WIRELESS SET NO A 510

UNIT WORK

GENERAL

1. Regular and careful maintenance is essential to keep the equipment in good working order. The maintenance detailed in this part should be carried out by qualified personnel at least once a fortnight, and more often if possible.

AERIALS

2.(a) *Rods*

Ensure that all are straight. Clean ends and lightly grease with vaseline to ensure a good contact. Check condition of nylon cord, and security of ferrule and button.

(b) *Wire aerials*

(i) Examine and remove knots, and ensure all wires are carefully wound.
(ii) The 130 ft. end-fed aerial should be examined to ensure that all 8 links and the orange aerial lead are present, and that the links are wound on the bobbin in their correct order. Each link is numbered, the numbers appearing on the metal hooks and eyes. No 8 link is wound first on the bobbin. The nylon cords securing the links should be examined for security. Fig. 1001 shows the lengths of the various links.
(iii) The hinges on the dipole aerial bobbin should be lightly oiled, and the assembly cleaned when necessary.

AERIAL TUNING INDUCTOR

3.(a) Check the free movement of the tuning knob and ensure that its locking key locks the knob in position.

(b) If internal dampness is suspected, the inductor should be opened as follows:-

(i) Remove locking ring, rubber gasket and insulator.
(ii) Remove 8 8BA screws holding front plate to the main body and withdraw front plate.

(c) Re-assemble in reverse order. This is important if damage to the contacts is to be avoided.

TRANSMITTER AND RECEIVER

4.(a) *Controls and panel fittings*

Check that all fittings are secure, and that all controls operate smoothly. Examine humidity indicators for evidence of moisture (a pink indicator shows that damp has entered the unit).

(b) *Check batteries*

Screw receiver and transmitter interconnecting plug and socket firmly together and set A-B-NET switch to NET.

LT Battery Test - Set control switch to CW. The transmitter meter should read within the red sector on the "AER. TUNE" scale.

HT Battery Test - Set control switch to VOICE. The meter on the transmitter should again read within the red sector on the "AER. TUNE" scale.

NOTE:- The bias battery will outlast the HT battery. No testing method is therefore necessary.

(c) *Check interconnecting cables*

If the battery tests show no response, the interconnecting cables are suspect. See that they are firmly secured together.

(d) *Check battery plugs*

If the interconnecting cables are firmly joined and there is still no reading on the transmitter meter, check the battery leads and plugs in the bottom compartments of the two units. Permissible repairs are described later.

(e) *Check crystal units*

If set will not tune, and the crystal is suspected, change to another frequency. If set then tunes, substitute a new crystal for the first used and re-tune.

NOTE:- Care should be taken to avoid bending the pins when removing and inserting crystal units.

VALVE TESTS (WITHOUT OPENING UNITS)

5. To replace valves it is first necessary to take the transmitter or receiver unit from its metal case. This will break the sealing and expose the unit to the atmosphere to the ultimate detriment of the equipment. It follows that these sealed units should only be opened by 1st line workshop personnel in extreme emergency.

6. When a set fails to function correctly, and all possible external faults have been eliminated the valves become suspect.

7. With the WS A 510, 1st line repairs are confined to external repairs, and replacement of electronic valves, and packs, silica gel. The units will only be opened when it is reasonably certain that the trouble is due to faulty valves. To assist in this deduction Tables 1 and 2 set out methods of testing for faulty valves before the sets are opened. The tables are based purely on the assumption that the fault is caused solely by faulty valves.

8. With closed sets the tests are not infallible and can only be considered as a rough guide.

MECHANICAL ADJUSTMENTS AND REPLACEMENTS

To replace control knobs (both units)

9.(a) Remove screw from centre of knob.

(b) Lift off knob.

(c) Place new knob in position and replace centre screw.

NOTE:- It is advisable to lubricate screw threads with a silicone grease before replacing screws.

To replace Dial Window Assembly (both units)

NOTE:- This will only be necessary when the dial window is broken. The sealing of the unit is thus broken and new packs, silica gel should be installed at the earliest opportunity. See later instructions for removal of units from cases and insertion of packs, silica gel.

10.(a) Using a pin spanner, unscrew the dial window assembly.

(b) Examine gasket and replace if necessary.

(c) Insert new dial window assembly.

To replace faulty Pilot Lamps

11.(a) Remove the rubber cover assembly marked "PRESS" by unscrewing it by hand.

