NORMAL

*MWO 11-5820-298-35/1

DEPARTMENT OF THE ARMY MODIFICATION WORK ORDER

MODIFICATION OF RADIO RECEIVERS R–274A/FRR (HAMMARLUND MODEL SP–600–JX), AND R–320A/FRC (HAMMARLUND MODEL SP–600–J) TO PROVIDE MORE ADEQUATE FUSING OF THE POWER TRANSFORMER AND TO PROVIDE BETTER ACCESSIBILITY TO THE B MINUS FUSE

Headquarters, Department of the Army, Washington 25, D. C. **24 October 1958**

1. Application. *a. Applied To.* All Radio Receivers R–320A/FRC (Hammarlund Model SP–600–J), and, Radio Receivers R–274A/FRR (Hammarlund Model SP–600–JX) with serial numbers 1 through 2,500.

b. Category of Maintenance.

(1) *Field.* This modification work order will be applied to installed fixed station equipment by station maintenance personnel, as soon as possible, within 1 year of the date of this publication, or within 1 year after receipt of equipment that requires this modification.

(2) *Depot.* This MWO will be applied to Signal Corps depot stock by depot maintenance personnel only when the equipment is—

(*a*) Scheduled for shipment to oversea consignees.

(*b*) Undergoing scheduled repair for stock.

(*c*) Subjectto other MWO's that require application prior to issue.

c. Applied By. Fixed station receiver repairman (MOS 233) or equivalent maintenance repair personnel.

d. Time Required. ½ man-hour.

e. Remarks. None.

2. Supply of Parts Required. *a. Source of Supply.*

(1) The kits will be requisitioned separately, through channels, by the designated maintenance organization, on a nonreimbursable basis, w thin the time limit established in paragraph 1*b*, c ting this MWO and date as authority. Requisitions for field requirements received after the time limit prescribed in paragraph 1*b* will cite consumer funds for stock fund reimbursement.

(2) The kit will be requisitioned separately through channels by Signal Corps depot shops citing this MWO and date as authority.

(3) The kit is available in the supply system.

*This modification work order supersedes MWO SIG 76, 23 July 1953, including C 1, 23 October 1953, and C 2, 28 July 1955.

TAGO 2204A—Oct. 480468*—58

b. New Parts Required.

Federal stock No.	Quantity (ea)	Nomenclature or description
5820–594–8101	1	Modification kit to provide more adequate fusing of the power transformer, and to provide better accessibility to the B minus fuse in Radio Receivers R–274A/FRR and R–320A/FRC.
		This kit consists of—
	2	Fuse, cartridge; ⅜ amp; opens in 25 sec at 200%, 8 sec at 300%, 3 sec at 500%, and 1 sec at 1,000% load, rated continuous at 110% load, 250 v; 1 time; glass body; ferrule term.; 1¼" lg x ¼" dia thermal cutout; Buss type MDL–⅜; FSN 5920–227–9137, or equal.
	2	Fuse, cartridge; 3 amp; 250 v; instantaneous; ferrule term.; glass body; 1 time; 1¼" lg x ¼" dia o/a; Littelfuse type No. 312003 replacing No. 1043; for general purpose use; FSN 5920–189–0846, or equal.
	2	Holder, spare fuse: for single No. 3AG fuse, 1/16" thk; fiber base w/brass clips; 1½" lg x 9/16" wd; Littelfuse No. 1318; single No. 6 mtg hole; FSN 5920–221–5660, or equal.
	1	Label, decalcomania; as per dwg SC–B–83191; FSN 7690–286–6065.
	1	Label, decalcomania: as per dwg SC–B–83192; FSN 7690–286–6064.
	2	Screw, machine: slotted drive, straight side Bind H; steel cad or zinc pl; No. 6–32 NC–2, ½" lg; full threaded; FSN 5305–K72–1136, or equal.
	1 ft.	Wire, electrical: ins; single No. 16 AWG stranded cond. 19/.0117" strands; copper, tinned; stranded; thermoplastic insulation, .126; color coded black; spec JAN–C–76; FSN 6145–164–7026, or equal.

3. Purpose of Modification. *a.* To prevent frequent blowouts of power fuse F1 by substituting a 3-ampere fuse for the 2-ampere fuse.

b. To prevent frequent blowouts of B minus fuse F2 by substituting a ⅜-ampere fuse for the ¼-ampere fuse.

c. To provide better accessibility to B minus fuse F2 by relocating it in the SPARE fuseholder adjacent to fuse F1.

4. Priority Classification. NORMAL.

5. Major Items Affected.

Name: Radio Receiver R–274A/FRR.
Federal Stock No. 5820–187–3143.
Name: Radio Receiver R–320A/FRC.
Federal Stock No. 5820–503–1243.
Reference: TM 11–851.

6. Assembly or Component Affected.

Name: Fuse. (Ref. symbol F1.)
Federal Stock No. None.
Name: Fuse. (Ref. symbol F2.)
Federal Stock No. None.

7. Parts Affected. *a. Parts Modified.* None.

b. Parts Removed.

Federal stock No.	Quantity (ea)	Nomenclature or description
(1) From Radio Receiver R–320A/FRC:		
5920–251–9142	1	Fuse, cartridge: 250V, ¼ amp.
		or
5920–356–2192	1	Fuse, cartridge: 250V, ⅜ amp.
(2) From Radio Receivers R–274A/FRR and R–320A/FRC:		
5305–206–4861	2	Screw, machine: BHS; 5/16" lg No. 6–32 thd.

c. Disposal of Removed Parts. In accordance with paragraph 7*b* and *c*, AR 735–11.

8. Drawings Required To Apply Modification. Only those illustrations provided with this modification work order are required to perform this modification.

9. Special Tools, Jigs, and Fixtures Required. None.

10. Modification Procedure. *a.* Remove the eight screws, washers, and lockwashers holding the radio receiver in its cabinet or rack, and remove the chassis from the cabinet or rack.

b. If a plate or dust cover is attached to the bottom of the chassis, remove the screws and lockwashers holding the plate and remove the plate from the chassis.

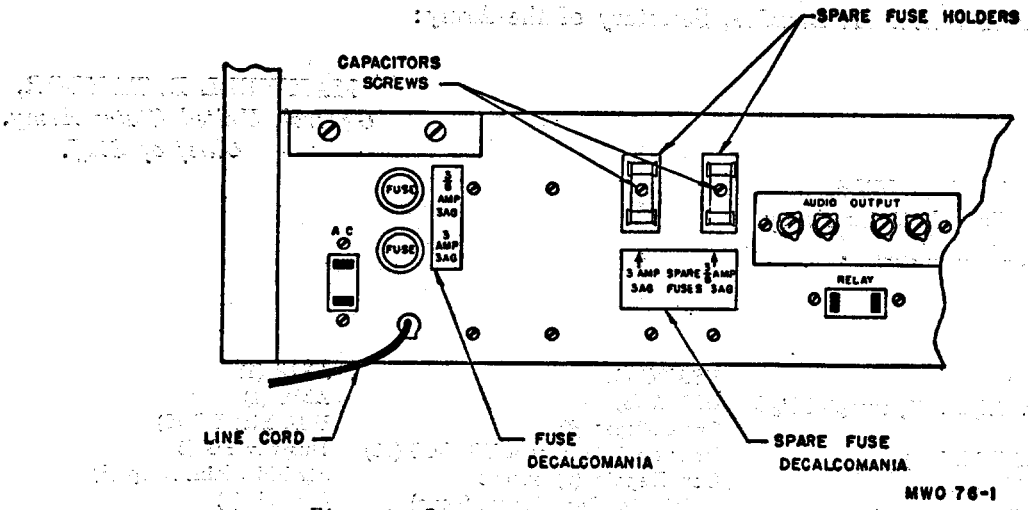

Figure 1. Location of spare fuseholders and decalcomanias.

c. Remove the fuse from the spare fuseholder that is located adjacent to the line fuseholder.

d. Examine the power transformer (T8) connections to determine whether a pigtail type solder-in fuse is wired in between terminal No. 11 and ground. If this fuse is present, clip the leads of the fuse and remove it from the circuit.

e. Connect and solder a suitable length of wire between the tip terminal of the fuseholder marked SPARE and terminal No. 11 of power transformer T8.

f. Connect and solder a suitable length of wire between the terminal located on the side of the fuseholder marked SPARE and terminal No. 20 of power transformer T8.

g. Remove the word SPARE which is adjacent to the spare fuseholder.

h. Apply the fuse decalcomania in the position shown in figure 1.

i. Insert a ⅜-ampere fuse in the newly wired fuseholder in accordance with instructions on the new decalcomania.

j. Examine the fuse in the line fuseholder. If it is not a 3-ampere fuse, remove it and replace with a 3-ampere fuse in accordance with instructions on the new decalcomania.

k. Remove the nuts, lockwashers, and screws that hold the top end of capacitors C151 and C160 (fig. 1) to the inside of the rear chassis wall.

l. Mount the two spare fuseholders in the position shown in figure 1. Use two new No. 6–32 thread × ½-inch long binding-head machine screws and the original lockwashers and nuts.

m. Apply the spare fuse decalcomania in the position shown in figure 1.

n. Insert a ⅜-ampere and a 3-ampere fuse in the new spare fuseholders as indicated on the decalcomania.

o. Check the newly made wiring with figure 2.

p. Replace the bottom plate using the original screws and lockwashers.

q. Replace the chassis in the rack or case. Use the original screws and lockwashers.

r. Check the overall performance of the receiver.

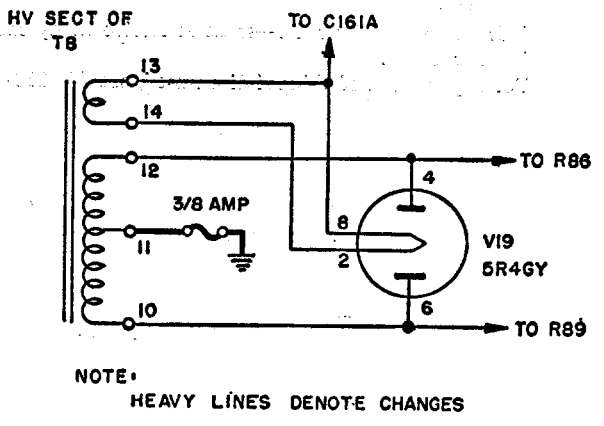

Figure 2. Circuit diagram for modified portion of the radio receiver.

11. Recording the Modification. Ink or paint MWO 11–5820–298–35/1 near the nomenclature plate on the front panel of the radio receiver. When modified equipment is packed or crated, clearly mark MWO 11–5820–298–35/1 on the exterior of the case or crate in a similar manner.

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

OFFICIAL:
HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

Distribution:
Active Army:

CNGB (1)
Technical Stf, DA (1) except CSigO (30)
Technical Stf Bd (1)
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USA Armor Bd (1)
USA Inf Bd (1)
USA Air Def Bd (1)
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USA Armor Bd Test Sec (1)
USA Air Def Bd Test Sec (1)
USA Arctic Test Bd (2)
US ARADCOM (2)
US ARADCOM Rgn (2)
OS Maj Comd (5)
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Gen Depots (2) except
Atlanta Gen Depot (none)
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Sig Sec, Gen Depots (5)
Sig Depots (15)
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USA Sig Msl Spt Agcy (5)
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USA Sig Pub Agcy (8)
USA Comm Agcy (2)
USA Sig Comm Engr Agcy (1)
US Army Pictorial Cen (2)
Engr Maint Cen (1)
WRAMC (1)
AFIP (1)
AMS (1)
USA Elct PG (2)
Dugway PG (5)
Sig Fld Maint Shop (3)
Sig Lab (5)
Mil Dist (1)
USA Corps (Res) (1)
Sector Comd, USA Corps (Res) (1)
JBUSMC (1)
Units organized under following TOE's:
11-7 (2)
11-16 (2)
11-57 (2)
11-500 (AA-AE) (2)
11-557 (2)
11-587 (2)
11-592 (2)
11-597 (2)
32-500 (2)

NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

U. S. GOVERNMENT PRINTING OFFICE: 1958

NORMAL

*MWO 11-5820-298-35/2

DEPARTMENT OF THE ARMY MODIFICATION WORK ORDER

MODIFICATION OF RADIO RECEIVERS R-274A/FRR, R-274C/FRR, R-320A/FRC, AND THE HAMMARLUND RADIO RECEIVERS SP-600-JX AND SP-600-JLX, TO IMPROVE SIGNAL-TO-NOISE RATIO ON AGC OR MGC OPERATION AND TO PREVENT BLOCKING OF THE FIRST MIXER TUBE

Headquarters, Department of the Army, Washington 25, D. C.

25 May 1959

1. Application. *a. Applied To.* All Radio Receivers R-320A/FRC and Hammerlund Radio Receivers SP-600-JX and SP-600-JLX procured before 1952 and all Radio Receivers R-274A/FRR and R-274C/FRR.

b. Category of Maintenance.

(1) *Field.* This MWO will be applied by *third echelon maintenance* personnel to equipment in the hands of using organizations. It will be applied as soon as possible within 1 year of the date of this publication, or within 1 year after the receipt of equipment that requires this modification. Organizations which do not have maintenance personnel qualified to perform maintenance in the echelon specified above, will request instructions from higher echelon maintenance facilities through command or established channels. When the applicable equipment is received by signal field maintenance facilities for other modifications or repairs, those facilities will perform this modification concurrently with such repairs or other modifications, if possible.

(2) *Depot.* This MWO will be applied as soon as practicable to all applicable equipment in Signal Corps depot stocks and also to applicable equipment undergoing depot maintenance. Depot schedules for application of this MWO will be established to anticipate demand and to assure application to applicable equipment prior to issue by the depot.

c. Applied By. Field radio repairman (MOS 296).

d. Time Required. Approximately 4 man-hours.

e. Remarks. Equipments modified in accordance with MWO SIG 89, 21 December 1953, and Changes No. 1, 18 May 1956, need not be re-modified.

2. Supply of Parts Required. *a. Source of Supply.*

(1) The *kit* will be requisitioned separately through channels by the third echelon maintenance organization, on

* This modification work order supersedes MWO SIG 89, 21 December 1953, including C 1, 18 May 1956.

a nonreimbursable basis, within the time limit established in paragraph 1*b*, citing this MWO and date as authority. Requisitions for field requirements received after the time limit prescribed in paragraph 1*b* will cite consumer funds for stock fund reimbursement.

(2) The kit will be requisitioned separately through channels by Signal Corps depot shops citing this MWO and date as authority.

(3) The kit is available in the supply system.

b. New Parts Required.

Stock No.	*Quantity (ea)*	*Nomenclature or description*
5820–392–5860	1	Kit, Modification: For radio receivers R274A/FRR, R–274C/FRR, R–320A/FRC, and Hammerlund radio receivers SP–600–JX, and SP–600–JLX to improve signal-to- noise ratio on AGC and MGC operation and to prevent blocking of the first mixer tube.
		This kit consists of:
	3	Capacitor: fixed; mica; 1 sect; 300 vdcw; 10,000 mmf ± 5%; rect shape; case matl low loss plastic; 11/32 in. max d x 53/64 in. max h x 53/64 in. max w; term, 2 axial wire un-insulated wire leads; term ins fr case; mtg facilities not incl; spec JAN–C–5 type No. CM35B103J. FSN 5910–100–8142.
	2	CAPACITOR: fixed; paper, 10,000 mmf ± 20%; 600 ydcw; HS ins metal case; 1 5/16 in. lg x ½ in. dia; 2 axial wire leads; spec No. MIL–C–25A. FSN 5910–112–7598. #CP26A1EF103M.
	1	LABEL: per CigC Dwg No. SC–B–98514.
	1	RESISTOR-CAPACITOR TERMINAL BOARD ASSEMBLY: consisting of bakelite terminal board w/10 post terminals, 2 of which are also screw type; to which are mounted resistors R48, R115, R116, R94, and capacitors C163 and C167, per SigC Dwg No. SC–DL–60452. FSN 5820–030–0110.
	1	RESISTOR: fixed; comp; ins; 390 ohms ± 5%; ½ w; spec No. MIL–R–11. FSN 5905–279–1890.
	1	RESISTOR: fixed; comp; ins; 510 ohms ± 5%; ½ w; spec No. MIL–R–11. FSN 5905–114–1595.
	1	RESISTOR: fixed; comp; ins; 1000 ohms ± 10% ½ w; spec No. MIL–R–11. FSN 5905–195–6817.
	1	RESISTOR: fixed; comp; ins; 10,000 ohms ± 10% ½ w; spec No. MIL–R–11.
	2	RESISTOR: fixed; comp; ins; 33,000 ohms ± 10%; ½ w; spec No. MIL–R–11. FSN 5905–117–4331.
	2	RESISTOR: fixed; comp; ins; 22,000 ohms ± 10%; ½ w; spec No. MIL–R–11. FSN 5905–279–2029.
	1	RESISTOR: fixed; power WW; 7,500 ohms ± 5%; 17 w; 2 in. lg x 19/32 in. dia; MIL–R–26 type No. RW32V752.
	1	RESISTOR: fixed; power WW; 10,000 ohms ± 5%; 17 w; 2 in. lg x 19/32 in. dia; MIL–R–26 type No. RW32V103. FSN 5905–284–3609.
	2	Lockwasher: rd steel; No. 6 size; SigC std No. 104–3S–6B. FSN 5310–186–7454.
	2	NUT, HEXAGONAL: brass; No. 6–32; SigC std No. 102–3B–6. FSN 5310–011–3102.
	2	SCREW, MACHINE: panhead; brass; No. 6–32 x 2½ in. lg; SigC std No. 100–1B6–40; per specs FF–S–92 and QQ–P–416.
	4	TERMINAL LUG: ring type; phospher-bronze; shakeproof type 2104–06–00. FSN 5940–642–3900.

Stock No.	Quantity (ea)	Nomenclature or description
	2	WASHER, FLAT: rd; brass; No. 6; SigC std No. 104–1B–6M. FSN 5310–595–6458.
	4	WASHER: cupped for No. 6 screw; Model Eng and Mfg Co., Inc. part No. 11003, or equal.
	4	WASHER: mica; ¼ in. id x ¾ in. od x 1/16 in. thk; Hammarlund Mfg Co., Inc. dwg No. 10002M part No. 62, or equal.
	18 in.	WIRE, ELECTRICAL; ins; stranded; No. 22 AWG; 1000 v max working; color coded black w/white tr. FSN 6145–500–4210.
	18 in.	WIRE, ELECTRICAL: ins; stranded; No. 22 AWG; 1000 v max working; color coded red w/green tr. FSN 6145–500–4211.
	36 in.	WIRE, ELECTRICAL: ins; stranded; No. 22 AWG; 1000 v max working; color coded orange w/green tr. FSN 6145–295–0805.
	18 in.	WIRE, ELECTRICAL: ins; stranded; No. 22 AWG; 1000 v max working; color coded green w/red tr. FSN 6145–500–4212.
	18 in.	WIRE, ELECTRICAL: ins; stranded; No. 22 AWG; 1000 v max working; color coded green w/white tr. FSN 6145–500–4213.
	18 in.	WIRE, ELECTRICAL: ins; stranded; No. 22 AWG; 1000 v max working; color coded white w/black tr. FSN 6145–284–0648.
	18 in.	WIRE, ELECTRICAL: ins; stranded; No. 22 AWG; 1000 v max working; color coded white w/blue tr. FSN 6145–295–1253.

