



**LA100, LA200,
MLA100 & MLA200
SINGLE & DUAL CHANNEL
LINE AMPLIFIER MODULES
FOR
SYSTEM 10K™**

OPERATING AND MAINTENANCE MANUAL



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DESCRIPTION

The **LA100** and **MLA100** modules are single channel line level amplifiers, and the **LA200** and **MLA 200** are dual channel line amplifiers specifically designed as plug-in modules for the **ATI System 10K Modular Amplifier System**. The System 10K provides proper mounting, shielding and power for a diverse family of Line, Microphone and Distribution Amplifier modules. The performance 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.

Line amplifier modules feature balanced, bridging inputs and transformer balanced (LA100-1) or active balanced (LA100-2) 600 ohm line level outputs. Each amplifier channel has an internal gain set jumper plug to select maximum gains of +20, +40 or +50dB.

Available options include Metering (MLA100-1, MLA100-2, MLA200-1 and MLA200-2), Knob Level Adjustments rather than the standard front panel screw-driver controls (example: LA100-1-K) and remote controllable DC operated VCA level controls (example: LA100-1-VCA).

The MLA100 and MLA200 modules incorporate a peak reading LED bar graph meter for monitoring the output signal level. Dual channel units include a panel toggle switch to meter either output. The TRS (Tip-Ring-Sleeve) headphone jack is properly wired to drive a stereo headset with either a single channel output (LA100 or MLA100) or both outputs of a dual channel unit (LA200 or MLA200).

A mating connector assembly is supplied with the amplifier module (or may have been preassembled into the RM100 rack frame if ordered together).

CIRCUIT OPERATION

Audio input lines are bridged by 18,000 ohm active balanced instrumentation amplifiers (A1/A2). The bridging resistor network is split and heavily bypassed for optimum RF protection. Trim pot R24/R25 adjusts input common mode hum rejection and is factory nulled between 60 and 80dB (depending on the coffee consumption of the test technician). To field adjust, apply a 60Hz input to HI and LO input terminals together referenced to ground, take a deep breath, hold it and trim R24/R25 for minimum output.

Channel gains are individually selectable by jumper plugs (P1/P2) for 0 reference, +20 or +30dB. In the 0dB position the input stage will bridge a +24dBm input line without clipping. The +20 and +30dB positions reduce the maximum allowable input level proportionately but maintain optimum noise performance.

Even if heavily overdriven, the input stage clips cleanly and symmetrically without ringing, phase reversal or punch-through.

With the front panel level controls (R34/R35) or the remote controls set at 12 o'clock and the gain set plug in the 0dB position, the channel yields unity gain with over 20dB of input to output headroom for a +4dBm operating level with 22dB of reserve gain adjustment.

The VCA option parallels the front panel level controls with DC operated voltage controlled amplifiers (A8/A9). An adjustable 0 to +15VDC level from a remotely located 10Kohm linear taper potentiometer controls the VCA gain to adjust the channel output the same as the front panel level control. The VCA control inputs are heavily filtered making them insensitive to hum, noise and RF pickup. Quad op-amp A11 interfaces the control lines to dual monolithic VCAs and provides a smooth 40dB gain adjustment ratio with a rapid taper to full off in the last 10% of the remote control pot rotation. The VCA circuit defaults to full OFF if the external control pot is connected. The higher gain setting for either the VCA or the front panel level control will predominate. Distortion trim pots R102 & R103 for the VCA are factory nulled at 20dB below maximum gain with 1kHz input.

A5A and A5D are intermediate 10dB gain stages. Output drivers A6 and A7 provide 16dB gain and an output signal level of +24dBm across a 600 ohm load. The output configuration is either transformer balanced (T1/T2) or active balanced.

Caution – Active balanced outputs are not happy driving their output into a grounded short circuit. If you are connecting an active balanced output module such as the LA100-2 to an unbalanced, single ended, IHF, hi-fi, one-wire-and-shield or Phono Jack INPUT, connect the module HI output to the HI center conductor of the receiving device and the shield or grounded conductor to the LA100-2 GND terminal, NOT to the LO terminal.

Further Caution – Active balanced outputs are not isolated and floating like transformer balanced lines and depend on a correct ground connection between the driving and receiving equipment. This ground is often provided by the power system ground. If your boss' brother-in-law wired the building, watch out for the exciting effects of power phase reversals and large ground drops on any receiving equipment.

Transformer balanced output modules such as a LA100-1 avoid all problems associated with active outputs and utilize a unique feedback technique which eliminates the typical response and distortion limitations of transformers. The transformer output units provide total ground isolation, insensitivity to unbalanced loads, short circuit protection and a very low source impedance for driving long lines with no pick-up, no inductive cross talk and ruler flat frequency response.

