

A.T. MICHAEL MACDONALD
RECORDING
NEW YORK, NEW YORK 10021
(212) 517-9235

OPERATING INSTRUCTIONS

UNIVERSAL AUDIO, INC.

Model 175 B

LIMITING AMPLIFIER

The Universal Model 175 B is an extremely versatile professional quality peak limiting amplifier designed for use in the recording, broadcasting and motion picture industries, as well as other high quality audio systems. The 175 B is a true limiting amplifier capable of high gain, low distortion, linear amplification at levels below the threshold of limiting and with excellent limiting characteristics and negligible increase in distortion at levels above.

The Model 175 B is designed to be mounted in a standard 19" rack. The unit requires only 3 $\frac{1}{2}$ " of rack space, and the front panel is hinged to provide accessibility to inner components. The highest quality military type printed circuitry is combined with 1% precision resistors and overrated components throughout to insure maximum performance and reliability. Plug-in type "FP" electrolytic capacitors are used for ease of replacement.

The 175 B has a self contained power supply, a VU meter that is switchable to indicate input or output level as well as gain reduction in db, and input and output attenuators detented in 2 db steps, with vernier adjustments in excess of 2 db for each step.

The limiter is provided with input and output jacks on the front panel as well as a terminal strip on the rear of the unit for interconnecting the amplifier with a system. The terminal strip also provides for connecting a remote VU meter if desired.

Separate adjustments of the attack and release times are provided on the front panel as well as a limit defeat switch mounted on the rear of the attack control, to allow for the wide variety of program material that the 175 B will be expected to handle. Checking the unit for balance, or rebalancing may be accomplished without the need of test equipment, because an internal signal for balancing is provided on one position of the test switch. Screw-driver adjustment holes are provided on the front panel so that the VU meter may be easily observed with the panel closed during balancing.

OPERATION

GAIN

The gain of the amplifier can be changed by altering resistance in the grid circuits of V1. Jumpers have been provided for this purpose (see schematic diagram). Unless otherwise specified, the unit is wired with the two jumpers connected for low gain (24 db). If desired, the jumpers can be relocated to the high gain (37 db) position.

VU METER

Unless otherwise specified, the 175 A is wired for a 8-dbm zero reading on the VU meter. If desired, the VU meter can be wired for a +4-dbm zero reading by relocating a jumper wire in the meter switching circuit (see schematic diagram).

Terminals are provided on the rear of the unit for connecting a remote VU meter. A strapping arrangement on the VU meter terminal board (see schematic diagram) allows the remote VU meter to perform all of the functions of the internal meter, or to just indicate gain reduction, while the internal meter is still usable to indicate input and output level.

ATTENUATORS

The input and output attenuators are both adjustable from 0 to 40 db. For this reason the 175 A may be utilized at any point in the system where the input signal level is between -24 dbm and +13 dbm. The attenuators are adjusted for proper operating levels as follows:

- a. Rotate the input and output attenuators fully counterclockwise (maximum attenuation).
- b. Interconnect the unit with the system through either the input and output jacks on the front panel or the terminal strip on the rear.
- c. Feed a sample of the program material into the system.
- d. Set the meter switch to GR position.
- e. Decrease attenuation with the input attenuator until the desired amount of limiting is observed on the meter (limiting should not exceed 3 to 4 db except where the program material contains extremely loud peaks).
- f. Set the meter switch to OUTPUT position.

g. Decrease attenuation with the output attenuator until the desired output level is observed on the meter.

h. Return the meter switch to GR position to verify amount of limiting during operation.

Note: The output level may be increased 6 db by replacing the output attenuator with a Langevin model AT 601 attenuator.

ATTACK AND RELEASE TIME

The ATTACK and RELEASE potentiometers should be adjusted for optimum results in accordance with the type of program material being used. The following general suggestions are given for use of the ATTACK and RELEASE adjustments:

a. For vocal or narration program material with minimum low frequency information, best results are usually obtained by adjusting for very fast attack and release times.

b. The release time should be lengthened as the low frequency content of the program material increases.

c. The attack time should be lengthened when the program material contains tremelo or vibrato which the limiter might possibly follow.

The limit defeat switch is located on the attack potentiometer. By turning the attack control full counter clockwise, the limiting action may be defeated and the unit performs as a normal line amplifier.

BALANCING ADJUSTMENTS

Inherent stability eliminates the need for frequent balancing of the 175 A. However, if thumping is noticed or components are replaced, the unit should be balanced as follows:

a. If using TEST 1 position, remove any input signal from the amplifier.

b. Set the attack and release controls to approximate mid settings.

c. Rotate the input and output attenuators fully counterclockwise (maximum attenuation.)

d. Set the meter switch to OUTPUT position.

e. Set the test switch to TEST 1 position.

NOTE: If desired, balancing can be performed by applying a 3-volt external signal to the input jacks and setting the test switch to TEST 2 position.

f. Rotate the output attenuator clockwise until an indication is observed on the meter.

g. Adjust first the PLATE BALANCE and then the CATHODE BALANCE controls for minimum meter deflection.

h. Rotate the output attenuator fully clockwise (zero attenuation).

i. Adjust first the PLATE BALANCE and then the CATHODE BALANCE controls for minimum meter deflection. Note meter indication.

j. Adjust the PLATE BALANCE control slightly clockwise until a change in meter indication is observed. Then attempt to adjust CATHODE BALANCE control for a meter indication less than that noted in step i.

(1) If meter indication is less than that noted in step i, perform step j repeatedly until absolute minimum meter indication is obtained.

(2) If meter indication is not less than that noted in step i, adjust the PLATE BALANCE control slightly counterclockwise until a change in meter indication is observed. Then adjust the CATHODE BALANCE control for minimum deflection. Perform sub-step (2) repeatedly until absolute minimum meter deflection is obtained.

NOTE: The absolute minimum meter deflection should be in the order of -20 db. If the two sections of the 6 BC8 are not reasonably symmetrical, optimum balancing cannot be obtained.

NOTE: The fastest attack or release time is attained by turning the control full clockwise.

PERFORMANCE SPECIFICATIONS

FREQUENCY RESPONSE:

Without limiting: ± 0.5 db, from 20 cps to 20 kc
With 5 db limiting: ± 0.5 db, from 20 cps to 20 kc

MAXIMUM POWER OUTPUT

After output attenuator with limiting switch off to prevent limiting at +24 dbm less than 1% THD from 50 cps to 15 kc

GAIN

Jumper in low gain position: 24 db
Jumper in high gain position: 37 db

MINIMUM INPUT LEVEL TO ACCOMPLISH LIMITING

Jumper in low gain position: -12 dbm
Jumper in high gain position: -24 dbm

MAXIMUM OUTPUT AT THRESHOLD OF LIMITING: +13 dbm

INPUT AND OUTPUT IMPEDANCE: 600 ohms, unbalanced

SIGNAL TO NOISE RATIO: 80 db

COMPRESSION RATIO (above threshold of limiting): 12 to 1

ATTACK TIME: Adjustable from 300 to 1000 microseconds

RELEASE TIME: Adjustable from 27 to 527 milliseconds

TUBE COMPLEMENT: One each, 6BC8, 12AX7, 12BH7, 6AL5, OB2, GZ34

DIMENSIONS: Width: 19 inches
Height: 3-1/2 inches
Depth: 9-1/4 inches

WEIGHT: 17 pounds

OPERATING INSTRUCTIONS

UNIVERSAL AUDIO

MODEL 175-A

LIMITING AMPLIFIER

GENERAL

The Universal Model 175-A is an extremely versatile high fidelity limiting amplifier designed for use in professional audio systems. The 175-A is a true limiting amplifier capable of high gain, low distortion, linear amplification at levels below the threshold of limiting and with excellent limiting characteristics at levels above.

