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.

AVENUE™

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