



# L1000-1

## 2-CHANNEL LINE AMPLIFIER WITH TRANSFORMER BALANCED OUTPUTS

### OPERATION AND MAINTENANCE MANUAL



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## DESCRIPTION

The ATI Model L1000-1 is a professional grade 2-Channel Line Amplifier equipped with transformer-isolated outputs. The unit is ½ RU in width, and it contains an internal power supply.

The IC's that were developed primarily for the instrumentation market had many shortcomings when used in high quality audio applications. The lack of audio related specifications, crossover distortion, high noise for low source impedances, limited output capability and limited gain bandwidth product forced many compromises when used in high gain audio systems. High ratio input transformers, output boost stages and multiple stage designs were all used to compensate for op amp deficiencies and in turn added additional response and distortion problems of their own.

Walter Jung, in a definitive series of articles, analyzed and defined slew rate induced distortion mechanisms, tested many commonly available ICs and correlated various distortion tests with subjective (listening) criteria. A very significant result of his efforts was the identification of an IC originally developed for the European professional audio market which has almost ideal characteristics for audio use and in particular provides a symmetrical high slew rate capability of 13 volts/microsecond, virtually eliminating slew induced Transient Intermodulation Distortion. By contrast the old standard 741-op amp has a slew rate of only .6V/microsecond.

This op amp is now available from several U.S. Manufacturers in single and dual versions and forms the basis for our designs. This chip incorporates a low noise input stage designed for excellent noise performance even with low source impedances. The L1000-1 has high output and is capable of driving 600 ohm loads directly to +22dBm with total freedom from crossover distortion. Its high inherent linearity, 100dB open loop gain and 50 MHz gain bandwidth product make the L1000-1 an ideal device for highest quality audio. The absence of Transient Intermodulation Distortion may be detected by the smooth effortless high frequency output capability, absence of the harsh, raspy sound typical of IC amplifiers driven to full output at high frequencies and the freedom from increasing harmonic distortion vs. frequency. As used in the amplifiers, a minimum of 40dB of loop gain is available for 100:1 distortion reduction even at 20kHz.

The high output swing capability allows the amplifier to use a simple, low distortion, flat response, 1:1 output transformer with faraday interwinding shields for high RF field environments.

Inaudible crosstalk characteristics allow use for either stereo or dual monaural applications. Dual gain controls are provided to facilitate either mode of operation.

Our power supply incorporates a couple of unique regulating devices called zener diodes. In contrast to most fancy three-terminal IC regulators, these devices will live through line transients and simultaneously protect your circuitry.

## **INSTALLATION**

### **MOUNTING**

Your amplifier may be desk mounted on its non-slip suction cup feet or you can stack the amplifiers on top of each other. An optional 19-inch Rack Mount Shelf, P/N 21075-501, mounts up to two units in one rack space. Use 1/2RU Filler Panel 21098-501 when rack mounting only one L1000-1.

### **WIRING**

Our insurance company insists on three-wire grounded plugs. The third wire ground can cause a ground loop with your facility ground. If you are sure your facility ground will provide adequate protection to personnel in case of an AC line short to the chassis, a 3-to-2 AC line 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 facility ground connection from the chassis.

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

Line inputs are connected to the rear screw terminal strip following the rear label designations. G1 is the CH1/Left Ground, G2 is the CH2/Right Ground. If grounding input and output shields at the unit, use the proper ground for each channel.

The L1000-1 will accept input audio to +24dBm bridging (12.5 Vrms). Inputs are protected by clamping diodes for signal swings exceeding  $\pm 4.1V$  P-P.

Output wiring is indicated on the rear panel label. HI outputs are in phase with each other and with the input signal. The L1000-1 is equipped with transformer outputs; therefore, either the HI or LO output may be grounded (but not both) when using the unit to drive unbalanced input devices.

## ADJUSTMENTS

The L1000-1 has sufficient gain and output capability to overdrive some console inputs, particularly those providing preamps for high-level input channels. A -10dBm line input will provide +8dBm output from the amplifier with the gain pots set to approximately 2 o'clock. 12 o'clock is approximately 0dBm output and 10 o'clock is -10dBm output (unity gain).

The common mode adjustment pots R16 and R35 are factory set to an 80dB null at 60Hz. If disturbed, they can be readjusted by applying a common mode 60Hz input to HI & LO input together referenced to ground and renulling R16 for CH 1/L and R35 for CH 2/R. The null drops to 40dB at 20kHz due to slightly unequal roll offs in the input RF bypass capacitors.

## MAINTENANCE NOTES

Power supply voltages are  $\pm 18\text{VDC}$  nominal, dropping to  $\pm 16\text{VDC}$  under full output. If zeners are replaced, remove A1, A2, and A3 ICs and check output voltage before plugging ICs back into the circuit. Remove power when inserting or removing ICs.

IC output DC voltages (no signal conditions) should measure  $0\text{VDC} \pm 5\text{VDC}$ . Significant deviation indicates an IC or circuit problem. Measurable DC difference between HI and LO amplifier inputs (other than due to meter loading) indicates IC failure.

## MODIFICATIONS FOR 230 VAC OPERATIONS

Your L1000-1 is wired for 115VAC 50/60Hz operations unless otherwise requested at the time of ordering. It can be modified for 230VAC use by removing the power transformer primary jumpers W1 and W3 and inserting a jumper in the W2 holes.

## **L1000-1 PERFORMANCE SPECIFICATIONS**

<b>OUTPUT CLIPPING LEVEL</b>	+22dBm / 600 ohms
<b>DISTORTION</b>	@ +20dBm output and input levels to +24dBm
<b>FREQUENCY RESPONSE</b>	±.25dB, 50 to 20,000 Hz, -1 dB at 20 Hz .2% maximum THD, 30 to 20,000 Hz
<b>INPUT IMPEDANCE</b>	Balanced differential inputs, 30,000 ohm bridging
<b>EQUIVALENT INPUT NOISE</b>	3.5 Microvolts 20kHz measurement bandwidth 600 ohm source impedance
<b>HUM REJECTION</b>	80dB for common mode hum
<b>INPUT OVERLOAD</b>	+24dBm bridging, 600 ohms
<b>GAIN</b>	34dB, front panel adjustable
<b>POWER</b>	115/230VAC ±10%, 47-63Hz
<b>SIZE</b>	8.5" (21.6cm) W x 1.75" (4.4cm) H x 7" (17.8cm) D
<b>WEIGHT</b>	2.5 lbs. (1.1kg) Net; 4 lbs. Shipping Weight
<b>MOUNTING</b>	Suction feet for non-slip desk mounting. Rack mount system 21075-501 mounts up to two units in one rack. Use 21098-501 1/2RU Filler Panel when mounting only one unit.

## 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.

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.

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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.