

12G/3G/HD/SD Dual Channel Multi Purpose Signal Processor

FA-9600

Preliminary

FOR.A[®]
INNOVATIONS IN VIDEO
and AUDIO TECHNOLOGY

12G/3G/HD/SD DUAL CHANNEL
MULTI PURPOSE SIGNAL PROCESSOR
FA-9600



Dual channel frame synchronizer, SDR/HDR processor, converter, is the next generation technology from FOR-A. Offering exceptional conversion format delivery, including 12G, 4K UHD, 1080p and SD/HD. Extremely versatile and easy to use. Build with the high reliability in mind. The FA-9600 is the ideal device for any HD transition to 4K UHD.

Applications

FA-9600 multipurpose signal processor offers essential features for emerging trends in video production. They are used in many professional settings.

Each of the two HD/SD inputs incorporates a frame synchronizer, and because the signal processor features 12G-SDI terminals, optional software opens the door to 4K UHD production. Adding an optional expansion card provides four more channels of 3G-SDI input or output.*1 The FA-9600 is more than a basic frame synchronizer. Video conversion of all kinds is easy. A newly developed color processing circuit supports the latest gamut and dynamic range specifications, and an optional converter circuit is available for up/down/cross conversion. Offering a wide range of audio processing, core features of remapping and gain adjustment, the FA-9600 can be expanded by adding an optional card that makes it an ideal standalone solution at transmission centers, in mobile production trucks, production studios, news stations, and other nonlinear editing and playout production environments.

*1 For details, see the expansion cards in "Options."

Advantages in mixed HDR/SDR environments



Mobile OB and Up-Link production trucks

- Convenient size where rack space is limited
- Energy-efficient



Live staging

- Greatly reduces the need for other equipment.
- Can be used as a simplified switcher.
- Audio embedding
- Multi-camera editing

HDR 4K UHD camera



SDR camera



4K UHD 30p camera



Camera with HDMI output



x 4

Frame synchronizer

Clean switch

Up/down/
cross converter*2

Delay adjustment

Aspect ratio converter*2

Resizing/repositioning*2

Frame rate converter*2

2SI/SQD converter*2

Color corrector

Process amplifier

Color space converter

External remote unit*2

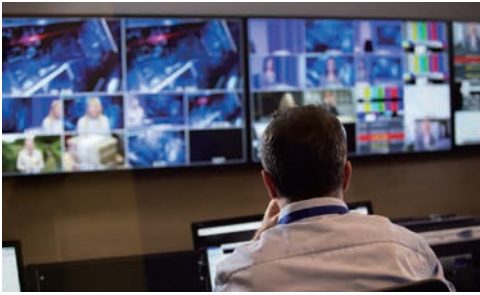
FA-9600

Direct HDR,
12G-SDI output

Converted to HDR,
12G-SDI output

*2 Optional

Versatile format support



Transmission Centers

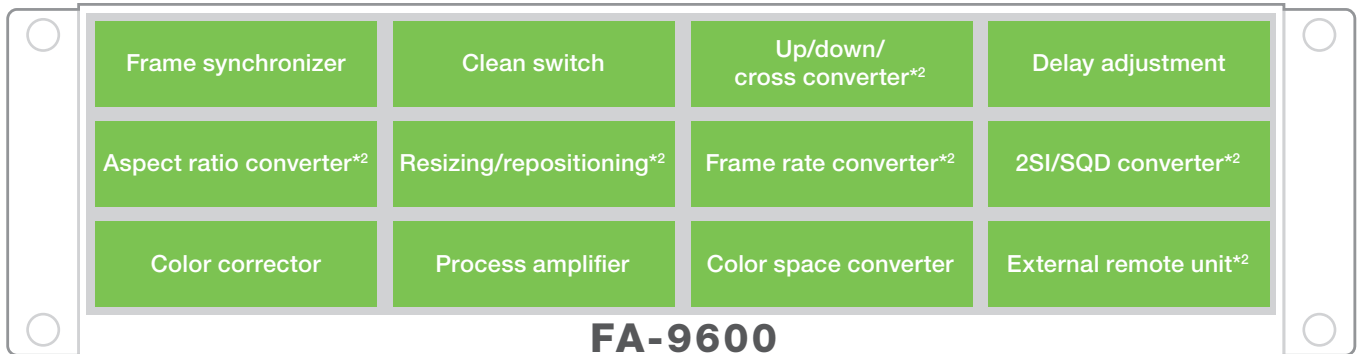
- Saves significant space
- Efficient processing of stable video
- Conversion to formats needed by recipients
- Redundant power supply