Typical distortion measurements at +4 to +24dBm barely exceed generator residuals at .02% from 20Hz to 20kHz. The output distortion null adjustments (R56/R57) are factory trimmed for minimum output distortion at 20Hz and maximum output. Misadjustment can cause low frequency oscillation. If this control is accidentally disturbed, re-null for minimum distortion using very high quality equipment with residual distortion levels below .02% at 20Hz. It will NOT be necessary to readjust this control when replacing output driver ICs A6 or A7.

In general, avoid the temptation to diddle the internal trim pots R24/R25, R56/R57 and, with the VCA option, R104/R105. All of these adjustments are sharp null settings which are greatly degraded by even slight misadjustment. IC replacements will generally not require readjustment of these pots.

If you really reel the need, you can play with the meter calibration trimmer R5. This is factory set for 0VU indicated at +4dBm output, but may be reset for 0VU from -10 to +18dBm.

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 (each 3/8A) 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 optimal shielding, all modules should be mounted side-by-side starting from 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. The ICs used are NE5532AN, LF347N, LM3315 (meter option) and VCA option DBX2155.

INSTALLATION

A mating connector assembly (P/N 20447-502) is included with each amplifier module. The connector assemblies may have been preassembled to the RM100 rack frame if ordered together. If not, they should be mounted against the rear of the frame using the 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.

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.

The rear terminals are clearly marked for function and polarity. However, since you will probably install this system in the darkest, hardest-to-get-to place in your facility, take a good look at the legends marked on the rear connector first.

The top six terminals are only used with the VCA option. The top pair of terminals connect to the ends of both remote VCA control potentiometers with CW to the top (Max) and CCW to the bottom (Min). The next two pairs of terminals return the control voltages from each VCA pot with a connection from each CW (Max) end twisted with its ARM connection. A connection must be made to the individual CW inputs or the VCA circuit will default to the OFF state.

The next pair of terminals are OUTPUT 1, LO and HI followed in dual channel units by OUTPUT 2, LO and HI.

A ground terminal "G" and a "+" voltage input for an external phantom power supply (not used with these modules) are placed directly under the output terminals. The "G" terminal may also be used as a ground return for an unbalanced output load.

Working down, "G" Ground terminals surround the INPUT 2, LO and HI terminals followed by INPUT 1, LO and HI with more "G" Ground terminals below.

The ground connections "G" must not be used for connecting the shields of input or output cables since this would degrade the system noise immunity by routing intercepted hum, noise and RF directly into the module. Cable shields should instead be tied to facility ground at a punch block, xmas tree block or jack field interconnect point and allowed to float at the input and outputs of the amplifiers.

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 shield cable. Connect source HI to amplifier input HI, connect source LO or GND to the amplifier input LO, tie cable shield to source or facility ground (allow shield to float at the amplifier) and make sure there is a connection from the source chassis to the facility ground.

If you absolutely insist on wiring the amplifier like your hi-fi 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 amplifier LO input to the same GND. If it doesn't work when you turn on your 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.

SYSTEM 10K LINE AMPLIFIER MODELS AND ACCESSORIES AVAILABLE

LA100-1	1-Channel Line Amplifier, Transformer Balanced Output
LA100-2	1-Channel Line Amplifier, Active Balanced Output
MLA100-1	Metered 1-Channel Line Amplifier with Transformer Balanced Output
MLA100-2	Metered 1-Channel Line Amplifier, Active Balanced Output
LA200-1	2-Channel Line Amplifier, Transformer Balanced Outputs
LA200-2	1-Channel Line Amplifier, Active Balanced Outputs
MLA200-1	Metered 2-Channel Line Amplifier, Transformer Balanced Outputs
MLA200-2	Metered 2-Channel Line Amplifier, Active Balanced Outputs
Knob Option	All units above are available with knob outputs as an option. Add the letter "K" to the end of the part number.
VCA Option	All the above modules are available with remote DC gain control. Add letters VCA to the end of the part number. Requires external 10K linear taper potentiometer.

SYSTEM COMPONENTS

RM100	Rack Frame Assembly, 3RU, 5-1/4" (13.3cm) by 19" (48.3cm)
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Mounts up to ten amplifier modules with up to two PS100 Power Supplies.

PS100

Power Supply, 115/230VAC IN, + and -18VDC OUT. Diode isolated outputs for redundant operation. Power Failure Alarm Output and Indicators.

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.

ATI DISCLAIMS ANY WARRANTIES, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR USE, EXCEPT AS EXPRESSLY SET FORTH HEREIN. THE SOLE OBLIGATION OF ATI UNDER THIS LIMITED WARRANTY SHALL BE TO REPAIR OR REPLACE THE COVERED PRODUCT, IN ACCORDANCE WITH THE TERMS SET FORTH HEREIN. ATI EXPRESSLY DISCLAIMS ANY LOST PROFITS, GENERAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM BREACH OF ANY WARRANTY, OR ARISING OUT OF THE USE OR INABILITY TO USE ANY ATI PRODUCT.

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.