



**AUDIO
TECHNOLOGIES
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Dedicated to sound engineering

OPERATION AND MAINTENANCE MANUAL

LA100, MLA100

LA200, MLA200

SINGLE and DUAL
LINE AMPLIFIERS

SYSTEM 10000

PLUG-IN MODULES

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

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DESCRIPTION

The LA100 and MLA100 are single channel line level amplifiers and the LA200 and MLA200 are dual channel line amplifiers specifically designed as plug-in modules for the ATI 10000 Series Modular Amplifier Systems. The System 10000 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 warranted ONLY when they are used as part of a System 10000 consisting of a 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), Knob level adjustments rather than the standard front panel screwdriver controls (LA100-1-K) and remote controllable DC operated VCA level controls (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 both outputs of a dual channel unit (LA200).

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 to 80dB (depending on the coffee consumption of the test technician). To field adjust, apply a 60Hz input to H 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 0 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 position, the channel yields unity gain with over 20dB of input output headroom for a +4dBm operating level with 22dB of resonance gain adjustment.

The VCA option parallels the front panel level controls with operated voltage controlled amplifiers (A8/A9). An adjustable +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 controls. The VCA control inputs are heavily filtered making them insensitive to hum, noise and pickup. Quad op-amp (A11) interfaces the control lines to monolithic VCAs and provides a smooth 40dB gain adjustment range 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 no external control pot is connected. The higher gain setting either the VCA or the front panel level control will predominate. Distortion trim pots (R102/R103) for the VCA are factory nulled 20dB below maximum gain with 1kHz in.

(A5A and A5D) are intermediate 10dB gain stages. Output drivers (A6/A7) provide 16dB gain and an output signal level of +24dB 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 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 floating like transformer balanced lines and depend on a common 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 receiving equipment.

Transformer balanced output modules such as a LA100-1 avoid all problems associated with active outputs and utilize a unity feedback technique which eliminates the typical resonance distortion limitations of transformers. The transformer output units provide total ground isolation, insensitivity to unbalanced loads, short 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 +4dBm barely exceed generator residuals at .02% from 20 Hz 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, renull for minimum distortion using v high quality equipment with residual distortion levels below . at 20Hz. It will NOT be necessary to readjust this control w replacing output driver ICs A6 or A7.

In general, avoid the temptation to diddle the internal trim p (R24/R25), (R56/R57) and with the VCA option (R104/R105). these adjustments are sharp null settings which are grea degraded by even slight misadjustment. IC replacements will generally require readjustment of these pots.

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

Unregulated input power at +/-18VDC nominal is filtered and limi to 16VDC maximum by zener diodes CR2 and CR3. Power indicator I CR5 detects the loss of either power supply voltage. On-bo fuses, F1 and F2, (3/8 A) protect the main power buss from mod faults. Zener CR1 provides 11VDC maximum to the meter display

An electrostatic shield is mounted to the PC board just behind panel to shield the low level circuitry. To achieve opti shielding, the modules should be mounted side-by-side starting the left side of the rack frame with no spaces left in betw modules. Panel retaining screws should be tight to effectiv ground the panel to the frame.

All parts with the exception of panels, shields and PC boards standard distributor items but are also available at exorbit prices from ATI stock. The IC's used are NE5532AN, LF347N, LMC (meter option) and VCA option DBX2155. Refer to the schematic

Installation

A mating connector assembly (P/N 20445-502) is included with e amplifier module. The connector assemblies may have b preassembled to the RM100 rack frame if ordered together. If r they should be mounted to the rear of the frame using the M2.5X6mm screws supplied. Install modules starting from extreme left (opposite power supplies). Leave no spaces betw modules to achieve the most effective shielding. Plug on the power buss connector to the polarized 3 pin receptacle at the of the connector assembly.

Audio inputs and outputs are connected to AMP insulat displacement solderless "barrel terminals". To make a connect to the terminal using Belden #8451 cable or equivalent cable v 22 to 24 gauge inner conductors, strip back the foil shield al 1" to 1-1/2" exposing the inner conductors and shield drain w. Remove shield and cut off the drain wire. Without strippi insert the red or black inner conductor into a barrel termina line with the slot until it hits the opposite inner wall of terminal. Place the yellow plastic stuffer cap over the term

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 phillips screwdriver inserted into the cross-recessed slot into 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, we have given you a picture to go by.

