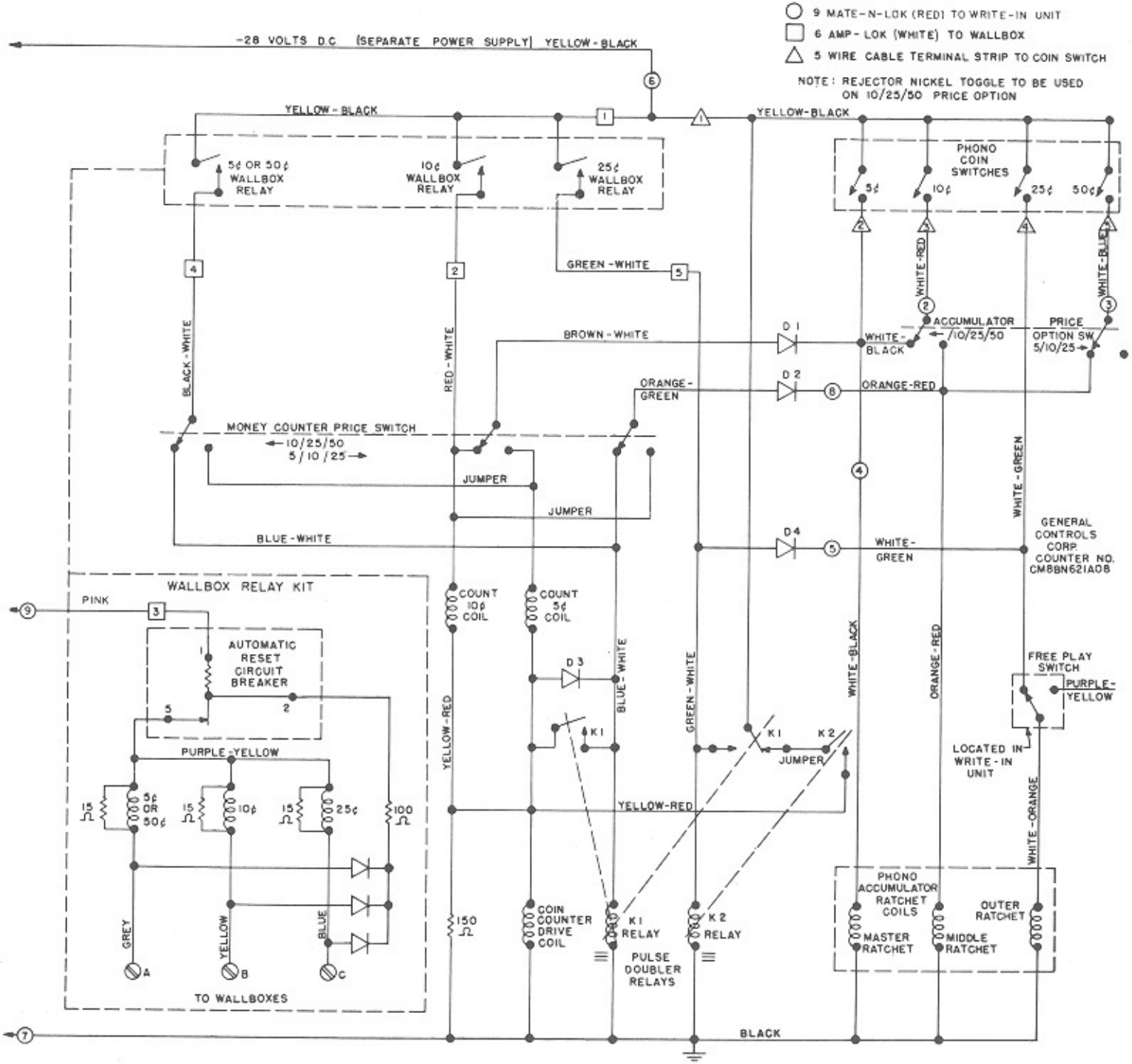
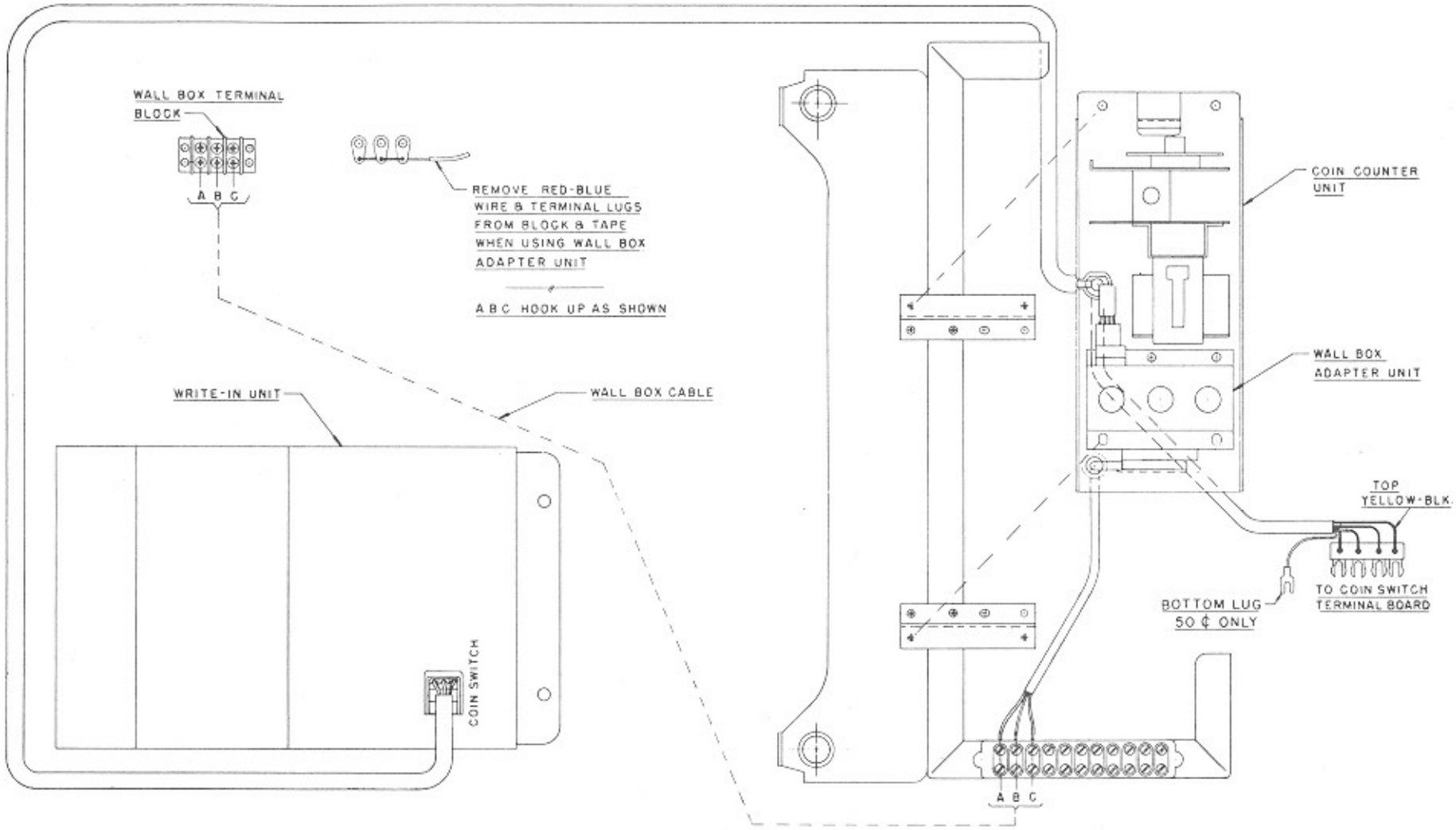
U.S. AND CANADIAN MONEY COUNTER KIT - NO. 1989

(PART NO. 38744)



NOTE: REMOVE ORIGINAL SWITCH CABLE ASSEMBLY AND DISCARD. REPLACE WITH CABLE PROVIDED AS PART OF COIN COUNTER UNIT.



COIN COUNTER UNIT INSTALLATION DIAGRAM

33-1/3 - 45 RPM RECORD INTERMIX CYCLE OF OPERATION

The turntable utilizes one constant speed 4-pole motor with only a shaft variance to accommodate 45 and 33 1/3 R.P.M. speeds. This is accomplished by a simple mechanical operation.

Turntable speed sensors are held in constant 45 R.P.M. position by three spring retained ball bearings. The 45 R.P.M. hub is also locked by the ball bearings and held in position by the sensors.

When a 33 1/3 R.P.M. record comes in contact with the turntable sensors, it triggers a ball bearing action allowing a rapid and simultaneous drop of the 45 R.P.M. hub and sensor. The sensor ring (the bottom section of the sensors) operates the sensor lever which unlocks the idler cam lever.

The drive rod driven by the rotating gripper gear allows the moving slide bar to engage the sensor lever pin and operate the idler cam lever and idler cam.

