

HD/SD Frame Synchronizer

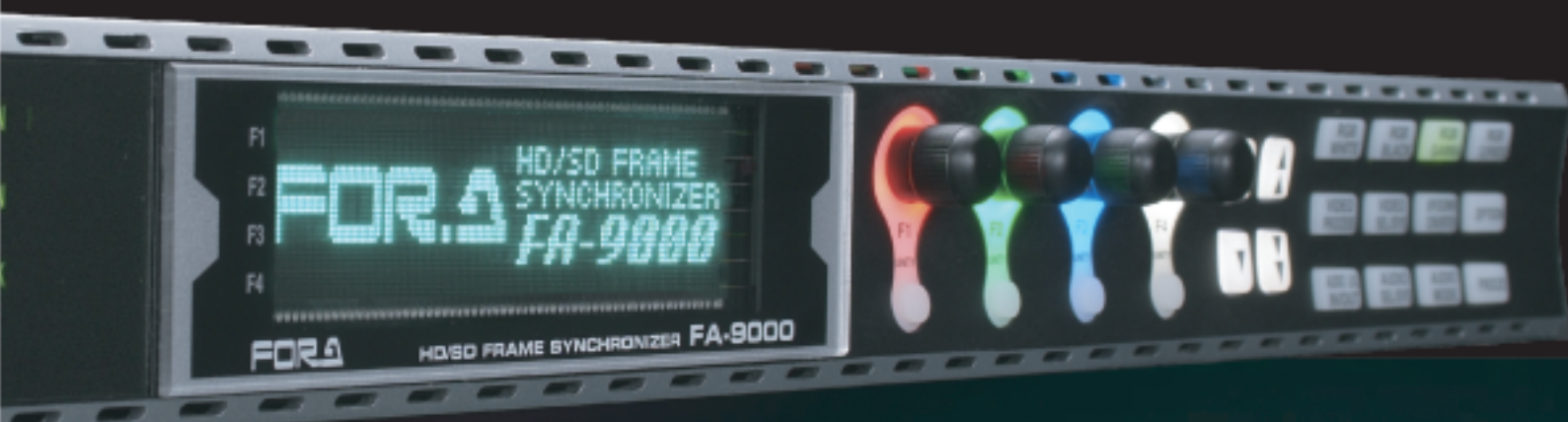
FA-9000



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

HD/SD Frame Synchronizer

FA-9000 "THE Processor"



All In One

HD-SDI

HDV

HD Analog Component

SD-SDI

DV

SD Analog Component

SD Analog Composite

Embedded Audio

Dolby E

AES/EBU

Analog Audio

Frame Synchronizer

Time Base Corrector

Up-Converter

Down-Converter

A/D Converter

D/A Converter

Audio Embedder

Audio De-embedder

Proc Amp

Color Corrector

Noise Reducer

Logo Generator

Introducing FOR-A's FA-9000, THE Processor.

Born from a long history of original technology in frame synchronization and signal processing.

Your ALL IN ONE signal processor.

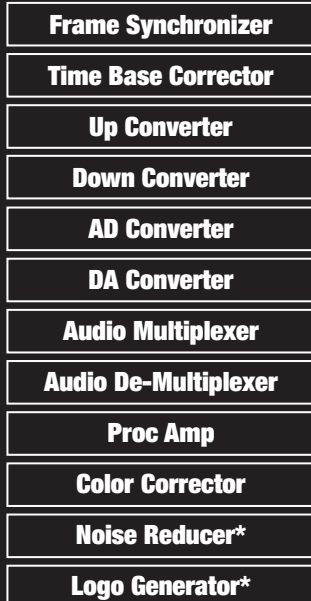
We are proud to introduce a new signal processor that supports all formats: HD, SD, analog, digital, plus audio. The FA-9000 uses 12-bit internal processing for high quality images. The FA-9000 goes beyond the realm of a typical signal processor featuring numerous options like an up-converter, down-converter, color corrector, median-based noise reduction, logo generator and Dolby E decoder. THE Processor is the next generation multi purpose signal processor.



