CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. GENERAL

8. Scope of Second Echelon Maintenance

Second echelon maintenance consists of the following:

a. Preventive maintenance (para 10).
b. Lubrication (para 11).
c. Visual inspection (para 12).
Replacement of crystals (para 14).
e. Replacement of tubes (para 15).
f. Replacement of defective fuse (para 16).
g. Replacement of power supply PP-621/URR (para 16).
h. Replacement of pilot lamps (para 17).

9. Materials, Tools, and Test Equipment Re-

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

a. Tools. Tool Equipment TE-41 is required in addition to the following special tools (mounted on the back panel) supplied with the equipment.

(1) Phillips screwdriver. The Phillips screwdriver is used to remove the screws that fasten the dust covers, the front panel, the removable subchassis, and the terminal boards.

(2) Fluted socket wrench. The No. 8 socket wrench is used to remove the front panel bar knobs and the MEGACYCLE CHANGE and KILOCYCLE CHANGE knobs.

(3) Tube pullers, seven-and nine-pin, The seven- and nine-pin tube pullers are used to facilitate the removal of the miniature tubes.

(4) Tube pin straighteners. The seven- and nine-pin tube pin straighteners are used to straighten the pins on tubes before replacement in the receiver.

b. Materials.
Cheesecloth, bleached, lint-free.
Lubricating oil, general purpose (OGP), MIL-L-7870.
Cleaning Compound (Federal stock No. 7930-395-9542).
Grease, aircraft and instrument (GL).

c. Test Equipment.

Nomenclature	Common name	Technical manual
Test Set, Electron Tube TV-7/U.	Tube tester	TM 11-6625-274-12
Multimeter AN/URM-105	Multimeter	TM U-6625-203-12

10. Preventative Maintenance

a. DA Form 11-238. DA Form 11-238 (fig. 3 and 4) is a preventive maintenance checklist to be used by organizational maintenance personnel. Items not applicable to the equipment are lined out in the figures. References in the ITEM block in the figures are to paragraphs that contain additional maintenance information pertinent to the particular item. Additional preventive maintenance information concerning DA Form 11-238 will be found in the preventive maintenance portion of TM 11-5820-357-10.

b. Items. The information in this subparagraph supplements DA Form 11-238. The item numbers correspond to the ITEM numbers on the form.

Item	Maintenance procedures
15	**Remove top and bottom dust covers (fig. 5 and 6) where necessary. Inspect all tubes for proper seating. without removing them.** Figures 8 **and 9 show the locations of all tubes.** **use a clean, dry, lint-free cloth for cleaning. Moisten the cloth with cleaning compound if necessary. After cleaning. wipe parts dry with a dry, lint-free cloth.**

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

11. Lubrication of Mechanical Tuning System

a. General. The only parts of the receiver that require lubrication (fig. 7) are the mechanical tuning system (which includes the gear train, slug racks, and the cam rack) and the BFO PITCH control shaft bearing. The receiver is lubricated at the factory and should be lubricated thereafter, once every 6 months, under normal operating conditions. If inspection indicates the need, or if abnormal conditions or activities are encountered, shorten the interval between lubrications. Overlubrication causes more harm than no lubrication. Check the condition of the mechanical tuning system whenever the receiver is withdrawn from the case or rack for servicing. Manually rotate the MEGACYCLE CHANGE and KILOCYCLE CHANGE controls tbroughouttheir ranges, and note ease of operation. Check for lack of lubrication on gears, edges of cams, cam rollers, guide slots, and bearing; inspect for gritty grease and oil. Operate the BFO PITCH control: if operation is rough or uneven, check the lubrication of the control shaft bearing.

Caution: Do not attempt to lubricate the sealed variable-frequency oscillator (vfo) , regardless of possible noisy operation of the unit during tuning. Unstable operation of the oscillator may result.

b. Cleaning Before Lubrication. Remove the dust covers from the rf subchassis. Use a thin, long-handled brush with medium bristles, dipped in cleaning compound. Remove dirt, oil, and grease from the gears, cams, guide slots, and bearings. To reach all the gear teeth while cleaning, rotate the MEGACYCLE CHANGE and KILOCYCLE CHANGE knobs. After dipping the brush in cleaning compound, remove the excess to prevent compound from dripping on the connecting cables, wiring, or other electrical parts. Use a clean, lint-free cloth moistened with cleaning compound to remove grease from the metal castings and chassis. Thoroughly wipe all parts with a clean, dry, lint-free cloth before proceeding with cleaning.

c. Detailed Lubrication Instructions. Lubricate the gear train, slug racks, and cam racks as indicated in figure ‘7. To apply oil to the bearings, dip a length of wire into the oil (OGP) to collect a small drop at the end, and transfer the oil to the bearings by touching the end of the wire to the edge of the bearings. Avoid using excessive amounts of oil (OGP). A standard grease gun and a thin, handled brush should be used for applying grease (GL) to gear teeth, edges of cams, and tuning rack guide slots. Rotate the MEGACYCLE CHANGE and KILOCYCLE CHANGE controls as necessary to expose the gear teeth.