DESCRIPTION

The Model 175-A is designed to be mounted in a standard 19-inch rack. The front panel is only 3-1/2 inches high and is hinged to provide accessibility to inner components. The limiter may be interconnected with the system through the input and output jacks on the front panel or the terminal strip on the rear of the unit.

Separate adjustments of the attack and release times are provided to allow for the wide variety of program material that the 175-A will be expected to handle. Both the input and output attenuators are graduated in 2-db steps and both are combined with vernier adjustments, adjustable in excess of 2 db for each step.

OPERATION

GAIN

The gain of the amplifier can be changed by altering resistance in the grid circuits of V_1 . Jumpers have been provided for this purpose (see schematic diagram). Unless otherwise specified, the unit is wired with the two jumpers connected for low gain (32 db). If desired, the jumpers can be relocated to the high gain (46 db) position.

VU METER

Unless otherwise specified, the 175-A is wired for a +8-dbm zero reading on the VU meter. If desired, the VU meter can be wired for a +4-dbm zero reading by relocating a jumper wire in the meter switching circuit (see schematic diagram).

ATTENUATORS

The input and output attenuators are both adjustable from 0 to 40 db. For this reason the 175-A may be utilized at any point in the system where the input signal level is between -33 dbm and +13 dbm. The attenuators are adjusted for proper operating levels as follows:

- a. Rotate the input and output attenuators fully counterclockwise (maximum attenuation).
- b. Interconnect the unit with the system through either the input and output jacks on the front panel or the terminal strip on the rear.
- c. Feed a sample of the program material into the system.
- d. Set the meter switch to GR position.
- e. Decrease attenuation with the input attenuator until the desired amount of limiting is observed on the meter (limiting should not exceed 3 to 4 db except where the program material contains extremely loud peaks).
- f. Set the meter switch to OUTPUT position.
- g. Decrease attenuation with the output attenuator until the desired output level is observed on the meter.
- h. Return the meter switch to GR position to verify amount of limiting during operation.

ATTACK AND RELEASE TIME

The ATTACK and RELEASE potentiometers should be adjusted for optimum results in accordance with the type of program material being used. The following general suggestions are given for use of the ATTACK and RELEASE adjustments:

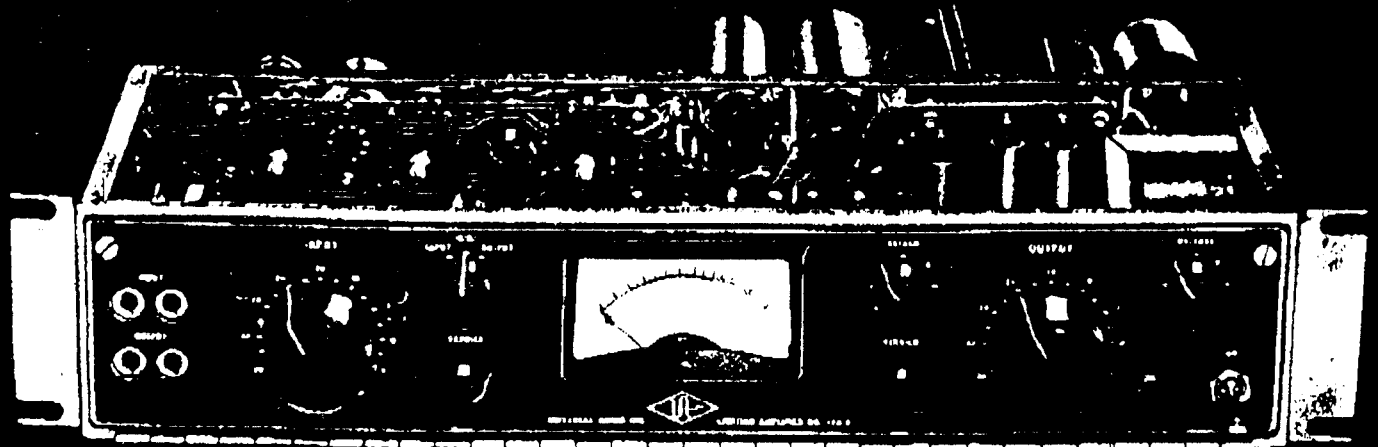
- a. For vocal or narration program material with minimum low frequency information, best results are usually obtained by adjusting for very fast attack and release times.
- b. The release time should be lengthened as the low frequency content of the program material increases.
- c. The attack time should be lengthened when the program material contains tremelo or vibrato which the limiter might possibly follow.



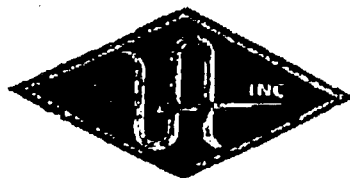
UNIVERSAL AUDIO INC.

5900 SUNSET BLVD., HOLLYWOOD 28, CALIFORNIA

LIMITING AMPLIFIER MODEL 175B

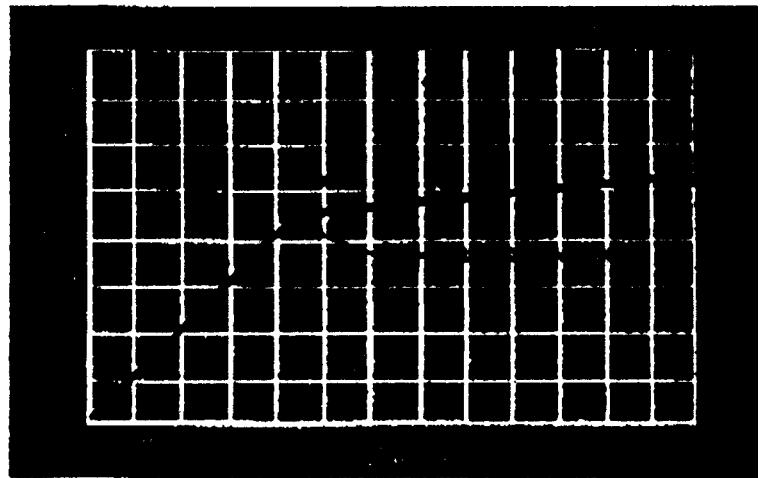


The Universal Model 175B is an extremely versatile, professional quality peak limiting amplifier, designed for use in the recording, broadcasting and motion picture industries, as well as other high quality audio systems. The 175B is a true limiting amplifier, capable of high gain, low distortion and linear amplification at levels below the threshold of limiting, with excellent limiting characteristics and negligible increase in distortion at levels above.



This compact unit is the smallest, completely self contained unit with power supply, available that can be used in critical audio applications.

