

# DA-2

## DISTRIBUTION AMPLIFIER

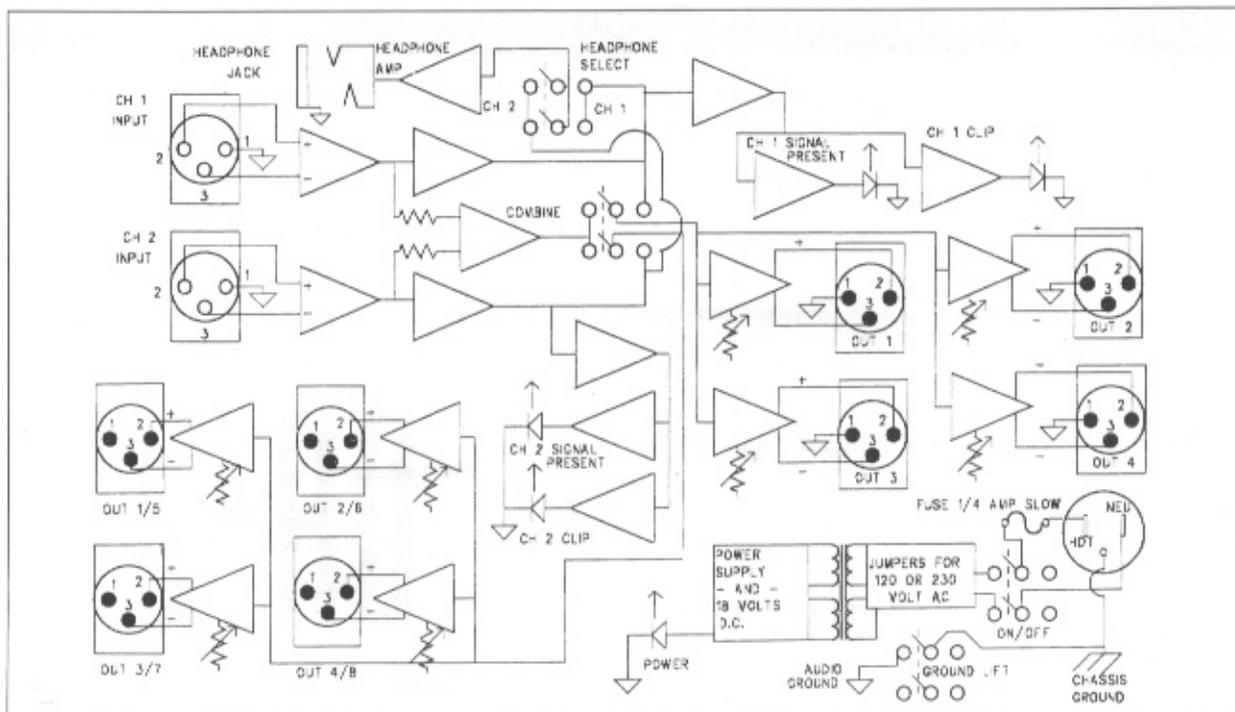


### INTRODUCTION

Thank you for selecting the US Audio DA-2. The DA-2 is a 2- channel, line-level, audio signal distribution amplifier. Each channel provides four electronically balanced XLR outputs with individual volume controls. The audio performance is of the absolute highest quality possible and at a reasonable price point, making it an excellent value. Great care was taken in the design so that the DA-2 can fulfill any distribution requirement, from professional disk and tape duplication to power amp input distribution. With the impedance of the active balanced XLR inputs set at 1Meg Ohms, several units can be paralleled for virtually unlimited outputs. The DA-2 can provide up to 18dB of gain allowing operation as a -10dB to +4dB converter. Other features include clip and signal LEDs, a headphone monitor circuit and a "combine" switch which configures the DA-2 as a one by eight distribution amp.

### UNPACKING

US Audio has made every effort to ensure that your equipment is received in the same perfect condition it was in when it left the factory. Please inspect your product for any signs of damage during shipping and report them to your dealer so that he can present a claim to the shipper. We recommend that you save your packaging material for use in the unlikely event that you need to return your equipment for service.



*Block Diagram: The DA-2 can be configured as a 2 by 4 or a 1 by 8 distribution amp through the combine circuit.*

## THEORY OF OPERATION

The U.S. Audio DA-2 is a dual channel line-level distribution amplifier with four outputs per channel. All inputs and outputs are active electronically balanced circuits accessed through XLR connectors. The input section and all critical gain sections of the DA-2 use the same IC chips as top professional mixing boards. The inputs are instrumentation grade differential amplifiers tuned for a high amount of Common Mode Rejection (CMR). The CMR of the DA-2 is greater than 90dB, 20 to 20KHz. The DA-2 has tunable input impedance, factory-set by a resistor at 1 Meg ohms, which allows many units to be connected together with their inputs paralleled. If lower input impedance is desired it can be easily accomplished by an internal resistor change. Output volume pots control the level of the rear panel output XLRs over a gain range of -60 to +18dB. This feature allows the DA-2 outputs to easily compensate for variations in input levels. Unity gain on the DA-2 is approximately at the 9 O'clock position and 14dB of gain is approximately at the 3 O'clock position. 60dB of attenuation in the "off" position allows the DA-2 to adequately "turn off" line level signals.