Note a. In some modification kits the following items may be missing and must be requisitioned separately:

Quantity	Nomenclature or description
1	Capacitor; fixed; paper FSN 5910-112-7598.
2	Resistor: fixed; comp; ins; 22000 ohms ± 10%; ½ w. FSN 5905-279-2029.

Note b. In some modification kits, there may be a few wires that are not color coded in accordance with new parts required. In this event, the wires so coded may be used without regard to the color code requirements of the modification procedure.

3. Purpose of Modification. *a.* To improve the signal-to-noise ratio on agc or mgc operation by revising the distribution of the gain control voltages.

b. To provide performance in direction finding applications by providing a special agc voltage tap.

c. To prevent grid block of the first mixer tube by removing coupling capacitor C45.

4. Priority of Classification. Normal.

5. Major Items Affected.

Name: Radio Receiver R–274A/FRR.
Federal stock No.: 5820–187–3143.
Name: Radio Receiver R–274C/FRR.
Federal stock No.: 5820–187–3143.
Name: Radio Receiver R–320A/FRC.
Federal stock No.: 5820–503–1243.
Name: Hammarlund Radio Receivers SP–600–JX and SP–600–JLX.
Federal stock No.: None.
Reference: TM 11–851, Radio Set SCR–244–D and Radio Receivers R–274A/FRR, R–274C/FRR, R–320A/FRC, R–483/FRR, and R–483A/FRR.

6. Assembly or Component Affected.

Name: RF Strip.
Federal stock No.: None.
Name: RF Tuning Turret Rotor Assembly.
Federal stock No.: None.

7. Parts Affected. *a. Parts Modified.* RF interstage subassemblies for bands 5 and 6.

b. Parts Removed.

Federal stock No.	Quantity (ea)	Nomenclature or description
5910–101–5614	1	Capacitor: mica; 100 $\mu\mu$f.
	1	Capacitor: paper; bath tube type; dual .05 mfd; CP53B6EF503V.
5910–112–7598	1	Capacitor: paper; .01 mfd.
5910–112–7000	1	Capacitor: paper; .25 mfd.
5310–209–5117	3	Lockwashers: for No. 6 screw.
	3	Nut: steel; zinc coated; 6–32 thd.
5905–114–1595	1	Resistor, fixed: ½ w; 510 ohms.
5905–114–2554	1	Resistor, fixed: ½ w; 1,100 ohms.
5905–117–4331	2	Resistor, fixed: ½ w; 33,000 ohms.
	3	Screw, machine: RH steel; 6–32 thd x ⅜ in. lg; Sig C stock No. 6L6632–6.49S, or equal.
	1	Terminal strip: 8 solder type term.
5310–596–7579	3	Washers: flat, brass for No. 6 screw.

c. Disposal of Removed Parts. In accordance with paragraph 7*b* and *c*, AR 735–11.

8. Drawings Required To Apply Modification. Only the illustrations in this MWO, and figure 19, TM 11–851.

9. Special Tools, Jigs, and Fixtures Required. None.

10. Modification Procedure.

Note a. Read the complete procedure prior to performing this modification.

Note b. In some radio receivers many of the following changes will have been incorporated in the process of manufacture. Examine each radio receiver carefully to determine which of the following modifications are necessary.

a. Installation of New Filter Capacitors Across AC Receptacle J5.

(1) Remove all external leads and connections from the radio receiver.

(2) Remove the 8 screws, flat washers, and lockwashers that hold the radio receiver to the cabinet or rack, and remove the receiver.

(3) Remove the 4 screws that hold the bottom plate to the receiver and remove the plate.

(4) Unsolder and remove the lead connected between the terminals of capacitor C152A and ac receptacle J5.

(5) Unsolder and remove the lead connected between the terminal of capacitor C152B and terminal No. 1 of transformer T8.

(6) Remove the 2 screws, lockwashers, and nuts that hold dual capacitor C152A and C152B to the side panel of the receiver chassis and remove the dual capacitor.

(7) Remove the 2 screws, lockwashers, and nuts that hold ac receptacle J5 to the rear panel of the receiver chassis.

(8) Remount the ac receptacle in its original position, using the original hardware, and place a terminal lug on each screw between the panel and the ac receptacle J5, as shown at A, figure 1.

(9) Connect and solder the new rectangular capacitor C152 (.01 mfd) between the terminal of receptacle J5 and solder lug, as shown at A, figure 2.

(10) Connect and solder new rectangular capacitor C168 (.01 mfd) between the terminal of receptacle J5 and the solder lug, as shown at B, figure 2.

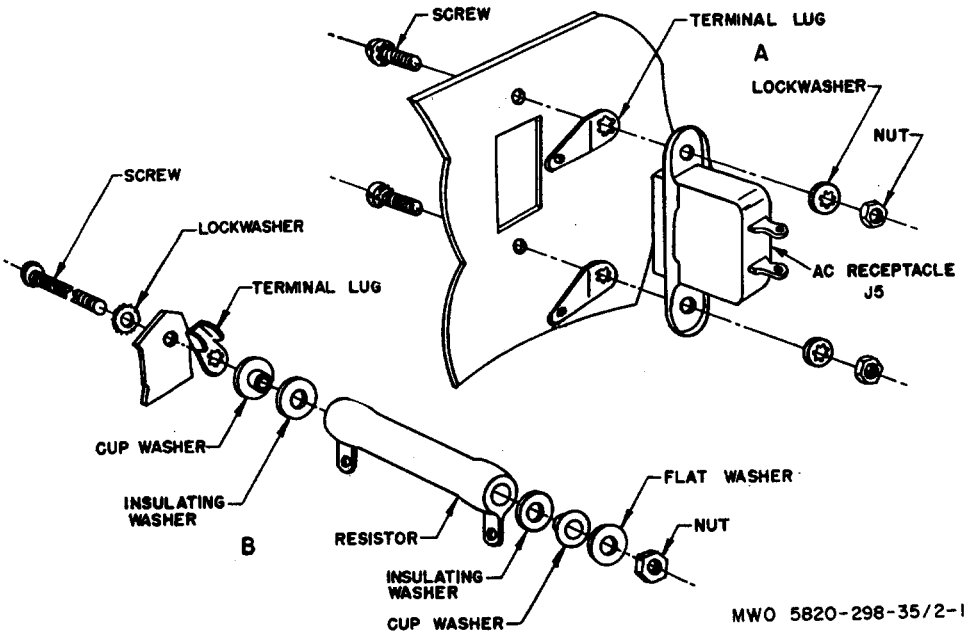


Figure 1. Exploded view of resistor and installation of terminal lugs.

b. Mounting of Resistors R72 and R73, and Removal of Resistors R148 and R53.

(1) Mount new resistor R73 (10K ohm, 17w) at the location of one of the existing mounting holes previously used to support dual capacitor C152, as shown at C, figure 2. Use a No. 6–32 x 2½-inch-long RHM screw, washers, terminal lug, and nut, as shown at B, figure 1.

(2) Mount new resistor R72 (7.5K ohms, 17w) at the location of the other existing mounting hole previously used to support dual capacitor C152, as shown at C, figure 2. Use a No. 6–32 x 2½-inch-long RHM screw, washers, and nut, as shown at B, figure 1.

(3) Connect and solder a suitable length of No. 22 AWG black-white wire between terminal No. 1 of resistor R73 and the terminal lug, as shown at C in figure 2.

(4) Connect and solder a suitable length of No. 22 AWG green-red wire between terminal No. 1 of resistor R72 and terminal No. 2 of resistor R73, as shown at C, figure 2.

(5) Unsolder and remove resistor R48 (33K ohms) connected between pin No. 6 of tube socket V9 and terminal No. 4 of terminal board E17.

(6) Unsolder and remove resistor R53 (33K ohms) connected between pin No. 6 of tube socket V10 and terminal No. 11 of terminal board E17.

(7) Connect and solder a suitable length of No. 22 AWG orange-green wire between pin No. 6 of tube socket V9 and pin No. 6 of tube socket V10, as shown at A, figure 3.

(8) Connect and solder a suitable length of No. 22 AWG orange-green wire between pin No. 6 of tube socket V10 and the junction of resistors R72 and R73, shown at C, figure 2.

c. Changes in the AGC–MGC Circuit

(1) In some radio receivers, a 510 ohm-resistor (R32) will be found connected between pin No. 1 of tube socket V7 and ground. In these receivers, this resistor should be moved, and a new 510-ohm resistor (R32) should be connected and soldered between pin No. 1 of tube socket V7 and terminal No. 1 of terminal board E17, as shown at B, figure 3.

(2) In some receivers, pin No. 7 of tube socket V7 will be found connected

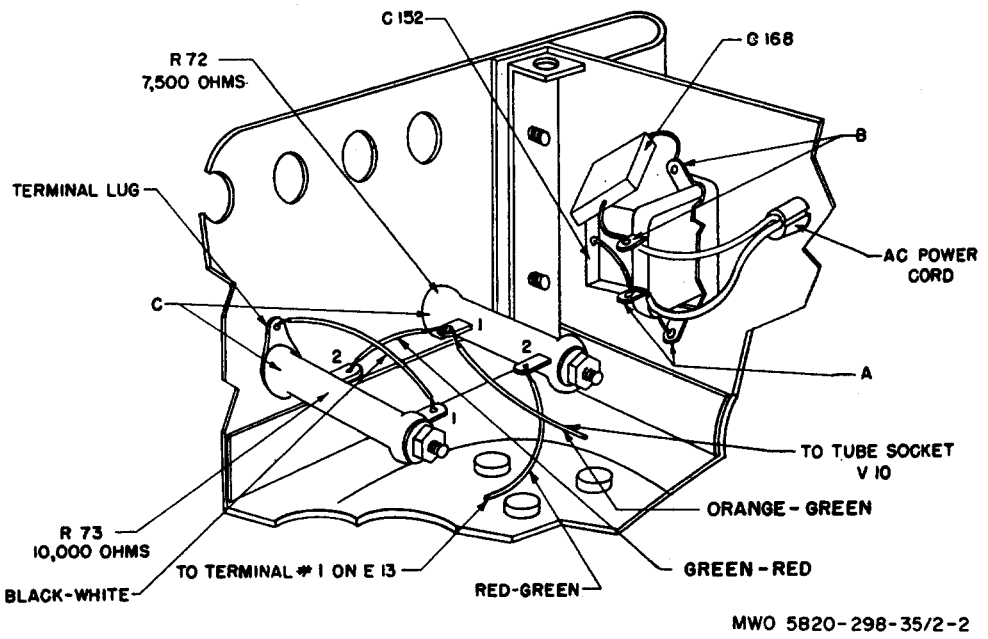


Figure 2. New locations of resistors R72 and R73, and capacitors C152 and C168.

directly to ground. In these receivers, remove the ground leads, and connect and solder a new 390-ohm resistor (R112) between pin No. 7 of tube socket V7 and the ground terminal of terminal board E17, as shown at C, figure 3. Connect and solder a new ground lead between pin No. 2 of tube socket V7 and the adjacent ground terminal.

(3) Connect and solder a new 10K-ohm resistor (R53) between terminals No. 1 and No. 3 of terminal board E17, as shown at D, figure 3, if this resistor does not already exist, or if it is of a value other than 10K ohms.

(4) Unsolder and remove the green-white lead from terminal No. 8 (ground lug) of terminal board E14, and connect and solder this lead to terminal No. 1 of terminal board E17, as shown at E, figure 3.

(5) Connect and solder a .01-mfd, 600-volt, tubular capacitor (C165) between terminal No. 1 of terminal board E17 and ground, as shown at F, figure 3, if capacitor C100 is not already installed in the same position.

(6) Unsolder and remove the blue-white lead connected to terminal No. 1 of transformer T2, and tape the exposed end. Tape this lead to the main wiring cable.

(7) Connect and solder a suitable length of No. 22 AWG white-black wire between terminal No. 1 of transformer T2 and terminal No. 13 of terminal board E17, as shown at G, figure 3.

d. Removal and Relocation of Jumper.

(1) Examine terminal board E17 for a jumper between terminals No. 3 and No. 9. If this jumper exists, remove it.

(2) Connect and solder a suitable length of No. 22 AWG white-black wire between terminals No. 3 and No. 6 of terminal board E17, as shown at H, figure 3, if this lead is not already installed.

e. Addition of Capacitor C169. Examine the radio receiver being modified for the presence of the diode output and AVC terminal board E3 on the rear panel. If E3 exists, connect and solder a .01 mfd rectangular capacitor on the inner side of the terminal board between the AVC negative terminal and the ground terminal, if the same type capacitor is not already installed between those terminals.

f. Installation of New Terminal Board E13.

(1) Examine the radio receiver being

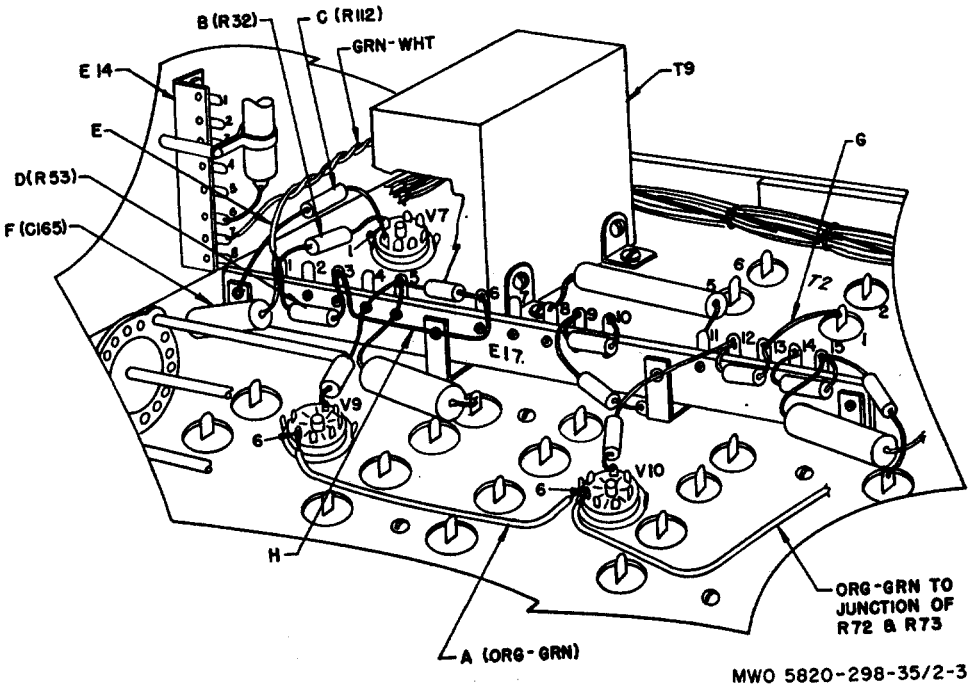


Figure 3. New component and wiring changes at terminal board E17.

modified for the presence of the .25 mfd capacitor (C163) in the position shown at A, figure 4. If one exists, remove it as explained below.

(2) Remove the 15 screws and lockwashers that hold the bottom cover to the tuning unit housing and remove the cover.

(3) Remove the screw, lockwasher, and nut that hold the capacitor to the tuning unit housing and remove the capacitor.

Note. The new .25 mfd capacitor (C163) will be found mounted on the new terminal board E13.

(4) Unsolder and remove the five leads connected to the power filter-choke subassembly. Tag the leads for identification.

(5) Remove the four screws and lockwashers, shown at B, figure 4, that hold the power filter-choke subassembly to the chassis and lift the subassembly from the chassis. This will permit access to terminal board E13, and to the leads, for removal and replacement with the new terminal board E13.

(6) Unsolder and remove all the leads from old terminal board E13.

(7) Remove the nuts and lockwashers from the two screws that hold the old terminal board E13 to the chassis and remove the terminal board.

(8) Mount new terminal board E13 in the position previously held by the old terminal board, using the original screws, lockwashers, and nuts.

(9) Connect and solder the lads removed from the old terminal board to the new terminal board in accordance with figure 5.

Note. On receivers which do not incorporate a crystal control, connect and solder a jumper between terminals No. 2 and No. 3 of terminal board E13.

(10) Connect and solder a suitable length of No. 22 AWG red-green wire between terminal No. 1 of new terminal board E13 and terminal No. 2 of resistor R72, shown at C, figure 2.

(11) Connect and solder a terminal lug to the white-black lead originating at transformer T1 and connect it to terminal No. 8 of new terminal board E13.

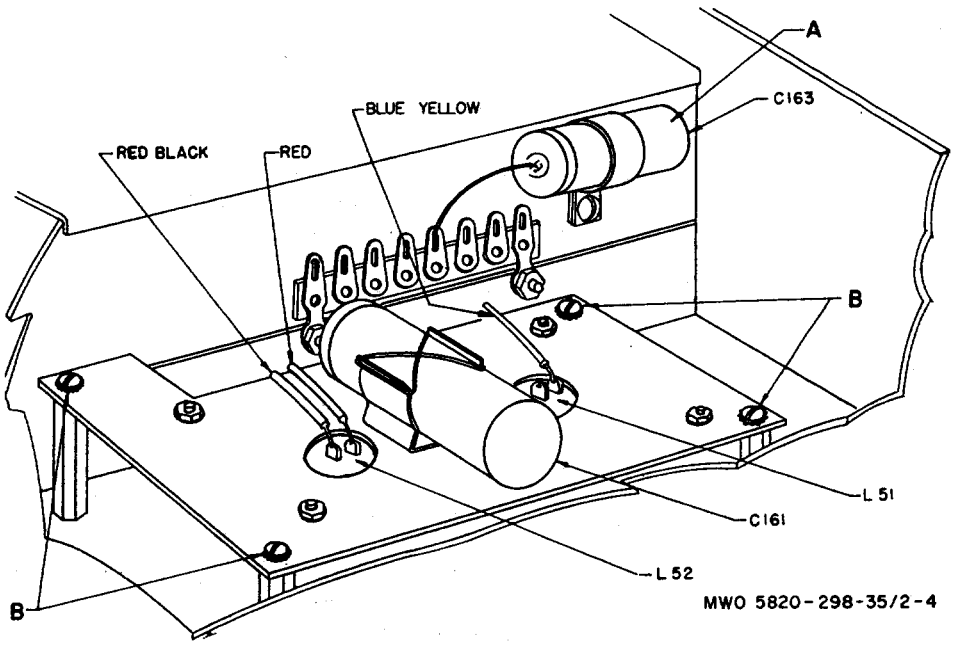


Figure 4. Original location of capacitor C163.