Computer



Router



*2 Optional



**Provides uniform
output of video
formats**



Control rooms

- Program production using uniform, converted output of a variety of source video formats



**Provides uniform
output of video
formats**



Nonlinear video and audio editing

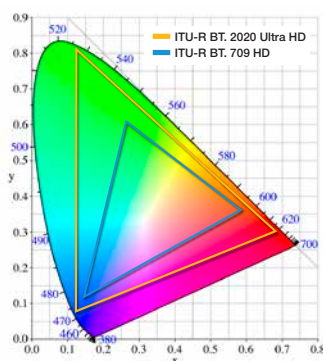
- Conversion to formats used in editing, even for unusual source formats

Standard features

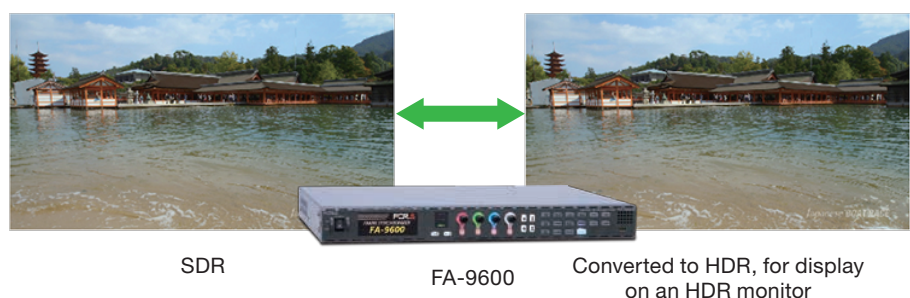
- Dual channel frame synchronization, via 2 SDI inputs and 4 outputs
- Extensive professional video format support, from SD to HD formats
- Connect a broad range of equipment—also equipped with HDMI ports.
- The FA-9600 comes standard with a dedicated application that runs on Windows, providing full access to many functions, and allows a wide variety of settings. Web server functionality is also implemented in the main unit, allowing adjustments^{*3} to be made to various parameters from mobile and tablet devices.
- New color processing circuit provides strong support in HD/4K UHD production. Useful not only at input—when converting to unified specifications before input to a switcher or editing system—but also at output, before HDR and SDR simulcasts, for example.

^{*3} This feature is available for a limited number of function and parameters.

- Supports and converts between the broad ITU-R BT.2020 gamut for 4K/8K and the conventional ITU-R BT.709 gamut for HD.



- Compensates for differences among external devices using EOTF/OETF corresponding to various HDR or SDR curves.
- EOTF/OETF log curves and gamut registrable from a computer.
- Dynamic range conversion compatible with HLG, PQ, SDR, and other log curves. Also compatible with S-Log3, Canon Log2, and other camera log curves.



Options

FA-964K

4K/12G-SDI-compatible software

Enables video processing up to 4K UHD, 6G/12G-SDI connectivity, and SQD/2SI conversion.

Add an optional expansion card for quad link 3G-SDI or single 12G-SDI or HDMI 2.0 input and output.

Convert quad link 3G-SDI input to 12G-SDI output



12G-SDI transmission greatly reduces cables

Convert 12G-SDI input to quad link 3G-SDI output for monitors



FA-96UDC

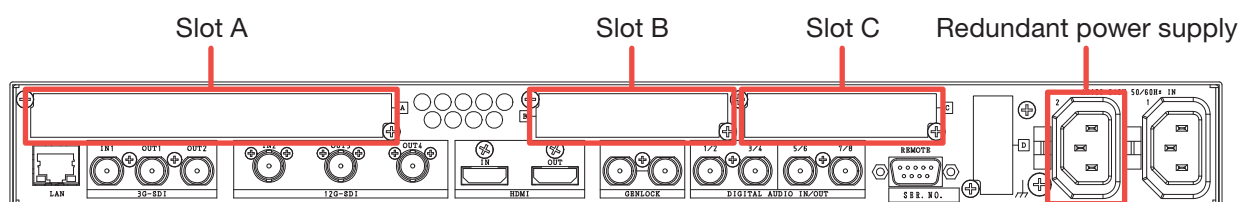
Up/down/cross converter

Enables conversion between SD/HD and 4K UHD*⁴ and between SD and HD. Also enables cross-conversion between 1080i and 720p.

