8500
Composite/SD Legalizer and Video Processing Frame Sync

Legalizer
The 8500 module is a composite Legalizer, Proc Amp, TBC and Frame Sync. The Legalizer is a predictive clipper which insures signal levels will not exceed those permitted in the composite domain. While the Legal setting automatically puts in values to insure signals will not exceed composite legal limits, selecting Custom allows the you to set a range of clip values.

Noise Reducer Option
The optional 8520 Noise Reducer removes unwanted noise and artifacts with is motion- and scene-adaptive filtering. Several forms of noise reduction are employed to ensure the best possible performance. Recursive Temporal Noise filtering includes Simple Recursive, Motion Adaptive and Motion Adaptive with Impulse Filters. Controls are provided for maximum signal-to-noise improvement and for noise threshold. These can be set manually or run in automatic mode. The combination of the 8500 module and the 8520 noise reducer is perfect for MPEG compression preprocessing and satellite or ENG feeds.

Uncompromised Pictures
Whether your input is standard definition SDI Digital Component, Analog Composite or Analog Component, the 8500 handles it with precision and accuracy. The SDI input is carried at full uncompressed bandwidth throughout the entire module, and EDH monitoring of the digital input alerts you to any incoming problem. Analog inputs are 4x oversampled at 12 bits of resolution. Composite signals are decoded using an adaptive comb filter. Complete control over signal levels is provided.

Digital and Analog Outputs
With both SD SDI and 12 bit analog inputs (composite, component, or S-Video [Y/C] formats), the 8500 is easily integrated into any hybrid facility. The 8500 simultaneously outputs both SDI digital component and 12 bit analog composite.

Outputs are fully timed to your house reference, including the subcarrier and ScH phase of the composite output. The analog output is constructed at 8 x oversampling with 12 bits of quantizing resolution. On loss of input, the output can mute to black or freeze on the last good frame of video.

Rock Steady TBC/Frame Synchronizer
Input video is synchronized to your house reference by an agile TBC/Frame Synchronizer. Even noisy and jittery analog sources are faithfully tracked to provide a steady, genlocked output. Robust signal handling ensures proper time base correction for virtually any source, even a consumer VHS machine. Select the SDI input and the 8500 is a serial digital frame sync.

Complete Proc Amp Functions
The 8500 has a full-featured Proc Amp for adjustment of every signal parameter. Proc controls include Video and Chroma Gain, NTSC-style hue rotation, Black Balance, and pedestal. Black and White clips can be set to prevent excessive signal excursions.

A Detail Enhancer recovers information that has been lost due to poor frequency response in upstream systems. Certain values represented in serial digital component may be illegal in the PAL or NTSC composite domains. The Predictive Composite Clipper mode identifies picture elements that would be illegal in analog composite, and limits color saturation and luminance excursions. You can be confident that the work you're doing in digital component will look its best in composite.

Selective (toothed) vertical blanking lets you choose to pass or strip content in the vertical interval on a line-by-line and field-by-field basis. To help optimize the settings in the Proc Amp, a Split Screen mode allows you to compare the processed output with the original material.

Audio Options
A four or eight channel audio sub module can be added to the main 8500 module. Either the 8415 or 8510 can be added to accommodate audio I/O, channel shuffling and mixing. The 8500 module passes embedded audio and Dolby without an audio sub module.

Total Control
Because the 8500 is an Avenue module, every function and parameter can be controlled from the Avenue Control System. Memory registers can be used to save the complete configuration of the module, making it easy to change instantly between different configurations. Any combination of Express Panels, Touch Screens and PCs can be used to control the 8500. The Express Panel is especially well suited for use with the 8500.

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Features

- **Video Legalizer**
- **Predictive Composite Clipper**
- **Black and White clips**
- **Excellent tracking of noisy inputs**
- **Adaptive Comb Filter decoder, sharpness filter**
- **Split Screen mode**
- **Outputs are fully timeable**
- **Composite, component, S-Video input**
- **A to D, and D to A, all in one module**
- **Full-featured TBC/Frame Synchronizer**
- **Comprehensive Proc Amp controls**
- **Passes embedded audio and Dolby**
- **12 bit, 8 x Oversampled analog output**
- **4x oversampled analog input**
- **SD SDI (Serial Digital) input**
- **Simultaneous SD SDI and analog composite outputs**
- **Line-Selectable toothed blanking**
- **Internal color bar generator**
- **Memory Registers**
- **4- or 8-channel audio options**
- **Noise Reducer option**