FA-9000 Functions

INPUT

- HD-SDI
- HDV*
- HD Analog Component
- SD-SDI
- DV*
- SD Analog Component
- SD Analog Composite
- Embedded Audio
- Dolby E*
- AES/EBU
- Analog Audio



OUTPUT

- HD-SDI
- HDV*
- HD Analog Component
- SD-SDI
- DV*
- SD Analog Component
- SD Analog Composite
- Embedded Audio
- Dolby E*
- AES/EBU
- Analog Audio

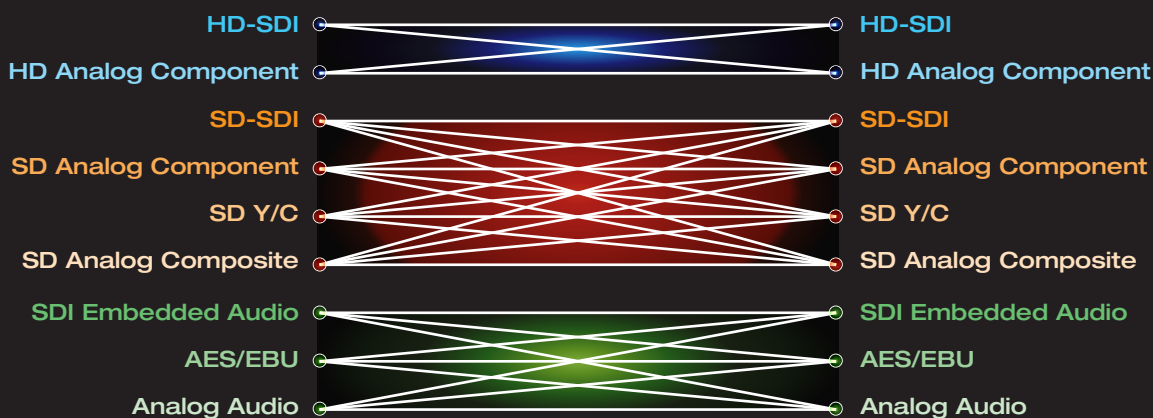
* HDV, DV, Dolby E, Noise Reducer, Logo Generator functions to be released.

Input/Output of All HD, SD, Digital, and Analog Formats

The FA-9000 supports all video signal formats, digital HD/SD-SDI or analog component HD/SD or NTSC/PAL analog composite or Y/C.

Digital/Analog Audio Support

The FA-9000 provides digital or analog input/output for audio signals in the same way as it handles video signals. 8-channel support is provided for embedded audio and AES/EBU, and 4-channel support is provided for analog audio. Multi-channel audio signal processing is possible without phase differences between channels. Individual level adjustments can be made for each audio channel, and audio delay adjustment is provided for synchronizing to the video signal.



High-quality A/D Converter and D/A Converter

In the FA-9000, the input signal is converted to all video output signals that are possible. Signal conversion of all output signals by A/D or D/A is constantly performed, allowing an on-air system to have all output signals available.

Powerful Frame Synchronizer Performance

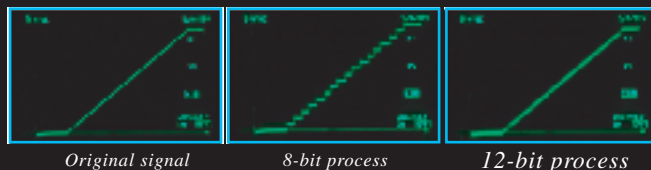
FOR-A's frame synchronizers have always exhibited superior performance when processing video with poor quality signals. The FA-9000 incorporates all of this technical expertise into a single unit, developed with the highest priority on reliable frame synchronization.

Standard Support for SNMP Monitoring

The FA-9000 model has a built-in Ethernet port that provides support for network monitoring using SNMP protocol. This feature allows remote checking of device status, signal errors and other available information.

12-bit Internal Processing for High Image Quality

The FA-9000 uses 12-bit internal processing for dramatically better format conversion and A/D and D/A image quality. FOR-A use the best elements in image processing technology which enables us to provide image quality that stands out from the competition.



Wide Range of Remote Interfaces

Like all FOR-A FA-series models, a remote interface using a BNC connection is standard. Additionally, remote control using RS-422/485 and GPI is also supported.

