DDA-416/WC106

Quad 1x4 AES/EBU Distribution Amplifier
and
1x6 Clock Distribution Amplifier

OPERATING AND MAINTENANCE MANUAL

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DDA-416/WC106 FEATURES

- Accepts AES3 and AES11 Word Clock inputs
- Independent Quad 1X4 AES/EBU Distribution Amplifiers
- Displays input sample rates of 32, 44.1, 48, 88.2, 96, 176.4 and 192 kHz
- Full diagnostics for all inputs and operating conditions
- Loop-thru inputs for AES Sync and Word Clock
- Switchable input termination, individual for all inputs
- 6 independently driven 75 Ohm BNC Word Clock outputs
- 16 isolated AES/EBU 110 Ohm XLR outputs
- Flexible signal routing system
- Switchable Input Re-clocking on all AES/EBU inputs
- Automatic Input Equalization for long input lines
- Front panel control locking system
- Attractive and rugged 2RU package
- No breakout cables required

DDA-416/WC106 Revision A.

SAFETY INFORMATION
To reduce risk of electric shock, do not remove covers. There are no user-serviceable items inside. Please refer servicing to qualified personnel.

UNPACKING
Examine all shipping cartons for external damage and retain all damaged cartons for inspection by the carrier. Examine all equipment for any sign of damage. Do not connect AC mains power to a unit which appears to be damaged. Contact the carrier to file a damage claim.

INSTALLATION LOCATION
This equipment must be installed in a location meeting the environmental conditions specified below. Adequate cooling must be provided if units are to be operated in high temperature locations. Exposure to liquid and condensation must be avoided.

GROUNDING
This equipment is connected to earth through the center conductor of the AC mains cable. Proper grounding protects operators from electric shock, and it must be maintained whenever the unit is connected to AC.

ELECTROMAGNETIC COMPATIBILITY
This unit complies with electromagnetic requirements described in EMC Directive 2004/108/EC and FCC Part 15. This unit does not generate undue electromagnetic interference, and is adequately protected against electromagnetic interference so that it can operate properly.

MAINTENANCE
This unit requires no maintenance other than periodic wiping with a soft dry cloth to remove any dust or contaminating substances. Do not use solvents for cleaning.

DECLARATIONS OF CONFORMITY

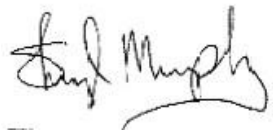
Class A Equipment – FCC Notice
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to FCC CFR 47, Part 15.

CE Declaration of Conformity
ATI Audio Inc., West Berlin, New Jersey 08091 USA, declares that all Model DDA-416/WC106 units are in conformity with the following EU regulations and amendments:

Low Voltage Directive (LVD) 2006/95/EC (replaces 73/23/EEC)
Electromagnetic Compatibility (EMC): EMC Directive 2004/108/EC
EMC: EN55103-1/-2:2009,

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

West Berlin, NJ USA, 31 July 2009



President

AIR TEMPERATURE AND HUMIDITY

Normal operation of this unit is warranted while operating in a temperature range of +5 to +40°C, with relative humidity ranging from 5 to 85%. Care should be taken to avoid operation outside these limits or erratic operation may result.

FUNCTIONAL STANDARDS

All Model DDA-416/WC106 units are in conformity with the following industry standards: AES3-2003, AES11-2003 and IEC958 SPDIF

DESCRIPTION

The ATI Model DDA-416/WC106 is an integrated package containing four 1X4 AES/EBU Digital Audio Distribution Amplifiers and one 1X6 Clock Distribution Amplifier. Operation of the unit is simple and straightforward, and it is housed in a rugged 2U rack mount enclosure. All audio connections are made directly to the unit's built-in XLR and BNC connectors, and no special breakout cables or accessory jack panels are required.