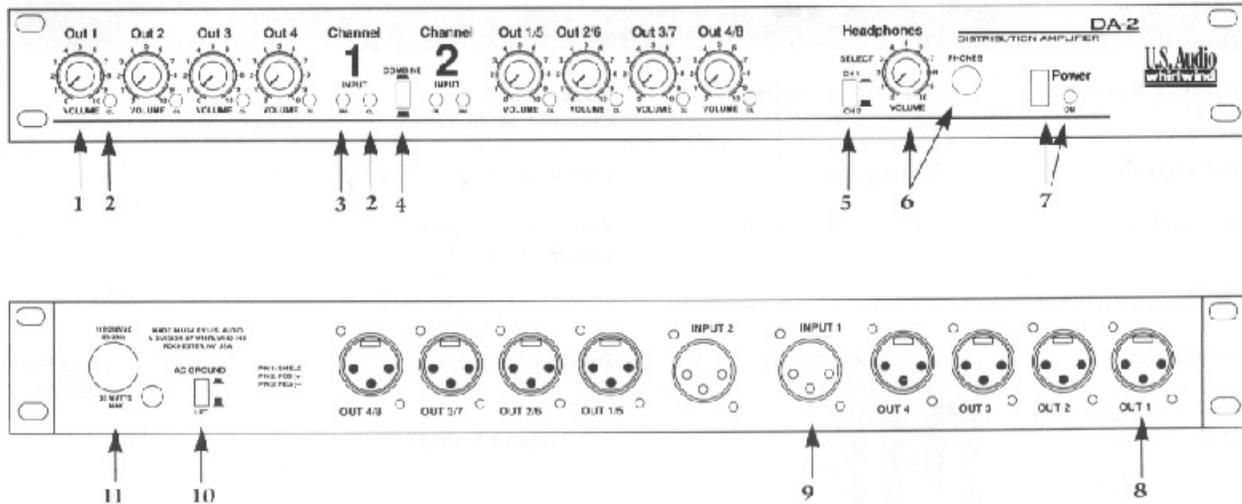
Maximum signal level through the DA-2 at clipping is +28dBm balanced and +22dBm unbalanced. The same figures apply to both the input and the output, and individual clip LEDs are provided which illuminate at 3dB below actual clipping. Green LEDs are provided for each channel, which verify input signal levels above -14dB balanced and -20dB unbalanced. With THD+n typically less than .004% throughout the entire audio spectrum, and a unity gain signal to noise ratio greater than 85dB with 22dB of headroom, the DA-2 is well suited for use in all

audio distribution applications. Along with great audio quality, the DA-2 features a high degree of isolation between channels, as well as immunity to RF and electromagnetic radiation.

The DA-2 headphone monitoring section consists of a channel select switch, a volume control and a 1/4" TRS headphone jack. The headphone circuit is a mono type which drives both left and right stereo earpieces in any headphones with 20 ohms or greater impedance. The volume control has a gain range of -60 to +18dB to accommodate a wide range of audio levels. The select switch allows listening to either the channel 1 or channel 2 inputs.

The combine switch is a unique feature that serves two functions. First, it allows the DA-2 to operate as two independent 1 in to 4 out distribution amps or as a single 1 in to 8 out amp when in combine mode. Secondly, in combine mode the two inputs are actively mono summed, allowing the DA-2 to provide a mono feed from left and right stereo signals. Either input may be used to feed the eight outputs when the combine switch is activated.

The DA-2 utilizes a dual primary power transformer that is configured with internal jumpers for 120 VAC 60Hz or 230 VAC 50Hz operations. There is an internal fuse on the hot side of the AC cord and the power switch makes and breaks both the hot and neutral legs of the AC cord. A ground lift switch is provided which disconnects the audio circuit ground from the AC chassis ground when engaged.



## CONTROLS AND CONNECTIONS

**1. Output Volume Pots** control the level at the corresponding rear panel output XLR. Each of the controls has a gain range of -60dB attenuation at full off to +18dB of gain at full on.

**2. Individual Clip LEDs** on all 8 outputs and on each of the two inputs indicate signal overload conditions within the circuitry. The red clip lights illuminate at 3dB below actual clipping (the unit clips at  $\pm 28$ dB balanced, the LEDs illuminate at +25dB).

**3. Signal Present LEDs** on each of the input channels indicate that signal is being applied to the input. The green lights illuminate when the input signal is greater than -14dB balanced or -20dB unbalanced.

**4. Combine Switch** converts the DA-2 from a 2 by 4 configuration to a 1 by 8 distribution amp. In this mode the two inputs are actively mono-summed or either input may be used to feed the eight outputs. The mono-sum feature allows the DA-2 to properly combine left and right stereo signals into a mono feed.

