TECHNICAL MANUAL
FOR
RADIO RECEIVER R-390A/URR
VOLUME I OF III

REPRINTED W/T-1 AUG 1963
W/T-1(A) NOV 1964
W/T-4 NOV 1966

BUREAU OF SHIPS · NAVY DEPARTMENT · WASHINGTON 25, D.C.
WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working on the 240-volt power supply and the circuits connected to it, or on the 115/230-volt ac line connections. Before connecting the receiver to an ac source, be sure that the chassis is connected to the same ground as the ac source.

DON'T TAKE CHANCES!
INTERNAL HEAT REDUCTION
FSN N5820-937-0141

TYPE ( ), CLASS ( ) OPERATIONAL CHANGE ( )
ESTIMATED MAN HOURS ( ) NON-OPERATIONAL CHANGE (X)

Prepared by
NAVAL SHIP ENGINEERING CENTER, NORFOLK DIVISION
(ELECTRONICS MAINTENANCE ENGINEERING CENTER)
U. S. NAVAL STATION
NORFOLK, VIRGINIA 23511

AUTHORIZATION NOTICE: Forces afloat shall accomplish this field change at
the earliest opportunity on ship-installed equipment without reference to
the Bureau of Ships.

EQUIPMENT AFFECTED: This field change applies to all shipboard installed
R390A/URR equipments.

PURPOSE: The purpose of this field change is to reduce internal heating.

PREVIOUS FIELD CHANGES: No previous field changes need be accomplished.

EFFECT ON NOMENCLATURE: None

IDENTIFICATION OF ACCOMPLISHMENT: The accomplishment of this field change
may be identified by: (1) The two rectifier tubes 26Z5W have been removed
from their sockets; (2) New type heat dissipating tube shields have been
installed on all tubes.
MATERIAL REQUIRED:

Supplied with Field Change Kit:

<table>
<thead>
<tr>
<th>Item</th>
<th>Ref. Design.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR801 &amp; CR802</td>
<td>2 ea.</td>
<td>Silicon Diode - 1N561, 9N5960-829-0728</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>13 ea.</td>
<td>Tube Shield, 7 pin medium 9N5960-686-8085</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7 ea.</td>
<td>Tube Shield, 9 pin medium 9N5960-686-8087</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2 ea.</td>
<td>Tube Shield, 7 pin short 9N5960-686-8119</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1 ea.</td>
<td>Tube Shield, 9 pin long 9N5960-752-5857</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1 ea.</td>
<td>Tube Shield, 7 pin long 9N5960-729-8150</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2 ea.</td>
<td>Field Change Bulletin NAVSHIPS</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2 ea.</td>
<td>Temporary Corrections to NAVSHIPS 93053. Technical Manual for Receiver R390A/URR</td>
<td></td>
</tr>
</tbody>
</table>

Required by Installing Activity

1  1 ea. NAVSHIPS 93053 Technical Manual for Radio Receiver R390A/URR

TOOLS REQUIRED:

Screwdriver, 6 inch common
Screwdriver, Phillips head, 6 inch
Diagonal Pliers, 6 inch
Longnose Pliers, 6 inch
Soldering Iron or Gun, 60-100 watts
Solder
AN/USM-116 or equivalent

PROCEDURE: (Refer to NAVSHIPS 93053)

NOTE: OBSERVE SAFETY PRECAUTIONS AT ALL TIMES, ALWAYS INSURE THAT THE EQUIPMENT IS PROPERLY GROUNDED, WHENEVER IT IS ENERGIZED.
1. De-energize the receiver at its power source.

2. Disconnect all wires and cables from the receiver.

3. Remove the receiver from its cabinet or rack and place upon a suitable workbench.

   CAUTION: SEE "E1B895" BULLETIN (DROPPING RESISTOR (+ B LINE) INSTALLATION)

A. Installation of the Silicon Diodes IN561 in the Receiver Power Supply:

1. Place the receiver on the workbench bottom up.

2. Remove the top and bottom dust covers if installed.

3. Remove the connector P111 from the power supply assembly.

4. With the Phillips head screwdriver, loosen the six greenheaded captive screws that secure the subchassis to the main frame of the receiver.

5. Carefully withdraw the subassembly from the receiver. Be careful not to drop it - it is heavy!

6. Remove the two rectifier tubes (2625W) from their sockets.

7. Place the power supply assembly bottom up, so that the socket connections are accessible. (See fig. 54, page 78, NAVSHIPS 93053).

   CAUTION: USE CARE WHEN SOLDERING TO PREVENT THE HEAT FROM DAMAGING
   THE DIODES. UTILIZE HEAT SHUNTS WHEN SOLDERING.

8. Shape, cut leads, install, and solder the two IN561 silicon diodes, item 1, as follows:

   a. One diode between pins 1 and 4 of socket XV801, connecting the cathode lead of the diode to pin 4.

   b. The remaining diode between pins 1 and 4 of socket XV802, connecting the cathode lead of the diode to pin 4.

9. Re-install the power supply in the following manner:

   a. Carefully lower the power supply sub-chassis into the receiver, be careful not to drop it on the bench or into the receiver.

   b. Engage the six green-headed captive screws that secure the power supply sub-chassis into the receiver. Tighten each of the six captive screws.

   Reconnect the plug P111.

10. Temporarily apply power to the receiver.
11. With the AN/USM-116 adjusted to read +150 volts dc, connect the common test lead to the receiver chassis and connect the other lead to the test jack E607. A reading of +148 to +152 v dc will be obtained which indicates proper operation of the power supply. If this voltage reading is not obtained, it indicates improper installation or a defective diode. Correct as required. If the test of the power supply is satisfactory, remove the test leads and remove the temporary power from the receiver.

12. Remove all the presently installed tube shields if they are not of the new heat dissipating type, MS-24333. Install the shields supplied in this kit on the sockets as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty.</th>
<th>Type</th>
<th>Size</th>
<th>Socket Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>13 ea.</td>
<td>MS-24233-2</td>
<td>7 Pin Med.</td>
<td>XV201, XV202, XV203, XV204, XV501, XV502, XV503, XV504, XV505, XV508, XV603, XV604, XV701</td>
</tr>
<tr>
<td>3</td>
<td>7 ea.</td>
<td>MS-24233-5</td>
<td>9 Pin Med.</td>
<td>XV205, XV206, XV506, XV507, XV509, XV601, XV602</td>
</tr>
<tr>
<td>4</td>
<td>2 ea.</td>
<td>MS-24233-1</td>
<td>7 Pin Short</td>
<td>XV207, XV401</td>
</tr>
<tr>
<td>5</td>
<td>1 ea.</td>
<td>MS-24233-6</td>
<td>9 Pin Long</td>
<td>XV510</td>
</tr>
<tr>
<td>6</td>
<td>1 ea.</td>
<td>MS-24233-3</td>
<td>7 Pin Long</td>
<td>XV605</td>
</tr>
</tbody>
</table>

13. Reinstall the receiver in its cabinet or rack and reconnect all cables or wires.

14. Check operation of the receiver in accordance with applicable Maintenance Standards Book.

15. Retain removed rectifier tubes (26Z5W) and dust covers for possible future use. Discard all removed tube shields.
b. Write in CP09AEXB105K3; 1.0 uf, 100, 100 vdcw.

Record this action on Report of Corrections Made page and adjacent to each pen and ink correction by inserting this EIB number (895).

AN/FSH-7(V) Allowance Parts List #54826827-
Corrections to

Refer to AN/FSH-7(V) Allowance Parts List (APL) #54923827 of April 1969 and make the following pen and ink corrections after completion of Field Change 1B-AN/FSH-7(V).

NOTE
All corrections to be made in Section B

1. Page 4—1A2A1587
   a. Delete 279-3504 and add 279-1876.
   b. Page 5—1A2A1514
   a. In the blank space after 1A2A1514 add: "1 A 2A15A 1 R- 4 279-3503 P1272 0028 1 01"
   b. Page 11—1A7A15C24
   a. Delete 835-2117 and add 815-9760.
Adapted to each pen and ink correction insert this EIB number (895).