(12) Replace the power filter-choke subassembly in its original position, using the original hardware.

(13) Reconnect and solder the five leads from the chassis to the power filter-choke subassembly in their original positions.

g. Reconnection of RF Gain Control R93.

(1) Loosen the two Allen setscrews that hold the knob to the RF gain control (R93) shaft and remove the knob.

(2) Remove the locknut that holds the RF gain control to the front panel and pull the RF gain control in and up sufficiently to permit access to the terminals.

(3) Unsolder and remove the white-blue leads from terminal No. 3 of the RF gain control (R93).

(4) Cut and tape the exposed end of the white-blue lead and tape the lead to the main wire cable.

(5) Connect and solder a suitable length of No. 22 AWG white-blue wire between terminal No. 3 of the RF gain control and terminal No. 6 of new terminal board E13, as indicated in figure 5, and tape this lead to the existing cable.

(6) Replace the RF gain control on the panel in its original position, using the original locknut.

(7) Replace the knob in its original position on the shaft of the RF gain control and retighten the Allen setscrews.

h. Removal of Resistor R94 (1,100 Ohms) From Transformer T2.

(1) Remove the four screws and lockwashers that hold the cover of transformer T2 to the chassis and remove the cover.

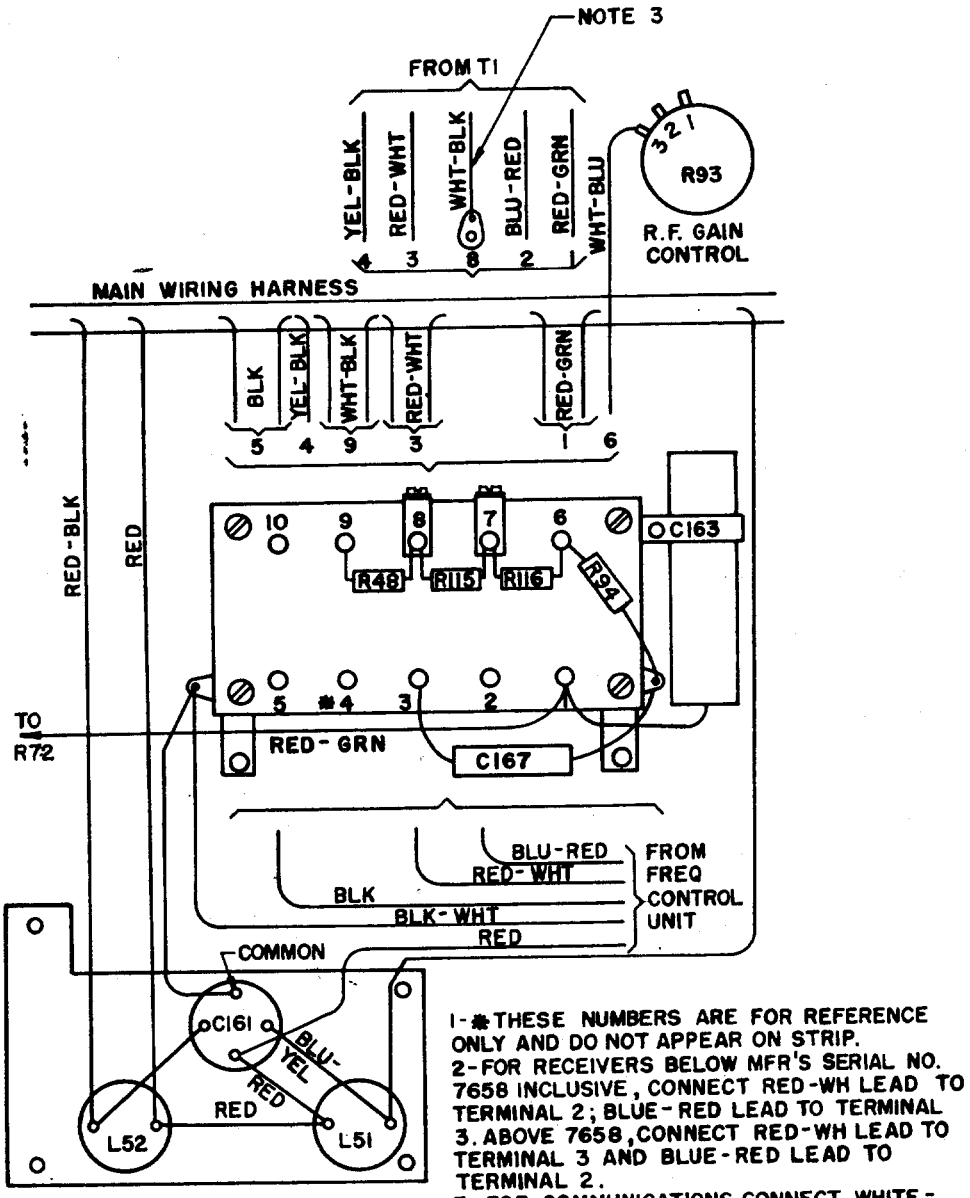
(2) Examine transformer T2 to determine whether resistor R94 exists. Where this resistor exists as shown at A, figure 6, cut and remove it from the transformer.

(3) Replace the transformer cover in its original position, using the original hardware.

Note. The new resistor R94 (1,100 ohms) will be found mounted on new terminal board E13.

i. Modification of RF Strip.

(1) Remove the 10 screws and lockwashers that hold the top cover to the capa-



1-*THESE NUMBERS ARE FOR REFERENCE ONLY AND DO NOT APPEAR ON STRIP.
2-FOR RECEIVERS BELOW MFR'S SERIAL NO. 7658 INCLUSIVE, CONNECT RED-WH LEAD TO TERMINAL 2; BLUE-RED LEAD TO TERMINAL 3. ABOVE 7658, CONNECT RED-WH LEAD TO TERMINAL 3 AND BLUE-RED LEAD TO TERMINAL 2.
3-FOR COMMUNICATIONS CONNECT WHITE-BLACK LEAD TO TERMINAL 8. FOR DIRECTION FINDING USE, CONNECT TO TERMINAL 7.

MWO 5820-298-35/2-5

Figure 5. Lead connections to new terminal board E13.

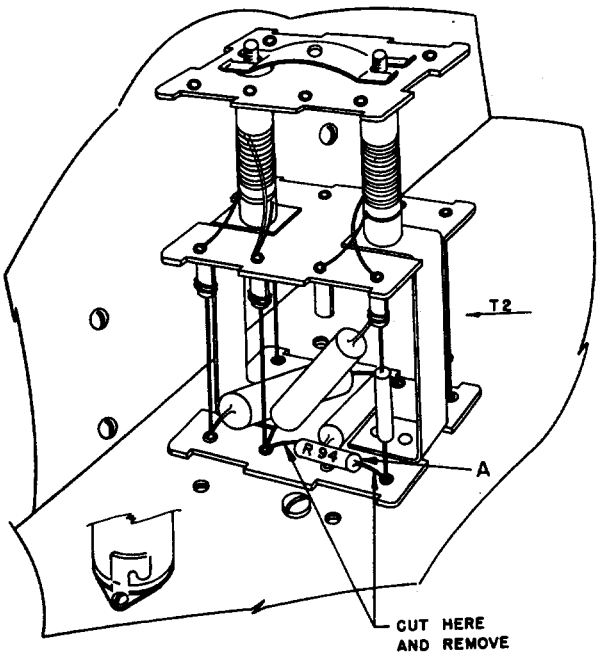


Figure 6. Original location of resistor R94.

citor tuning unit housing and remove the cover.

(2) Unsolder and remove the 12 leads and 4 ground straps connected to the tuning capacitor terminals which terminate at the RF strip. Note their respective positions.

(3) Remove the two cap nuts that hold the cover to transformer T1 and remove the cover.

(4) Unsolder and remove the seven leads connected to the transformer T1 terminal board that terminate at the RF strip and tag the leads for identification. Refer to figure 7 for connections to the unmodified RF strip.

(5) Unsolder and remove the bare wire connected to switch S3 that passes through the ceramic bushing located on the top front of the RF strip.

Caution: **The band change switch must be turned to a position halfway between any two frequency bands before complete removal of the RF strip is attempted. Do not change the position of the switch until the RF strip is reconnected and fastened in place; otherwise, damage will result.**

(6) Remove the eight screws and lockwashers that hold the RF strip to the capacitor tuning unit housing and remove the RF strip.

(7) Examine RF section C of the RF strip for the presence of capacitor C45 in the position shown at A, figure 7.

(8) If capacitor C45 exists in this position, unsolder and remove the capacitor from pin No. 7 of tube socket V5 and terminal No. 6 of the ceramic switch stator S1C, as shown in figure 7.

(9) Connect and solder a suitable length of No. 22 AWG green-white wire between pin No. 7 of tube socket V5 and terminal No. 6 of the ceramic switch stator S1C, as shown at A, figure 8.

(10) Examine RF section B of the RF strip for presence of capacitor C165 in the position shown at B, figure 7.

(11) If the capacitor is in this position, unsolder and remove the .01 mfd capacitor (C165) from terminal B2 of the RF strip and ground terminal GT2, shown at B, figure 7.

(12) Check resistor R3 for proper resistance value. It is located in RF section A, and connected between pin No. 6 of tube socket V1 and the junction of resistor R4 and capacitor C21, as shown at C, figure 7. If this resistor is other than 33,000 ohms, replace it with a 33,000-ohm, ½-watt resistor.

Caution: **When mounting resistors R3, R14, R114, and capacitor C166, do not block the holes used for entrance of the alinement tool.**

(13) Check resistor R14 for proper resistance value. It is located in RF section B, and connected between pin No. 6 of tube socket V2 and the junction of resistor R114 and capacitor C166, shown at D, figure 7. If this resistor is other than 33,000 ohms, replace it with a 33,000-ohm, ½-watt resistor.

Note. In some receivers, resistor R14 is connected between pin No. 6 of tube socket

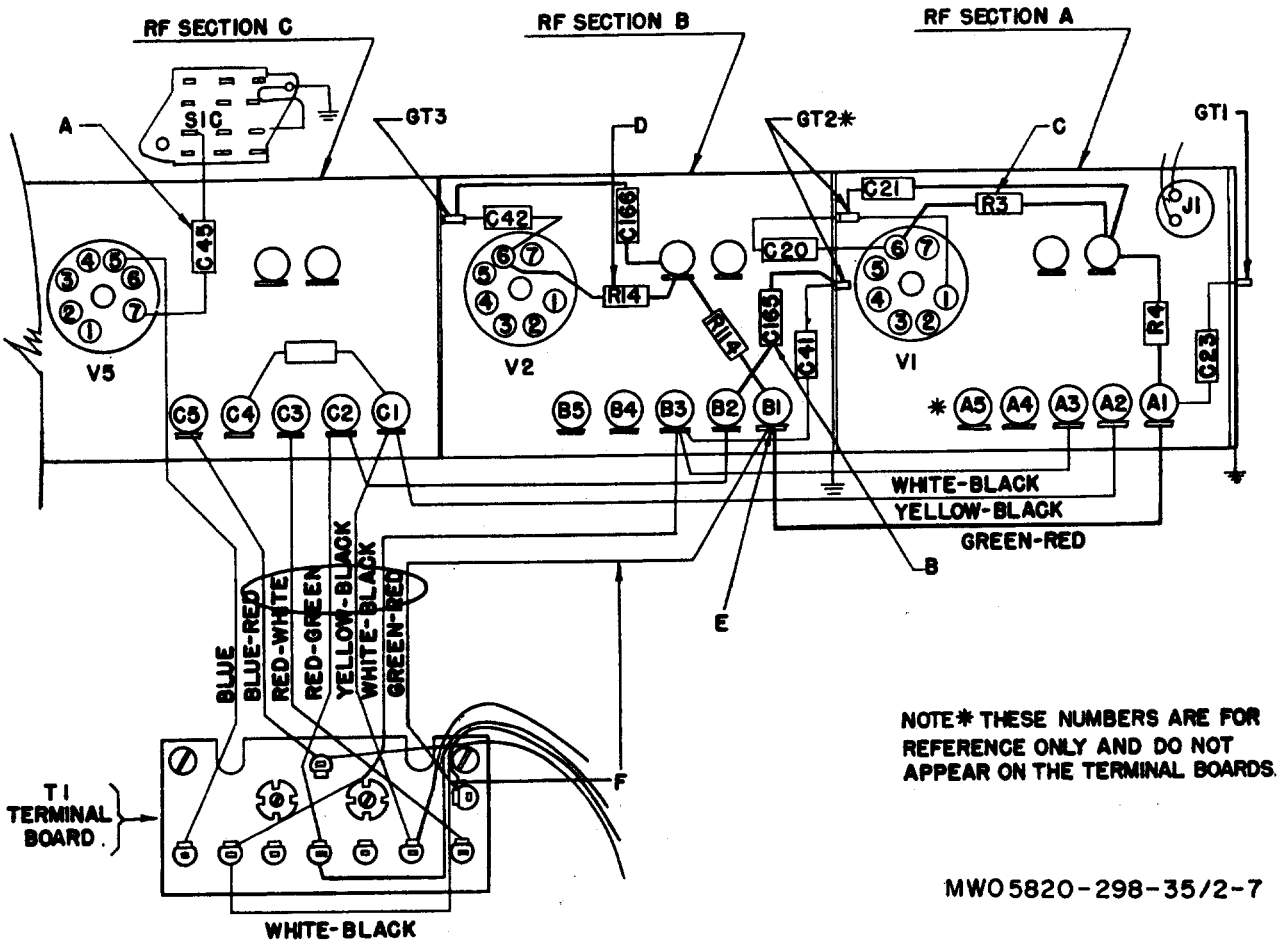


Figure 7. Original wiring of RF strip.

V2 and the junction of resistors R5 and R6. In these sets, resistor R14 should be reconnected in accordance with figure 8.

(14) Connect and solder a .01 mfd, 600 vdcw tubular capacitor (C166) between terminal B1 and chassis ground terminal GT3, as shown in figure 8, if a capacitor is not already connected in this position.

(15) Unsolder and remove the green-red lead connected to terminal B1, shown at E, figure 7 (the other end of the lead terminates at terminal A1), and connect and solder it to terminal B2, as shown at B, figure 8.

(16) Unsolder and remove the green-red lead shown at F, figure 7 from terminal B1, and remove from the plastic sleeve.

(17) Connect and solder a 1,000-ohm, ½-watt resistor (R114) between terminals B1 and B2, as shown in figure 8, if a 1,000-ohm resistor is not at this location.

(18) Check the wiring for conformity with figures 8 and 9.

(19) Replace the RF strip in its original position, using the original hardware.

(20) Reconnect and solder the remaining six original leads to the terminal board of transformer T1.

(21) Reconnect and solder in their original positions the 12 leads and 4 ground straps that connect the RF strip with the tuning capacitor terminals.

(22) Replace the cover to transformer T1, using the original cap nuts.

(23) Reconnect and solder the bare wire lead to switch S3 in its original position.

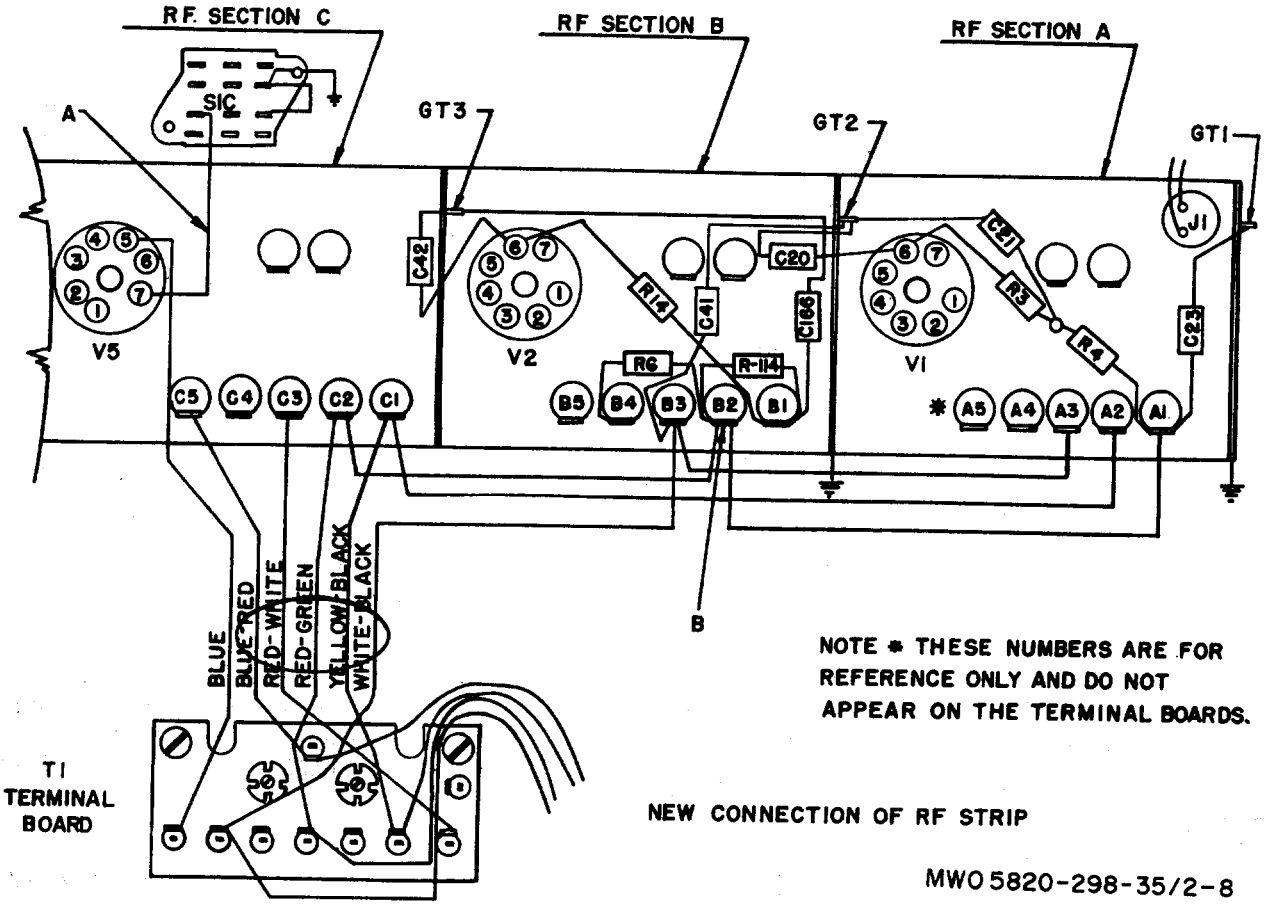


Figure 8. New connection of RF strip.

