DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

RADIO RECEIVER R-388/URR

C 1, TM 11-854
TO 16-35R-388-5

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
WASHINGTON 25, D. C., *30 March 1953*

TM 11-854/TO 16-35R-388-5, 23 April 1952, is changed as follows:

8. Additional Equipment Required

The following material * * * for its operation.

* * * * *

b. A 115- or 230-volt source of alternating current (ac), capable of providing at least 80 watts of power.

* * * * *

8.1 (Added) Differences in Models

The following changes and additions are made in Radio Receiver R-388/URR, serial numbers 1408 through 1447, on Order No. 3470-Phila-52:

a. The value of resistor R173 is changed from 2,200 ohms to 1,800 ohms.

b. The value of resistor R182 is changed from 1,000 ohms to 220 ohms.

c. The positive terminals of capacitors C214A and C214B are connected by a short bus wire. This bypasses the contacts of relay K101 so that B plus voltage is applied continuously to the IF amplifier stages when switch S113 is in the ON position.

18.1 (Added) Antijamming Procedures

When the radio receiver is being jammed by unwanted signals, the immediate superior officer must be notified promptly. However, the operator must not cease operating the equipment under any condition. One or more of the following procedures may be used for obtaining the maximum intelligibility from the desired signals during the jamming process.

a. Jammed AM Signals by CW, Pulse, or Other Sharp Noise Signals.

(1) Detune the receiver several degrees on either side of the desired signal by using the MEGACYCLES-KILOCYCLES tuning knob. This may cause some separation of the desired signal from the jamming signal.

(2) Operate the LIMITER switch to the ON position. Strong pulse signals may be reduced greatly. If not, operate the switch to the OFF position.

(3) Operate the CRYSTAL FILTER SELECTIVITY control to position 1. Adjust the CRYSTAL FILTER PHASING control for the best reception of the desired signals. Repeat the procedures given in (1) above. If the results are unfavorable, operate the SELECTIVITY control to each of the three other positions and adjust the PHASING control each time the SELECTIVITY control is operated. Again repeat the procedures given in (1) above. When the SELECTIVITY control is in position 4, the radio receiver is most selective. Selectivity may result in a greater separation of signals.

(4) Vary the RF GAIN control in both directions. This may reduce the jamming signal sufficiently to permit the comparatively weak wanted signal to be copied. When the radio frequency gain of the receiver is increased it is possible to saturate the jamming signal.

(5) Operate the AVC control to the OFF position. Position the CRYSTAL FILTER SELECTIVITY control either at position 1, 2, 3, or 4 for the best reception. The sensitivity of the radio receiver will be increased somewhat, and better separation of the wanted signals and the jamming signals may be obtained.

(6) Vary the AUDIO GAIN control in both directions. The level of the desired signal may be raised sufficiently to saturate

the jamming signals and provide perfect copy of the desired signals.

(7) If the above instructions fail to provide satisfactory separation of the desired signals from the jamming signals, try the following methods:

(*a*) Request a change in frequency and call letters.

(*b*) Request the use of cw signals if am methods fail.

(*c*) Install the antenna behind a tree, tank, or hill, and change the polarization of the antenna from horizontal to vertical, or vice versa.

(*d*) Change the direction, length, or height of the antenna.

(8) When the jamming action is so thorough that communication is impossible, make a report to the immediate superior but continue to operate the equipment.

b. Jammed AM Signals by FM and AM Signals, or Bagpipes. Use the methods outlined in *a* above to counteract these types of signals.

c. Jammed CW Signals by CW and Pulse Signals, or Other Type Sharp Noises.

(1) Repeat the procedures given in *a*(1) and (3) above.

(2) Vary the BFO PITCH control to separate the tone characteristics of the desired signal from that of the jamming signal.

(3) Operate the LIMITER control to the ON position to eliminate strong noise pulses.

(4) Repeat the procedures given in *a*(4), (5), (6), (7), and (8) above.

d. Jammed CW Signals by AM or FM Signals, or Bagpipes Either Separately, or in Combination. Repeat the procedures given in *a* and *c* above.

Figure 23. The following fixed capacitor is added in parallel with capacitor C214A: C214B, 1UF.

Figure 26. The following note is added:

Note. ON SERIAL NUMBERS 1408 THROUGH 1447, ORDER NO. 3470-PHILA-52, R173 IS 1,800 OHMS AND R182 IS 220 OHMS.

53. Power Supply

The receiver power * * * for 230-volt operation.

a. The power transformer * * * and ON positions. Transformer T108 has * * * receiver tube filaments.

* * * * *

c. (Superseded) Voltage for the vfo unit and the a-f power tube, V115, is taken from the junction of chokes L122 and L123. The vfo unit voltage is regulated by current limiting resistor R181 and voltage regulator tube V116 type 0A2. If. amplifier tubes V107, V108, and V109, receive the B+ from terminal 2 of choke L123 through the ON position contacts of switch S113 and relay K101 contacts. Voltage for the remaining receiver circuits is supplied directly from terminal 2 to choke L123. Receivers with serial numbers 1 through 833, originally wired so that disabling relay K101 would remove the B+ from the if. amplifier stages during transmission, have been modified by MWO SIG-64. This modification consists of connecting a shorting wire (bus wire) across the positive terminals of capacitors C214A and C214B. Receivers so modified may be used to monitor nearby transmissions when the antenna input is disabled (as when used with Radio Set AN/GRC-26A). Receivers with serial numbers 1408 through 1447, Order No. 3470-Phila-52, have received this change at the factory.

54. Input-Output Meter

A 0- to * * * the meter connections.

* * * * *

b. Output Meter. When the INPUT-OUTPUT * * * T107 secondary winding. Meter loading resistor R182 is connected in parallel with meter M101. The rectified voltage * * * across resistor R182.

APPENDIX II

INDENTIFICATION TABLE OF PARTS

Rescinded.

Figure 42. The following notes are added:

1. ON SERIAL NUMBERS 1408 THROUGH 1447, ORDER NO. 3470-PHILA-52, R173 IS 1,800 OHMS AND R182 IS 220 OHMS.
2. ON SERIAL NUMBERS 1408 THROUGH 1447, ORDER NO. 3470-PHILA-52, THE POSITIVE TERMINALS OF C214A AND C214B ARE CONNECTED BY A SHORT BUS WIRE.

[AG 413.44 (2 Mar 54)]

DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

RADIO RECEIVER R-388/URR

TM 11-854
TO 31R1-2URR-121
CHANGES No. 2

DEPARTMENTS OF THE ARMY AND
THE AIR FORCE
WASHINGTON 25, D. C., *29 September 1955*

TM 11-854/TO 31R1-2URR-121, 23 April 1952, is changed as follows:

6. Description of Receiver
(figs. 4 and 5)

* * * * *

c. Headphone and speaker * * * of the chassis. The receivers procured on Order No. 25635-Phila-53 do not have a speaker jack on the front panel.

