DDA-212 SERIES 2

Models DDA-212BNC and DDA-212XLR

192kHz AES/EBU DIGITAL AUDIO DISTRIBUTION AMPLIFIERS

OPERATING AND MAINTENANCE MANUAL

DESCRIPTION

DDA-212 Series 2 Digital Audio Distribution Amplifiers are designed to regenerate, isolate and distribute digital audio data formatted in accordance with specifications AES3-1992 and IEC 958. This is commonly called AES/EBU formatting or AES3.

DDA-212 Series 2 units have two inputs and 12 outputs, with the assignment of inputs and outputs configurable from a front panel switch. The unit may be operated as a Dual 1X6 or as a 2-Input 1X12, depending on the Input Select switch setting. The selected input feeds AES audio to either six or all 12 separate outputs.

A front panel switch selects either re-clocking or non-reclocking of the input signal. In most cases, re-clocking is preferred, as this feature improves the integrity of weak or distorted input signals. Re-clocking may be switched off to allow distribution of AES sync signals, Dolby E encoded AES signals, or other signals that should not be re-clocked.

DDA-212 Series 2 units work with AES signals that contain sample rates from 27 through 192kHz and 16-bit through 24-bit density, thus permitting very high resolution signals to be distributed.

The front panel displays full status of the input signal, including Sample rate, Word Length, Digital Errors and Pro or Consumer Mode.

DDA-212 Series 2 units contain a unique automatic equalization function that can adjust for extremely long input lines. Equalization works independently for each input. A Front Panel Lock feature protects all your settings.

The Model DDA-212XLR uses XLR connectors and operates from and drives a 110-ohm balanced shielded twisted pair distribution system per AES3-1992.

The Model DDA-212BNC uses BNC connectors and operates from and drives single-ended 75-ohm coaxial cable per AES-3id-1995 and is designed to integrate easily into video facilities.

S/PDIF (consumer) formatted digital audio data differs primarily in the use of consumer type "RCA" audio connectors in an unbalanced 75 ohm system and can be handled by a DDA-212BNC with use of an RCA-to-BNC input cable.

Input Loop-through connections for each of the two inputs are provided to permit multiple units to be stacked, or to insert the DDA-212 into your digital workflow. Switchable line termination is provided. Standard practice dictates that the last AES input be terminated; therefore, if you are not using the loop-through feature, Input Termination should be switched ON.

FEATURES

- Configurable for Dual 1X6 or 2-Input 1X12 operation
- Accepts sample rates from 27 to 192kHz
- Displays standard sample rates of 32, 44.1, 48, 88.2, 96, 176.4 and 192 kHz
- Displays Word Length of 16, 18, 20 and 24 bit
- Status and error LEDs show clock lock and data validity
- Automatic input equalizers compensate for very long cable runs
- Switchable re-clocking regenerates stable data before distribution
- Loop thru transformer balanced and isolated inputs
- Switchable input termination
- Individual, transformer balanced and isolated 110-ohm XLR outputs (XLR only)
- Individual isolated 75-ohm BNC outputs (BNC only)
- Two front-panel-selectable inputs
- 12 outputs
- Front panel control locking system
- Quiet, internal linear power supply
- Attractive and rugged 1RU package

DESCRIPTION

INPUTS

Incoming AES/EBU formatted digital audio data from Inputs 1 and 2 is applied to individual input transformers. Input termination resistors at 75 ohms for BNC inputs or 110 ohms for XLR inputs can be switched in or out of the circuit with the front panel Input Term switch. Inputs should always be terminated unless they are looped thru to another device or DDA input. The last device or input should always terminate the line.

INPUT EQUALIZERS

The input signals feed automatic cable equalizer circuits. Input equalization should only be necessary for extremely long input cable lengths and should only be used if proven to be necessary. Automatic equalization is enabled by pressing the front panel button labeled Input EQ. The automatic equalizer provides only the minimum amount of boost required to compensate for excess cable roll-off to avoid over-equalization, which can degrade noise margins. Input equalizers work independently for Input 1 and Input 2.