(24) Replace the top cover to the capacitor tuning unit housing in its original position, using the original hardware.

j. Modification of RF Interstage Subassemblies.

(1) Set the band change switch to band 3, as indicated at A, figure 10. This will bring the RF interstage subassemblies for bands 5 and 6 to the bottom and accessible for easy removal (B, fig. 10).

(2) Place the receiver in a position to permit access to RF interstage subassemblies.

(3) Using the special pliers (FSN 5120–293–3476), remove the flat springs that hold the RF interstage subassemblies for bands 5 and 6 to the RF tuning unit rotary turret. Remove the subassemblies. For removal procedure, refer to figure 19 and paragraph 90*a*, TM 11–851.

(4) Connect and solder a 22,000-ohm, ½-watt resistor across capacitor C57 in the RF interstage subassembly for band 5, as shown at A, figure 11.

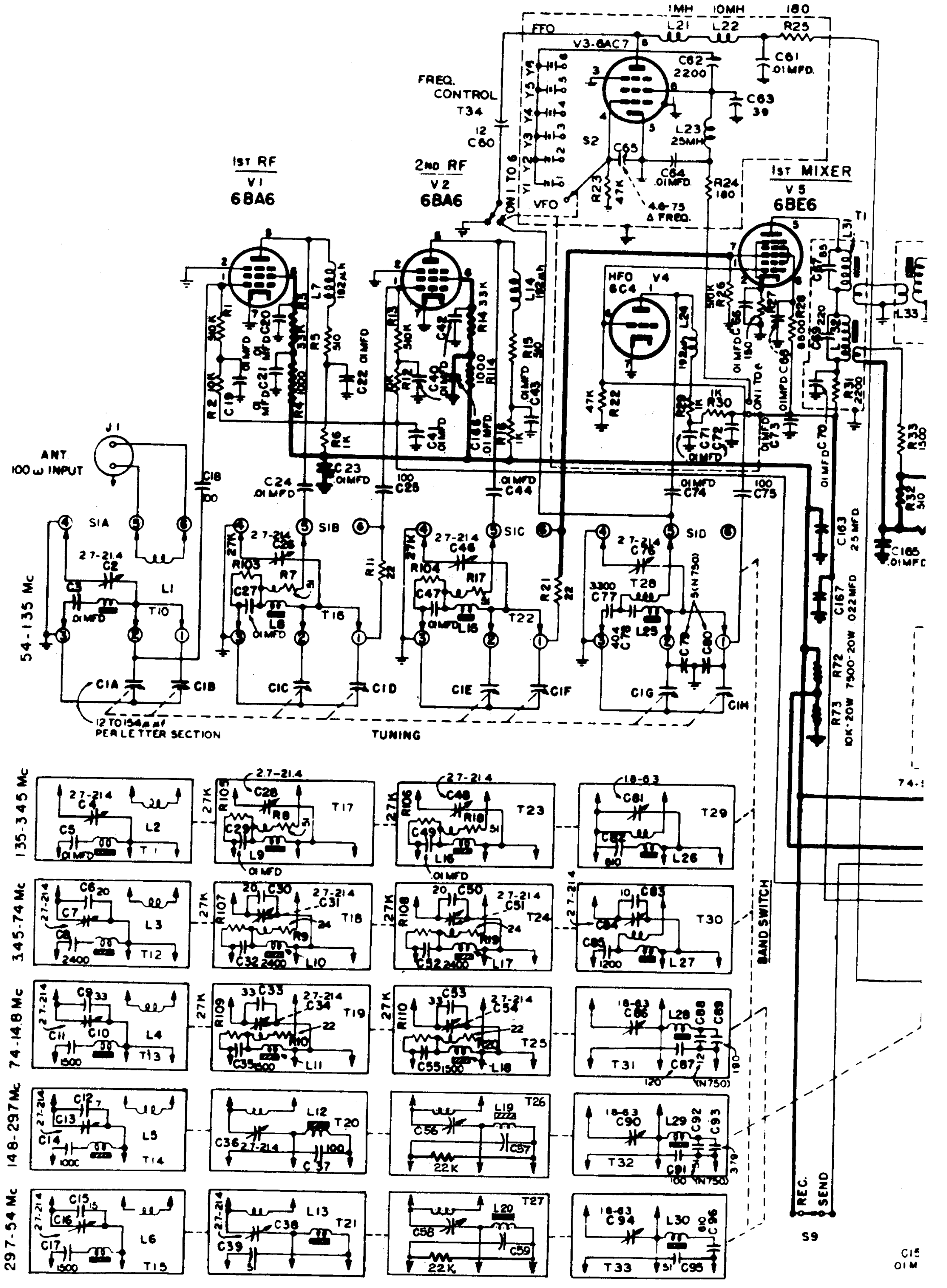
(5) Check the wiring for conformity with the diagram at A, figure 12.

(6) Connect and solder a 22,000-ohm, ½-watt resistor across capacitor C59 in the RF interstage subassembly for band 6, as shown at B, figure 11.

(7) Check the wiring for conformity with the diagram at B, figure 12.

(8) Replace the RF interstage subassemblies for bands 5 and 6 to the RF tuning unit rotary turret in their original position, using the original flat springs.

(9) Replace the bottom cover to the tuning



1st RF
V1
6BA6
2nd RF
V2
6BA6
1st MIXER
V5
6BE6
HFO V4
6C4
VFO
V3-6AC7
FREQ.
CONTROL
T34
1MH
L21
10MH
L22
180
R25
C61
.01MFD.
C62
2200
C63
39
L23
25MH
C64
.01MFD.
R24
180
C65
4.6-75
Δ FREQ.
R23
47K
S2
Y1 Y2 Y3 Y4 Y5 Y6
12
C60
ON 1 TO 6
J1
ANT.
100 ω INPUT
S1A
S1B
S1C
S1D
54-135 Mc
135-345 Mc
345-74 Mc
74-148 Mc
148-297 Mc
297-54 Mc
C1A
C1B
C1C
C1D
C1E
C1F
C1G
C1H
12 TO 154 μμf
PER LETTER SECTION
TUNING
BAND SWITCH
REC.
SEND
S9
L1
T10
T16
T22
T28
T17
T23
T29
L2
T11
L3
T12
T18
T24
T30
L4
T13
T19
T25
T31
L5
T14
T20
T26
T32
L6
T15
T21
T27
T33
R72
7500-20W
R73
10K-20W
C163
25 MFD
C167
0.22 MFD
C165
.01MFD
T1

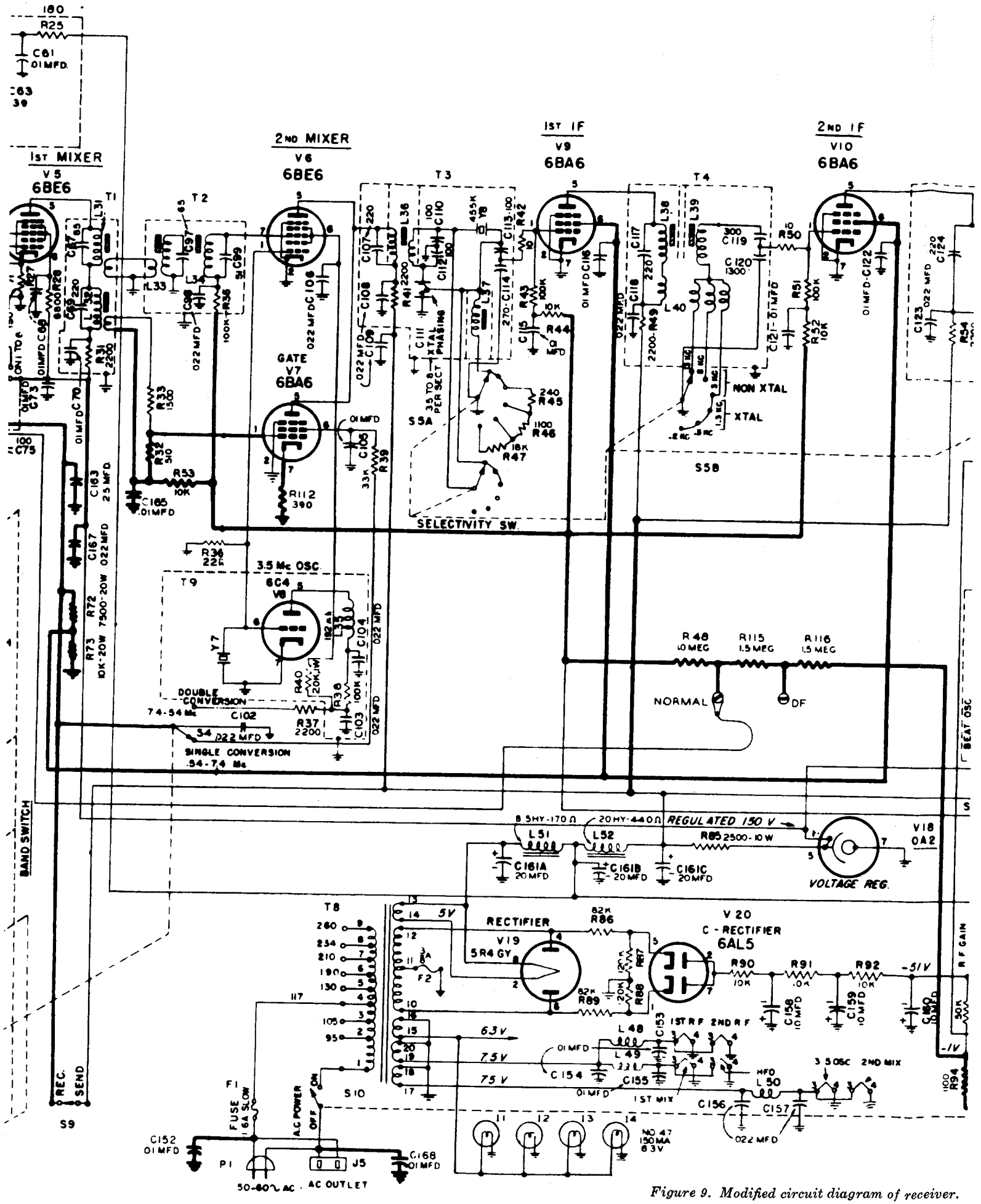
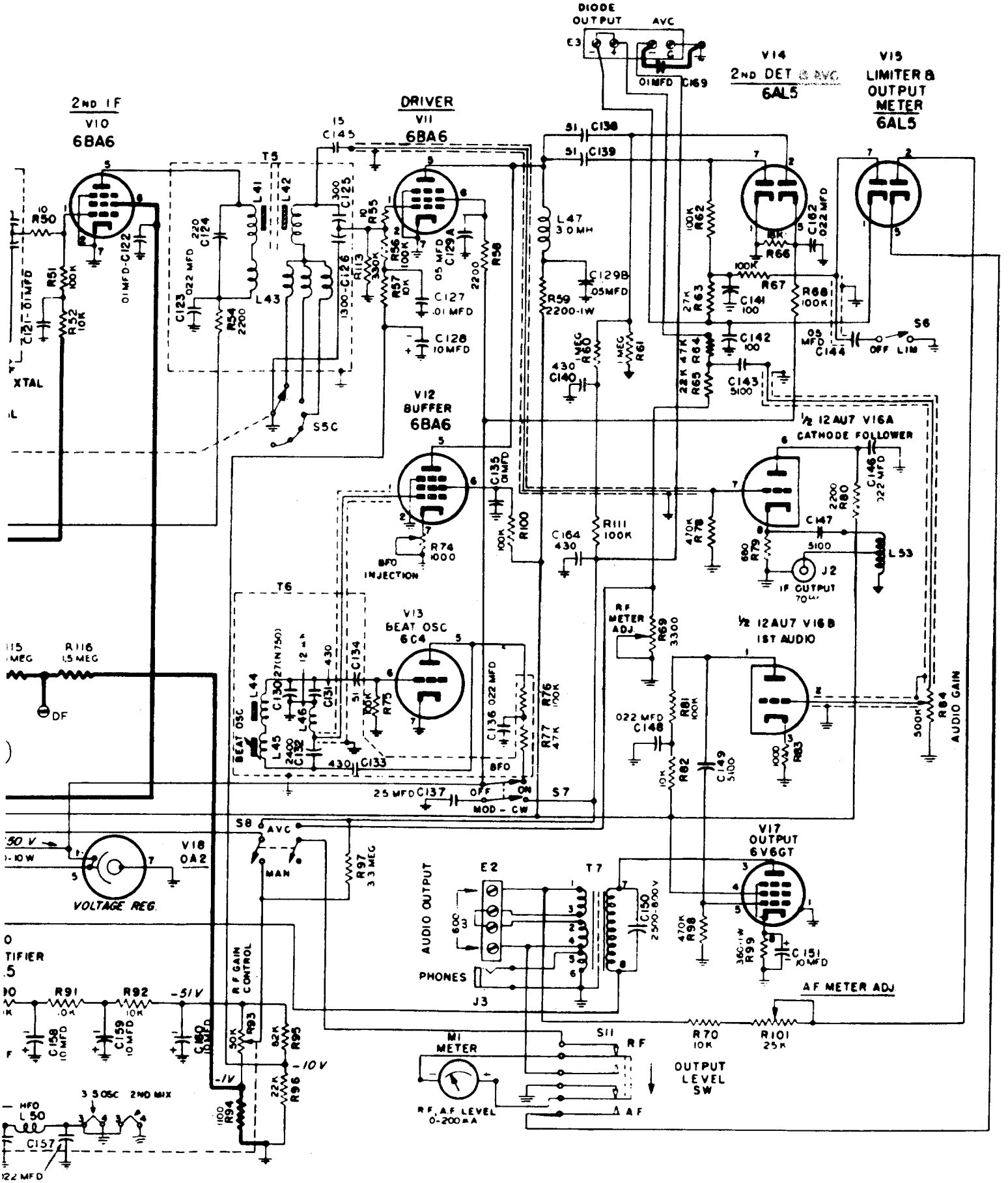


Figure 9. Modified circuit diagram of receiver.



NOTE: HEAVY LINES DENOTE MODIFICATION.

odified circuit diagram of receiver.

MWO5820-298-35/2-9

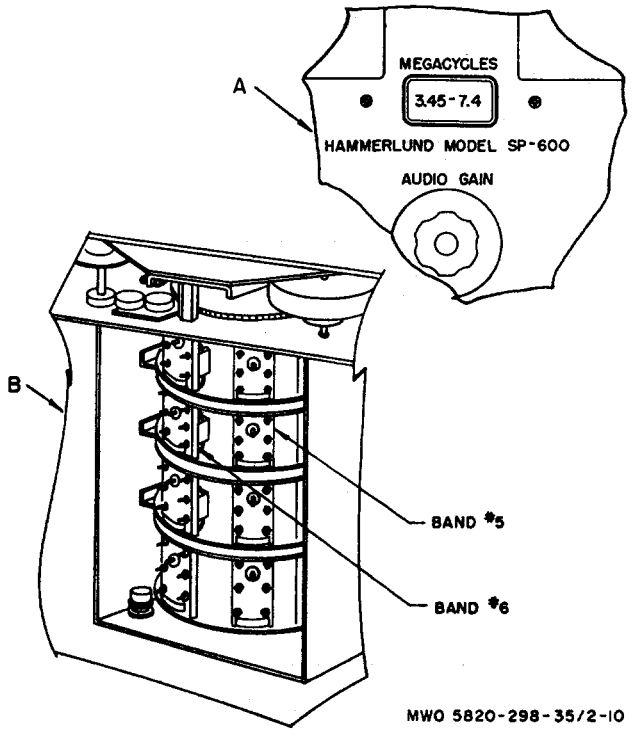


Figure 10. Location of RF interstage subassemblies for bands 5 and 6.

unit housing, using the original hardware.

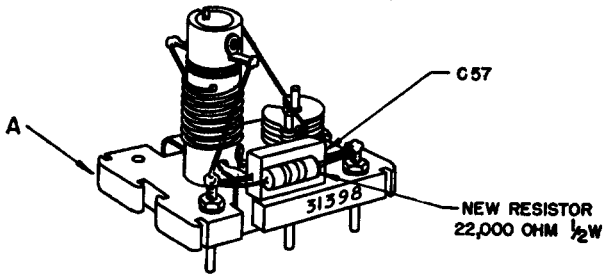
(10) Replace the bottom plate to the receiver in its original position, using the original hardware.

(11) Mount the label on the top cover of the capacitor tuning unit housing in accordance with directions supplied.

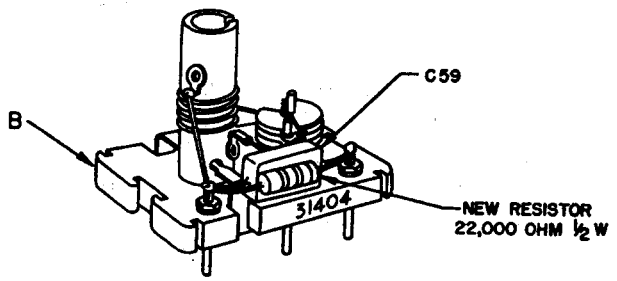
(12) Replace the receiver in its cabinet or rack, using the original hardware and reconnect all leads and connections.

(13) Check the overall performance of the equipment.

11. Recording the Modification. Ink or paint MWO 11–5820–298–35/2 near the nomenclature plate on the front panel of Radio Receivers R–274A/FRR, R–274C/FRR, R–320A/FRC, and Hammarlund Radio Receivers SP–600–JX and SP–600–JLX. When modified equipment is packed or crated, clearly mark MWO 11–5820–298–35/2 on the exterior of the case or crate in a similar manner.



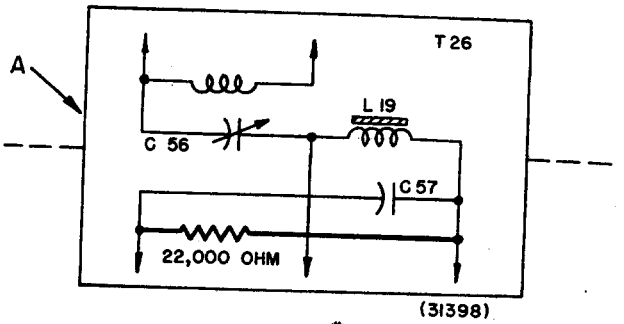
BAND #5



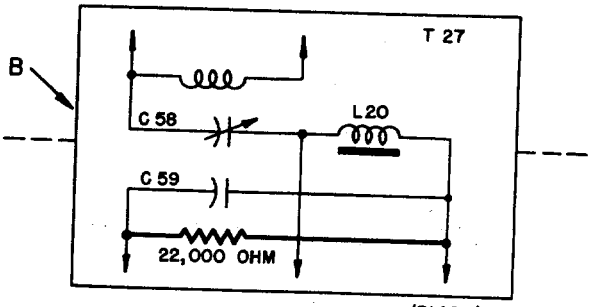
BAND #6

MWO 5820-298-35/2-11

Figure 11. Installation of new resistors in RF interstage subassemblies.