R-390A/URR Receivers, Frequent Failures and Replacements of V603 and V604 AF Amplifier Tubes, 6AK6 Type—Maintenance Hint

It has been reported by CTMC David Myles of MAPSEC, Adzell, Scotland that they are replacing a large number of 6AK6 tubes used in the V603 and V604 R-390A/URR receiver AF amplifier application. Upon investigation, they found that when Field Change #6 to an R-390A/URR was accomplished, plate voltage to these two tubes is increased by 20 to 35 VDC, depending on AC line input voltage. Tube specifications for 6AK6's stipulate that they should not be operated with plate voltages (plate to cathode) in excess of 180 VDC. R-390A/URR field change #6 is boosting the plate to cathode voltage to between 200 and 215 VDC. This is resulting in the development of internal tube shorts, which in turn, in some instances, also results in damage to each tube's respective cathode resistors.

In order to minimize downtime and the unnecessary use of repair time and parts, a series B+ dropping resistor may be installed by activities which are experiencing this problem.

The resistor will be located between terminal #5 of J619 and terminal #1 of L601 and may be installed as follows:

a. The following resistor types and values are recommended for this installation and should be obtained from supply, before starting the installation, if they are not on hand. One resistor is required for each receiver. Use a 200 ohm resistor if the AC line voltage is consistently maintained at 115 VAC; use a 220 ohm resistor if the line voltage will vary up to 120 and 125 VAC.

   * R131V221 220 ohms, 14 watts 9W903-00-642-2542
   * R131V201 200 ohms, 14 watts 9W903-00-636-9919
   * R60V221 220 ohms, 11 watts 9W903-00-973-9157
   * R60V201 200 ohms, 11 watts 9W903-00-973-9225

b. Remove the AC power from the receiver at the main bulkhead switch.

c. Remove the receiver chassis from its cabinet or rack. Disconnect and tag as necessary the cables connected to the rear of the receiver.

d. Place the receiver chassis on its side on a flat work surface and remove the AF amplifier sub-chassis.

e. Unbend and disconnect the single lead from L601 terminal #1. Check that the opposite end of the lead is connected to J619 terminal #5.

f. Cut the wiring harness tie as necessary to enable connection of the disconnected end of the lead to XC-606 spare terminal #2.

g. Install the resistor between L601-1 and XC-606-2. Prior to the resistor installation, position any leads in the area between L601 and XC-606 so that they will not contact the resistor, or be between the resistor and the chassis. Route the leads as necessary and solder the connections.

h. Reconnect the AF sub-chassis to J619 and J620 so that the component side of the chassis is accessible; reapply AC line power to the receiver, and set the FUNCTION switch to AGC.
i. Check the DC plate voltage between pins 5 and 7 at V603 and V604 tube sockets. — Depending on AC line input levels, B+ should be in the approximate range of 170 to 180 VDC.

j. After the resistor installation, the CARRIER meter and IF GAIN adjustments should be checked, and performed if found necessary, in accordance with the procedures in Chapter 6 of the technical manual.

k. Remove the AC power from the receiver and reinstall the AF amplifier sub-chassis in its respective mounting location; reconnect the cables at the rear of the receiver chassis, and reinstall the receiver in its cabinet or rack.

l. Reapply AC power to the receiver; return the receiver to the mode desired.

TA-790/U Microphone Element—Maintenance Hint

Several failures of Roanwell part number 113950 microphone element (part of TA-790/U telephone set) have been reported recently. The failures are due to broken wires internal to the element.

This article provides a procedure for repairing the element. Use of this procedure is recommended only in an emergency situation when a replacement microphone is not available.

The microphone element is a factory sealed unit. The seal must be broken in order to effect repair. Caution must be exercised in both breaking and restoring the seal.

Material Required:
- Scotch-Weld Adhesive #1838 B/A or equivalent
- #28 AWG Stranded Wire

Tools Required:
- Screwdriver, flat, 1/8 inch blade
- Soldering Iron, 25-30 watt
- Solder, 60/40, Resin core

Test Equipment Required:
- None

Procedure:
Proceed as follows:

1. Construct a jig to hold the microphone element during the disassembly and assembly operation.

2. Using a small screwdriver gently tap to puncture seal. Continue around the periphery of the element.

3. Cautiously separate black portion of microphone from red portion to expose broken wire.

4. Remove broken wire and replace with 2 inches of #28 AWG stranded wire.

5. Place a ball of cotton between the internal element and the case sufficient to preclude vibration of the element under normal conditions.

6. Place black portion of microphone over red portion in the original alignment.

7. Seal with sealant.

The first part of this maintenance hint is a result of an adopted suggestion by DAVID A. FRITZLER, ETM 3, USS SHREVEPORT (LPD 12) and the second part is a result of an adopted suggestion by JONATHAN P. WORLEY, ETMSN, USS VREELAND (DE-1068).

COUNTERMEASURES

Field Change 37-AN/FRA-54(V), 5-AN/FRA-54A(V), 22-AN/FLR-11(V), 5-AN/FLR-11A(V)—Removal of Storage Batteries and Power Selector Unit from OA-4414/F Time Code Distribution Group—Correction to EIB 886

The purpose of this article is to correct a discrepancy on subject field changes as printed in EIB 886 and to add one additional step.

Refer to EIB 886, page 3, Procedures: Delete Step 6. Write in "See EIB 895 for further steps."

Corrected Step 6 and additional Step 7 are as follows:
1. Step 6. Save P-14 from the removed interconnecting cables. Remove all wires from subject plug and perform the following:
   a. Solder a jumper between pin 3 and pin 5 of P-14.
   b. Solder a jumper between pin 1 and pin 4 of P-14.
   c. Reinstall P-14 into J-14 of the 0-1076/F.
2. Step 7. Restore equipment to operational condition.

All other items of this field change are correct.

Thanks to CTMCN William H. MAUER, CTM1 Robert B. HANSHAW, CTM1 William L. SILAS an

This temporary change revised the manual to reflect the equipment changes made by Field Changes 4-R-390A/URR and 5-R-390A/URR which appeared in EIBs 655, 661 and 664.

When this change is included in the manual, the manual shall cover the equipment as though Field Changes 4-R-390A/URR and 5-R-390A/URR, NAVSHIPS 0967-063-2140 had been accomplished on the equipment. This change does not supersede any other changes or corrections.

Maintenance Support Activities shall make this change in the technical manual immediately but shall keep the superseded data intact for support of equipments that have not been modified.

Holders of equipment accompanied by technical manuals shall not make this change in the manual until accomplishment of the field changes referenced above.

Insert this temporary change in the manual immediately after the front cover and preceding the title page or prior changes or temporary corrections in effect. Make pen-and-ink changes in the manual as follows:

1. The following technical manual change material was originally published as part of Field Change 4-R-390A/URR which appeared in EIB 655, 661 and 664.

   Figure 89, sheet 2: Delete wire between P120-11 and shielded ground 1/4 inch above P120-11. Change shielded ground connection into a test jack and at right, label "J904-Diode Load Test Jack."

   Add the following notes on page 2:
   NOTE 1: The AN/USM-116 Multimeter is to be used throughout this technical manual in lieu of the TS-503 Multimeter.
   NOTE 2: The Impedance Adaptor MX-1487/URM-25D is to be used between RF Signal Generator and Receiver whenever alignment or adjustment of the RF or IF sections of the receiver are made.
2. The following technical manual change material was originally published as part of Field Change 5-R-390A/URR which appeared in EIBs 655, 661 and 664. 