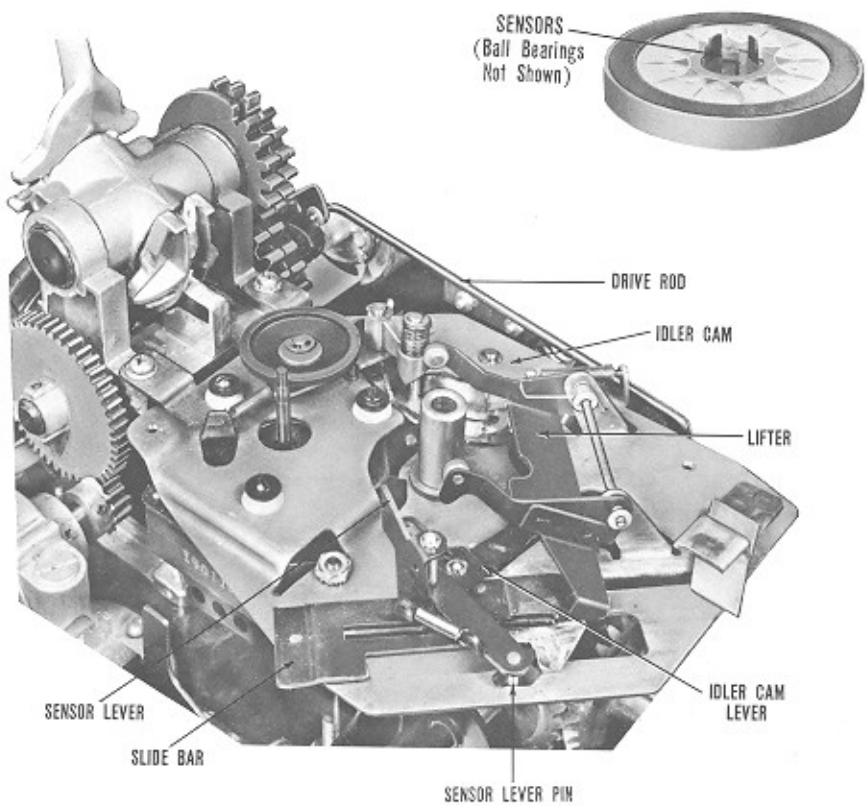
The moving idler cam in one rapid motion will:

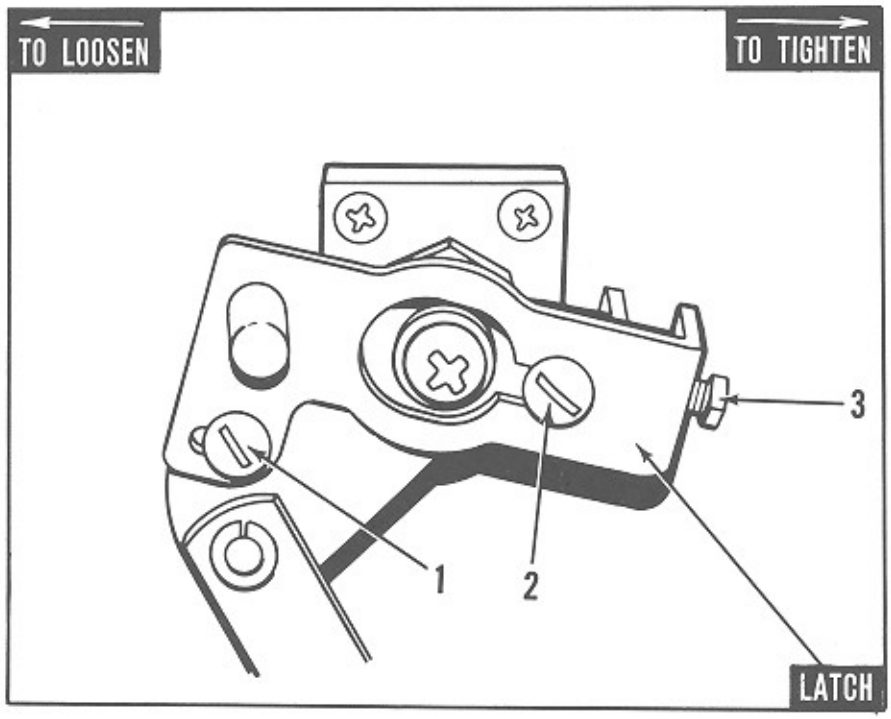
1. Swing idler wheel away from the 45 R.P.M. motor drive shaft and turntable.
2. Raise idler wheel.
3. Return idler wheel against the 33 1/3 R.P.M. speed portion of the motor drive shaft and also turntable.

Upon completion of the music cycle the rotating gripper gear releases the drive rod tension allowing a lifter to raise the sensing fingers and 45 R.P.M. hub to their original position.

The lifter mechanism remains in a raised position and lowers just prior to record coming in contact with turntable.

CAUTION: DO NOT ATTEMPT TO LOWER THE TURNTABLE SENSORS DURING MACHINE STAND-BY AS THIS MAY MISALIGN THE CAMMING ACTION.





CABINET DOME ADJUSTMENT

The cabinet dome is held secure by an adjustable latch on each cabinet side and operated from a single lock. If adjustment is necessary loosen screws NO. 1 and NO. 2. Adjust latch in the direction as shown above. Set screw NO. 3 must always be bottomed to the lower bracket after latch adjustment is made.

To observe proper dome latching clearance, remove the end program holders for viewing.

AMPLIFIER

SECTION

SOUND SYSTEM SPECIFICATIONS

Because transistors represent a new concept in amplifiers the following precautions should be observed to prevent accidental damage.

1. DON'T use any type of "short" test. (Such as shorting circuits to ground to see if voltage is present.)

2. DON'T connect to, or disconnect anything from the amplifier when power is ON.

3. DON'T remove or replace transistor covers with power ON.

4. DON'T block any air vents in amplifier or cabinet.

5. DON'T connect external speakers until you have thoroughly read the SPEAKER LOAD CHART on page 62.

6. DON'T attempt to repair or adjust the amplifier until you have read the SERVICE & ADJUSTMENT sections of the manual.

The circuit is illustrated in the BLOCK DIAGRAM and consists of the following:

1. PICKUP CARTRIDGE. This is a "Shure" Stereo Magnetic Cartridge with a replaceable diamond stylus, compatible for use with Stereo or Monaural records. It requires a needle pressure of 4 to 6 grams for proper record tracking. The output is .01 volt, plus or minus 3 db from 5.5 cm/sec. 1000 cps. recording.

2. MAGNETIC PRE-AMPLIFIER. The pre-amplifier is a low distortion dual channel plug-in type, with left and right input adjustments to compensate for normal variations in cartridge output.

   NOTE: See page 54 for adjustment procedure.

3. AMPLIFIER. The transistorized power amplifier has a low distortion factor and is rated at 18 watts per channel. Each signal is fed from the pre-amplifier into the A.V.C. amplifier section which has a low output impedance. This permits the use of a volume control up to a hundred feet from the phonograph without excessive hum or other extraneous pick-up. The A.V.C. is a thermistor controlled feed-back circuit to the voltage amplifier section. The thermistors for each channel are matched-pairs to preserve channel balance.

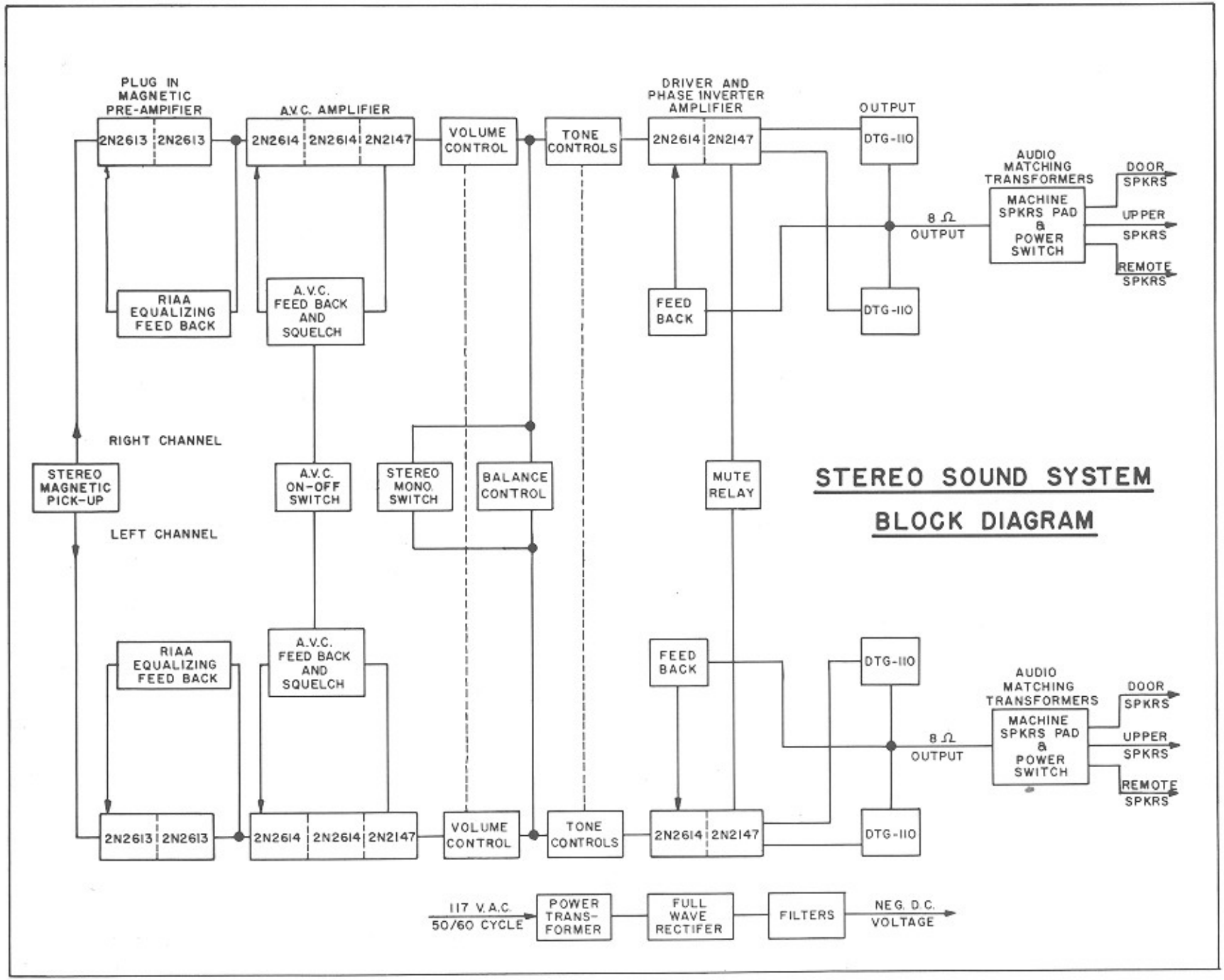
   Because of manufacturing tolerances of various amplifier components, the output from the volume control will vary between left and right channel.