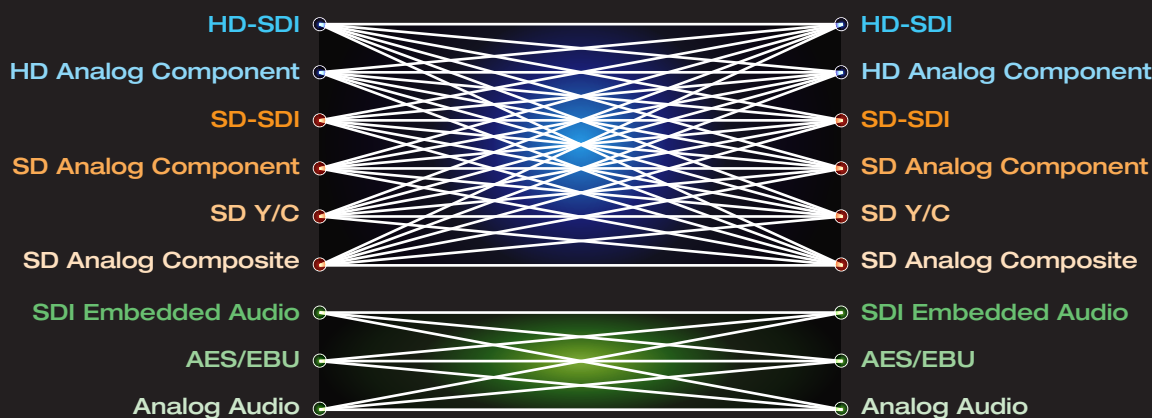
Allows Installation of Up/Down-conversion

Up-converter and down-converter are optionally available for enabling conversion of HD signals to SD and SD signals to HD. With the FA-9000, there's no need to have an external up/down converter.

*No frame rate conversion function is provided.

SD→HD	Format	Convert format
	NTSC	1080/59.94i, 720/59.94p
	525/60	1080/59.94i, 720/59.94p
	PAL	1080/50i, 720/50p
	625/50	1080/50i, 720/50p

HD→SD	Format	Convert format
	1080/59.94i	NTSC, 525/60
	1080/50i	PAL, 625/50
	720/59.94p	NTSC, 525/60
	720/50p	PAL, 625/50



Process Control

The standard model allows adjusting video level, chroma level, chroma phase, and setup level. Remote control of these parameters is also possible.

< Main process control functions >

- Adjustment functions in Video level, Chroma level, Setup level and Chroma phase
- Clip functions (Y-white, C-white, Y-black clip)

Color Correction

In addition to the standard process control function, a color correction option is also available. Three available color correction modes (balanced, differential and sepia) with gamma correction and various clip functions are provided to enable easy reproduction of the video's original color space and range.

< Main color correction functions >

- Three color correction functions (balance, differential and sepia)
- Gamma adjustment functions in HIGH, MID and LOW tones
- White level and Black level adjustment functions

Color Correction

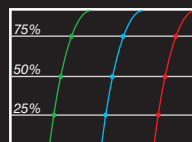


Balance mode:
For color correction in RGB signals.

Differential mode:
For color correction without effecting the white balance.

Sepia mode:
For monotone color schemes.

Gamma Function



RGB independent gamma adjustment in HIGH (near 75%), MID (near 50%) or LOW (near 25%) tone.

Will be available as option

Allows Installation of Dolby E Decoder

A Dolby E decoder can be installed as an additional audio function. This enables accurate monitoring and signal correction for surround signals in multi-channel environments.

Logo Generator

An optional logo generator can be installed for insertion of company or program logos or indication credits for creative content. The FA-9000 can serve as a useful tool for program branding.

