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

FA-9520  "THE Processor"
FA-9520, the Dual Channel Processor

The FA-9520 is a dual channel multipurpose signal processor loaded perfectly for a variety of applications including: master control, mobile production, post production services, live production and more.

We have developed the FA-9520 to provide a dual channel version of our industry leading FA-9500 processor.

The FA-9250 supports 3G-SDI, HD/SD-SDI, and analog composite I/O. In addition to its functionality as a frame synchronizer, it also provides: up/down/cross/aspect converter, full color corrector and automatic video optimizer (AVO) as standard features. Numerous optional features include: analog component I/O, Dolby E encoder and Dolby E decoder. The wealth of features in the FA-9520 can replace many single purpose units. This is a complete toolbox for almost any video need, all with FOR-A’s legendary signal quality and reliability.

Dual Channel Mode

The FA-9520 is provided with two modes, “Dual Channel Mode” and “FA-9500 Compatible Mode.” The FA-9500 Compatible Mode can be used for HD/SD simultaneous operation using a second converter.

3G-SDI/HD-SDI/SD-SDI/Analog Composite I/O

3 video inputs are standard (2 3G/HD/SD-SDI inputs and 1 analog composite input). Adding the optional analog component input provides a 4th input. Any of the inputs can be independently assigned to the two internal independent frame synchronizers. In addition, each SDI input has an error detection function. When the signal is missing or an error is detected, this optional feature provides a clean switch for a seamless changeover to the other channel. Both channels are equipped with emergency bypass. In case of a power outage, the original signal will be passed through to the appropriate output in its original format.

Digital/Analog Audio I/O

The FA-9520 supports a variety of audio signals, including: 16 synchronous/asynchronous channels** of embedded audio, 8 channels of AES/EBU, and 4 channels of analog audio. This provides a total of 28 input and 28 output audio channels. Many types of signal processing are incorporated such as, embedding/de-embedding with video and A/D, D/A conversion. The unit provides a lot of flexibility for multi-channel audio content. Individual sampling rate converters are provided for each audio channel. Signal processing without any phase difference between channels is possible for delay adjustment, level adjustment, down-mixing and remapping.

Up/Down/Cross/Aspect Converter

In addition to A/D and D/A conversion, an up/down/cross/aspect converter is standard equipment on the FA-9520. In addition to bi-directional conversion between HD and SD, the FA-9520 also offers bi-directional conversion between 1080i format and 720p format (IP conversion). The aspect ratio conversion allows for specific control of horizontal and vertical sizing.

Powerful Frame Synchronizer Performance

FOR-A frame synchronizers are renowned for superior performance when processing video with poor quality signals and the FA-9520 is no exception. Synchronizer modes can be selected from, Frame, Line, Input*2 and AVDL mode. AVDL adjustment range is 5H in video with poor quality signals and the FA-9520 is no exception. Synchronizer modes can

*1: During HD input/output only. In SD, only synchronous audio is supported, and at most there are 16 input channels and 12 output channels.

*2: The Input mode is supported only in “FA-9500 Compatible Mode.”

Color Corrector

FOR-A’s industry leading real-time color correction is a standard feature. This function has proven extremely popular for correcting on set monitors, correcting white balance problems and matching cameras. The unit provides intuitive control with 4 rotary encoders that light: red, green, blue and white to indicate the controlled function.

Main Functions

- Three types of color correction modes (balance, differential and sepia)
- Gamma adjustment function with high, mid and low tone
- White level and black level adjustment function
- Various clip functions (Y white, C white, Y black, etc.)

Closed Caption Conversion (Subtitles) between HD and SD Videos

You can convert the closed captioning (subtitles) during up/down conversion (CEA-608--CEA-708).

Web GUI for Intuitive Operations and Remote Control

The Web server is installed in the main unit to enable operations and monitoring via a Web browser from an external PC. The block diagram-based, easy-to-understand GUI allows you to intuitively control video/audio routing and adjustment along with the signal flow.

