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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Jul 03
1.0	First Release	Jul 03
1.1	Fixed formatting and typos	Jul 07

1. OVERVIEW

The 500AMDA-AESU is a five output reclocking and auto equalizing AES Distribution Amplifier for unbalanced 75 ohm AES signals. It is also a high quality 24-bit audio Digital to Analog Converter (DAC). The 500AMDA-AESU automatically equalizes up to 1000m of Belden 1694A coax and provides 5 reclocked outputs. The 500AMDA-AESU also converts AES/EBU digital signal to 2 balanced analog audio outputs. The input sample rates supported are 32kHz, 44.1kHz and 48kHz. Analog audio output levels may be set individually from the front panel.

Evertz's optional SoftSwitch™ technology mitigates audio pops during hot-switching the AES input and maintains consistent audio sequences and formatted output. It ensures that AES devices downstream will receive properly formatted AES signals always. Hence downstream devices are protected from "hot switched" upstream AES routers. SoftSwitch™ is the +SS option.

Analog audio level control is provided via a card edge toggle switch. The full scale digital signal can be calibrated to produce analog peak levels ranging from 12dBu to 24.8dBu with 0.1dB resolution. The 500AMDA-AESU card edge LED indicators provide quick and accurate assessment of the incoming signal integrity. Balanced analog audio is provided via a terminal strip adapter.

The 500AMDA-AESU is housed in the 500FR exponent Frame that will hold up to 16 modules.

Features:

- Five output DA for SMPTE 276M standard for AES audio on 75 ohm coax
- 24-bit, high-quality D to A conversion - 2 channels of balanced analog audio (1 AES/EBU)
- 44.1kHz, 32kHz and 48kHz sampling rates supported
- 0dBFS programmable from 12dBu to 24.8dBu
- Cable equalization and reclocking outputs provide extended cable length compensation (>1000m)
- Fully hot-swappable from front of frame with no cable disconnect required
- Optional SoftSwitch™ technology for protection against hotswitch formating errors & provides audio pop mitigation
- Card edge LEDS for module health status, AES signal present, detected AES sample rate, PCM versus non-PCM data, audio level bargraph with ballistics
- Tally output on Frame Status bus upon loss of input signal

