Operating Instructions for the PRESTO 90-B RECORDING AMPLIFIER

PRESTO RECORDING CORPORATION
NEW YORK, N. Y. PARAMUS, N. J.

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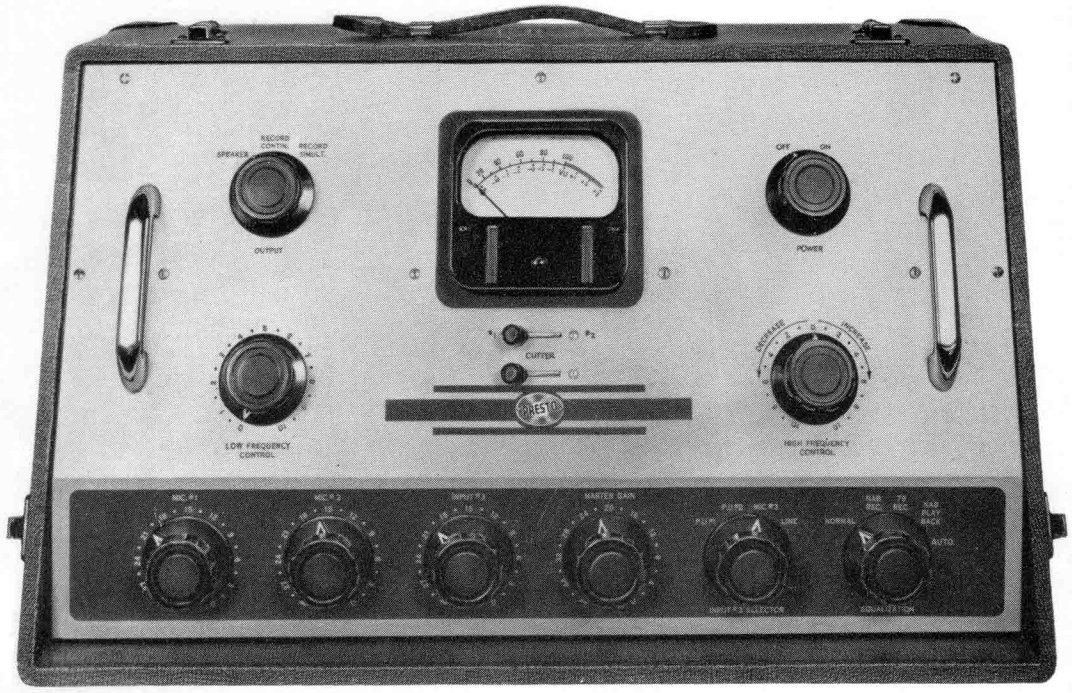
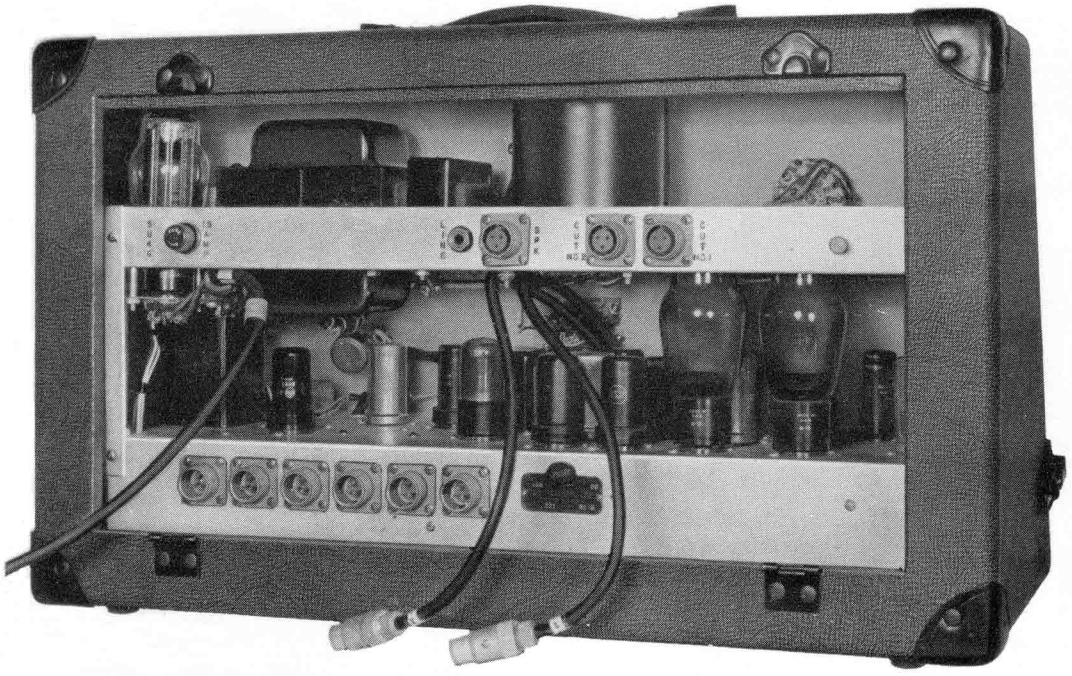


Front view of 90-B Recording Amplifier.



Rear view of 90-B Recording Amplifier.

DESCRIPTION

The Presto 90-B recording amplifier is a portable recording console containing all the facilities necessary for operation on remote assignments, but with an overall performance found only in high fidelity studio equipment.

The 90-B consists of three preamplifiers with individual gain controls, a mixer circuit, a master gain control and recording amplifier. Provision is made for connecting the Presto 161-A automatic equalizer (radius compensator.)

A five position selector switch provides the following characteristics: 1—flat response, 30 to 15,000 cps ± 1 db; 2—NAB 33⅓ rpm recording; 3—present day 78 rpm recording; 4—NAB playback and 5—automatic equalization. (Refer to figure 1 for the curves showing the response characteristics of the fixed equalizers.) The flat response can be modified by variable bass and treble controls, giving emphasis up to a maximum of 20 db at 100 and 7,500 cycles per second or 20 db de-emphasis at 7,200 cycles per second.

Noise is 60 db below recording level and distortion at maximum output is less than 1.5%. (Refer to figure 2.)

The use of input and output selector switches makes the 90-B amplifier unusually flexible. It permits combining the signals of three microphones or of two microphones and either one of two pickups. By using the "Line" position, recordings can be made from an incoming program line. The output selector has three positions: playback (public address), continuous recording and simultaneous recording. While recording, the line jack provides a monitoring outlet or permits feeding a program line at the correct level.

The recording level is monitored by means of a Weston Type 30 VU indicator with illuminated scale and its closely controlled electrical and dynamic characteristics make it an ideal volume indicator for recording.