Signal routing is provided via rear panel accessible DIP switches to provide exceptional versatility. The front panel provides full status monitoring of all input signals, including displays for Input Sample Rate, Word Length, Digital Errors and Pro/Consumer mode. A unique Source Monitor & Control function allows front panel setup for input termination and input equalization. Input Fault displays are also provided, as is switchable Re-clocking on AES/EBU 1, 2, 3 and 4 inputs.

The DDA's Clock Distribution Amplifier has both Input and Loop-thru outputs to allow downstream equipment to be fed from the input reference signal. When no downstream equipment is connected, the inputs should be terminated via the front panel Input Termination switch. Loop-through inputs are also provided for AES SYNC IN input.

INPUT FAULT LEDs indicate loss of carrier occurring on any input, regardless of the position of the Source Monitor selector.

A front panel lock switch protects all settings. The DDA retains all of its settings, even if power is removed.

INPUTS

Incoming AES/EBU formatted digital audio data and AES11 sync is applied to individual input transformers. Input termination resistors at 75 ohms for BNC Word Clock 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 a second DDA input. The last device or input should always terminate the line. Automatic Input Equalization is provided for all inputs, as selected on the front panel.

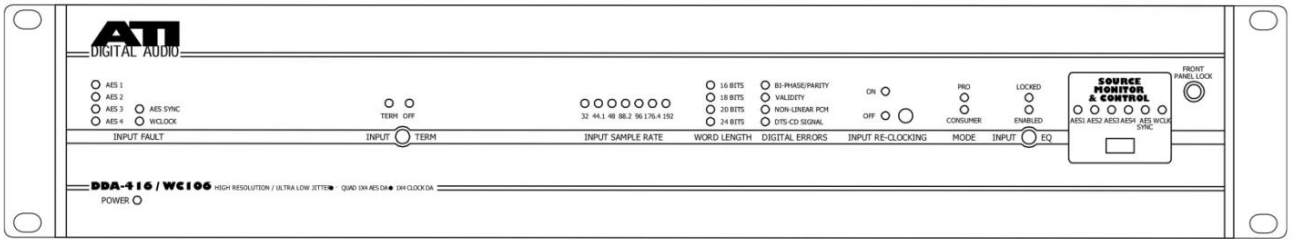
A Frame Clock signal is derived from AES INPUT 1. This Frame Clock signal is available for routing to all XLR and BNC outputs.

OUTPUTS
AES/EBU XLR Outputs 1 through 4, 5 through 8, 9 through 12 and 13 through 16 operate as independent groups. Also, BNC Outputs 1 through 6 operates as a group. Each or any of these groups may be driven from the following input sources, as selected via rear panel DIP switches:

1. INPUT 1 AES/EBU
2. INPUT 2 AES/EBU
3. INPUT 3 AES/EBU
4. INPUT 4 AES/EBU
5. AES External Sync Input
6. Word Clock Input
7. AES 1 Frame Clock

It is not necessary to terminate unused outputs, as each is individually isolated. Cable routing should be kept clear of AC lines and other noise-producing wiring.

FRONT PANEL DISPLAYS AND SWITCHES



POWER
Indicates power is supplied to the DDA and it is turned on.

INPUT FAULT
Indicates a no carrier condition on any of the six inputs, INPUT 1 (AES 1), INPUT 2 (AES 2), INPUT3 (AES 3), INPUT4 (AES 4), AES SYNC IN (AES Sync) or WORD CLOCK INPUT (WCLK).

INPUT TERM
Indicates whether the input termination is on or off for the source selected by the Source Monitor & Control switch. Press the INPUT TERM button to toggle the setting. Settings are individual for each source selected, and are memorized and retained through power outages.

INPUT SAMPLE RATE
Indicates sample rate of the input selected by the Source Monitor & Control switch. Sample rates from 32 kHz through 192 kHz are displayed when they are within 3% of nominal.

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

DIGITAL ERRORS
Indicates four error conditions encountered in digital signals as an aid to troubleshooting: Bi-Phase/Parity, Validity, Non-Linear PCM and DTS-CD Signal. It displays the conditions for the channel selected with the SOURCE MONITOR AND CONTROL.