Figure 1. Correction to figure 89-1.

a. Volume 1, page 5 and Volume 2, page 11; add at bottom of page "Antenna input connections modified by Field Change 5, Shipboard installations use J103."

b. Volume 3, pages 7, 8, 169, and 171; add at left side of figure "Antenna input connections modified by Field Change 5, Shipboard installations use J103 (see figure 89-1)."

c. In the following paragraphs, change "Balanced Antenna" to "Unbalanced Antenna": 48C, 107a thru 113a, 115b(1), 116a, 118a thru 121a, and 122F.

d. Page 91, step 11; delete "Balanced" from Test Connection column.

e. Add the following at the top left of figures 57 and 75 through 81: "Use J103 Antenna Jack in lieu of J104 for test on shipboard installations - Field Change 5."

f. Page 178, figure 89-1:

(1) Correct antenna input connections at upper left side of page as shown in figure 1 of this article.

(2) Delete "125 ohm Balanced" in J104 block at left of antenna input.

(3) Below antenna input wiring, write "Antenna input modified on shipboard installations by Field Change 5. Shipboard installations use J103."
The ordering number for this correction is 0967-063-2010.

Make the following pen and ink corrections to Technical Manual NAVSHIPS 93053.

**LOCATION**

Page 6, para. 4-L
Line 4

Page 44, para. 28(a)
Power Supply and Main Filter Circuits. Lines 8 and 9

Line 10

Line 13

Line 15

Page 45, Fig. 28
Power Supply Schematic at tube sockets.

Page 58, para. 41(a)
Lines 5 and 6

Page 60, under B+ Short Circuit Tests
First line, Isolating Procedure

Second Line,

Sixth Line

Page 61, para. 42a(1)
Open Circuits
Lines 9 and 10

Page 62, para. 42a(2)

Page 62, para 42b(1)
Short Circuits
Lines 9 and 10

**ACTION**

Change line to read "AC Power is rectified by CR801 and CR802"

Delete the following: "The plates of each rectifier (V801 and V802) are connected in parallel and ..."

Delete "tubes"
Insert "diodes"

Delete "V801 and V802"
Insert "CR801 and CR802"

Delete "V801 and V802"
Insert "CR801 and CR802"

Delete "V801-26Z5W and V802-26Z5W" from schematic
Insert "CR801, 1N561 and CR802, 1N561"
Insert "Symbols for diodes with cathodes connected to pin 4 and plates to pin 1"

Delete "V801 and V802"
Insert "CR801 and CR802"

Delete "Remove V801"

Correct to read: "XV801 and chassis"

Delete "Remove V802"

Delete reference to "V801 and V802"

Delete "IF Rectifiers V801 and V802 DO NOT LIGHT, THE TROUBLE IS WITH THE TUBES".

Delete "Tubes V801 and V802 in the power supply subchassis light and"

Page 1(of 2)
Delete "Remove V801 and V802"

Delete "Remove V801 and V802"

Correct to read:
"Pin 1 of XV801 and pin 1 of XV802"

Next to Symbols V801 and V802, insert "Removed by FC 6"

Delete reference to "V801-V802, 26Z5W, and insert "CR801-CR802, 1N561"

Delete reference to "V801, V802, 26Z5W"
Insert "CR801-CR802, 1N561"

Delete reference to "V801-V802-26Z5W"
Insert "CR801-CR802, 1N561"
Insert symbol for diode connected to pin 1 and pin 4 with cathode connected to pin 4 on sockets XV801 and XV802.
This temporary correction revises the manual to reflect the equipment changes made by Field Change 3-R-390A/URR. The purpose of this field change is to alter the electrical access at the rear of the receiver from terminal boards to "AN" type connectors. If it becomes necessary to remove the receiver from its cabinet, it will be necessary only to unfasten connectors instead of the individual wires at the terminal boards. The field change applies to all shipboard R-390A/URR Receivers, all serial numbers.

Maintenance Support Activities shall make this correction in the technical manuals immediately but shall keep the superseded data intact for support of equipments that have not been modified.

Holders of equipment accompanied by technical manuals shall not make this correction in the manuals until accomplishment of the field change.

Make the following pen-and-ink corrections. Insert this temporary correction in the technical manuals immediately after the front cover.

<table>
<thead>
<tr>
<th>PAGE NO.</th>
<th>PARA &amp; LINE or Fig &amp; Location</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Volume I</td>
<td>11</td>
<td>Figure 7</td>
</tr>
<tr>
<td>Volume II</td>
<td>9</td>
<td>Figure 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) &quot;600 ohm speaker&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) &quot;To 115/230 volts AC 48 to 62 CPS&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) &quot;Balanced 600 ohm audio line to auxiliary equipment&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Add: &quot;The cables are now terminated with &quot;AN&quot; plugs which are connected to the receptacles shown in Figure 1 of T-1(A) NAVSHIPS 93053.&quot;</td>
</tr>
<tr>
<td></td>
<td>12,14,</td>
<td>Figure 7</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>WARNING</td>
</tr>
<tr>
<td>PAGE NO</td>
<td>PARA &amp; LINE or FIG &amp; LOCATION</td>
<td>ACTION</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------</td>
<td>--------</td>
</tr>
</tbody>
</table>
| 21      | 15 (e) Step 2                  | Delete: "Loudspeaker connected to LOCAL AUDIO terminals 6 and 7, or...."  
Add after 13: "...via P902 and J902."
Delete: "If 600 ohm line is not available, connect headset to terminals for test purposes." |
| Volume III  | 126 Figure 75                  | Delete "16 GND" and add: "Ground common lead of electronic multimeter at any convenient point on the receiver." |
| 130      | Figure 76                      | Add: "Connections to terminal boards TB102 and TB103 must be made from inside the receiver." |
| 134      | Figure 77                      | Same as Figure 76. |
| 140      | Figure 79                      | Same as Figure 76. |
| 142      | Figure 80                      | Same as Figure 76. |
| 178      | Figure 89 (Sheet 1)            | Change Fig. 89, sheet 1, to show AC input power in accordance with Figure 1 center drawing of T-1(A) NAVSHIPS 93053. |
| 179      | Figure 89                      | Change Fig. 89, sheet 2, to show audio output in accordance with Fig. 1 of T-1(A) NAVSHIPS 93053. |
SUPPLEMENTAL SCHEMATIC DIAGRAM

FIGURE 89(2) --- NAVSHIPS 93053

J901 is MS3102A10SL-4P
J902 same as J901
J903 is MS3102A16S-5P

P901 is MS3108B-10SL-4S or MS3106B-10SL-4S
P902 same as P901
P903 is MS3108B-16S-5S or MS3106-B-16S-5S

P901-P902 have Cable Clamp MS3057-4
P903 has Cable Clamp MS3057-8

Figure 1
TEMPORARY CHANGE T-1 to ELECTRONICS FIELD CHANGE BULLETIN 6-R-390A/URR-
NAVSHIPS 0967-063-2110.

An error appears in the Field Change Bulletin for Field Change 6-R-390A/URR, NAVSHIPS 0967-063-2110. Activities installing this field change should make the following corrections to the bulletin and temporary correction prior to accomplishment:

Delete reference to "Pin 4" of XV801 and XV802. Insert "Pin 3" in lieu of "Pin 4."

On page 3 of bulletin, page 8(a) and (b):
On page 1 of Correction T-2, line "Page 45, Fig. 28."
On page 2 of Correction T-2, line "Page 178, Fig. 89."

This correction material appeared in EIB 702 dated 13 March 1967.
TEMPORARY CORRECTION T-1 TO TECHNICAL MANUAL FOR
RADIO RECEIVER R-390A/URR
NAVSHIPS 93053

This temporary correction revises the manual to reflect the equipment changes made by Field Change 3-R-390A/URR. The purpose of this field change is to alter the electrical access at the rear of the receiver from terminal strips (TB102, TB103) to "AN" type connectors. If it becomes necessary to remove the receiver from its cabinet, it will be necessary only to unfasten three connectors instead of the individual wires at the terminal strips. The field change applies to all R-390A/URR receivers, all serial numbers.