* * * * *

Figure 4. The following note is added:

NOTE: ON ORDER NO. 25635-PHILA-53, THE BREAK-IN OFF-ON SWITCH REPLACES THE SPEAKER JACK ON THE FRONT PANEL.

8.1. Differences in Models Procured on Order No. 3470-Phila-52

The following changes * * * Order No. 3470-Phila-52.

* * * * *

8.2. Differences in Models Procured on Orders No. 25635-Phila-53 and 3357-Phila-52
(Added)

a. The following changes are made in equipment procured on Order No. 25635-Phila-53:

(1) Resistor R181 is 3,100 ohms.
(2) Capacitor C206 is either 5 $\mu\mu$f or 7 $\mu\mu$f (par. 85*d*).
(3) Capacitors C123 and C129 are each 62 $\mu\mu$f.
(4) Capacitors C121 and C127 are each 200 $\mu\mu$f.
(5) Capacitor C103 is 390 $\mu\mu$f.
(6) Capacitor C101 is 800 $\mu\mu$f.
(7) BREAK-IN OFF-ON switch S119 replaces SPEAKER jack J102 on the front panel.

b. The following changes are made in equipment procured on Order No. 3357-Phila-52:

(1) Resistor R173 is 1,800 ohms.
(2) Resistor R182 is 220 ohms.
(3) The positive terminals of capacitor C214A and C214B are connected by a short bus wire.

12. Connections

When the radio * * * (figs. 3 and 9) as follows:

* * * * *

c. Speaker Connection.

(1) A speaker or * * * of the receiver. Radio Receiver R-388/URR, with serial numbers 1 and above, on Order No. 25635-Phila-53, do not have a SPEAKER jack (J102) on the front panel.

* * * * *

14. Controls and Their Uses
(fig. 10)

Table I lists the controls of the radio receiver and indicates their functions.

Table I. Controls

Control	Function
* * *	* *
BFO PITCH control	Adjusts * * * ON).
BREAK-IN OFF-ON toggle switch (on receivers procured on Order No. 25635-Phila-53)	In OFF position, opens coil circuit of disabling relay K101. In ON position, closes coil circuit of disabling relay K101.
* * *	* *

Figure 10. The following note is added:

NOTE: ON RADIO RECEIVERS R-388/URR, SERIAL NUMBERS 1 AND ABOVE (ORDER NO. 25635-PHILA-53), A BREAK-IN OFF-ON SWITCH REPLACES THE SPEAKER JACK ON THE FRONT PANEL.

15. Starting Procedure

a. Preliminary. Set the front panel controls as follows:

Control	Position
* * *	* *
CRYSTAL FILTER PHASING control.	Aligned with mark on panel.
BREAK-IN OFF-ON switch (on receivers with serial numbers 1 and above (Order No. 25635–Phila–53)).	ON.

* * * * *

20. Operating Precautions and Notes

The following notes will aid the operator in securing maximum performance from the receiving equipment.

* * * * *

d. (Added) The BREAK-IN OFF-ON switch on receivers procured on Order No. 25635–Phila–53, should be in the ON position for nearly all modes of operation. The switch is operated to OFF to disable the break-in facilities of the equipment.

29. Performing Preventive Maintenance

The following preventive * * * operation dictate otherwise.

Caution: Screws, bolts, and * * * damaged or broken.

* * * * *

c. Monthly. Remove receiver from * * * necessary and clean.

(10) Check PHONES and SPEAKER jacks J103 and J102 for tight fit and good contact. Radio Receivers R–388/URR, serial numbers 1 and above (Order No. 25635–Phila–53), do not have the front-panel SPEAKER jack (J102).

* * * * *

30. Lubrication Instructions

a. (Superseded) Cover the tuning gear train teeth, cam edges, and the slug table riders with a light grease film (AN–G–25 viscosity). The bfo capacitor is located inside of T106 (fig. 33), and is varied by means of a steel extension shaft. This shaft passes through a bearing hole in the aluminum gear panel. Lubricate the shaft at the bearing point every 6 months, as follows:

(1) Loosen the setscrew in the flexible coupling at the capacitor.

(2) Pull the stainless-steel extension shaft forward until the portion that rotates in the aluminum gear panel hole is exposed. Remove corrosion with No. 000 sandpaper, and then lubricate that portion with Grease, Aircraft and Instrument (GL).

* * * * *

36. Equipment Performance Checklist

	Item No.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	*	*	*	*	*
	12	CALIBRATE OFF-ON switch (Order No. 25635–Phila–53 only).	Turn to OFF.	----	----
	*	*	*	*	*

38. Radio-Frequency Amplifier V101

The r-f amplifier * * * uses single conversion.

a. Tuning Step 1. With the BAND * * * (high-frequency) end. Capacitor C101 is large so that the effect of tube input capacitance changes (Miller effect) in frequency will be negligible. The tuned r-f * * * interstage coupling capacitors.

* * * * *

Figure 13. The following note is added:

NOTE: ON RADIO RECEIVERS R–388/URR, SERIAL NUMBERS 1 AND ABOVE (ORDER NO. 25635–PHILA–53), CAPACITOR C101 IS 800 $\mu\mu$F.

Figure 14. The following note is added:

NOTE: ON RADIO RECEIVERS R–388/URR, SERIAL NUMBERS 1 AND ABOVE (ORDER NO. 25635–PHILA–53), CAPACITOR C103 IS 390 $\mu\mu$F.

Figure 15. The following note is added:

NOTE: ON RADIO RECEIVERS R–388/URR, SERIAL NUMBERS 1 AND ABOVE (ORDER NO. 25635–PHILA–53), CAPACITORS C121 AND C127 ARE EACH 200 $\mu\mu$F; C123 AND C129 ARE EACH 62 $\mu\mu$F.

Figure 23. The following note is added:

NOTE: ON RADIO RECEIVERS R–388/URR WITH SERIAL NUMBERS 1408 THROUGH 1447 (ORDER NO. 3470–PHILA–52) AND WITH SERIAL NUMBERS 1 THROUGH 1670 (ORDER NO. 3357–PHILA–52), FIXED CAPACITOR C214B (0.1 μF) IS CONNECTED IN PARALLEL WITH C214A.