   These signals are balanced with a 100 K ohm balance potentiometer. The bass and treble controls are 4 position switches.

   The chassis is provided with a muting relay which blocks both amplifiers during all cycles but the music cycle of operation.

   The output circuits are protected from shorts or overloads by two Dual Barretters. These bulbs normally never light thus having an extended life and should not need replacement.

   Two bias controls in each channel provide for adjustment of the minus D.C. voltages and current of the output circuits.

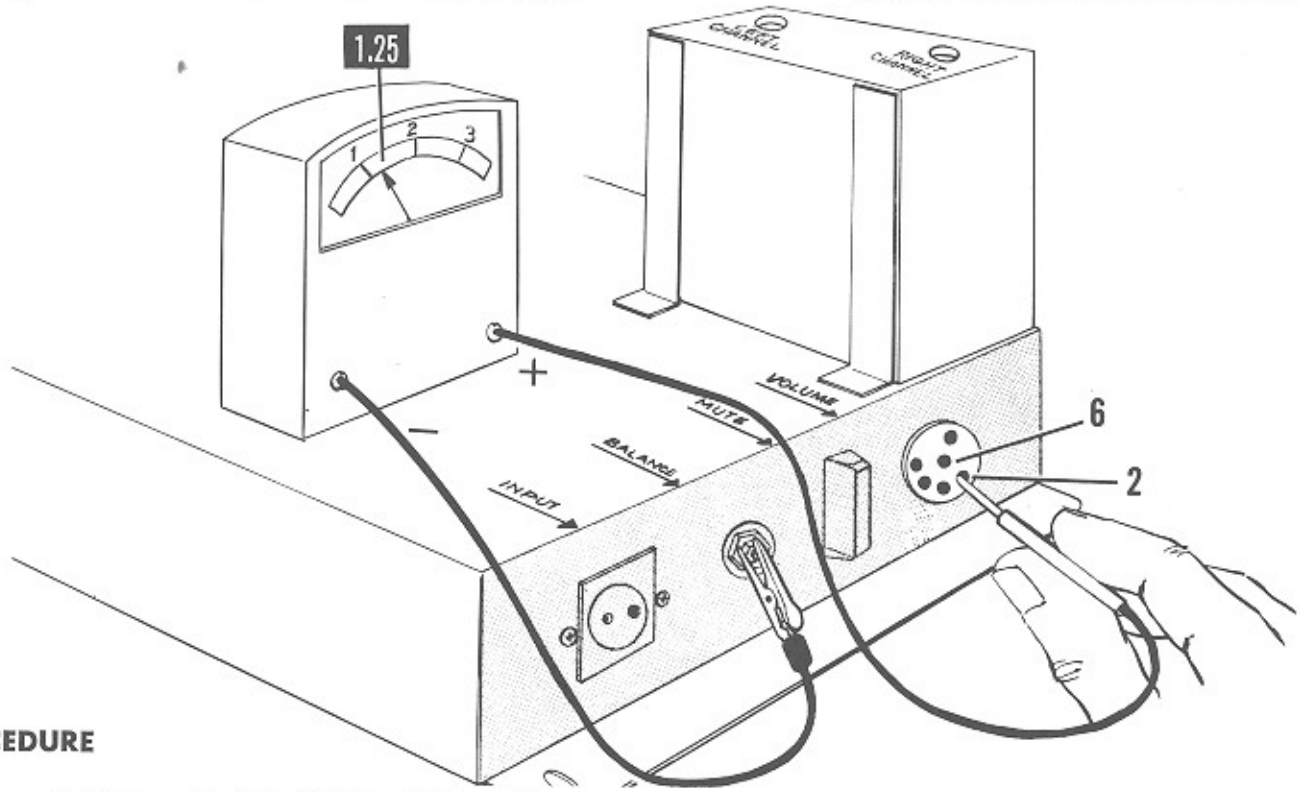

PLUG IN MAGNETIC PRE-AMPIFIER
2N2613 2N2613
A.V.C. AMPLIFIER
2N2614 2N2614 2N2147
VOLUME CONTROL
TONE CONTROLS
DRIVER AND PHASE INVERTER AMPLIFIER
2N2614 2N2147
OUTPUT
DTG-110
AUDIO MATCHING TRANSFORMERS
MACHINE SPKRS PAD & POWER SWITCH
DOOR SPKRS
UPPER SPKRS
REMOTE SPKRS
8 Ω OUTPUT
RIAA EQUALIZING FEED BACK
A.V.C. FEED BACK AND SQUELCH
FEED BACK
DTG-110
RIGHT CHANNEL
STEREO MAGNETIC PICK-UP
A.V.C. ON-OFF SWITCH
STEREO MONO. SWITCH
BALANCE CONTROL
MUTE RELAY
LEFT CHANNEL
STEREO SOUND SYSTEM
BLOCK DIAGRAM
RIAA EQUALIZING FEED BACK
A.V.C. FEED BACK AND SQUELCH
FEED BACK
DTG-110
AUDIO MATCHING TRANSFORMERS
MACHINE SPKRS PAD & POWER SWITCH
DOOR SPKRS
UPPER SPKRS
REMOTE SPKRS
8 Ω OUTPUT
2N2613 2N2613
2N2614 2N2614 2N2147
VOLUME CONTROL
TONE CONTROLS
2N2614 2N2147
DTG-110
117 V.A.C. 50/60 CYCLE
POWER TRANS-FORMER
FULL WAVE RECTIFER
FILTERS
NEG. D.C. VOLTAGE

SOUND SYSTEM ADJUSTMENTS

1. INPUT LEVEL ADJUSTMENTS

Input level adjustment located on the Magnetic Pre-Amplifer. These controls are set at the factory and should only be re-adjusted whenever the Pick-up has been replaced or the Amplifier or Pre-Amplifier has been serviced.

A R.M.C. Stereo Test Record #1001 and an A.C. Voltmeter of at least 1000 ohms per volt are required to adjust these controls.



PROCEDURE

Turn A.V.C. switch to OFF and Tone Controls to MAXIMUM. Also turn the Stereo-Mono switch to STEREO and remove the Volume Control plug.

Connect the A.C. Voltmeter leads to pin #2 of the Volume Control Socket and chassis ground. (Use Balance Control locking nut for chassis ground.) Play Band #1 (left only) of test record. Turn Left Input Level adjustment until meter reads 1.25 volts.

Do same to Right Input Level except use pin #6 in volume control socket and play Band #2 (right only) of the test record.)

2. BALANCE CONTROL

This Balance Control is located on the right hand side of the main Amplifier. This control is set at the factory for equal outputs from Left and Right channel and should only be readjusted if the Amplifier has been serviced. Use the same test record and an A.C. voltmeter of at least 1000 ohms per volt to adjust this control.

PROCEDURE

Be sure Input Levels Controls are properly adjusted. Turn A.V.C. switch to ON and Bass and Treble Controls to MAXIMUM. Turn the Stereo-Mono switch to STEREO and Speakers Power Switch to 18 WATT position. The Machine Speakers "L" pad must be turned up to MAXIMUM.

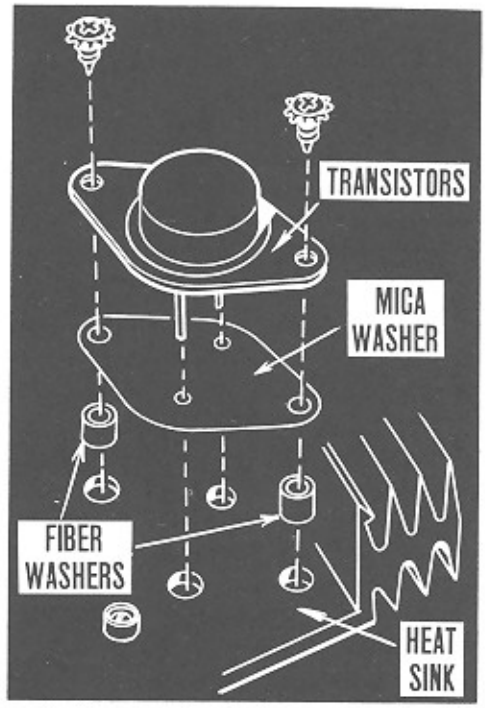
Play Band #3 (right and left) of the Test Record. Connect A.C. voltmeter alternately across the 12" door speakers. The equal voltage reading from each speaker should be approximately 8 volts. If this is not the case, loosen locking nut on the Balance Control adjustment and Re-set control until outputs are identical.

