TECHNICAL MANUAL

RADIO RECEIVERS BC-779-A, -B; BC-794-A, -B; BC-1004-B, -C, -D; and R-129/U; POWER SUPPLY UNITS RA-74-B, -C-D; RA-84-A, -B; and RA-94-A; RADIO SETS SCR-244-A, -B; SCR-704; and AN/FRR-4 (HAMMARLUND SUPER PRO RECEIVER)

CHANGES No. 1

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *20 May 1949*

TM 11-866, 12 February 1948, is changed as follows:

That part of the title referring to Power Supply Units RA-74-B, -C is changed to read: **POWER SUPPLY UNITS RA-74-B, -C, -D**

1. General

* * * * *

c. The receivers are * * * their frequency ranges. This figure also shows **six** power supply units and their input requirements. Each of the * * * with any receiver.

* * * * *

f. (Added.) Power Supply Unit RA-74-(*) represents Power Supply Units RA-74-B, -C, and -D.

In figure 2, change designation "Power Supply Units RA-74-B, -C" to read: "Power Supply Units RA-74-B, -C, -D."

In tables I and II change RA-74-C to read: RA-74-C, -D.

8. Description of Power Supply Unit

The **six** power supply units are similar in appearance. Each one is * * * screws (fig. 7). **This dust cover is not supplied with Power Supply Unit RA-74-D.** The under side * * * supply connecting cable.

10. Differences in Models

* * * * *

g. (Added.) Power Supply Units RA-74-B, -C, and -D are physically and electrically interchangeable. However, Power Supply Unit RA-74-D differs from the other models in that the number of filter capacitors has been increased, additional resistors have been added, and preferred tube types are used. Moreover, the location of the resistors and capacitors in Power Supply Unit RA-74-D with serial numbers 1 through 390, Order No. 12618-Phila-47, differs from their location in Power Supply Unit RA-74-D with serial numbers 391 through 791, Order No. 6036-Phila-48.

13. Connections and Interconnections

* * * * *

e. A-C INPUT. Before plugging the * * * in figure 12. **The primary tap of Power Supply Unit RA-74-D is indicated in figures 44.1 and 44.2.** Connect the primary * * * bottom cover plate.

* * * * *

Figure 12. Bottom view of ***Power Supply Unit RA-94-A,*** *showing primary tap connection.*

Figure 14. Power Supply Unit ***RA-74-B, -C, RA-84-A, -B, or RA-94-A,*** *tube location.*

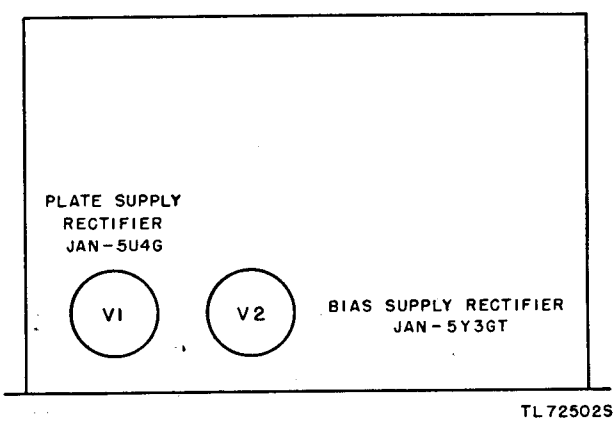


Figure 14.1 (Added.) *Power Supply Unit RA-74-D, tube location.*

14. Preparation for Use

a. TUBES. Check to see * * * on the receiver.

* * * * *

(2) *Power supply unit.* Take the dust * * * two rectifier tubes. **Figures 14 and 14.1 show** the location of these tubes.

* * * * *

70. Differences in Models

Power **Supply** Units RA–74–**B, –C,** RA–84–(*), and RA–94–A are electrically alike except for variations in power transformers T1, T2, and T3 (figs. 50, 51, and 52). The output of * * * input requirements vary. **Power Supply Unit RA–74–D is electrically similar to Power Supply Units RA–74–B and RA–74–C except for the following: types of tubes used, d–c resistance of L2, number and values of resistors, value of plate supply filter input capacitor, values of bias filter capacitors, reference symbols, and transformer wiring connections (fig. 50.1). Also, the physical location of the resistors and capacitors in Power Supply Unit RA–74–D with serial numbers 1 through 390, Order No. 12618–Phila–47, is not the same as their location in Power Supply Unit RA–74–D with serial numbers 391 through 791, Order No. 6036–Phila.–48.**