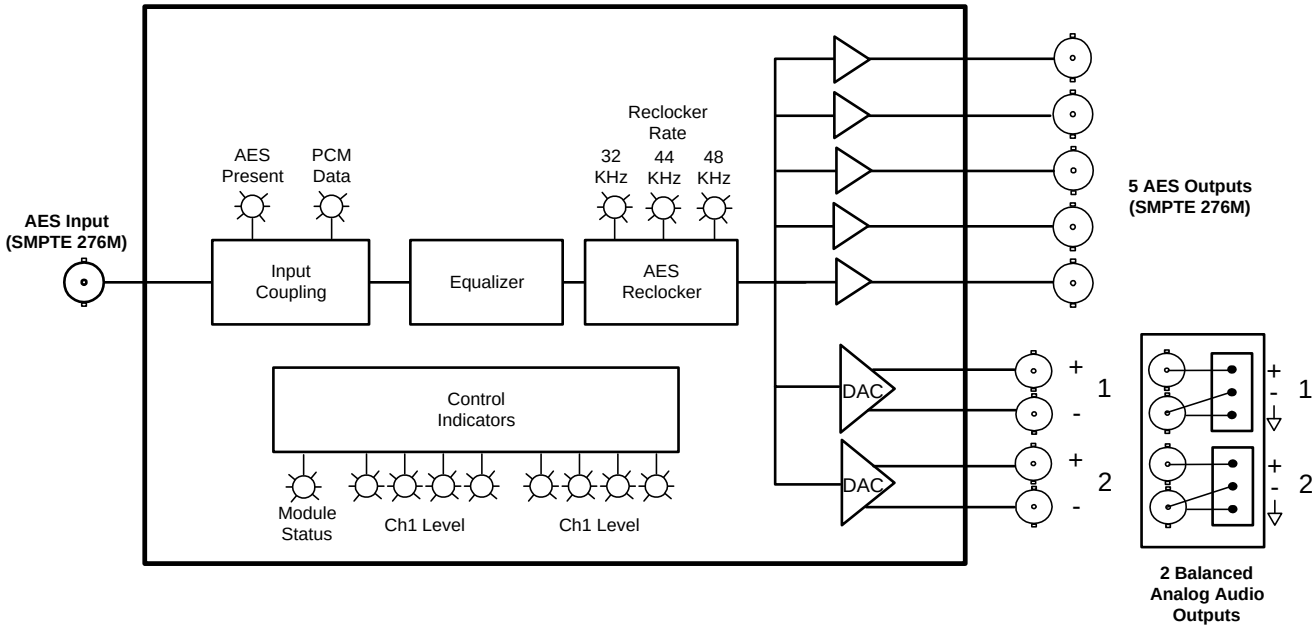

Figure 1-1: 500AMDA-AESU Block Diagram

2. INSTALLATION

The 500AMDA-AESU comes with a companion rear panel overlay that can be placed over the rear panel BNC connectors to identify their function. For information on inserting the module into the frame see section 3 of the 500FR chapter.

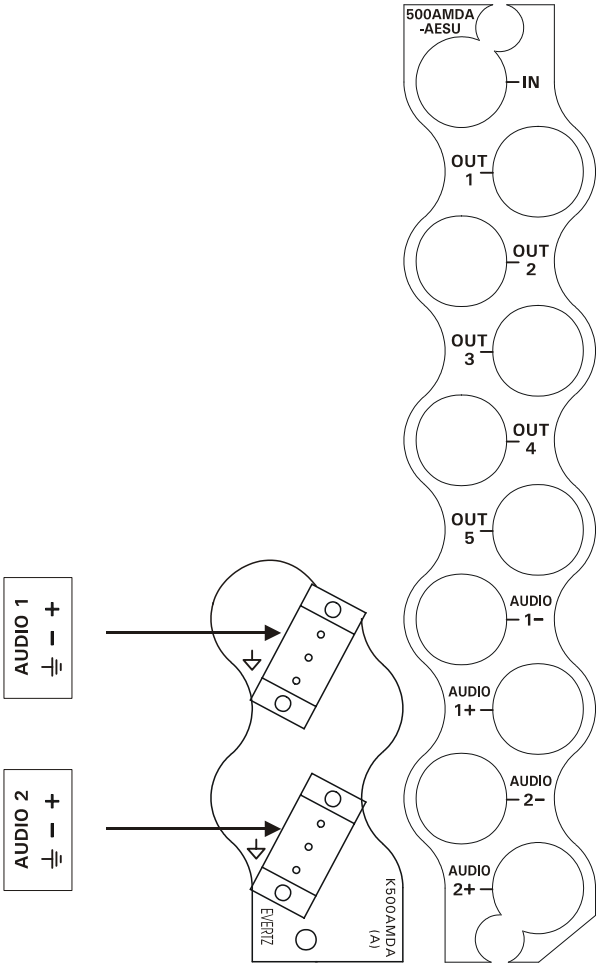

Figure 2-1: 500AMDA-AESU Rear Panel Overlay

IN Input BNC connector for unbalanced AES audio signals compatible with the SMPTE 276M standard.

OUT 1 to 5 There are five BNC connectors with reclocked unbalanced AES, compatible with the SMPTE 276M.

AUDIO 1 and 2 The 500AMDA-AESU is shipped with a K500AMDA-IO terminal block adapter for the balanced analog audio outputs. This adapter must be installed to the rear panel of the frame according to the instructions below. The K500AMDA-IO adapter has two 3 pin terminal blocks containing balanced analog audio that has been converted from the input AES audio. There are labels on the side of the terminal strips identifying the Audio 1 and 2 outputs. The output audio cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the rear panel. The left/right channels from the AES IN input will come out the Analog Audio 1 and 2 outputs respectively.

Refer to the picture in Figure 2-2 for additional information on installing the panel adapter.