Maintenance Support Activities shall make this correction in the technical manual immediately but shall keep the superseded data intact for support of equipments that have not been modified.

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<tbody>
<tr>
<td>Volume I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Figure 7</td>
<td>Add: &quot;This panel is now modified. See Figure 1 of this correction.&quot;</td>
</tr>
<tr>
<td>Volume II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Figure 5</td>
<td>Delete those parts of the illustration associated with:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(a) &quot;600 ohm speaker&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) &quot;To 115/230 volts AC 48 to 62 CPS&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) &quot;Balanced 600 ohm audio line to auxiliary equipment&quot;</td>
</tr>
</tbody>
</table>

The cables are now terminated with "AN" plugs which are connected to the receptacles shown in Figure 1 of this temporary correction.
<table>
<thead>
<tr>
<th>PAGE NO</th>
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</thead>
<tbody>
<tr>
<td>12, 14, 15</td>
<td>Figure 7</td>
<td>Delete illustrations 8 to 19 inclusive</td>
</tr>
<tr>
<td>13</td>
<td>WARNING</td>
<td>Change: &quot;...connect GND terminal 16 on the rear panel to the same ground as the power source.&quot; to: &quot;...be sure that the receiver is grounded to the same source as the AC power.&quot;</td>
</tr>
</tbody>
</table>
| 21 | 15 (e) Step 2 | Delete: "Loudspeaker connected to LOCAL AUDIO terminals 6 and 7, or..."
Step 3 | Add after 13: "via P902 and J902."
Delete: "If 600 ohm line is not available, connect headset to terminals for test purposes." |
| Volume III | 126 Figure 75 | Delete "16 GND" and add: "Ground common lead at any convenient point on the receiver." |
| 130 | Figure 76 | Add: "Connections to terminal strips TB102 and TB103 must be made from inside the receiver." |
| 134 | Figure 77 | Same as Figure 76. |
| 140 | Figure 79 | Same as Figure 76. |
| 142 | Figure 80 | Same as Figure 76. |
| 179 | Figure 89 (Sheet 2) | Add: "For wiring of connector channel on back panel of receiver, see Figure 1 of this correction.
It is recommended that Figure 1 be inserted between Figure 89(1) and Figure 89(2)." |
SUPPLEMENTAL SCHEMATIC DIAGRAM

FIGURE 89  —— NAVSHIPS 93053

TB102

7 8

FL101

TB103

10 13

P901 IS MS3102A10SL-4P
J902 SAME AS J901
J903 IS MS3102A16S-5P

P901 IS MS3108B-10SL-4S
P902 SAME AS P901
P903 IS MS3108B-16S-5S

P901-P902 HAVE CABLE CLAMP MS3057-4
P903 HAS CABLE CLAMP MS3057-8

FIGURE I.

CORRECTION T-1
**RADIO RECEIVER R–390A/URR**

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<td></td>
<td>Authority for demolition</td>
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<td>32</td>
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*This manual supersedes so much of TM 11–856A, 20 January 1956, including C1, 19 March 1956; C2, 17 May 1956; C3, 29 November 1956; C4, 7 June 1957; C5, 23 July 1958, and C6, 13 November 1958, as pertains to the operation of the equipment.*
Figure 1. Radio Receiver R-390A/URR.
CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope
This manual describes Radio Receiver R-390A/URR (fig. 1) and covers its operation, and operator's maintenance. It includes cleaning and inspection of the equipment and replacement of parts available to first echelon maintenance. Throughout this manual, Radio Receiver R-390A/URR is referred to as the receiver.

2. Forms and Records
   a. Unsatisfactory Equipment Reports.
      (2) Fill out and forward AF TO Form 29 (Unsatisfactory Report) to the Commander, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO 00-35D-54.

Section II. DESCRIPTION AND DATA

3. Purpose and Use
   a. The receiver (fig. 1) is a general-purpose receiver for use in both fixed and mobile applications. The receiver provides reception of continuous-wave (cw), modulated-continuous-wave (mCW), amplitude-modulated (am.), frequency-shift keyed (fsk), and single-sideband (ssb) signals.
   b. The receiver furnishes audiofrequency (af) output power to a local loudspeaker and headset or a balanced line. An intermediate frequency (if.) output is also provided so that received radio teletypewriter signals may be fed to other equipment for conversion into signals usable by teletypewriter printers.
   c. The calibration of the receiver is accurate to within 300 cps; this permits use of the receiver as a frequency meter.

4. System Application
   a. Space-Diversity Receiving System.
      (1) Two or three receivers can be connected as a space-diversity receiving system for reception of voice signals (fig. 2). This system provides substantially uniform audio output to a loudspeaker or headset, minimizing the effect of fading signals.
      (2) Rhombic or doublet antennas spaced at least 600 feet apart are connected to the two receivers.
   b. Space-Diversity Radio Teletypewriter

   c. Preventive Maintenance Form. Prepare DA Form 11-238 (fig. 15), (Maintenance Check List for Signal Equipment (Sound Equipment, Radio, Direction Finding, Radar, Carrier, Radiosonde, and Television)) in accordance with instructions on the form.
   d. Parts List Form. Forward DA FORM 2028, (Recommended Changes to DA Technical Parts Lists or Supply Manuals 7, 8, or 9) directly to the Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-ML, Fort Monmouth, N.J., with comments on parts listings in Appendix II.
   e. Comments on Manual. Forward all other comments on this publication directly to the Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-PA2d, Fort Monmouth, N.J.
System. Figure 3 shows two receivers connected in a space-diversity radio teletypewriter system. The doublet or rhombic antennas feed the incoming frequency-shift signals to the receivers. The outputs of the receivers are applied to a converter which provides diversity combining and produces direct current (dc) signals for the operation of teletypewriter equipment.

c. Single-Sideband Radio Teletypewriter System. A receiver and a single sideband converter may be connected as shown in figure 4. This system permits the reception of single-sideband (ssb) signals, occupying 12 kc of rf spectrum space divided into two 6-kc sidebands, one 6-kc sideband on each side of a reduced carrier. A double-sideband signal, either am or phase-modulated (pm), occupying up to a total of 12 kc of spectrum space also can be received. This system is used primarily for the reception of multichannel radio-teletypewriter transmissions. For additional information, refer to TM 11–649.
5. Technical Characteristics
Frequency range .... 0.5 to 32 mc.
Type of signals Cw, mCW, voice, ssb, fsk. received
Type of tuning ..... Continuous; frequency read directly on countertype indicator
Method of calibration Built-in crystal-controlled.
Calibration points .. Every 100 kc.
Power source .......... 115 or 230 volts ac ±10%, 48 to 62 cps.
Power input ..........* 250 watts total; 140 watts with OVENS switch turned to OFF.

Antenna requirements:
Unbalanced .... Straight wire of random length or vehicular-mounted whip.
Balanced ......... 125-ohm terminating impedance; matches 50- to 200-ohm balanced or unbalanced transmission line by use of adapters.

6. Components of Radio Receiver
R-390A/URR

a. Components. The components of Radio Receiver R-390A/URR are listed in the following table:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Fig. No.</th>
<th>Height [in.]</th>
<th>Depth [in.]</th>
<th>Width [in.]</th>
<th>Unit weight [lb]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Radio Receiver R-390A/URR</td>
<td>1</td>
<td>10 15/32</td>
<td>16 19/32</td>
<td>19</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>TM 11-5820-358-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 set</td>
<td>Running spares (b below)</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Running Spares. (fig. 5). The following is a list of running spares except as noted.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electron tube, 0A2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electron tube, 6AK6</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electron tube, 6C4</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electron tube, 6G03</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electron tube, 2B25W</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electron tube, 5654/6AK5W</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Electron tube, 5749/6BA6W</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Electron tube, 5814A</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuses, 3-ampere, 250-volt</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Lamp, incandescent, 6-volt, 0.2-ampere, Federal Spec. No. W-L-11</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Resistor, current-regulating</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuses, 1/4-ampere, 250-volt</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Fuses, 1/4-ampere, 250-volt</td>
<td></td>
</tr>
</tbody>
</table>

- Only on receivers bearing Order No. 15-PHILA-14, serial numbers 2682 and above, and Order No. 14388-PHILA-58.