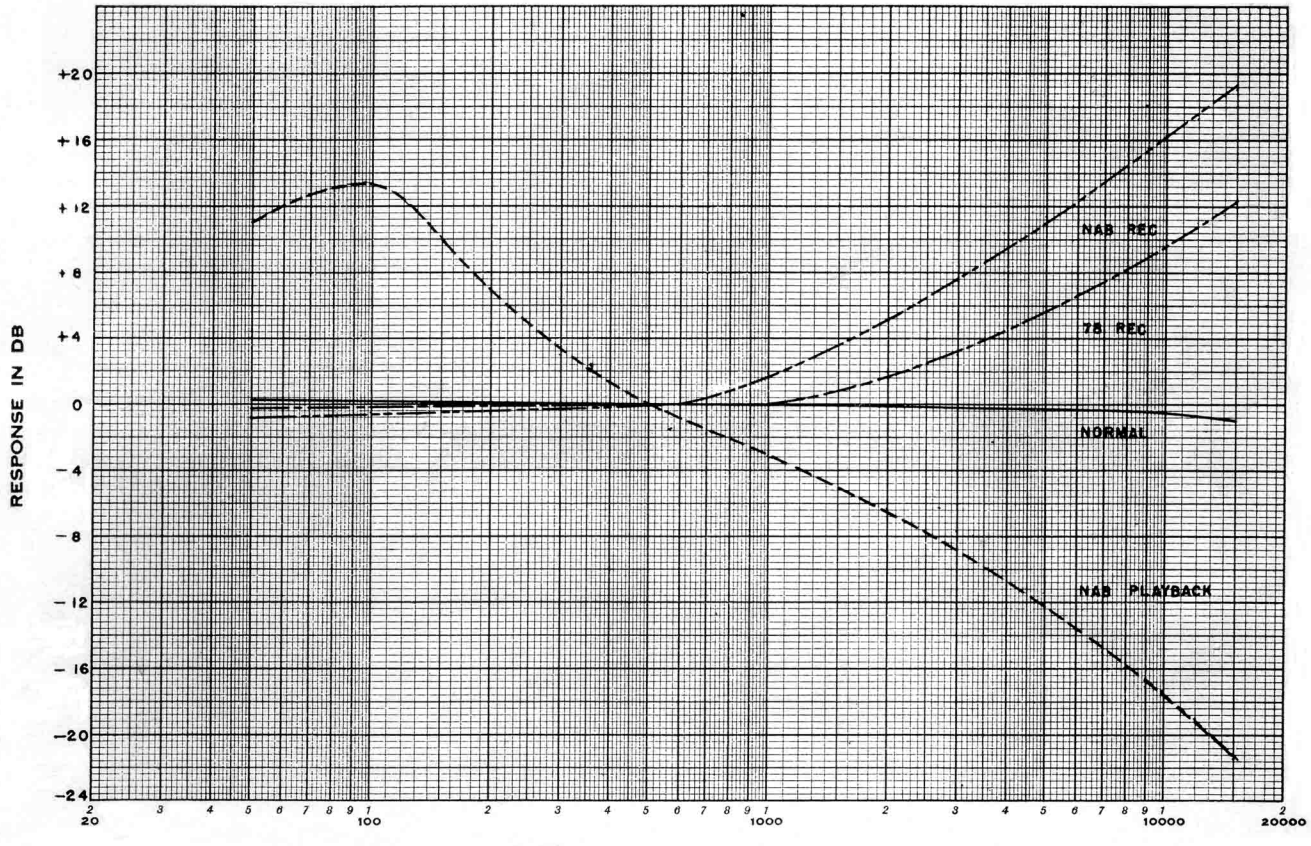


Figure 1. Response Characteristics of the Fixed Equalizers.

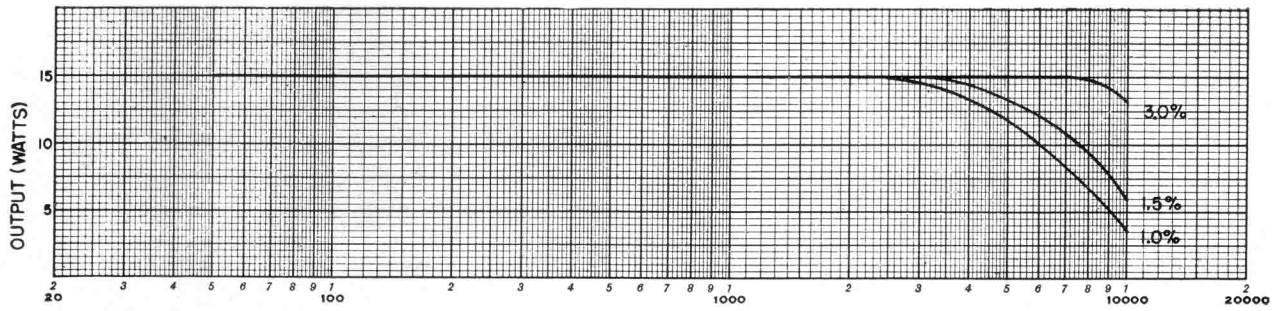


Figure 2. Power Characteristics at 1%, 1.5% and 3% Distortion.

SPECIFICATIONS

Input (source) Impedance:

Microphone No. 1...50, 200 and 500 ohms
Microphone No. 2...50, 200 and 500 ohms
Microphone No. 3...50, 200 and 500 ohms
Pickup No. 1.....50, 200 and 500 ohms
Pickup No. 2.....50, 200 and 500 ohms
Line ..... 500 ohms

Output (load) Impedance:

Speaker ..... 500 ohms
Outgoing Line .....balanced 600 ohms
Cutter No. 1..... 500 ohms
Cutter No. 2..... 500 ohms

Output (source) Impedance:

Outgoing Line ..... 600 ohms

Gain:

Microphone/pickup to cutter/speaker (maximum power gain).....112 db ± 3 db
Line Input to cutter/speaker (maximum power gain)..... 80 db ± 3 db

Maximum Input Level:

Microphone or pickup.....approx.—44 dbm*
Line input .....approx.—10 dbm**
(0 dbm = 0.001 watt)

Signal-to-Noise Ratio (at recording level):

All microphone channels and line channel at 80 db gain.....at least 55 db

Volume Indicator Calibration:

O VU corresponds to:
+ 29 dbm at 1,000 cps into cutting head.
+ 7 dbm at 1,000 cps into line output.

Output Level and Distortion:

Speaker or cutter (maximum)..... 10 watts
Distortion at maximum output (50-7,500 cps) .....less than 1.5%

Frequency Response:

All microphone channels and line (input) channel.....30-15,000 cps ± 1 db

Power Input:

117 volts, 50/60 cps.....135 watts

Tube Complement:

6-type 6SJ7, 1-type 6SQ7, 1-type 6SN7GT, 2-type 6L6G, 1-type 5U4G.

Mounting:

Reinforced carrying case covered in dark grey leatherette, equipped with 4 nickel plated catches and a leather handle.

** at overload of preamplifier section.* *** In order to maintain smooth control it is not recommended to go above approximately—27 dbm.*

OPERATION

1. SWITCHES AND THEIR USE

INPUT No. 3 SELECTOR.—This four-position selector switch permits the following operations:

"P.U. No. 1": Mixing of MIC. No. 1, MIC. No. 2 and Pickup No. 2.
"P.U. No. 2": Mixing of MIC. No. 1, MIC. No. 2 and Pickup No. 2.
"MIC. No. 3": Mixing of MIC. No. 1, MIC. No. 2 and MIC. No. 3
"LINE": Line input only.