INPUT RE-CLOCKING
Indicates Input Re-Clocking On or Off. Press the RE-CLOCKING button to toggle the setting. Note that this function applies only to INPUT 1 to 4. Settings are individual for either AES 1, AES 2, AES 3 or AES 4 inputs, and are memorized and retained through power outages.

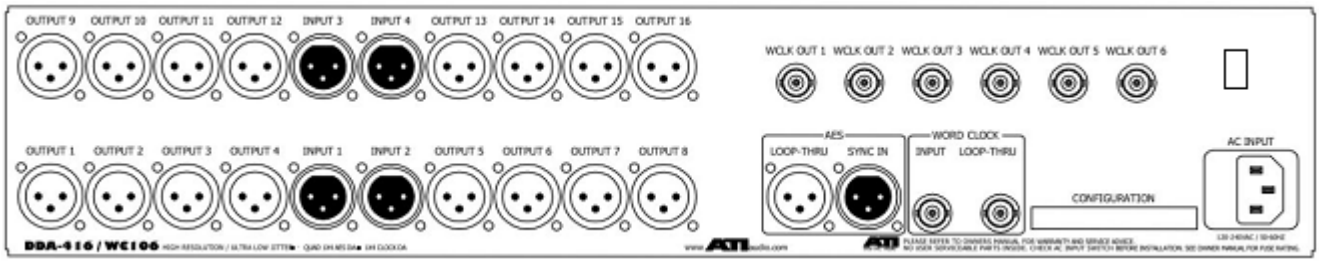
MODE
Indicates whether incoming AES/EBU input signal is Pro or Consumer (S/PDIF) mode for the input selected.

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. Settings are individual for all inputs, and are memorized and retained through power outages.

SOURCE MONITOR & CONTROL
Selects the input source to be monitored or controlled. Pressing the button cycles through, INPUT 1 (AES 1), INPUT 2 (AES 2), INPUT3 (AES 3), INPUT4 (AES 4), AES SYNC IN (AES Sync) or WORD CLOCK INPUT (WCLK).

FRONT PANEL LOCK
The Front Panel Lock protects your front panel settings. Press and hold the FRONT PANEL LOCK button until the LED in the SOURCE MONITOR & CONTROL field stops flashing, to lock all the front panel controls. Press and hold again to unlock.

REAR PANEL CONNECTIONS AND SWITCHES



AES/EBU Input 1
Provides a balanced, transformer isolated 110 ohm AES/EBU input that may be routed to Outputs 1 – 4, 5 – 8, 9 – 12 and/or 13 – 16 via the configuration DIP switches. This input may also be routed to the six BNC outputs as either AES or derived Word Clock.

AES/EBU Input 2
Provides a balanced, transformer isolated 110 ohm AES/EBU input that may be routed to Outputs 1 – 4, 5 – 8, 9 – 12 and/or 13 – 16 via the configuration DIP switches. This input may also be routed to the six BNC outputs.

AES/EBU Input 3
Provides a balanced, transformer isolated 110 ohm AES/EBU input that may be routed to Outputs 1 – 4, 5 – 8, 9 – 12 and/or 13 – 16 via the configuration DIP switches. This input may also be routed to the six BNC outputs.

AES/EBU Input 4
Provides a balanced, transformer isolated 110 ohm AES/EBU input that may be routed to Outputs 1 – 4, 5 – 8, 9 – 12 and/or 13 – 16 via the configuration DIP switches. This input may also be routed to the six BNC outputs.

AES External Sync In
Provides a balanced, transformer isolated 110 ohm AES External Sync input that may be routed to Outputs 1 – 4, 5 – 8, 9 – 12 and/or 13 – 16 via the configuration DIP switches as a Word Clock. This input may also be routed to the six BNC outputs.