BAND #5



BAND #6

NOTE: HEAVY LINES DENOTE MODIFICATION

MWO 5820-298-35/2-12

Figure 12. Revised circuit diagrams of RF interstage subassemblies for bands 5 and 6.

By Order of *Wilber M. Brucker*, Secretary of the Army:

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JBUSMC (1)
AFIP (1)
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USA Sig Msl Spt Agcy (5)
Sig Lab (5)
USA Sig Pubs Agcy (8)
Army Pictorial Cen (2)
Fld Comd, Def Atomic Spt Agcy (8)
USA Elct PG (2)
Dugway PG (2)
USA Ord Msl Comd (3)
Units org under fol TOE:
11-7 (2)
11-16 (2)
11-57 (2)
11-500 AA-AE (2)
11-587 (2)
11-592 (2)
11-597 (2)

NG: State AG (3).

USAR: Units same as Active Army except allowance is one copy to each unit.

For explanation of abbreviations used, see AR 320-50.

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NORMAL

MWO SIG 89

DEPARTMENT OF THE ARMY MODIFICATION WORK ORDER

MODIFICATION OF RADIO RECEIVERS R–274A/FRR, R–274C/FRR, R–320A/FRC, R–483/FRR, R–483A/FRR AND HAMMARLUND RADIO RECEIVERS SP–600–JX AND SP–600–JLX TO IMPROVE SIGNAL-TO-NOISE RATIO ON AGC OR MGC OPERATION AND TO PREVENT BLOCKING OF FIRST MIXER TUBE

Department of the Army, Washington 25, D. C., **21 December 1953**

Note. Apply this modification in accordance with conditions specified in paragraph 12.

1. Major Items Affected.

Name of item: Radio Receiver R–274A/FRR.
Signal Corps stock No.: 2C4180–274A.
Name of item: Radio Receiver R–274C/FRR.
Signal Corps stock No.: 2C4180–274.
Name of item: Radio Receiver R–320A/FRC.
Signal Corps stock No.: 2C4180–320A.
Name of item: Radio Receivers R–483/FRR and R–483A/FRR.
Signal Corps stock No.: 2C4180–483.
Name of item: Hammarlund Radio Receivers SP–600–JX and SP–600–JLX.
Signal Corps stock No.: None.
Reference. TM 11–851.

2. Purpose of Modification. *a.* To improve the signal-to-noise ratio on agc or mgc operation by revising the distribution of the gain control voltages.

b. To provide improved performance in direction finding applications by providing a special agc voltage tap.

c. To prevent grid blocking of the first mixer tube by removing coupling capacitor C45.

3. Category of Maintenance. Operations performed by field maintenance or higher Signal Service organization.

4. Priority Classification. NORMAL.

5. Assembly or Component Affected.

Name: Radio Receiver R–274A/FRR.
Signal Corps stock No.: 2C4180–274A.
Name: Radio Receiver R–274C/FRR.
Signal Corps stock No.: 2C4180–274.
Name: Radio Receiver R–320A/FRC.
Signal Corps stock No.: 2C4180–320A.
Name: Radio Receivers R–483/FRR and R–483A/FRR.
Signal Corps stock No.: 2C4180–483.
Name: Hammarlund Radio Receiver SP–600–JX.
Signal Corps stock No.: None.
Name: Hammarlund Radio Receiver SP-600–JLX.
Signal Corps stock No.: None.

6. Parts Affected. *a. New Parts Required.*

Signal Corps stock No.	*Quantity (ea.)*	*Nomenclature or description*
2Z5727–224	1	Kit: for modification of Radio Receivers R–274A/FRR, R–274C/FRR, R–320A/FRC, R–483/FRR, R–483A/FRR, and Hammarlund Radio Receivers SP–600–JX and SP–600–JLX to improve signal-to-noise ratio on agc and mgc operation and to prevent blocking of first mixer tube, consisting of the following:
	3	Capacitor, fixed: mica; 10,000 $\mu\mu$f ±5%; 300 vdcw; $\frac{53}{64}$" lg x $\frac{53}{64}$" wd x $\frac{11}{32}$" thk; JAN CM35B103J; molded bakelite case; two 1⅛" lg #18 AWG axial wire leads; MIL–#C–5 spec; Sig C stock No. 3K3510312.
	1	Capacitor, fixed: paper; JAN CP26A1EF103M; 10,000 $\mu\mu$f ±20%; 600 vdcw; HS ins nonmagnetic metal case; $1\frac{5}{16}$" lg x ½" dia; two #20 AWG axial wire leads 1½" lg; no int gnd connections spec No. MIL–C25; Sig C stock No. 3DA10–388.
	1	Decal: per dwg SC–B–98514.
	1	Resistor-Capacitor-Terminal Board Assembly: per dwg SC–DL–60452; c/o bakelite term. board with 10 post term., two screw type; resistors R48, R115, R116 and R94, and capacitors C163 and C167 mtd to screw type.
	1	Resistor, fixed: comp; 390 ohms ±5%; ½ w; JAN RC20BF391–K; Sig C stock No. 3RC20–BF391K.
	1	Resistor, fixed: comp; 510 ohms ±5%; ½ w; JAN RC20BF511–J; Sig C stock No. 3RC20–BF511J.
	1	Resistor, fixed: composition; 1,000 ohms ±10%; ½ w; JAN RC20–BF102K; Sig C stock No. 3RC20BF102K.
	1	Resistor, fixed: composition; 10,–000 ohms ±10% ½ w; JAN RC20BF103K; Sig C stock No. 3RC20BF103K.
	2	Resistor, fixed: composition; 33,–000 ohms ±10%; ½ w; JAN RC20BF333K, Sig C stock No. 3RC20BF333K.
	1	Resistor, fixed: power, WW; 7,500 ohm ±5%; 20 w; cement coated; tubular ceramic; 2" lg x $\frac{21}{32}$" dia; MIL–R–26, type No. RW32V752.
	1	Resistor, fixed: WW; 10,000 ohm ±5%; 20 w; 2" lg x $\frac{21}{32}$" dia; cement ins; inductive; ceramic core; 2 solder lug term. ⅝" lg; MIL–R–26, type No. RW32–V103.
	2	Lock washer: round; steel; for a 6# screw; Sig C std #104–3S–6B.
	2	Nut: hex.; brass; for a #6–32 screw; Sig C std #102–3B–6.
	2	Screw, machine: RH; brass; #6–32 thd; 2½" lg; Sig C std #100–1B6–40.
	4	Terminal lug: ring type phosphor bronze; $\frac{11}{64}$" lg x $\frac{5}{32}$" max wd x .018" thk; shakeproof type 2104–06–00; Sig C stock No. 3Z12059–7, or equal.
	2	Washer: flat; rd; brass; for a #6 screw; Sig C std #104–1B–6M.
	4	Washer: cupped for a #6 screw; Model Eng and Mfg. Co., Inc.; part No. 11003, or equal.
	4	Washer: mica; ¼" ID x ¾" OD x $\frac{1}{32}$" thk o/a; Hammerlund Mfg. Co., Inc., New York; dwg. No. 10002M, part No. 62, or equal.
	18 in.	Wire, electrical: ins single cond #22 AWG; SD copper, tinned, stranded, color-coded black w/ white tracer; Sig C stock No. 1B1322.09.
	18 in.	Wire, electrical: ins single cond #22 AWG; SD copper, tinned, stranded, color-coded, red w/ green tracer; Sig C stock No. 1B1322.25.
	36 in.	Wire, electrical: ins single cond #22 AWG; SD copper, tinned, stranded, color-coded orange w/ green tracer; Sig C stock No. 1B1322.35.
	18 in.	Wire, electrical: ins single cond #22 AWG; SD copper, tinned, stranded, color-coded green w/ red tracer; Sig C stock No. 1B1322.52.
	18 in.	Wire, electrical: ins single cond #22 AWG; SD copper, tinned, stranded, color-coded green w/ white tracer; Sig C stock No. 1B1322.59.

Signal Corps stock No.	Quantity (ea.)	Nomenclature or description
	18 in.	Wire, electrical: ins single cond #22 AWG; SD copper, tinned, stranded, color-coded white w/ black tracer; Sig C stock No. 1B1322.90.
	18 in.	Wire, electrical: ins single cond #22 AWG; SD copper, tinned, stranded, color-coded white w/ blue tracer; Sig C stock No. 1B1322.96.

b. Parts Discarded.

Signal Corps stock No.	Quantity (ea.)	Nomenclature or description
	1	Capacitor: mica; 100 $\mu\mu$f; Sig C stock No. 3K2010133.
	1	Capacitor: paper; bath tube type; dual .05 $\mu\mu$f; CP53B6EF503V; Sig C stock No. 3DA50–46.
	1	Capacitor: paper; .01 μf; Sig C stock No. 3DA10–388.
	1	Capacitor: paper; .25 μf; Sig C stock No. 3DA250–45.
	3	Lock washers: for #6 screw; Sig C stock No. 6L70006C, or equal.
	3	Nut: steel; zinc coated; 6–32 thd; Sig C stock No. 6L3606–32–4.3, or equal.
	1	Resistor, fixed: ½ w; 510 ohms; Sig C stock No. 3RC20BF511J.
	1	Resistor, fixed: ½ w; 1,100 ohms; Sig C stock No. 3RC20BF113J.
	2	Resistor, fixed: ½ w; 33,000 ohms, Sig C stock No. 3RC20BF333K.
	3	Screw, machine: RH steel; 6–32 thd x ⅜" lg; Sig C stock No. 6L6632–6.49S, or equal.
None	1	Terminal strip: 8 solder type term.
	3	Washers: flat, brass; for #6 screw, Sig C stock No. 6L58006-C, or equal.

c. Parts Modified.

Name: Agc-mgc control voltage distribution circuit.

Signal Corps stock No.: None.

Name: R-f strip coupling capacitor and screen voltage circuit.

Signal Corps stock No.: None.

d. Supply of Parts Required.

(1) *Source of supply.* Requisition through regular channels. Requisition for these parts will cite, as a basis, this modification work order number and date.

(2) *Estimated date available.* 9 February 1954.

e. Weight and Cubage of Parts.

(1) *Weight.* Approximately 1½ pounds.

(2) *Cubage.* Approximately 864 cubic inches.

7. Drawings Required to Apply Modification. Only those illustrations provided with this MWO are required to perform the modification.

8. Special Tools, Jigs, and Fixtures Required. None.

9. Special Instructions. *a. Applied By.* Field radio repair supervisor (MOS 1648) or equivalent Signal Service personnel.

b. Time Required. Approximately 4½ manhours.

c. Comments with Reference to Published Modification Work Orders. None.

d. Disposal of Discarded Parts. In acccordance with SR 735–150–1.

e. Report Required and to Whom to be Sent. None required.

f. Serial Numbers Required on Report. None.

10. Modification Procedure.

Note. In some radio receivers many of the following changes will have been incorporated in the process of manufacture. Each radio receiver will be carefully examined to determine which of the following modifications are necessary.

a. Installation of New Filter Capacitors Across A-C Receptacle J5.

(1) Remove the 8 screws, washers, and lock washers that hold the radio receiver to the cabinet or rack, and remove the chassis from the cabinet or rack.

(2) Remove the four screws that hold the bottom plate to the receiver, and remove the plate.

(3) Unsolder and remove the lead connected between the terminals of capacitor C152A and a-c receptacle J5.

(4) Unsolder and remove the lead connected between the terminal of capacitor C152B and terminal No. 1 of transformer T8.

(5) Remove the two screws, lock washers, and nuts that hold dual capacitors C152A and C152B to the side panel of the receiver chassis, and remove the dual capacitor.

(6) Remove the two screws, lock washers, and nuts that hold a-c receptacle J5 to the rear panel of the receiver chassis.

(7) Remount the a-c receptacle in its original position; use the original screws, lock washers, and nuts; place a terminal lug on each screw between the panel and a-c receptacle J5, as shown at A, figure 1.

(8) Connect and solder a .01-μf capacitor (C152) between the terminal of a-c receptacle J5 and the solder lug as shown at A, figure 2. Make the leads as short as possible.

(9) Connect and solder a .01-μf capacitor C168 between the terminal of a-c receptacle J5 and the terminal lug as shown at B, figure 2. Make the leads as short as possible.

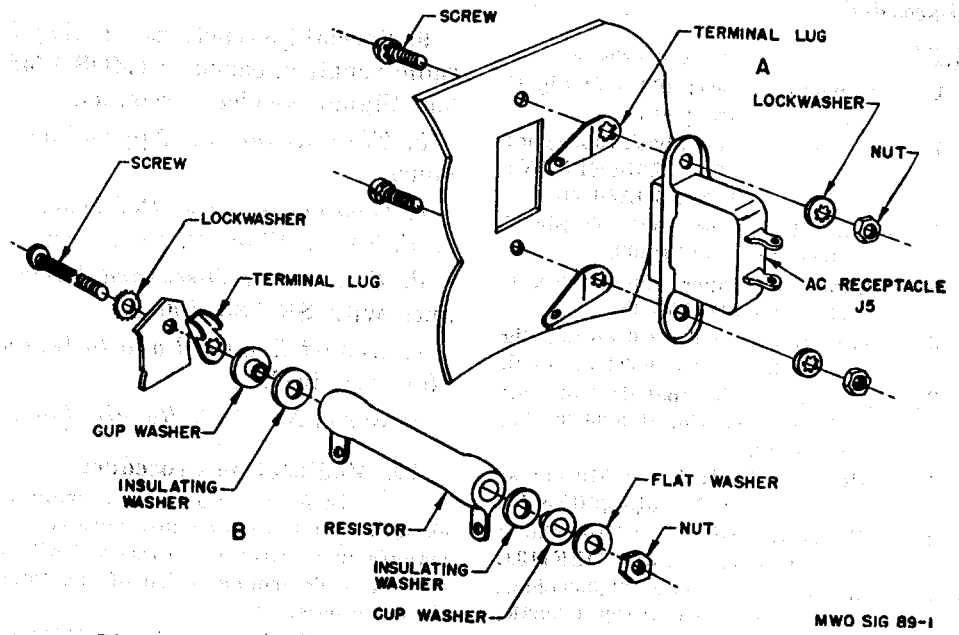


Figure 1. Exploded view of resistor and installation of terminal lugs.

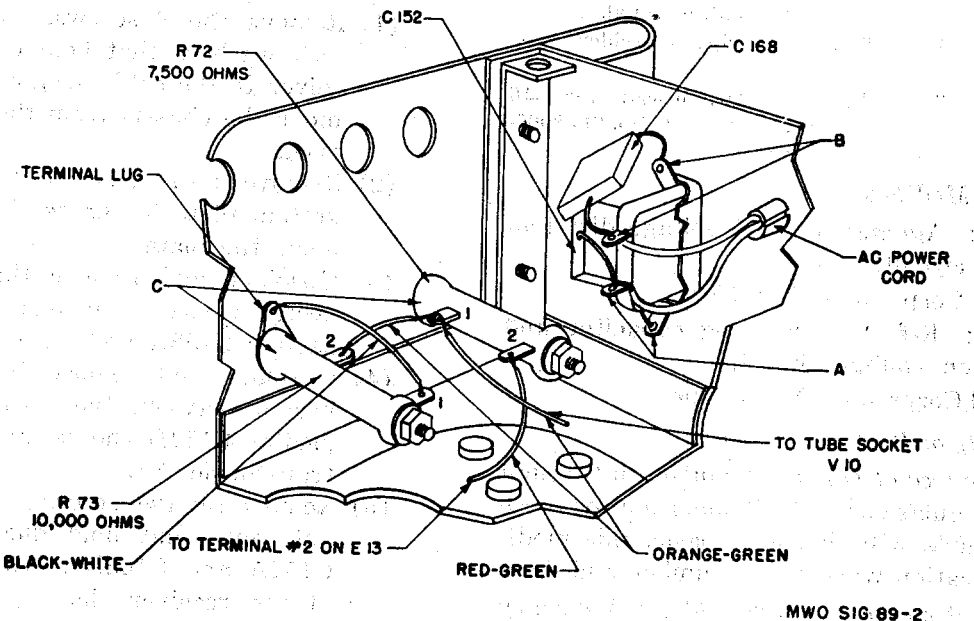


Figure 2. New locations of resistors R72 and R73 and capacitors C152 and C168.

b. Mounting of R72 and R73 and Removal of R48 and R53.

(1) Mount a new 10,000-ohm wire-wound resistor (R73) ; use a No. 6–32 x 2½-inch long round head steel screw, washers, nut, solder lug, and the existing hole originally used to mount one side of dual capacitor C152 and C152B, as shown at B, figure 1, and in the position shown at C, figure 2.

(2) Mount a new 7,500-ohm wire-wound resistor (R72) ; use a No. 6–32 x 2½-inch long round head steel screw, washers, nuts, and the existing hole originally used to mount one side of dual capacitor C152A and C152B, as shown at B, figure 1, and in the position shown at C, figure 2.

(3) Connect and solder a suitable length of black-white wire between terminal No. 1 of resistor R73 and the terminal lug as shown in figure 2.

(4) Connect and solder a suitable length of orange-green wire between terminal No. 1 of resistor R72 and terminal No. 2 of resistor R73, as shown in figure 2.

(5) Unsolder and remove resistor R48 (33,000 ohms) connected between pin No. 6 of tube socket V9 and terminal No. 4 of terminal board E17.

(6) Unsolder and remove resistor R53 (33,000 ohms) connected between pin No. 6 of tube socket V10 and terminal No. 11 of terminal board E17.

(7) Connect and solder a suitable length of orange-green wire between pin No. 6 of tube socket V9 and Pin No. 6 of tube socket V10 as shown at A, figure 3.

(8) Connect and solder a suitable length of orange-green wire between pin No. 6 of tube socket V10 and the junction of resistors R72 and R73 as shown in figure 2.

c. V7 Avc Return.