EQUALIZATION.—This five-position selector switch permits choice of the following characteristics. (Refer to figures 1 and 3 for the response curves.)

"NORMAL": Uniform frequency response (with both low and high frequency controls at zero). For continuously variable low and high frequency pre-emphasis or high frequency de-emphasis in the "NORMAL" position, see LOW and HIGH FREQUENCY CONTROL, paragraph 2.

"NAB REC.": Fixed equalization corresponding to NAB recording characteristic for lateral transcriptions. Low frequency response below cross-over is determined by cutting head characteristic in this region. Tolerance ± 2 db.

"78 REC.": Fixed high frequency pre-emphasis of 10 db at 10,000 cycles. Tolerance ± 2 db.

"NAB PLAYBACK": Fixed characteristic complimentary to NAB recording characteristic for lateral transcriptions. Tolerance (80-10,000 cycles) ± 2 db.

"RADIUS": Automatic equalizaiton when used in conjunction with the Presto 161-A slider control.

OUTPUT.—This three-position selector switch permits the following operations:

"SPEAKER": Public address and playback.

"RECORD CONTIN.": Continuous recording with one cutting head and simultaneous monitoring.

"RECORD SIMULT.": Simultaneous recording with two cutting heads and simultaneous monitoring.

CUTTER.—The upper lever switch (S5) permits selection of cutting heads. Center position neutral. The lower lever switch (S6) selects the Presto 161-A slider mounted on the machine with the corresponding cutter. In operation both lever switches should be flipped simultaneously.

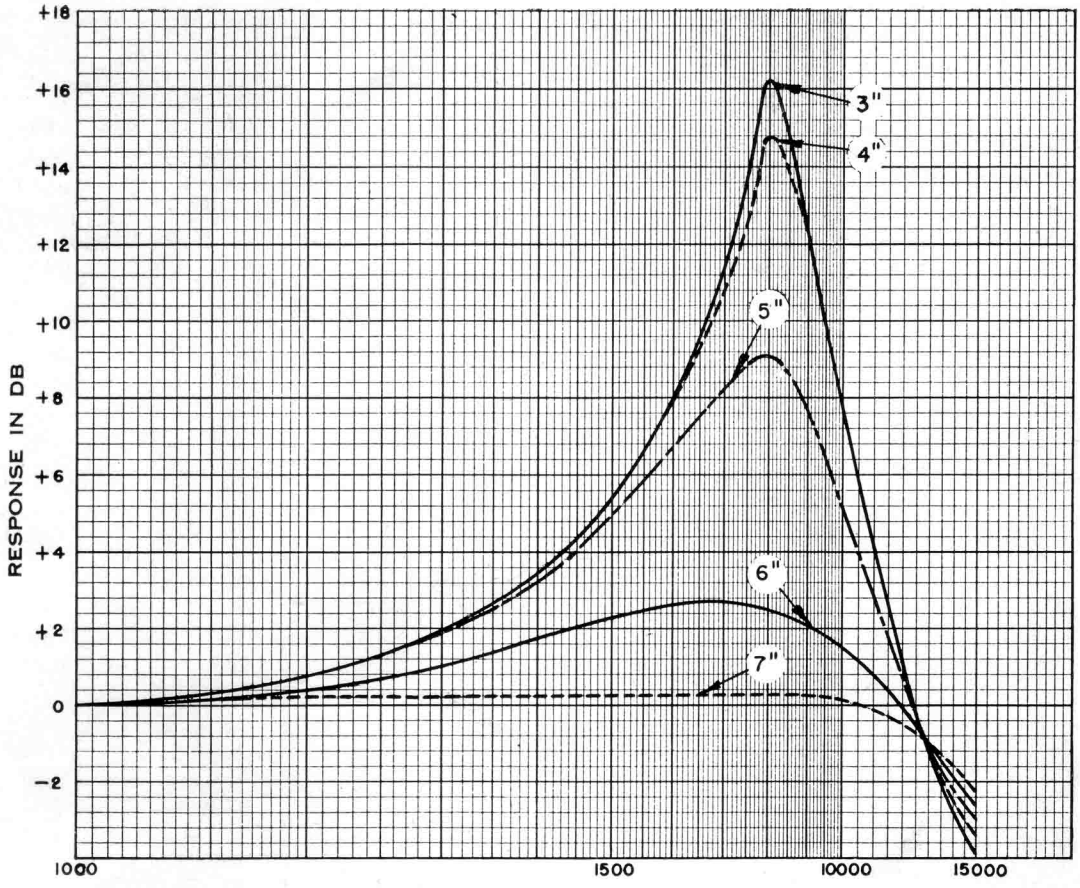


Figure 3. Automatic Equalizer Response Characteristics at Various Disk Diameters.

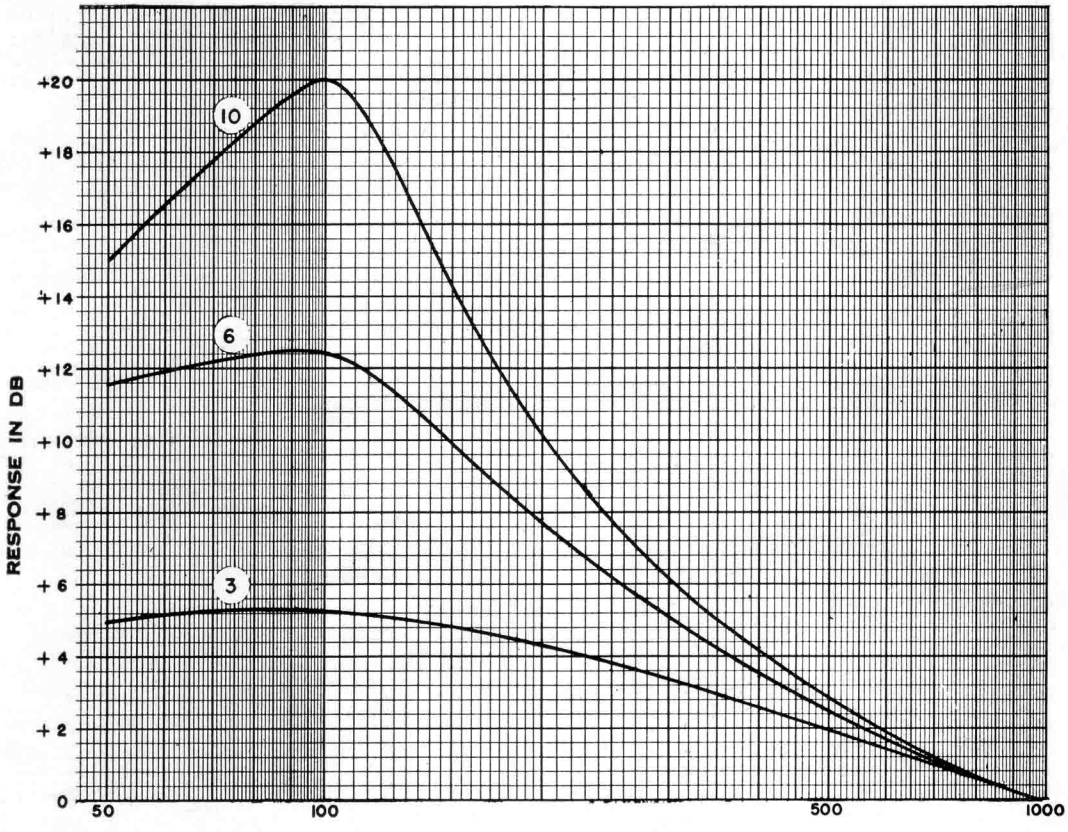


Figure 4. Response Characteristics for Low Frequency Control.

