

INSTALLATION AND SERVICE DIVISION**RCA MANUFACTURING CO., INC.**

CAMDEN, N. J.

MI-9325

MI-9350

CLASSIFICATION Technical - Photophone - Amplifiers

DATE Jan. 17, 1938

SUBJECT: MI-9325 VOLTAGE AMPLIFIER (PG-116)
MI-9350 POWER AMPLIFIER

NUMBER SL-2C3-6.4

TO: A-5, B-1, B-2, B-4, C-7, D-7, E-7, F-7, G-1, G-2, G-3, G-4, H-7

ELECTRICAL SPECIFICATIONS

Application Theatre Sound Reproduction
Voltage rating 105/125 volts - 50/60 cycles
Power Consumption at 125 volts 170 watts
Input impedance (terminals 4 & 7) work from 500 ohms
(red and yellow - green and red) work from 250 ohms
Load impedance See tabulation Page 8
Frequency response See response curve Figure 3
Power output at 1.6% harmonic distortion 10 watts
Output level - (.006 watt zero reference level) 32 db
(.0125 watt zero reference level) 29 db
Input level - (max. permissible) (.006 watt zero reference level) -37 db
(max. permissible) (.0125 watt zero reference level) -40 db
(min. for normal power output) (.006 watt zero ref.) -71 db
(min. for normal power output) (.0125 watt zero ref.) -74 db
Hum level - (15 ohm load) (.006 watt zero ref.) -12 db
(15 ohm load) (.0125 watt zero ref.) -15 db
Average overall gain 100 db
Power supply to external fields 1 - 1000 ohm field 125 v at 125 ma
2 - 1000 ohm fields 250 v at 125 ma

MECHANICAL SPECIFICATIONS

	MI-9325	MI-9350
Height	6-3/4 inches	8-1/2 inches
Width	13-1/2 inches	16-1/8 inches
Depth	8 inches	8 inches
Weight	9-1/2 pounds	33 pounds

RADIOTRON SOCKET VOLTAGES

115 Volt A-C Line (115-125 volt tap on power transformer)

Read on 20,000-ohm-per-volt meter

MI-9325

Radiotron No.	Cathode Volts*	Screen Grid Volts*	Plate Volts*	Plate Current MA	Heater Volts
1. RCA-57	2.5	53	75	.50	2.2
2. RCA-56	4.2	-	80	1.25	2.2
3. RCA-56	5.0	-	105	2.00	2.2

MI-9350

4. RCA-59	18.	-	220	17.5	2.3
5. RCA-2A3	62.**	-	295	30.0	2.3
6. RCA-2A3	62.**	-	295	30.0	2.3
7. RCA-83	-	-	345 AC	-	5.0
8. RCA-80	-	-	220	-	5.0

* Voltage to ground.

** Measured from grid to ground.

1. - REVISIONS

The MI-9325 voltage amplifier is similar to MI-4236-A with the following exceptions:

- | MI-9325 | MI-4236-A |
|--|-------------------------------------|
| 1. C-11 consists of four moulded mica capacitors each .025 mfd. all in parallel
<i>For replacements specify Stock No. 30848</i> | was tubular type,
Stock No. 4839 |
| 2. C-15 consists of two moulded mica capacitors each .025 mfd. in parallel
<i>For replacements specify Stock No. 30847</i> | was tubular type,
Stock No. 4886 |
| 3. C-30 added | |
| 4. C-20 new Stock No. 30856 | was Stock No. 41345 |
| C-25 new Stock No. 30859 | was Stock No. 4870 |
| C-15, C-28 new Stock No. 30847 | was Stock No. 4886 |
| C-11, C-12, C-16 new Stock No. 30848 | was Stock No. 4839 |
| C-13 new Stock No. 30849 | was Stock No. 42484 |
| 5. Main terminal board has four terminals | had seven terminals |

MI-9350 is similar electrically to MI-4256-C.

- | MI-9350 | MI-4256-C |
|--------------------------------|--------------------|
| C-47, C-48 new Stock No. 30854 | was Stock No. 5148 |

2. - ADJUSTMENT FOR LINE VOLTAGE

The power transformer is initially connected at the factory for a 115-125 volt supply. Should the supply voltage fall below 115 volts, change the internal wiring so that the lead from the fuse is connected to the taped red and black wire on the power transformer primary.