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 are placed directly under the output terminals. The "G" terminal may also be used as a ground return for an unbalanced output load. External phantom power must not exceed 48VDC.

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 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 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 studio ground (allow shield to float at the amplifier) and make sure there is a connection from the source chassis to the studio ground.

If you absolutely insist on wiring the amplifier like your hi- 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 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 and balanced interface boxes sitting here just waiting for your call

MODELS AVAILABLE

LA100-1	Line Amplifier, Transformer Balanced Output
LA100-2	Line Amplifier, Active Balanced Output
MLA100-1	Metered Single Line Amplifier with Transformer Balanced Output
MLA100-2	Metered Line Amplifier, Active Balanced Output
LA200-1	Dual Line Amplifier, Transformer Balanced Outputs
LA200-2	Dual Line Amplifier, Active Balanced Outputs
MLA200-1	Metered Dual Line Amplifier, Transformer Balanced Outputs
MLA200-2	Metered Dual 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 plug-ins 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, 5-14 inch by 19 inch EIA Mounting. 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 Outputs and Indicators.

SPECIFICATIONS

LA100, MLA100, LA200, MLA200 Single and Dual Line Amplifier Plug In Modules

Specifications reflect performance in a typical LA10000 System consisting of mixed amplifier modules and two PS100 power supplies mounted together in a rack frame.

GAIN: 50dB, 40dB, & 20dB with gain control at clockwise MAX. gain is selectable by internal jumper plug position. Panel screwdriver level adjustment standard, Knobs optional (specify -K e.g. MLA100-1-K).

OUTPUT LEVEL: +24dBm Maximum 600 ohms

INPUT LEVEL: +24dBm Maximum Bridging 600 ohms

DISTORTION: .05% Max THD, transformer or active balanced at +22dBm out 20 to 20,000Hz

FREQ.RESPONSE: \pm .25dB, 20 to 20,000Hz

NOISE: -94dBu EIN, 20kHz bandwidth

CROSS TALK: -70dB MAX at 10kHz - applicable to dual unit

HUM REJECTION: 60dB minimum common mode hum rejection at 60Hz

INPUT IMPEDANCE: 18K ohm minimum, active balanced

METER SETTING: OVU = +4dBm Adjustable internally +18dBm down to -10dBm

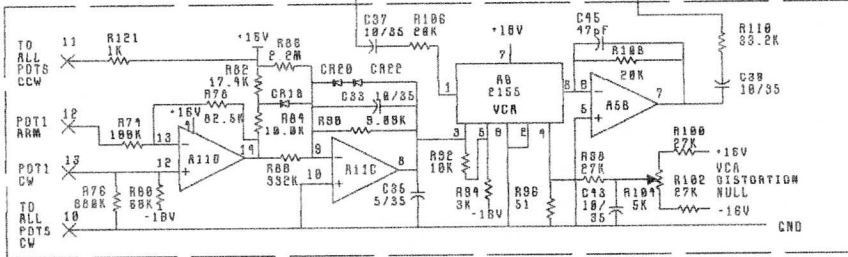
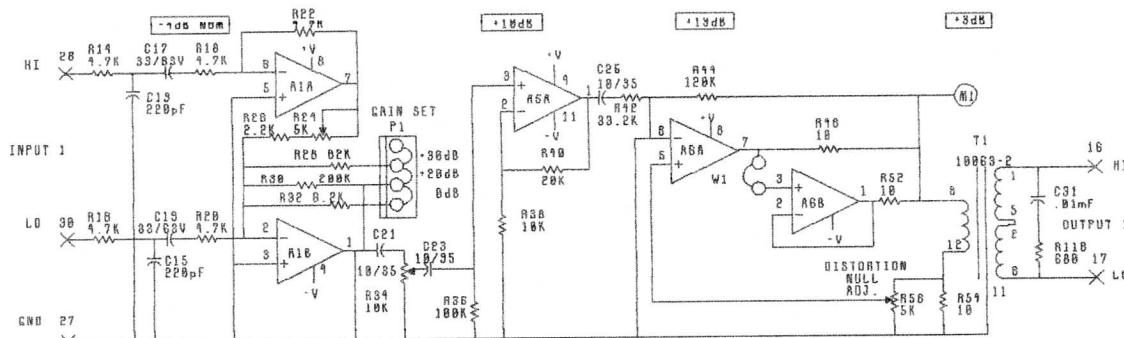
HEADPHONE OUTPUT: Drives 8 to 600 ohm stereo headphones, TRS jack