RECEIVERS

When input re-clocking is enabled, the equalized AES/EBU data stream is applied to the receiver circuit which recovers the clock and synchronization signals and separates the audio and digital data. The audio data may be 16 to 24 bits at sample rates from 27 to 192 kHz.

Frame sync (FSYNC), Serial Clock (SCK), Serial audio data (SDATA), Channel status (C), User channel data (U), and data validity information (VERF) are passed directly to the transmitter section for reformatting into the output data stream. VERF is an OR'ing of the validity information from the incoming data (V) with an internal error flag (ERF) that detects serious transmission errors such as parity errors, bi-phase coding violations and an out-of-lock PLL receiver. Errors are displayed on the front panel to aid in troubleshooting. VERF then becomes the transmitted validity bit (V) and can be used by downstream error correction devices to interpolate through errors.

FRONT PANEL DISPLAYS AND SWITCHES

Power
Indicates that low voltage DC is applied to the input of the voltage regulators.

Input Fault
Illuminates when a digital error is present. Inputs 1 and 2 are simultaneously and separately monitored.

Input Termination
Indicates whether the input termination is Off or On. Press the INPUT TERM button to toggle the setting.

Input Sample Rate
Indicates the sample rate of the input signal from 32 through 192 kHz.

Word Length
Indicates the Word Length of the input signal from 16 through 24 bit.

Digital Errors
Indicates four main error conditions encountered in digital signals as an aid to troubleshooting,

Re-Clocking
Indicates Input Re-Clocking On or Off. Press the RE-CLOCKING button to toggle the setting.

Mode
Indicates whether input signal is Pro or Consumer mode.

Input EQ
Enables automatic input equalization. LOCKED indicates input data is present and acceptable. ENABLED indicates equalization is applied. Press the INPUT EQ button to enable automatic equalization.

Input Select
The Input Select switch has four modes of operation. Press the Input Select switch repeatedly to advance through the four following operating modes:

Mode	LEDs On	Function
1	1	Unit operates as Dual 1X6, front panel displays and controls Input 1
2	2	Unit operates as Dual 1X6, front panel displays and controls Input 2
3	1 & Bridge	Unit operates as 1X12 using Input 1 as source; front panel displays and controls Input 1
4	2 & Bridge	Unit operates as 1X12 using Input 2 as source; front panel displays and controls Input 2

DDA212 Series 2 units retain their last operating mode even if power is interrupted.

Front Panel Lock

Press and hold the FRONT PANEL LOCK button to lock all the front panel controls. Press and hold again to unlock.

TRANSMITTERS

The Frame sync (FSYNC), Serial Clock (SCK), Serial audio data (SDATA), Channel status (C), User channel data (U), and data Validity information (VERF) are passed directly to the transmitters for reformatting into the AES/EBU output data stream. The transmitters are capable of operation from 27 to 192 kHz equivalent sample rates. The transmitters operate in a transparent mode, which allows the transmitter block structure (Channel Status, User and Validity bits) to be slaved to the block structure of the receiver. In the transparent mode the propagation delay of data is less than 25 nanoseconds even at the lowest sample rate.

OUTPUT DRIVERS

DDA-212XLR units are equipped with balanced, 110-ohm, transformer coupled outputs and XLR type connectors. DDA-212BNC units use the alternative 75-ohm unbalanced outputs to BNC coax connectors. The XLR outputs are in full compliance with specification AES3-1992 and the BNC outputs are in accordance with the recommendations of AES-3id-1995. XLR outputs are transformer coupled for ground isolation.

POWER SUPPLY

Power transformer primary windings are paralleled for 115VAC or wired in series for 230VAC. Internal jumpers allow field modification if necessary. See below for voltage conversion instructions.

INSTALLATION

LOCATION

To avoid addition of jitter (timing variations) to the digital bitstream, which could cause noise and distortion in the recovered audio, avoid locating the DDA in close proximity to a high energy, high frequency switching type power supply or a power amplifier that utilizes a switching supply. If possible, do not power both devices from the same AC power line.

Expensive components start to die at internal temperatures above 70°C (158°F). We recommend that you maintain rack temperatures below 50°C (122°F) to prevent excessive internal temperature buildup. This is another good reason not to mount the DDA directly above that 500W power amplifier.