* * * * *

71. Circuit Details for Power Supply Units RA–74–B, –C, RA–84–A, –B, and RA–94–A.

* * * * *

71.1 (Added.) Circuit Details for Power Supply Unit RA–74–D.

a. Power transformer T1 (fig. 50.1) is connected to the power source by line cord W1 and is fused by 2-ampere, 250-volt fuse F1. Terminals 8 and 9 of terminal strip E1 are connected when the receiver ON-OFF switch is closed, thus completing the primary circuit of the transformer. The average power consumed is 180 watts.

b. The power unit furnishes filament, plate supply, and bias voltages to the receiver. The filament voltage, 6.3 volts ac, is obtained from secondary winding 10–11 on the transformer and applied to the receiver through terminals 1 and 2 on the terminal strip.

c. Plate supply voltage is supplied by the plate supply rectifier Tube JAN–5U4G, V1, connected in a full-wave circuit. The plates are connected to terminals 19 and 16 of the high-voltage center-tapped secondary. The center tap, terminal 17, is grounded. Filament supply for V1 is provided by secondary winding 12–13. After the voltage is rectified, it is filtered by the capacitor input pi-section filter consisting of choke L1, two 2-mf capacitors C1 and C2, and two 4-mf capacitors C3 and C4. The filtered voltage, which is connected to terminal 6, provides approximately 385 volts dc for the plates of a-f tubes V15 and V16 in the receiver. Further filtering by second filter choke L2 and two 4-mf capacitors C5 and C6 in parallel provides approximately 270 volts d-c plate and screen supply at terminal 5. Approximately 140 volts dc for screen grid supply is

obtained from the junction of resistors R1 and R2, which are part of the bleeder chain composed of bleeder resistors R11, R12, and through R4. This screen voltage is filtered by two more 4-mf capacitors C7 and C8 and is connected to terminal 4 on terminal strip E1.

d. Bias supply rectifier Tube JAN–5Y3GT, V2, is used in a half-wave rectifier circuit to supply bias voltages to the receiver. Filament supply for V2 is furnished by winding 14–15. The filament is connected to tap 18 on the high-voltage secondary. The a-c voltage across the 17 and 18 windings of the high-voltage secondary is thus applied to V2. Since tap 17 is grounded, the plate of V2 is at a negative potential. The rectified output of V2 is filtered by resistors R5 through R10 and 4-mf capacitors C9 through C12. When connected to the receiver, the voltage at the end of this filter, terminal 7 on E1, is approximately —50 volts.

74. Trouble-shooting Data

Take advantage of * * * trouble-shooting data:

* * * * *

b. Power Supply Unit.

Fig. No.	Description
50	Power Supply Unit RA–74–B, –C, schematic diagram.
50. 1	**Power Supply Unit RA–74–D, schematic diagram.**
*	* * * * *
45	**Power Supply Unit RA–74–B, –C, RA–84–A, –B, and RA–94–A, tube** socket voltage and resistance chart.
45. 1	**Power Supply Unit RA–74–D, tube socket voltage and resistance diagram.**
45. 2	**Power Supply Unit RA–74–D, with serial numbers 391 through 791, Order No. 6036–Phila–48, diagram.**
43	Power **Supply Unit RA–94–A,** chassis, top view.
43. 1	**Power Supply Unit RA–74–D, with serial numbers 1 through 390, Order No. 12618–Phila–47 chassis, top view.**
43. 2	**Power Supply Unit RA–74–D, with serial numbers 391 through 791, Order No. 6036–Phila–48, chassis, top view.**
*	* * * * *
44. 1	**Power Supply Unit RA–74–D, with serial numbers 1 through 390, Order No. 12618–Phila–47, chassis, bottom view.**
44. 2	**Power Supply Unit RA–74–D, with serial numbers 391 through 791, Order No. 6036–Phila–48, chassis, bottom view.**