2. CONTROLS AND THEIR USE

MIC. No. 1.—Linear gain control for microphone channel No. 1, 1.5 db per step, last step infinity.

MIC. No. 2.—Same as above for microphone channel No. 2.

INPUT No. 3.—Same as above for pickup No. 1, pickup No. 2 or microphone channel No. 3.

MASTER GAIN.—Tapered master gain control or line gain control is 2.0 db per step, last step infinity.

LOW FREQUENCY CONTROL.—Continuously variable low frequency pre-emphasis, maximum equalization at approximately 100 cycles is at least 20 db. (Refer to figure 4.)

HIGH FREQUENCY CONTROL.—INCREASE section: Continuously variable high frequency pre-emphasis, maximum equalization at approximately 7,500 cycles is at least 20 db. (Refer to figure 5.) DECREASE section: Continuously variable high frequency de-emphasis at approximately 7,200 cycles to a maximum of at least 20 db. (Refer to figure 6.)

3. RECEPTACLES AND PLUGS

Input Receptacles: The following input channels are provided at its corresponding receptacle: MIC. No. 1, MIC. No. 2, MIC. No. 3, P.U. No. 1, P.U. No. 2 and LINE.

Output Receptacles, Jacks and Plugs: The following output channels are provided: CUT. No. 1, CUT. No. 2, LINE, SPK., and two equalizer plugs No. 1 & No. 2 for continuous equalization.

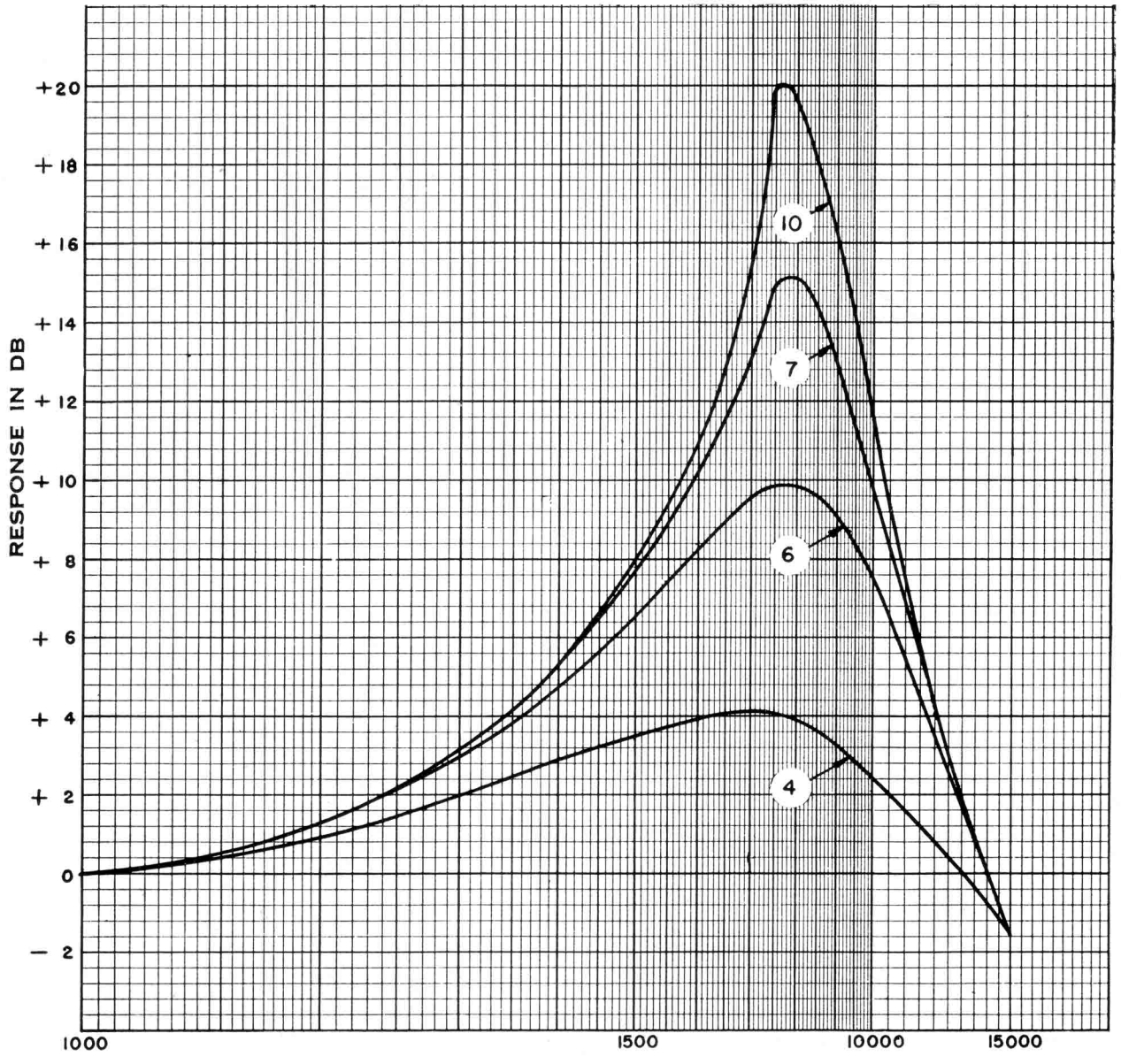


Figure 5. Response Characteristics for High Frequency Control (Increase Positions).