(1) In some radio receivers, a 510-ohm resistor (R32) will be connected between pin No. 1 of socket V7 and ground. In these receivers, this resistor should be removed, and a new 510-ohm resistor (R32) should be connected and soldered between pin

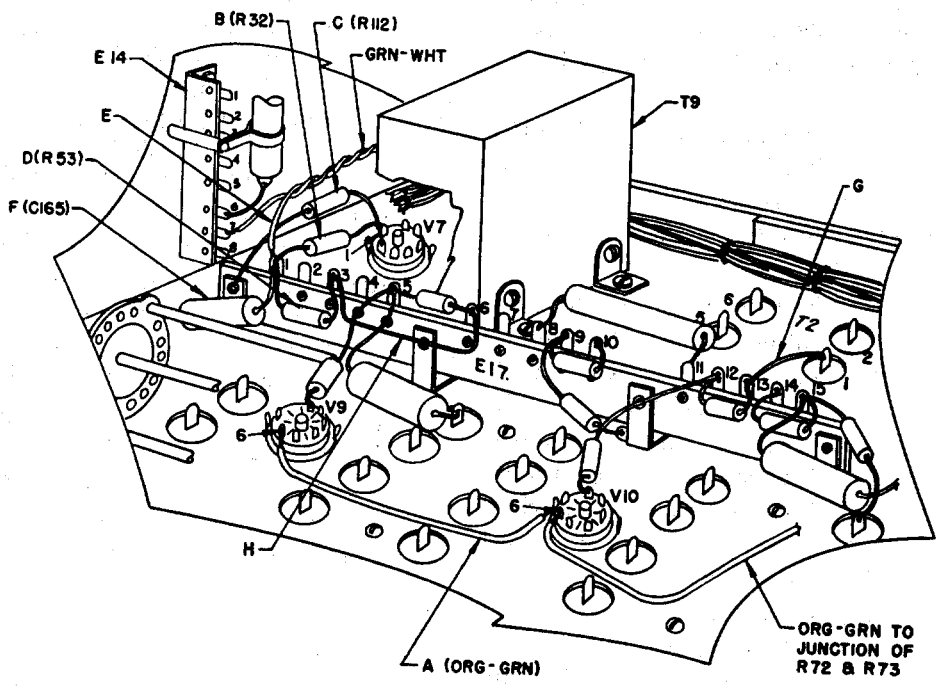


Figure 3. New component and wiring changes at terminal strip E17.

No. 1 of socket V7 and terminal No. 1 of terminal board E17 (B, fig. 3).

(2) In some receivers, pin No. 7 of V7 is ground. Remove the ground leads, and connect and solder a 390-ohm resistor (R112) between pin No. 7 of V7 and the ground terminal of E17 (C, fig. 3).

(3) Connect and solder a 10,000-ohm resistor (R53) between terminals No. 1 and No. 3 of terminal board E17 as shown at D in figure 3, where this resistor does not already exist or is of a value other than 10,000 ohms.

(4) Unsolder and remove the green-white wire from terminal No. 8 (ground lug) of terminal board E14, and connect and solder this lead to terminal No. 1 of terminal board E17 (E, fig. 3).

(5) Connect and solder a .01-μf, 500-volt capacitor C165 between terminal No. 1 of terminal board E17 (F, fig. 3) and ground, where this capacitor does not already exist as C100 in this position.

(6) Unsolder and remove the white-blue lead connected to terminal No. 1 of transformer T2, and tape the exposed end. Tape this lead to the main wiring cable.

(7) Connect and solder a suitable length of white-black wire between terminal No. 1 of transformer T2 and terminal No. 13 of terminal strip E17, as shown at G in figure 3.

d. Removal and Relocation of Jumper.

(1) Examine terminal strip E17 for a jumper between terminals No. 3 and 9. Where this jumper exists, remove it.

(2) Connect and solder a suitable length of white-black wire between terminals No. 3 and 6 of terminal strip E17 (H, fig. 3) where this lead is not connected in this position.

e. Addition of Capacitor C169. Examine the radio receiver that is being modified for the presence of the diode and avc terminal strip E3 on the rear panel; if E3 exists, connect and solder a .01-μf rectangular capacitor on the inner side of the terminal strip between the avc negative terminal and ground, if the capacitor is not already connected in this position.

f. Installation of New Terminal Board E13.

(1) Examine the radio receiver being modified for the presence of the .25-μf capacitor C163 in the position shown at A, figure 4; if one exists, it should be removed as explained below.

(2) Remove the 15 screws and lock washers that hold the bottom cover to the tuning unit housing, and remove the cover.

(3) Remove the screw, lock washer, and nut that hold the capacitor to the tuning housing, and remove the capacitor.

Note. The new .25-μf capacitor (C163) will be found mounted on the new terminal board E13.

(4) Replace the bottom cover to the tuning unit housing; use the original screws and lock washers.

(5) Unsolder and remove the five leads connected to the power filter-choke subassembly; note their respective positions and color.

(6) Remove the four screws and lock washers (B, fig. 4) that hold the power filter-choke subassembly to the chassis and lift the subassembly from the chassis.

Note. This will permit access to terminal strip E13 and to the leads for its removal and replacement with the new terminal board E13.

(7) Unsolder and remove all the leads from the old terminal strip E13.

(8) Remove the nuts and lock washers from the two screws that hold the old terminal strip E13 to the chassis, and remove the terminal strip.

(9) Mount the new terminal board E13 in the position formerly held by the old terminal strip, using the original screws, lock washers, and nuts.

(10) Connect and solder the wires removed from the old terminal strip to the new terminal board in accordance with figure 5.

Note. For receivers with serial numbers, below manufacturer's serial No. 7658 inclusive, connect red-white and blue-red leads

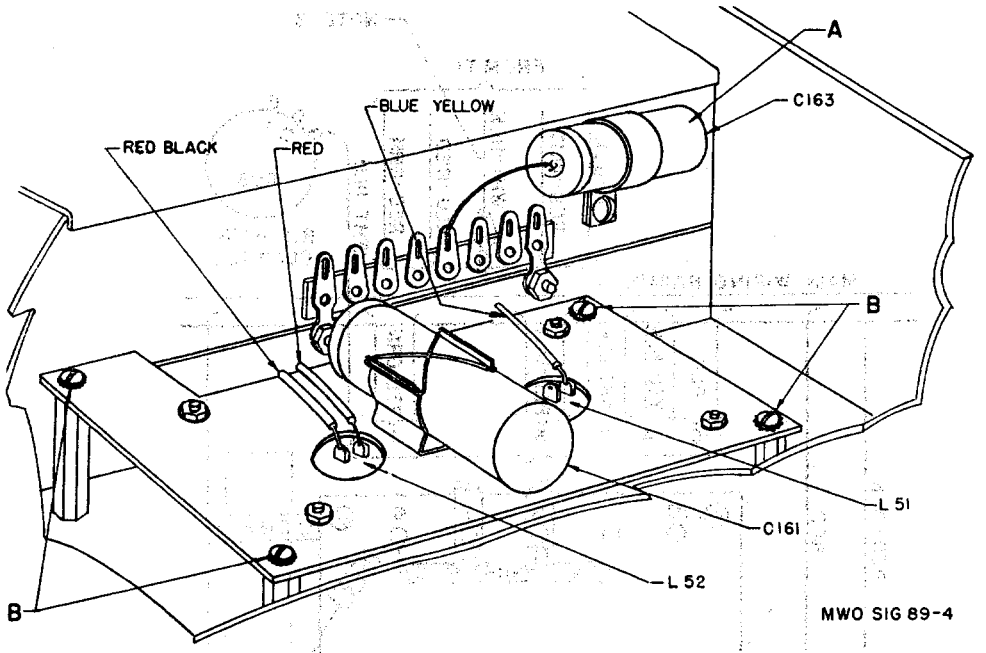


Figure 4. Original location of capacitor C163.

from the frequency control unit to terminals No. 2 and No. 3 of E13 respectively. Reverse these leads on receivers bearing higher serial numbers.

(11) Connect a suitable length of red-green wire between terminal No. 2 of terminal board E13 and terminal No. 2 of resistor R72 (fig. 2).

(12) Connect and solder a terminal lug to the white-black lead originating from transformer T1 and connect it to terminal No. 8 of new terminal board E13.

(13) Replace the power filter choke subassembly in its original position; use the original screws and lock washers.

(14) Reconnect and solder the five leads from the chassis to the power filter choke subassembly in their original positions.

g. Reconnection of R-f Gain Control R93.

(1) Loosen the two Allen setscrews that hold the knob to the r-f gain control (R93) shaft, and remove the knob.

(2) Remove the locknut that holds the r-f gain control to the front panel, and pull the r-f gain control in and up sufficiently to permit access to the terminals.

(3) Unsolder and remove the white-blue lead from terminal No. 3 of the r-f gain control R39.

(4) Cut and tape the exposed end of the white-blue lead, and tape it to the main wire cable.

(5) Connect and solder a suitable length of white-blue wire between terminal No. 3 of the r-f gain control and terminal No. 6 of the new terminal board E13 (fig. 5), and tape this lead to the existing cable.

(6) Replace the r-f gain control on the panel in its original position; use the original locknut.

(7) Replace the knob in its original position on the shaft of the r-f gain control; use the original Allen setscrews.

h. Removal of R94 (1,100 ohms) from T2.

(1) Remove the four screws and lock washers that hold transformer T2 case to the chassis, and remove the case.

(2) Examine transformer T2 to determine whether resistor R94 exists. Where this resistor exists, cut and remove

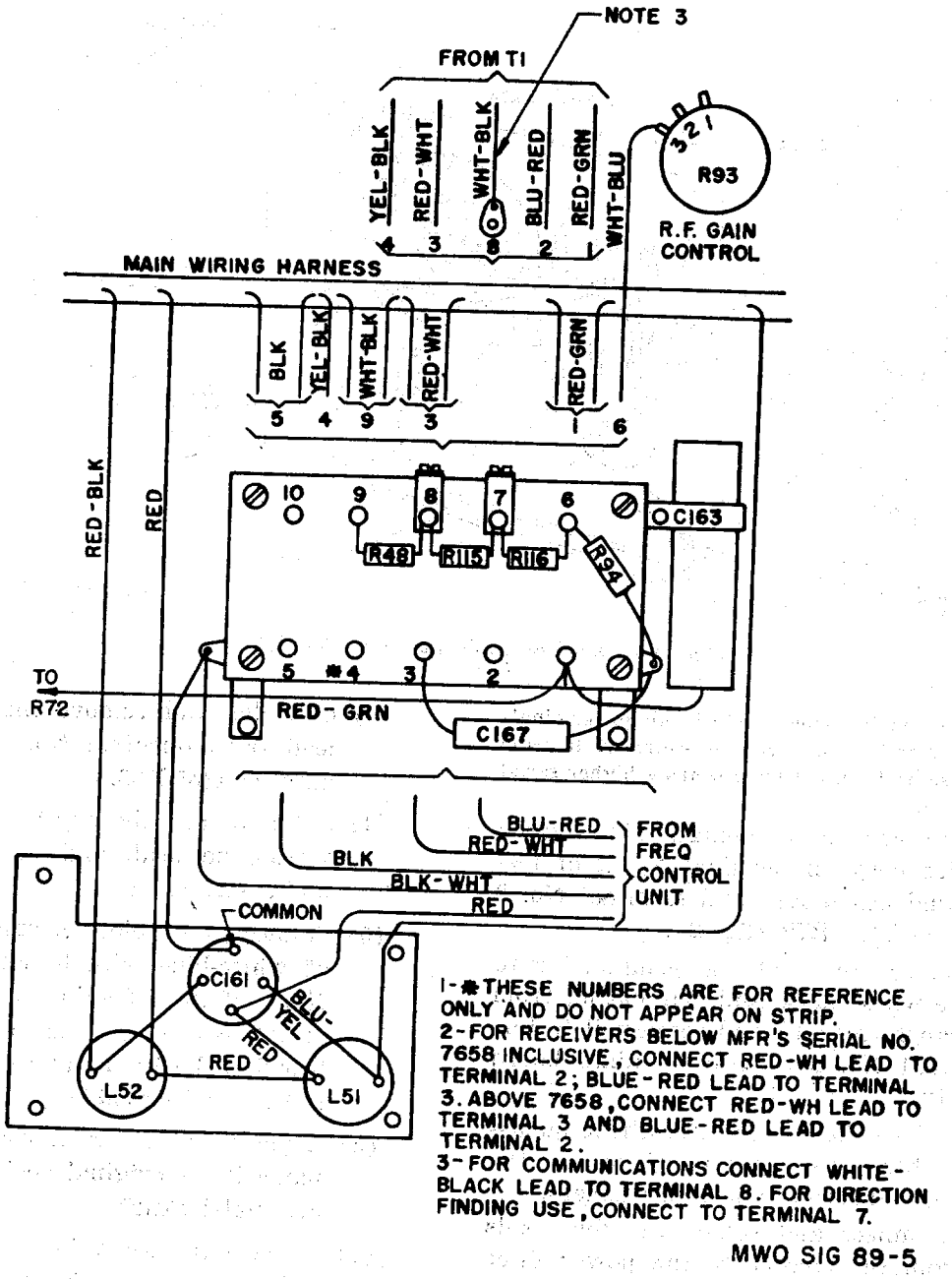


Figure 5. Lead connections to new terminal board E13.

it from the transformer shown at A in figure 6.

(3) Replace the transformer T2 case in its original position; use the original screws and lock washers.

Note. The new 1,100-ohm resistor R94 will be found mounted on the new terminal board E13.

i. Modification of R-F Strip.

(1) Remove the 10 screws and lock washers that hold the top cover to the capacitor tuning unit housing, and remove the top cover.

(2) Unsolder and remove the 12 leads and 4 ground straps connected to the tuning capacitor terminals which termi-

nate at the r-f strip; note their respective positions.

(3) Remove the two cap nuts that hold the cover to transformer T1, and remove the cover.

(4) Unsolder and remove the leads connected to the transformer T1 terminal board that terminate at the r-f strip; note their respective positions and color (fig. 7).

(5) Unsolder and remove the bare wire connected to switch S3 that passes through the ceramic bushing located on the top front of the r-f strip.

Caution: The BAND CHANGE switch must be turned to a position halfway between any two frequency bands before complete removal of the r-f strip is attempted. Do not change the position of the switch until the r-f strip is reconnected and fastened in place; otherwise damage will result.

(6) Remove the eight screws and lock washers that hold the r-f strip to the capacitor tuning unit housing, and remove the r-f strip.

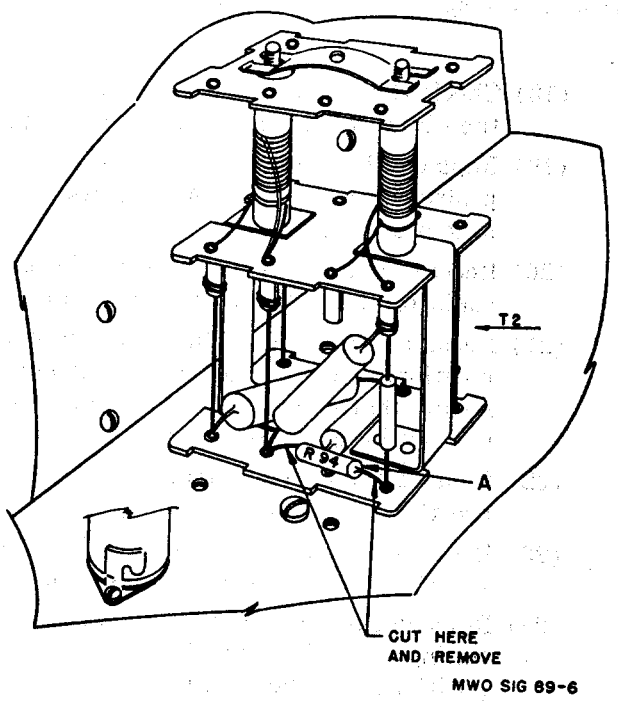


Figure 6. Original location of resistor R94.

(7) Examine r-f section C of the r-f strip for the presence of capacitor C45, in the position shown at A, figure 7.

(8) If this capacitor is in this position, unsolder and remove the capacitor (C45) from pin No. 7 of tube socket V5 and terminal No. 6 of the ceramic switch stator S1C, as shown in figure 7.

(9) Connect and solder a suitable length of white-black wire between pin No. 7 of tube socket V5 and terminal No. 6 of the ceramic switch stator S1C as shown at A in figure 8.

(10) Examine r-f section B of the r-f strip for presence of capacitor C165 in the position shown at B in figure 7.

(11) If the capacitor is in this position, unsolder and remove the .01-μf capacitor (C165) from terminal B2 of the r-f strip and ground terminal GT2 shown at B in figure 7.

(12) Check resistor R3, located in r-f section A and connected between pin No. 6 of tube socket V1 and the junction of resistors R4 and capacitor C21 as shown at C in figure 7, for proper resistance value. Where this resistor is found to be other than 33,000 ohms, replace it with a 33,000-ohm, ½-watt resistor.

(13) Check resistor R14 located in r-f section B and connected between pin No. 6 of tube socket V2 and the junction of resistor R114 and capacitor C166, shown at D in figure 7, for proper resistance value. Where this resistor is found to be other than 33,000 ohms, replace it with a 33,000-ohm, ½-watt resistor.

Note. In some receivers, resistor R14 is connected between pin No. 6 of tube socket V2 and the junction of resistors R5 and R6. In these sets, resistors R14 should be reconnected in accordance with figure 8.

(14) Connect and solder a .01-μf capacitor (C166) between terminal B1 and chassis ground terminal GT3 as shown in figure 8, if one is not connected in this position.

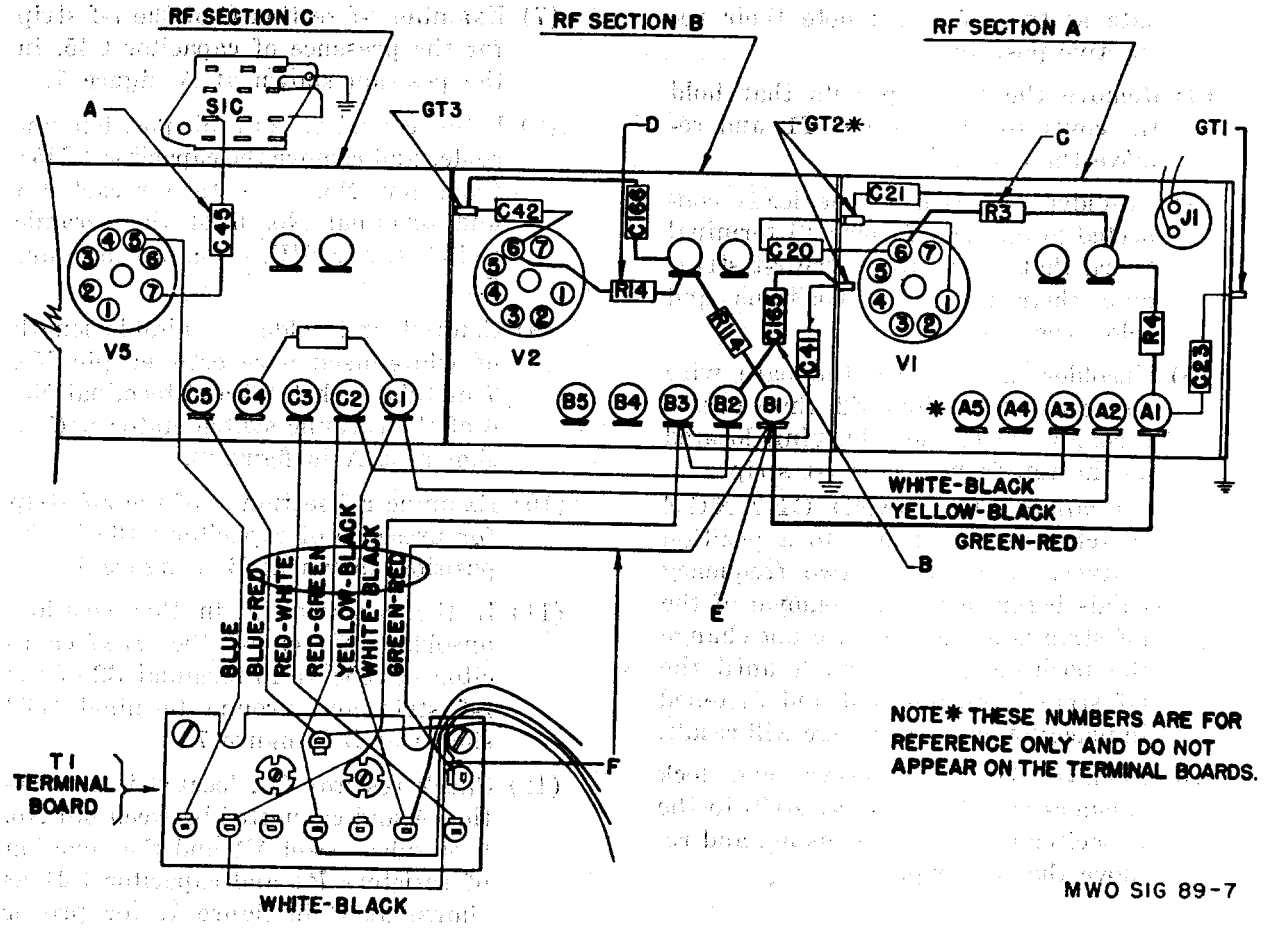


Figure 7. Original wiring of r-f strip.