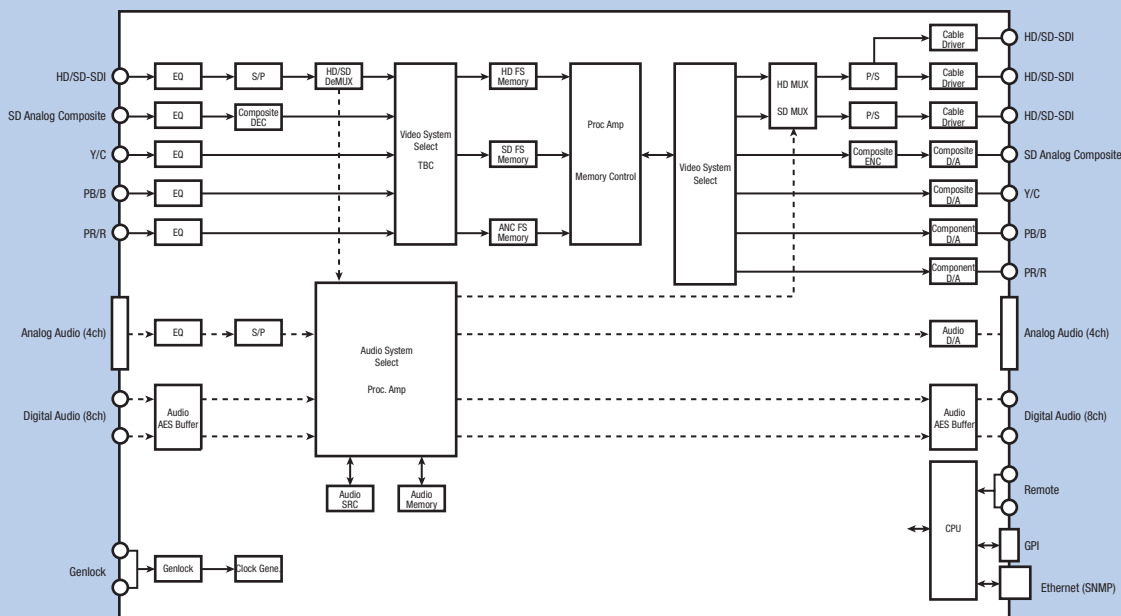
Allows Installation of HDV/DV Interface

An optional IEEE-1394 terminal can be installed to support DV and HDV interface, with conversion between these signals and all available video outputs.

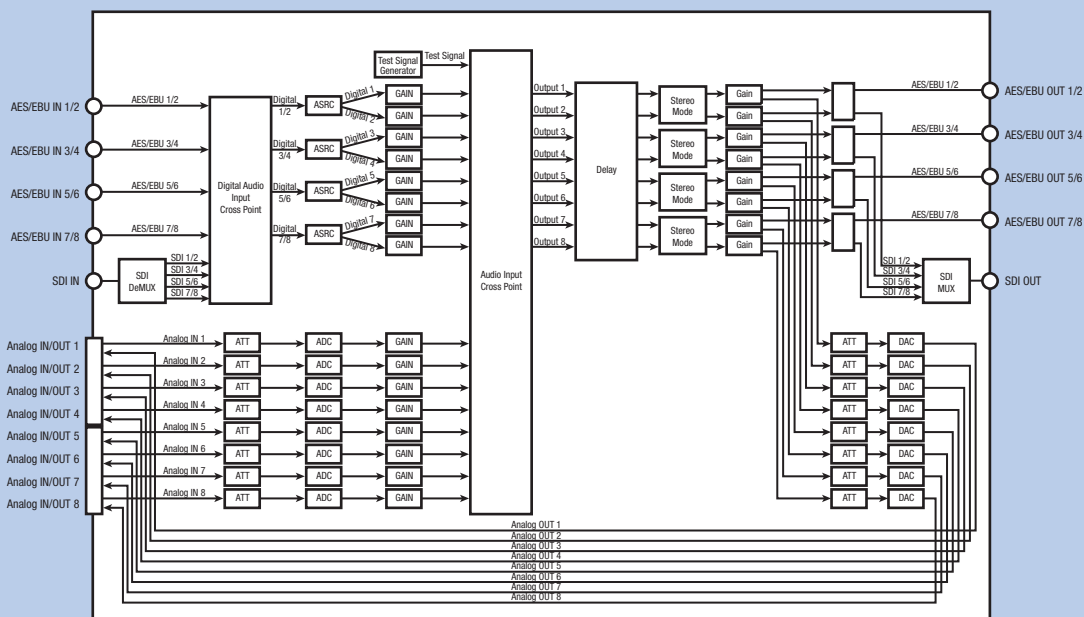
Noise Reduction

The standard model comes complete with a recursive noise reduction filter. An optional higher quality noise reduction function using a median filter can also be added. (available soon as an option). This removes only the noise while minimizing the effect on the video signal. This technique demonstrates FOR-A engineering's superior image processing technology.

