AUDIO
TECHNOLOGIES
INCORPORATED
Dedicated to sound engineering

OPERATION
AND
MAINTENANCE MANUAL

Encore Series™

DA 208 Dual Distribution Amplifier

DA 416 Quad Distribution Amplifier

Technical specifications are subject to change at the discretion of the manufacturer.

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Thanks for buying ATI equipment. Since ATI does not have the biggest name, the most dealers, the fanciest advertising or the lowest prices we must assume that your ATI distribution amplifier has been purchased because you searched long and hard to find the BEST EQUIPMENT to do your job. Congratulations on finding us, we will do our best to merit your confidence.

If you have comments or complaints, suggestions or sarcasm, praise or panic, please call us direct at (215) 443-0330 (no panics accepted before morning coffee).

Thank you for selecting ATI.

Ed Mullin & Sam Wenzel
Audio Technologies Inc.

SIMPLE LIMITED WARRANTY

ATI warrants that:

Your DA will work when you get it.
Your DA will do what our published specs say it will do.
Your DA will continue to do the above for at least one year.

As Long As:

You treat it right.
Your power company treats it right.
You don't take it swimming.

If it doesn't work, Call us first
we will immediately:

Tell you with a straight face that you are the first person who ever had a problem with one of our DAs.
Send you a replacement part or
Send you a replacement unit.
Ask you to return the defective unit prepaid.
Help you put in a damage claim to the shipper.
Recommend you to a competitor.

We are not responsible for:

Acts of God
Murphy's Law
The wrath of your boss and other consequential damage.

DESCRIPTION

Our engineers insisted on including this section in the instruction book. It is really just an excuse to blow their own horn by telling you about all the clever things they have done inside your Encore DA. If they have really been clever, you will never even have to think about what's inside your DA and this whole section will be superfluous.

The heart of your Encore distribution amplifier is a high speed quad JFET input operational amplifier, the LF 347 manufactured by National Semiconductor. This device combines high loop gain and high slew rate with good noise performance and linearity. The LF 347 is interchangeable with other BiFET devices such as the TL074 and UAF774 but offers a consistant edge in output capability and distortion. Because the input devices are JFET rather than MOSFET types this IC does not require any special handling.

The use of a quad IC leads naturally to a four output circuit configuration (or maybe it was the other way around). In either case, your Encore distribution amplifier provides two (DA208) or four (DA416) independent one in by four out circuit groups. A four way 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 1 x 8, 2 x 8 or 1 x 16 operation. Since each input circuit has a 30,000 ohm 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 +22dBm (10Vrms) without clipping. Common mode hum signals are attenuated by 60db and the input resistor network is split and heavily by passed 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 occuring 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 logarithimic gain control for each output using an inexpensive (but good) 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, we 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 to drive semi pro IHF 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 a output line from feeding back into the DA.

One thing about designing with quad ICs....we always seem to end up with a few extra IC sections. We have put them to work in your Encore DA driving 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 U1A 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 thru R25 to the error amplifier U5A at pin 13. U5A, inturn, drives the clipping LED thru Q1. The error amplifier is also fed by feedback voltages from three other output channels. To avoid any crosstalk thru 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 combination 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. Conserve power....try not to light the yellow LEDS.

Your Encore 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 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 thru slots in the rear panel. We have absolutely no idea of how many Encore DAs you can stack up in a rack before the solder melts but we will be happy to sell you enough to find out.

WIRING

Our insurance company insists on 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 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 the barrier strip 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 heroic measures to keep RF out of your Encore DA. This heroism includes split and bypassed input and output resistor networks, beaded, bypassed and isolated power inputs, non-concentric wound power transformers, double ground plane PC boards and a nice enclosure which will keep rain and snow off the circuit 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. If you have a decent ground system and still have RF problems give us a call and we will hold a telephone prayer meeting. If you don't have a ground system you will still be O.K. as long as you don't turn on your transmitter.

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. Fanning strips are provided with your DA so that our ears won't be burning in the middle of the night while you are trying to wrap wires around those tiny barrier strip screws. The fanning strips are Kulka part number 649A-22 and extras are available at exorbitant prices from our parts and accessories department.

CAUTION:

Your Encore 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 wonderful Encore 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 with a comfortable 70db signal to noise ratio....and avoid building, trimming and repairing all those nasty little attenuator pads.

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.

Five to ten years from now replace all the aluminum electrolytic capacitors.

Keep 250W soldering guns out of the DA.

If hit by lightning replace A1 thru A7 and anything else that has turned black.