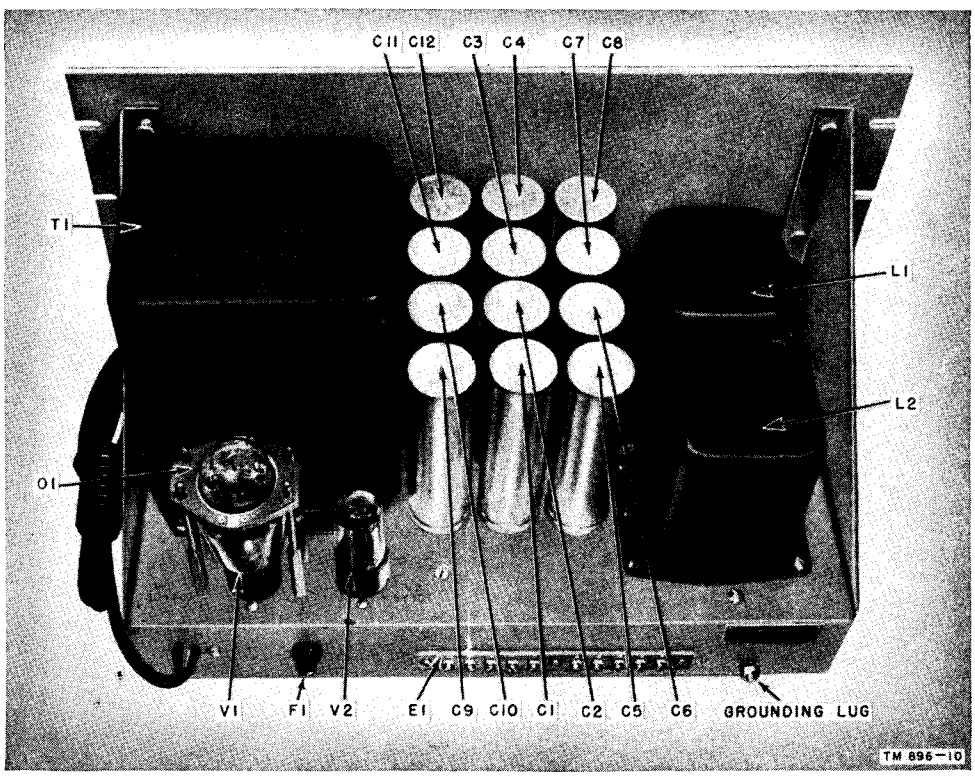


Figure 43.1 (Added.) *Power Supply Unit RA–74–D, with serial numbers 1 through 390, Order No. 12618–Phila–47, chassis, top view.*

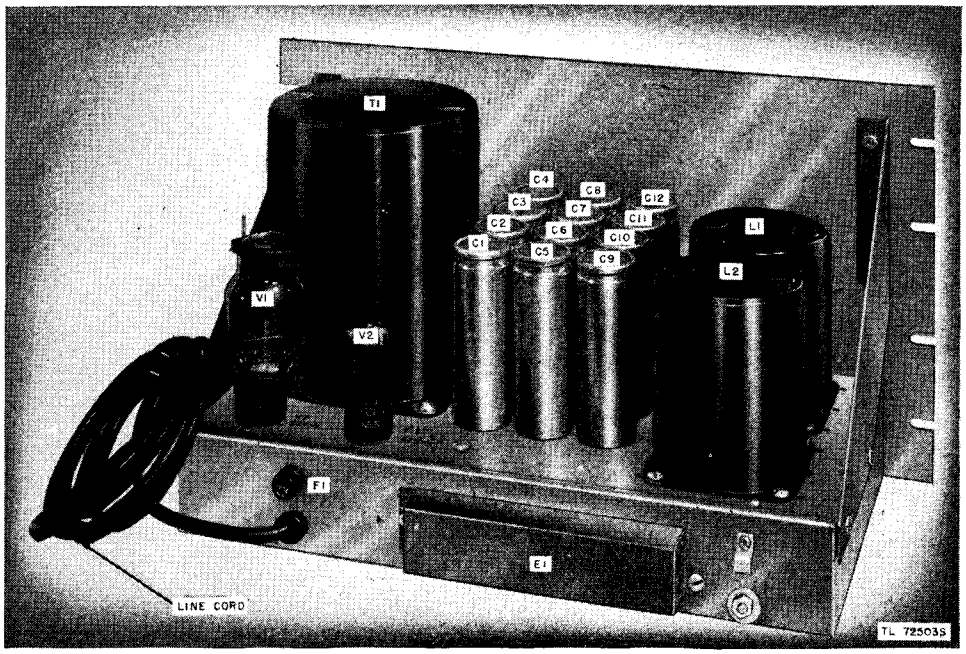


Figure 43.2 (Added.) *Power Supply Unit RA–74–D, with serial numbers 391 through 791, Order No. 6036–Phila–48, chassis, top view.*