1. Using a Philips screwdriver, remove the screw below the slot where you want to install the panel adapter.

2. Install the jack post that was supplied with the panel adapter. Tighten with pliers or a hex wrench.

3. Slide the BNC connectors of the panel adapter over the BNC connectors on the rear of the frame. The panel adapter should go all the way in until it touched the jack post.

4. Reinstall the screw and tighten with a Philips screwdriver.

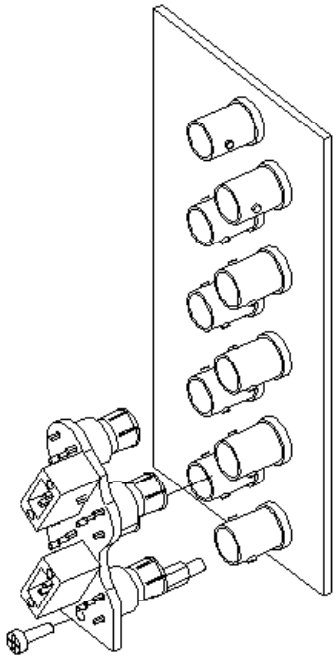

Figure 2-2: K500AMDA-IO Rear Panel Adapter Installation

3. SPECIFICATIONS

3.1. AES AUDIO INPUT

Number of Inputs:	1
Standard:	SMPTE 276M, unbalanced AES
Connectors:	BNC per IEC 169-8
Signal Level:	0.1 to 2.5 Vp-p
Equalization:	>1000m @ 48kHz with 1 Vp-p drive and Belden 1694A or equivalent coax cable
Resolution:	24 bits
Sample Rate:	32, 44.1, 48 kHz; ±100 ppm
Input Impedance:	75 Ω, AC-coupled
Return Loss:	> 25 dB, 100 kHz to 6.0 MHz
BNC Grounding:	AC-coupled (for 60 Hz ground loop current protection)

3.2. AES AUDIO OUTPUTS

Number of Outputs:	5
Standard:	SMPTE 276M, unbalanced AES
Connectors:	BNC per IEC 169-8
Sample Rate:	same as input
Impedance:	75 ohm unbalanced
Return Loss:	> 25 dB, 100 kHz to 6.0 MHz

3.3. ANALOG AUDIO OUTPUTS

Number of Outputs:	4
Type:	Balanced analog audio
Connector:	two 3 pin removable terminal strips on BNC adapter panel
Output Impedance:	66 Ω
Output Load:	600 Ω or high impedance (10 K Ω)
Signal Level:	0dB FS => +12 to +24.8 dBu into 10 K Ω load (user settable)
DC Offset:	< ± 30mV
Frequency Response:	< ± 0.05dB (20Hz to 20kHz)
Dynamic Range:	24 bits
THD+N:	< -100dB RMS @ 1kHz, with 24dBu output
SNR:	> 110dB RMS (20Hz to 20kHz), “A” weighted
Inter-Channel Phase Error:	< ± 1° (20Hz to 20kHz)
Crosstalk Isolation:	> 110dB RMS (20Hz to 20kHz), unweighted
Digital to Analog Delay:	0.95m sec

3.4. ELECTRICAL

Voltage: + 12VDC
Power: 6 Watts
EMI/RFI: Complies with FCC Part 15 Class A, EU EMC Directive

3.5. PHYSICAL

Number of slots: 1

4. STATUS LEDS

The 500AMDA-AESU has 15 LED Status indicators on the front card edge to show operational status of the card at a glance. Figure 6-1 shows the location of the LEDs.

4.1. MODULE STATUS LEDS

Two large LEDs on the front of the board indicate the general health of the module

LOCAL FAULT: This Red LED indicates poor module health and will be On during the absence of a valid input signal or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

MODULE OK: This Green LED indicates good module health. It will be On when a valid input signal is present, and board power is good.

4.2. SIGNAL PRESENT LEDS

There are two small LEDs directly under the large LEDs that indicate the presence of AES audio:

AES OK: This Green LED will be On when there is a valid signal present at the module input. The LED is labeled **AES VAL** on Rev 1 circuit cards.