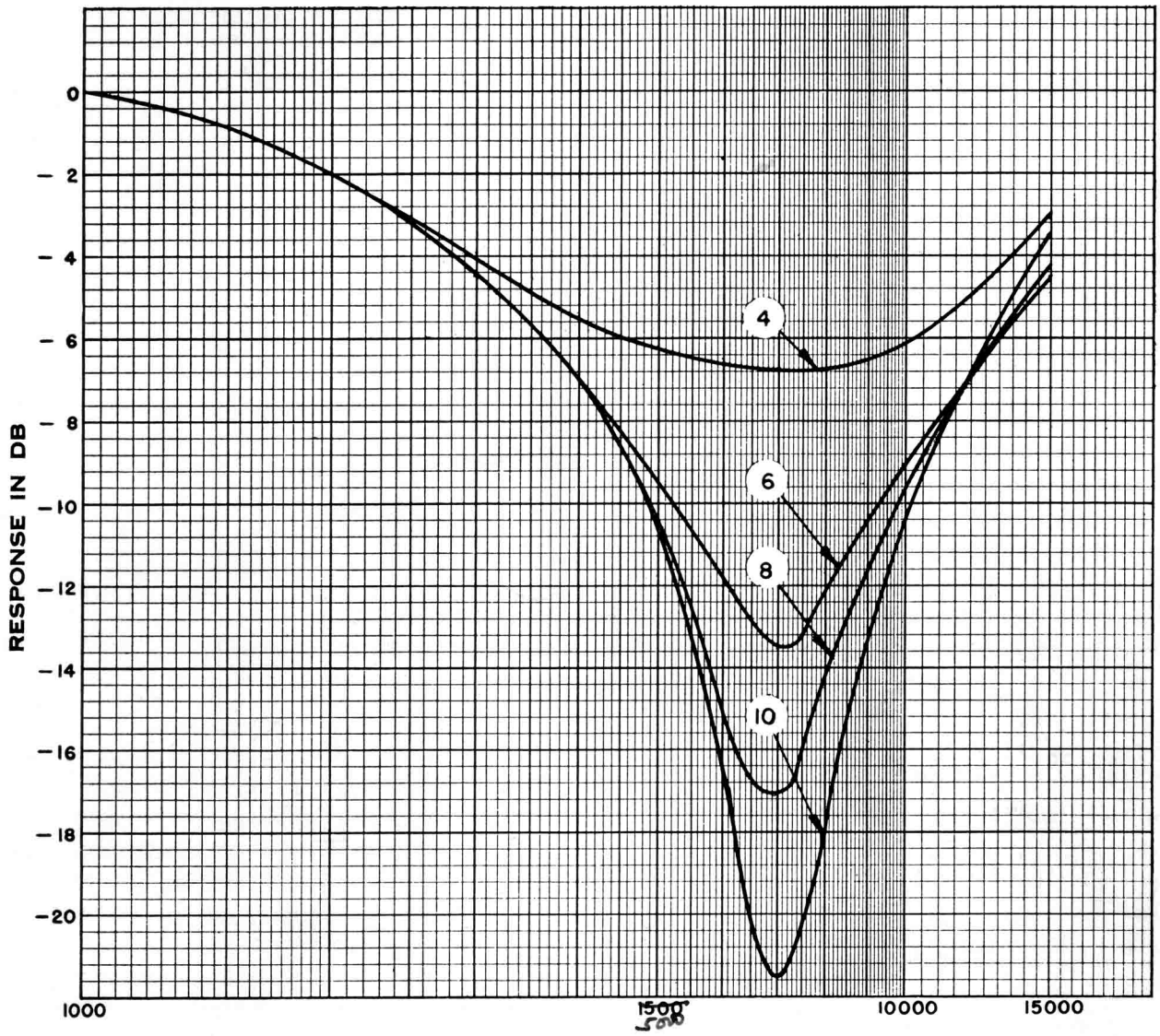


Figure 6. Response Characteristics for High Frequency Control (Decrease Positions).

FUNCTION OF THE AMPLIFIER

Refer to the Block Diagram figure 7 and the Schematic Diagram figure 10 for the following discussion on the amplifier.

In high gain operation (INPUT No. 3 SELECTOR in positions 1, 2 and 3) the signal originating in microphones or pickups are applied through the input transformers (T1, T2 and T3) to the preamplifier sections (V1, V2 and V3). The individually controlled signals are then brought to the mixer stage (V4) through the INPUT No. 3 SELECTOR and the MASTER GAIN control. The output of the mixer is fed into a buffer amplifier (V5) and then into the equalizer amplifier sections and 1st audio (V6A). By means of a phase inverter (V6B) the signal is applied to a push-pull amplifier consisting of two 6SJ7 tubes (V7 and V8) to drive the 6L6 push-pull output stage (V9 and V10). A considerable reduction in distortion and noise as well as low internal output impedance is obtained through the use of a large amount of stabilized negative feedback from the 6L6 plates to the 6SJ7 cathodes.

In reduced gain operation (INPUT No. 3 SELECTOR in LINE position) the 90-B is converted into a single channel recording amplifier of 80 db gain with the MASTER GAIN control used for level adjustment.

In both high and low gain operation the frequency response of the amplifier can be modified for recording or playback with the aid of the EQUALIZATION selector; the NORMAL (No. 1) position permitting manual control of the low and high frequency response characteriestics. Variable response is obtained by means of two series-resonant circuits (C20-L3 and C19-L2) inserted in the feedback loop which decrease the feedback and thereby produce maximum equalization at 100 and 7,500 cycles, respectively. High frequency de-emphasis is obtained by turning the HIGH FREQUENCY CONTROL counter-clockwise. This varies the shunting effect of the series-resonant circuit (C18-L1) across the plate of the mixer tube V4. Maximum de-emphasis is obtained at 7,200 cycles.

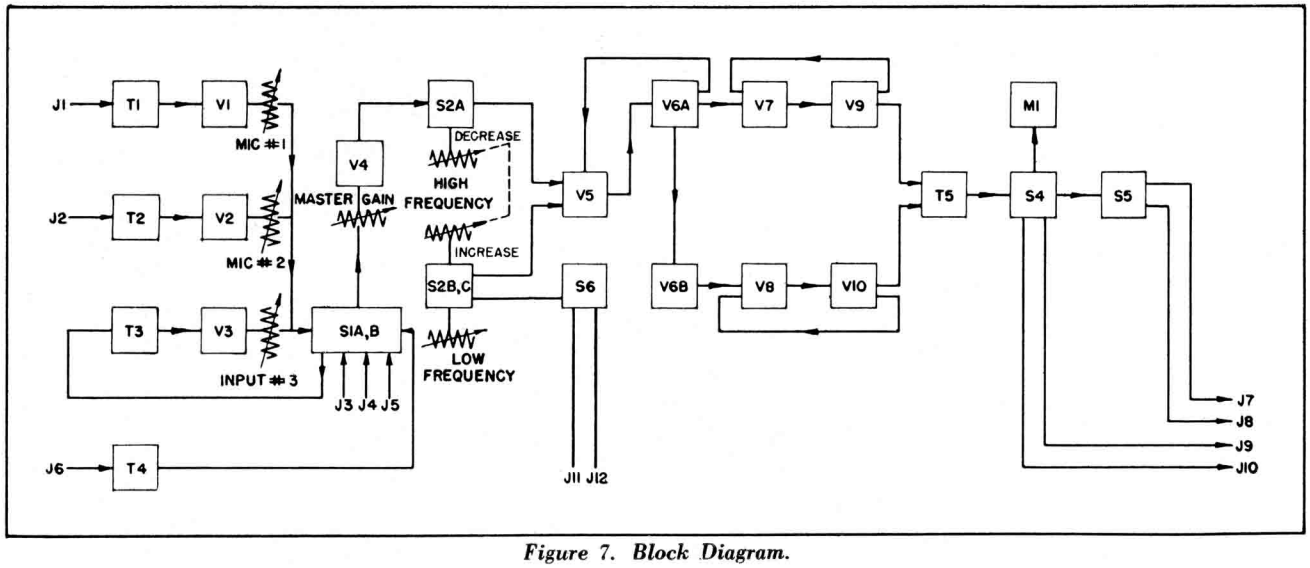


Figure 7. Block Diagram.