Other Features (Standard Functions)

- Video/audio delay
- 2D/3D comb filter for Y/C separator (composite)
- Active Format Description (AFD)
- SNMP monitoring/control function (partially)
FA-9520 Total Concept

**Input**
- 3G-SDI
- HD-SDI
- HD Analog Component*
- SD-SDI
- SD Analog Component*
- Analog Composite
- Y/C*
- Embedded Audio (16 x 2 Channels)
- AES/EBU* (8 Channels)
- Analog Audio (4 Channels)
- Dolby E*
- Dolby Digital*

**Output**
- 3G-SDI
- HD-SDI
- HD Analog Component*
- SD-SDI
- SD Analog Component*
- Analog Composite
- Y/C*
- Embedded Audio (HD: 16 x 2 Channels / SD: 12 x 2 Channels)
- AES/EBU* (8 Channels)
- Analog Audio (4 Channels)
- Dolby E*

AES/EBU can switch the input and output by each 4 channels as a standard. 8 channels AES/EBU can be supported with an audio expansion option. * are supported when options are added.

**Automatic Video Optimizer (AVO)**
The AVO is a unique feature that can monitor and adjust luminance levels in real time. Parameters are user set to provide correction for changing lighting conditions. The AVO function can only be assigned to a single channel.

**Logo Generator**
This allows you to key logo images over input video. Data is maintained even when the unit is powered off. The logo function can be used for branding purposes, or used as a side panel added to a 4:3 video in place of a logo. One Logo Generator each is provided for each of dual channels.

**Options**
The FA-9520’s wide range of options to let you add the specific functions you require.
- Dolby E encoder/decoder
- Loudness control
- Analog component I/O
- Analog component I/O
- Digital audio expansion cable
- Redundant power supply unit

**Rear Panel**

**External Dimensions**
Specifications

Video Formats
1080/59.94p, 1080/50p (Level-A)
1080/59.94i, 1080/50i, 1080/23.98P/59.94i, 720/59.94p,
720/59.94p, 525/60i (ITU), 625/50i (PAL)

Video Input
3G-SDI: 3 Gbps, HD-SDI: 1.5 Gbps or SD-SDI: 270 Mbps, 75 Ω BNC

Video Input (option)
HD Analog Component

Video Output
3G-SDI: 3 Gbps or HD-SDI: 1.5 Gbps or SD-SDI: 270 Mbps, 75 Ω BNC x 4 (2 × 2 outputs)

Video Output (option)
HD Analog Component

Video I/O Process
3 inputs (standard) or 5 inputs (maximum input) → 1 processing → 2 x 2 outputs

Video Processing
4:2:2 Digital Component

Quantization
9/10/HD/SD-SDI: 10-bit

Sampling Frequency
3G-SDI (option): 1°: 148.5 MHz, C: 72.5 MHz

Frequency Response
100 kHz to 4.2 MHz: –0.05 dB to +0.05 dB
4.2 MHz to 5.0 MHz: –0.10 dB to +1.00 dB
roll off above 5.0 MHz (MTC, composite)
100 kHz to 4.2 MHz: –0.05 dB to +0.05 dB
4.2 MHz to 5.5 MHz: –0.10 dB to +1.00 dB
roll off above 5.5 MHz (PAL, composite)

UG/DP
1°/°° (composite)

SNR Ratio
60 dB or higher (without quantization noise, composite)

K Factor (2T pulse)
1% (composite)

Comb Filter
2D or 3D comb filter (selectable, composite)

Genlock Input
IEEE NTSC: 0.202 Vp-p/75Ω or 0.3 Vp-p or Tri-level Sync: 0.6 Vp-p, 75Ω BNC, 1°, loop-through (terminate with 75Ω), terminated