Analog Inputs

Signal Type	SMPTE Y, Pr, Pb Beta Y, Pr, Pb NTSC, PAL Composite NTSC, PAL S-Video (Y/C)
Impedance	75 Ω
Return Loss	>40 dB
Input DC	±1 volt DC
Input Hum	<100 mV

Serial Digital Input

Signal Type	SD Serial Digital 270 Mb/s, SMPTE 259M
EDH	Fully compliant
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters Belden 1694A

Automatic Cable Input Equalization

Reference Input

Number	One external One internal Master Timing Ref
Signal Type	1 V P-P Composite Video, PAL or NTSC
Impedance	75 Ω, BNC
Return Loss	>40 dB

Analog to SDI Performance

Bit Resolution	12 bit input quantization, 4 x oversampling
Signal to Noise	>62 dB, weighted
Frequency Response	
Composite and Y	±0.1 dB, 0 to 5.5 MHz
Cr, Cb	±0.1 dB, 0 to 2.75 MHz
Minimum Delay	90 µSec

SDI to SDI Performance

Passes entire SDI signal from input to output, including embedded audio and all other ancillary data

Analog Output

Signal Type	PAL or NTSC Composite Standard follows input
Impedance	75 Ω
Return Loss	>40 dB
Output DC	<50 mV

Serial Digital Outputs

Number	One, two or four (selectable)
Signal Type	SD Serial Digital 270 Mb/s, SMPTE 259M
EDH	Fully compliant
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

SDI to Analog Performance

Bit Resolution	12 bit output reconstruction 8 x oversampling
Signal to Noise	>65 dB
Frequency Response	±0.1 dB, 0 to 5.5 MHz
K Factor	<1%
ScH Phase Error	<±2 degrees
Differential Phase	<1 degree
Differential Gain	<1%
Color Field Sequence	Locked to selected Ref
Minimum Delay	25 µSec

General Specifications

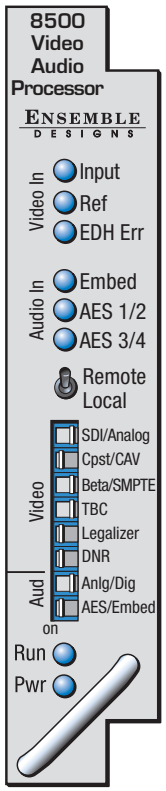
Power Consumption	10 watts (with 2 options installed)
Temperature	0 to 40°C ambient (all specs met)
Relative Humidity	0 to 95%, noncondensing
Altitude	0 to 10,000 ft
Size	Occupies one slot in 3RU or 1RU Frame (including 1 audio and DNR sub module)