*⁴ When FA-964K is installed

Expansion cards

Rear panel



For slot A

FA-96EX3G44-R

3G-SDI I/O Card

Card for input and output of standards from SD-SDI to 3G-SDI.

Pass-through supported on all 4 inputs and outputs.

For slots B and C

FA-96AES-UBL

AES Audio I/O Card

Card for unbalanced AES input and output.

Enables input and output using pairs of terminals (a configuration of 8 inputs, 4 inputs/4 outputs, or 8 outputs is available).

FA-96EX12G06

12G-SDI 6 Output Expansion Card

Card for 6 distributed outputs of 12G/HD/SD-SDI.

FA-96GPI

GPI I/O Expansion Card

GPI card for 10 inputs/10 outputs.

Other options

FA-96PS

Redundant power supply unit

Remote control units

FA-10RU

The FA-10RU allows remote operation of almost all FA-9600 functions. A single FA-10RU is able to control up to 100 FA-9600s. In addition, one FA-9600 is able to also be controlled from up to five remote control units (including the FA-10DCCRU and FA-9600GUI) simultaneously.

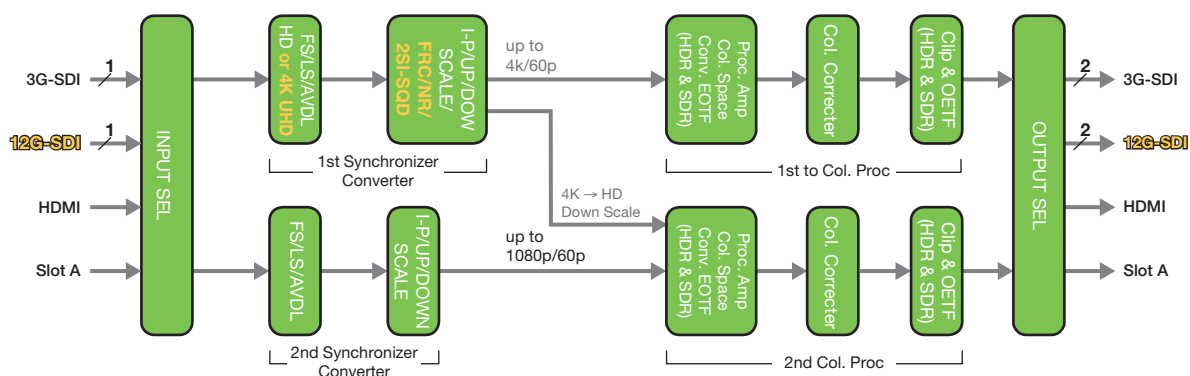


FA-10DCCRU

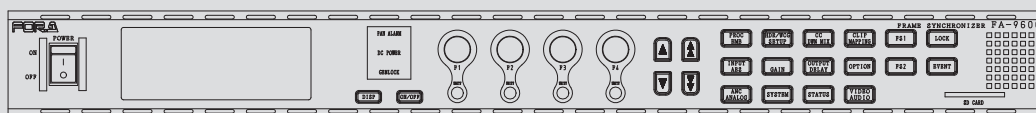
The FA-10DCCRU allows remote operation of the color corrector functions of the FA-9600. One FA-9600 is able to be controlled from up to five remote control units (including the FA-10RU and FA-9600GUI) simultaneously.



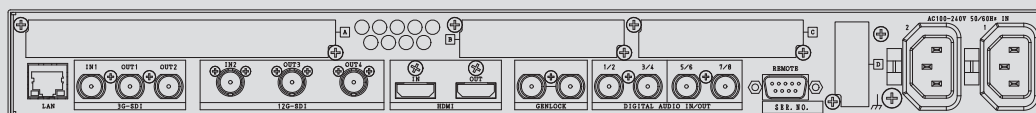
Block diagram



Front view



Rear view



Frame synchronizer lineup

4K HD : 4K support **12GSDI** : 12G-SDI support **HDR** : HDR support **WCG** : WCG support