With the EQUALIZATION switch in the NAB REC. and 78 REC. positions a capacitor network is inserted between the feedback loop and ground. This decreases the feedback at high frequencies and results in a rising characteristic. In the NAB PLAYBACK position a corrective R-C network is inserted between the output of the mixer tube, V4, and the input of the buffer amplifier, V5, to obtain a high frequency roll-off. The low frequency compensation is accomplished by means of a low frequency series-resonant circuit (C20-L3) in the feedback loop.

In the AUTO. position the operation of the automatic equalizer is similar to that of the high frequency emphasis circuit when the equalization switch is in the NORMAL position except that the manual control (R53) is replaced by the slider in such a way that maximum equalization is obtained at the inside of a recording disk.

In recording, the "OUTPUT" selector is switched to the second or third position, depending on whether a single cutting head or two cutters are used at the same time. In the latter case the heads are paralleled across a 250 ohm tap of the output transformer by setting the lever switch marked CUTTER into either No. 1 or No. 2 position. The volume indicator is adjusted to indicate correct recording level for a Presto 500 ohm 1-D cutting head at zero VU. While recording, the LINE (output) jack permits monitoring or the feeding of a 600 ohm program line at the correct level.

In using the Presto 90-B amplifier the precautions commonly observed in operation of high gain amplifiers should be applied. They include proper grounding of the amplifier, use of shielded input and output connections and avoidance of unnecessary coupling between input and output. In connection with the last statement, it is worthwhile noting that, when equalizing, the power gain of the amplifier rises to almost 140 db at certain frequencies.

MAINTENANCE

1. Replacing Pilot Lamp

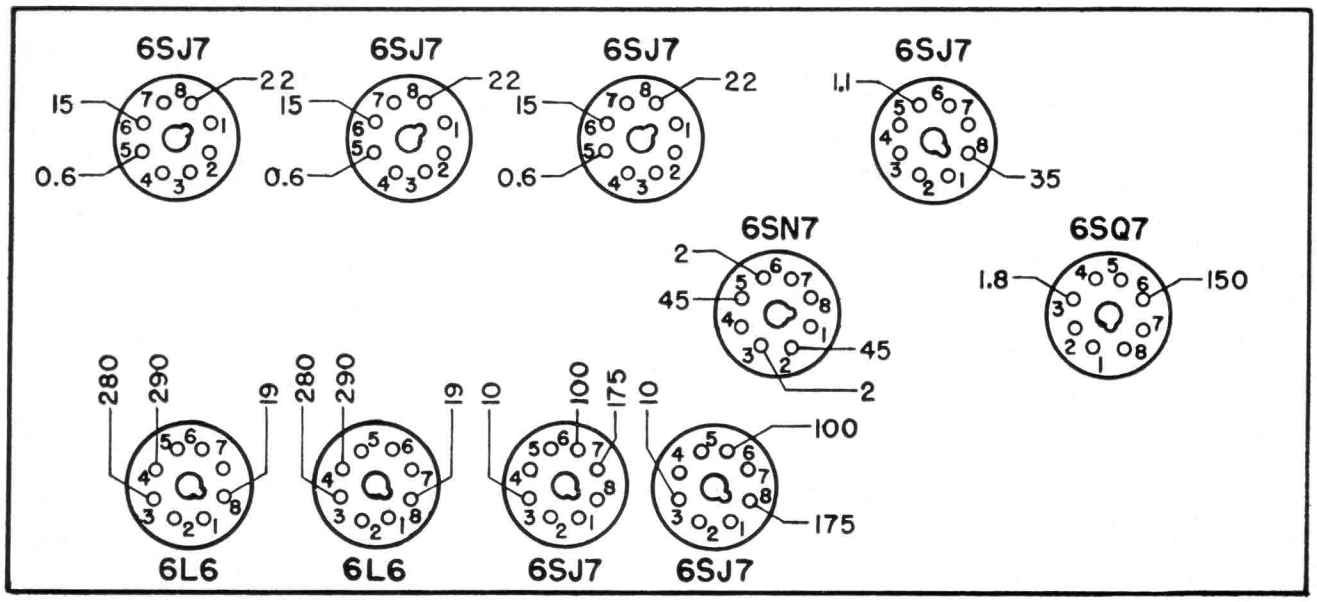
To replace a pilot lamp, the front part of the meter case must be removed. It is accomplished simply by removing the two front screws in opposite ends of the meter case. (Do not touch the pointer centering screw.) Lift case from meter and replace defective pilot lamp.

2. Removing Chassis from Carrying Case

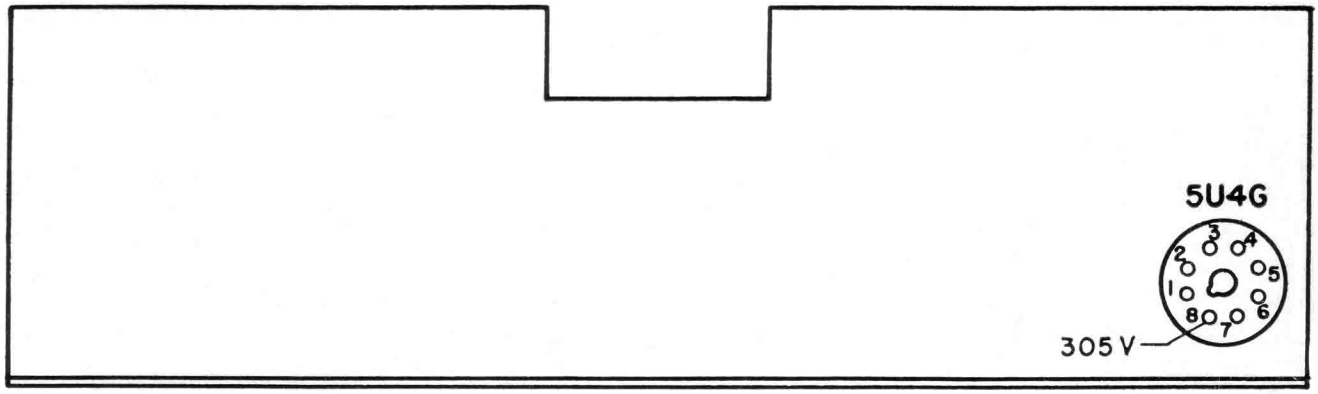
To remove the chassis from the carrying case it is necessary to remove the four machine bolts on bottom of case and the five wood screws on front panel.

3. Voltage Measurements

Figure 8 indicates typical tube socket voltages of the amplifier. Figure 10, the schematic diagram, shows other voltages at important circuit points. All voltages should be measured with a voltmeter having a resistance of 1000 ohms per volt.