7. Description

a. The receiver (fig. 1 and 6) is designed for mounting in a standard 19-inch rack or a table-top cabinet.

b. All operating controls, indicators, and a PHONES jack are located on the front panel. Two handles are provided to aid in removal of the receiver from the rack or cabinet. The chassis is enclosed by dust covers which may be removed when the receiver is installed in a cabinet.

c. Antenna connectors, operating and spare fuses, a power cord, an if. connector, an OVENS switch, terminal boards, and special tools are mounted on the rear panel (fig. 7).
Cutouts are provided to permit access to internal controls.

8. Additional Equipment Required

The following material is not supplied as a part of Radio Receiver R-390A/URR but is required for its operation. The connectors required will depend on the particular installation.

Antenna:
- Balanced .......... Doublet or rhombic.
- Unbalanced .... Random-length straight-wire or whip.

Low-impedance transmission line:
- Balanced .......... 50 to 200 ohms.
- Unbalanced .... 70-ohm coaxial cable.
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>Plug UG-573/U or Connector Plug PL-259.</td>
<td></td>
</tr>
<tr>
<td>Headset</td>
<td>Headset Navy type CW-49507 or equivalent 600-ohm headset.</td>
<td></td>
</tr>
<tr>
<td>Cord</td>
<td>Headset Cord CX-1334/U, or equivalent.</td>
<td></td>
</tr>
<tr>
<td>Loudspeaker</td>
<td>LS-166/U, or equivalent.</td>
<td></td>
</tr>
<tr>
<td>Mounting and housing</td>
<td>Standard 19-inch rack or cabinet such as:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Fixed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CY-1119/U or CY-</td>
<td></td>
</tr>
</tbody>
</table>

*917/URR (Mobile)*

Adapter Connector

- Adapts Connector Plug UG-970/U
  - PL-259 on unbalanced antenna lead-in to balanced antenna input.

Adapter Connector

- Adapts Connector Plug UG-971/U
  - UG-573/U on unbalanced antenna lead-in to balanced antenna input.
CHAPTER 2
OPERATING INSTRUCTIONS

Section 1. CONTROLS AND INSTRUMENTS

9. General
Haphazard operation or improper setting of the controls can result in poor reception; therefore, it is important to know the function of every control. The actual operation of the equipment is given in paragraphs 11 through 18.

Cautions:
1. Do not turn the MEGACYCLE CHANGE control beyond 00 or 31 megacycles.
2. Do not turn the KILOCYCLE CHANGE control beyond 000 counterclockwise or 999 clockwise. If a + or — appears in the third frequency indicator column from the left, the control has been turned too far.
3. Do not turn the FUNCTION switch counterclockwise beyond OFF or clockwise beyond CAL.

10. Receiver Controls and Indicators (fig. 6)

<table>
<thead>
<tr>
<th>Control or indicator</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE LEVEL meter</td>
<td>Indicates level of balanced-line audio output.</td>
</tr>
<tr>
<td>LINE METER switch</td>
<td>Meter switch has four positions:</td>
</tr>
<tr>
<td></td>
<td>( \text{Sw Pos} ) Effect</td>
</tr>
<tr>
<td>OFF</td>
<td>Disconnects meter from balanced-line audio output.</td>
</tr>
<tr>
<td>+10</td>
<td>Adds 10 vu to LINE LEVEL meter vu indication.</td>
</tr>
<tr>
<td>0</td>
<td>Reads LINE LEVEL meter directly.</td>
</tr>
<tr>
<td>-10</td>
<td>Subtracts 10 vu from LINE LEVEL meter indication.</td>
</tr>
<tr>
<td>LINE GAIN control</td>
<td>Controls level of signal applied to balanced-line audio output terminals.</td>
</tr>
<tr>
<td>AGC switch</td>
<td>Determines rapidity of change in gain of receiver for a change of signal strength.</td>
</tr>
<tr>
<td>LIMITER switch and control</td>
<td>Increasing clockwise rotation of control increases reduction of static interference.</td>
</tr>
<tr>
<td>CARRIER LEVEL meter</td>
<td>Indication of 0 db with RF GAIN control at 10 corresponds to an input signal of approximately 2 microvolts.</td>
</tr>
<tr>
<td>BANDWIDTH switch</td>
<td>Causes the receiver to reject frequencies that differ from the carrier frequency by more than the amount adjusted for.</td>
</tr>
<tr>
<td>BFO switch</td>
<td>Makes cw signals audible.</td>
</tr>
<tr>
<td>BFO PITCH control</td>
<td>Varies tone when receiving cw signals.</td>
</tr>
<tr>
<td>AUDIO RESPONSE switch</td>
<td>( \text{Sw Pos} ) Effect</td>
</tr>
<tr>
<td></td>
<td>Sharp 800 cps tone is loudest; used for cw.</td>
</tr>
<tr>
<td></td>
<td>Wide Most voice frequencies are heard.</td>
</tr>
<tr>
<td>BREAK IN switch</td>
<td>Permits break-in operation with proper connections have been made at rear panel.</td>
</tr>
<tr>
<td>FUNCTION switch</td>
<td>Function switch has five positions.</td>
</tr>
<tr>
<td></td>
<td>( \text{Sw Pos} ) Effect</td>
</tr>
<tr>
<td>OFF</td>
<td>Receiver is turned completely off.</td>
</tr>
<tr>
<td>STAND BY</td>
<td>Receiver inoperative, but ready for instant use.</td>
</tr>
</tbody>
</table>
11. Preparing Receiver for Reception

A sample frequency of 07.275 megacycles will be used in paragraphs 11 through 15; it is understood that the operator will substitute the desired frequency. For preparatory procedure, refer to figure 8.

12. Calibration

The receiver is now ready for calibration. To maintain maximum tuning accuracy, calibrate the frequency indicator at the 100-kc point nearest the desired frequency. Recalibrate whenever the MEGACYCLE CHANGE control is turned. Start with the controls set as in paragraph 11. For calibration procedure, refer to figure 9.

13. Tuning Receiver for Voice Reception

Start with controls set as in paragraph 11. For voice reception tuning procedure, refer to figure 10.

14. Mcw or Cw Reception

Set up the controls the same as for voice reception (para 13). For mcw or cw reception, refer to figure 11.

15. Reception of Frequency-Shift Signals

The following procedure can be used for tuning the receiver to frequency-shift signals, unless another procedure is given in the technical manual covering the particular receiving system. The receiver requires exact tuning for this type of operation. The entire procedure applies only to systems that use the audio output of the receiver, such as Radioteletype Terminal Equipment AN/FGC–1. Omit the procedure given in step 4, figure 12, with equipments that use the if. output of the receiver, such as Frequency Shift Converter CV–116/URR. Set up the receiver the same as for mcw or cw reception (para 14). For reception of frequency-shift signals, refer to figure 12.

16. Single-sideband Reception

Tuning the receiver for ssb reception must be done accurately if this type of signal is to be received. Calibrate the receiver as shown in paragraph 12. Start with the receiver set up as in paragraph 14. For ssb tuning procedure refer to figure 13.
1. Turn the FUNCTION switch to AGC. Allow the receiver to warm up for several minutes before operating it.

2. Turn the BFO switch to OFF.

3. Turn the LINE GAIN to 0.

4. Turn the RF GAIN control to 10.

5. Turn the LOCAL GAIN control to 6.

Figure 8©. Preparing receiver for reception (part 1 of 2).
6  Turn the BANDWIDTH switch to 8.

7  Turn the AUDIO RESPONSE switch to WIDE.

8  Turn the AGC switch to MED.

9  Turn the LIMITER control to OFF.

10 Turn the DIAL LOCK to the left until it stops.

*Figure 8©. Preparing receiver for reception (part 2 of 2).*
1 Turn the BANDWIDTH switch to .1.