Channel Count	Model	Inputs/Outputs	Features
10-channel	FA-1010	10 x 10	3G/HD/SD-SDI - input x 10/output x 10 - Max. 192 audio channels - frame synchronizer x 10 - color corrector x 10 10 x 10 clean switch 4K UHD capability
5-channel	FA-505	5 x 10	3G/HD/SD-SDI - input x 5/output x 10 - Max. 112 audio channels - frame synchronizer x 5 - color corrector x 5 - up/down/cross converter x 5 5 x 5 clean switch 4K UHD capability
2-channel	FA-9600	2 x 4	12G/6G/3G/HD/SD-SDI - input x 2/output x 4 - Max. 64 audio channels - frame synchronizer x 2 - color corrector x 2 - up/down/cross converter 4K UHD capability
2-channel	FA-9520	2 x 4	3G/HD/SD-SDI - input x 2/output x 4 - Max. 44 audio channels - frame synchronizer x 2 - color corrector x 2 - up/down/cross converter x 2 - automatic video optimizer - logo generator
1-channel	FA-9500	2 x 4	3G/HD/SD-SDI - input x 2/output x 4 - Max. 28 audio channels - frame synchronizer - color corrector - up/down/cross converter x 2 - automatic video optimizer - logo generator

Specifications (preliminary)

Video formats	
Standard	1080/60p, 1080/59.94p, 1080/50p, 1080/30p, 1080/29.97p, 1080/25p, 1080/24p, 1080/23.98p, 720/60p, 720/59.94p, 720/50p, 720/30p, 720/29.97p, 720/25p, 720/24p, 720/23.98p, 1080/60i, 1080/59.94i, 1080/50i, 1080/30PsF, 1080/29.97PsF, 1080/25PsF, 1080/24PsF, 1080/23.98PsF, 525/60, 625/50
Optional FA-964K	3840 x 2160/60p, 3840 x 2160/59.94p, 3840 x 2160/50p, 3840 x 2160/30p, 3840 x 2160/29.97p, 3840 x 2160/25p, 3840 x 2160/24p, 3840 x 2160/23.98p
Video inputs	
Standard	3G/HD/SD-SDI: 3 Gbps to 270 Mbps, 75Ω, BNC x 2 ^{*1} HDMI: HDMI (Type-A) x 1
Optional FA-964K	12G/6G/3G/HD/SD-SDI: 12 Gbps to 270 Mbps, 75Ω, BNC x 1 ^{*2} 3G/HD/SD-SDI: 3 Gbps to 270 Mbps, 75Ω, BNC x 1
Optional FA-96EX3G44-R	3G/HD/SD-SDI: 3 Gbps to 270 Mbps, 75Ω, BNC x 4 ^{*3}
Video outputs	
Standard	3G/HD/SD-SDI: 3 Gbps to 270 Mbps, 75Ω, BNC x 4 ^{*1} HDMI: HDMI (Type-A) x 1
Optional FA-964K	12G/6G/3G/HD/SD-SDI: 12 Gbps to 270 Mbps, 75Ω, BNC x 2 ^{*2} 3G/HD/SD-SDI: 3 Gbps to 270 Mbps, 75Ω, BNC x 2
Optional FA-96EX3G44-R	3G/HD/SD-SDI: 3 Gbps to 270 Mbps, 75Ω, BNC x 4 ^{*3}
Video functions	
I/O processing	Standard: 2 inputs, 2 distributed outputs (3G-SDI to SD-SDI) 4K: 1 input (12G-SDI to SD-SDI) + 1 input (3G-SDI to SD-SDI) 1 input, 2 distributed outputs (12G-SDI to SD-SDI) + 1 input, 2 distributed outputs (3G-SDI to SD-SDI)
Processing	4:2:2 digital component
Quantization	12G/6G/3G/HD/SD-SDI: 10-bit
Genlock input	BB: 0.429 Vp-p (NTSC)/0.45 Vp-p (PAL) Tri-level sync: 0.6 Vp-p, 75Ω, BNC x 1, loop-through (to be terminated with 75Ω terminator, if unused)
Synchronizer modes	Frame, Line, AVDL, and Input modes
System phase adjustment	
Frame mode	Horizontal: -1/2H to +1/2H Vertical: -1/2 frames to +1/2 frames Max. delay: 1 frame +1H, Min. delay: 1H
Line mode	Horizontal: -1/2H to +1/2H Vertical: -1/2 frames to +1/2 frames Max. delay: 1H +1/2H, Min. delay: 1/2H
AVDL mode	Horizontal: -1/2H to +1/2H Vertical: -1/2 frames to +1/2 frames Max. delay: 5H +1/2H, Min. delay: 1/2H (HD) Max. delay: 1H +1/2H, Min. delay: 1/2H (SD)
Input mode	Horizontal: -1/2H to +1/2H Vertical: -1/2 frames to +1/2 frames Max. delay: 1 frame, Min. delay: T.B.D.
Video delay adjustment	Max. 8 frames (in frame or Input mode)
Converter (optional)	I/P conversion, up/down/cross-conversion, aspect conversion, resizing and repositioning, frame delay conversion, 4K 2SI/SQD conversion, 3G-SDI Level A-B conversion
Color processing	Process amplifier, color space conversion, EOTF (de-gamma)/OEFT (gamma), color corrector, video clipping