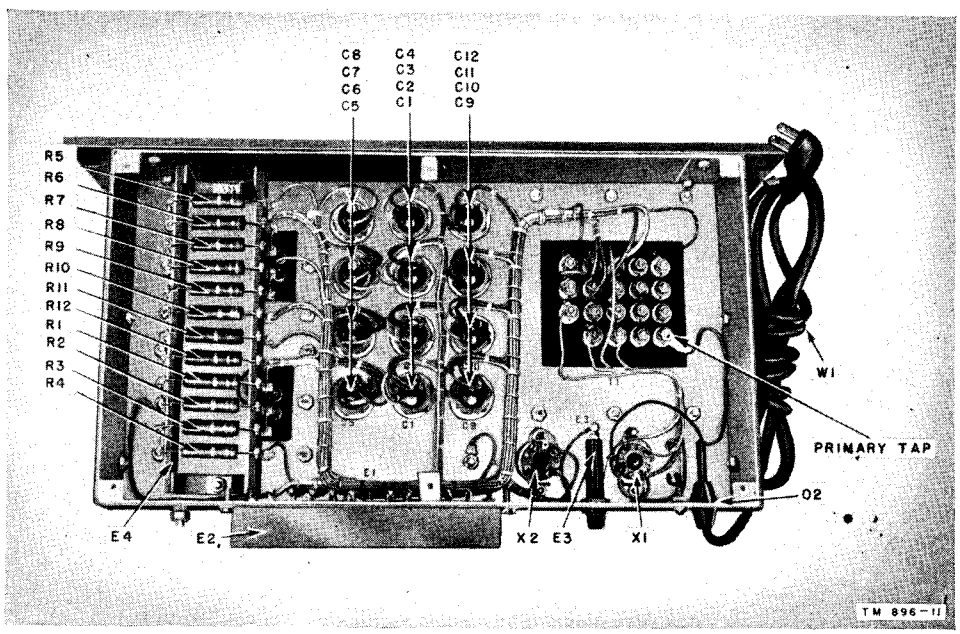


Figure 44.1 (Added.) *Power Supply Unit RA–74–D, with serial numbers 1 through 390, Order No. 12618–Phila–47, chassis, bottom view.*

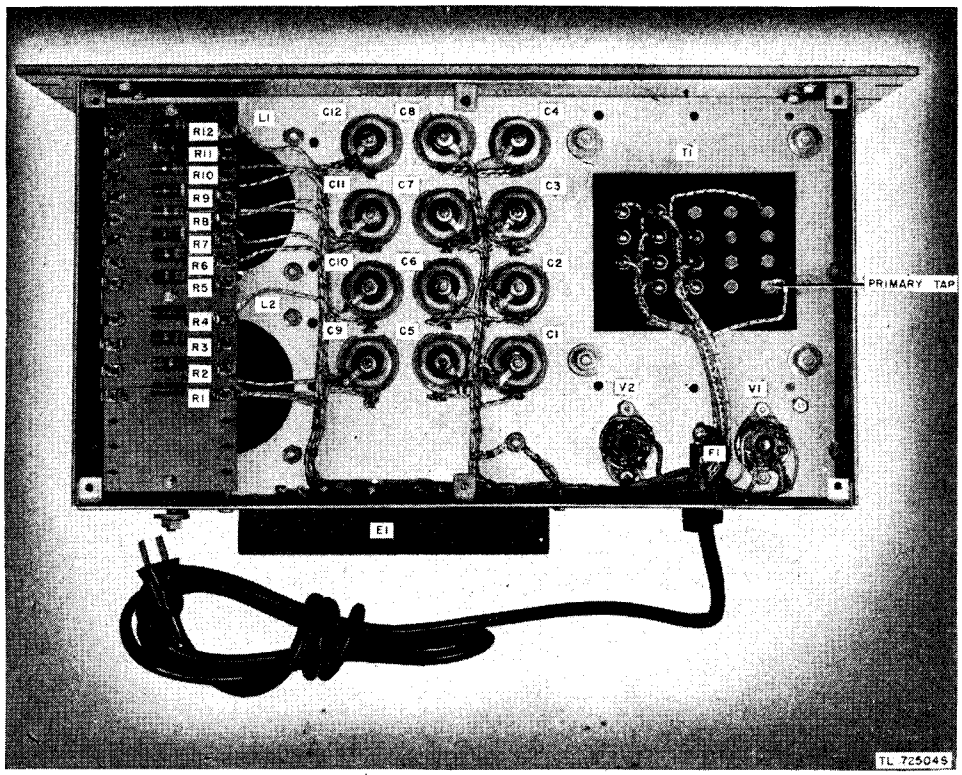
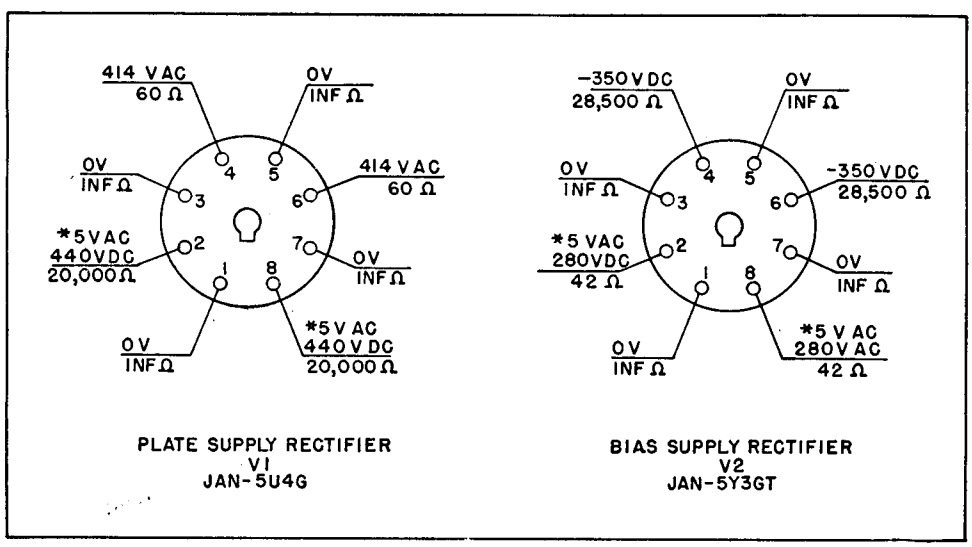