50. Noise Limiter and A-F Amplifier

* * * * *

c. A-F Power Amplifier V113. The a-f power * * * or SPEAKER jack. A SPEAKER jack does not appear on the equipment with serial numbers 1 and above (Order No. 25635-Phila-53). Located at the * * * can be connected. The SPEAKER jack (not on Radio Receivers R-388/URR with serial numbers 1 and above (Order No. 25635-Phila-53)) and PHONES jack are connected across the 600-ohm winding of the transformer. Screen voltage for * * * equalize audio output.

Figure 26. The following notes are added:

NOTES:
1. SPEAKER JACK (J102) DOES NOT APPEAR ON RADIO RECEIVERS R-388/URR WITH SERIAL NUMBERS 1 AND ABOVE ON ORDER NO. 25635-PHILA-53.
2. IN RADIO RECEIVERS R-388/URR WITH SERIAL NUMBERS 1408 THROUGH 1447 ON ORDER NO. 3470-PHILA-52 AND SERIAL NUMBERS 1 THROUGH 1670 ON ORDER NO. 3357-PHILA-52, R173 IS 1,800 OHMS AND R182 IS 220 OHMS.

Figure 27. The following note is added:

NOTE: CAPACITOR C206 IS EITHER 5 $\mu\mu$F OR 7 $\mu\mu$F TO FULFILL THE REQUIREMENT OF THE INDIVIDUAL RECEIVER.

53. Power Supply

The receiver power * * * for 230-volt operation.

a. The power transformer * * * and On positions. Transformer T108 has * * * receiver tube filaments.

* * * * *

54. Input-Output Meter

A 0- to * * * the meter connections.

* * * * *

b. Output Meter. When the INPUT-OUTPUT * * * T107 secondary winding. On Order No. 3357-Phila-52, meter loading resistor R182 is connected in parallel with meter M101. The rectified voltage * * * across resistor R182.

Figure 29. The following notes are added:

NOTES:
1. IN RADIO RECEIVERS R-388/URR WITH SERIAL NUMBERS 1 AND ABOVE ON ORDER NO. 25635-PHILA-53, RESISTOR R181 IS 3,100 OHMS.
2. IN RECEIVERS WITH SERIAL NUMBERS 361 AND ABOVE ON ORDER NO. 25067-PHILA-54-55-(51), R181 IS 1,400 OHMS; R185 (1,800 OHMS) IS CONNECTED BETWEEN THE JUNCTION OF R181 and B+ FOR V113 AND THE JUNCTION POINT OF L122 AND L123. CAPACITOR C239 (8 μF) IS CONNECTED BETWEEN THE JUNCTION POINT OF R181 AND R185 AND TERMINAL 1 OF CAPACITOR C217.

75. Removal of VFO

a. When trouble occurs in the vfo unit, replace the entire unit. To begin this task, remove the V001 and V002 tube shields, then the tubes.

* * * * *

78. Replacement of Dial Cables (fig. 39)

* * * * *

c. Drum Cable. To replace the drum cable, a 27-inch length of nylon-covered string is required.

(1) Turn the BAND CHANGE shaft to tuning step 30 (29.5 to 30.5 mc) position, thus causing pulley B to reach its counterclockwise stop.

(2) Tie a loop in the end of the cable and attach it to pulley B and wind it around as shown in figure 39.

* * * * *

85. BFO Adjustment (Superseded)

Before performing the bfo adjustment procedure, check for optimum output of bfo input signal to the detector. To check the output, operate the METER INPUT-OUTPUT toggle switch to INPUT, turn the BFO switch to ON, and rotate the BFO PITCH control throughout its range. A noticeable change in the reading of the input-output meter, when the BFO PITCH control is rotated, indicates that excessive bfo signal is being applied to the detector. When the reading is excessive, check the value of capacitor C206 (fig. 37). This capacitor is in the output circuit of the bfo. If the value of this capacitor is 7 $\mu\mu$f, replace it with a 5-$\mu\mu$f capacitor. In Radio Receivers R-388/URR with serial numbers 1 and higher, on Order No. 25635-Phila-53, one each 5-$\mu\mu$f and 7-$\mu\mu$f capacitors are included and are located beneath the chassis for use in the bfo output circuit. The unused capacitor is stored by connecting it to two grounded lugs.

a. Turn the BFO switch to ON. Connect the signal generator between the grid (pin 7) of V106 and chassis. Set the BFO PITCH capacitor to midrange.

b. With a Bristo wrench, loosen the BFO

PITCH knob, and match the index line to the line on the chassis. Tighten the knob.

c. Adjust the tuning core in T106 for zero beat; use an insulated screwdriver.

Figure 42. The line connection between the junction point of R181 and terminal 2 of T107, and the junction point of L122 and L123 is deleted. Resistor R185 (1,800 ohms) is inserted in place of the line.

Capacitor C239 (8 μf) is added between the junction point of R181 and R185 and terminal 1 of C217.

The word NOTE is changed to read: NOTES. The numerals 1 and 2 are placed before the two existing notes, respectively. The following notes are added:

3. IN RADIO RECEIVERS R-388/URR WITH SERIAL NUMBERS 1 AND ABOVE (ORDER NO. 25635-PHILA-53), CAPACITORS C123 AND C129 ARE EACH 62 μμF; CAPACITORS C121 AND C127 ARE EACH 200 μμF; CAPACITOR C103 IS 390 μμF; CAPACITOR C101 IS 800 μμF; JACK J102 IS DELETED; RESISTOR R181 IS 3,100 OHMS; CAPACITOR C206 IS EITHER 5 μμF OR 7 μμF; AND BREAK-IN OFF-ON (SPST) SWITCH (S119) IS ADDED IN THE COIL CIRCUIT OF DISABLING RELAY K101.

4. IN RADIO RECEIVERS R-388/URR WITH SERIAL NUMBERS 1 THROUGH 1670 (ORDER NO. 3357-PHILA-52), RESISTOR R173 IS 1,800 OHMS; RESISTOR R182 IS 220 OHMS; AND THE POSITIVE TERMINALS OF C214A AND C214B ARE CONNECTED BY BUS WIRE.

5. IN RADIO RECEIVERS R-388/URR WITH SERIAL NUMBERS 885 THROUGH 1184 AND 1601 AND HIGHER (ORDER NO. 25635-PHILA-53), THE RATING OF T108 IS 700 V CT, .125 AMP.

6. IN RADIO RECEIVERS R-388/URR WITH SERIAL NUMBERS 301 AND HIGHER (ORDER NO. 25067-PHILA-54-55-(51)), R181 IS 1,400 OHMS.