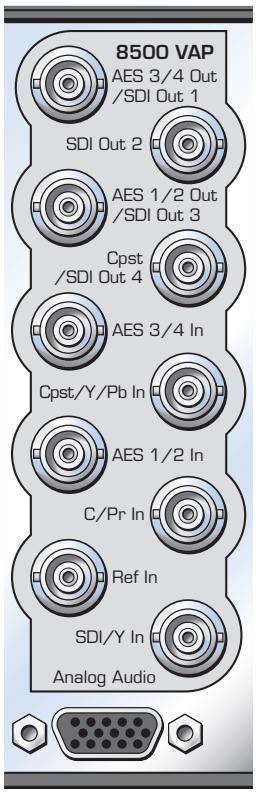
8500

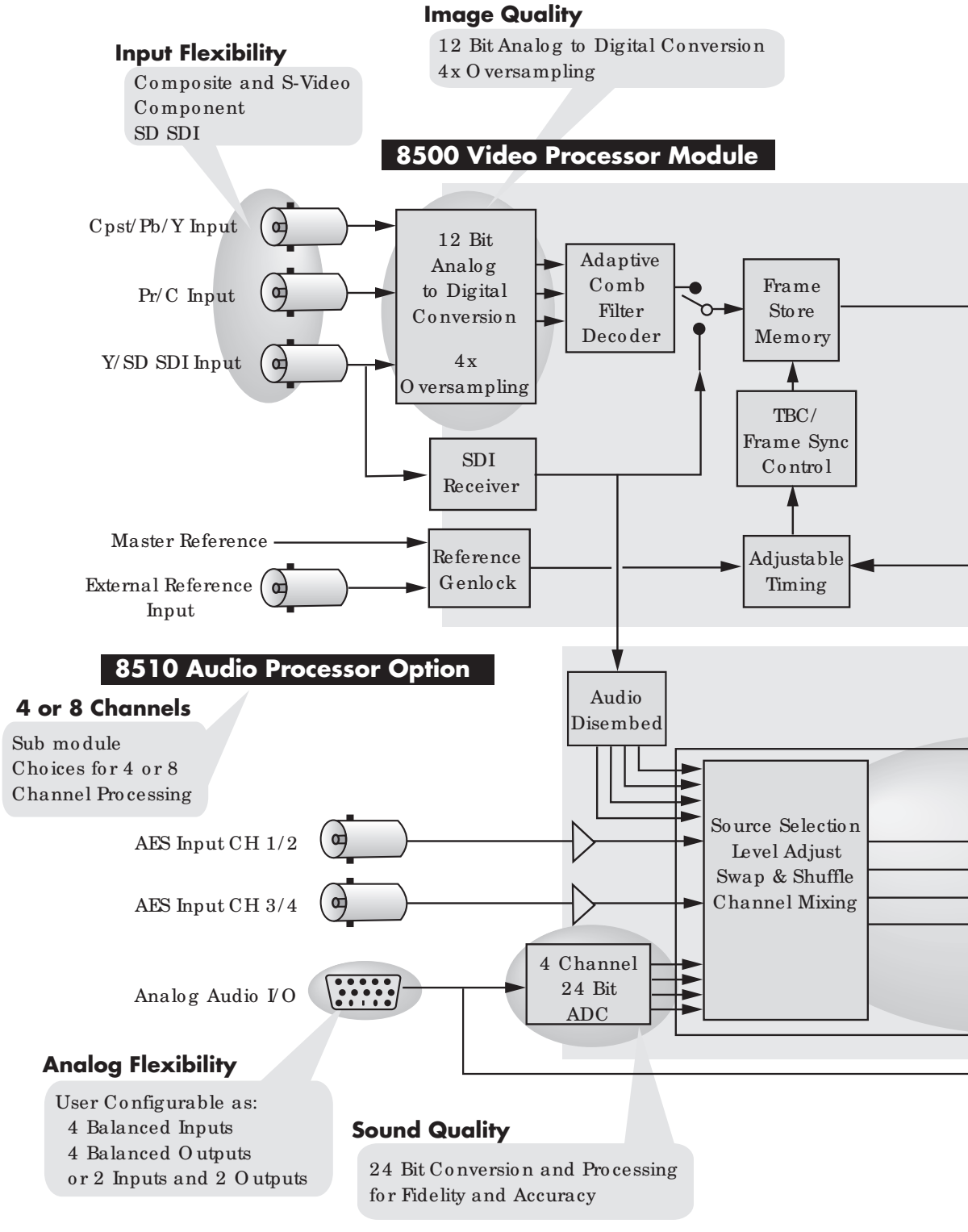
Composite/SD Legalizer and Video Processing Frame Sync