Model 175B requires only 3½ inches of rack space and is designed to be mounted on standard 19 inch racks. The front panel is hinged to provide accessibility to inner components. Maximum performance and reliability is insured by use of the highest quality military type printed circuitry, combined with 1 percent precision resistors and overrated components. Plug-in type "FP" electrolytic capacitors are used for ease of replacement and an internal switch is provided on one position of the test switch, permitting balancing or rebalancing to be accomplished without test equipment. The VU meter can be switched to indicate input and output level as well as gain reduction in db. Attenuators are detented in 2 db steps, with vernier adjustments in excess of 2 db for each step. All control functions, including separate attack and release time, are accessible on the front panel, eliminating the necessity of entering the unit. A limit defeat switch is mounted on the rear of the attack control. Screw driver adjustment holes on the front panel allow the VU meter to be adjusted during balancing, with panel closed. Input and output jacks are provided on the front panel and a terminal strip is located on the rear of the unit providing dual means of interconnecting the amplifier with a system. The terminal strip can also be used for connecting a remote VU meter.



PERFORMANCE SPECIFICATIONS

FREQUENCY RESPONSE:

Without limiting: ±1 db, from 20 cps to 20 kc
 With 3 db limiting: ±1 db, from 20 cps to 20 kc

MAXIMUM POWER OUTPUT:

Less than 1% THD from 50 cps to 15 kc at 24 dbm

GAIN:

Jumper in low gain position: 34 db
 Jumper in high gain position: 34 db

MINIMUM INPUT LEVEL TO ACCOMPLISH LIMITING:

Jumper in low gain position: -12 dbm
 Jumper in high gain position: -24 dbm

MAXIMUM OUTPUT AT THRESHOLD OF LIMITING: ±13 dbm

INPUT AND OUTPUT IMPEDANCE: 600 ohms, unbalanced

SIGNAL TO NOISE RATIO: 80 db

COMPRESSION RATIO (above threshold of limiting): 12 to 1

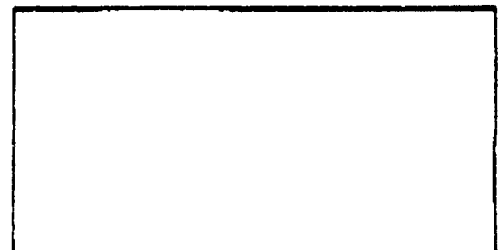
ATTACK TIME: Adjustable from 100 to 1000 microseconds

RELEASE TIME: Adjustable from 27 to 527 milliseconds

TUBE COMPLEMENT: One each, 6BC6, 12AX7, 12BK7, 6 AL5, 6B2, 6Z34

DIMENSIONS:
 Width: 19 inches
 Height: 3½ inches
 Depth: 9¼ inches

WEIGHT: 17 pounds



OPERATING INSTRUCTIONS

UNIVERSAL AUDIO, INC.

Model 175 B

LIMITING AMPLIFIER

The Universal Model 175 B is an extremely versatile professional quality peak limiting amplifier designed for use in the recording, broadcasting and motion picture industries, as well as other high quality audio systems. The 175 B is a true limiting amplifier capable of high gain, low distortion, linear amplification at levels below the threshold of limiting and with excellent limiting characteristics and negligible increase in distortion at levels above.

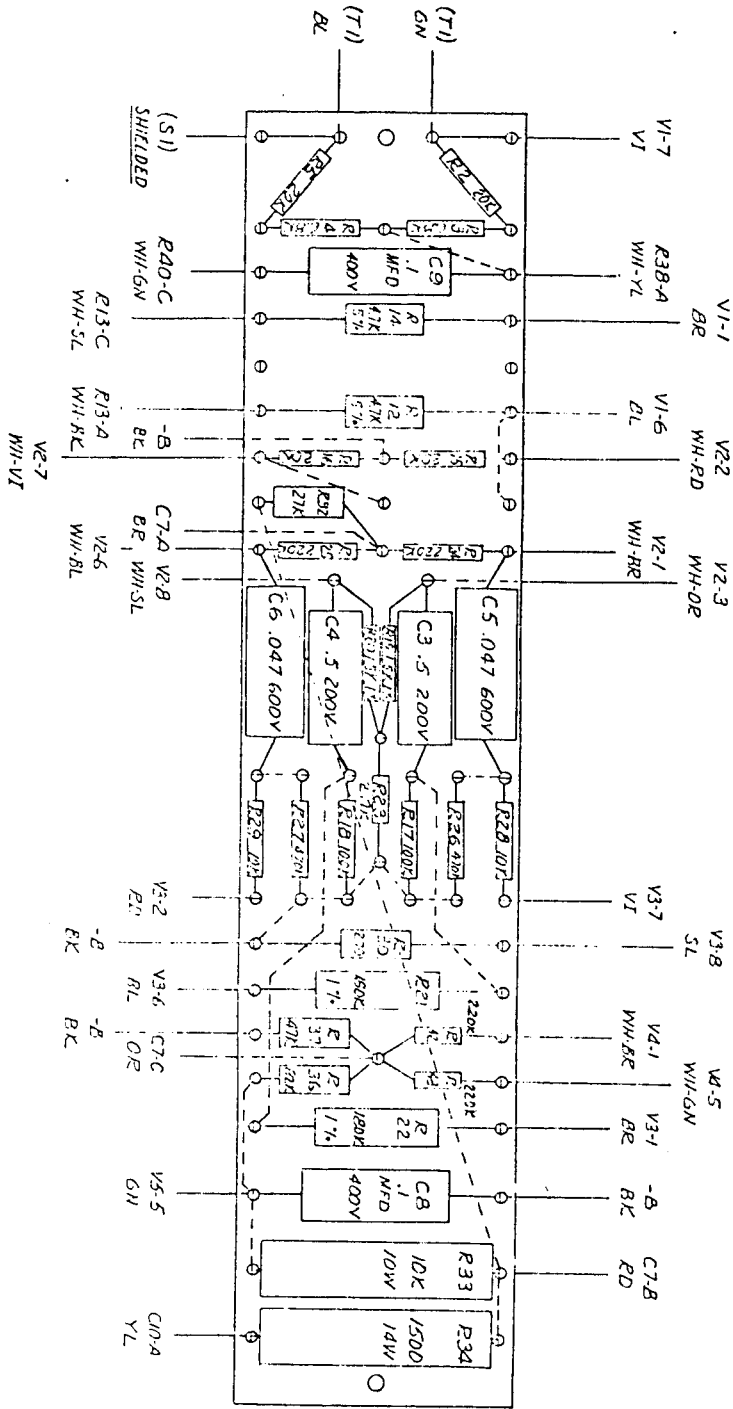
The Model 175 B is designed to be mounted in a standard 19" rack. The unit requires only 3 $\frac{1}{2}$ " of rack space, and the front panel is hinged to provide accessibility to inner components. The highest quality military type printed circuitry is combined with 1% precision resistors and overrated components throughout to insure maximum performance and reliability. Plug-in type "FP" electrolytic capacitors are used for ease of replacement.

The 175 B has a self contained power supply, a VU meter that is switchable to indicate input or output level as well as gain reduction in db, and input and output attenuators detented in 2 db steps, with vernier adjustments in excess of 2 db for each step.

The limiter is provided with input and output jacks on the front panel as well as a terminal strip on the rear of the unit for interconnecting the amplifier with a system. The terminal strip also provides for connecting a remote VU meter if desired.