2 Turn the BFO switch to ON.

3 Turn the BFO PITCH control to O.

4 Turn the FUNCTION switch to CAL.

5 Turn the MEGACYCLE CHANGE control to the desired band.

6 Turn the KILOCYCLE CHANGE control to the 100-kc point nearest the desired frequency.

Figure 9©. Calibration (part 1 of 2).
7 Turn the ZERO ADJ knob to the right until it stops.

8 Adjust the ANT TRIM knob to obtain a maximum indication of the CARRIER LEVEL meter.

9 Adjust the KILOCYCLE CHANGE control for a maximum indication of the CARRIER LEVEL meter (step 6).

10 If the BFO PITCH control does not produce a zero beat at 0, tune it for zero beat, loosen the knob screw, and adjust the knob to zero without turning the shaft. Tighten the knob screw.

11 Turn the ZERO ADJ knob to the left until it stops. The dial is now calibrated accurately (step 7).

Figure 90. Calibration (part 2 of 2).
1. Turn the KILOCYCLE CHANGE control slightly toward the left or right of the desired station for a maximum CARRIER LEVEL meter indication (the MEGACYCLE CHANGE control has been set during calibration).

2. Adjust the ANT TRIM control for a maximum CARRIER LEVEL meter indication.

3. Turn the DIAL LOCK knob to the right until it stops.

4. Adjust the LOCAL GAIN control for a comfortable volume level.

5. If there is excessive noise, turn the LIMITER control to the right as needed.

Figure 10(1). Tuning receiver for voice reception (part 1 of 2).
6. If the signal fades rapidly, turn the AGC control to FAST.

8. The LINE METER switch (when used) is usually set at 0.

7. If another station is interfering, turn the BANDWIDTH switch to 4, or if necessary to 2.

9. When the LINE METER switch is set at 0, the LINE GAIN control is usually adjusted for a LINE LEVEL meter indication at the VU mark.

10. If the receiver is to be disabled during periods of transmission, turn the BREAK IN switch to ON.

Figure 10©. Tuning receiver for voice reception (part 2 of 2).
1 Turn the BFO switch to ON.

2 Adjust the BFO PITCH control for a comfortable tone.

3 Turn the BANDWIDTH switch to 2, or if necessary to a lower position, to reduce adjacent channel interference.

4 Turn the AGC switch to SLOW. If keying is at such a slow speed that noise is heard between characters, perform steps 5 and 6.

5 Turn the FUNCTION switch to MGC.

6 Reduce the RF GAIN control setting to prevent blocking. For greater selectivity during cw reception, perform steps 7, 8, 9, 10, and 11.

*Figure 11(1). Mcw or cw reception (part 1 of 2).*
7 Turn the BANDWIDTH switch to .1.

9 Tune the KILOCYCLE CHANGE control for zero beat.

8 Turn the BFO PITCH control to 0.

10 Adjust the BFO PITCH control for a comfortable tone.

11 Turn the AUDIO RESPONSE switch to SHARP.

Figure 11©. Mcw or cw reception (part 2 of 2).
1. Turn the BANDWIDTH switch to 2. (For filter-type equipment, such as Radioteletype Terminal Equipment AN/FGC-1, where audio frequencies of 2,125 and 2,975 cps are used, turn the BANDWIDTH switch to 4.)

2. Turn the FUNCTION switch to AGC.

3. Tune the KILOCYCLE CHANGE control to the desired frequency; then readjust it slightly until mark and space signals with the same tone are heard.

4. Adjust the BFO PITCH control until the teletypewriter prints good copy.

5. Turn the LINE METER switch to 0.

Figure 12(1). Reception of frequency-shift signals (part 1 of 2).
6. Turn the LINE GAIN control to 10. The LINE LEVEL meter should deflect fully to the right.

7. Adjust the LIMITER control for a LINE LEVEL meter indication at the VU mark.

Figure 12©. Reception of frequency-shift signals (part 2 of 2).
1. Turn the FUNCTION switch to MGC.

2. Turn the RF GAIN control to 6.

3. Turn the LOCAL GAIN control to 6.

4. Turn the BANDWIDTH switch to 2 for a 2-kc bandwidth, or to 4 for a 4-kc bandwidth.

*Figure 13*. Single-sideband reception (part 1 of 2).
5 Turn the BFO switch to ON.

6 Set the BFO PITCH control at −1 for upper sideband reception with a signal 2-kc wide, or −2 for a 4-kc signal width (+1 or +2 respectively for lower sideband reception).

7 Tune the KILO CYCLE CHANGE control to the carrier frequency +1 kc for a 2-kc bandwidth, or +2 kc for a 4-kc bandwidth if the upper sideband is used (−1 kc or −2 kc respectively if the lower sideband is used).

8 Adjust the BFO PITCH and/or KILO CYCLE CHANGE control slightly for the most intelligible reception (steps 6 and 7).

9 Adjust the LOCAL GAIN and RF GAIN controls for the desired audio level (steps 2 and 3).

Figure 13. Single-sideband reception (part 2 of 2).
17. Stopping Procedure

When the receiver is not to be used but is to be maintained in a state of readiness, turn the FUNCTION switch to STAND BY.

Caution: The FUNCTION switch should not be left in STAND BY for more than 30 minutes. Under this condition, the life of certain vacuum tubes may be shortened. For stopping procedure, refer to figure 14.

18. Antijamming Instructions

When it is determined that the receiver is being jammed, promptly inform your immediate superior officer. To provide maximum intelligibility of jammed signals, use the procedures given for each type of operation.

a. When receiving jammed voice signals, follow the procedures in the order indicated below until the signal is heard with the least amount of interference.

(1) Turn the KILOCYCLE CHANGE control very slowly through several dial markings on either side of the desired signal. Some separation of the desired signal from the jamming signal may be achieved.

(2) Turn the BANDWIDTH switch to 4 or 2, whichever gives better results. Slowly tune as described in (1) above.

(3) Adjust the ANT TRIM control to the point where the signal is heard with the least amount of interference.

(4) If the noise is severe, adjust the LIMITER control as required.

(5) When the jamming signal is weak, turn the FUNCTION switch to MGC and the RF GAIN control counterclockwise. The interfering signal may be reduced enough to permit the desired signal to come through.

(6) If these steps do not provide a readable signal, request a change of frequency and call sign.

(7) Request the use of cw operation, if permissible (b below).

(8) If possible, change the direction, length, and height of the antenna. This may reduce the jamming effectiveness so that some degree of satisfactory reception is obtained.

(9) If the jamming prevents communication, report this fact to your immedi-

---

1 When the receiver is not to be used but is to be maintained in a state of instant readiness, turn the FUNCTION switch to STAND BY.

Caution: Do not leave the FUNCTION switch in STAND BY for more than 30 minutes, because the life of certain vacuum tubes may be shortened.

2 To shut the receiver off, turn the FUNCTION switch to OFF.

Figure 14. Stopping procedure.
ate superior. Keep your receiver tuned to the desired signal; continue to operate.

b. When receiving jammed cw or mcw signals, follow the procedures in the order indicated below until satisfactory reception is established.

(1) Turn the KILOCYCLE CHANGE control very slowly through a few dial markings on either side of the desired signal. Some separation of the desired signal from the jamming may be achieved.

(2) Turn the BANDWIDTH switch to 1 or .1 and turn the AUDIO RESPONSE switch to SHARP. Slowly tune as described in (1) above.

(3) Reset the BFO PITCH control; it may be possible to separate the tone of the desired signal from the jamming signal to provide readability.

