cropped to fit new screen size

Cross-Conversion

- Hardware 10-bit
- 1080i to 720p
- 720p to 1080i
- 720p to 1080PsF

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Tech Specs *(Continued)*

SD to SD Aspect Ratio Conversion

- Letterbox: This transforms SD anamorphic material to a letterboxed image.
- H Crop: Will produce a horizontally stretched effect on the image; transforms anamorphic SD to full frame
- SD Pillarbox: Will produce 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: Will transform SD letterbox material to an anamorphic image.

Timecode

- SDI RP188 via SDI BNC

Reference Input

- Analog Color Black (1V) or Composite Sync (2 or 4V)
- Looping, non-terminating.

Network Interface

- 10/100 Ethernet (RJ-45)
- Embedded web server for remote control
- VTECS™ protocol for Remote Control Panel

User Interface

- Alphanumeric display, with dedicated buttons

Control

- GPI in/out, 15-pin D-connector
- Pinout is as follows:

1	GROUND	9	GPI OUT 2
2	GPI IN 1	10	GPI I/O GND 3
3	GPI IN 2	11	GPI I/O GND 4
4	GPI IN 3	12	GPI OUT 3
5	GPI I/O GND 1	13	GPI OUT 4
6	GPI I/O GND 2	14	NC
7	GPIN 4	15	GROUND
8	GPI OUT 1		

- RS-422, Sony 9-pin protocol (reserved for future use)
- 9-pin D-connector pinout is as follows:

1	NC	9	RS-485 Dolby Metadata Output -
2	RS-422 Machine Control Output +	10	NC
3	RS-422 Machine Control Output -	11	GROUND
4	RS-485 Dolby Metadata Output -	12	RS-485 Dolby Metadata Output -
5	GROUND	13	RS-485 Dolby Metadata Output +
6	NC	14	NC
7	RS-422 Machine Control Output -	15	GROUND
8	RS-422 Machine Control Output +		

Physical

- Width: 17.25" (43.81cm)
- Depth: 12.5" (31.75cm)
- Height: 1RU, 1.75" (4.44cm)
- Weight: 7.85lb (3.56kg)
- Power: 100-240 VAC 50/60Hz (Dual, redundant power supplies), 55W typical; 80W max. 15A max.
- Operating temperature: 0 to 40 degrees C
- Relative humidity: 0 to 90%, non-condensing

Input/Output Combinations

Input	Possible Output Formats		
525i59.94	525i59.94	720p59.94	1080i59.94
720p59.94	525i59.94	720p59.94	1080i59.94
1080i59.94	525i59.94	720p59.94	1080i59.94
1080pSF23.98	1080pSF23.98	1080i59.94	525i59.94
625i50	625i50	1080i50	720p50
720p50	625i50	1080i50	720p50
1080i50	625i50	1080i50	720p50
1080pSF24	1080pSF24	1080i60	Input
1080i60	1080i60	720p60	Input
720p60	720p60	1080i60	

Notes:

1. In the case of 1080pSF/23.98 input - and when 1080i59.94 (or 525) is selected as an output format, the FS2 automatically does 3:2 pulldown to get the correct frame rate. Similarly, in the case of 1080pSF/24 input, FS2 automatically does 3:2 pulldown to get the correct frame rate.
2. When passing 24 or 60 framerate video, output is high definition.

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Incredible 5-year warranty

AJA Video warrants that Converter products will be free from defects in materials and workmanship for a period of five years from the date of purchase.

About AJA Video Systems, Inc.

Since 1993, AJA Video has been a leading manufacturer of video interface and conversion solutions, bringing high-quality, cost-effective digital video products to the professional broadcast and post-production markets. AJA offers the Io and KONA desktop video products, Ki Pro family of recorders, miniature standalone converters, and a complete line of rack mount interface and conversion cards and frames. With a headquarters and design center located in Grass Valley, California, AJA Video offers its products through an extensive sales channel of dealers and systems integrators around the world. For further information, please see our website at **www.aja.com**

AJA Video Systems Inc.
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