Caution: When mounting resistors R3, R14, R114, and capacitor C166, care should be taken not to block the holes used for entrance of the alinement tool.

(15) Unsolder and remove the green-red lead connected to terminal B1 shown at E, figure 7 (the other end of the lead terminates at terminal A1), and connect and solder it to terminal B2 as shown at B, figure 8.

(16) Unsolder and remove the green-red lead shown at F, figure 7 from terminal B1, and remove from the plastic sleeve.

(17) Connect and solder a 1,000-ohm, ½-watt resistor (R114) between terminals B1 and B2, as shown in figure 8, if a 1,000-ohm resistor is not at this location.

(18) Check the wiring in accordance with the diagram shown in figures 8 and 9.

(19) Replace the r-f strip in its original position; use the original screws and lock washers.

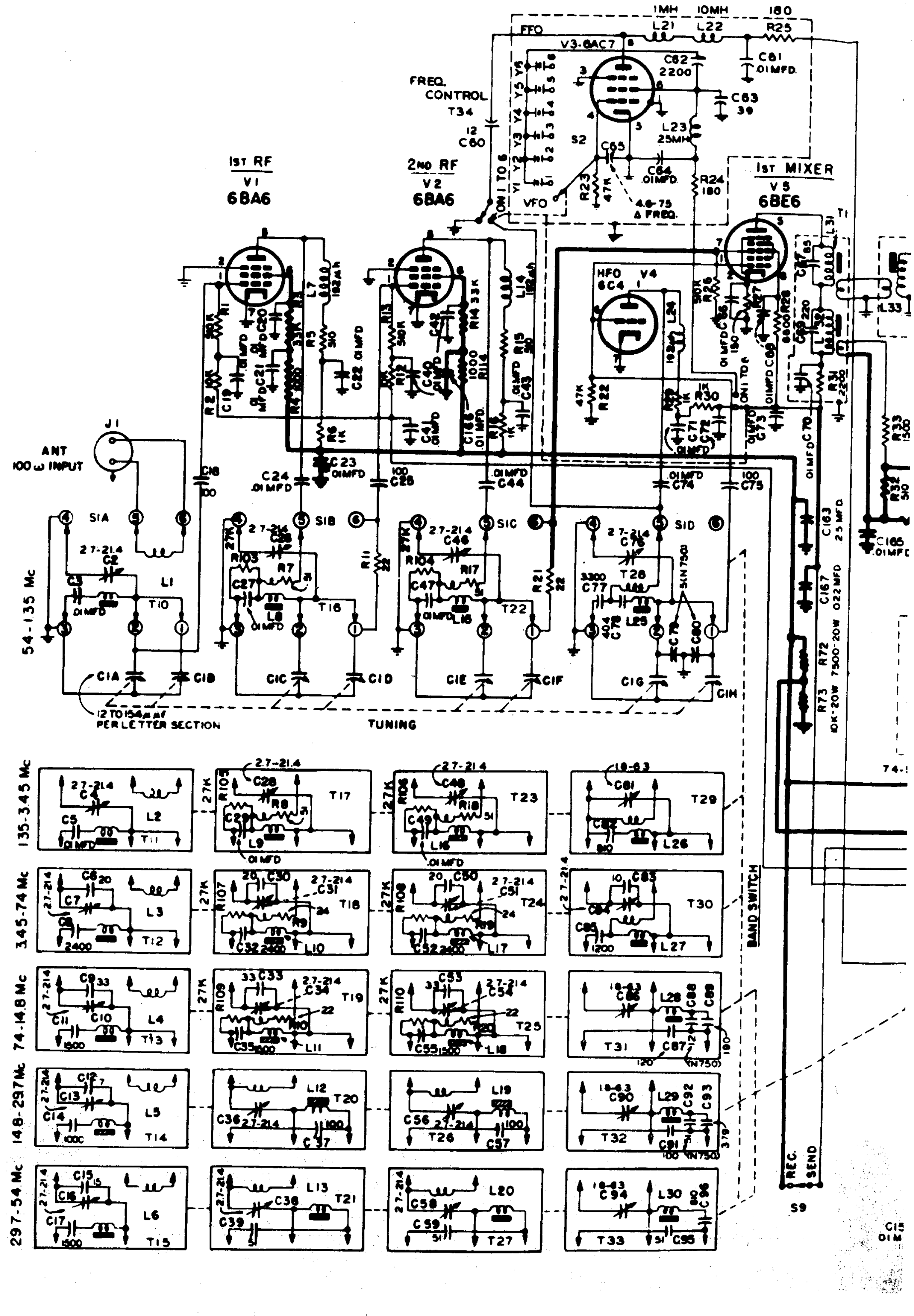
(20) Reconnect and solder the six original leads to the terminal board of T1.

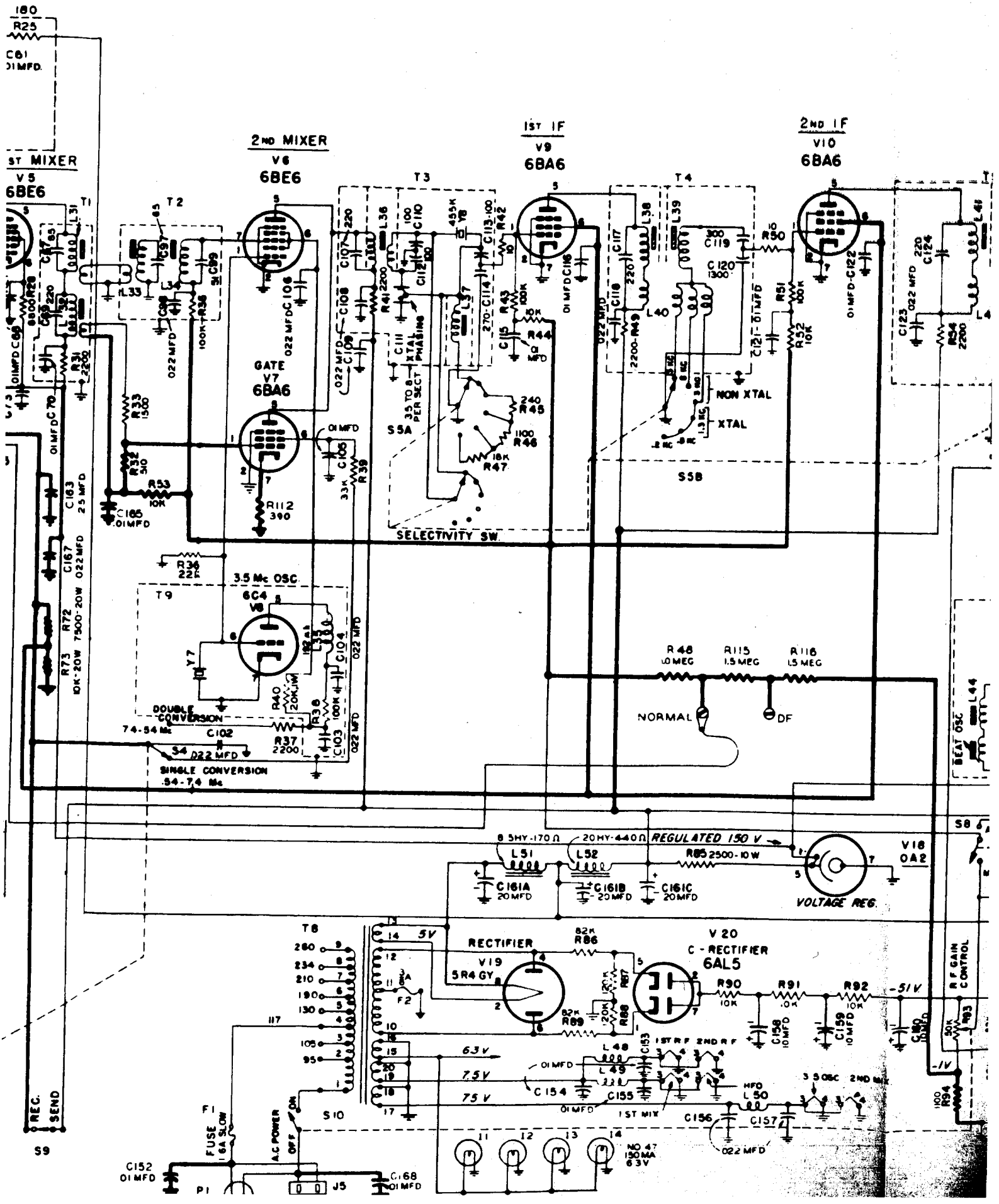
(21) Reconnect and solder in their original positions the 12 leads and 4 ground straps that connect the r-f strip with the tuning capacitor terminals.

(22) Replace the cover to transformer T1; use the original cap nuts.

(23) Reconnect and solder the bare lead to switch S3 in its original position.

(24) Replace the top cover to the capacitor tuning unit housing in its original position; use the original screws and lock washers.


1ST RF
V1
6BA6
2ND RF
V2
6BA6
1ST MIXER
V5
6BE6
HFO V4
6C4
V3-6AC7
FFO
FREQ. CONTROL
T34
VFO
S2
ON 1 TO 6
4.6-7.5
Δ FREQ.
1MH
L21
10MH
L22
180
R25
C62
2200
C61
.01MFD.
C63
39
L23
25MH
C65
C64
.01MFD.
R23
47K
R24
180
C60
12
L7
182μh
L14
182μh
R22
47K
R30
1K
J1
ANT
100 ω INPUT
C18
100
C24
.01MFD
C23
.01MFD
C25
100
C44
.01MFD
C74
.01MFD
C75
100
S1A
S1B
S1C
S1D
L1
T10
T16
T22
T28
L8
L15
L25
C1A
C1B
C1C
C1D
C1E
C1F
C1G
C1H
12 TO 154μμf
PER LETTER SECTION
TUNING
BAND SWITCH
.54-1.35 Mc
1.35-3.45 Mc
3.45-7.4 Mc
7.4-14.8 Mc
14.8-29.7 Mc
29.7-54 Mc
2.7-21.4
27K
T11
T12
T13
T14
T15
L2
L3
L4
L5
L6
T17
T18
T19
T20
T21
L9
L10
L11
L12
L13
T23
T24
T25
T26
T27
L16
L17
L18
L19
L20
T29
T30
T31
T32
T33
L26
L27
L28
L29
L30
(N750)
R72
7500-20W
R73
10K-20W
C163
25 MFD
C167
.022 MFD
C165
.01MFD
R32
510
R33
1500
REC.
SEND
S9


2ND MIXER
V6
6BE6
1ST IF
V9
6BA6
2ND IF
V10
6BA6
T3
T4
GATE
V7
6BA6
3.5 Mc OSC
T9
V8
6C4
SELECTIVITY SW.
S5A
S5B
NON XTAL
XTAL
NORMAL
DF
DOUBLE CONVERSION
74-54 Mc
SINGLE CONVERSION
54-74 Mc
REGULATED 150 V
VOLTAGE REG.
V18
0A2
RECTIFIER
V19
5R4GY
C - RECTIFIER
V 20
6AL5
1ST R F
2ND R F
1ST MIX
3.5 OSC
2ND MIX
R.F. GAIN CONTROL
REC.
SEND
A.C. POWER
ON
OFF
FUSE
1.6A SLOW
F1
S10
S9
P1
J5
5V
6.3V
7.5V
7.5V
-51V
-1V

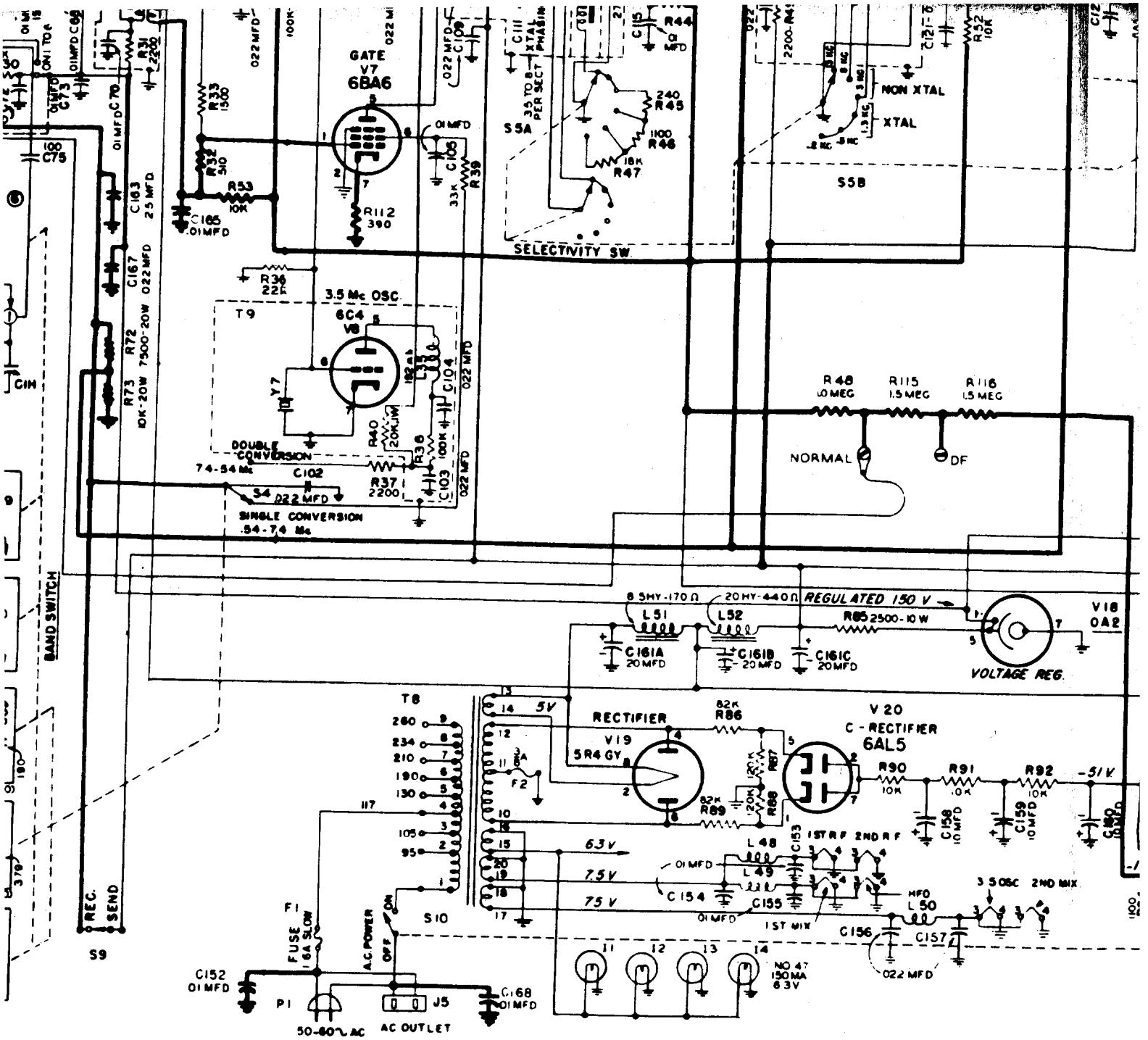
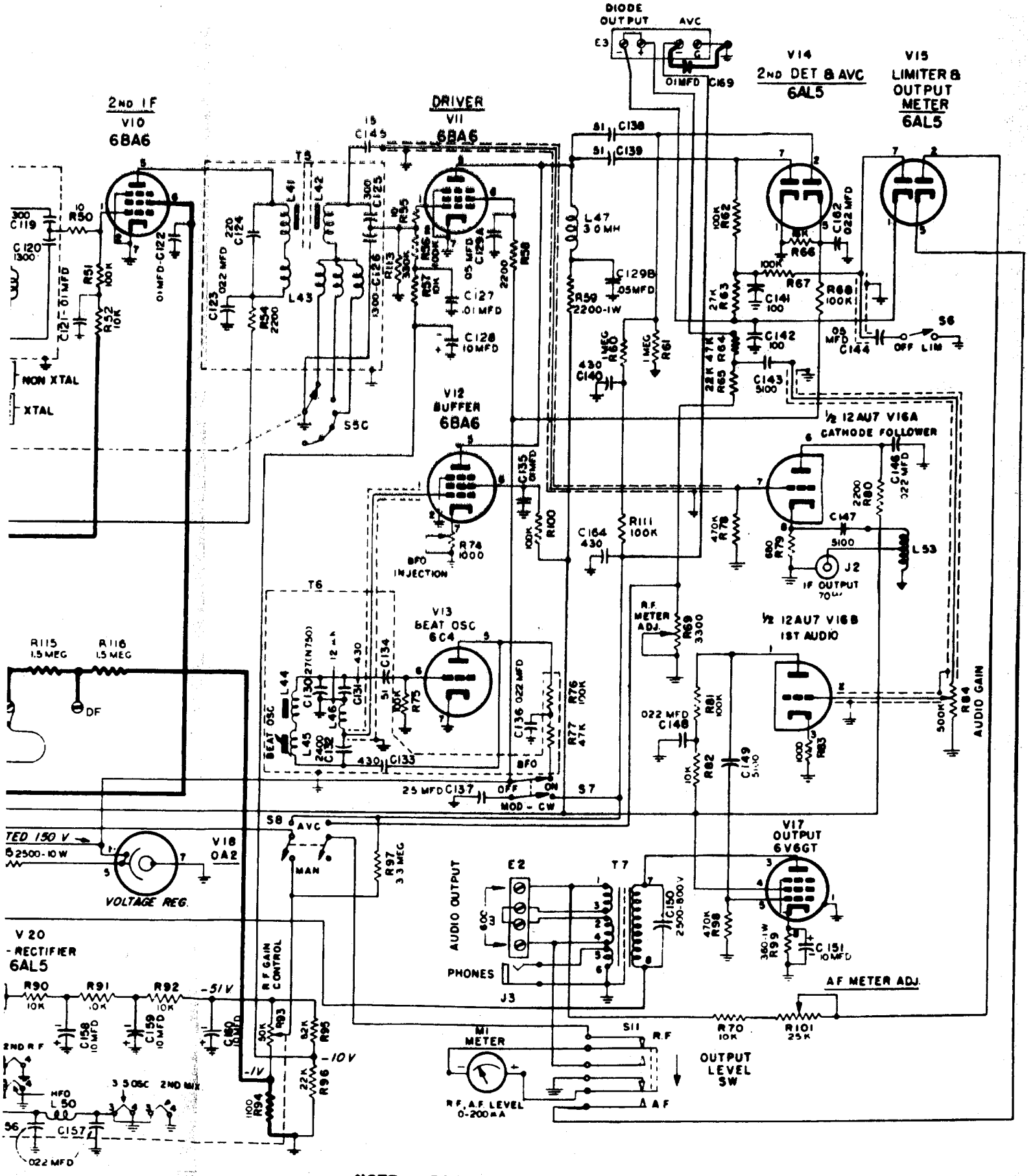


Figure 9. Modified circuit diagram of receiver.