AES Loop-Thru
Provides a convenient loop-thru port for the AES External Sync input. When looping this signal to another device, set Input Termination to Off.

Word Clock Input
Provides an isolated Hi Impedance or 75 ohm Word Clock input to drive the six BNC Clock Outputs via the configuration DIP switches. This input may also be routed to AES/EBU Outputs 1 – 4, 5 – 8, 9 – 12 and/or 13 – 16 as a Word Clock.

Word Clock Loop-Thru
Provides a convenient loop-thru port for the Word Clock input. When looping this signal to another device, set Input Termination to Off.

CONFIGURATION DIP Switches
Provides routing and other selections for signal flow in the unit. See the DIP Switch Routing Table for settings:

The switches are labeled left to right BANK A switch “1” is “DIP Switch 1 in the following tables. In this view Outputs 1-4 are connected to input 1. OUTPUT 5 to 8 are connected to Word Clock generated by the WORD CLOCK INPUT.

SOURCE SELECTION FOR AES/EBU OUTPUTS 1, 2, 3 & 4

Selected Source →	**AES INPUT 1**	**AES INPUT 2**	**AES INPUT 3**	**AES INPUT 4**	**AES SYNC INPUT**	**WORD CLOCK INPUT**	**AES 1 FRAME CLOCK**
DIP Switch 1	Down	Up	Down	Up	Down	Up	Up
DIP Switch 2	Down	Down	Up	Up	Down	Down	Up
DIP Switch 3	Down	Down	Down	Down	Up	Up	Up

SOURCE SELECTION FOR AES/EBU OUTPUTS 5, 6, 7 & 8

Selected Source →	**AES INPUT 1**	**AES INPUT 2**	**AES INPUT 3**	**AES INPUT 4**	**AES SYNC INPUT**	**WORD CLOCK INPUT**	**AES 1 FRAME CLOCK**
DIP Switch 4	Down	Up	Down	Up	Down	Up	Up
DIP Switch 5	Down	Down	Up	Up	Down	Down	Up
DIP Switch 6	Down	Down	Down	Down	Up	Up	Up

SOURCE SELECTION FOR AES/EBU OUTPUTS 9, 10, 11 &12

Selected Source →	AES INPUT 1	AES INPUT 2	AES INPUT 3	AES INPUT 4	AES SYNC INPUT	WORD CLOCK INPUT	AES 1 FRAME CLOCK
DIP Switch 7	Down	Up	Down	Up	Down	Up	Up
DIP Switch 8	Down	Down	Up	Up	Down	Down	Up
DIP Switch 9	Down	Down	Down	Down	Up	Up	Up

SOURCE SELECTION FOR AES/EBU OUTPUTS 13, 14, 15 & 16

Selected Source →	AES INPUT 1	AES INPUT 2	AES INPUT 3	AES INPUT 4	AES SYNC INPUT	WORD CLOCK INPUT	AES 1 FRAME CLOCK
DIP Switch 10	Down	Up	Down	Up	Down	Up	Up
DIP Switch 11	Down	Down	Up	Up	Down	Down	Up
DIP Switch 12	Down	Down	Down	Down	Up	Up	Up

SOURCE SELECTION FOR WORD CLOCK OUTPUTS

Selected Source →	AES INPUT 1	AES INPUT 2	AES INPUT 3	AES INPUT 4	AES SYNC INPUT	WORD CLOCK INPUT	AES 1 FRAME CLOCK
DIP Switch 13	Down	Up	Down	Up	Down	Up	Up
DIP Switch 14	Down	Down	Up	Up	Down	Down	Up
DIP Switch 15	Down	Down	Down	Down	Up	Up	Up