BOTTOM VIEW OF CHASSIS



BOTTOM VIEW OF SHELF

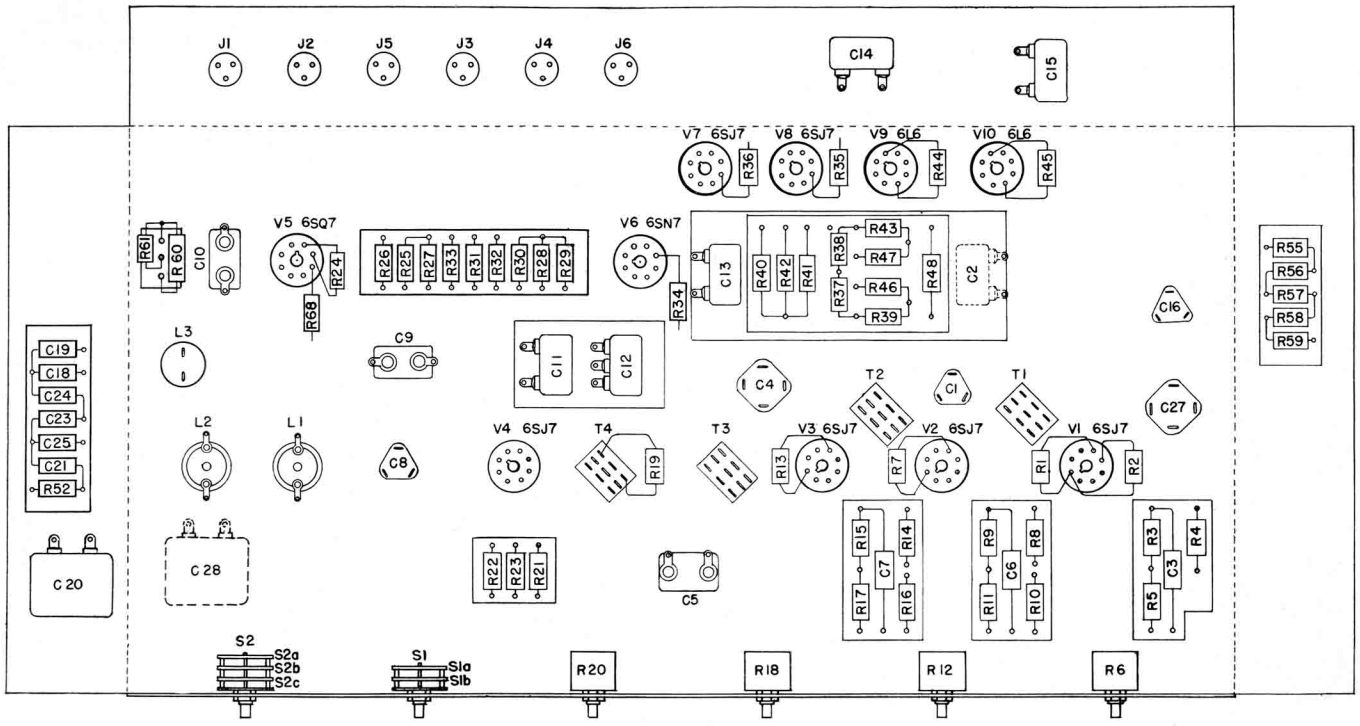
Figure 8. Voltage Measurements.

PARTS LIST

SYMBOL	DESCRIPTION	STOCK No.
C1, C8, C16	Capacitor: 40/40/40mf, 25 v	1619
C2	" 0.25 mf, 400 v	1118
C3, C6, C7	" 0.05 mf, 600 v	1517
C4, C26, C27	" 15/15/10/10 mf, 450 v	1579
C5	" 0.25/0.25 mf, 400 v	1818
C9, C10	" 0.1 mf, 400 v	1737
C11, C13	" 0.1 mf, 600 v	1123
C12	" 0.1/0.1 mf, 600 v	1697
C14, C15	" 0.5 mf, 400 v	1115
C17	" 0.0016 mf, 500 v	2306
C18	" 0.006 mf, 400 v	1616
C19	" 0.004 mf	1516
C20, C28	" 1.0 mf	1280
C21	" 0.001 mf, 400 v	1413
C23	" 0.01 mf, 600 v	1756

PARTS LIST (cont.)

SYMBOL	DESCRIPTION	STOCK No.
C24	Capacitor: 0.0039 mf, 400 v	1516
C25	" 0.0051 mf, 400 v	1655
F1	Fuse: 1.5 amperes	2314
I1, I2	Pilot Lamp: 6-8 volt	1505
J1, J2, J3, J4, J5, J6	Receptacle: Male	2139
J7, J8, J10	Receptacle: Female	1709
J9	Phone Jack	1858
J11, J12	Equalizer Connectors	1272
L1, L2	Inductance 85 mh	1597
L3	Inductance 5 h	180
L4	Filter Choke 6 h	1567
M1	Meter: Includes Presto 1504 Rectifier	1792
P1, P2, P3, P4, P5, P6	Plug: Female	2138
P7, P8, P10	Plug: Male	1710
R1, R5, R7, R11, R13, R17, R23, R24, R25, R26, R27, R49	Resistor: 100,000 ohms ½ watt	1598
R2, R8, R14, R21, R52	Resistor: 1,000 ohms ½ watt	1584
R3, R9, R15, R31, R32, R33, R35, R40, R42	Resistor: 240,000 ohms ½ watt	1954
R4, R10, R16, R36, R41, R58	Resistor: 1 megohm	1536
R6, R12, R18	Gain Control	2264
R19, R59	Resistor: 33,000 ohms ½ watt	1720
R20	Master Gain Control	2265
R22	Resistor: 51,000 ohms ½ watt	1644
R28	Resistor: 510,000 ohms ½ watt	1569
R29, R30	Resistor: 2,400 ohms ½ watt	1962
R34	Resistor: 18,000 ohms ½ watt	2313
R37, R8, R63, R64	Resistor: 1,500 ohms ½ watt	1951
R39, R43, R46, R47	Resistor: 24,000 ohms 2 watt ± 5%	1975
R44, R45	Resistor: 450,000 ohms ½ watt	1718
R48	Resistor: 150 ohms 10 watt	2307
R50, R53	High Frequency Control	2267
R51	Resistor: 75,000 ohms ½ watt	1964
R54	Low Frequency Control	2266
R55, R56	Resistor: 10,000 ohms ½ watt	1528
R60	Resistor: 240,000 ohms 1 watt	1571
R61	Resistor: 20,000 ohms ½ watt	1570
R62	Resistor: 620 ohms ½ watt	1457
R65	Resistor: 5,100 ohms ½ watt	1585
R66	Resistor: 350 ohms ½ watt	1139A
R67	Resistor: 3,600 ohms ½ watt	1808
R68	Resistor: 7,500 ohms ½ watt	1849
R69	Resistor: 27,000 ohms ½ watt	1381
S1	Input No. 3 Selector Switch	1260
S2	Equalization Switch	1398
S3	Power Switch	2316
S4	Output Switch	2290
S5, S6	Cutter-Equalizer Switch	1587
T1, T2, T3, T4	Input Transformer	1621
T5	Output Transformer	179
T6	Power Transformer	159