3. - RCA-2A3 BIAS SUPPLY

The bias voltage on the final amplifier tubes RCA-2A3, depends upon the correct connections as tabulated on the schematic circuit diagram. *Terminals 18 and 19 must be shunted if no speaker fields are supplied from the MI-9350.*

4. - FUSES

Fusetron fuses are incorporated in the power amplifier units and replacements must be made according to the exact rating of the fuses. A fuse of the wrong value will not fit into the fuse receptacle, therefore, caution should be used in ordering from the replacement parts list herein.

5. - COMPENSATION

(a) FREQUENCY RESPONSE LIMITS

The film frequency response obtained in the field should follow the attached curve within the following limits:

- | | | |
|-----|--|--------------------|
| (1) | 50 to 100 cycles | plus or minus 2 db |
| (2) | 100 to 5000 cycles | plus or minus 1 db |
| (3) | 5000 to 8000 cycles | plus or minus 2 db |
| (4) | Use response at 1000 cycles as reference level | |

(b) MI-493-A

The MI-493-A voice frequency filter supplied with the PG-416 equipment should be connected as follows:

- (1) Connect 8 mfd. across 1 and 3
- (2) Connect 200 ohms across 1 and 3
- (3) Add 100 ohm, 10 watt resistor across 1 and 3
- (4) Connect line to terminals 2 and 3
- (5) If speech is boomy increase resistance across terminals 1 and 3

(c) HIGH FREQUENCY COMPENSATION

If too many highs, remove .05 mfd. capacitor from across R-22. If not enough highs, add a .1 mfd. capacitor across R-21 in addition to the .05 mfd. across R-22.

(d) LOW FREQUENCY BOOSTER

A low frequency booster is used in the plate circuit of the first stage of the MI-9325 voltage amplifier (RCA-57) consisting of R-31, 100,000 ohms, shunted by C-20 .015 mfd. in series with R-12, 47,000 ohms. If, after adjusting the MI-493-A filter, there are still too many lows, reduce the value of R-31, but also increase the value of R-12 by the same amount R-31 is reduced. This is to keep the d-c circuit constant. It is recommended that no attempt be made to increase low frequency response by increasing the value of R-31, as distortion and loss of gain in the mid-range and higher frequencies would result. *In no case should the response at low frequencies exceed the response at 1000 cycles by more than 10 db.*

(e) BACKSTAGE TREATMENT

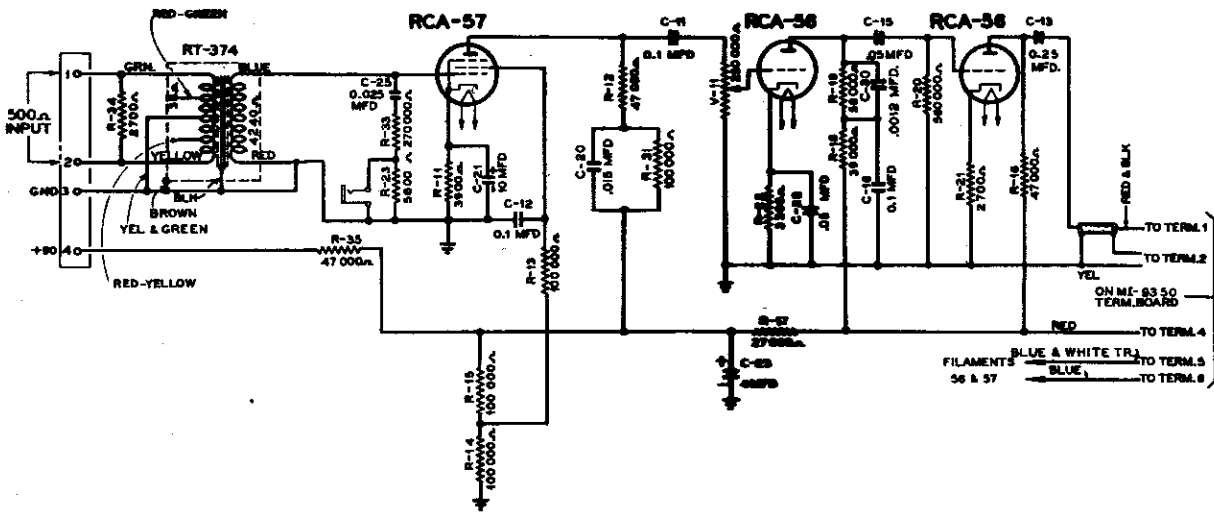
In general where the backstage acoustic condition permits, the back of the MI-1457 baffle should be removed. The exhibitor should be encouraged to treat the backstage. Listening tests with and without the rear baffle cover should be made. The front of the MI-1453 or MI-1469 baffle should be flush with the front of the MI-1457 baffle, and cones of the low and high frequency units should be mechanically out-of-phase (moving in opposite directions).