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26. ~~INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.~~	
27. CHECK FOR NORMAL OPERATION.	✓
28. ~~BEFORE SHIPPING OR STORING, REMOVE BATTERIES.~~	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
SOUND EQUIPMENT RADIO, DIRECTIDN FIND!NG
RADAR. CARRIER, RADIOSONDE AND TELEVISION
(AR 750-625)

EQUIPMENT NOMENCLATURE

RADIO RECEIVER R390/URR

EQUIPMENT SERIAL NUMBER

696

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1. For detailed Preventive Maintenance instructions see:
   a. The Technical Manual *(in TM 11 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   b. The Supply Bulletin *(SB 11-100 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   c. The Department of the Army Lubrication Order. *(See DA Pamphlet Number 310-4)*

2. The following action will be taken by either the Communications Officer/ Chief for 1st echelon, or the Inspector for higher echelon:
   a. Enter Equipment Nomenclature and Serial Number.
   b. Strike out items that do not apply to the equipment.

3. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4. After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor.

TYPE OF INSPECTION

OPER-ATOR	2/3 ECH-ELON	DATE	SIGNATURE
✓		10 JAN	Cpl. M. Glashan
✓		17 JAN	Cpl. M. Glashan
	✓	18 JAN	M/Sgt D. McCracken

FOLD

4

DA FORM 1 MAY 87 11-238

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-245, 11-248, 11-249, 11-250, AND 11-251; WHICH ARE OBSOLETE.

Figure 3. DA FORM 11-238, pages 2 and 3.

LEGEND for marking conditions:
Satisfactory, ✓.
Adjustment, Repair or Replacement required, X.
Defect corrected, (X).

DAILY CONDITION FOR MONTH OF

NO.	DAILY ITEM	1 MG / MG 17	2 MG / MG 18	3 MG / MG 19	4 MG / MG 20	5 MG / MG 21	6 LM / 22	7 MG / 23	8 MG / 24	9 MG / 25	10 MG / 26	11 MG / 27	12 LM / 28	13 LM / 29	14 MG / 30	15 / 31	16	2D 3D ECHELON
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. (~~Transmitter~~, receiver, ~~carrying cases, wire~~, cables, ~~microphones~~, tubes, spare parts, technical manuals).	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			LM
2.	CLEAN DIRT AND MOISTURE FROM ANTENNA, ~~MISC. PHONES~~, HEADSETS, ~~KEYS~~, JACKS, PLUGS, COMPONENT PANELS.	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			LM
3.	INSPECT CONTROLS FOR NORMAL OPERATION. TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OUT FROM LOOSE CONTACTS.	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			LM
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION.	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			LM

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5. CLEAN AND TIGHTEN EXTERIORS OF CASES, ~~RACKS~~, MOUNTS, ~~TRANSMISSION LINES~~.	✓	✓	✓			LM
6. INSPECT CASES, ~~MOUNTS, ANTENNA TOWERS~~ AND EXPOSED METAL SURFACES FOR RUST, CORROSION.	✓	✓	✓			LM
7. INSPECT CORDS, CABLE, ~~WIRE, SHOCK MOUNTS~~ FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN.	✓	X	⊗			LM
8. ~~CHECK ANTENNA GUY WIRES FOR PROPER TENSION OR DAMAGE~~.						
9. ~~INSPECT CANVAS AND LEATHER ITEMS FOR MILDEW, TEARS, FRAYING~~.						
10. INSPECT ACCESSIBLE ITEMS FOR LOOSENESS: SWITCHES, KNOBS, JACKS, CONNECTORS, RELAYS, TRANSFORMERS, ~~MOTORS~~, PILOT LIGHTS, ~~BLOWERS~~, ETC.	✓	✓	✓			LM
11. CLEAN AND/OR INSPECT ~~AIR FILTERS, BRASS~~ NAME PLATES, DIAL AND METER WINDOWS.	✓	✓	✓			LM
12. ~~INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, SPECIFIC GRAVITY, DAMAGED CASES. INSPECT DRY BATTERIES FOR LEAKAGE~~.						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
13. ~~INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER PROOFING, TEARS, FRAYING~~.	
14. ~~CHECK TERMINAL BOX COVERS FOR CRACKS, DIRT, LEAKS, DAMAGED GASKETS, GREASE~~.	