Separate adjustments of the attack and release times are provided on the front panel as well as a limit defeat switch mounted on the rear of the attack control, to allow for the wide variety of program material that the 175 B will be expected to handle. Checking the unit for balance, or rebalancing may be accomplished without the need of test equipment, because an internal signal for balancing is provided on one position of the test switch. Screw-driver adjustment holes are provided on the front panel so that the VU meter may be easily observed with the panel closed during balancing.

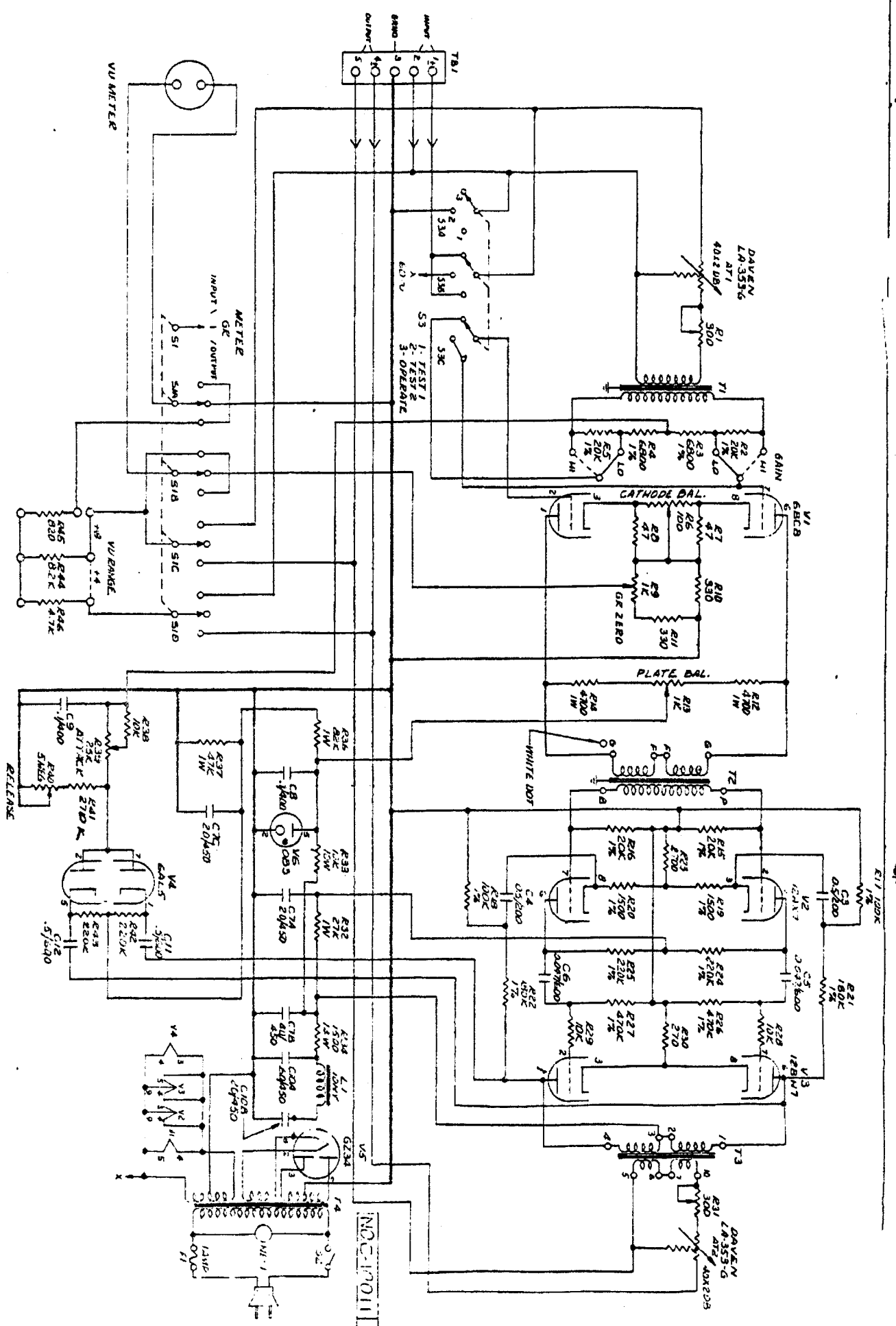
NO. B10010 A



UNIVERSAL AUDIO, INC.
OF HOLLYWOOD
6052 SUNSET BLVD.
HOLLYWOOD 28, CALIF.