[AG 413.44 (15 Aug 55)]

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

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

OFFICIAL:

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

N. F. TWINING,
Chief of Staff, United States Air Force.

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E. E. TORO,
Colonel, United States Air Force,
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Units organized under following TOE's:
11-7R, Sig Co Inf Div (2)
11-16R, Hq & Hq Co, Sig Bn, Corps or Abn Corps (2)
11-57R, Armd Sig Co (2)
11-127R, Sig Rep Co (2)
11-128R, Sig Depot Co (2)
11-500R (AA-AE), Sig Svc Org (2)
11-557R, Abn Sig Co (2)
11-587R, Sig Base Maint Co (2)
11-592R, Hq & Hq Co, Sig Base Depot (2)
11-597R, Sig Base Depot Co (2)

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

TM 11-854
TO 31R1-2URR-121
CHANGES No. 3

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
WASHINGTON 25, D. C., *24 May 1957*

TM 11-854/TO 31R1-2URR-121, 23 April 1952, is changed as follows:

Page 6.

8.3. Differences in Models Procured on Order No. 30951-Phila-57

(Added)

a. Capacitors C005 and C006 are 4,700 $\mu\mu$f each.

b. IF GAIN potentiometer R187 (50K) and capacitor C240 (.01 μf) are connected between the cathode of V108 (pin 7) and ground.

c. DIODE LOAD jack, and the AGC jack are located on the rear panel.

d. Resistor R186 (220K) is connected between the grid of V113 (pin 7) and chassis ground.

Page 16.

20*e.* (Added) Use the receiver disabling relay to disconnect the receiving antenna when the transmitter is in operation; or detune the receiver from the frequency of the transmitter. This will prevent excessive RF current from warping the antenna coil.

Page 19, paragraph 30*a* (page 2 of C 2). Make the following changes:

Line 1. Add after "(Superseded)": Lubricate the receiver upon reassembly after repair.

Lines 1 and 2. Add after "gear train teeth,": band-changing gear trains,

Page 19, paragraph 30. Make the following changes:

b. Line 1. Add after "Gasoline": or carbon tetrachloride.

c. Line 2. Delete "carbon tetrachloride or solvent (SD)" and substitute: Cleaning Compound.

Page 38, figure 23.

Note. (Added) IN EQUIPMENT PROCURED ON ORDER NO. 30951-PHILA-57, IF GAIN POTENTIOMETER R187 (50K) WITH CAPACITOR C240 (.01 UF) IN PARALLEL, ARE CONNECTED BETWEEN PIN 7 OF V108 AND GROUND.

Page 40, figure 25. Make the following changes:

Change the value of R149 to: 680.

Note. (Added) IN EQUIPMENT PROCURED ON ORDER NO. 30951-PHILA-57, RESISTOR R186 (220K) IS CONNECTED BETWEEN PIN 7 OF V113 AND GROUND.

Page 42, figure 26.

Note. (Added) IN EQUIPMENT PROCURED ON ORDER NO. 30951-PHILA-57, RESISTOR R186 (220K) IS CONNECTED BETWEEN PIN 7 OF V113 AND GROUND.

Page 45, figure 29. Add pins 2 and 7 next to pin 4 (ground connection) on voltage regulator tube V116.

Page 56, figure 32. Make the following changes:

Pins, 2, 4, and 7 of V116 are internally connected and the voltage and resistance readings are zero.

Pins 5 and 1 are internally connected and the voltage and resistance readings are +150 volts and 44K, respectively.

In equipment procured on Order No. 30951-Phila-57, the resistance at pin 7 of V113 is 220K ohms.

Place VOLTAGE directly above "REGULATOR V116."

Page 72, paragraph 84. (Introductory paragraph.) Delete the eighth sentence and substitute: Connect a vtvm to the junction of resistors R150 and R152, and ground (fig. 26). In equipment procured on Order No. 30951-Phila-57, connect the vtvm from the DIODE LOAD jack, on the rear panel, to chassis ground.

Page 73, paragraph 87*a*. Delete the last sentence and substitute: Connect a vtvm to the junction of resistors R150 and R152, and chassis ground (fig. 26). In equipment procured on Order No. 30951-Phila-57, connect the vtvm from the DIODE LOAD jack, on the rear panel, to chassis ground.

91.1. Intermediate Frequency Adjustment

(Added.)

Note. The following applies to equipments procured on Order No. 30951-Phila-57.

a. Connect the signal generator to the ANTENNA jack through a dummy antenna (47-ohm resistor in series with a 100-$\mu\mu$f capacitor).

b. Connect a 47-ohm resistor from IF OUTPUT jack J104 to ground, and connect the vtvm across the resistor.

c. Set the AVC switch to OFF.

TAGO 6662A—May 400475°—57

AF Olmsted AFB, Pa., 18 Aug 58 300 REPRINT

d. Adjust the ANT. TRIM control for maximum IF output as indicated by the vtvm.

e. Adjust the IF GAIN potentiometer (R187) for 175 mv as indicated by the vtvm. (R187 is located near the METER ZERO potentiometer (R140).)

f. Retune the secondary of transformer T103, and the primary of transformer T104. Use the procedure outlined in paragraph 84*a* and *d*.

Page 98. Make the following changes:

Change the value of R149 to: 680.

On VOLTAGE REGULATOR V116, add pins 2 and 7 next to pin 4 (ground connection); and add pin 1 beside pin 5 (plate).

Complete the connection from pin 5 of BFO V114 to the plate.

NOTES: (Added) (FOR EQUIPMENT PROCURED ON ORDER NO. 30951-PHILA-57.)

1. CAPACITORS C005 AND C006 HAVE A VALUE OF 4,700 MMF.
2. THE DIODE LOAD TEST POINT IS AT THE JUNCTION OF R150 AND R152.
3. THE AGC TEST POINT IS AT THE PLATE OF V11A (PIN 1).
4. RESISTOR R186 (220K) IS CONNECTED BETWEEN PIN 7 (V113) AND CHASSIS GROUND.
5. THE CONNECTION BETWEEN PIN 7 OF V108 AND GROUND IS REMOVED. CAPACITOR C240 (.01 UF) IS CONNECTED FROM PIN 7 TO CHASSIS GROUND. POTENTIOMETER R187 (50K) IS CONNECTED TO PIN 7 WITH THE MOVABLE CONTACT CONNECTED TO CHASSIS GROUND.

[AG 413.44 (17 May 57)]

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

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

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HERBERT M. JONES,
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Hq CONARC	ARWC	JBUSMC
CONARC Bd	CGSC	Units organized under following TOE's:
CONARC Bd Test Sec	Br Svc Sch	
Army Air Def Comd	Gen Depots	11-7
OS Maj Comd	Sig Sec, Gen Depots	11-16
OS Base Comd	Sig Depots	11-57
Log Comd	POE (OS)	11-127
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Div	Army Sig Pub Agency	11-587
US Army Tng Cen	Army Sig Comm Engr Agency	11-592
Ft & Cp	Army Comm Agency	11-597
Sp Wpn Comd	White Sands Sig Agency	32-500

NG: State AG; units—same as Active Army.
USAR: None.
For explanation of abbreviations used, see SR 320-50-1.