POWER

If it is necessary to convert a unit wired for 115VAC to 230VAC operation, unplug the unit from the power source, remove the cover mounting screws and locate the jumpers next to the power transformer. Clip the jumpers 1-2 and 3-4 (don't unsolder), jumper from 2-3 carefully soldering together the free ends of 2-3 previously clipped. This procedure is recommended to avoid soldering damage to the multi-layer PC board.

WIRING

XLR types require special controlled impedance, 110 ohm, low loss, foil shielded, twisted pair cables. Standard audio cable is not recommended except for runs of only a few feet. Belden and most other cable manufacturers offer special digital audio cabling for this application. With equalization, cable runs of 300 meters (about 1000 feet) should be achievable. BNC types use 75-ohm coax (RG59). Select a cable for losses less than 20dB at 12MHz (for data rates up to 96kHz) at the maximum distance you require. Runs up to 1000 meters should be readily achievable with low loss coax.

SPECIFICATIONS

INPUTS

Connectors:	XLR female or BNC, DC isolated from chassis Input connector pairs paralleled for loop-thru
Level:	200mVp-p minimum
Impedance:	Transformer isolated, balanced and floating, XLR inputs 110 ohms, and BNC inputs 75 ohms
Termination:	Terminating resistors may be switched in or out from front panel
Cable Length:	300m of 110-ohm cable, 1000 m of 75 ohm coax (with equalizer)
Equalizer:	Automatic via front panel actuation button, independent for Inputs 1 or Input 2
Sample Rates:	Accepts 27kHz to >192kHz
Clock:	With re-clocking on, regenerated from input signal; clock jitter <300 picoseconds peak-to-peak at 96kHz sample rate
	With re-clocking off, input clock is passed directly to outputs

OUTPUTS

Connectors:	12 x XLR male or 12 x BNC chassis mount
Levels:	XLR, 4Vp-p loaded at 110 ohms BNC, 2Vp-p loaded at 75 ohms
Impedances:	XLR: 110 ohms, balanced, transformer isolated BNC: 75 ohms, unbalanced
Output Jitter:	<300 picoseconds peak to peak at 96kHz sample rate
Propagation Delay:	<25 nanoseconds
POWER	Internal supply, 115/230VAC+/-10%, 50/60Hz, 10VA, IEC320 3 pin connector
SIZE	1 RU, 19”(48.3cm) W X 1.75”(4.5cm) H X 8.5”(21.6cm) D
WEIGHT	7 lbs (3.2kg) net; 9 lbs (4.1kg) shipping weight
MODELS:	DDA-212XLR DDA-212BNC

One Year Limited Warranty

ATI warrants this product to be free from defects in materials and workmanship to its original owner for a period of one year from date of purchase. ATI will repair or replace such product or part thereof, which upon inspection by ATI, is found to be defective in materials or workmanship.

The Proper Return Authorization Number must be obtained from ATI in advance of return. Contact ATI at 856-626-3480 or email sales@atiaudio.com to receive the number and instructions for return of your unit.

A written statement providing the name, address, daytime telephone number and email address of the original owner, together with receipt from the original purchase, and a brief description of any claimed defects, must accompany all returns. Parts or product for which replacement is made shall become the property of ATI.

The customer shall be responsible for costs of transportation and insurance to the factory of ATI, and shall be required to prepay such costs.

ATI shall use reasonable efforts to repair or replace any product covered by this limited warranty within thirty days of receipt. In the event repair or replacement shall require more than thirty days, ATI shall notify the customer accordingly. ATI reserves the right to replace any product that has been discontinued from its product line with a new product of comparable value and function.

This warranty shall be void in the event a covered product has been damaged, or failure is caused by or attributable to acts of God, abuse, accident, misuse, improper or abnormal usage, failure to follow instructions, improper installation or maintenance, alteration, or lightning, power fluctuations and other incidental or environmental conditions. Further, product malfunction or deterioration due to normal wear is not covered by this warranty.

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This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

ATI reserves the right to modify or discontinue, without prior notice to you, any model or style product.

If warranty problems arise, or if you need assistance in using your product contact us.