(4) Perform the procedures indicated in a(3) through (6), (8), and (9) above.

c. When receiving frequency-shift signals, refer to the technical manual on the particular receiving system for antijamming instructions.
CHAPTER 3
MAINTENANCE INSTRUCTIONS

19. Scope of Operator’s Maintenance

a. The following is a list of maintenance duties normally performed by the operator of Radio Receiver R–390A/URR. These procedures do not require special tools or test equipment.

b. Operator’s maintenance for Radio Receiver R–390A/URR consists of the following:

   (1) Preventive maintenance (para 20).
   (2) Visual inspection (para 22).
   (3) Operational check (para 23).
   (4) Replacement of defective fuses (para 21).

20. Preventive Maintenance

a. DA Form 11–238, DA Form 11–238 (fig. 15) is a preventive maintenance checklist to be used by the operator. Items not applicable to the receiver are lined out in the figure. References in the ITEM block in the figure are to paragraphs that contain additional maintenance information pertinent to the particular item. Instructions for the use of the form appear on the form.

b. Items. The information shown in the chart below is supplementary to DA Form 11–238. The item numbers correspond to the ITEM numbers on the form.

<table>
<thead>
<tr>
<th>Item</th>
<th>Maintenance procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Use a clean cloth to remove dust, dirt, moisture, and grease from the exteriors of cases, racks, mounts, transmission lines, headsets, and front panel controls. If necessary, wet the cloth with Cleaning Compound (Federal stock No. 7930–396–9542) and then wipe the parts with a dry clean cloth.</td>
</tr>
<tr>
<td>3</td>
<td>All control knobs should work smoothly, be tight on the shaft, and should not bind. Tighten all loose knobs and be sure that the knobs do not rub against the panel.</td>
</tr>
<tr>
<td>7</td>
<td>Report to the higher echelon repairman any cut, worn, or broken cables, wires, or transmission lines.</td>
</tr>
</tbody>
</table>

Warning: Cleaning compound is flammable and its fumes are toxic. Do not use near a flame; provide adequate ventilation.

21. Checking Fuses
(fig. 7)

a. Remove the fuses from the rear panel. See that they are of the proper value. If the receiver is to be operated from a 115-volt source with the OVENS switch at OFF, replace the AC 3 AMP fuse with a 2-ampere fuse. If the receiver is to be operated from a 230-volt source with the OVENS switch at ON, use a 1½-ampere fuse; use a 1-ampere fuse with the OVENS switch at OFF.

Note. Receivers bearing Order No. 14–Phil–56, serial numbers 2683 and above, and Order No. 14385–Phil–58 have a ½-ampere and a ¼-ampere fuse on the rear panel in addition to the AC 3 AMP fuse.

b. If you replace a burned-out fuse with a new one and the new fuse burns out, notify a higher echelon repairman.

Caution: To avoid serious damage to the receiver, do not use any fuse other than the value specified.

22. Visual Inspection

a. When the equipment fails to perform properly, turn the power off and check all the items listed below. Do not check any item with the power on.

   (1) Wrong settings of switches and controls (para 9 and 10).
   (2) Cables, headset cord, or antenna lead-in wire improperly connected.
   (3) Disconnected cables, plugs, or headset cord.
   (4) Grounded or broken antenna lead-in wire.
   (5) Burned-out fuses (usually indicate some other faults) (para 21).

b. If the above checks do not locate the trouble, proceed to the operational checklist (para 23).

23. Operational Checklist

a. General. The operational checklist will help the operator to locate trouble quickly. The corrective measures are used to repair this
<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>DAILY CONDITION FOR MONTH OF JULY 1960</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>07 09 26 27 28 29 01 02 03 04 05 06 07</td>
</tr>
<tr>
<td>1.</td>
<td>COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. (Components, wiring, connectors, switches, switches, switches, components, technical manual).</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CLEAN DIRT AND MOISTURE FROM ANTENNA, HEADS, HEADERS, JACKS, PLUGS, COMPONENT PANELS.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>INSPECT CONTROLS FOR NORMAL OPERATION. TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OFF FROM LOOSE CONTACTS. PARA 20</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION. PARA 20</td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND for marking conditions:**
- Satisfactory: ✓
- Adjustment, repair or replacement required: X
- Defective: ( )

**WEAKLY ITEM CONDITIONS EACH WEEK 2D 3D 4TH 5TH ECH**

<table>
<thead>
<tr>
<th>WEEKLY</th>
<th>CONDITION</th>
<th>1ST 2D 3D 4TH 5TH ECH</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>CLEAN AND TIGHTEN EXTERIORS OF CASES, RACKS, MOUNTS, TRANSMISSION LINES.</td>
<td>✓</td>
</tr>
<tr>
<td>6.</td>
<td>INSPECT CASES, MOUNTS, HINGED AND EXPOSED METAL SURFACES FOR RUST, CORROSION.</td>
<td>✓</td>
</tr>
<tr>
<td>7.</td>
<td>INSPECT CORDS, CABLE, HIRE, SHOCK MOUNTS FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN. PARA 20</td>
<td>✓</td>
</tr>
<tr>
<td>8.</td>
<td>INSPECT AND CORRECT EXHAUST SILENCERS.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>INSPECT ADDITIONAL ITEMS FOR LOOSE: NUTS. BOLTS, SCREWS, CONNECTORS, GROMMETS,論子, DEVICES, TOOLS.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>CLEAN AND OR INSPECT BRASS NAME PLATES, DIAL, AND METER WINDOWS.</td>
<td>✓</td>
</tr>
<tr>
<td>12.</td>
<td>INSPECT AND CORRECT EXHAUST SILENCERS.</td>
<td></td>
</tr>
</tbody>
</table>

**ADDITIONAL ITEMS FOR 2D AND 3D ECHelon INSPECTIONS**

<table>
<thead>
<tr>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. CLEAN AND CORRECT EXHAUST SILENCERS.</td>
</tr>
<tr>
<td>14. INSPECT ADDITIONAL ITEMS FOR LOOSE: NUTS, BOLTS, SCREWS, CONNECTORS, GROMMETS,論子, DEVICES, TOOLS.</td>
</tr>
</tbody>
</table>

**CONTINUED ON PAGE 4**
trouble. If the measures suggested do not restore normal operation, troubleshooting is required by a higher echelon repairman. Note on the repair tag what corrective measures were taken and how the equipment performed at the time of failure.

c. **Checklist**

<table>
<thead>
<tr>
<th>Action</th>
<th>Normal indication</th>
<th>Corrective measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUNCTION switch at AGC.</td>
<td>Dial lamps lighted.</td>
<td>Check power cord and fuses (para 21).</td>
</tr>
<tr>
<td>Turn MEGACYCLE CHANGE control to each band.</td>
<td>Rushing noise or signal heard in headset.</td>
<td>Check headset cord and plug.</td>
</tr>
<tr>
<td>Tune KILOCYCLE CHANGE control to a desired station.</td>
<td>Proper numbers appear in frequency-indicator window.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Adjust ANT TRIM control for a maximum indication on CARRIER LEVEL meter.</td>
<td>Desired station is heard.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn LOCAL GAIN control from minimum to maximum.</td>
<td>A maximum deflection of meter is obtained.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn LINE GAIN control from minimum to maximum.</td>
<td>Volume at loudspeaker or headset will increase.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn RF GAIN control from minimum to maximum.</td>
<td>Output level to 600-ohm line or headset and LINE LEVEL meter will increase.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn FUNCTION switch to MGC.</td>
<td>Audio output and CARRIER LEVEL meter indication will increase.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Tune KILOCYCLE CHANGE control to several different signals with FUNCTION switch at AGC.</td>
<td>With no signal being received, noise level should increase slightly and CARRIER LEVEL not indicate.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn FUNCTION switch to CAL and operate KILOCYCLE CHANGE control.</td>
<td>Output volume nearly constant.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn LIMITER control to the right.</td>
<td>Deflection on CARRIER LEVEL meter at each 100 kc reading.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn LINE METER switch to 0 and adjust LINE GAIN control for LINE LEVEL meter reading at VU mark.</td>
<td>Noise peaks are reduced in amplitude.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>LINE METER switch at −10.</td>
<td>LINE LEVEL meter reads at VU mark.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>LINE METER switch at +10.</td>
<td>LINE LEVEL meter reads completely to right.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>LINE METER switch at OFF.</td>
<td>LINE LEVEL meter reads −10.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn BFO switch to ON.</td>
<td>LINE LEVEL meter reads completely to left.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn KILOCYCLE CHANGE control.</td>
<td>A whistle-like tone is heard as each station is tuned in.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn BFO PITCH control.</td>
<td>The pitch of the tone changes.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Action</td>
<td>Normal indication</td>
<td>Corrective measure</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Turn BANDWIDTH KC switch to each position from 16 to .1.</td>
<td>Selectivity becomes sharper and noise decreases. Only low frequency audio tones are heard in the .1 position.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn FUNCTION switch to STAND BY.</td>
<td>No noise or signal is heard, dial lamps remain lighted.</td>
<td>Higher echelon repair required.</td>
</tr>
<tr>
<td>Turn FUNCTION switch to OFF.</td>
<td>Dial lamps go out.</td>
<td>Higher echelon repair required.</td>
</tr>
</tbody>
</table>
CHAPTER 4
SHIPMENT AND LIMITED STORAGE AND DEMOLITION
TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