**5. Channel 1/2 Select Switch** determines which channels input signal is fed to the headphone circuit for monitoring.

**6. Headphone Circuit** monitors the signals coming into the DA-2 inputs. It is a mono circuit which drives both earpieces in stereo headphones that have an impedance greater than 20 Ohms. The volume control has a gain range of -60 to +18dB to accommodate a wide range of audio levels. The jack is a standard 1/4" TRS type.

**7. Power Switch** connects AC to the transformer primary and the LED indicates that the unit is working. Both sides of the AC line are switched and a mains fuse is located on the circuit board inside the unit.

**8. Output XLR5** on the DA-2 are actively balanced with the audio ground lifted (pin 1 disconnected). If grounding pin 1 of the XLR is required, there is a spot for a jumper for each XLR output on the PC board. Each output is driven with its own individual driver circuit providing channel-to-channel isolation greater than 74dB. The outputs are wired pin-2 positive, pin-3 negative and are RF-bypassed with capacitors for rejection of RF signals on the output lines.

**9. Input XLR Connectors** feed actively balanced differential amplifiers providing over 90dB of common mode rejection. The input impedance is factory-set at 1Meg Ohms, allowing the inputs of many units to be paralleled together. If lower input impedance is desired it can be easily accomplished by an internal resistor change. In Combine mode inputs 1 and 2 are actively summed to mono. Pin-2 is positive, pin-3 negative and pin-1 is connected to audio ground.

**10. Ground Lift Switch** connects the audio circuit ground to AC ground and the chassis of the unit, if desired.

**11. Power Cord** - a standard 15 amp plug for 120VAC and has no plug on the DA-2X 230VAC model. Black is line, white is neutral and green is earth.

# SPECIFICATIONS

|                                   |   |   |   |
|-----------------------------------|---|---|---|
| <b>Frequency response</b>         | ± .3dBm 20 to 20KHz<br>± 3dBm 3 to 140KHz | <b>Added noise of dual channel mode</b>         | +2dBm   |
| <b>Input impedance</b>            | 1Meg Ohm balanced                         | <b>C.M.R. of inputs 20-20kHz</b>                | >90dBm  |
| <b>Max. input level</b>           | +23dBm unbalanced<br>+28dBm balanced      | <b>Range of headphone volume control</b>        | -60 to +18dBm   |
| <b>Output impedance</b>           | 112 Ohm balanced, ground lifted           | <b>Isolation between outputs</b>                | >74dBm  |
| <b>Max. output level</b>          | +22dBm unbalanced<br>+28dBm balanced      | <b>Power Consumption @120VAC</b>                | .15 Amps max. A.C.  |
| <b>T.H.D.</b>                     | .004% at 1kHz.<br><.005% 20-20kHz         | <b>@230VAC</b>                                  | .15 Amps max. A.C.  |
| <b>Rise time</b>                  | 3uSec                                     | <b>AC Dropout Voltage</b>                       | +105 VAC @ 120VAC<br>+205 VAC @ 230VAC                                  |
| <b>Phase shift</b>                | .5 degree at unity gain                   | <b>Internal Mains Fuse</b>                      | .25 Amps Slo-Bl0 3AG  |
| <b>Intermodulation distortion</b> | .007% at unity gain                       | <b>Size (Single Space Standard E.I.A. Spec)</b> | 19.0" (482.6mm) Width<br>6.0" (152.4mm) Depth<br>1.75" (44.45mm) Height |
| <b>Signal present threshold</b>   | -20dBm unbalanced<br>-14dBm balanced      | <b>Shipping Weight</b>                          | 8.0 lbs (3.63kg)  |
| <b>LED Clip Threshold</b>         | +19dBm unbalanced<br>+25dBm balanced      | <b>Unit Weight</b>                              | 6.5 lbs (2.95kg)  |
| <b>Output signal range level</b>  | -60 to +18dBm                             |   |   |

## *Equivalent Input Noise and Signal to Noise Ratio*

| <b>INPUT LEVEL (dBm)</b> | <b>GAIN (dBm)</b> | <b>HEADROOM (dBm)</b> | <b>OUTPUT LEVEL (dBm)</b> | <b>SIGNAL TO NOISE RATIO (dBm)</b> | <b>E.I.N. (dBm)</b> |
|--------------------------|-------------------|-----------------------|---------------------------|------------------------------------|---------------------|
| +10                      | 0                 | 12                    | +10                       | 97                                 | -87                 |
| 0                        | 0                 | 22                    | 0                         | 87                                 | -87                 |
| 0                        | 10                | 12                    | +10                       | 89                                 | -79                 |
| -10                      | 0                 | 32                    | -10                       | 77                                 | -87                 |
| -10                      | 10                | 22                    | 0                         | 79                                 | -79                 |
| -10                      | 14                | 18                    | +4                        | 79                                 | -75                 |
| -20                      | 10                | 32                    | -10                       | 69                                 | -79                 |
| -20                      | 14                | 28                    | -6                        | 69                                 | -75                 |
| -30                      | 10                | 42                    | -20                       | 59                                 | -79                 |
| -30                      | 18                | 34                    | -12                       | 58                                 | -70                 |

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