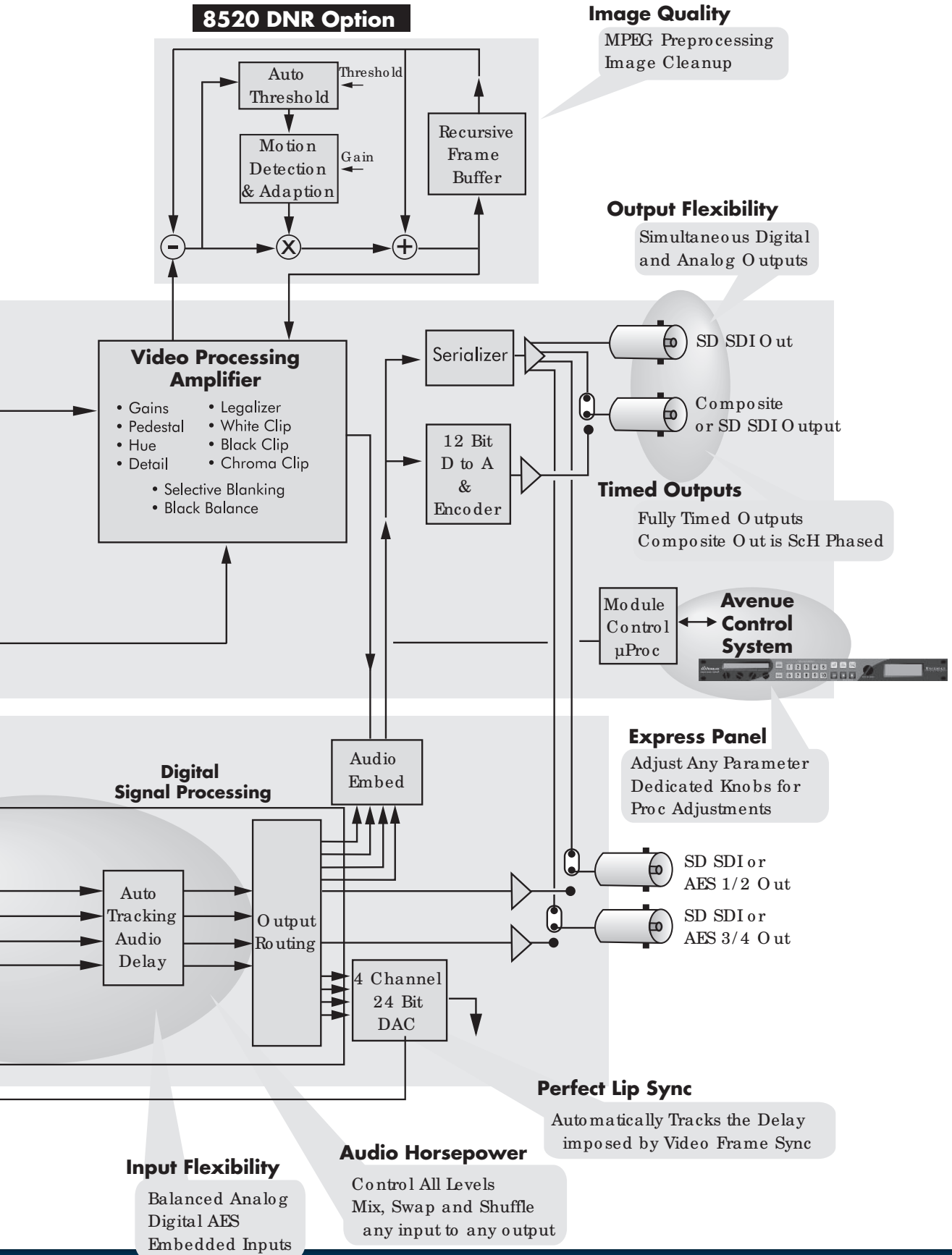
Features

- Legalizer
- Digital Noise Reducer option
- Digital Proc Amp
- SD Analog and Digital Inputs
- SD Analog and Digital Outputs
- TBC/Frame Sync
- Passes embedded audio
- Embedded Audio Processing option
- 4 or 8 channels
- Tracking Audio Delay








8520 DNR Option
Auto Threshold
Threshold
Motion Detection & Adaption
Gain
Recursive Frame Buffer
Image Quality
MPEG Preprocessing
Image Cleanup
Output Flexibility
Simultaneous Digital and Analog Outputs
Video Processing Amplifier
• Gains
• Pedestal
• Hue
• Detail
• Legalizer
• White Clip
• Black Clip
• Chroma Clip
• Selective Blanking
• Black Balance
Serializer
12 Bit D to A & Encoder
SD SDI Out
Composite or SD SDI Output
Timed Outputs
Fully Timed Outputs
Composite Out is ScH Phased
Module Control µProc
Avenue Control System
Express Panel
Adjust Any Parameter
Dedicated Knobs for Proc Adjustments
Audio Embed
Digital Signal Processing
Auto Tracking Audio Delay
Output Routing
4 Channel 24 Bit DAC
SD SDI or AES 1/2 Out
SD SDI or AES 3/4 Out
Perfect Lip Sync
Automatically Tracks the Delay imposed by Video Frame Sync
Audio Horsepower
Control All Levels
Mix, Swap and Shuffle any input to any output
Input Flexibility
Balanced Analog
Digital AES
Embedded Inputs

8510
4 Channel Audio Processor sub module for 8400 and 8500

The 8510 Audio Processor is a sub module option for use with the 8400 and 8500 modules. The 8510 adds both analog and digital audio capability with a flexible architecture that addresses a wide range of audio handling needs.

When the 8500 is being used as a video A to D converter, the 8510 can perform the same function with the associated audio. If the 8500 is being fed an SDI signal with embedded audio, the 8510 can produce an analog output of that audio. When using the 8400 as an SDI frame sync, the 8510 can properly resynchronize the embedded audio content.

