



SDA200 and SMDA200
STEREO DISTRIBUTION AMPLIFIER
MODULES for SYSTEM 10K
OPERATING AND MAINTENANCE MANUAL

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DESCRIPTION

The **SDA200** and **SMDA200** modules are both two-input and eight-output audio distribution amplifiers designed as plug-in components for the SYSTEM 10K Modular Audio Distribution System. The SYSTEM 10K provides proper mounting, shielding and power for a family of interchangeable amplifier modules. Performance to published specifications and operational life of these modules are covered by ATI's standard warranty on the SYSTEM 10K only when they are used as part of a SYSTEM 10K consisting of an RM100 Rack Enclosure and PS100 Power Supplies.

The **SDA200** and **SMDA200** modules feature eight active balanced outputs in two groups of four. Both output groups are controlled together by a single, stereo, full range, audio taper level control. Individual left and right multi-turn trimmers provide fine matching adjustment with a limited range of $\pm 4\text{dB}$.

A board mounted DIP switch selects normal left/right stereo outputs or can select either the left or the right input to drive all eight outputs or can even be used to sum both left and right (L+R) inputs into either or both sets of outputs. By reversing the phase of the right input signal on the external connector, an L-R difference signal can be generated in the same manner.

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 **SMDA200** incorporates an LED peak-indicating bargraph meter which is switchable to either the inputs or the outputs and will monitor either the Left Channel, the Right Channel or the Left plus Right (L+R) Sum signal 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 90dB. 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.

A full range, ganged stereo OUTPUT control, R23 and R24, adjusts both channels simultaneously; unity channel gain is at 50 percent rotation. Individual multi-turn trimpots, R17 and R18, allow fine TRIM and precise matching of each

channel's gain over a 4dB range above and below the nominal stage gain of 22dB.

Board mounted DIP switch S1 provides four normally open switch sections to independently direct the left and right input signals to either or both output amplifiers. Resistive mixing allows both left and right inputs to be summed (L+R) into either or both outputs.

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 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 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 to avoid excessive power supply loading and loss of headroom. Instead, connect the unbalanced load between the HI output and DC GROUND (rather than HI and LO) or use a transformer output equipped DA module such as an ATI MIDA100-1 or isolate the unbalanced load through a balanced-to-unbalanced converter such as an ATI L1000-1 Line Amplifier or an isolation transformer.

The **SMDA200** includes a bargraph peak-reading meter. Front panel switches S2 and S3 select input or output and either Left, Right or the L+R sum signal. A4A sums and amplifies the switch output with a 3dB gain reduction allowance for the L+R rms sum. The meter circuit is designed for equal input and output levels and as shipped is calibrated by R71 for +4dBm at 0VU. 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 ± 18 VDC nominal is filtered and limited to 16VDC maximum by zener diodes CR2 and CR3. Power indicator LED CR5 detects the loss of either power supply voltage. On-board fuses, F1 and F2, (3/8 A) protect the main power buss from module faults. Zener diode 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 modules should be mounted side-by-side starting on the left side of the rack frame with no spaces left 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 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 opamps. The output boost transistors are GE D44C3 (NPN) and D45C3 (PNP).

INSTALLATION

A mating connector assembly 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 to the rear of the frame using the (4) M2.5X6mm 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.

To make a connection to the 3.5mm modular connectors 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. All connectors and 3.5mm modular connectors are marked clearly for function and polarity.

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 pickup directly into the module. Cable shields should instead be tied to studio ground at a punch block, Christmas tree block or jack field interconnect point and allowed to float at the input and outputs of the DA.

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-plus-foil shielded cable. Connect source HI to DA input HI, connect source LO or GND to the DA input LO, tie 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 studio ground.

SPECIFICATIONS

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

INPUT

Channels	2 (Configurable as Dual Mono or Single Stereo)
Input Impedance	>30 K ohm balanced
CMR Range	$\pm 20V$
CMR Ratio	>90 dB @60Hz

OUTPUT

Channels	8 total Mono or 4 per Stereo Input Channel
Output Impedance	<600 ohm
Output-to-Output isolation	>70 dB, 20Hz to 20kHz
Nominal Output Level	+4dBm @ 600 ohm = 0 VU Indication
Maximum Output Level	+24dBm @ 600 ohm
Headphone Output	10Vrms maximum through 150 ohms

PERFORMANCE

S/N Ratio	>90dB (unweighted) 20Hz to 20kHz
Gain Range	-4 to +24 dB Front Panel Adjustable
Frequency Response	<-0.25, +0dB 20Hz to 20kHz
Total Harmonic Distortion	<0.025% @ 1kHz
Intermodulation Distortion	<0.05% @ 1kHz
Channel Crosstalk	>90 dB @ 1KHz

ENVIRONMENTAL

Power Supply	120 or 230 VAC $\pm 10\%$ @50/60 Hz (determined by power supply wiring)
Operating Temperature	0 deg C to 40 deg C
Humidity	0 to 90% non-condensing

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 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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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.