SIZE RACK FRAME: 5-1/4"H by 19"W by 14-1/2"D

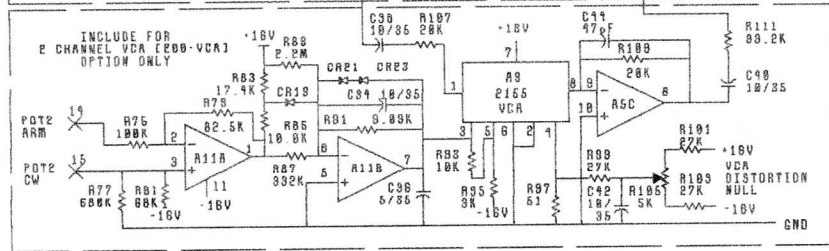
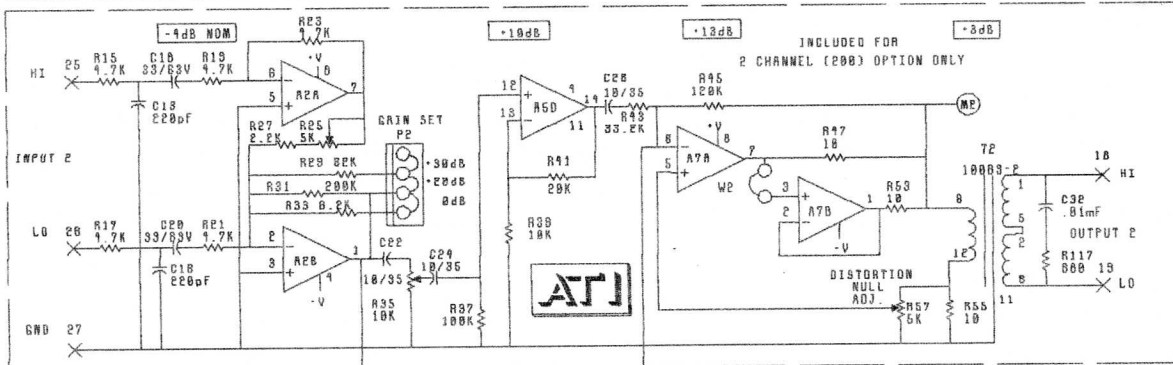
AMP. MODULES: Eurocard format, 100mm x 220mm, 1.2 inch panel width

POWER SUPPLY MOD: Eurocard Format, Extruded Frame, 2.0 inch panel width

CONNECTION: External audio wiring is connected to insulation displacement terminals on the module connector assembly. No special termination are required for termination.



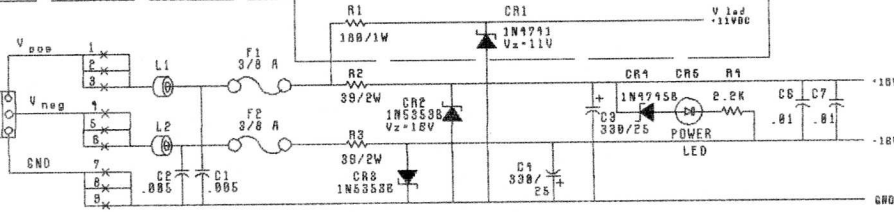
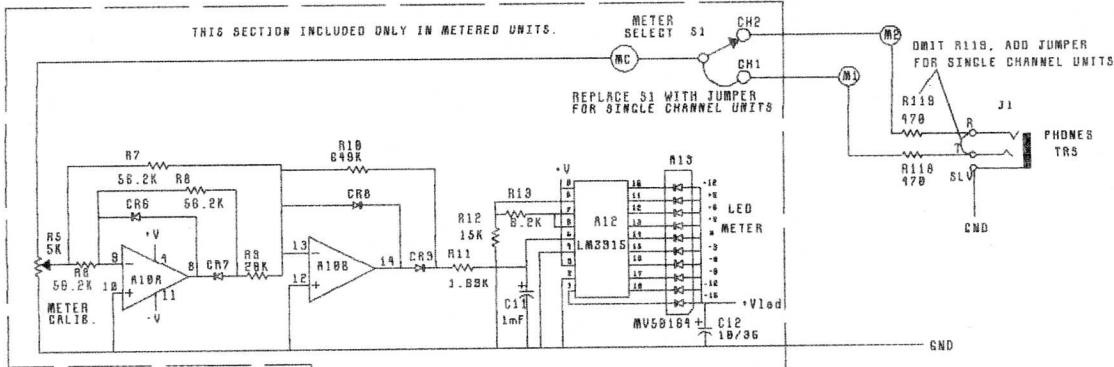
- A1, A2, A6, A7 NE5532AN
 A5, A10, A11 LF347N
 A0, A9 2155
 A12 LM3916
 C6 THRU C9 1M9148
 C18 THRU C22 1M9148