6. - MI-1484 LOUDSPEAKER DIVIDER NETWORK

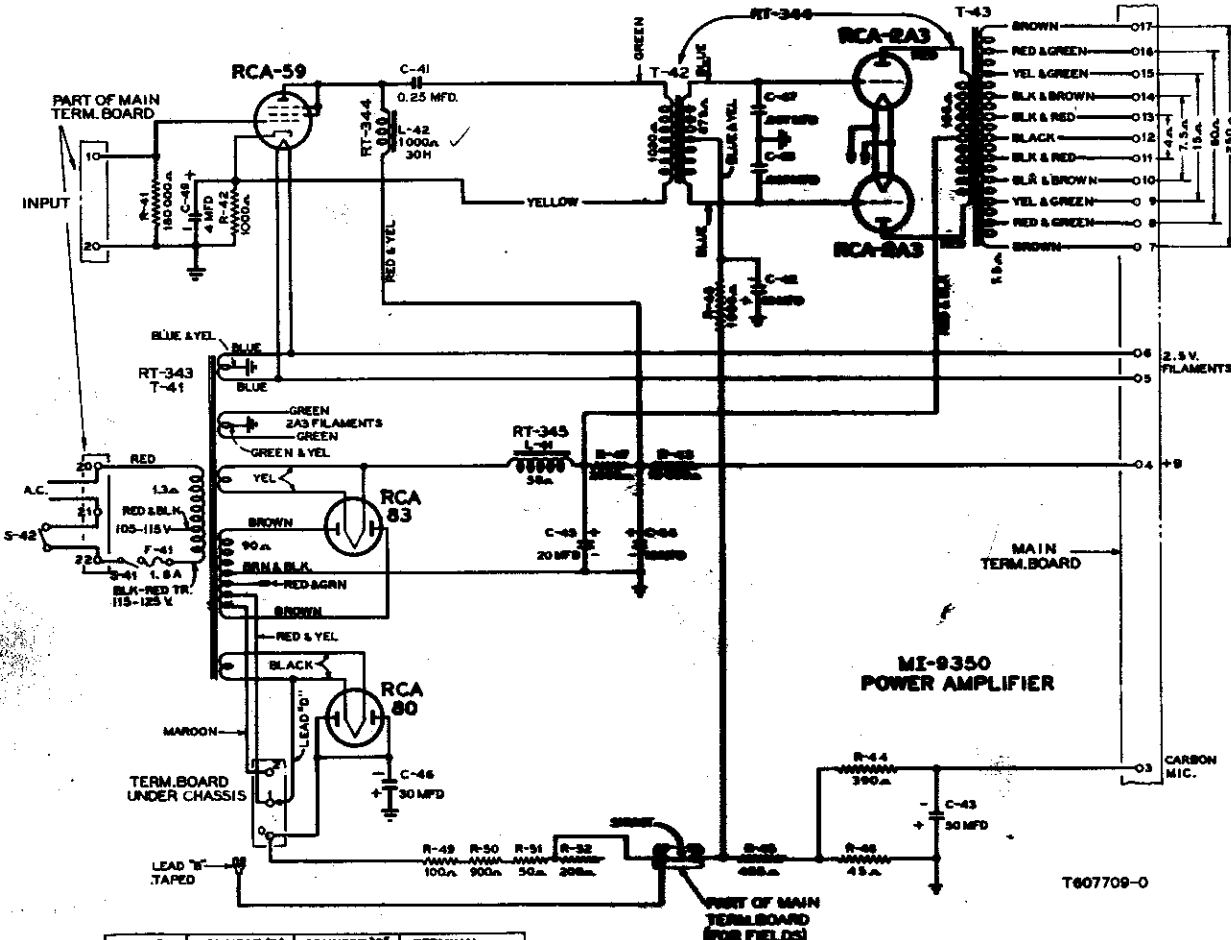
Use 20 mh reactor winding (terminals 1 and 4) and 40 mfd. capacity (terminals 1, to 2 and 3 in parallel) for loudspeaker connections. This will give a crossover of approximately 175 cycles.