U. S. GOVERNMENT PRINTING OFFICE: 1957

TM 11-854
*C 4

RADIO RECEIVER R-388/URR

CHANGE
No. 4

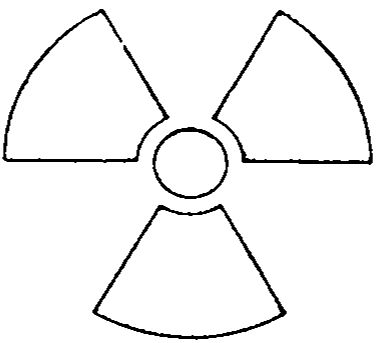
HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D. C., *25 November 1963*

TM 11-854, 23 April 1952, is changed as follows:

Note. The parenthetical reference to previous changes (example: "page 1 of C 2") indicates that pertinent material was published in that change.

Inside front cover. Include the following notice on the inside of the front cover:

RADIATION HAZARDS



STD--RW--2

Ni 63
Co 60

Tube type OA2 or OA2WA used in the R-388/URR contains radioactive material. These tubes are potentially hazardous when broken; see qualified medical personnel and the Safety Director if you are exposed to or cut by broken tubes. Use extreme care in replacing these tubes and follow safety procedures in their storage, and disposal (para 63.1).

Never place a radioactive tube in your pocket.

Use extreme care not to break radioactive tubes while handling them.

Never remove radioactive tubes from cartons until ready to use them.

Refer to paragraph 63.1 on handling, storage, and disposal of radioactive material.

* This change supersedes C 3, 24 May 1957, and together with TM 11-5820-508-20P, 21 June 1963, supersedes SIG 783 R-388/URR, 16 December 1957.

Page 1, paragraph 1. Delete the second sentence and substitute:

Three appendixes covering a list of references a maintenance allocation chart, and a basic issue items list are also provided at the back of the manual.

Add paragraph 1.1 after paragraph 1:

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply manuals (types 4, 6, 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

Delete paragraph 2 and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omission, and recommendation for improving this manual is authorized and encouraged. DA Form 2028 (Recommended changes to DA technical manual parts lists or supply manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to Commanding Officer, U. S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, N. J. 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned officer, supervisor etc.).

Page 4, paragraph 4*d*. Add the following:

Warning: **Tube type OA2 and OA2A are used in this equipment. These tubes contain radioactive material and are potentially hazardous when broken. The type and quantity of radioactivity are listed below:**

Tube type	Where used	Isotope	Quantity (microcuries)
OA2 or OA2WA	V116, power supply Voltage regulator	Ni63 Co60	0.01 -0.05 0.0067

Page 6. Delete paragraph 8.3 (as added by C 3, 24 May 1957) and substitute:

8.3 Differences in Models Procured on Order No. 30951-Phila-57 and 37003-PC-62

a. Capacitors C005 and C006 are 4,700 uuf each.

b. IF Gain potentiometer R187 (50K) and capacitor C240 (0.01 uf) are connected between the cathode of V108 (pin 7) and ground.

c. A DIODE LOAD jack and an AGC jack are installed on the rear panel.

d. Resistor R186 (220K) is connected between the grid of V113 (pin 7) and ground.

e. On Order No. 37003-PC-62 only, a transistorized circuit has been included to protect the antenna circuit from overloads (para. 37.1).

Page 7, paragraph 10. Delete subparagraph *d* and substitute:

d. Checking Unpacked Equipment.

(1) Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (par 2).

(2) See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the basic issue items list (app. III). Report all discrepancies in accordance with TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

GPO 810-780-1

(3) If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front panel near the nomenclature plate. Check to see whether the MWO number (if any) and appropriate notations concerning the modification have been entered in the equipment manual.

Note. Current MWO's applicable to the equipment are listed in DA Pam 310-4.

Page 10, paragraph 11. Insert warning beneath paragraph heading:

Warning: **The OA2 or OA2WA tube contains radioactive material. Handle carefully to avoid breaking.**

Page 11, paragraph 12. Add the following to subparagraph *c*(1):

The receivers procured on Order No. 25635-Phila-53 and 37003-PC-62 do not have a speaker jack on the front panel. Connection to the speaker must be made from the rear panel.

Page 13, paragraph 14, table 1 (page 1 of C 2), "BREAK-IN OFF-ON toggle switch." Add to the end of the statement in the "Control" column: and 37003-PC-62

Page 14, paragraph 15*a* (page 2 of C 2), "BREAK-IN OFF-ON switch." Add to the end of the statement in the "Control" column: and 37003-PC-62.

Page 15, paragraph 20*d* (page 2 of C 2), line 3. After "53" insert: and 37003-PC-62.

Page 16, paragraph 20. Delete subparagraph *e* (as added by C 3, 24 May 1957) and substitute:

e. Except in Order No. 37003-PC-62, use the receiver disabling relay to disconnect the receiving antenna when the transmitter is in operation; or detune the receiver from the frequency of the transmitter. This will prevent excessive RF current from damaging the antenna coil.

Page 17. Change chapter heading to: MAINTENANCE INSTRUCTIONS.

Delete section I, II, and III and substitute:

Section I. OPERATOR'S MAINTENANCE

25. Scope of Maintenance

The maintenance duties assigned to the operator of Radio Receiver R-388/URR are listed below together with a reference to the paragraphs covering the specified maintenance function. The duties assigned do not require tools or test equipment other than those issued with the receiver.

a. Daily preventive maintenance checks and services (par. 28).

b. Cleaning (par. 29).

26. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraph 28 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services chart (par. 28) outlines functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the *References* column lists the illustrations, paragraphs, or manuals that contain supplementary information. If the defect cannot be remedied by the operator, higher echelon maintenance or repair is required. Records and reports of these checks and services must

be made in accordance with the requirements set forth in TM 38-750.

27. Preventive Maintenance Checks and Services Periods

Paragraph 28 specifies checks and services that must be accomplished daily or under the special conditions listed below:

a. When the equipment is initially installed.

b. When the equipment is reinstalled after removal for any reason.

c. At least once each week if the equipment is maintained in a *standby* condition.

28. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Exterior surfaces.	Clean the receiver dust covers and front panel; clean the frequency indicator glass and meter glass.	Par. 29.
2	Frequency indicator glass; meter glass.	Inspect the frequency indicator glass and the meter glass for cracks and breaks.	None.
3	Cords and cables.	Check cords and cables for cracks and breaks.	None.
4	Connectors.	Inspect connectors at the rear of the receiver for tightness.	Fig. 9.
5	Knobs and switches.	While making the operational test, (item 6) check the mechanical action of each knob and switch for external and internal binding.	Fig. 10.
6	Operational test.	Check the receiver in accordance with the procedures given in paragraphs 15 through 19.	None.

