



# **DA200 AND MDA200**

## **DUAL DISTRIBUTION**

## **AMPLIFIERS**

## **FOR SYSTEM 10K™**

**OPERATING AND MAINTENANCE**  
**MANUAL**



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## DESCRIPTION

The DA200 and MDA200 modules are both two input, eight output audio distribution amplifiers designed as plug-in components for the System 10K Modular Distribution System. The System 10K provides proper mounting, shielding and power for a family of interchangeable amplifier modules and power supplies. Performance to published specifications and operational life of these modules is covered by ATI's standard warranty ONLY when they are used as part of a System 10K assembly consisting of an RM100 Rack Enclosure and PS100 Power Supplies.

The DA200 and MDA200 modules feature eight active balanced outputs in two groups of four. Both output groups are controlled by individual, full range, audio taper level controls.

A TRS (tip-ring-shield) stereo headphone output jack is mounted on the front panel. Both low and high impedance stereo headphones will be driven properly without output loading. The jack monitors CH1 on the tip and CH2 on the ring.

The MDA200 includes an LED peak indicating bargraph meter. It is switchable to monitor either the inputs or the outputs and will monitor either Channel 1 or Channel 2 signals as selected by a pair of front panel switches.

## CIRCUIT OPERATION

The audio input lines are bridged by a 30,000-ohm active balanced, differential input stage with a loss of 2.5dB. The bridging resistor network is split and heavily bypassed for maximum RF protection. Trimmers R13 and R14 null out common mode hum inputs and are factory set to 80dB. To field adjust, apply a 60 Hz input to HI and LO input terminals together referenced to ground and adjust the trimmer to null the output. The input stage will bridge a +24dBm input line without clipping. The input stages use two sections of a quad bi-fet LF347N IC.

Full range OUTPUT controls R23 and R24 adjust all outputs of CH1 or CH2 simultaneously; unity channel gain is at 50 percent rotation.

The output stages consist of a bridged pair of high current output ICs (NE5532AN) that provide the first 20ma. of output current directly. Above that level, the complimentary class B output booster transistors take over. This simple but unique, wide bandwidth, high slew rate design provides effective class AB operation with minimal crossover distortion from a power output stage operating in true class B with zero quiescent power dissipation. The outputs provide 3.5dB of stage gain, 6dB additional gain due to the balanced configuration and 3.5dB of output loss through the build-out resistors when loaded by 600 ohms.

The HI and LO amplifier outputs are split into four isolated balanced outputs through 150 ohm build-out resistors. The build-out resistors are individually bypassed to prevent RF pickup on an output line from affecting the operation of the DA. The build-out resistors totally isolate disturbances on one output line from all other outputs. All outputs will tolerate short circuits across the outputs or to ground without damage. However, since all the outputs are driven by active stages, DO NOT CONNECT EITHER HI or LO OUTPUT TERMINALS TO GROUND or to the grounded side of an unbalanced load, as this will cause excessive power supply loading and loss of headroom. Instead, connect an unbalanced load between the HI output and DC GROUND (rather than HI and LO) or use a transformer output Distribution Amplifier module such as a MIDA100-1 or isolate the unbalanced load through a balanced-to-unbalanced converter such as an ATI Model L1000-1 Line Amplifier or an isolation transformer.

The MDA200 includes a bargraph peak reading meter. Front panel switches S2 and S3 select input or output and either CH1 or CH2. Integrated circuit section A4A sums and amplifies the switch output. The meter circuit is designed for equal input and output levels and as shipped is calibrated by R71 for +4dBm at 0VU. IC sections A4B and A4C form an active full wave meter rectifier driving the LED bargraph with a range of 12dB above and 15dB below 0VU in 3dB increments. The display and circuit time constants approximate PPM ballistics. The meter driver, A5, is a National LM3915 and A6 is a General Instrument MV50164 ten-segment LED display.

Unregulated input power at  $\pm 18\text{VDC}$  nominal is filtered and limited to 16VDC maximum by zener diodes CR2 and CR3. Power indicator LED CR5 detects the loss of either positive or negative power supply voltage. On-board fuses F1 and F2 (both 3/8 A) protect the main power buss from module faults. Zener CR1 provides 11VDC maximum to the meter display.

An electrostatic shield is mounted to the PC board just behind the panel to shield the low level circuitry. To achieve optimum shielding, System 10K plug-in modules should be mounted side by side starting on the left side of the RM100 rack frame with no spaces left in between modules. Panel retaining screws should be tight to effectively ground the panel to the frame.

