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STATION, RADIO, A510

TECHNICAL HANDBOOK - UNIT REPAIRS

This EMER must be read in conjunction with TELS F 562 Part 2 which contains figures and tables to which reference is made.

MAINTENANCE

Aerials

Rod aerials

1. All sections of these should be reasonably straight, the nylon retaining cord intact and the ferrules and button undamaged. Clean the ends of the rods where they enter the mating sections and smear lightly with mineral jelly.

Wire aerials

2. (a) Examine the wire aerials for damage. Remove any knots and straighten kinks. Ensure that they are wound carefully on their bobbins.
- (b) Examine the 130 ft end-fed aerial. Ensure that all eight sections are intact and that they are connected in the sequence shown in Fig 2501. Each section link is numbered, the sequence being 1 to 8 with the orange aerial lead attached to No 8. The section numbers are stamped on the connecting links. The aerial is wound on the bobbin starting with section 8. Examine the nylon cords connecting the links for damage and replace if necessary. Fig 2501 shows the length of each section.
- (c) Lightly oil the hinges on the dipole aerial bobbins, check the aerial wire for damage and continuity and clean the whole assembly, if necessary.

Rod aerial tuner

3. (a) Check the free movement of the tuning control and that the locking lever, situated below it, locks the tuning control securely when turned through 180 deg.

- (b) Remove the cover from the body and examine the interior for moisture. If moisture is present, dry the tuner with a clean cloth or other suitable material and re-assemble.

Controls and panel fittings

4. Check that all controls function smoothly and satisfactorily and that they are secure and undamaged. Check that the sockets on both panels are undamaged. Check that the cable covering is sound where it enters the plug and socket and the gland nuts on the panels. If this covering is damaged, the effectiveness of the sealing of the set against moisture is destroyed. Examine the humidity indicators for evidence of moisture. If the indicators are pink, moisture is present inside the equipment.

Functional tests

Battery check

- 5. (a) Couple the interconnecting cable plug and socket, screwing up firmly. Set the A-B-NET switch to NET.
- (b) To check the l.t. battery set the system switch to CW. The transmitter meter should read within the red sector on the AER. TUNE scale. Mid-scale reading is approximately 1.5V.
- (c) To check the h.t. battery set the system switch to VOICE. The transmitter meter should again read within the red sector. Mid-scale reading is approximately 90V.

Performance check

- 6. (a) Connect the headset or handset and the key.
- (b) Insert four crystals that are within the frequency range of the transmitter.
- (c) Connect a 75 $\Omega$  dummy load and set the A-B-NET switch to B.
- (d) Set the system switch to CW, the CRYSTAL switch to 1 and the MATCHING switch to 0.
- (e) Tune the SET TO FREQ. control to the No 1 crystal frequency. With fresh batteries, the indication on the AER. TUNE meter should be better than three divisions.
- (f) Switch to VOICE. The meter indication should be better than two divisions.
- (g) Repeat the tests with crystals 2, 3 and 4.
- (h) Change the dummy load to 2k $\Omega$  and set the A-B-NET switch to A.
- (j) Repeat the tests as in (d) to (g).

- (k) Erect the end-fed wire aerial, connect this and an earth lead to the transmitter and repeat the tests.
- 7. (a) Set the system switch to R and check that receiver noise is present on A and B.
- (b) Switch to CW and check that the sidetone note can be heard in the phones.
- (c) Switch to R and NET and check that the set nets satisfactorily on both receiver bands.
- 8. Check the dial lamps as indicated in Table 1.

Table 1 - Dial lamp checks

Switch positions		Receiver	Transmitter
System switch	A-B-NET switch		
CW	A	-	Lights
CW	B	-	Lights
CW	NET	-	Lights
R	A	Lights	-
R	B	Lights	-
R	NET	Lights	Lights
VOICE	A	-	Lights
VOICE	B	-	Lights
VOICE	NET	-	Lights

FAULT FINDING

Valve tests, without opening sealed units

9. Permissible unit repairs are confined to external repairs and the replacement of valves and desiccators. Units will not be opened unless it is reasonably certain that faulty valves are the cause of the set failure. Tables 1 and 2 set out methods of testing for faulty valves without opening the units. These tables are based purely on the assumption that faulty valves are the cause of the set failure. If the indicated valve replacement does not cure the fault, the set should be sent to workshops.

10. Replacement of valves can only be carried out when the transmitter and receiver have been removed from their metal cases. This breaks the sealing, exposing the unit to the atmosphere which is to the ultimate detriment of the equipment. Therefore, these sealed units should only be opened by unit workshop personnel in an emergency.