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15. INSPECT SEATING OF READILY ACCESSIBLE PLUCK-OUT ITEMS: TUBES, LAMPS, FUSES, CRYSTALS, CONNECTORS, ~~VIBRATORS, PLUG-IN COILS~~.	⊗
16. INSPECT RELAYS ~~AND CIRCUIT BREAKERS~~ FOR LOOSE MOUNTINGS, BAD CONTACTS, MIS-ALINEMENT OF CONTACTS AND SPRINGS, PROPER SPRING TENSION.	✓
17. ~~INSPECT VARIABLE CAPACITORS FOR DIRT, MIS-ALINEMENT OF PLATES, LOOSE MOUNTINGS, MOISTURE~~.	
18. INSPECT RESISTORS, ~~BUSHINGS~~ AND INSULATORS FOR CRACKS, CHIPPING, BLISTERING, MOISTURE, DISCOLORATION.	✓
19. CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, ~~BLOWERS~~, RELAY CASES AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE.	✓
20. INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.	✓
21. ~~INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS~~.	
22. INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS ~~AND RHEOSTATS~~ FOR OVERHEATING ~~AND OIL LEAKAGE~~.	✓
23. ~~INSPECT GENERATORS, AMPLIDYNES, DYNA-MOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND PITTING OF COMMUTATOR~~.	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS~~.	
25. ~~INSPECT WATERPROOF GASKETS FOR LEAKS, WORN OR LOOSE PARTS~~.	

CONTINUED ON PAGE 4

Figure 4. DA Form 11-238, pages 1 and 4.