AC Input

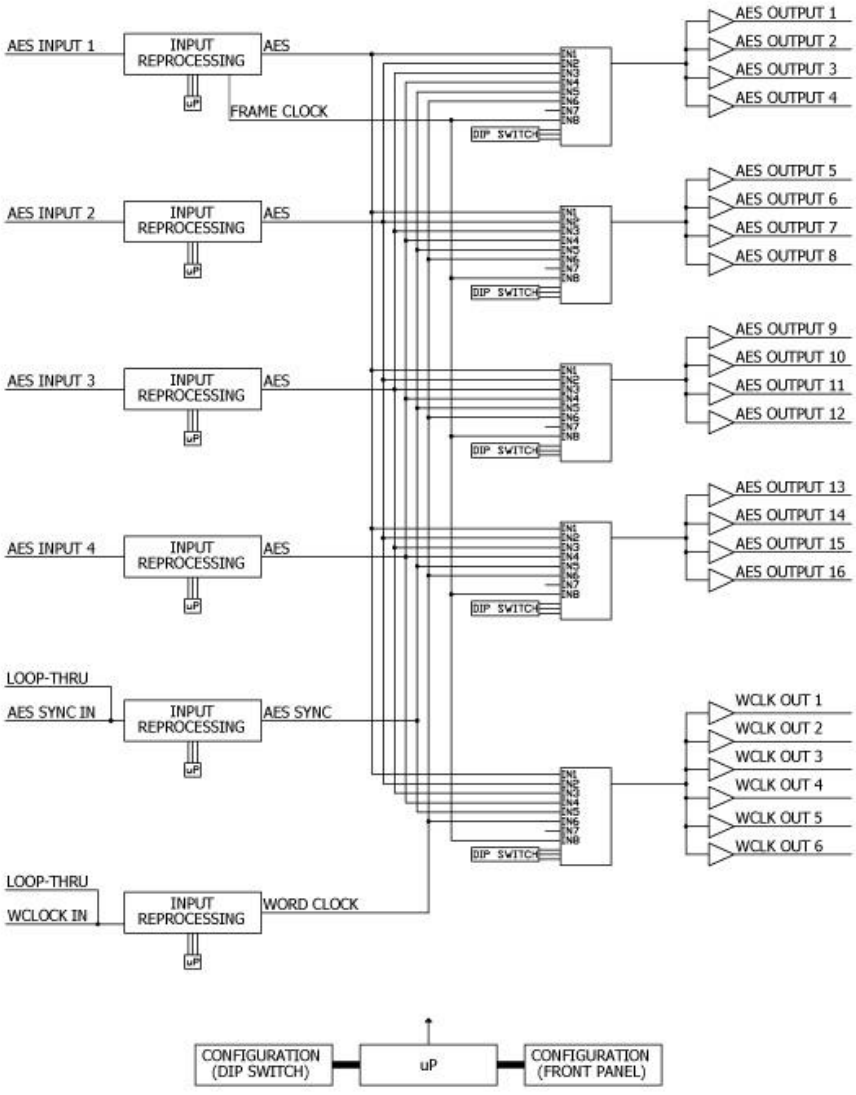
Connector for socket IEC 320/C13. Power cord is supplied.

Voltage .....85 ~ 264Vac
Frequency .....47 to 63Hz

Power Switch

Turns the DDA on and off.

DDA-416 WC106 BLOCK DIAGRAM



Input processing includes transformer isolation, cable termination, cable equalization, and AES digital audio interface receiver (DIR) and digital audio interface transmission (DIT). The output of each input signal processor is routed to a multiplexing chip which allows connection to each of the output groups. Selection is controlled by the position of the configuration switches on the back panel of the DDA. Each output port is driven by its own driver preventing interaction between outputs. A microprocessor sets up the DDA for operation.

INSTALLATION

LOCATION

The DDA is readily installed into a 2 RU, 19” rack. The DDA is only to be installed in an inside location where it is protected from inclement weather. Operate the DDA in temperature range of +5 to +40°C (105°F), with relative humidity ranging from 5 to 85%.

POWER

Connector for socket fused IEC 320/C13. Power cord is supplied. The DDA has a rear panel On Off power switch.