24. Disassembly
The following instructions are recommended for preparing the receiver for transportation and storage:
   a. Disconnect the antenna lead-in cable.
   b. Remove all connections to the rear-panel terminal strips of the receiver.
   c. Unplug the headphone cord from the front panel PHONES jack.
   d. Disconnect the power cable from the ac outlet. Wind the cable around the clips provided on the receiver rear panel.

25. Repacking for Shipment or Limited Storage
Repacking for shipment or limited storage is normally done at a higher echelon level.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

26. Authority for Demolition
The receiver and its accessories will be demolished only upon the order of the commander. The destruction procedures outlined in paragraph 28 will be used to prevent the enemy from using or salvaging the equipment.

27. Methods of Destruction
Use any or all of the methods listed in a through f below to make the equipment completely useless.
   a. Smash. Smash the controls, tuning mechanism, tubes, coils, switches, capacitors, transformers, filters, and meters; use sledges, axes, handaxes, pickaxes, hammers, crowbars, or other heavy tools.
   b. Cut. Cut the power cord, the antenna lead-in cable, and the headset cord; use an axe, a handaxe, or a machete.
   c. Burn. Burn cords, cables, and manuals; use gasoline, kerosene, oil, flamethrowers, or incendiary grenades.
   d. Bend. Bend the panel, the cabinet, and the main frame.
   e. Explosives. If explosives are necessary, use firearms, grenades, or TNT.
   f. Disposal. Bury or scatter the destroyed parts in slit trenches or foxholes, or throw them into streams.
### APPENDIX I

#### REFERENCES

Following is a list of applicable references that are available to the operator of Radio Receiver R-390A/URR:

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA PAM 108-1</td>
<td>Index of Army Motion Pictures, Film Strips, Slides, and Phono Recordings.</td>
</tr>
<tr>
<td>FM 21-5</td>
<td>Military Training.</td>
</tr>
<tr>
<td>FM 21-6</td>
<td>Techniques of Military Instruction.</td>
</tr>
<tr>
<td>SR 210-5</td>
<td>Military Symbols.</td>
</tr>
<tr>
<td>SR 320-50</td>
<td>Dictionary of United States Army Terms.</td>
</tr>
<tr>
<td>SR 320-50</td>
<td>Authorized Abbreviations and Brevity Codes.</td>
</tr>
</tbody>
</table>
APPENDIX II
BASIC ISSUE ITEMS LIST
RADIO RECEIVER R–390A/URR

Section 1. INTRODUCTION

1. Scope
   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. The columns are as follows:
      (1) Source, maintenance, and recoverability code. Not used.
      (2) Federal stock number. This column lists the 11-digit Federal stock number.
      (3) Designation by model. Not used.
      (4) 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 on the requisition.
      (5) Unit of issue. The unit of issue is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowance, and issue purposes.
      (6) Expendability. Expendable items are indicated by the letter X; nonexpendable items are indicated by NX.
      (7) 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 Spares and Accessory 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.
      (8) Illustrations. The “Figure No.” column lists the illustrations in which the items appear. The “Item No.” column lists the reference designations that appear on the part in the equipment. These designations are also used on any illustrations of the equipment.

2. Critical Items
   A zero slash (0) in the “Description” column indicates items that are expected to fail during the first year or items that will make the equipment inoperative if they fail.
### Section II. FUNCTIONAL PARTS LIST

<table>
<thead>
<tr>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>(f)</th>
<th>(g)</th>
<th>(h)</th>
<th>(i)</th>
<th>(j)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5820-538-5555</td>
<td>RECEIVER RADIO R-9061/URR</td>
<td>5905-502-4840</td>
<td>RESISTOR, CURRENT REGULATING MIL.TYPE TJ311MOI</td>
<td>R-390A/URR</td>
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<td>001 thru 900</td>
<td>TECHNICAL MANUAL TM }&quot;-5820-358-19</td>
<td>6240-155-1957</td>
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</table>

#### ITEMS COMPRISING AN OPERABLE EQUIPMENT

<table>
<thead>
<tr>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>(f)</th>
<th>(g)</th>
<th>(h)</th>
<th>(i)</th>
<th>(j)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5820-188-3084</td>
<td>ELECTRON TUBE: MIL type 912</td>
<td>5820-188-3351</td>
<td>ELECTRON TUBE: MIL type 6AK5</td>
<td>5820-188-3513</td>
<td>ELECTRON TUBE: MIL type 6F1</td>
<td>5820-348-5068</td>
<td>ELECTRON TUBE: MIL type 600A</td>
<td>5820-262-0223</td>
<td>ELECTRON TUBE: MIL type 2A7BA</td>
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<tr>
<td>5820-264-2069</td>
<td>ELECTRON TUBE: MIL type 1S18-A55V4W, (68KΩ ± 1%) is replaced sub-assembly must be adjusted</td>
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<td>5840-310-0210</td>
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<tr>
<td>5920-410-9662</td>
<td>FUSE, CARTRIDGE: MIL type P330/800</td>
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<tr>
<td>5920-553-0435</td>
<td>FUSE, CARTRIDGE: MIL type P330/800</td>
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<tr>
<td>5920-355-2188</td>
<td>FUSE, CARTRIDGE: MIL type P330/8111</td>
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<tr>
<td>5920-356-2188</td>
<td>LAMP, WICKED: For spec No. W-11, trade No. 33B; Collins part No. W-112-33B, 3383-14</td>
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<tr>
<td>5920-356-2188</td>
<td>LAMP, GLASS: For spec No. W-11, trade No. 3383-14, 3383-14, 3383-14</td>
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</table>

#### RUNNING MACHINES AND VARIOUS ITEMS

<table>
<thead>
<tr>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
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<td>ELECTRON TUBE: MIL type 6AK5</td>
<td>5820-188-3513</td>
<td>ELECTRON TUBE: MIL type 6F1</td>
<td>5820-348-5068</td>
<td>ELECTRON TUBE: MIL type 600A</td>
<td>5820-262-0223</td>
<td>ELECTRON TUBE: MIL type 2A7BA</td>
</tr>
<tr>
<td>5820-264-2069</td>
<td>ELECTRON TUBE: MIL type 1S18-A55V4W, (68KΩ ± 1%) is replaced sub-assembly must be adjusted</td>
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</tr>
<tr>
<td>5920-410-9662</td>
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<td>5920-553-0435</td>
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**ILLUSTRATIONS**

- **Figure No.**
- **Item No.**
By Order of Wilber M. Brucker, Secretary of the Army:

G. H. DECKER,
General, United States Army,
Chief of Staff.

Official:
R. V. LEE,
Major General, United States Army,
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For explanation of abbreviations used, see AR 320-50.