FA-9000 Block Diagram



FA-9000 Audio Block Diagram



Standard	HD: 1080/59.94i, 50i, 720/59.94p, 50p (Auto detect) (Other formats to be released) SD: 525/60 (NTSC), 625/50 (PAL) (Auto detect)
Video Input	HD-SDI: 1.5Gbps, 75Ω, 1 ea., BNC
	HD Analog Component: Y: 1.0Vp-p, Pb/PbR: 0.7Vp-p, 75Ω, 1 ea., BNC
	SD-SDI: 270Mbps, 75Ω, 1 ea., BNC
	SD Analog Component: Y: 1.0Vp-p, R-Y/B-Y: 0.757Vp-p, (Betacam or SMPTE level selectable), 75Ω, 1 ea., BNC
	SD Y/C: Y: 1.0Vp-p, C: 0.275Vp-p (NTSC)/0.3Vp-p (PAL), 75Ω, 1 ea., BNC SD Analog Composite: 1.0Vp-p, 75Ω, 1 ea., BNC
Genlock Input	BB: NTSC: 0.429Vp-p/PAL: 0.45Vp-p; or Tri-level Sync: 0.6Vp-p, 75Ω, 1 ea., BNC
Genlock Phase Control	SC Phase: ±180° / H Phase: ±0.5H / V Phase: ±562H H Position: ±0.5H / V Position: ±562H
Video Output	HD-SDI: 1.5Gbps, 75Ω, 3 ea., BNC
	HD Analog Component: Y: 1.0Vp-p, Pb/PbR: 0.7Vp-p, 75Ω, 1 ea., BNC
	SD-SDI: 270Mbps, 75Ω, 3 ea., BNC
	SD Analog Component: Y: 1.0Vp-p, R-Y/B-Y: 0.757Vp-p, (Betacam or SMPTE level selectable), 75Ω, 1 ea., BNC
	SD Y/C: Y: 1.0Vp-p, C: 0.275Vp-p (NTSC)/0.3Vp-p (PAL), 75Ω, 1 ea., BNC SD Analog Composite: 1.0Vp-p, 75Ω, 1 ea., BNC
Audio I/O	Digital Audio: AES/EBU or Embedded Audio
	Analog Audio: 24-bit, 48kHz sampling
Input	Embedded Audio: 2 groups (4-ch stereo) Sampling frequency: 48kHz Quantization: 20/24-bit
	AES/EBU: unbalanced, 75Ω, 4 ea. (4-ch stereo), BNC Sampling frequency: 32kHz/44.1kHz/48kHz Quantization: 20/24-bit
	Analog Audio: Balanced or unbalanced, 4 ea. (2ch stereo), terminal block Input Impedance: 600Ω/High impedance Sampling frequency: 48kHz Quantization: 24-bit
Output	Embedded Audio: 2 groups (4-ch stereo) Sampling frequency: 48kHz Quantization: 20/24-bit
	AES/EBU: unbalanced, 75Ω, 4 ea. (4-ch stereo), BNC Sampling frequency: 48kHz Quantization: 20/24-bit
	Analog Audio: Balanced or unbalanced, 4 ea. (2-ch stereo), terminal block Output Impedance: less than 100Ω Sampling frequency: 48kHz Quantization: 24-bit
Audio Delay	4ms - 1000ms ±1ms (2ms steps)

Processing	4:2:2 component
Correction range	2 fields (field inversion prevented)
Quantization	12-bit, Internal process: 12-bit
Sampling Frequency	HD: Y: 74MHz, C: 37MHz / SD: Y: 13.5MHz, C: 6.75MHz
Frequency Response	100kHz - 4.2MHz: -0.5dB - +0.5dB, 4.2MHz - 5.0MHz: -1.0dB - +1.0dB, roll off above 5.0MHz (NTSC, composite) 100kHz - 4.2MHz: -0.5dB - +0.5dB, 4.2MHz - 5.5MHz: -1.0dB - +1.0dB, roll off above 5.5MHz (PAL, composite)
DG / DP	1% / 1° (composite)
S/N ratio	60dB (without quantization noise, composite)
K-factor (2T-pulse)	1% (composite)
Process Control	Video level: -3dB - +3dB Chroma level: -3dB - +3dB Chroma Phase: -30° - +30° Setup level: -15IRE - +15IRE Y-white clip: Approx. 50% - Approx. 110% C-white clip: Approx. 50% - Approx. 110% Y-black clip: Approx. -15% - Approx. 50%
Noise Reduction	Y and C: 4 steps, motion adaptive filtering performed (Median filtering noise reduction soon as an option)
Color Correction (Option)	Mode: balanced, differential, sepia (selectable) White level: 50% - 200% ea., G, B, and R Black level: 50% - 200% ea., G, B, and R Gamma level: 75% - 125% ea., G, B, and R (Adjustable between Highlight, Middle and shadow level)
Interfaces	Control: 2 ea. (IN/OUT), BNC RS-422/485: 1 ea., 9-pin D-sub (male) Ethernet (SNMP): 10/100Base-T, 1 ea., RJ-45 GPI: 7 ea., 9-pin D-sub (female), TTL negative logic level signal or make contact
Temperature / Humidity	10°C - 40°C / 30% - 90% (no condensation)
Power / Consumption	100VAC - 240VAC±10%, 50/60Hz / Approx. 60W
Dimensions / Weight	430(W) x 44(H) x 425(D) mm, EIA1RU / Approx. 6.0kg
Accessories	Operation manual, AC cable, Rack mount brackets
Options	Remote control unit Up/Down converter function Color corrector function HDV/DV Interface (IEEE1394 Interface) ★ Logo generator function ★ Median filtering noise reduction function ★ Dolby E decoder ★

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