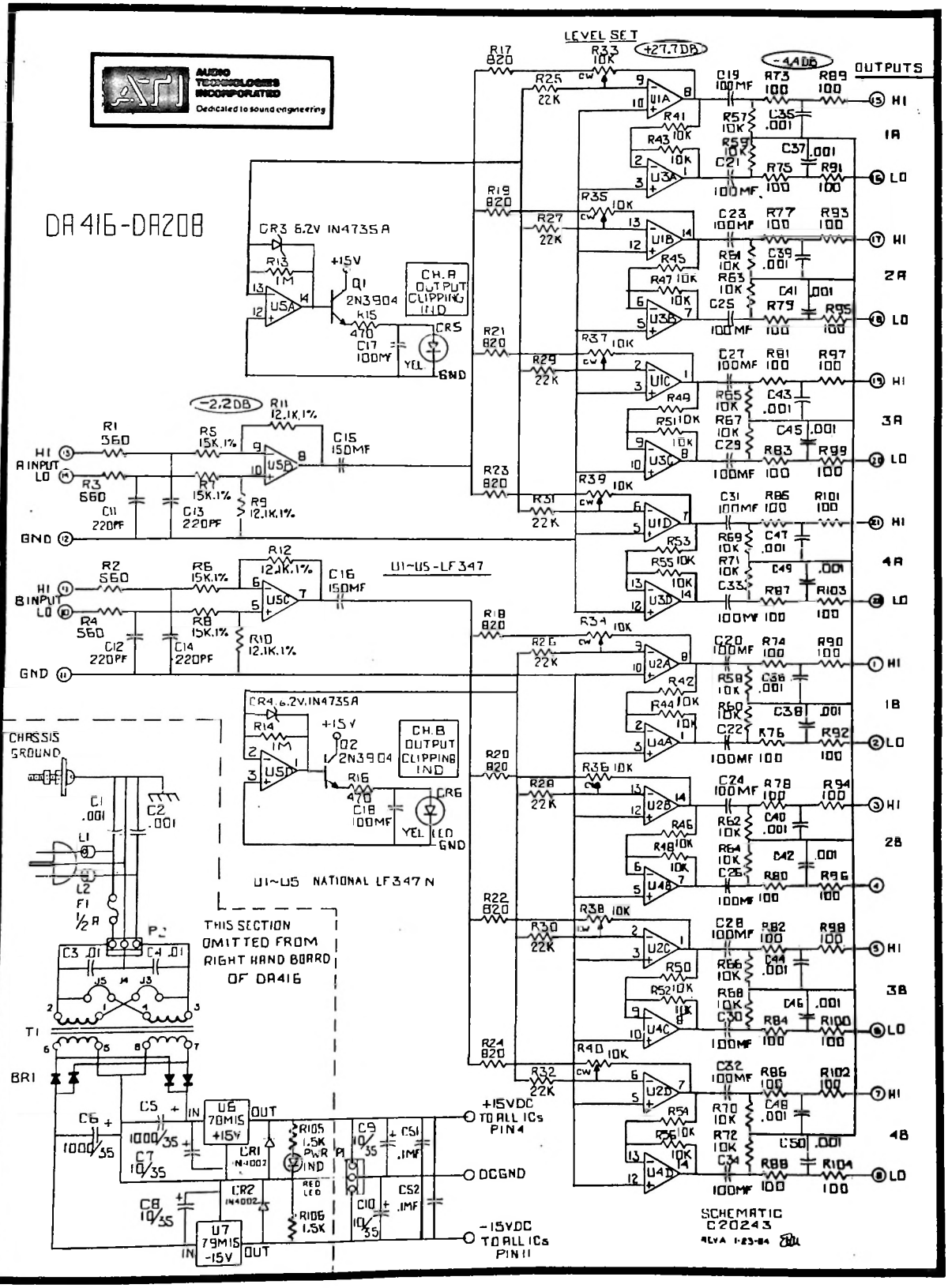
MODIFICATIONS

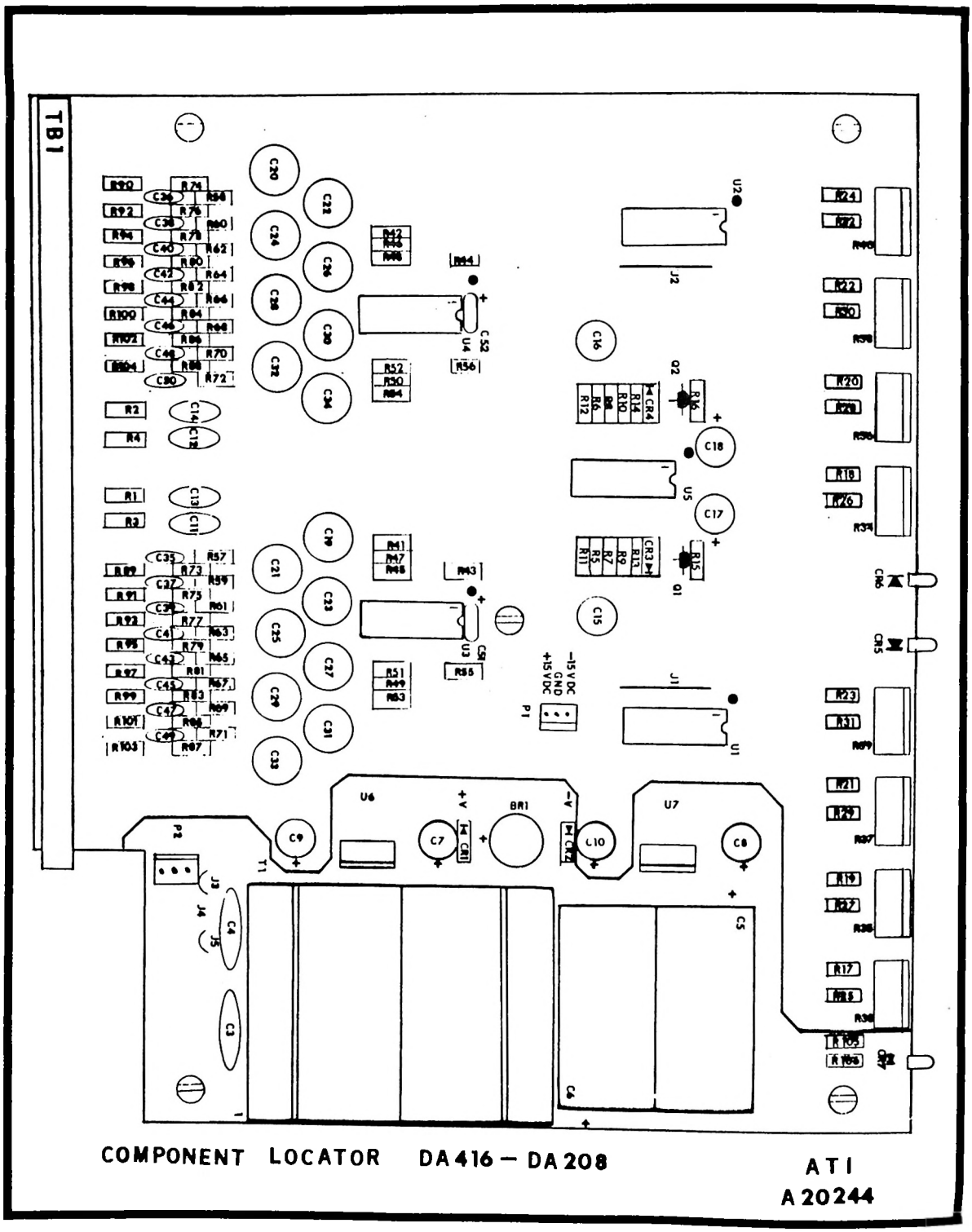
230 VAC OPERATION

Your DA is wired for 115 VAC, 50/60Hz operation unless otherwise requested at the time of ordering. It can be modified for 230 VAC operation by removing the power transformer primary jumpers J3 and J5 and inserting a jumper in J4.

SPECIFICATIONS

OUTPUT LEVEL:	+18dBm into 600 ohm balanced or unbalanced loads. 10 Vrms into high impedance loads.
DISTORTION:	.10% maximum THD, 20-20000Hz at +18dBm. .05% maximum IMD, SMPTE measurement.
SLEW RATE:	13 Volts per microsceond.
RESPONSE:	±.25db, 30 to 20,000Hz.
NOISE:	-75dBm maximum at output, maximum gain, 20 to 20,000Hz flat measurement bandwidth.
GAIN:	20db maximum, each output has 40db smooth adjustment range going to full off.