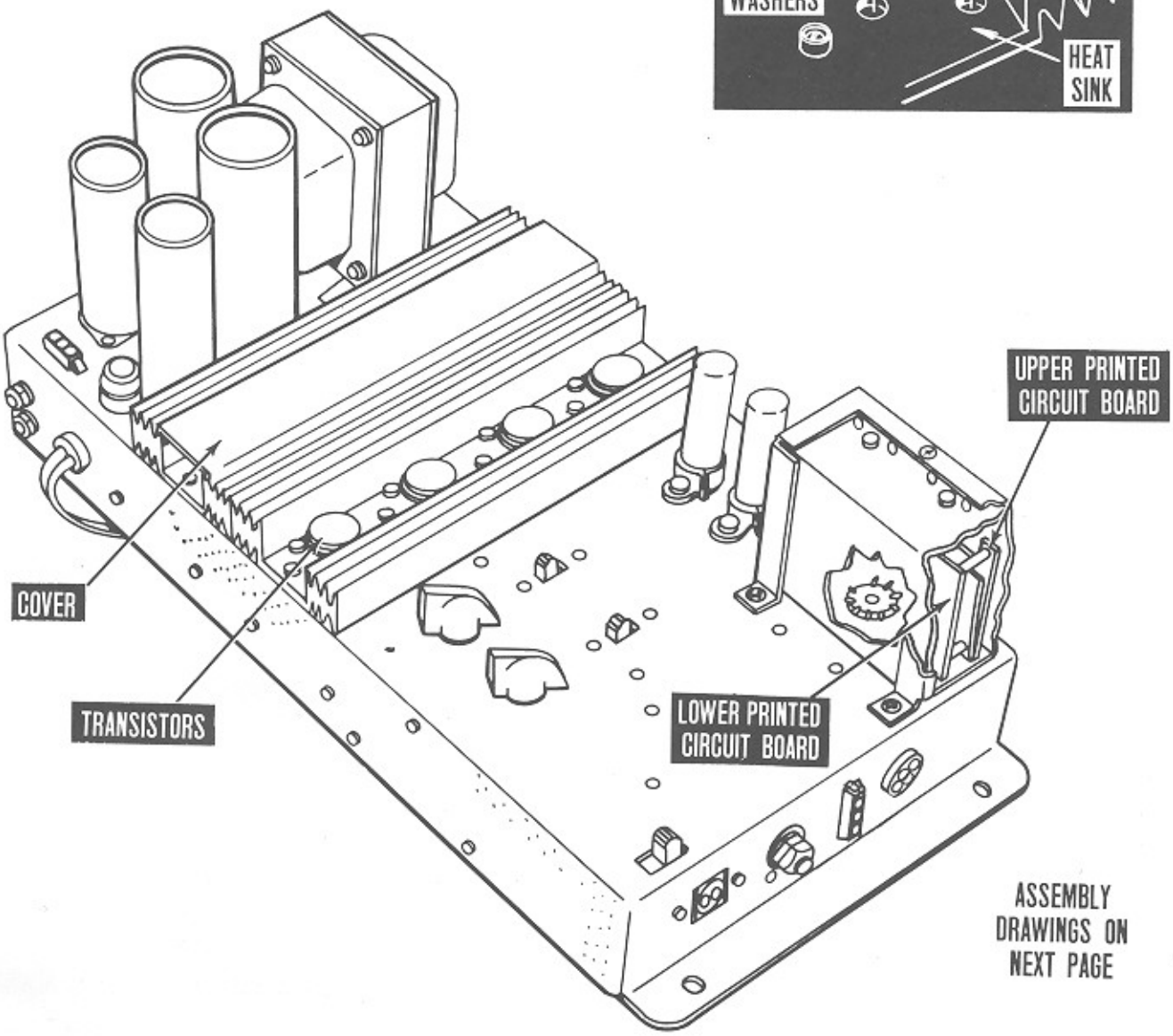
TRANSISTORS

If a defective transistor is found, replace with the same type ONLY. The DTG-110 Transistors are matched pairs and should be replaced in pairs with matched Beta. One of a pair can be replaced if it has the same Color Printing on the top side of its case. These can be purchased through your local Distributor.

The Power Transistors DTG-110 and 2N2147 are insulated electrically from the Heat Sink by a Mica Washer which must be coated with Silicone Grease for good heat transfer to the Sink.

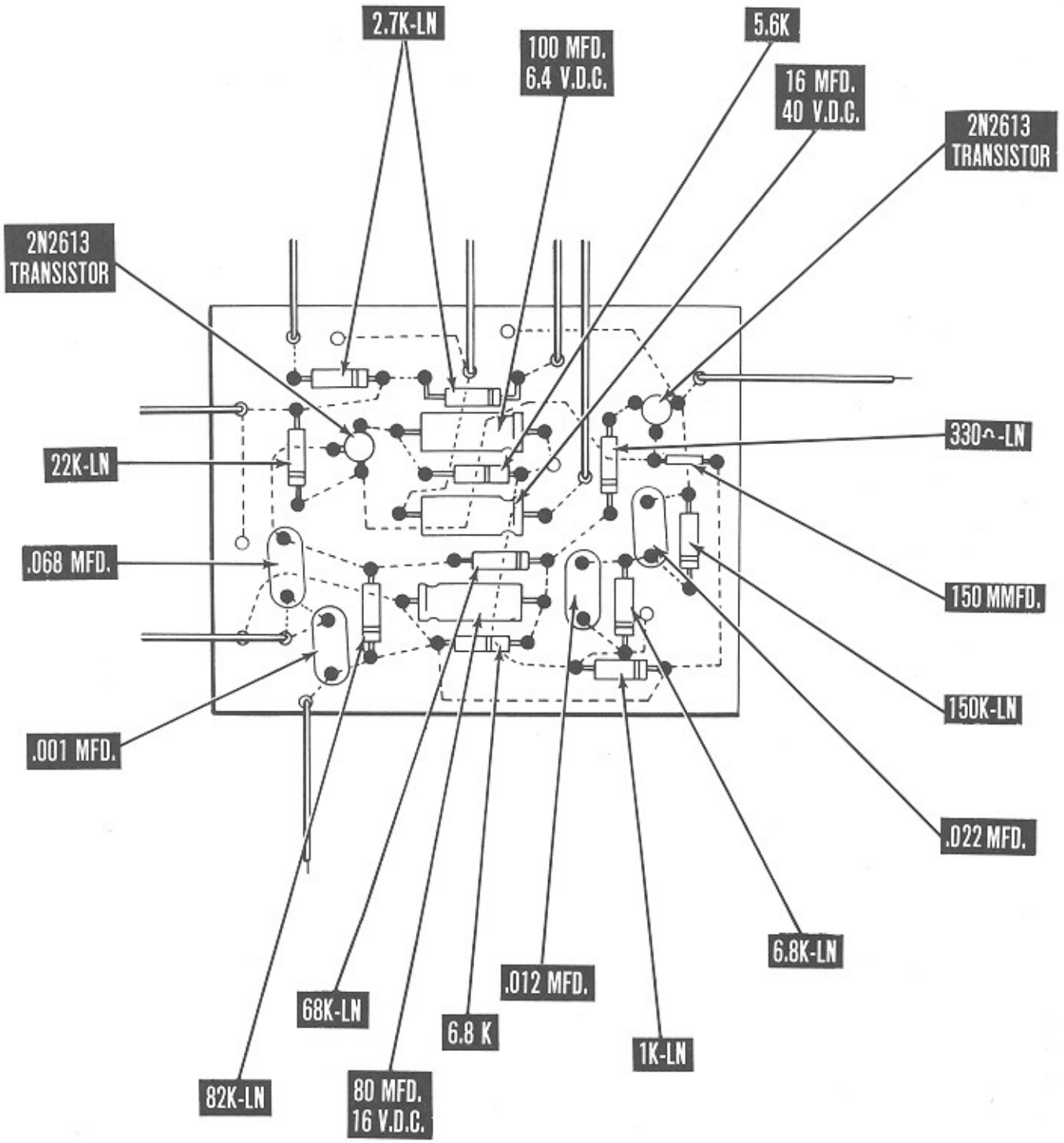
NOTE: Make certain that the mica washer mounting holes are always centered over the fiber spacers in the heat sink.