7. - LOUDSPEAKER FIELD SUPPLY

PG-416 is normally supplied with MI-150CA1 for field supply to the stage loudspeakers. In the case that one or two 1000 ohm fields are supplied by the MI-9350, connections should be made as tabulated on the schematic circuit diagram.



MI-9325
VOLTAGE AMPLIFIER



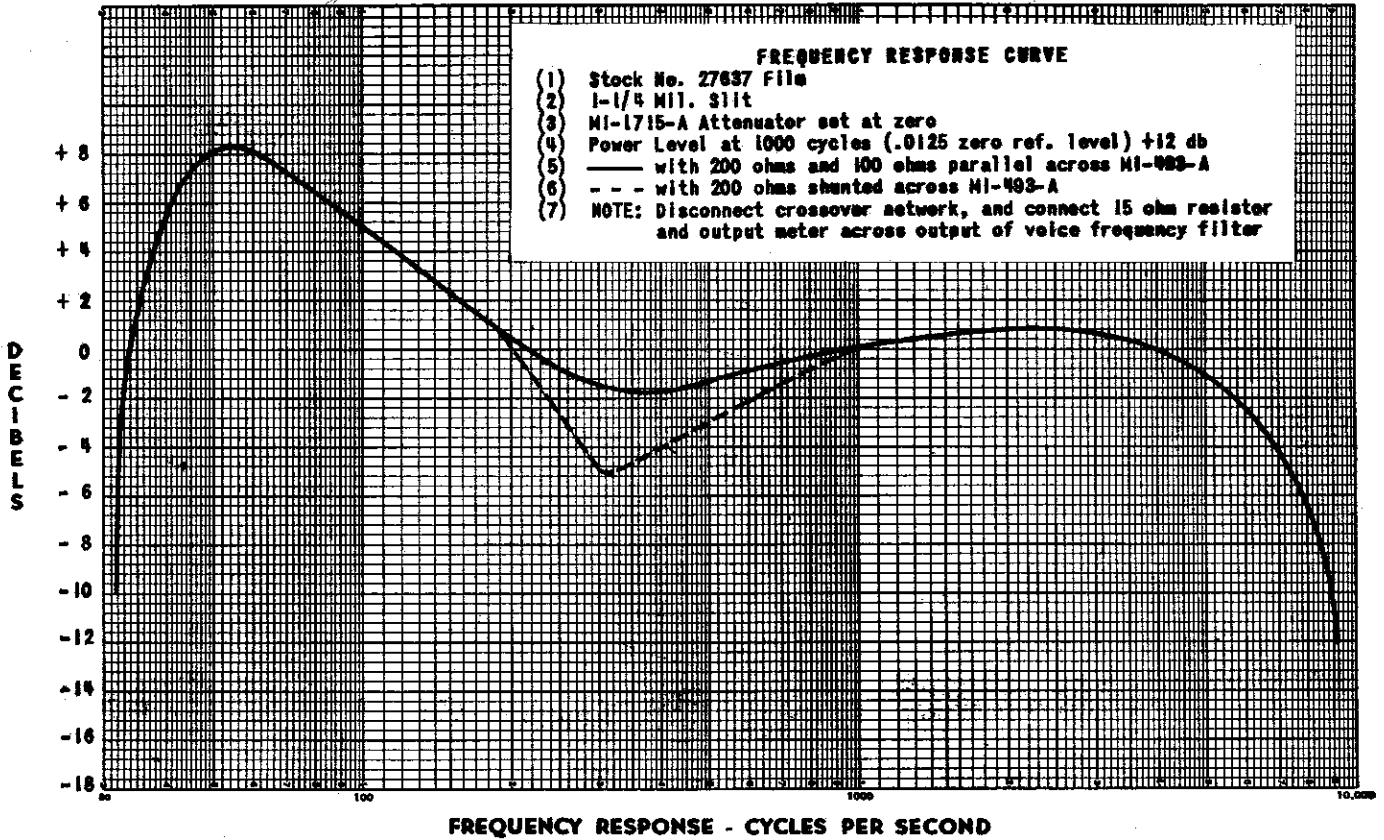
MI-9350
POWER AMPLIFIER

No. OF SPEAKERS	CONNECT 'D' TO TERMINAL	CONNECT 'B' TO TERMINAL TAPE	TERMINAL No. 18 & No. 19 SHORT AS SHOWN
NONE	1	0	REMOVE SHORT CONN. ONE FIELD
1	1	0	REMOVE SHORT CONN. TWO FIELDS IN SERIES
2	2	0	REMOVE SHORT CONN. TWO FIELDS IN SERIES

CONNECTIONS SHOWN FOR NO LOUDSPEAKER FIELD.