DIODE OUTPUT
AVC
E3
.01MFD C169
V14
2ND DET & AVC
6AL5
V15
LIMITER & OUTPUT METER
6AL5
2ND IF
V10
6BA6
DRIVER
V11
6BA6
V12
BUFFER
6BA6
V13
BEAT OSC
6C4
½ 12AU7 V16A
CATHODE FOLLOWER
½ 12AU7 V16B
1ST AUDIO
V17
OUTPUT
6V6GT
V18
0A2
VOLTAGE REG.
V 20
-RECTIFIER
6AL5
NON XTAL
XTAL
S5C
S6
OFF LIM
S7
MOD - CW
S8
AVC
MAN
BFO INJECTION
BFO
BEAT OSC
R.F METER ADJ.
IF OUTPUT
J2
AUDIO OUTPUT
E2
T7
PHONES
J3
AUDIO GAIN
AF METER ADJ.
R.F GAIN CONTROL
MI METER
R.F, A.F LEVEL 0-200 mA
S11
R.F
A.F
OUTPUT LEVEL SW
2ND R.F
3.5 OSC
2ND MIX
MFD
L50
-51V
-10V
-1V
DF
R115 1.5 MEG
R116 1.5 MEG
L47 30 MH
L53
T6
T7
C129B .05MFD
C141 100
C142 100
C143 5100
C144 .05 MFD
C146 .022 MFD
C147 5100
C148 .022 MFD
C149 5100
C150 2500-800V
C151 10MFD
C162 .022 MFD
C164 430
C157 .022 MFD
C158 10 MFD
C159 10MFD
C160 10MFD
R59 2200-1W
R70 10K
R101 25K
R94 100
R95 22K
R96 22K
R97 3.3 MEG
R98 470K
R99 360-1W
R100 100K
R111 100K
R74 1000
R75 100K
R76 100K
R77 47K
R78 470K
R79 680
R80 2200
R81 100K
R82 10K
R83 1000
R84 500K
R69 3300
R62 100K
R63 27K
R64 47K
R65 22K
R66 1K
R67 100K
R68 100K
R60 1 MEG
R61 1 MEG
R90 10K
R91 10K
R92 10K
R93 50K
NOTE: HEAVY LINES DENOTE MODIFICATION.

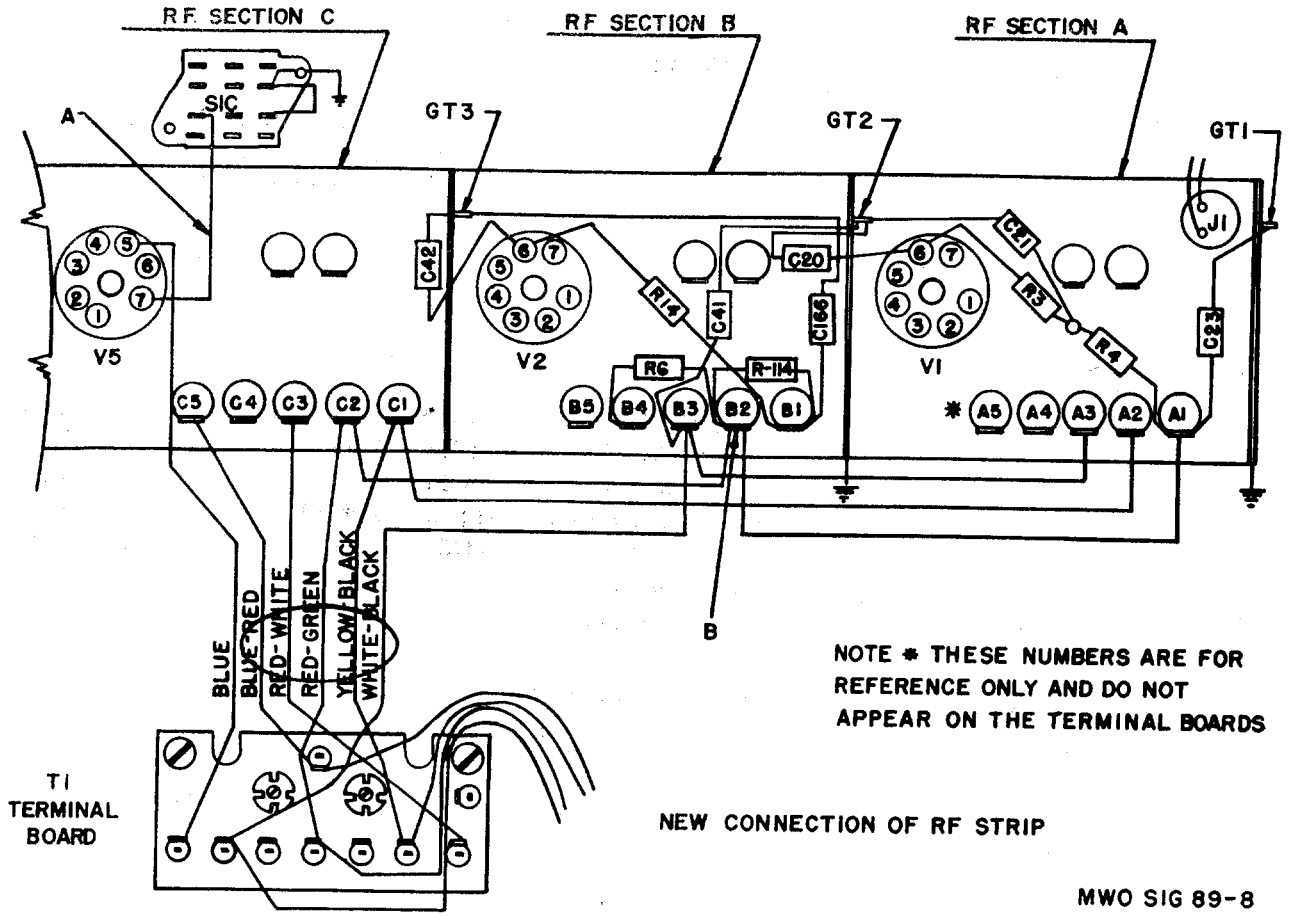


Figure 8. New connection of r-f strip.

(25) Replace the bottom plate to the receiver in its original position; use the original screws and lock washers.

(26) Mount the decal on the top cover of the capacitor tuning unit housing in accordance with directions supplied.

(27) Replace the radio receiver in its cabinet or rack; use the original screws, washers, and lock washers.

(28) Check the over-all performance of the equipment.

11. Recording the Modification. Ink or paint MWO SIG 89 on the front panel of the radio receiver adjacent to the nomenclature plate. When modified equipment is packed or crated, clearly mark MWO SIG 89 on the exterior of the case or crate.

12. Remarks. This modification will be applied to all Radio Receivers R–320A/FRC, R–483/FRR, R–483A/FRR, Hammarlund Radio Receivers SP–600–JX and SP–600–JLX, procured before 1952, and Radio Receivers R–274A/FRR and R–274C/FRR below serial No. 1570 which are—

a. In depot stock.

b. In the depot for repair.

[AG 413.44 (7 Dec 53)]

BY ORDER OF THE SECRETARY OF THE ARMY:

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:

WM. E. BERGIN,
Major General, United States Army,
The Adjutant General.

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NG: Same as Active Army except one copy to each unit.

USAR: None.

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

☆ U. S. GOVERNMENT PRINTING OFFICE: 1953—270614

MWO SIG 89

Change No. 1

DEPARTMENT OF THE ARMY MODIFICATION WORK ORDER

MODIFICATION OF RADIO RECEIVERS R-274A/FRR, R-274C/FRR, R-320A/RFC, R-483/FRR, R-483A/FRR AND HAMMARLUND RADIO RECEIVERS SP-600-JX AND SP-600-JLX TO IMPROVE SIGNAL-TO-NOISE RATIO ON AGC OR MGC OPERATION AND TO PREVENT BLOCKING OF FIRST MIXER TUBE

Department of the Army, Washington 25, D. C. **18 May 1956**

MWO SIG 89, 21 December 1953, is changed as follows:

Page 1. Paragraph 3. Change the sentence to read: **Third Echelon or higher Signal Corps maintenance organization.**

Page 2. Paragraph 6*a*. In the "Nomenclature or description" column, after the third item, add the following:

Note. The following additional items may not be supplied in the original kit stock No. 2Z5727-224, and should be requisitioned from depot stock.

Signal Corps stock No.	*Quantity (ea)*	*Nomenclature or description*
-------	1	Capacitor, fixed: paper; JAN type CP26A1EF103M; 0.01μf±20% 600 vdcw; HS; ins; non magnetic metal tubular case; 1 9/16" lg x ½" dia; two No. 20 AWG axial wire leads 1½" lg; no int gnd connections; Spec No. MIL-C-25; Sig C stock No. 3DA10-388, or equal.
-------	2	Resistor, fixed: comp; 22,000 ohm ±10%; ½ W; JAN type RC20GF223 K Spec No. MIL-R-11; Sig C stock No. 3RC20GF223K, or equal.

Page 4. Figure 2. Make the following change in figure 2: At the end of the "RED-GREEN" lead connected to terminal 2 of R72, change "TO TERMINAL #2 ON E13" to read: TO TERMINAL #1 ON E13.

Page 6. Paragraph 10*c*(5). Change subparagraph (5) to read: Connect and solder a 0.01 μf, **600** volt **tubular** capacitor (**C165**) between terminal No. 1 of terminal board E17 (F, fig. 3) and ground, **if** capacitor C100 **is not already installed in the same** position.

Page 6. Paragraph 10*f*(4). Delete subparagraph (4). Renumber the subparagraphs (1) through (13).

Page 7. Paragraph 10*f*(11). Change the subparagraph to read: Connect a suitable length of red-green wire between terminal No. **1** of **new** terminal board E13, and terminal No. 2 of resistor R72 (fig. 2).

Page 7. Paragraph 10*g*(3). Change subparagraph (3) to read: Unsolder and remove the white-blue lead from terminal No. 3 of rf gain control **R93.**

Page 9. Paragraph 10*i*(14). Change subparagraph (14) to read: Connect and solder **a** 0.01 μf, **600 vdcw** capacitor (C166) between terminal B1 and chassis ground terminal GT3 as shown in figure 8, if **a capacitor** is not **already** connected in this position.

Page 10. Paragraph 10*i*(24). After subparagraph (24), add the note and subparagraphs (24)(*a*) through (24)(*i*).

Note. In certain instances, the changes made in subparagraphs *i*(1) through (24) do not effectively prevent blocking the first mixer tube. To assure effective blocking in all cases, perform the procedures in subparagraphs (24) (*a*) through (24) (*i*) and (29) which follow:

(*a*) Set the BAND CHANGE switch to band 3 (A, fig. 10). This will bring

the rf interstage subassemblies for bands 5 and 6 to the bottom and accessible for easy removal (B, fig. 10).

(*b*) Place the receiver on its back with the bottom facing you.

(*c*) Use the special pliers (Signal Corps stock No. 6R4625–3) and remove the flat springs that hold the rf interstage subassemblies for bands 5 and 6 to the rf tuning unit rotary turret. Remove the subassemblies. (Refer to figure 19, page 42, and subparagraph 90a, page 131, in TM 11–851, dated October 1953.)

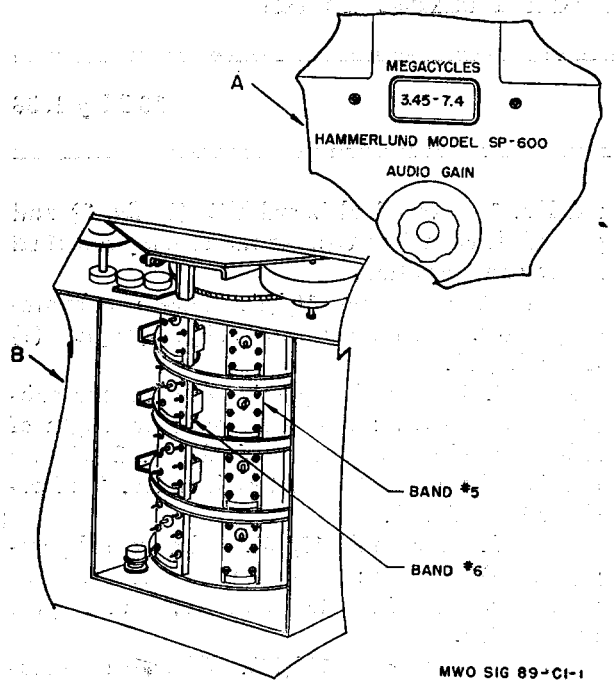
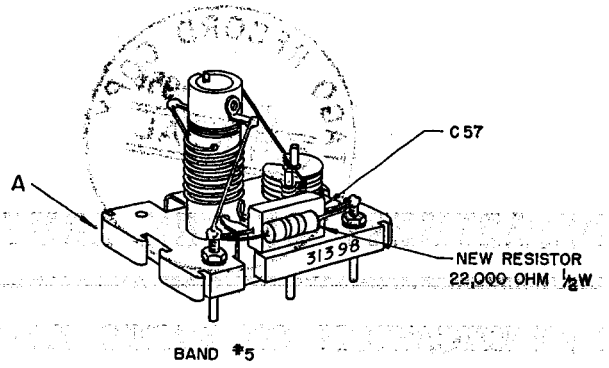


Figure 10. Location of rf interstage subassemblies for bands 5 and 6.

(*d*) Connect and solder a 22,000-ohm, ½-watt resistor across capacitor C57 in the rf interstage subassemblies for band 5, as shown at A, figure 11.

(*e*) Check the wiring in accordance with the wiring diagram of the rf interstage subassemblies for band 5 as shown at A, figure 12.

(*f*) Connect and solder a 22,000-ohm, ½-watt resistor across capacitor C59 in the rf interstage subassemblies for band 6 as shown at B, figure 11.



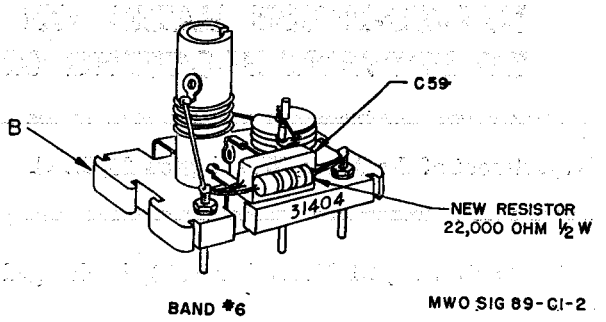


Figure 11. Installation of new resistors.

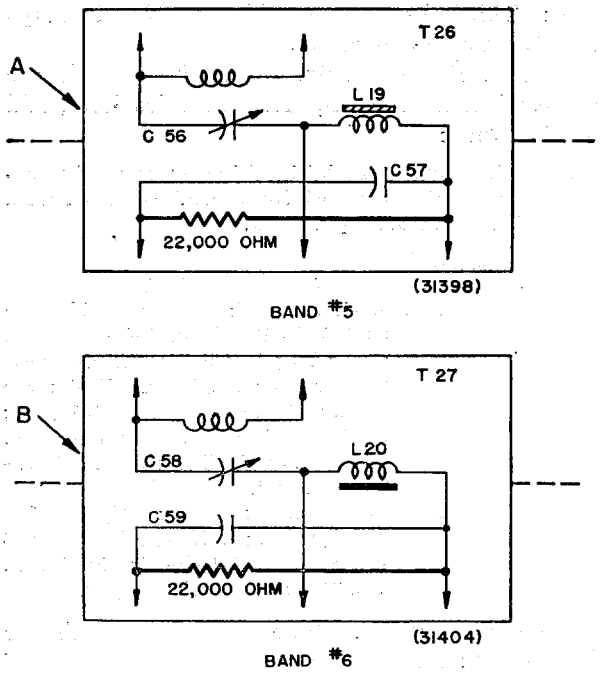


Figure 12. Revised circuit diagrams of the rf interstage subassemblies for bands 5 and 6.

(*g*) Check the wiring with the wiring diagram of the rf interstage subassemblies for band 6 as shown at B, figure 12.

(*h*) Replace the rf interstage subassemblies for bands 5 and 6 to the rf tuning unit rotary turret in their original position. Use the original flat springs.

(*i*) Replace the bottom cover to the tuning unit housing; use the original screws and lockwashers.

Page 11. Paragraph 10*i*(28). After subparagraph (28), add subparagraph (29):

(29) With suitable ink, insert the circuit changes contained in figure 12, into figure 9 in MWO SIG 89, dated 21 December 1953.

Page 11. Paragraph 12. Change the contents of paragraph 12 to read: **Perform this modification work order on** all Radio Receivers R–320A/FRC, R–483/FRR, and R–483A/FRR; Hammarlund Radio Receivers SP–600–JX and SP–600–JLX procured before 1952; and Radio Receivers R–274A/FRR and R–274C/FRR below serial No. 1570 which are:

a. In **hands of using organizations.**

b. **In shops when equipment is returned for repair.**

c. **In depot stock when equipment is unpacked for any reason.**

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

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11–597R, Sig Base Depot Co (1)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see SR 320–50–1.

U. S. GOVERNMENT PRINTING OFFICE: 1956