POWER INPUT SPECIFICATIONS:

Voltage .....85 ~ 264Vac
Frequency .....47 to 63Hz

This equipment is connected to earth through the center conductor of the AC mains cable. Proper grounding protects user/operators from electric shock, and it must be maintained whenever the unit is connected to AC.

WIRING

XLR inputs for external clock sources require special controlled impedance, 110 ohm, low loss, foil shielded, twisted pair cables. Standard audio cable is not recommended. Belden and most other cable manufacturers offer special digital audio cabling for this application. BNC connectors use 75-ohm coax (RG59). Select a cable for losses less than 20dB at 12MHz (for data rates up to 96 k samples) at the maximum distance you require. Keep cable length as short as possible

DDA-416/WC106 SPECIFICATIONS

INPUTS	
CONNECTORS	XLR female for AES/EBU and AES Sync BNC for Word Clock
LEVEL	XLR 200 mVp-p minimum; BNC 1 Vp-p minimum
IMPEDANCE	Transformer isolated, balanced and floating, XLR 110Ω, BNC 75 Ω; input terminations may be switched in or out via front panel control
SAMPLE RATES	30kHz to 200kHz
OUTPUTS	
AES/EBU OUT CONNECTORS	16 x XLR male
LEVEL	5 Vp-p loaded at 110Ω
IMPEDANCE	110Ω
JITTER	< 800 picoseconds
CLOCK OUT CONNECTORS	6 x BNC
LEVEL	2 Vp-p loaded
IMPEDANCE	75Ω, unbalanced
LOOP-THRU	XLR-M and BNC
INDICATORS	
INPUT FAULT	AES 1, AES 2, AES 3, AES 4, AES External Sync, Word Clock
INPUT TERMINATION	Terminated or Un-terminated (OFF)
INPUT SAMPLE RATE	32, 44.1, 48. 88.2, 96, 176.4 or 192kHz
WORD LENGTH	16 Bits, 18 Bits, 20 Bits and 24 Bits
DIGITAL ERRORS	Bi-Phase Parity, Validity, Non-Linear PCM and DTS-CD Signal
INPUT RE-CLOCKING	On and Off
MODE	Pro and Consumer
INPUT EQ	Locked and Enabled
SOURCE MONITOR & CONTROL	AES 1, AES 2, AES 3, AES4, AES External Sync, Word Clock
POWER	Internal Supply, 115/230VAC ±10%, 50/60Hz, IEC320 3 pin connector
SIZE	2 RU Package, 19" (48.3cm) W x 3.5" (8.9cm) H x 8.5" (21.6cm) D
WEIGHT	9 pounds (4.1 kg) net; 10 pounds (4.5 kg) shipping weight
WARRANTY	Limited, One Year Warranty

Specifications are subject to change without notice to upgrade the performance of our products.

One Year Limited Warranty

DaySequerra warrants ATI products to be free from defects in materials and workmanship to its original owner for one (1) year from the date of purchase. DaySequerra will repair or replace such product or part thereof that upon inspection by DaySequerra, is found to be defective in materials or workmanship subject to conditions contained herein.

ATI products are sold worldwide, through a network of authorized ATI dealers and distributors. This Warranty is for the sole benefit of the original purchaser of an ATI product, purchased directly from an authorized ATI dealer or distributor, is restricted to such original purchaser, and shall not be transferred to a subsequent purchaser of the product. Proof of purchase in the form of a bill of sale or receipted invoice substantiating that the product was purchased directly from an authorized ATI dealer or distributor and is within the warranty period must be presented to obtain warranty service. Removal or alteration of the original ATI serial number from a product automatically renders that product warranty null and void.

A Return Authorization Number must be obtained from DaySequerra in advance of return. Parts or product for which replacement is made shall become the property of DaySequerra. The customer shall be responsible for all costs of transportation and insurance to and from the DaySequerra factory, and all such costs will be prepaid.

DaySequerra 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, DaySequerra shall notify the customer accordingly. DaySequerra 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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