TERMINAL BOARD ASSEMBLY —
LIMITING AMPLIFIER
MODEL 175A

NO. B10010

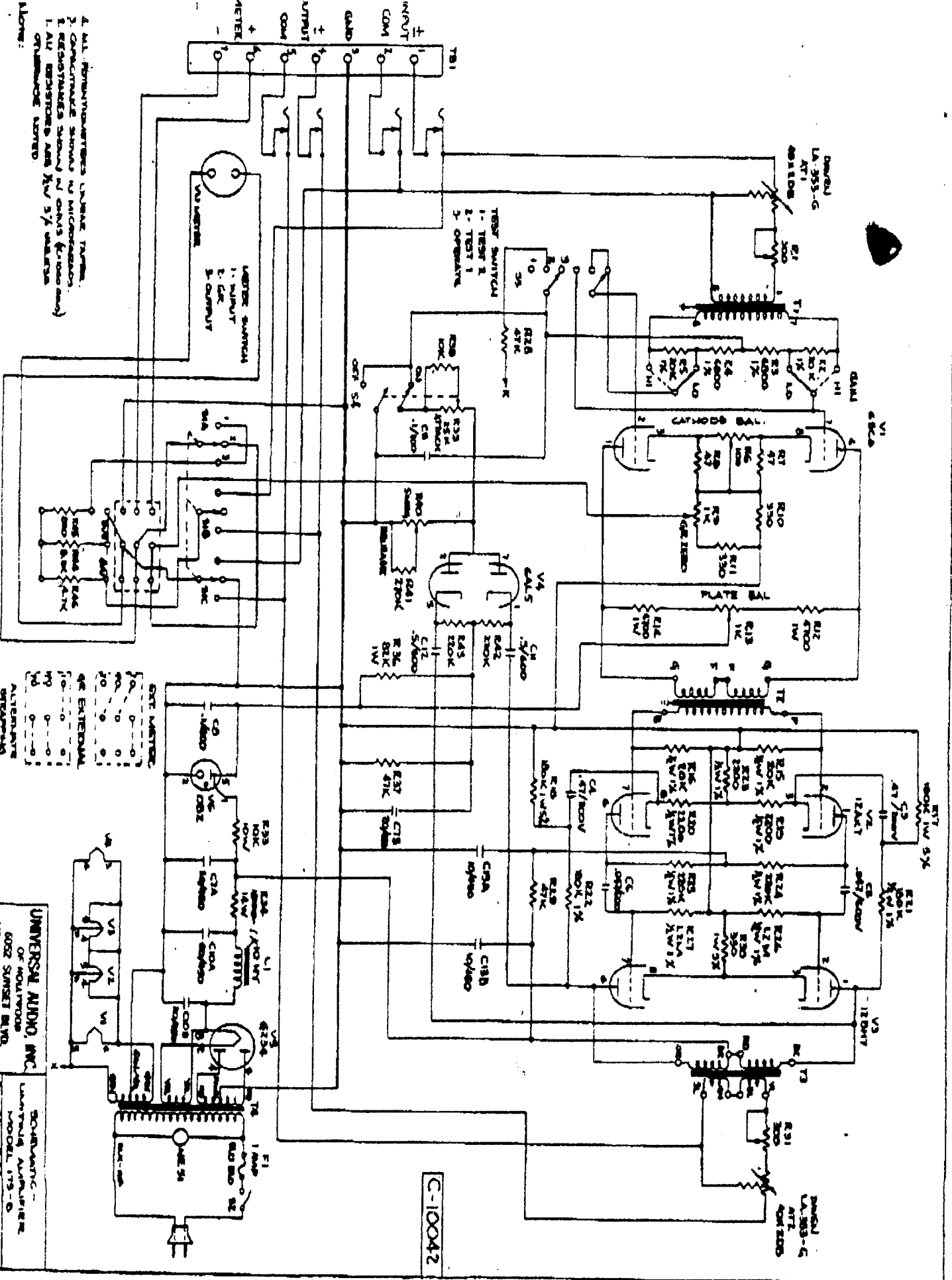


- NOTE:
1. ALL POTENTIOMETERS LINEAR TAPER.
 2. CAPACITANCES IN MICRORGRADS.
 3. RESISTANCES IN OHMS ($E=1000$ OHMS).
 4. ALL RESISTORS 5% UNLESS OTHERWISE NOTED.

UNIVERSAL AUDIO, INC.
 OF HOLLYWOOD
 6062 SUNSET BLVD.
 HOLLYWOOD 28, CALIF.

AMPLIFIER SCHEMATIC -
 MODEL 1759 LIMITING
 AMPLIFIER

NO-C-10011



- ALL COMPONENTS UNLESS STATED OTHERWISE SHOWN IN MICROSCOPIC DETAIL. RESISTORS SHOWN IN OHMS (R100000) UNLESS OTHERWISE NOTED.
1. ALL RESISTORS ARE 1/2 WATT
 2. ALL CAPACITORS ARE 5% TOLERANCE

EXT. METER

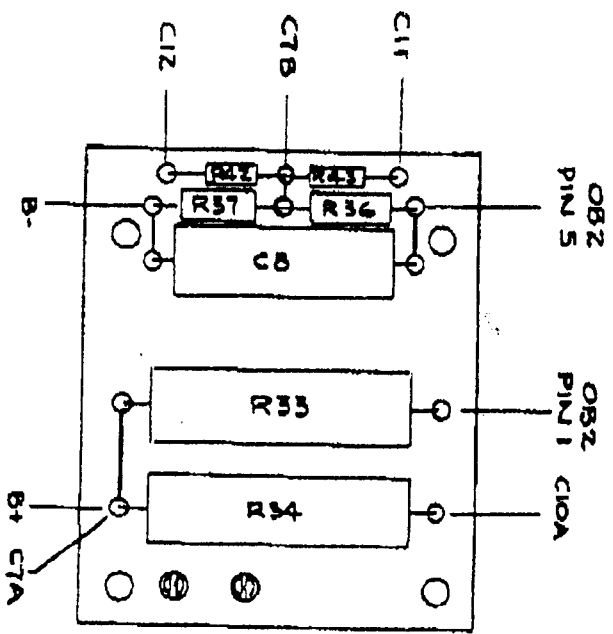
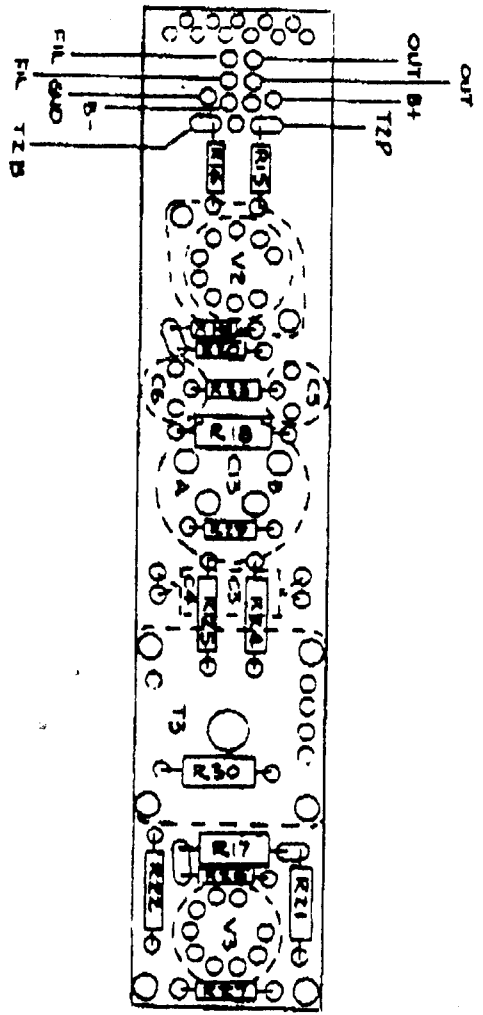
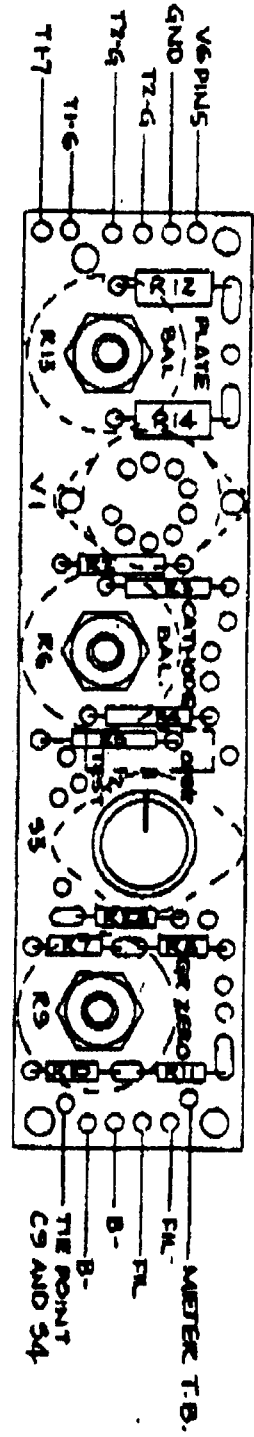
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10	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0
0.1	0	0	0	0	0	0	0	0	0

OR EXTERNAL ALTERNATE METERING

UNIVERSAL AUDIO, INC.
OF HOLLYWOOD
4022 SUNSET BLVD.
HOLLYWOOD 28, CALIF.