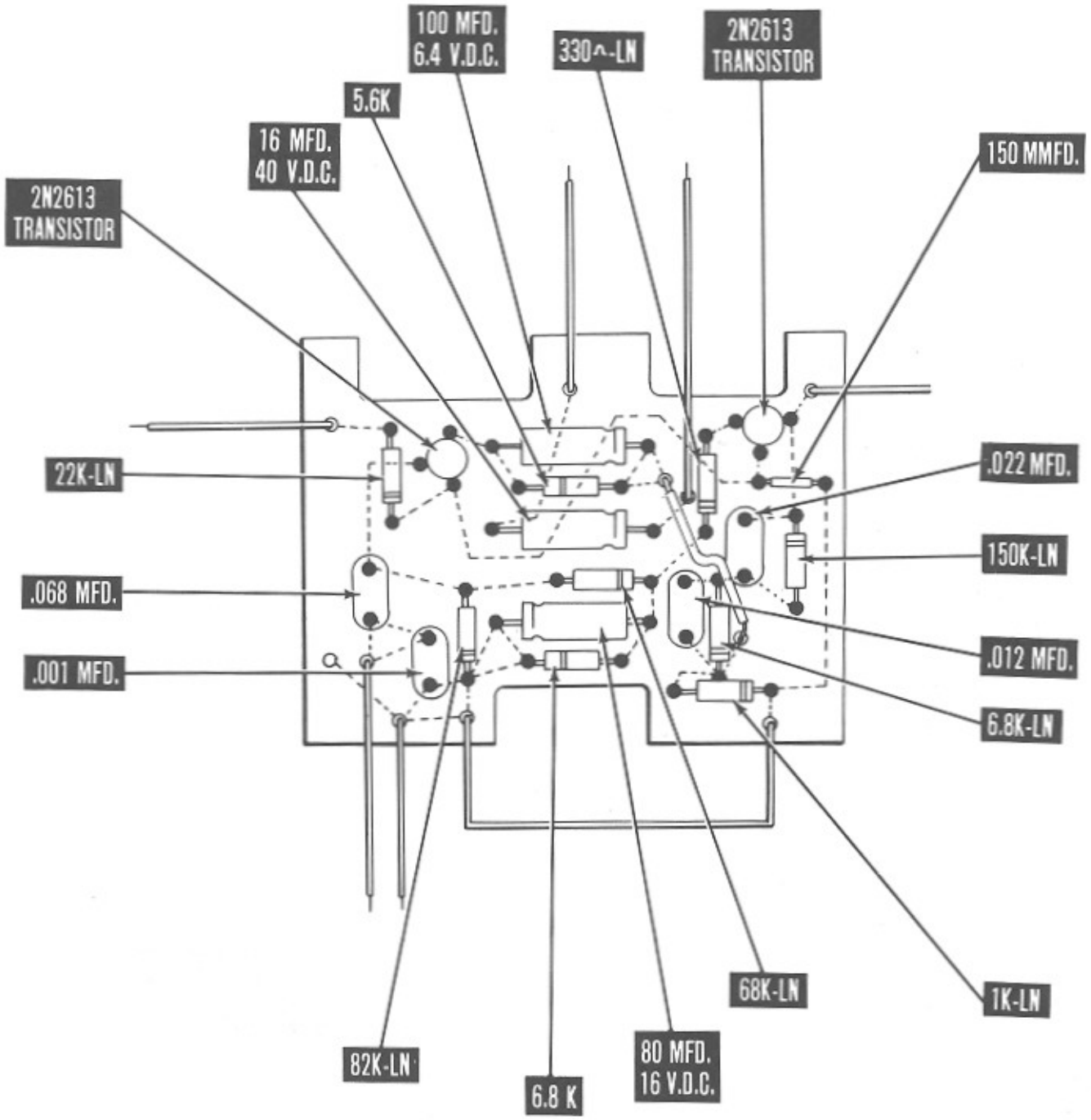
ASSEMBLY DRAWINGS ON NEXT PAGE

LOWER PRINTED CIRCUIT BOARD ASSEMBLY



LN DENOTES LOW NOISE
SEE PARTS CATALOG FOR PART NUMBERS

UPPER PRINTED CIRCUIT BOARD ASSEMBLY



BIAS CONTROLS

These controls (2 per channel) are set at the factory and should only be re-adjusted if the output circuits (DGT-110 Transistors, #42265 Dual lamps) have been serviced.

A.D.C. millimeter (0-100) and a D.C. voltmeter (0-50) of at least 1000 ohms per volt are required.

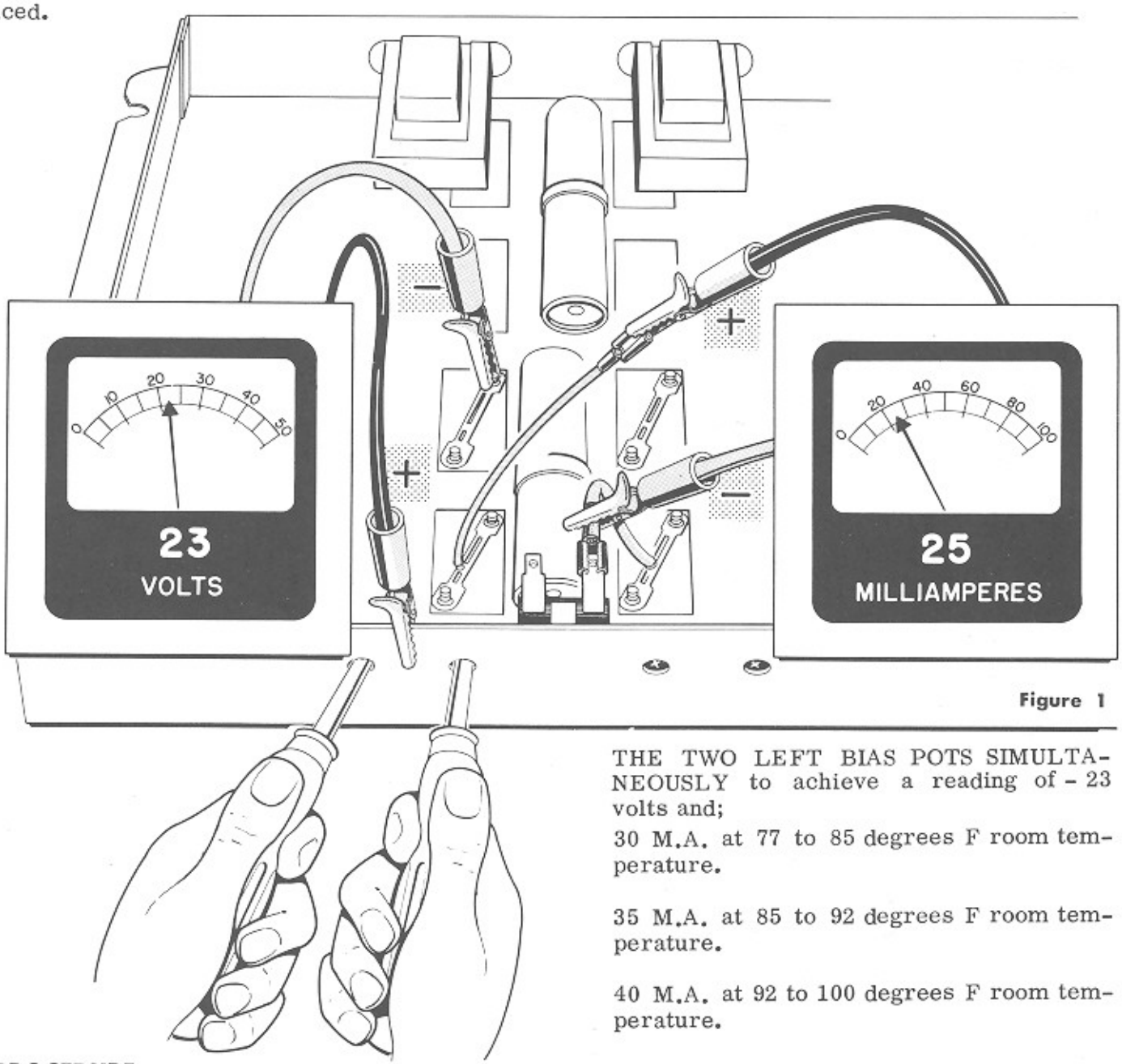


Figure 1

PROCEDURE

Be sure Amplifier cord is unplugged. Voltage and Current Meters must be connected in the bias circuit for left channel as shown in Fig. 1.

With power off, allow the Amplifier to stand until it reaches room temperature. Plug power cord into 117 volt outlet and ADJUST THE TWO LEFT BIAS POTS SIMULTANEOUSLY to achieve a reading of - 23 volts and;

30 M.A. at 77 to 85 degrees F room temperature.

35 M.A. at 85 to 92 degrees F room temperature.

40 M.A. at 92 to 100 degrees F room temperature.

25 Milliamperes at 70 to 77 degrees F room temperature.

Unplug Amplifier power plug. For Meter connections for Right Channel see Fig. 2.

Follow the same procedure as above and adjust right hand bias pots for the same voltage and current.

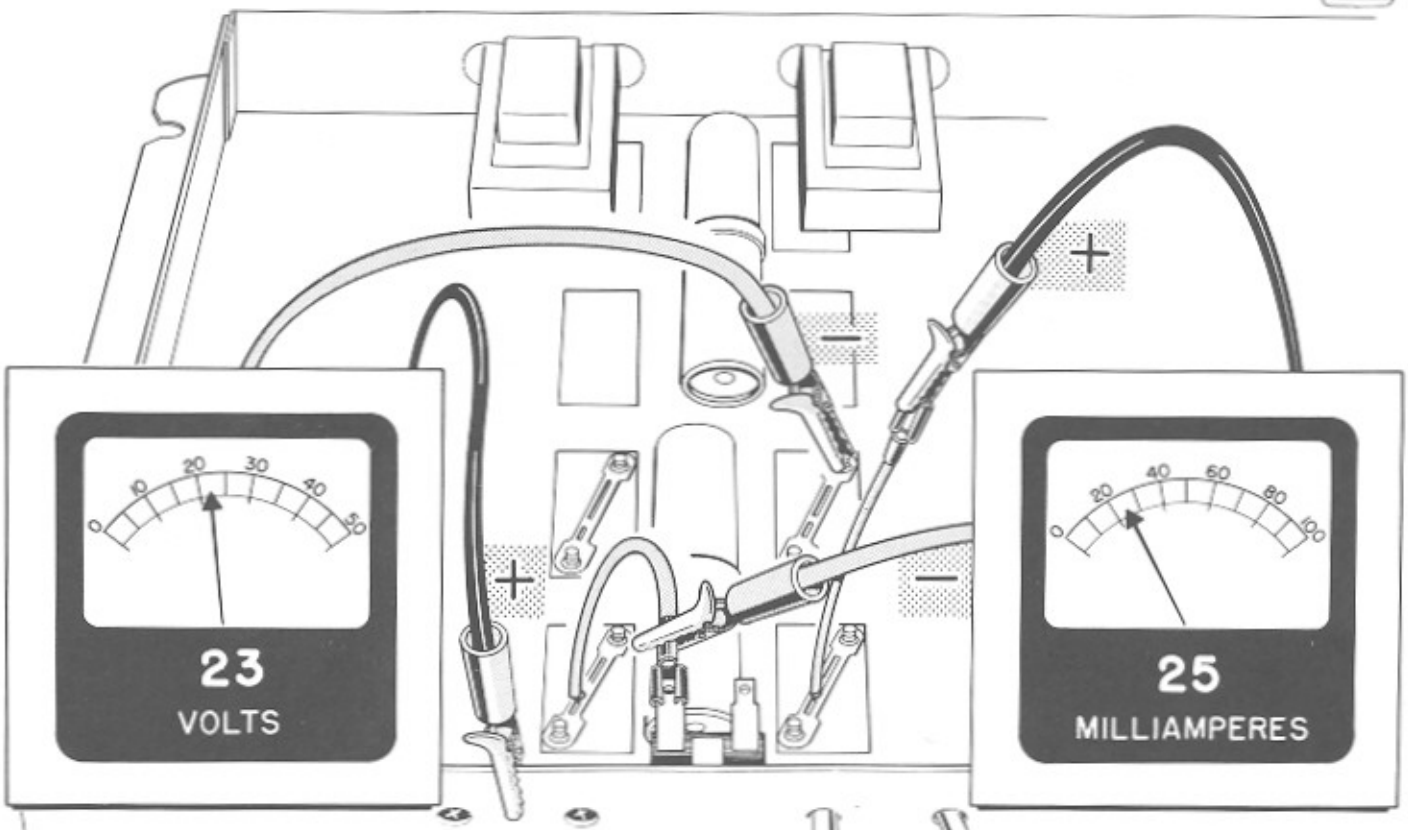
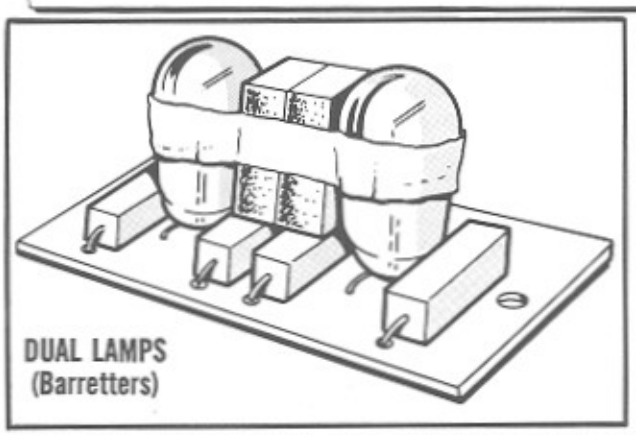
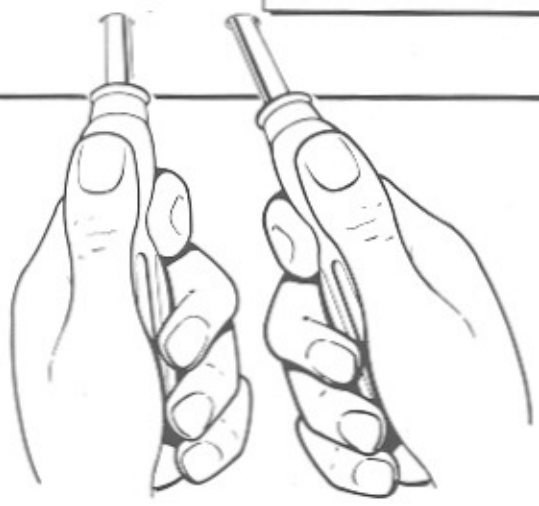