All parts with the exception of panels, shields and PC boards are standard distributor items but are also available at exorbitant prices from ATI stock. A1 and A4 are National LF347N quad bi-fet ICs, interchangeable with TI TL074 and others. A2 and A3 are Signetics, TI or Exar NE5532AN dual, high output audio op-amps. The output boost transistors are GE D44C3 (NPN) and D45C3 (PNP).

## INSTALLATION

A mating connector assembly (P/N 20470-501) is included with each amplifier module. The connector assemblies may have been pre-assembled to the RM100 rack frame if ordered together. If not, they should be mounted against the rear of the frame using the (4) M2.5 x 6 mm screws supplied. Install modules starting from the extreme left (opposite power supplies). Leave no spaces between modules to achieve the most effective shielding. Plug on the DC power buss connector to the polarized 3-pin receptacle at the top of the connector assembly.

Audio inputs and outputs are connected to AMP insulation displacement solderless "barrel terminals." To make a connection to the terminal using Belden #8451 cable or equivalent cable with 22 to 24 gauge inner conductors, strip back the foil shield about 1" to 1-1/2" exposing the inner conductors and shield drain wire. Remove shield and cut off the drain wire. Without stripping, insert the red or black inner conductor into a barrel terminal in line with the slot until it hits the opposite inner wall of the terminal. Place the yellow plastic stuffer cap over the terminal with the slot in the cap aligned with the slot in the terminal and the inserted wire. Push the yellow cap down slowly and firmly using a Philips screwdriver inserted into the cross-recessed slot in the top of the cap. The wire will be forced down the slot in the barrel terminal cutting through the insulation and making a gas tight seal as reliable as a solder joint. A second wire may be inserted above the first if necessary to parallel connections. Be careful to push in a direct line with the terminal to avoid snapping off the barrel terminal. Caps are AMP #230707-1 and the terminals are AMP #552699-1.

All terminals are marked clearly for function and polarity. The top four barrel terminal positions marked A, B, C, and D are for future control functions and are not used on the DA200 or MDA200 modules. Working from the top down, the CH1 output pairs are marked 1, 2, 3 and 4 with two CH1 channel output grounds "G" immediately under output 4. CH2 output pairs are 5, 6, 7 and 8 with CH2 output grounds under output 8.

The output ground connections "G" are used for connecting the LO side of unbalanced, single ended, one side grounded loads. They must NOT be used to terminate the shields of the cables connected to the outputs or inputs since this would degrade the RF immunity of the system by routing intercepted RF and other noise pick-up directly into the module. Cable shields should instead be tied to studio ground at a punch block, Xmas tree block or jack field interconnect point and allowed to float at the input and outputs of the DA module.

All inputs, whether balanced or unbalanced, should be treated and wired as balanced sources to achieve maximum immunity to hum, noise and RF which may be picked up on the input wiring. All inputs should use two-conductor plug foil shield cable. Connect source HI to DA input HI, connect source LO or GND to the DA input LO, the cable shield to source or studio ground (allow shield to float at the DA) and make sure there is a connection from the source chassis to the facility ground.

If you absolutely insist on wiring the DA like your HiFi with single conductor shielded cable from single ended sources, connect the center conductor to HI Input, connect shield to input GND and also jumper the DA LO input to same GND. If it doesn't work when you turn on the radio or TV transmitter in the next room, call us; we have lots of expensive (but good) unbalanced-to-balanced interface boxes sitting here just waiting for your call.

## **SPECIFICATIONS**

Specifications reflect performance in a typical System 10K installation consisting of ten mixed distribution amplifier modules and two PS100 power supplies mounted together in an RM100 rack frame.

NOMINAL OUTPUT LEVEL	+4dBm, 600 ohms = 0VU meter indication
OUTPUT CLIPPING LEVEL	+22dBm, all outputs driven
HEADPHONE OUTPUT	10Vrms max through 150 ohms
GAIN	28dB, maximum
DISTORTION	.25% THD, 20 - 20kHz
FREQUENCY RESPONSE	-.25, +0dB, 20Hz to 20kHz
OUTPUT HUM AND NOISE	-72dBm max in any position 20kHz bandwidth and 24dB gain
CROSSTALK	-65dB max. @ 10kHz
POWER	±18VDC nominal, ±22VDC max.

## 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](mailto: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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Some states do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you.

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.