29. Cleaning

Inspect the exterior of the radio receiver. The exterior surfaces should be clean, and free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean soft cloth.

Warning: **Cleaning Compound (Federal stock No. 7930-395-9542) is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near a flame.**

b. Remove grease, fungus, and ground-in dirt from the front panel; use a cloth dampened (not wet) with cleaning compound.

c. Remove dust and dirt from plugs and jacks with a brush.

Caution: **Do not press on the meter face (glass) when cleaning; the meter may become damaged.**

d. Clean the meter and control knobs; use a soft clean cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

Section II. ORGANIZATIONAL MAINTENANCE

30. Scope of Organizational Maintenance

This section contains instructions covering second echelon preventive maintenance of the equipment. It includes tools, materials, and test equipment required for performing preventive maintenance by the organizational repairman.

31. Tools, Materials, and Test Equipment Required

The tools, materials, and test equipment required for organizational maintenance are listed below.

a. Tools. Tool Kit, Radio Repair TK-115/G.

Page
cr

b. Special Tools.

(1) A set of four wrenches of different sizes for setscrews of the fluted socket type is mounted in a tension clasp on the under side of the dust cover.

(2) Phillips-head screwdriver is mounted on the outer side rear of the dust cover (fig. 9).

c. Materials.

(1) Cleaning Compound (FSN 7930-395-9542).

(2) Cleaning cloth.

(3) Grease, Aircraft and Instrument (GL).

(4) Fine sandpaper (No. 000).

d. Test Equipment.

(1) Multimeter AN/URM-105.

(2) Test Set, Electron Tube TV-7/U.

32. Organizational Preventive Maintenance

a. Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all echelons concerned with the equipment and includes the inspection, testing, and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of the equipment at the second echelon level are made at monthly intervals unless otherwise directed by the commanding officer. The preventive maintenance checks and services should be scheduled concurrently with the periodic service schedule of the carrying vehicle for all vehicular installations.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38-750.

32.1. Monthly Maintenance

Perform the maintenance functions indicated in paragraph 32.2 once each month. A month is defined as approximately 30 calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. Equipment maintained in a standby (ready for immediate operation) condition must have monthly preventive maintenance checks and services performed on it. Equipment in limited storage (requires service before operation) does not require monthly preventive maintenance.

32.2. Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Publications.	See that all publications are complete, serviceable, and current.	DA Pam 310-4.
2	Modifications.	Determine whether new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	DA Pam 310-4, and TM 38-750.
3	Installation.	See that the equipment is properly installed.	Par. 11.
4	Preservation.	Check all surfaces for evidence of fungus. Remove rust and corrosion and spot-paint bare spots.	Par. 32.3.
5	Fuses.	See that operating fuse is of the correct value. Check spare fuses for proper value and quantity.	Fig. 9.
6	Handles.	Inspect handles for looseness.	Fig. 1.
7	Interior.	Clean the interior of chassis and cabinet.	Figs. 33, and 34.
8	Pluckout items.	Inspect seating of pluckout items.	

Sequence No	Item	Procedure	References
9	Resistors and capacitors.	Inspect resistors and capacitors for cracks, blistering, or other detrimental defects.	Figs. 33 through 38.
10	Lubrication	Check to see that the tuning gear train teeth cam edges and slug table riders have a light film of Grease, Aircraft and Instrument (GL).	Par. 32.4.
11	Transformers and chokes.	Inspect the transformers and chokes for evidence of overheating. Check the terminals on power transformer. There should be no evidence of dirt or corrosion.	Fig. 33.
12	Equipment performance.	Operate the equipment according to the chart in paragraph 36.	

Section III. PRESERVATION AND LUBRICATION

32.3. Cleaning and Touchup Painting Instructions

Clean rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TM 9-213.

32.4. Lubrication

Lubrication consists of the application of Grease Aircraft and Instrument (GL) to cover the tuning gear train teeth cam edges and slug table riders.

a. Remove old grease with a lint-free cloth moistened with cleaning compound.

b. Wipe with a dry cloth and apply lubricant.

Page 24. Add paragraph 37.1 after paragraph 37:

37.1. Antenna Protection Circuit

On Order No. 37003-PC-62, Radio Receiver R-388/URR is provided with an antenna protection circuit (fig. 11.1). This protection circuit is physically located near antenna input jack J101 in place of I104, and functions to isolate the rf input tuning coils from the antenna in the event of an rf overload from a nearby transmitter.

a. The antenna protection circuit consists of transistor Q401 in conjunction with relay K401. The level of current flow through the relay is determined by the dc bias level established between the emitter and base of the transistor as a result of signal rectification by CR401 and CR402.

b. When the receiver OFF-STANDBY-ON control is set to ON, relay K401 is energized and the antenna input circuit is completed to rf stage V101. Desired input signals below a predetermined level develop some dc bias across C403 but at a level which does not increase the transistor emitter collector current to a level which will deenergize K401.

c. If an rf input signal above a pre-established level is received, the increased positive dc bias applied to the base of the transistor will increase the transistor emitter collector current sufficiently to cause relay K401 to deenergize and open the antenna input circuit.

d. The negative end of L401 is tied to the junction of resistors R164 and R165 are part of a fixed bias supply, located between the center tap of the power supply transformer high voltage secondary winding and ground.

Add figure 11.1 after figure 11:

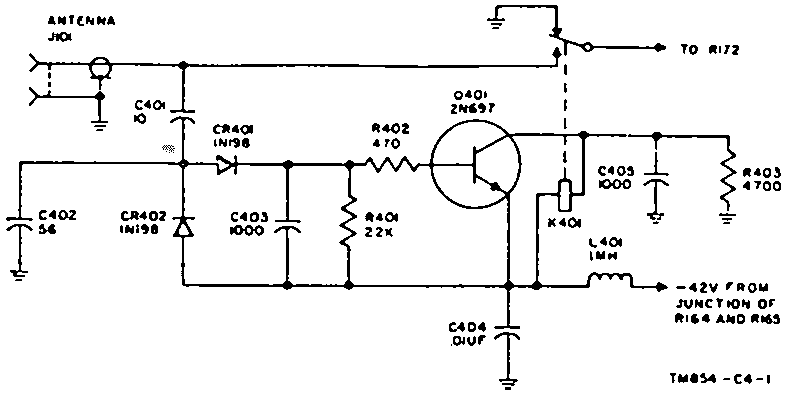


Figure 11.1 Rf input protective circuit.