SCHWABIC
UNIVERSAL AUDIO
MODEL 175-C
SERIAL 10042

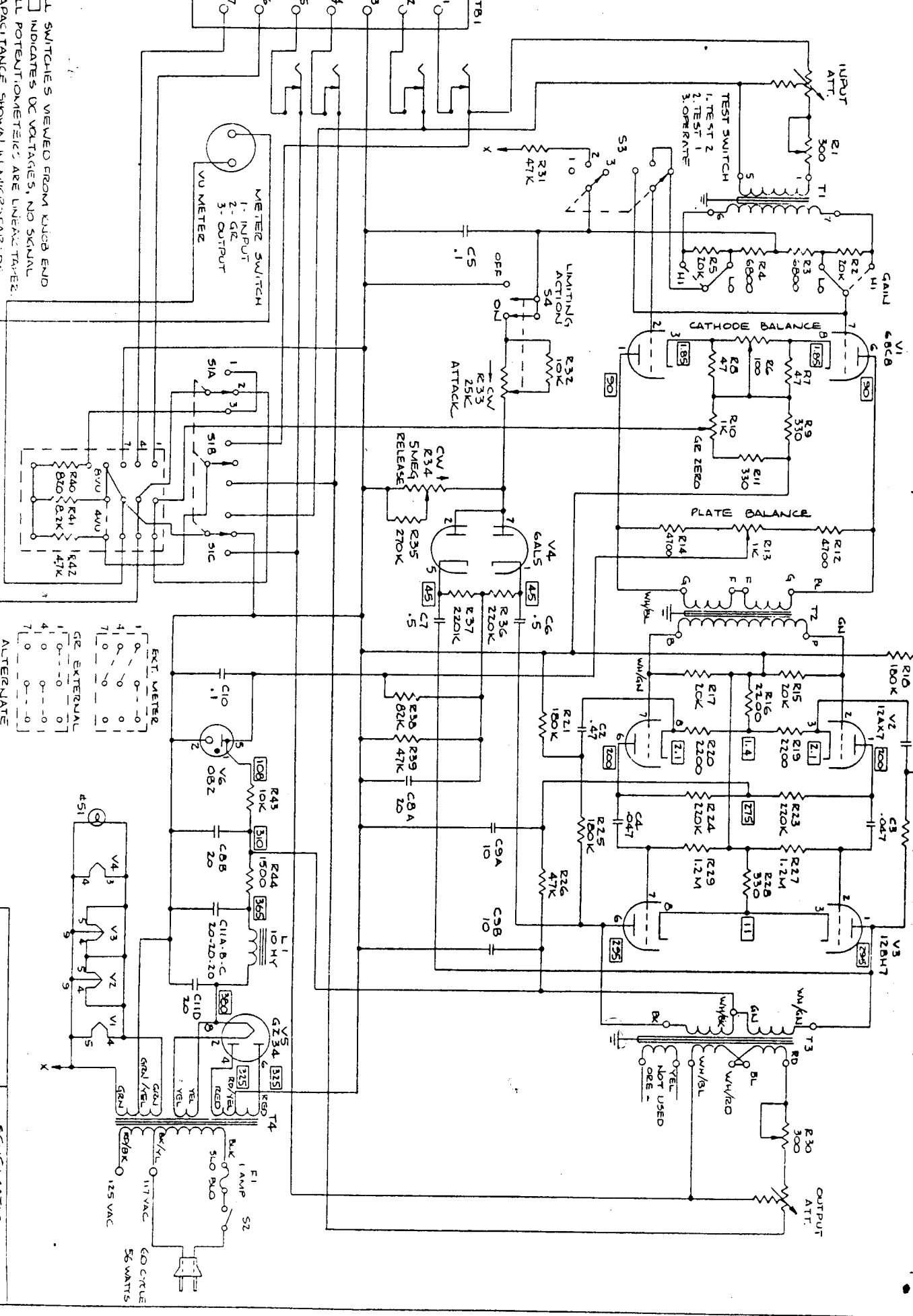
C-10042



UNIVERSAL AUDIO, INC.
 6052 SIEMET BLVD.
 HOLLYWOOD 28, CALIF.

COMPANIST LOCATION
 LAMONT, CALIFORNIA
 MODEL 173-B

C-10043



SWITCHES VIEWED FROM KUBO END
 INDICATES DC VOLTAGES, NO SIGNAL
 ALL POTENTIOMETERS ARE LINEAR TAPER
 CAPACITANCE SHOWN IN MICROFARADS
 RESISTANCES SHOWN IN OHMS (K=1000 OHMS)
 ALL RESISTORS ARE 1/2W AND 5%

METER 5W/10V
 1. INPUT
 2. GND
 3. OUTPUT

EXT. METER
 1 0 0 0 0 0
 2 0 0 0 0 0
 3 0 0 0 0 0
 4 0 0 0 0 0
 5 0 0 0 0 0
 6 0 0 0 0 0
 7 0 0 0 0 0

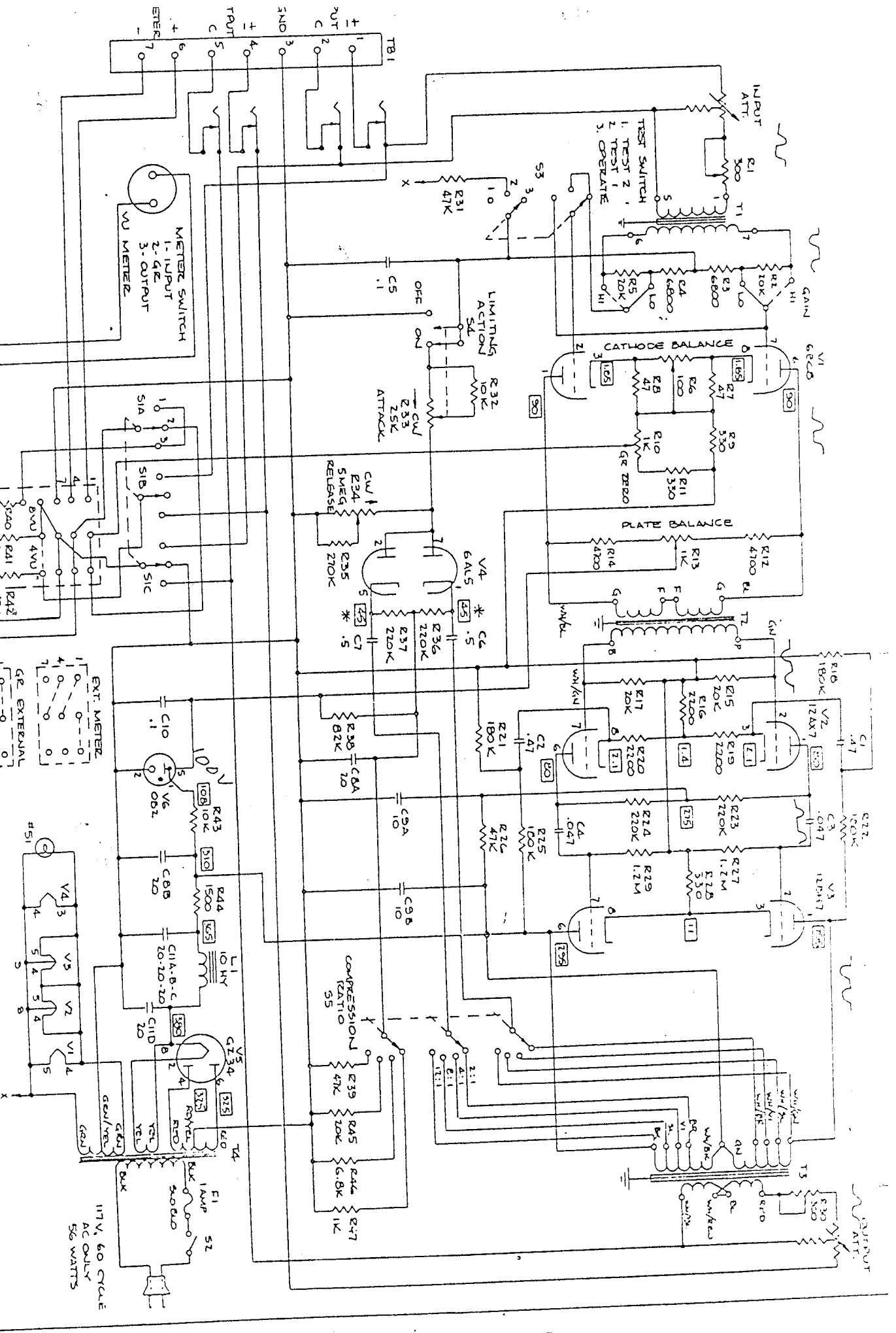
UNIVERSAL AUDIO DIV.
 STUDIO ELECTRONICS CORP.
 11922 VALENTI ST.
 NO. HOLLYWOOD, CALIF. 91605