Figure 2





The two dual lamps in the output circuit of the Amplifier serve as transistor protectors. If one of the bulbs should become defective, that particular channel will be inoperative. In removing a defective bulb, observe the red insulation on one pair of leads. These leads on all replacement bulbs must be always connected in the same manner.

The Thermistors, Part No. 38698 which control the A.V.C. action are matched pairs and are not interchangeable with Tube Type Amplifiers. One of a pair may be replaced if it has the same color dot.

SERVICE AND REPLACEMENT OF COMPONENTS

If trouble should occur that cannot be corrected in the field the defective unit should be checked with a D.C. V.T.V.M., A.C. V.T.V.M., Oscilloscope and Audio Generator. All voltages shown on the schematic are with 117 A.C. volt line.

NOTE: ALL D.C. VOLTAGES ARE NEGATIVE (-) WITH RESPECT TO CHASSIS GROUND

The Amplifier power cord may be plugged into the 117 A.C. 50/60 cycle line.

AMPLIFIER-SPEAKER POWER DISTRIBUTION UNIT—VOLUME CONTROL

The amplifier in this machine is a dual purpose Stereophonic-Monaural amplifier. It may be used monaurally and stereophonically through the machine speakers and remote speakers.

1. There are several controls on the amplifier, speaker power distribution unit and volume control, some of which require explanation.

   A. The "Bass" and "Treble" controls are quite ordinary, and should be set to give the desired type of sound.

   B. The "Stereo-Monaural" switch directs the amplifier output in the following ways:

      STEREO position: This position connects machine and remote speakers for stereo application.

      MONAURAL position: This position combines the stereo channels into one and directs this output to the machine and/or remote speakers.

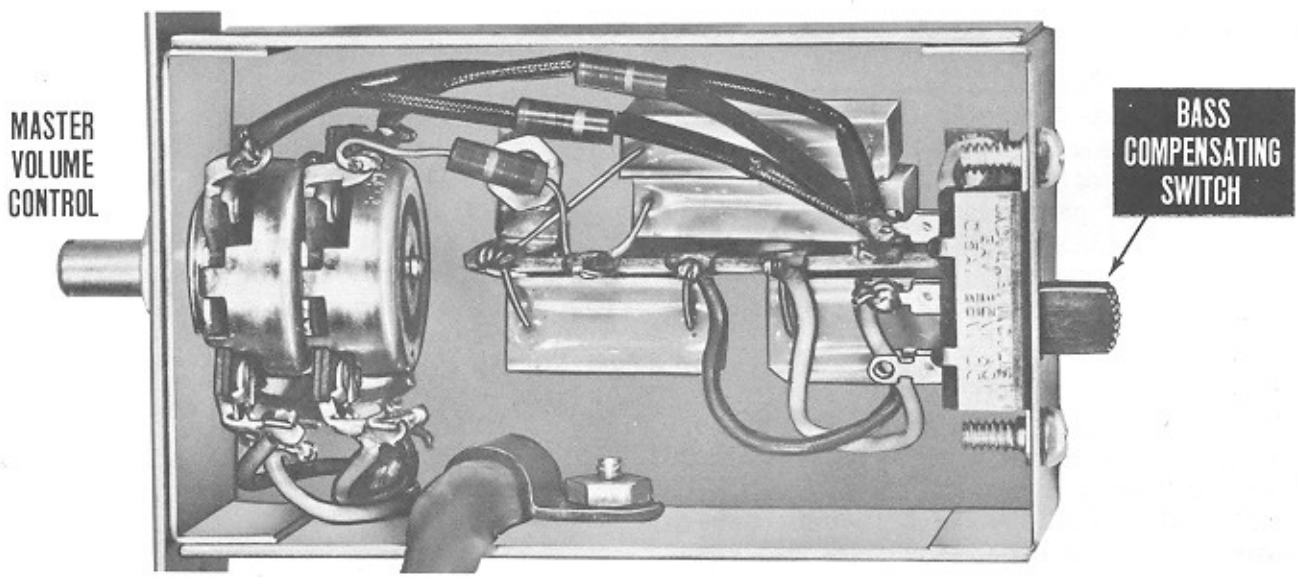
   C. The "Scratch Filter" switch is incorporated in the amplifier circuit, and when set to "On" position, the noise level of worn or sub-standard records are automatically reduced.

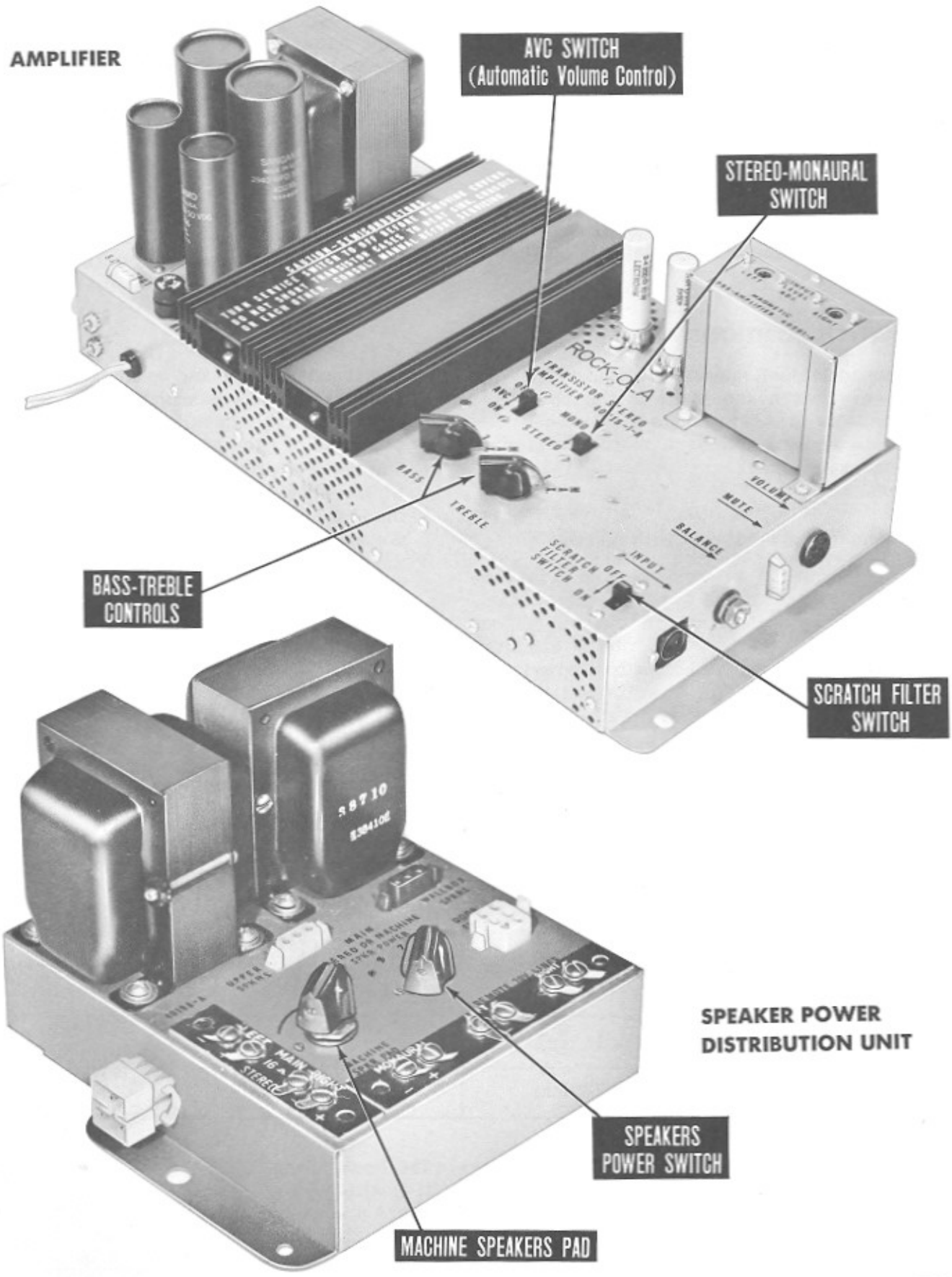
   D. AVC (Automatic Volume Control) switch should be set to "On" position for normal operation. The "Test" position is for servicing of amplifier only.