Figure 1 - Schematic Circuit Diagram - MI-9325 & MI-9350

Equipment Type PG-116 Theatre _____ Location MI-1453 or Date 12/17/37
 MI-9325
 Amp. Type MI-9350 Ser. No. _____ Speakers (Type & No.) High Freq. MI-1460 Low Freq. MI-1457
 Meter Type WESTON 695 Ser. No. _____ Crossover (Type & Freq.) MI-1484 Res. Load Ohms 15



Engineer _____

Figure 3

FORM 103

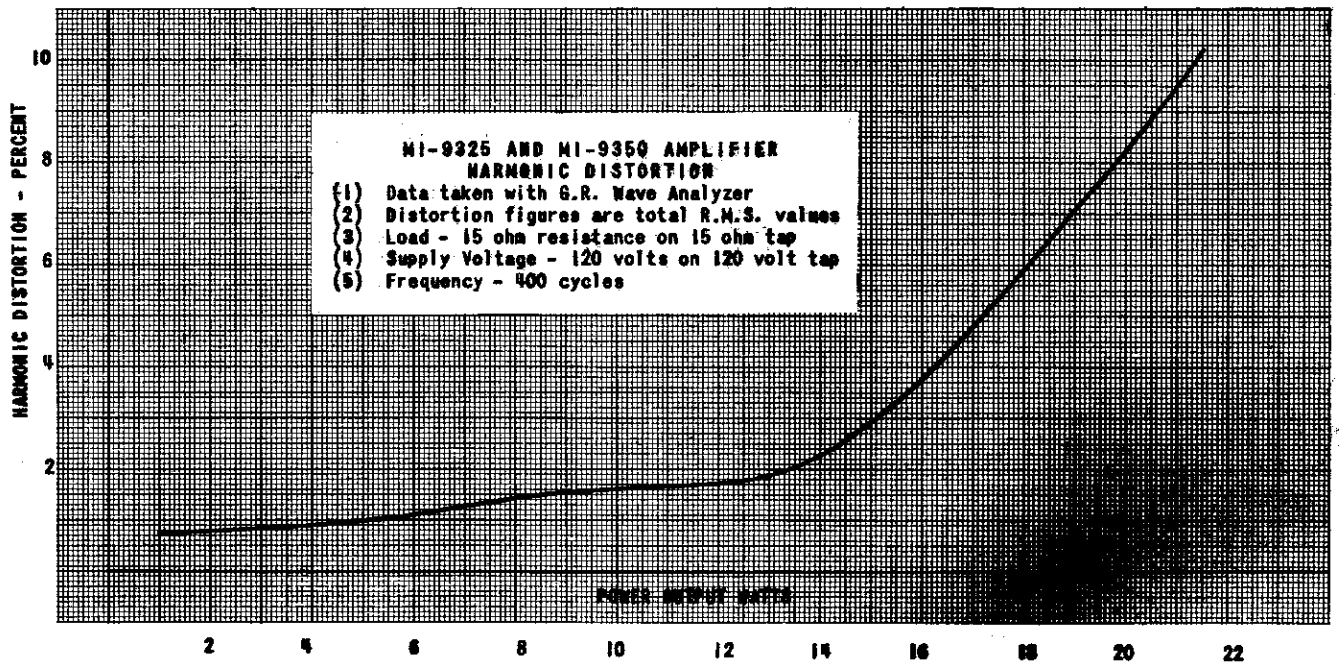


Figure 4

7. - LOAD IMPEDANCES VS OUTPUT TERMINALS

The table below shows the output taps to use for loads of different impedance values, for a single power amplifier and for two parallel power amplifiers.