SCHEMATIC
 LIMITING AMPLIFIER
 MODEL 175-B

DESIGNED BY
 DRAWN BY
 CHECKED BY
 APPROVED BY

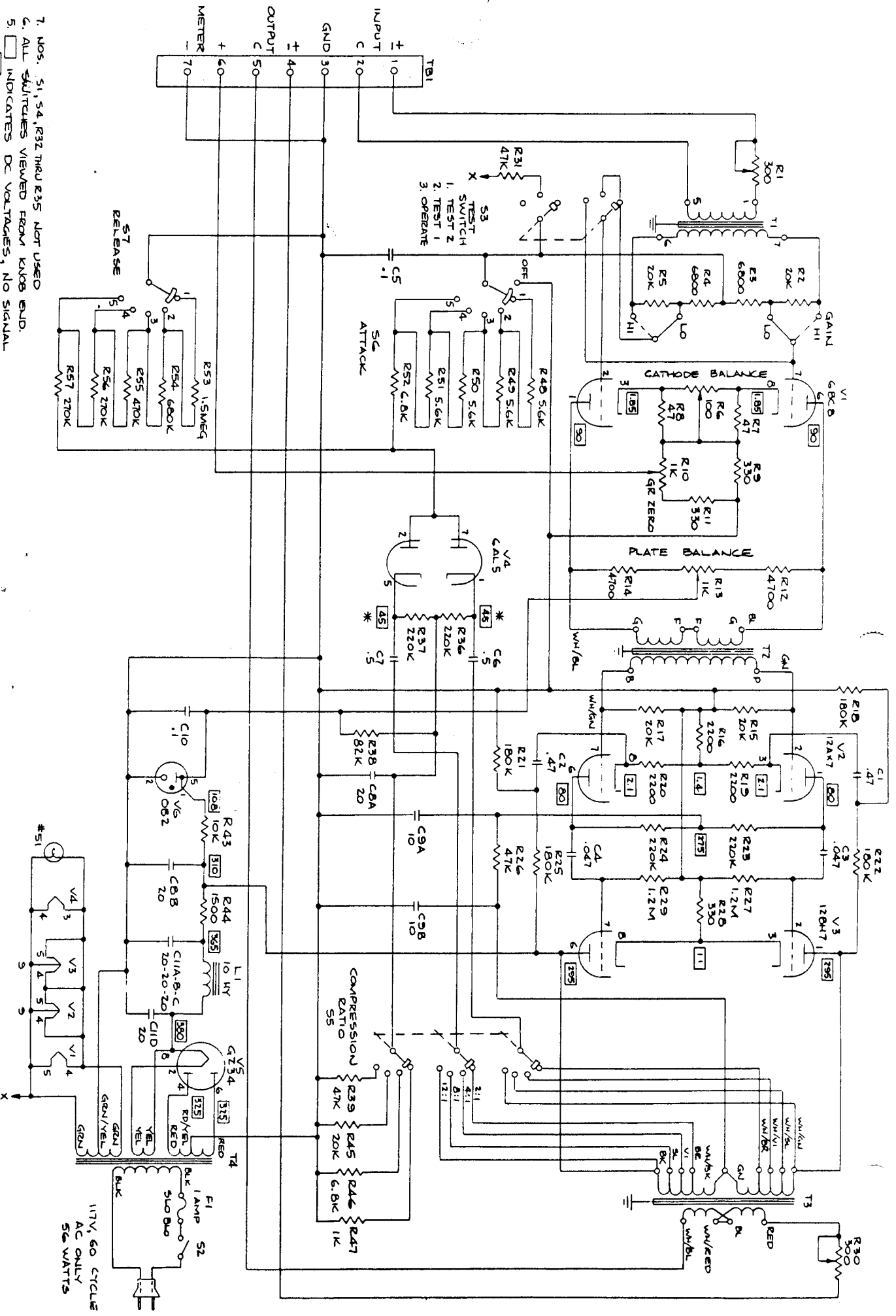
10475

1. ALL SWITCHES VIEWED FROM KNOB END.
2. RESISTANCES SHOWN IN OHMS (K=1000 OHMS)
3. CAPACITANCE SHOWN IN MICROFARADS
4. ALL POTENTIOMETERS ARE LINEAR TAPER.
5. * [25] INDICATES DC VOLTAGES, NO SIGNAL
6. ALL SWITCHES VIEWED FROM KNOB END.



UNIVERSAL AUDIO
 INCORPORATED
 6000 SUNSET BOULEVARD
 HOLLYWOOD 28, CALIF.

SCHEMATIC
 LIMITING ACTION
 MODEL 176
 C-10476



1. NOS. 51, 54, R32 THRU R35 NOT USED
2. ALL SWITCHES VIEWED FROM KNOB END.
3. [] INDICATES DC VOLTAGES, NO SIGNAL
4. * [] VOLTAGE AT 12 TO 1 RATIO
5. ALL POTENTIOMETERS ARE LINEAR TAPER.
6. CAPACITANCE SHOWN IN MICROFARADS
7. RESISTANCES SHOWN IN OHMS (K = 1,000 OHMS)
8. ALL RESISTORS ARE 1/2W AND 5%