Table 2 - Locating faulty valves without opening sealed units - transmitter

Notes: 1. No aerial to be used in these tests.  
2. Batteries must be fully serviceable.

Test No	Stage checked	Test	Correct result	Conclusion
1	V8 and V9, R.F. power amplifier	Tune transmitter. Set A-B-NET switch to A and system switch to CW. Plug in key.	Aerial tuning meter should read full scale.	(a) If no reading either V7 or both V8 and V9 are faulty. (b) If low reading either V8 or V9 is faulty.
2	V7, Crystal oscillator	Set A-B-NET switch to NET and system switch to R.	Netting signal should be heard when receiver is tuned to transmitter crystal frequency.	If no netting signal (a) V7 is faulty, or (b) V5 in the receiver is faulty.
3	V6, Modulator and c.w. sidetone oscillator	Set system switch to VOICE, A-B-NET switch to A and speak into the microphone. Detune frequency knob until aerial tuning meter reads full scale.	Needle of aerial tuning meter should flicker.	If meter does not flicker, V6 is faulty.
4		Set A-B-NET switch to A and speak into microphone.	After detuning, needle of aerial tuning meter should flicker.	If meter does not flicker, V6 is faulty. (If the set operates correctly on Test 3 but not on Test 4, return it to field workshops)
5		Set system switch to CW and press key.	Side-tone should be heard in headset.	If side-tone is not heard, V6 is faulty.

Table 3 - Locating faulty valves without opening sealed units - receiver

- Notes: 1. The rod aerial and rod tuner should be used for these tests.  
2. Batteries must be fully serviceable.

Test No	Stage checked	Test	Correct result	Conclusion
1	V2, Frequency changer  <small>2104</small>	Set frequency band switch to blue band and then to orange band.	Receiver noise should be heard in each position of the switch.	If receiver noise is heard on the blue band but not on the orange band, V2 is faulty.
2	V5, Detector and heterodyne oscillator	Set A-B-NET switch to NET and tune receiver to transmitter crystal frequency.	Beat note should be heard.	If no beat note is heard, V5 is faulty.

REPAIRS

Replacing control knobs

11. (a) Remove the screw from centre of the control knob.
- (b) Lift off the knob.
- (c) Place the new knob in position and replace the centre screw, after lubricating the screw threads with grease.

Replacing dial window assembly

12. It will only be necessary to replace the dial window when it is broken. The sealing of the unit is thus broken and the desiccators should be replaced as soon as possible (see para 15 for removal of units from cases and para 17 for replacement of desiccators).
13. (a) Using a pin spanner (Fig 3001) unscrew the dial window assembly.
- (b) Examine the sealing gasket and replace if necessary.
- (c) Insert new dial window assembly and screw up tight.

Replacing battery plugs

14. (a) Unlock the battery compartment by rotating the locking wheels.
- (b) Remove the battery from the compartment and the plug from the battery.
- (c) Remove the plug cover plate by bending back the metal tags.
- (d) Unsolder the leads from the pins on the damaged plug.
- (e) Solder the leads to the pins of the new plug (see wiring diagrams Fig 2502). Note that excessive heat will damage the plugs.

- (f) Replace the metal plug cover.
- (g) Insert the plug into battery and replace battery into the battery compartment.

Removing transmitter and receiver units from cases

15. Units will only be removed from their cases in an emergency and then only when new desiccators of the correct type are available. The work must be performed under cover and in the driest possible conditions. The equipment must be closed again as soon as possible.

- 16. (a) Remove the No 2 BA hexagon nuts from the bolts at the corners of the panel. Remove the bolts from the holes.
- (b) Hold the unit upright with one hand and, using the carrying handle, withdraw the unit from its case. Owing to the possibility of a vacuum having been created inside the unit during sealing it may not be possible to withdraw the unit in the manner described. If this difficulty is experienced, remove the hexagon headed sealing screw at the right-hand end of the panel. This will break the vacuum and enable the unit to be withdrawn.

Removing desiccators, with the units removed from their cases

17. The receiver unit contains two desiccators, one at each end of the chassis. These are held in place by perforated metal plates attached to the chassis by two No 6 BA screws and washers (Fig 2508).

18. The transmitter has only one desiccator, situated at the cable entry end of the chassis. This is retained in the same manner as those in the receiver.

19. To remove the desiccators proceed as follows:-

- (a) Release the cover plates by removing the No 6 BA screws and washers.
- (b) Discard the old desiccators.
- (c) Place the new desiccators in position, replace the cover plates and fit and tighten the No 6 BA screws and washers.