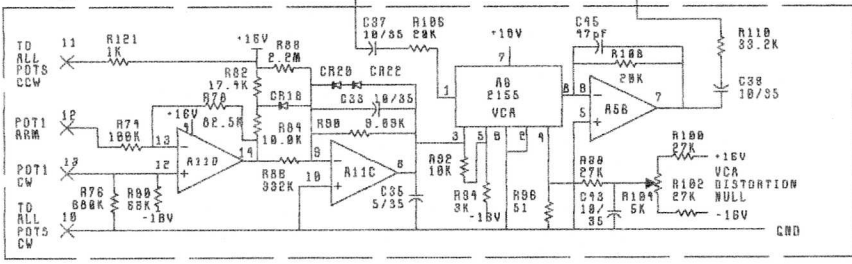
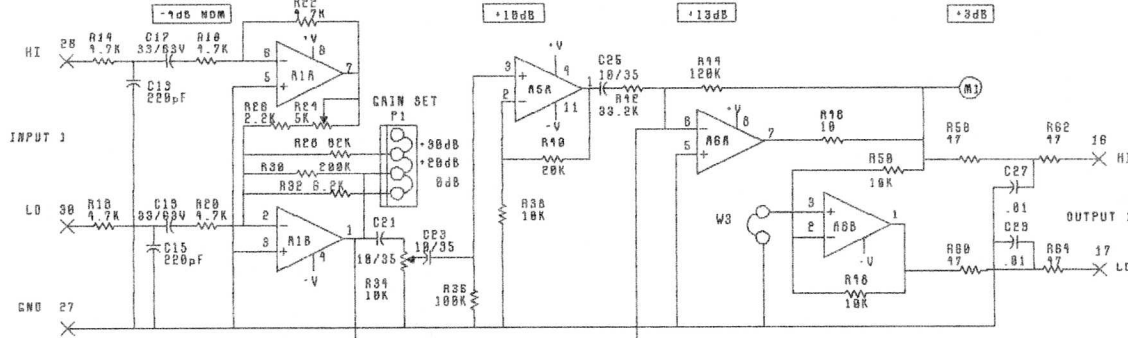
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SCHEMATIC DIAGRAM
 DUAL CHANNEL LINE
 AMPLIFIER PLUG-IN

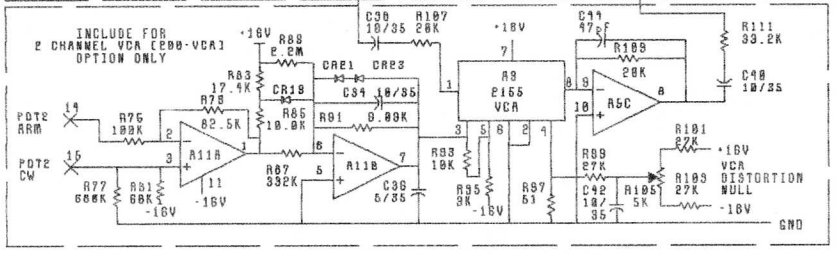
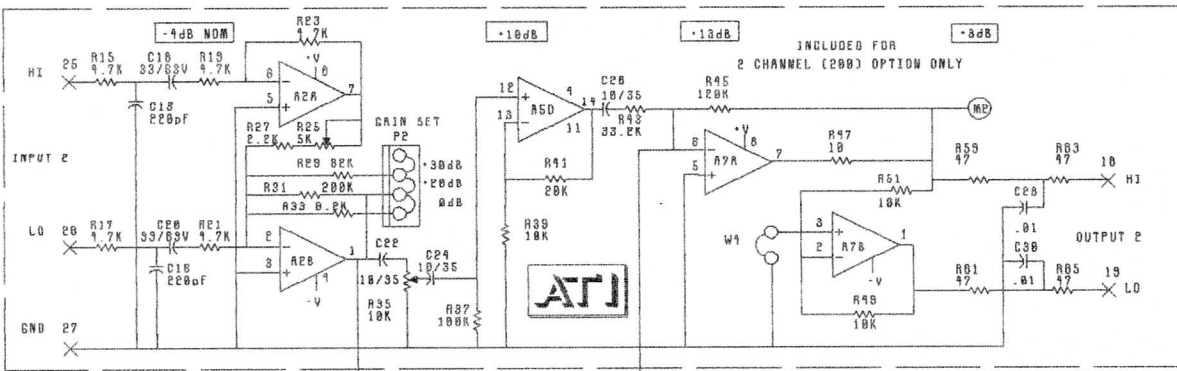
TRANSFORMER BALANCED OUTPUTS
 WITH
 REMOTE GAIN CONTROL (VCA)
 AND
 METERING OPTIONS