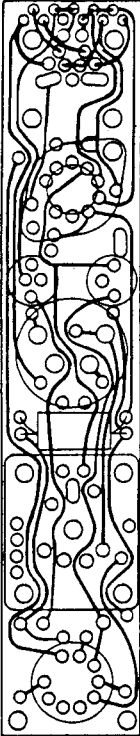
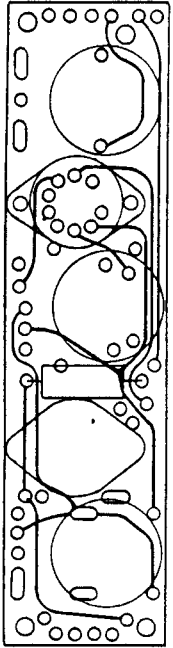
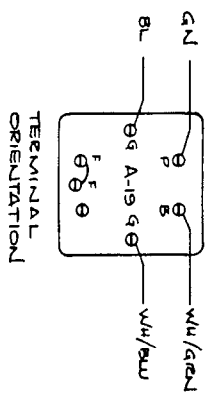
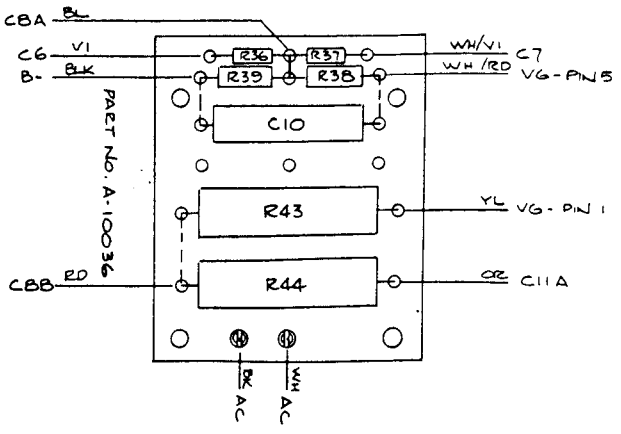
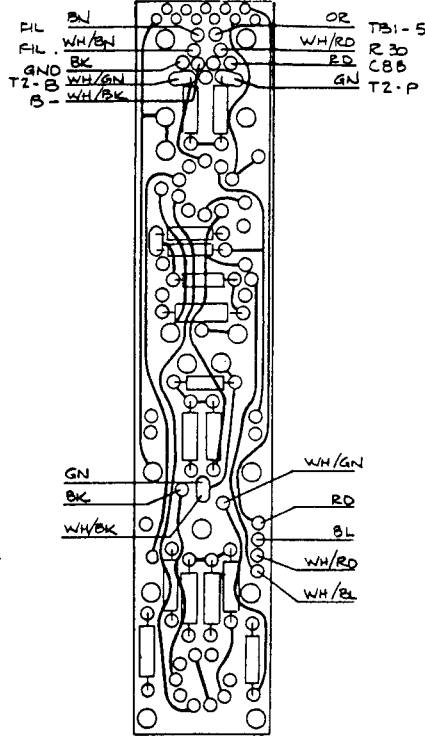
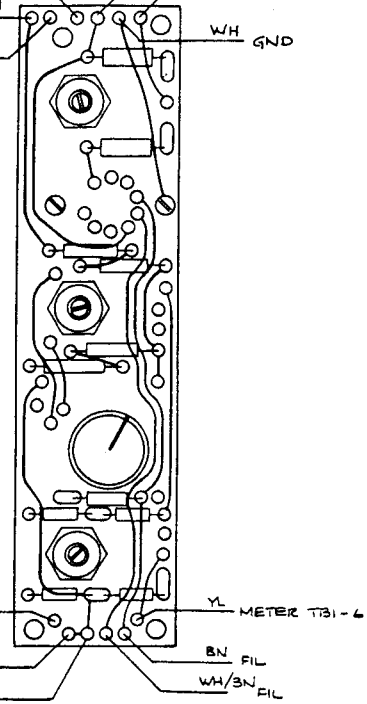
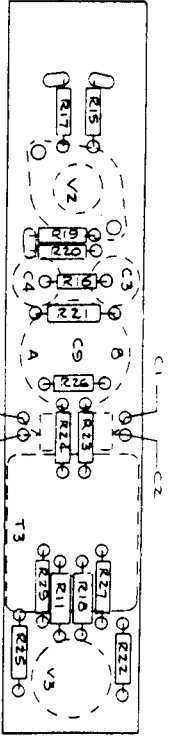
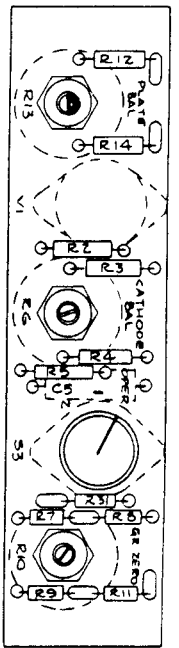
NOTE: UNLESS OTHERWISE SPECIFIED

UNIVERSAL AUDIO
 INCORPORATED
 6000 SUNSET BOULEVARD
 HOLLYWOOD 28, CALIF.

SCHERMATIC
 LIMITING AMPLIFIER
 MODEL 177

DESIGN: []
 APPROV: []

C-10477

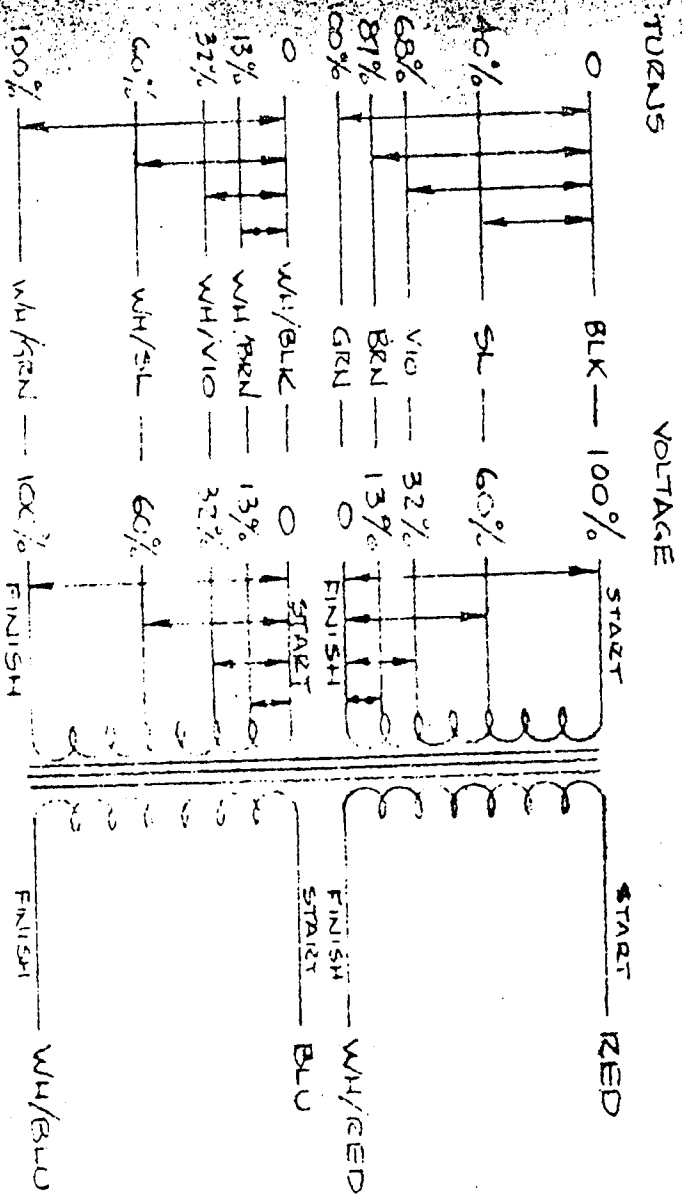


UNIVERSAL AUDIO
INCORPORATED
6000 SUNSET BOULEVARD
HOLLYWOOD 28, CALIF.

CIRCUIT BOARD DETAILS
LIMITING AMPLIFIER
MODEL 177
DRAWN BY: [signature]
CHECKED BY: [signature]
DATE: 2/1/55
APPD.

C-10480

EVERETT MANUFACTURING



MODIFIED BASIC 100B TRANSFORMER
 LESS TERTIARY WINDING AND
 PLUS TAPS (REFERENCE UTC NO. PA5946)
 REFERENCE UNIVERSAL C-10477
 FOR CIRCUIT

UNIVERSAL AUDIO
 INCORPORATED
 6000 SUNSET BOULEVARD
 HOLLYWOOD 28, CALIF.

OUTPUT TRANSFORMER
 LIMITING AMPLIFIER
 MODELS 176/177
 DRAWN GEIER 5/1/55
 DESIGNED A-10-50