Figure 44.2 (Added.) *Power Supply Unit RA–74–D, with serial numbers 391 through 791, Order No. 6036–Phila–48, chassis, bottom view.*

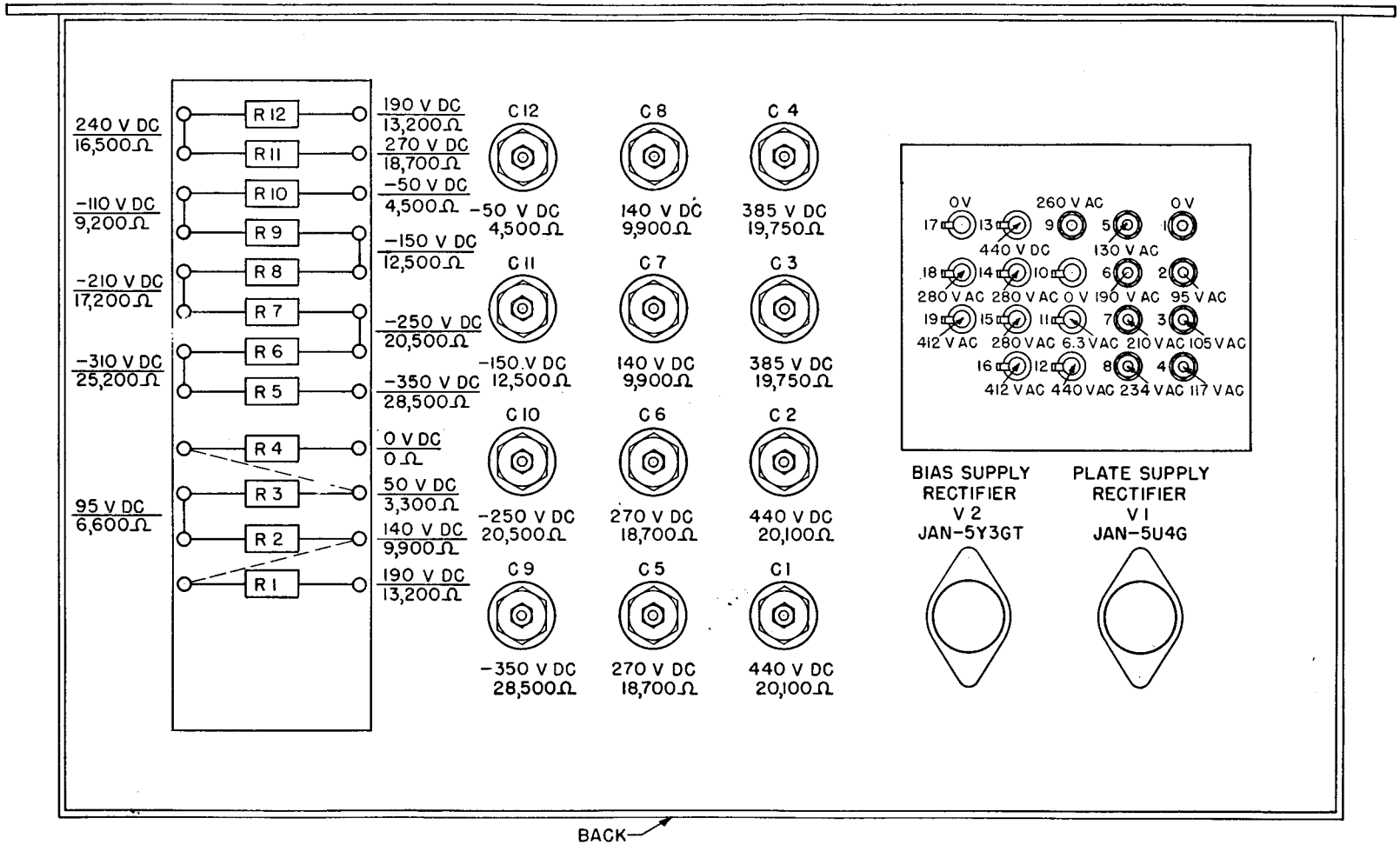
Figure 45. Power Supply Unit ***RA–74–D, –C, RA–84–A, –B, and RA–94–A,*** *tube socket voltage and resistance diagram.*