Synchronizer mode
Frame Sync mode, Line Sync mode, AVDL mode, Input Sync mode**2

System Phase Control
Frame Sync mode
H phase: –1/2 H to +1/2 H
V phase: –1/2 frame to +1/2 frame
Maximum delay: 1 frame + 1/2 H, Minimum delay: –1 H

Line Sync mode**1
H phase: –1/2 H to +1/2 H
V phase: –1/2 frame to +1/2 frame
Maximum delay: 1 H + 1/2 H, Minimum delay: –1 H + 1/2 H

AVDL mode**1
H phase: –1/2 H to +1/2 H
V phase: –1/2 frame to +1/2 frame
Maximum delay: 0 H + 1/2 H, Minimum delay: –1/2 H (HD)

Input Sync mode**1
H phase: –1/2 H to +1/2 H
V phase: –1/2 frame to +1/2 frame
Maximum delay: 1 frame, Minimum delay: –520 clk

Video Delay
Maximum 6 frames (Frame Sync or Input Sync)

Video Processing Functions
Ups/Down/Cross converter, Aspect ratio converter, Proc Amp, Color corrector, Automatic Video Optimizer, Logo Generator

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°

Video Clip
YPbP mode, RGB mode, Composite mode

Color Correction
Balance mode, Differential mode, Sepia mode

Audio Input
Embedded Audio
SDI: 16 channels (Group 1 to 4), 48 kHz, 16 to 24-bit, synchronous/asynchronous
AES/EBU: Unbalanced, 1.0 Vp-p, 75 Ω BNC × 4 for AES/EBU input/output, Maximum 4 pairs of stereo channels, 48 kHz, 16 to 24-bit

Audio Analog
Balanced or unbalanced, 4 inputs (2 stereo channels),
25-pin D-sub (female) × 1 for analog audio input/output

400 Ohm or High impedance, 48 kHz, 24-bit

Audio Output
Embedded Audio
SDI: 16 channels (Group 1 to 4), 48 kHz, 16/24-bit, synchronous/asynchronous
AES/EBU: Unbalanced, 1.0 Vp-p, 75 Ω BNC × 4 for AES/EBU input/output, Maximum 4 pairs of stereo channels, 48 kHz, 16/24-bit

Audio Analog
Balanced or unbalanced, 4 outputs (2 stereo channels),
25-pin D-sub (female) × 1 for analog audio output/input

less than 100 Ω, 48 kHz, 24-bit

Audio Delay
4 ms to 13000 ms (adjustable in 1 ms steps)

Audio Processing
Sampling rate converter (SRC), Gain control, Down mix, Channel re-mapping, Channel mute

Interfaces
Ethernet: 10/100BASE-TX/1000BASE-T, RJ-45 × 2
Remote (GPIO) / 2 × D-sub (male) / (7 terminals) × 1
TTL negative logic level signal or Make contact

Temperature/Humidity
0°C to 40°C / 30% to 90% (no condensation)

Power
100 V AC to 240 V AC ±10%, 50/60 Hz

Consumption
FA-9560: 60 VA (59W) at 100 V AC to 120 V AC, br />
FA-9560 + FA-9565: 60 VA (59W) (at 100 V AC to 120 V AC),
br />
FA-9570A (3G, HD, SD): 120 VA (113W) @ 220 V AC to 240 V AC

Dimensions/Weight
430 (W) × 350 (D) × 44 (H) mm / 3.0 kg (without options)

Accessories
Operation manual, AC cord, rack mount brackets

Options
FA-9565: Redundant power supply unit
FA-9565CBL: Digital audio expansion connection cable
FA-9568-D: Dolby E / Dolby Digital decoder
FA-9569-E: Dolby encoder
FA-9569U: Remote control unit
FA-9570CG: Changeover function**2
FA-9590D: HD/SD analog component, Y/C input/output
FA-9590LA: Loudness control

1 The phase control range indicates values at the time of the SDI input. For values at the time of analog (composite, component), see the operation manual.

2 This function operates in FA-9550 Compatible Mode only.

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