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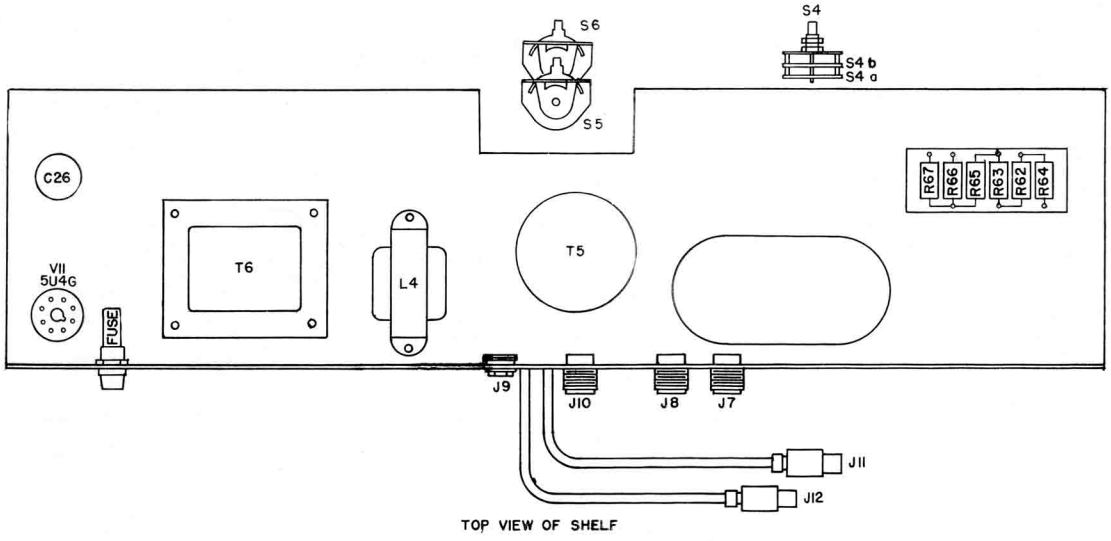

TOP VIEW OF SHELF

Figure 9. Parts Layout.

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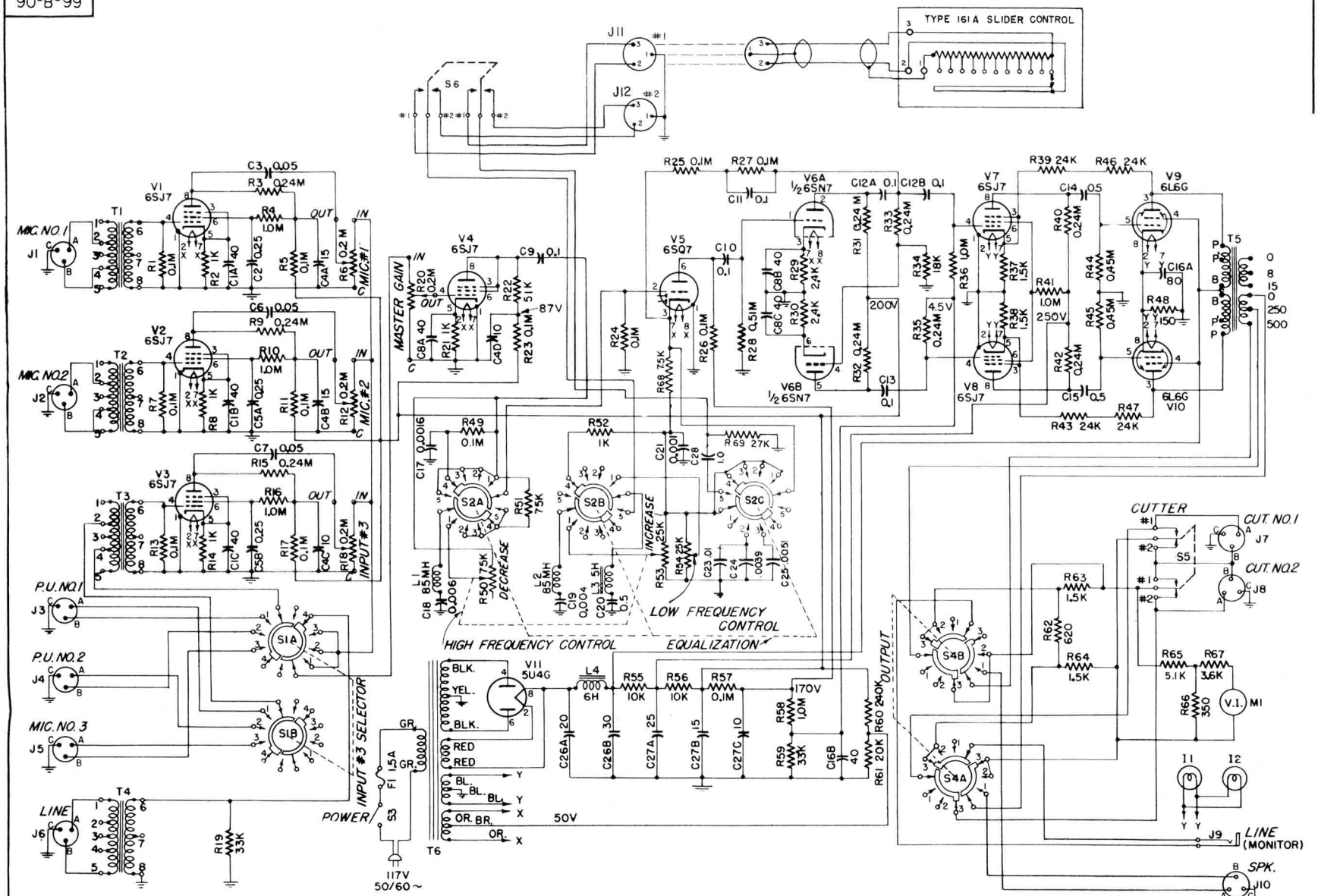
ISSUE:-



INPUT TRANSFORMER CONNECTIONS

INPUT (OHMS)	50	200	500
TAP NO.	3&4	2&4	1&5
D.C. RES.	16	30	48

INPUT # 3 SELECTOR
1. P.U. # 1
2. P.U. # 2
3. MIC. # 3
4. LINE

S1A — REAR DECK

EQUALIZATION
1. NORMAL
2. NAB REC.
3. 78 REC.
4. NAB PLAYBACK
5. AUTO.

S2A—REAR DECK

NOTE
ALL CAPACITORS ARE IN MICROFARADS.
ALL RESISTORS ARE IN OHMS EXCEPT THOSE MARKED AS FOLLOWS:
K= 1000 OHMS
M= 1 MEGOHM

OUTPUT
1. SPEAKER
2. RECORD CONTIN.
3. RECORD SIMULT.

S4A—REAR DECK

REVISED 8-11-48
ASSOCIATED DRAWINGS

PRESTO RECORDING CORP.
242 W. 55TH STREET NEW YORK, N. Y.

SCHEMATIC
AMPLIFIER 90-B

DRAWN E. COLE	SCALE ~
CHECKED	90-B-99
APPROVED	


PRESTO