NOTES: •
1 A-C LINE VOLTAGE EQUAL TO PRIMARY TAP ON POWER TRANSFORMER.
2 LOADED BY PROPERLY CONNECTED RECEIVER.
3 VOLTAGES MEASURED TO CHASSIS WITH A 1,000 OHM-PER-VOLT METER.
4 *MEASURED ACROSS FILAMENTS.

TL72506S

Figure 45.1 (Added.) *Power Supply Unit RA–74–D, tube socket voltage and resistance diagram.*



NOTES:

1 READINGS BASED ON AN A.C. LINE VOLTAGE EXACTLY EQUAL TO THE PRIMARY TAP ON THE POWER SUPPLY UNIT POWER TRANSFORMER. HIGHER OR LOWER LINE VOLTAGE SHOULD RESULT IN CORRESPONDING VARIATIONS IN THESE READINGS.

2 VOLTAGES AND RESISTANCES MEASURED TO CHASSIS WITH A 1,000 OHM-PER-VOLT METER.

3 SENSITIVITY AND AUDIO GAIN OF RECEIVER AT 0.

TL 72507S

Figure 45.2 (Added.) *Power Supply Unit RA-74-D, with serial numbers 391 through 791, Order No. 6036-Phila-48, voltage and resistance diagram.*

APPENDIX II

IDENTIFICATION TABLE OF REPLACEABLE PARTS

6. (Added.) Identification Table of Replaceable Parts for Power Supply Unit RA–74–D

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	POWER SUPPLY: Sig C Power Supply Unit RA–74–D; electronic type; output 380 v DC at 50 ma, 250 v DC at 100 ma, approx 100 v DC at 4.5 ma, "C" bias approx 50 v DC at 11 ma; input 95/105/117/130/190/210/234/260 v AC, single ph, 25–60 cyc, 180 w; chassis w/std 19" rack panel, 19" lg x 10½" h x 10" d; 1 Tube JAN–5Y3GT half-wave, 1 JAN–5U4G full-wave; built-in filter.	Furnishes a-c and d-c operating voltages for Radio Receiver R–270/FRR, or Radio Receivers BC–779–A, –B; BC–794–A, –B; BC–1004–B, –C, –D; and R–129/U.	3H4496–74D.
E1	BOARD, terminal: connecting power to receiver; 10 screw term; arranged in groups of 5 term ea; phenolic; term numbered 1 to 10; Jones HB per Hammarlund #3838.	Receiver connections	2C4528/35.
W1	CABLE, power: Sig C Cordage Co–144; Underwriters type "S"; 2 #18 AWG cond ea comprising 41 #32 AWG strands; RC; ¼" OD; Sig C spec #71–684.	A-c line cord	3E2144.
C1 thru C12	CAPACITOR, fixed: paper dielectric; 4.0 mf +20%–10%, 600 vdcw; max body dimen 4½" lg x 1½" diam; JAN type CP41B1EF–405V.	C1 thru C8—Plate supply filter. C9 thru C12—Bias supply filter.	3DB4–288.
	CONNECTOR, plug: 2 flat parallel male blade cont; straight; 1 9/16" OD x 1¼" lg less cont; 15 amp, 125 v, 10 amp, 250 v; cylindrical steel body, cad pl; bakelite insert; cable opening 9/32" diam w/cable clamp; Hubbel #7057.	A-c plug	6Z1727.
F1	FUSE FU–27: cartridge; 2 amp, 250 v; glass body; ferrule term; 1¼" lg x ¼" diam over-all.	Overload protector	3Z1927.
E3	HOLDER, fuse: extractor post: for #3AG cartridge fuse; molded black bakelite body; 125 v AC or DC, 10 amp max; 2⅛" lg x ¾" diam over-all, 2 solder lug term; red extractor knob; Littelfuse #341001.	For fuse F1	3Z3275.
L1	REACTOR: filter choke; 21.2 min hy, 160 ma; 350 ohms approx DC resistance; 2500 v RMS test; HS metal case; 4½" lg x 3⅝" wd x 4⅝" h excl term; 6 holes 7/32" diam w/1⅜" ctrs spaced 3⅞"; per JAN–T–27 Chi Trans #7410E.	Smoothing choke	3C317–54.
L2	REACTOR: filter choke; 45 min hy, 120 ma; 1050 ohms approx DC resistance; 2500 v RMS test; HS metal case; 4½" lg x 3⅝" wd x 4⅝" h excl term; 6 holes 7/32" diam w/1⅜" ctrs spaced 3⅞"; per JAN–T–27; Chi Trans #12522.	Smoothing choke	3C317–55.
R1 thru R5, R7, R9, R12	RESISTOR, fixed: comp; 3300 ohms ±5%; 2 w; max body dimen 1.78" lg x 0.405" diam; JAN type RC41BF332J.	R1 thru R4 and R12—Part of plate supply voltage divider. R5, R7, R9—Part of bias supply filter.	3RC41BF332J.
R6, R8 R10	RESISTOR, fixed: comp; 4700 ohms ±5%; 2 w; max body dimen 1.78" lg x 0.405" diam; JAN type RC41BF472J.	Part of bias supply filter	3RC41BF472J.