Replacing faulty valves, with the units removed from their cases

20. Care must be exercised to avoid damaging the pins when removing or inserting the valves.

Transmitter

- 21. (a) Remove the two No 6 BA screws and washers and lift off the valve retaining plate (see Fig 2510). This gives access to all valves.
- (b) Remove faulty valves and replace with serviceable ones.
- (c) Replace the valve retaining plate and fit and tighten the No 6 BA holding screws.

- (d) Renew the desiccators.

Note: If after replacing V6 (CV785) the modulator stage still does not function, check that contact 4 of SC3Fa is not being earthed by the aluminium case of C112.

Receiver

22. (a) Remove the four No 6 BA screws and washers and lift off the valve cover plate (Fig 2508). This gives access to all valves.
- (b) Remove faulty valves and replace with serviceable ones.
- (c) Replace the valve cover plate and fit and tighten the No 6 BA holding screws.
- (d) Renew the desiccators.

Replacing transmitter and receiver units in their cases

23. (a) Ensure that new desiccators have been fitted.

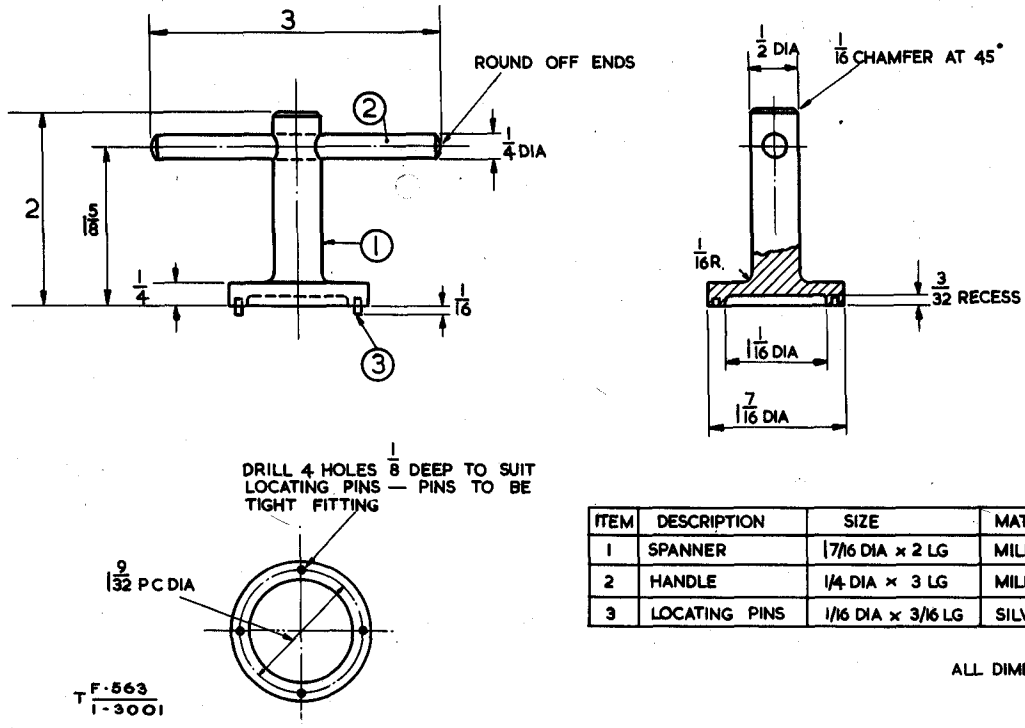
- (b) Lower the unit vertically into its case taking care not to drop it.
- (c) Replace the No 2 BA nuts and bolts in the holes in the corners and tighten evenly and securely to obtain a good seal.

Replacing the rod aerial tuner contact pin

- 24.
- (a) Remove the aerial insulator by unscrewing the knurled clamping ring.
  - (b) Place the spring over the new pin and insert the pin in the hole in the aerial socket base.
  - (c) Hold the body of the rod tuner vertically upside down over the aerial insulator. Match the two parts together and tighten the knurled clamping ring.

Note: The next page is Page 1001.





ITEM	DESCRIPTION	SIZE	MATERIAL	No OFF
1	SPANNER	$\frac{7}{16}$ DIA $\times$ 2 LG	MILD STEEL	1
2	HANDLE	$\frac{1}{4}$ DIA $\times$ 3 LG	MILD STEEL	1
3	LOCATING PINS	$\frac{1}{16}$ DIA $\times$ $\frac{3}{16}$ LG	SILVER STEEL	4

ALL DIMENSIONS IN INCHES

Fig 3001 - Dial window assembly pin spanner

EME8c/835

END