Page 38, figure 23. Delete the note (As added by C 3 24 May 1957) and substitute:

Note IN EQUIPMENT PROCURED ON ORDERS NO. 30951-PHILA-57 and 37003-PC-62, IF GAIN POTENTIOMETER R187 (50K) WITH CAPACITOR C240 (.01 UF) IN PARALLEL ARE CONNECTED BETWEEN PIN 7 OF V108 AND GROUND.

Page 40, figure 25. (As changed by C 3 24 May 1957) Make the following changes:

Change the value of R149 to: 680.

Delete the note and substitute:

Note IN EQUIPMENT PROCURED ON ORDERS NO. 30951-PHILA-57 and 37003-PC-62, RESISTOR R186 (220K) IS CONNECTED BETWEEN PIN 7 OF V113 AND GROUND.

Page 41, paragraph 50c. Add to lines 5 and 8 (page 3 of C2) after "Phila-53": and 37003-PC-62).

Page 42, figure 26. (Page 3 of C 2) Add to note 1: and 37003-PC-62.

Delete note (as changed by C 3 24 May 1957) and substitute:

3. IN EQUIPMENT PROCURED ON ORDERS NO. 30951-PHILA-57 and 37003-PC-62, RESISTOR R186 (220K) IS CONNECTED BETWEEN PIN 7 OF V113 AND GROUND.

Page 45, figure 29. (As changed by C 3 24 May 1957) Add pins 2 and 7 next to pin 4 (ground connection) on voltage regulator tube V116.

Page 54, paragraph 63. Add paragraph 63.1 after paragraph 63:

63.1. Handling, Storage, and Disposal of Radioactive Material

Follow the procedures for safe handling, storage, and disposal of radioactive materials as directed by TB SIG 225, AR 40-580, and AR 755-380.

Page 56, figure 32. (As changed by C 3 24 May 1957) Make the following changes:

Pins, 2, 4, and 7 of V116 are internally connected and the voltage and resistance readings are zero.

Pins 5 and 1 are internally connected and the voltage and resistance readings are +150 volts and 44K, respectively.

In equipment procured on Orders No. 30951-Phila-57 and 37003-PC-62, the resistance at pin 7 of V113 is 220K ohms.

Place VOLTAGE directly above "REGULATOR V116".

Page 63, paragraph 66, chart. Add the following to symptom number 3:

Symptom	Probable trouble	Correction
No signal output from receiver.	K401 defective.	Replace K401.
	Transistor Q401 defective.	Substitute transistor with a transistor known to be good.
Signal at output of receiver when very strong rf signal is received.	CR401 or CR402 defective.	Replace CR401, or CR402.

Page 72, paragraph 84. (As changed by C 3 24 May 1957) (Introductory paragraph). Delete the eighth sentence and substitute:

Connect a vtvm to the junction of resistors R150 and R152, and ground (fig. 26). In equipment procured on Order No. 30951-Phila-57 and 37003-PC-62, connect the vtvm from the DIODE LOAD jack, on the rear panel, to chassis ground.

Page 73, paragraph 87*a* (as changed by C3 24 May 1957). Delete the last sentence and substitute:

Connect a vtvm to the junction of resistors R150 and R152, and chassis ground (fig. 26).

In equipment procured on Orders No. 30951-Phila-57 and 37003-PC-62, connect the vtvm from the DIODE LOAD jack, on the rear panel, to chassis ground.

Page 74, (As changed by C 3 24 May 1963) Add paragraph 91.1 after paragraph 91:

91.1. Intermediate Frequency Adjustment

Note. The following applies to equipments procured on Orders No. 30951-Phila-57 and 37003-PC-62.

a. Connect the signal generator to the ANTENNA jack through a dummy antenna (47-ohm resistor in series with a 100-uuf capacitor).

b. Connect a 47-ohm resistor from IF OUTPUT jack J104 to ground, and connect the vtvm across the resistor.

c. Set the AVC switch to OFF.

d. Adjust the ANT. TRIM control for maximum IF output as indicated by the vtvm.

e. Adjust the IF GAIN potentiometer (R187) for 175 mv as indicated by the vtvm. (R187 is located near the METER ZERO potentiometer (R140)).

f. Retune the secondary of transformer T103, and the primary of transformer T104. Use the procedure outlined in paragraph 84*a* and *d*.

Page 77. Delete appendix I and substitute:

APPENDIX I

REFERENCES

AR 40-580	Control of HAZARDS to Health from Radioactive Materials.
AR 700-51	Logistics Responsibilities.
AR 755-380	Disposal of Unwanted Radioactive Material.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 4, 6, 7, 8, and 9) Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TB SIG 225	Identification and Handling of Radioactive Signal Items.
TM 9-213	Painting Instructions for Field Use.
TM 38-750	The Army Equipment Record System and Procedures.

Page 80. Add appendixes II and III after appendix I:

APPENDIX II

MAINTENANCE ALLOCATION

Section 1. INTRODUCTION

1. General

a. This section assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation chart are as follows:

(1) *Component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and the subassemblies which are part of an assembly are listed immediately below that assembly. Each generation break-down (components, assemblies, or subassemblies) are listed in disassembly order or alphabetical order.

(2) *Maintenance function.* This column indicates the various maintenance functions allocated to the echelons.

(a) Service. To clean, to preserve, and to replenish lubricants.

(b) Adjust. To regulate periodically to prevent malfunction.

(c) Inspect. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(d) Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(e) Replace. To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(f) Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement or parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(g) Align. To adjust two or more components of an electrical system so that their functions are properly synchronized.

(h) Calibrate. To determine, check, or rectify the graduation of an instrument, weapon, or weapons, system, or components of a weapons system.

(i) Overhaul. To restore an item to *completely serviceable* condition as prescribed in serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(j) Rebuild. To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance tech-

nique of complete disassembly of the item, inspection of all parts of components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications and subsequent reassembly of the item.

(3) *1st, 2d, 3d, 4th, and 5th echelons.* The symbol X placed in columns 3 through 7 indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by X are authorized to perform the indicated operation.

(4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding column.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2d, 3d, 4th, and 5th echelon.* The dagger (†) symbol in these columns indicates the echelons normally allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment.