Flexible Inputs

The 8510 accepts four channels of balanced analog audio. Analog inputs are digitized at 24 bits of resolution. Two AES inputs provide four channels of digital audio to the input selector. Sample rate converters can be selected in the AES input path, allowing the use of asynchronous digital sources. The 8510 accepts synchronous AC-3 or Dolby E inputs.

An audio disembedder fed by the SDI input to the 8400 or 8500 provides four additional channels of digital audio. The input selector allows any of these four channels to serve as inputs to the audio processing functions.

Mix, Swap and Shuffle

The 8510 has a full-featured, four-channel audio mixer. Precise control over audio level is provided for each input. A gain of up to +12dB can be applied to signals with low input levels. Signal phase inversion is selectable on a channel-by-channel basis to correct phase errors in incoming material.

Assignment of input channel to output channel is completely flexible, making it possible to swap any input to any output, or produce a mix of any input combination on any output.

All audio processing is performed at the full 24 bit resolution of the system by a digital signal processor (DSP).

Tracking Audio Delay

In order to compensate for the delay introduced in the video path by the frame synchronizer function of the 8400 or 8500, a tracking audio delay automatically delays the four audio channels. This prevents the video synchronizing process from causing lip sync errors. The amount of delay required is communicated to the 8510 by the 8400 or 8500 module's microcontroller. Changes in delay are made incrementally over several seconds.

In addition to the automatic tracking delay, the 8510 has an additional bulk delay that is user-adjustable up to one second in length. This delay can be used to correct lip sync errors that were already present in the original signal.

Digital and Analog Output

The four audio output channels can be delivered in both analog and digital form. 24 bit digital to analog conversion produces the analog balanced outputs, with reference level selectable from -10 to +4 dBu.

The output channels are simultaneously available in AES digital form, synchronous to the video reference supplied to the 8500 module. Finally, the four channels may also be embedded into the SDI output of the 8400 or 8500.

Embedded Audio Handling

The 8510 has been designed to provide superior handling of embedded audio. The disembedder on the input side follows the timing of the SDI input, even if that input is asynchronous to the house reference. The embedder on the output side is synchronous to house. This allows embedded audio to be safely bypassed around the video framestore with the lip sync properly preserved.

8510

4 Channel Audio Processor sub module for 8400 and 8500

Features

- **24 bit processing throughout**
- **Up to 4 Balanced Analog Inputs**
- **2 AES Inputs (4 Channels)**
- **Embedded Audio Input (4 Channels)**
- **Built-in sample rate converter accepts asynchronous inputs**
- **Up to 4 Balanced Analog Outputs**
- **2 AES Outputs (4 Channels)**
- **Embedded Audio Output (4 Channels)**
- **Embedded Audio-Friendly Synchronization**
- **Mix, Shuffle, Level Adjust of Embedded Audio**
- **Fully adjustable audio levels**
- **Complete shuffling and mixing among all channels**
- **Phase inversion selectable on a channel basis**
- **Tracking Audio Delay**
- **User-adjustable Bulk Audio Delay**
- **Built-in tone generator**
- **100 MHz DSP**
- **Memory Registers**
- **Use with 8400 and 8500 modules**

Analog Inputs

Number	Configurable as two or four
Signal Type	Balanced
Impedance	>15 K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 kHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 kHz
Reference Level	-10 dBu to +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 kHz
Crosstalk	<102 dB
Dynamic Range	>106 dB

AES/EBU Digital Inputs

Number	Two (total of four channels)
Signal Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 bit
Sample Rate	30 kHz to 100 kHz (sample rate converted internally to 48 kHz)
Crosstalk	<144 dB
Dynamic Range	>144 dB
Reference Level	-18 or -20 dBFS (selectable)
AC-3, Dolby E	Supported when inputs are synchronous

Embedded Inputs

Number	One (from SDI video input)
Signal Type	SMPTE 274M compliant Selectable to any of four groups
Channels	Four
Bit Depth	20 and 24 bit

Analog Outputs

Number	Configurable as two or four
Signal Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x Oversampled
Reference Level	-10 dBu to +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 kHz
Crosstalk	<102 dB
Dynamic Range	>106 dB

AES/EBU Digital Outputs

Number	Two (total of four channels)
Signal Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 bit
Sample Rate	48 kHz, synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

Embedded Output

Number	One (or more, depending on main module)
Signal Type	SMPTE 274M compliant
Group Assign	Cascade or replace any two of four groups
Channels	Four
Bit Depth	24 bit