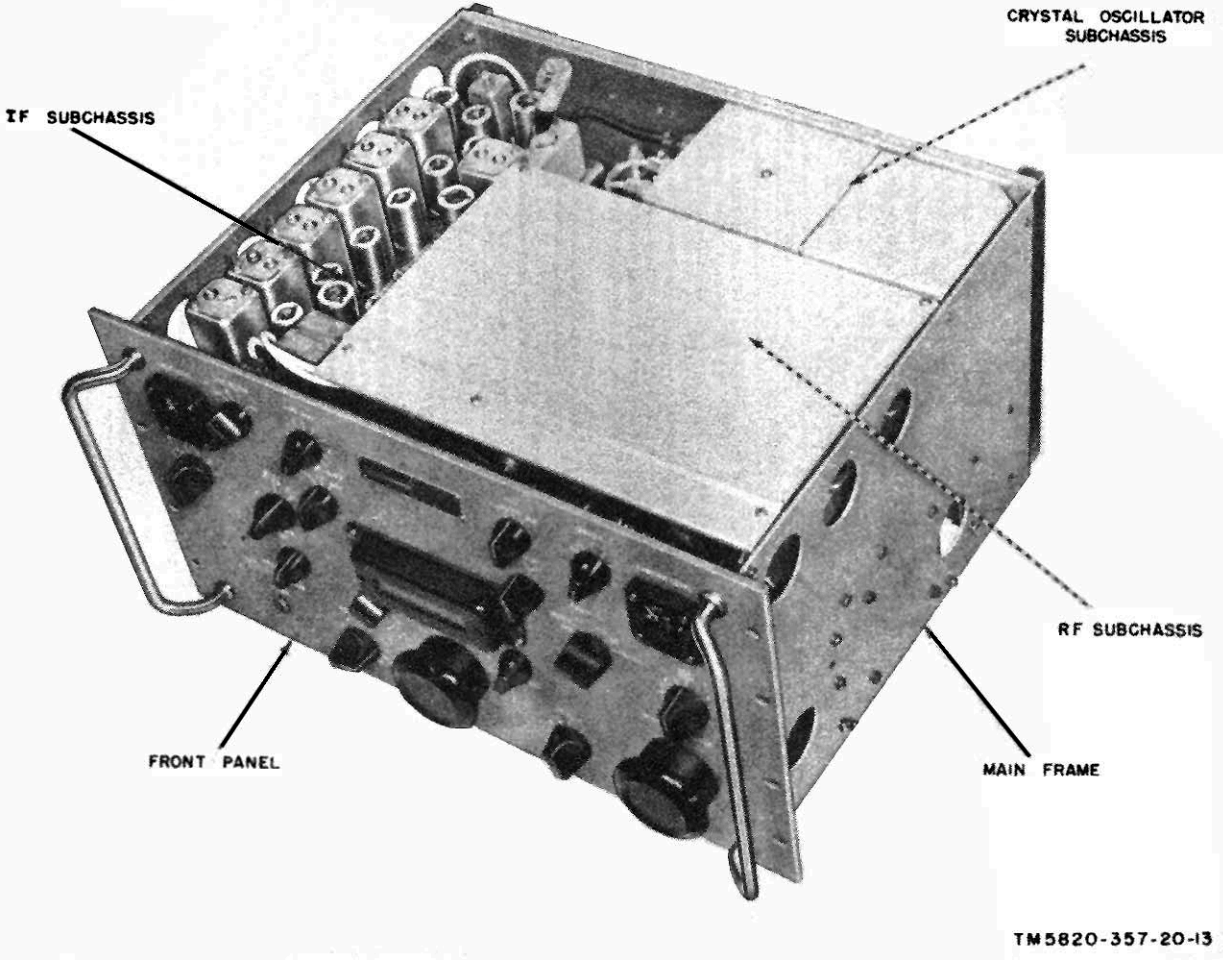

Figure 6. Radio receiver, front view, dust cover removed.

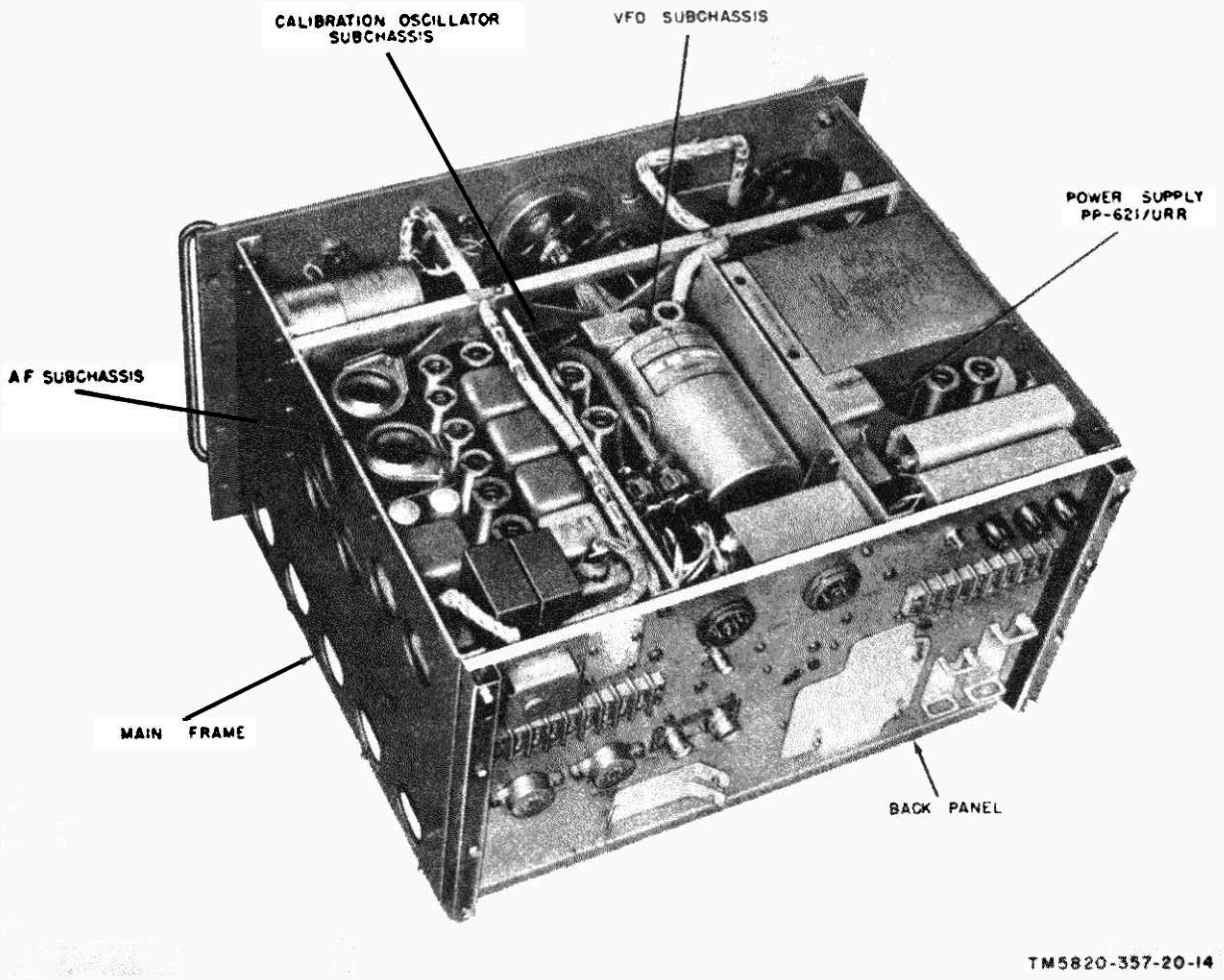

Figure 6. Radio receiver, rear view, dust cover removed.