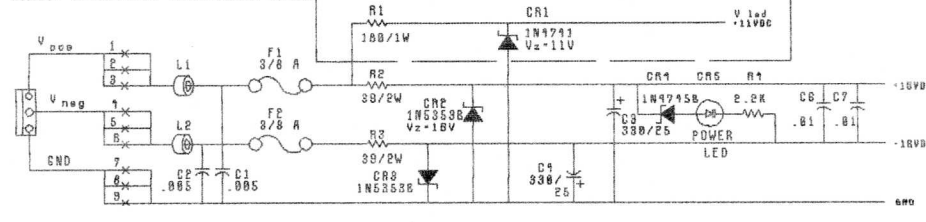
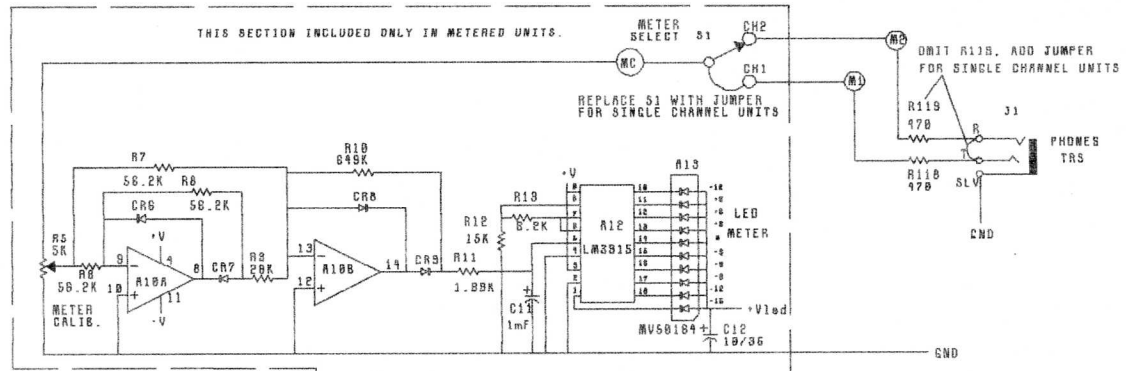
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AUDIO TECHNOLOGIES INCORPORATED 200 MARLBOROUGH AVENUE, MARLBOROUGH, MA 01844		
SCHEMATIC DIAGRAM MLA200-1-VCA		
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FMR	7/29/82	
RELEASED BY	DATE	
FMR	7/29/82	
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A1, A2, A3, A7 NE5532AN
 A5, A10, A11 LF397N
 A8, A9, A11 P155
 A12 LM3915
 CR8 THRU CR9 1N4148
 CR18 THRU CR23 1N4148