OUTPUT ISOLATION:	70db at 1Khz, a shorted output does not affect other output lines.
CROSSTALK:	70db between channels at 10Khz.
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, 60db CMR at 60Hz. To terminate inputs mount 600 ohm resistors on fanning strip.
POWER:	115/230 VAC ±10%, 47-63Hz, 12 VA.
SIZE:	19"W x 1 3/4"H x 7 1/2"D, 10 lbs.
TERMINALS:	Rear barrier blocks, fanning strips provided for easy prewiring.


AUDIO TECHNOLOGIES INCORPORATED
Dedicated to sound engineering
DA416-DA208
LEVEL SET
+27.7DB
-4.4DB
OUTPUTS
CR3 6.2V IN4735A
CH.A OUTPUT CLIPPING IND
CR4 6.2V IN4735A
CH.B OUTPUT CLIPPING IND
-2.2DB
HI AINPUT LO
HI BINPUT LO
GND
U1-U5 - LF347
U1-U5 NATIONAL LF347N
CHASSIS GROUND
THIS SECTION OMITTED FROM RIGHT HAND BOARD OF DA416
+15VDC TO ALL ICs PIN4
DCGND
-15VDC TO ALL ICs PIN11
SCHEMATIC C20243



COMPONENT LOCATOR DA416 — DA208

ATI
A20244