Proc Amp	Video level: 0.0% to 200.0% Chroma level: 0.0% to 200.0% Black level: -20.0% to 100.0% Hue: -179.8° to +180°
Color correction	Balance & differential, Sepia
Video clipping	Knee Clip (RGB), YPbPr Clip
Color spaces	ITU-R BT.709/2020, user-defined (can be downloaded)
EOTF/OETF	HLG, SMPTE2048, ITU-R BT.1886, etc. user-defined (can be downloaded)
Audio inputs	
Embedded	4K UHD: 32 channels (Group 1 to 8), 48 kHz, 16 to 24-bit, synchronous/asynchronous 3G/HD: 16 channels (Group 1 to 4), 48 kHz, 16 to 24-bit, synchronous/asynchronous SD: 16 channels (Group 1 to 4), 48 kHz, 16 to 24-bit, synchronous
AES/EBU	1.0 Vp-p, unbalanced, 75Ω, BNC x 4 (Input/output switchable), Max. number of stereo inputs: 4, 32/44.1/48kHz, 16-bit to 24-bit
Audio outputs	
Embedded	4K UHD: 32 channels (Group 1 to 8), 48 kHz, 16 to 24-bit, synchronous/asynchronous 3G/HD: 16 channels (Group 1 to 4), 48 kHz, 16 to 24-bit, synchronous/asynchronous SD: 12 channels (Group 1 to 3), 48 kHz, 16 to 24-bit, synchronous
AES/EBU	1.0 Vp-p, unbalanced, 75Ω, BNC x 4 (Input/output switchable), Max. number of stereo outputs: 4, 48kHz, 16-bit to 24-bit
Audio functions	
Delay adjustment	Fixed mode: 4 ms to 1,000 ms (adjustable in 1 ms increments) Tracking mode: Automatically follows video processing delay
Signal processing	Sampling rate converter (SRC), gain control, down-mixing, remapping, mute (per channel)
Main unit	
Interfaces	Ethernet: 10BASE-T/100BASE-TX/1000BASE-T, RJ-45 x 1
Temperature/humidity	0°C to 40°C/30% to 90% (no condensation)
Power	100 V to 240 V AC ±10%, 50/60 Hz
Dimensions/weight	430 (W) x 44 (H) x 300 (D) mm / 3.0 kg
Consumables/replacement timing (under constant use at room temperature)	Power unit/approx. 5 years Cooling fan/approx. 6 years
Included accessories	Operation manual, AC cord, rack mount brackets
Options	
For slot A	FA-96EX3G44-R: 3G-SDI I/O card FA-96EX12G06: 12G-SDI 6 output expansion card
For slots B and C	FA-96AES-UBL: AES audio I/O card FA-96AES-UBL-C: AES audio output expansion cable FA-96GPI: GPI I/O expansion card
For Slot D	FA-96DIN4-CBL: DIN 4 pin cable
Other options	FA-964K: 4K/12G-SDI-compatible software FA-96UDC: Up/down/cross converter FA-96PS: Redundant power supply unit FA-10RU: Remote control unit FA-10DCCRU: Remote control unit

*1 Pass-through supported between IN2 and OUT2a.

*2 3 Gbps to 270 Mbps between IN1 and OUT1a/OUT1b without FA-964K expansion.

*3 Pass-through supported.



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