   E. Speakers Power Switch: This switch is located on the Speaker Power Distribution Unit which controls the distribution of power, and serves to match impedances between the machine speakers and remote speakers. If only the machine speakers are to be used, this switch should be in the "18 W" position. A description of this switch, and its uses with stereo and remote speakers, is contained in the chart found on the next page.

   F. Machine Speaker Pad: This control is also located on the Speaker Power Distribution Unit. It serves as a separate control for machine speakers only.

   G. Low Volume Bass —"ON-OFF" Switch: The master volume control is provided with a bass compensating switch, and when set to "On", increases the bass response at all levels below maximum setting of the volume control.




AMPLIFIER
AVC SWITCH
(Automatic Volume Control)
STEREO-MONAURAL
SWITCH
BASS-TREBLE
CONTROLS
SCRATCH FILTER
SWITCH
SPEAKER POWER
DISTRIBUTION UNIT
SPEAKERS
POWER SWITCH
MACHINE SPEAKERS PAD

SPEAKER INSTALLATION GUIDE

The audio amplifier in this phonograph is a dual purpose type and can be used as a "Stereo" or "Monaural" sound system. In either application, the method of impedance matching will remain the same. As it will be impossible to cite all conceivable speaker installations, the following will illustrate only the typical. The best results will be obtained and the amplifier protected if the few rules under discussion will be followed.

1. The same number of speakers of the same rating must be connected to each channel to maintain proper balance.
2. All low impedance speakers (4 ohm, 8 ohm, 16 ohm) must be connected to the 16 ohm terminal source. DO NOT CONNECT TO THE 70 VOLT LINE TERMINALS.
3. Speakers with matching transformers must always be connected to the 70 volt line terminal source.

POWER SWITCH POSITIONS

1. When no additional speakers are used, the Power Switch should be in the 18 Watt position; this represents a impedance of 16 ohms which is a match for the phonograph speakers for best performance.

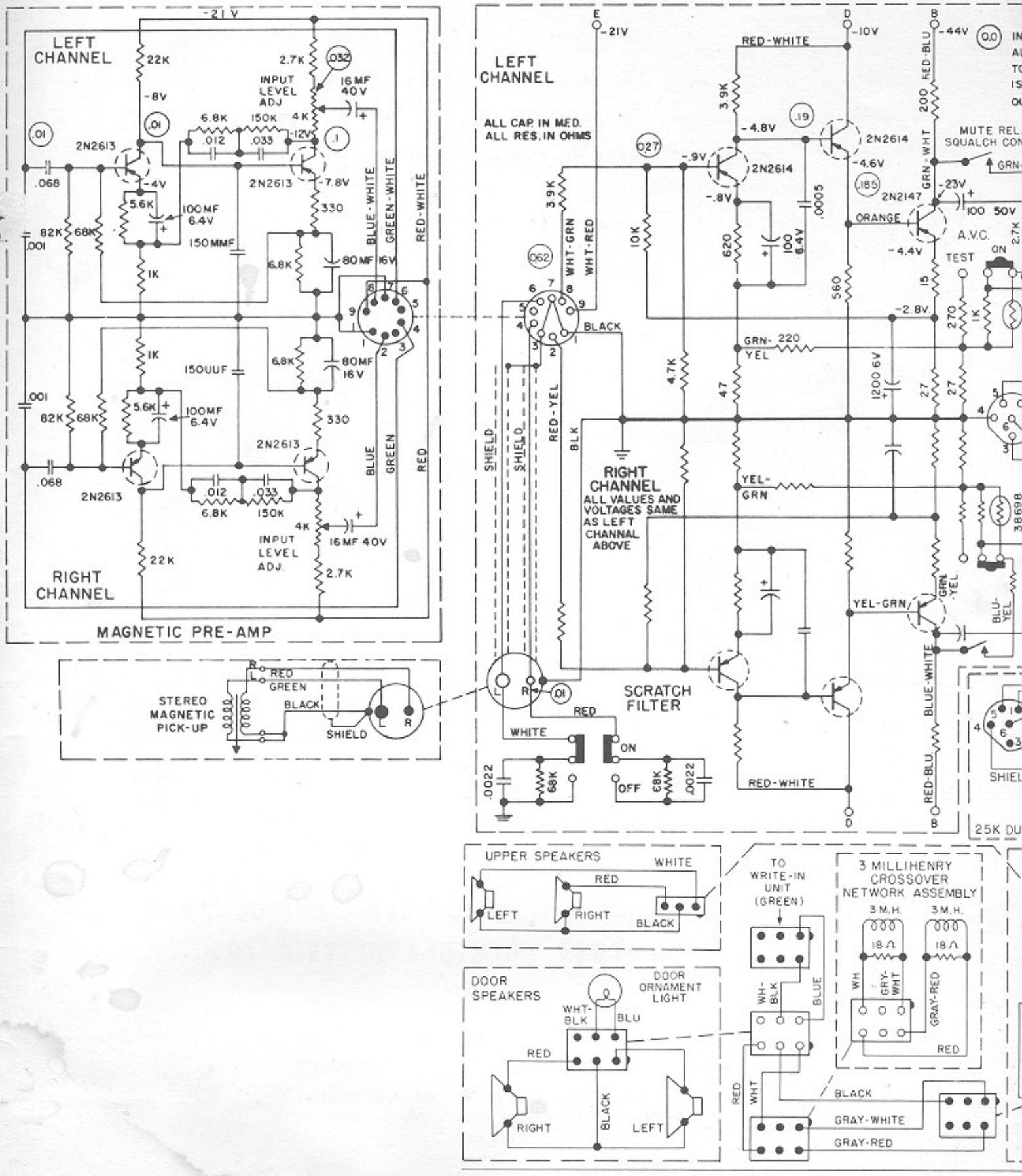
2. When connecting speakers with matching transformers and each speaker, or group of speakers with varying power output is to be considered, add the watt positions of each speaker in one channel. Set the Power Switch to a watt position which when added to the watt power of the external speakers, the total does not exceed 25 watts per channel.

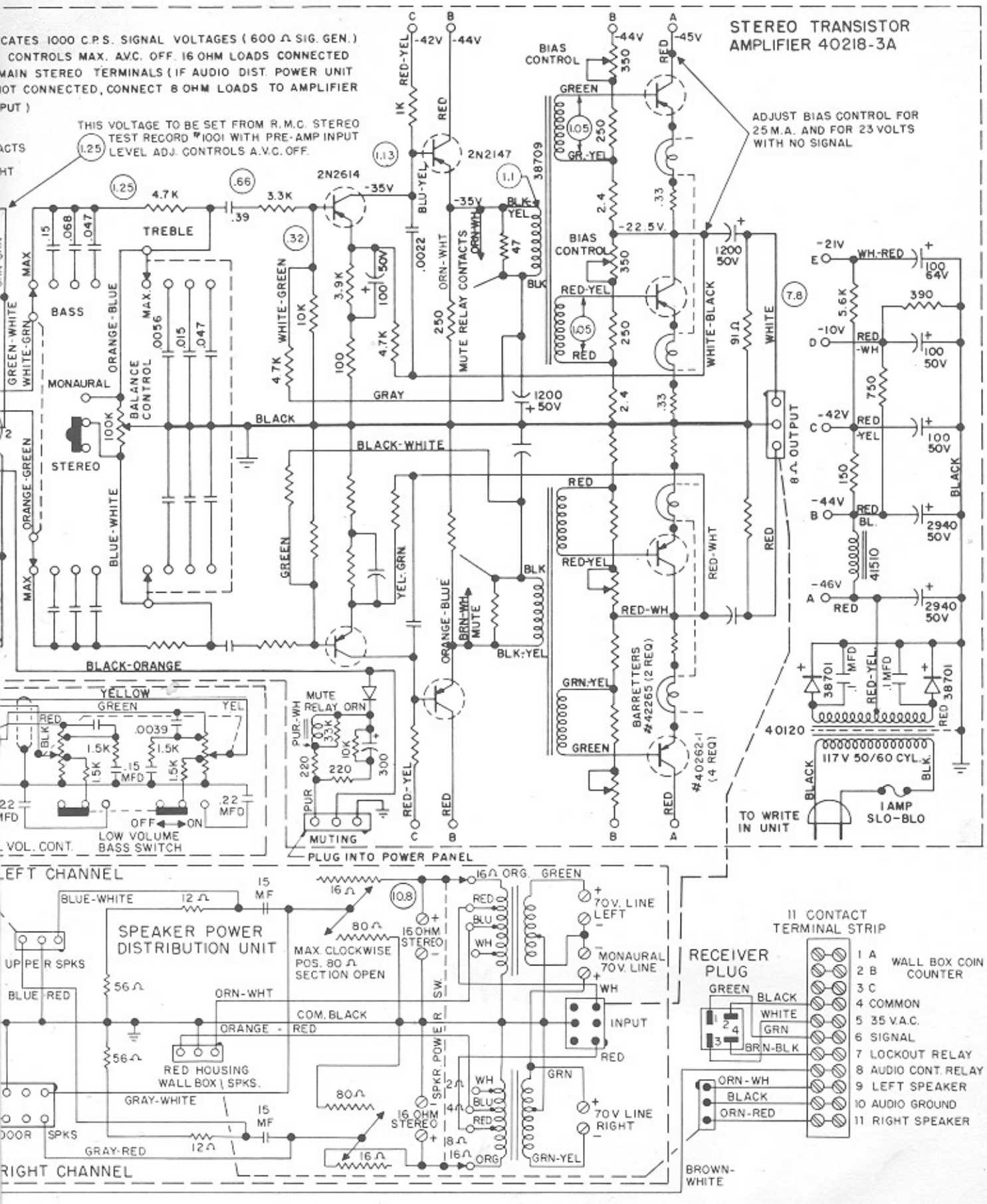
Example: 3 speakers are to be connected to each channel. Consider each channel as one unit. Two of the speakers are to be set to a power output of 4 watts and the last speaker to 2 watts. The total power output required is 10 watts. Adjust the Power Switch to the 12 watt position. The total power requirement for the entire system when added is 22 watts. This does not exceed the power capabilities of the amplifier.