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
R11	RESISTOR, fixed: comp; 2200 ohms ±5%; 2 w; max body dimen 1.78" lg x 0.405" diam; JAN type RC41BF222J.	Part of plate supply voltage divider.	3RC41BF222J.
01	RETAINER, tube: consists of 4 hex base stainless steel posts and removable spring retainer assembly to fit ST–16 type glass bulb; mts w/#10 screws in 4 mtg holes on rectangular ctrs 2 3/16" x 7/8"; WECo part/dwg #D152560.	Holds Tube JAN–5U4G rectifier in socket.	2Z7780–19.
X1, X2	SOCKET, tube; octal; one-piece saddle mtg; two 5/32" diam holes on 1½" mtg/c; round molded phenolic body; 1⅛" diam x ½" h excl term; beryllium copper silver pl wrap-around type contacts; Cinch #9661.	Tube sockets	2Z8678.300.
T1	TRANSFORMER, power: filament and plate type; input 95 to 260 v, 25–60 cyc, single ph; pri taps at 95/105/117/130/190/210/234 and 260 v; 4 output secd windings: secd #1, 5 v, 3 amp; secd #2, 5 v, 2 amp; secd #3, 6.3 v, 7 amp; secd #4 830 v CT, 170 ma and tap at 270 v from CT at 28 ma; 3000 v ins; HS metal case; 5⅞" lg x 6½" wd x 7½" h over-all; 19 ins thd post type term on bottom of case; six ¼" diam holes w/2⅛" ctrs; per JAN–T–27; Chi Trans #1270S.	Power transformer	2Z9608–91.
V1	TUBE, electron: JAN–5U4G	Plate supply rectifier	2J5U4G.
V2	TUBE, electron: JAN–5Y3GT	Bias supply rectifier	2J5Y3GT.