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
RADIO RECEIVER, R-388/URR	service		X					
	adjust	X						Use front panel controls only (External)
	inspect		X				8,20	External voltages
	test		X				8,17,20	Shorts, continuity tubes
				X			3,4,9,13,14,17,18	Tests to determine serviceability after repairs and replacement of parts
					X		1,3,5,6,9,10,11,12,14, 15,17,18,19,22	Tests to determine sensitivity and audio output
						X	1,2,3,5,6,7,9,10,11, 12,13,14,15,16,18,19, 21,22	All testing
	replace		X				20	
	repair			X			18	
	align				X		4,5,6,7,11,12,14,15	
	rebuild					X	18,19	

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
RADIO RECEIVER, R-388/URR (continued)							
ACCESSORY KIT MK-288/URM				†	†	1	
ANALYZER, SPECTRUM TS-723/U					†	2	
AUDIO OSCILLATOR TS-382/U			†	†	†	3	
FREQUENCY METER AN/URM-32			†			4	
FREQUENCY METER AN/URM-79				†	†	5	
FREQUENCY METER AN/URM-80				†	†	6	
FREQUENCY METER AN/USM-26					†	7	
MULTIMETER AN/URM-105		†				8	
MULTIMETER TS-352/U			†	†	†	9	
MULTIMETER ME-26/U				†	†	10	
OSCILLOSCOPE OS-8/U				†	†	11	
OUTPUT METER TS-585/U				†	†	12	
POWER SUPPLY PP-1243/U			†			13	
RF SIGNAL GENERATOR SET AN/URM-25			†	†	†	14	
SIGNAL GENERATOR AN/USM-44				†	†	15	
TEST SET, ELECTRON TUBE TV-2/U					†	16	
TEST SET, ELECTRON TUBE TV-7/U		†	†	†		17	
TOOL KIT, RADAR AND RADIO REPAIRMAN TK-87/U			†	†	†	18	
TOOL KIT, RADAR AND RADIO REPAIRMAN TK-88/U				†	†	19	
TOOL KIT, RADIO REPAIRMAN TK-115/G		†				20	
TRANSFORMER, VARIABLE POWER CN-16/U					†	21	
VOLTMETER, METER ME-30/U				†	†	22	

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

a. This appendix lists items supplied for initial operation and for running spares. The list includes tools, accessories, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

b. Columns are as follows:

(1) *Federal stock number.* This column lists the 11-digit Federal stock number.

(2) *Designation by model.* Not used.

(3) *Description.* Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

(4) *Unit of issue.* The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(5) *Expendability.* Nonexpendable items are indicated by NX. Expendable items are not annotated.

(6) *Quantity authorized.* Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spare Items" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

(7) *Illustration.* The "Item No." column lists the reference symbols used for identification of the items in the illustration or text of the manual.

2. Other Service Stock Numbers

Other service items listed herein are authorized in accordance with AR 700-51.

Section II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION FIGURE NO	ILLUSTRATION ITEM NO
5820-044-0990		RADIO RECEIVER R-88/URR: A1,A2,A3,P1 reception; freq .5 to 30.5 mc; 30 bands; oper power 115 v or 230 v, 45 to 75 cyc, 1 ph		NX			
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
Ord thru AGC		TECHNICAL MANUAL TM 11-654			2		
5120-356-4353		ALIGNMENT TOOL: phenolic; screwdriver type; 5-13/16 in lg x 0.315 in dia; Collins part/dwg 505-2119-001			1		11
5120-356-4354		ALIGNMENT TOOL: phenolic; screwdriver type; 7-3/4 in lg Collins part/dwg 505-2115-001			1		12
5120-696-9317		SCREWDRIVER: 90 deg offset; phillips cross tip No. 1 size; 3-1/4 in lg; Vaco part #P111			1		
5120-223-6995		WRENCH, SOCKET HEAD SCREW: splined; 6 flutes; L-type handle; 1-7/8 in nom lg; Spec Fed GGG-W-652, type II, class A			1		
5120-224-2482		WRENCH, SOCKET HEAD SCREW: for Bristo #10			1		
5120-249-9670		WRENCH, SOCKET HEAD SCREW: splined; 4 flutes; L type handle; 1-3/4 in lg; Spec Fed GGG-W-652, type II, class A			1		
5120-293-0195		WRENCH, SOCKET HEAD SCREW: 1-9/16 in lg x 3/8 in w x 0.060 in OD; Collins part/dwg 024-2900-00			1		
		RUNNING SPARE ITEMS					
5960-503-4880		ELECTRON TUBE: MIL type 0A2WA			1		
5960-168-3947		ELECTRON TUBE: MIL type 5V4G			1		
5960-166-7663		ELECTRON TUBE: MIL type 12AU7			1		
5960-166-7664		ELECTRON TUBE: MIL type 12AX7			1		
5960-262-1357		ELECTRON TUBE: MIL type 5654/6AK5W			1		
5960-264-2089		ELECTRON TUBE: MIL type 5749/6BA6W			3		
5960-264-3002		ELECTRON TUBE: MIL type 5750/6BE6W			1		
5960-268-3063		ELECTRON TUBE: MIL type 6X5/6AQ5W			1		

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO
		R-388/URR (continued)					
5920-260-9328		FUSE, CARTRIDGE: 1-1/2 amp; MIL type FO2D1R50B			6		
6240-155-8706		LAMP, INCANDESCENT: 6-8 v, 0.15 amp; MIL std MS1557/1-2 type TB-14			2		

Page 98, figure 42. Make the following changes:

(Page 4 of C 2) Note 3, line 3. After "25635-PHILA-53" add: and 37003-PC-62.

(As changed by C3, 24 May 1957) Make the following changes:
Change the value of R149 to: 680.

On VOLTAGE REGULATOR V116, and pins 2 and 7 next to pin 4 (ground connection); and add pin 1 beside pin 5 (plate).
Complete the connection from pin 5 of BFO V114 to the plate.

Delete the notes 1 through 5 and substitute:

7. (FOR EQUIPMENT PROCURED ON ORDERS NO. 30951-PHILA-57 and 37003-PC-62:

CAPACITORS C005 and C006 HAVE A VALUE OF 4,700 MMF. DIODE LOAD JACK IS CONNECTED TO THE JUNCTION OF R150 AND R152. THE AGC JACK IS CONNECTED TO THE PLATE OF V111A (PIN 1).

RESISTOR R186 (220K) IS CONNECTED BETWEEN PIN 7 (113) AND CHASSIS GROUND.

THE CONNECTION BETWEEN PIN 7 OF V108 AND GROUND IS REMOVED. CAPACITOR C240 (.01 UF) IS CONNECTED FROM PIN 7 TO CHASSIS GROUND.

POTENTIOMETER R187 (50K) (ON ORDER NO. 37003-PC-62) IS CONNECTED TO PIN 7 WITH THE MOVABLE CONTACT CONNECTED TO CHASSIS GROUND.

8. RF PROTECTIVE CIRCUIT (FIG. 11.1) HAS BEEN ADDED TO ORDER No. 37003-PC-62).