PCM: This Green LED will be On when the decoded AES signal has its V bit set to zero indicating that it is PCM audio data and is suitable for a conversion to an analog audio signal that is available on the analog audio outputs from the distribution amplifier. When the LED is Off it indicates that there is encoded data such as Dolby E on the AES signal and that it is not suitable for conversion to analog audio. The LED is labeled **AES VBID** on Rev 1 circuit cards.

4.3. SAMPLE RATE LEDS

There are three small LEDs that indicate the sample rate of AES audio that the reclocker is locked to:

48 KHZ: This Green LED will be On when the reclocker is locked to a 48 KHz AES signal. The LED will be flashing when the input rate is not within +/-100 ppm of 48 Khz.

44 KHZ: This Green LED will be On when the reclocker is locked to a 44.1 KHz AES signal. The LED will be flashing when the input rate is not within +/-100 ppm of 44.1 Khz.

32 KHZ: This Green LED will be On when the reclocker is locked to a 32 KHz AES signal. The LED will be flashing when the input rate is not within +/-100 ppm of 32 Khz.

4.4. AUDIO LEVEL LEDS

There are two groups of four small LEDs that are used as bar graphs to indicate the approximate volume level of each audio channel within the AES pair. Each LED can operate at 3 different brightness levels as well as off to give a combination of 16 different audio levels indicated by the four LEDs.

LED intensity	
Bright	
Dim	
Faint	
Off	

level (dBFS)	notes	top LED			bottom LED
> -2	all LEDs brightly ON				
- 2 to -6					
-6 to -10					
-10 to -14					
-14 to -18					
-18 to -22					
-22 to -26					
-26 to -30					
-30 to -34					
-34 to -38					
-38 to -42					
-42 to -60					
< -60	all LEDs OFF				

Table 4-1: Audio Level Indicators

5. DIP SWITCHES

The 500AMDA-AESU is equipped with a 4 position DIP switch to allow the user to select various functions. When the switches are set to Off the 2 groups of LED status indicators near the DIP switch indicate the level of the audio. When other DIP switch combinations are selected (as shown in Table 5-1) the toggle switch is used to control either the Channel 1 or Channel 2 level. The On position is down, or closest to the printed circuit board. All positions are assigned sequentially such that the first position is located at the top of the DIP switch (farthest from to the card ejector).

DIP Switch				Toggle Switch Function	Control Description
1	2	3	4		
Off	Off	Off	Off	Not used	No control. LEDS monitor audio level
On	Off	Off	Off	adjusts analog output 1 level: UP = increases level by 0.1 dB, DOWN = decreases level 0.1 dB, analog level limits are +12 to +25 dBu, for 0 dBFS (full scale) digital input	Analog channel 1 (left) volume level - all “CHANNEL 1 (LEFT) LEVEL” LEDs will flash
Off	On	Off	Off	adjusts analog output 2 level: UP = increases level by 0.1 dB, DOWN = decreases level 0.1 dB, analog level limits are +12 to +25 dBu, for 0 dBFS (full scale) digital input	Analog channel 2 (right) volume level - all “CHANNEL 2 (RIGHT) LEVEL” LEDs will flash
On	On	Off	Off	Not used	Factory use only
---	---	On	Off		
---	---	---	On		

Table 5-1: DIP and Toggle Switch Function Overview

6. JUMPERS AND USER ADJUSTMENTS

Figure 6-1: LED and Jumper Locations

6.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper J1, located at the front of the module, determines whether local faults (as shown by the Local Fault indicator) will be connected to the 500FR frame's global status bus.

FRAME STATUS: To monitor faults on this module with the frame status indicators (on the power supply's FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position.

When this jumper is installed in the Off position local faults on this module will not be monitored.

6.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE The UPGRADE jumper J5, located at the front of the module, is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* section in the front of the binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move Jumper J5 into the *UPGRD* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J3 just behind the small LEDs. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section in the front of the binder. Once the upgrade is completed, remove the module from the frame, move J5 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.