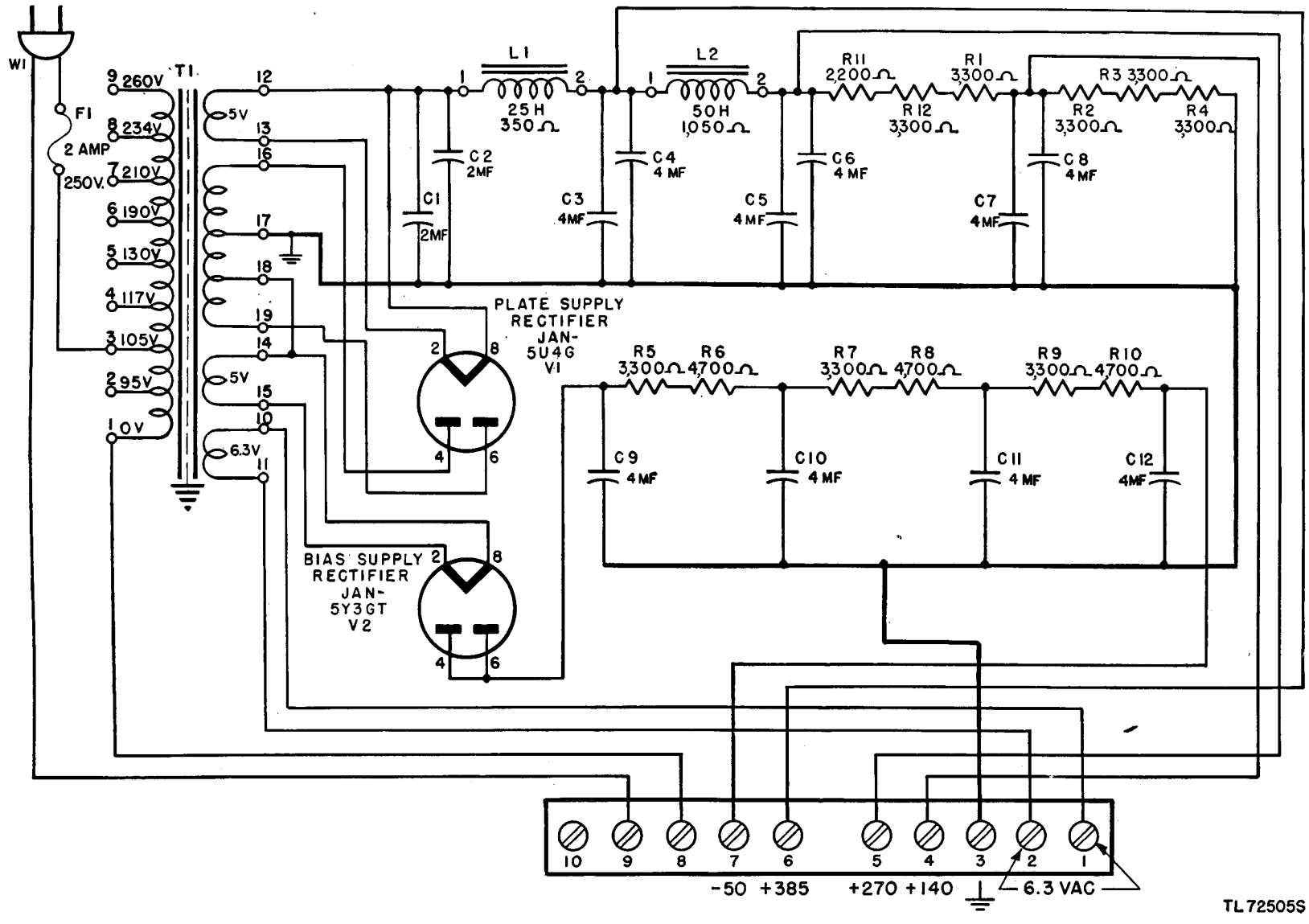


Figure 50.1 (Added.) *Power Supply Unit RA–74–D, schematic diagram.*

[AG 300.7 (14 Jan 49)]

By order of the Acting Secretary of the Army:

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Major General
The Adjutant General

OMAR N. BRADLEY
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For explanation of distribution formula, see SR 310–90–1.

U. S. GOVERNMENT PRINTING OFFICE: 1949

TECHNICAL MANUAL

RADIO RECEIVERS BC-779-A, -B; BC-794-A, -B; BC-1004-B, -C, -D; AND R-129/U; POWER SUPPLY UNITS RA-74-B, -C, -D; RA-84-A, -B; AND RA-94-A; RADIO SETS SCR-244-A, -B; SCR-704; AND AN/FRR-4 (HAMMARLUND SUPER PRO RECEIVER)

CHANGES No. 2

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *20 September 1949*

TM 11-866, 12 February 1948, is changed as follows:

95. I-F Alinement Procedure

a. Throw the OFF-ON * * * the receiver chassis.

Note (added). Radio Receiver BC-1004-D was not originally equipped with a tuning meter (S meter). However, where alinement procedures require the use of the tuning meter, a d-c vacuum-tube voltmeter, such as Volt-ohmmeter TS-294C/U or Electronic Multimeter TS-505/U, connected across the receiver PHONO terminals may be used instead. When connected in this manner, the vacuum-tube voltmeter will measure a portion of the voltage developed across the detector load and, unlike the output meter, will respond to unmodulated signals.

* * * * *

[AG 300.7 (22 Aug 49)]

BY ORDER OF THE SECRETARY OF THE ARMY:

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AGO 637A—Sept. 851709°—49

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