LOAD IMPEDANCE IN OHMS*		AUDIO OUTPUT FROM TERMINALS	LOAD IMPEDANCE IN OHMS*		AUDIO OUTPUT FROM TERMINALS
ONE P.A.	TWO P.A.		ONE P.A.	TWO P.A.	
0.13	0.06	.... 10 to 11 or 13 to 14	15	8	..... 8 to 12 or 12 to 16
0.32	0.16	.... 9 to 10 or 14 to 15	16	8	..... 7 to 8 or 16 to 17
0.68	0.44	.... 9 to 11 or 13 to 15	24	12	..... 8 to 13 or 11 to 16
1	0.50	.... 11 to 12 or 12 to 13	28	13	..... 8 to 14 or 10 to 16
2	0.95	.... 10 to 12 or 12 to 14	34	17	..... 8 to 15 or 9 to 16
4	2	.... 9 to 12 or 12 to 15	35	18	..... 7 to 9 or 15 to 17
4	2	.... 8 to 9 or 15 to 16	43	21	..... 7 to 10 or 14 to 17
4	2	.... 11 to 13	48	24	..... 7 to 11 or 13 to 17
6	3	.... 10 to 13 or 11 to 14	60	30	..... 8 to 16
6	3	.... 8 to 10 or 14 to 16	62	31	..... 7 to 12 or 12 to 17
7.5	4	.... 10 to 14	79	40	..... 7 to 13 or 11 to 17
8	4	.... 8 to 11 or 13 to 16	86	43	..... 7 to 14 or 10 to 17
9	4	.... 9 to 13 or 11 to 15	97	49	..... 7 to 15 or 9 to 17
11	6	.... 9 to 14 or 10 to 15	139	70	..... 7 to 16 or 8 to 17
15	8	.... 9 to 15	250	125	..... 7 to 17

*NOTE: With the exception of those impedances which are less than 1 ohm, all figures for impedance given in the above table are accurate to the nearest whole number.

REPLACEMENT PARTS

MI-9325 VOLTAGE AMPLIFIER

DESCRIPTION	STOCK NO.
BASE - Tube shield base (TS1)	14053
CAPACITOR - 0.0012 mfd. (C30)	13054
CAPACITOR - 0.015 mfd. (C20)	30856
CAPACITOR - 0.025 mfd. (C25)	30859
CAPACITOR - 0.05 mfd. (C15, C28)	30847
CAPACITOR - 0.1 mfd. (C11, C12, C16)	30848
CAPACITOR - 0.25 mfd. (C13)	30849
CAPACITOR - 4 mfd. (C23)	6782
CAPACITOR - 10 mfd. (C21)	26199
JACK - Phonograph input jack	23531
KNOB - Volume control knob	7960
RESISTOR - 2,700 ohms, insulated, 1/2 watt (R21, R34)	30730
RESISTOR - 3,300 ohms, carbon type, 1/2 watt (R22)	12330
RESISTOR - 3,900 ohms, carbon type, 1/2 watt (R11)	8071
RESISTOR - 5,600 ohms, carbon type, 1/2 watt (R23)	5175
RESISTOR - 27,000 ohms, carbon type, 1/2 watt (R17)	8065
RESISTOR - 39,000 ohms, insulated, 1/2 watt (R18)	30147
RESISTOR - 47,000 ohms, carbon type, 1/2 watt (R12, R16, R35)	12573
RESISTOR - 56,000 ohms, carbon type, 1/2 watt (R19)	8026
RESISTOR - 100,000 ohms, carbon type, 1/2 watt (R13, R14, R15, R31) .	3252
RESISTOR - 270,000 ohms, carbon type, 1/2 watt (R33)	11958
RESISTOR - 560,000 ohms, carbon type, 1/2 watt (R20)	14323