DA208 AND DA416

DISTRIBUTION AMPLIFIERS
OPERATING AND MAINTENANCE MANUAL

DESCRIPTION

Your DA208 or DA416 provides two (DA208) or four (DA416) independent one-in by four-out circuit groups. A four-output feed is sufficient for many applications; however, if you need more outputs, you can parallel channels by bridging several inputs across the same line for 1X8, 2X8 or 1X16 operation. Since each input circuit has 30k ohms balanced input impedance, you can simply terminate your source line with a single 620 ohm resistor (if necessary) and then parallel as many inputs as necessary across it.

Each input can bridge line levels up to +24dBm without clipping. Common mode hum signals are attenuated by 70dB and the input resistor network is split and heavily bypassed for good protection from RF signals riding on the input lines. The input differential amplifier operates at slightly less than unity gain to optimize input headroom and to prevent any signal clipping from occurring prior to the gain controls.

Each output consists of an adjustable gain stage driving the HI output terminal along with a unity gain inverter stage. The inverter drives the LO output in opposite phase to provide an active balanced output. The adjustable gain stage utilizes a unique circuit arrangement that allows us to provide a smooth, full range logarithmic gain control for each output using a linear cermet potentiometer. This circuit provides 20dB gain at full clockwise rotation, unity gain in the 12 o'clock position and tapers smoothly to full off at the full CCW position. Since we actually vary the gain of the output stage rather than taking the more conventional approach of adjusting the input level to a fixed gain stage, you can use the DA at low output levels with very little noise penalty. You can easily match the DA outputs to console medium level inputs (-20dBm) or drive semi-pro RCA inputs (single ended at .10Vrms) without requiring outboard attenuator pads.

Each balanced output stage is isolated from the output terminals by DC blocking capacitors and 400 ohms of build-out resistance. The build-out resistors are split and bypassed to prevent any RF signals that might be picked up on an output line from feeding back into the DA.

Your DA has clipping indicators to warn you of overdriven and overloaded outputs. These indicators individually sense nonlinear operation of any output channel by measuring the error voltage at the feedback terminal of the HI side output amplifier. As long as the output stage operates linearly, the error voltage at its negative input (for example WA pin 9) will remain very small. The onset of clipping, current limiting or even slew rate limiting immediately causes a large increase in this error signal, which is then fed through R25 to the error amplifier U5A at pin 13. U5A, in turn, drives the clipping LED through Q1. Feedback voltages also feed the error amplifier from three other output channels. To avoid any crosstalk through the summing network, CR3 across R13 prevents nonlinear clipping of U5A and therefore maintains an extremely small common point voltage at U5A pin 13. If any single output or any combinations of outputs are driven too high, they will light the clipping LED. Each clipping indicator monitors only four outputs, making it easy to locate the "hot" output.

Your DA operates from a bipolar 15VDC regulated supply. The power supply is designed for minimum susceptibility to power line transients and conducted RFI using ferrite beads, double capacitive bypasses and a non-concentric wound semi-toroidal power transformer.

INSTALLATION

MOUNTING

Your ENCORE SERIES DA is designed for rack mounting on standard E.I.A. 1-3/4 inch centers. Each unit dissipates approximately 10 watts and is ventilated through slots in the rear panel.

WIRING

There are three wire grounded plugs. The power line ground could cause a loop with your studio ground. If you are sure your studio ground will provide adequate protection to personnel in case of an AC line short to chassis, a 3-to-2 AC adapter can be used to isolate the power line ground. We recommend that the adapter be removed and the power line ground be reconnected prior to any service work requiring removal of the studio ground from the chassis.

To allow maximum flexibility in grounding in high RF environments, the DA circuit grounds are isolated from case ground. For normal operation, add a ground jumper from any Phoenix connector ground terminal to the chassis ground screw.

The four inch silver bearing low inductance copper strap which you are, of course, using for your studio ground is not going to fit around the #6 chassis ground screw on the amplifier rear panel. Run the strap to within a few inches of the chassis and jump to the chassis ground screw with shield braid.

We have taken serious measures to keep RF out of your DA. This includes split and bypassed input and output resistor networks, beaded, bypassed and isolated power inputs, non-concentric wound power transformers and double ground plane PC boards. However, in a difficult broadcast application, any RF shielding and suppression system is going to be no better than the ground system into which it is trying to dump the unwanted RF. For optimal product performance, be sure to have a good facility grounding system.

Audio inputs and outputs should be connected using the rear panel labels as a guide. HI outputs are all in phase with each other and in phase with the HI inputs.

CAUTION

Your Distribution Amplifier has active drivers for both HI and LO output terminals. DO NOT GROUND either HI or LO terminals. If you are driving a single-ended (unbalanced, one side grounded) high impedance or 600 ohm load, it should be connected between either HI to GND or LO to GND. If you are driving a balanced load, connect it between HI and LO output terminals. It is generally unnecessary to terminate the DA with a 600 ohm load if it is driving a high impedance input, although placing a terminating resistor across a hi-Z input at the receiving end will occasionally reduce RF pickup.

ADJUSTMENTS

It is sometimes difficult to maintain good noise performance when using a DA to drive medium level console (-20dBm) or IHF (.1V) equipment inputs. You may have found it necessary in the past to insert attenuator networks between a DA and medium level console inputs to allow the DA to operate at a high enough output level to maintain a good signal-to-noise ratio. Your DA will reduce its already low output noise still further as you turn down its gain. In the absence of high RF fields, you can distribute input signals as low as -20dBm to multiple loads at 0 to -20dBm levels.

MAINTENANCE

Power supply voltages are + and - 15VDC nominal.

IC output DC Voltages under no signal, shorted input conditions should remain within .1V of ground. Greater deviation is an indication of IC or circuit problems.

MODIFICATIONS

230 VAC OPERATIONS

Your DA is wired for 115 VAC, 50/6OHz operation unless otherwise requested at the time ordering. It can be modified for 230 VAC operations by removing the power transformer primary jumpers J3 and J5 and inserting a jumper in J4. Units supplied with a -230VAC suffix have had this wiring change made at the factory.

Different types of attachment plug or line cords may be required for connection to alternate supply voltages.

DA208 and DA416 SPECIFICATIONS

OUTPUT LEVEL:	+24dBm into 600 ohm balanced loads
THD:	.001% typical, 20Hz to 20kHz
IMD:	.05% maximum, SMPTE measurement
SLEW RATE:	13 Volts per microsecond
RESPONSE:	+/-. 25dB, 30Hz to 20kHz
NOISE:	-100dBm EIN 20Hz to 20kHz
GAIN:	20dB maximum; each output has 40dB smooth adjustment range going to full off
CROSSTALK:	70dB minimum at 1kHz
OUTPUT IMPEDANCE:	400 ohms balanced, 200 ohms single-ended, split and RF bypassed, AC coupled
INPUTS:	30K ohm active balanced, split and RF bypassed; +22dBm maximum input level
HUM REJECTION:	70dB CMR at 60Hz
POWER:	115/230 VAC +10%, 47-63Hz, 12 VA
SIZE:	19" (48.3cm) W x 1-3/4" (4.4cm) H x 7-1/2" (19.1cm) D
SHIPPING WEIGHT	5 pounds (2.3kg)
TERMINALS:	Euro style modular connectors