When using low impedance speakers, use the following chart for proper impedance matching.

Impedance	Power Switch Position	16 ohm speakers	8 ohm speakers	16 ohm and 8 ohm
16 ohm	18 Watt position. Machine speakers only			
8 ohm	12 Watt	1 - 16 ohm	1 - 8 ohm	
4 ohm	8 Watt	3 - 16 ohm	2 - 8 ohm	1 - 16 ohm 1 - 8 ohm
2 ohm	4 Watt	7 - 16 ohm	3 - 8 ohm	1 - 16 ohm 3 - 8 ohm
				2 - 16 ohm 2 - 8 ohm
				3 - 16 ohm 2 - 8 ohm
				4 - 16 ohm 1 - 8 ohm

NOTE: Never leave the Power Switch in the 18 Watt Position when external speakers are used.


LEFT CHANNEL
-21V
22K
2.7K
.032
INPUT LEVEL ADJ
16 MF 40V
-8V
.01
6.8K
150K
4K
.012
.033
-12V
.1
2N2613
-4V
-7.8V
.068
5.6K
100MF 6.4V
330
82K
68K
.001
150MMF
1K
6.8K
80MF 16V
BLUE-WHITE
GREEN-WHITE
RED-WHITE
150UUF
BLUE
GREEN
RED
RIGHT CHANNEL
MAGNETIC PRE-AMP
STEREO MAGNETIC PICK-UP
RED
GREEN
BLACK
SHIELD
L
R
LEFT CHANNEL
ALL CAP. IN M.F.D.
ALL RES. IN OHMS
-21V
-10V
-44V
RED-WHITE
3.9K
-4.8V
.19
2N2614
-4.6V
.027
-.9V
-.8V
.0005
10K
620
100 6.4V
ORANGE
2N2147
-23V
100 50V
A.V.C.
-4.4V
TEST
ON
560
15
-2.8V
270
1K
2.7K
.062
WHT-GRN
WHT-RED
BLACK
GRN-YEL 220
4.7K
47
1200 6V
27
RED-YEL
BLK
SHIELD
RIGHT CHANNEL
ALL VALUES AND VOLTAGES SAME AS LEFT CHANNAL ABOVE
YEL-GRN
SCRATCH FILTER
WHITE
ON
OFF
.0022
68K
RED-WHITE
RED-BLU
BLUE-WHITE
GRN-WHT
200
MUTE RELAY
SQUALCH CONTROL
GRN
YEL-GRN
GRN-YEL
BLU-YEL
38698
SHIELD
25K DUAL
UPPER SPEAKERS
WHITE
RED
LEFT
RIGHT
BLACK
TO WRITE-IN UNIT (GREEN)
3 MILLIHENRY CROSSOVER NETWORK ASSEMBLY
3 M.H.
3 M.H.
18Ω
18Ω
WH
GRY-WHT
GRAY-RED
RED
DOOR SPEAKERS
DOOR ORNAMENT LIGHT
WHT-BLK
BLU
RED
BLACK
RIGHT
LEFT
WH-BLK
BLUE
RED
WHT
BLACK
GRAY-WHITE
GRAY-RED


STEREO TRANSISTOR AMPLIFIER 40218-3A
CATES 1000 C.P.S. SIGNAL VOLTAGES (600 Ω SIG. GEN.)
CONTROLS MAX. A.V.C. OFF. 16 OHM LOADS CONNECTED
MAIN STEREO TERMINALS (IF AUDIO DIST. POWER UNIT
NOT CONNECTED, CONNECT 8 OHM LOADS TO AMPLIFIER
PUT)
THIS VOLTAGE TO BE SET FROM R.M.C. STEREO TEST RECORD #1001 WITH PRE-AMP INPUT LEVEL ADJ. CONTROLS A.V.C. OFF.
ADJUST BIAS CONTROL FOR 25 M.A. AND FOR 23 VOLTS WITH NO SIGNAL
2N2614
2N2147
TREBLE
BASS
BALANCE CONTROL
MONAURAL
STEREO
MUTE RELAY CONTACTS
MUTE RELAY ORN
MUTING
PLUG INTO POWER PANEL
LOW VOLUME BASS SWITCH
VOL. CONT.
BIAS CONTROL
8Ω OUTPUT
BARRETTERS #42265 (2 REQ)
#40262-1 (4 REQ)
40120
117 V 50/60 CYL.
1 AMP SLO-BLO
TO WRITE IN UNIT
LEFT CHANNEL
RIGHT CHANNEL
SPEAKER POWER DISTRIBUTION UNIT
MAX. CLOCKWISE POS. 80 Ω SECTION OPEN
16 OHM STEREO
70 V. LINE LEFT
MONAURAL 70 V. LINE
70 V LINE RIGHT
INPUT
RED HOUSING WALL BOX SPKS.
UPPER SPKS
DOOR SPKS
SPKR. POWER SW.
11 CONTACT TERMINAL STRIP
RECEIVER PLUG
WALL BOX COIN COUNTER
1 A
2 B
3 C
4 COMMON
5 35 V.A.C.
6 SIGNAL
7 LOCKOUT RELAY
8 AUDIO CONT. RELAY
9 LEFT SPEAKER
10 AUDIO GROUND
11 RIGHT SPEAKER

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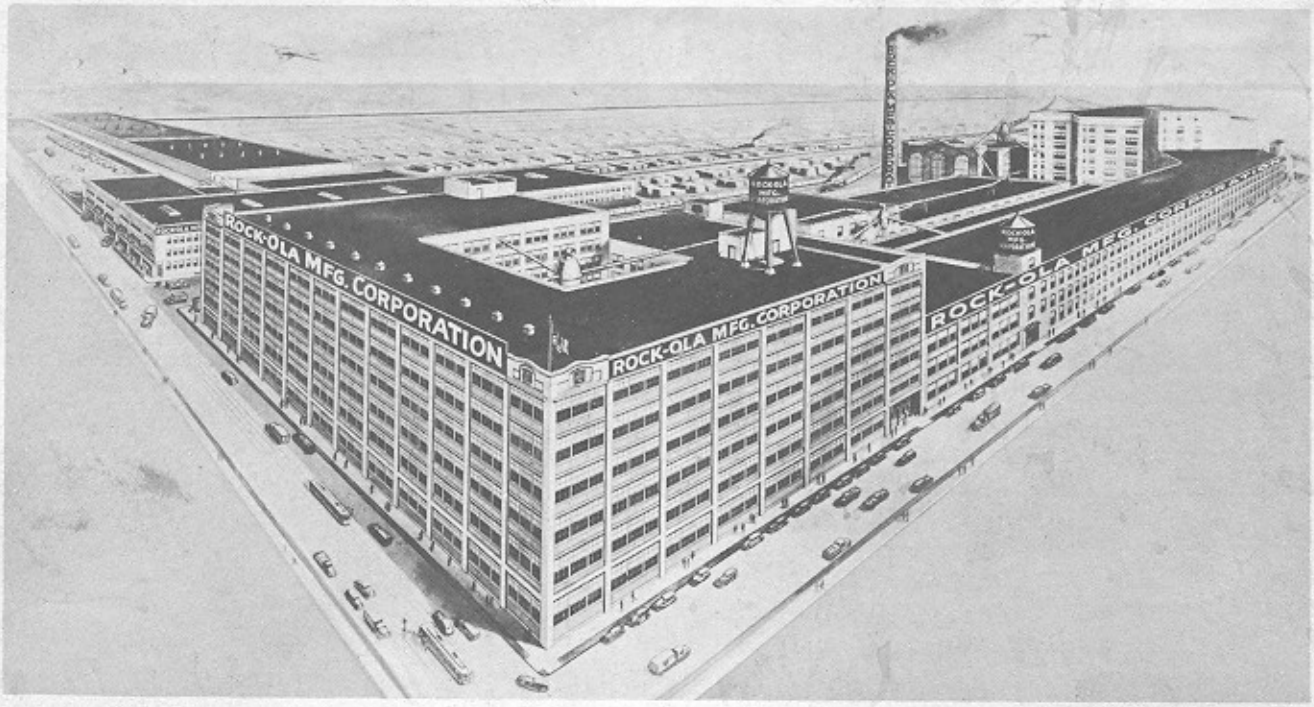
The Rock-Ola factory in Chicago is the largest factory of its kind in the world devoted to the production of Coin Operated Equipment. It consists of a ground area of three and one-half city blocks with 23 buildings and a floor area of more than one-half million square feet.



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