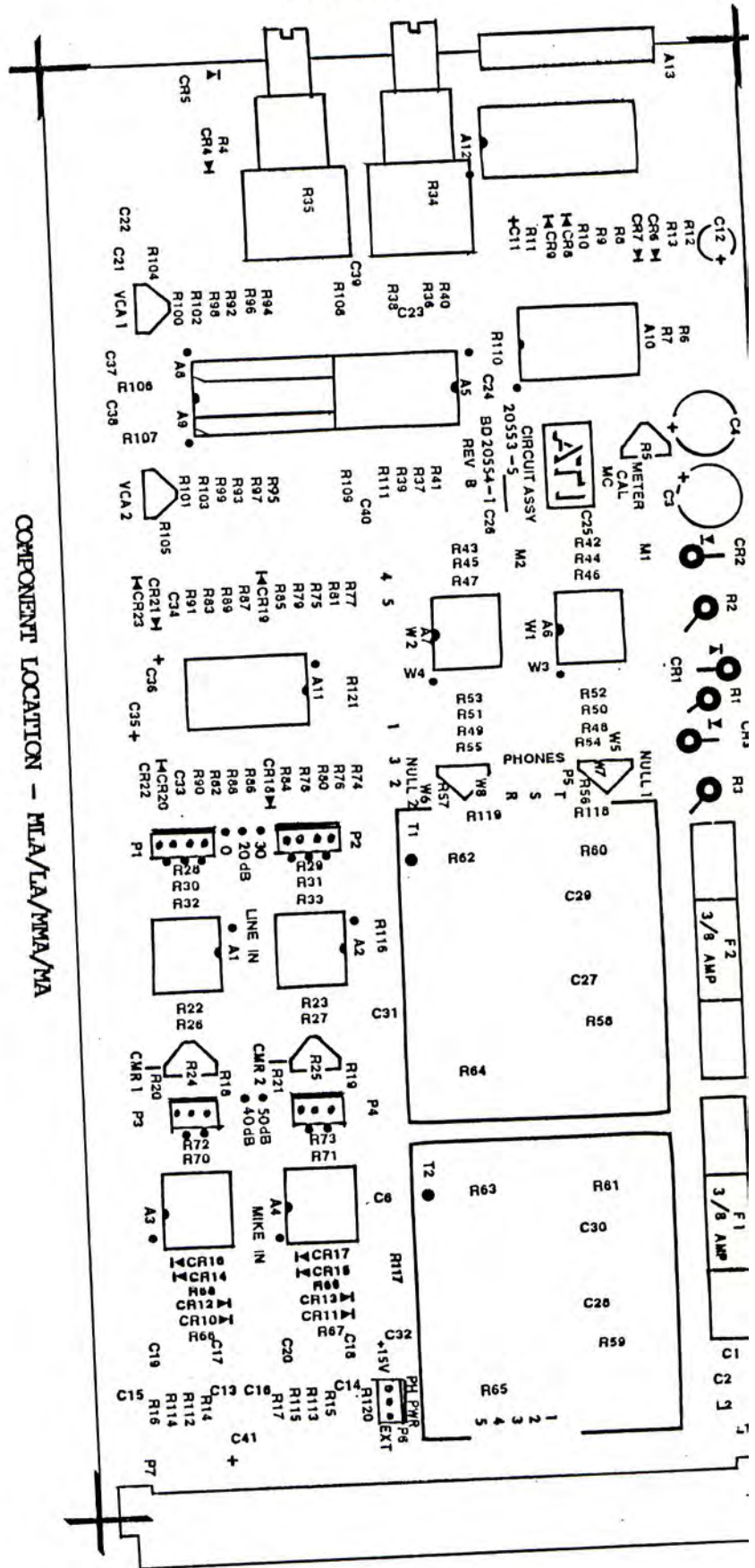


SCHEMATIC DIAGRAM
 DUAL CHANNEL LINE
 AMPLIFIER PLUG-IN
 ACTIVE BALANCED OUTPUTS
 WITH
 REMOTE GAIN CONTROL (VCA)
 AND
 METERING OPTIONS



REV	ECN	DATE	DESCRIPTION
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			AUDIO TECHNOLOGIES INCORPORATED <small>388 APPLE AVE., HERSHEY, PA 17033</small>
SCHEMATIC DIAGRAM			
MLA200-2-VCA			
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FMH	7/29/82	SPW	
RELEASED BY	DATE	APP'D	
FMH	7/29/82	SPW	

FRONT PANEL



COMPONENT LOCATION - MLA/LA/MMA/MA

DC POWER



- VCA REF DC
- CCW ● CW
- VCA 1 ● ARM
- CW ●
- VCA 2 ● ARM
- CW ●
- 1 LO ● HI
- OUT ●
- 2 LO ● HI
- EXT PHAN G ● +
- PWR ●

- G ● G
- 2 LO ● HI
- IN G ● G
- 1 LO ● HI
- G ● G

BD 20445-2
CONN ASSEMBLY
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