(b) Remove the defective lamp and coil spring (see Fig. 1).

(c) Remove the defective lamp from the spring and substitute a new lamp. The base of the lamp should be screwed TWO TURNS into the close coils of the spring. The base of the lamp should be well clear of the spring.

(d) Insert the lamp and its spring into the lamp housing on the panel, with the head of the lamp downwards.

(e) Replace the rubber cover assembly in the housing.

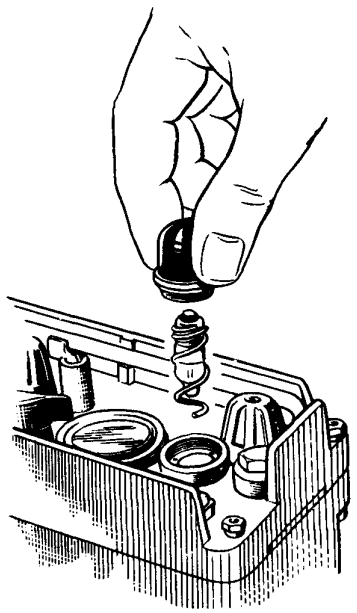

FIG. 1

To replace Crystal Cover Assembly

12.(a) Remove screw securing chain to panel.

(b) Fit new crystal cover assembly.

To replace Battery Plugs

13.(a) Remove battery from compartment and plug from battery.

(b) Remove plug plate and unsolder leads.

(c) Solder leads to terminals of new plug (see wiring diagrams, Figs. 2 and 3).

NOTE:- Excessive heat will damage plugs.

(d) Insert plug in battery and replace battery in battery compartment.

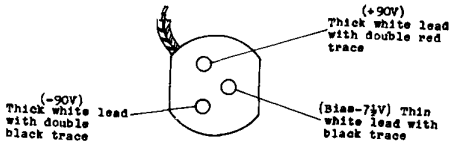

FIG. 2 - TRANSMITTER BATTERY PLUG - WIRING DIAGRAM

FIG. 3 - RECEIVER BATTERY PLUG - WIRING DIAGRAM

Removal of Transmitter and Receiver Units from Cases

NOTE:- This will only be done in emergency and then only when new packs, silica gel of the approved type are available. The work must be performed under cover and in the driest possible position. The equipment must be closed again as soon as possible.

14.(a) With a Spintite spanner, remove the 4BA hexagon nuts and bolts from the corners of each panel.

(b) Holding the set upright with one hand, withdraw the units from their cases by means of the carrying handles.

To renew Packs, silica gel (units out of cases)

15. There are two packs, silica gel in the receiver unit, one being situated at each end of the chassis and retained in position by a perforated plate secured by two 6BA screws and washers (see Fig. 1004).

16. The transmitter unit has only one packs, silica gel, situated at the cable end of the chassis, this is fitted in the same manner as those in the receiver.

(a) Remove cover plates by withdrawing screws and washers.

(b) Discard old packs, silica gel.

(c) Place new packs, silica gel in position and replace cover plates, ensuring that screws are securely tightened.

To replace faulty valves (units out of case)

NOTE:- Care must be taken to avoid damaging the pins when removing and inserting the valves.

Transmitter

17.(a) Remove two 6BA screws and washers and lift off valve retaining plate (see Fig. 1002). This gives access to all valves.

(b) Replace faulty valves.

(c) Replace retaining plate, ensuring that holding screws are firmly tightened.

(d) Renew packs, silica gel as directed.

NOTE:- If after replacing V6 (CV785), the modulator stage still does not operate, check that pin 9 of SWC5 is not being earthed by the aluminium case of C112.

Receiver

18.(a) Remove four 6BA screws and washers and lift off valve cover plate (Fig. 1003). This gives access to all valves.

(b) Replace faulty valves.

(c) Replace cover plate, ensuring that all screws are tight.

(d) Renew packs, silica gel as directed.

TEMPORARY REMEDY FOR FAULTY MR1 (CV448)

19. See Table 2. When this crystal valve becomes unserviceable, and so makes the station inoperative, the set may be made usable again by the expedient depicted in Fig. 4. It consists of eliminating MR1 by cutting the lead as indicated in the figure. This will enable the set to be used until it is possible to have a new crystal valve inserted.

20. This operation involves opening the receiver unit, removing the cover plate (see Fig. 1003) and renewing the packs, silica gel as described in the above paragraph.

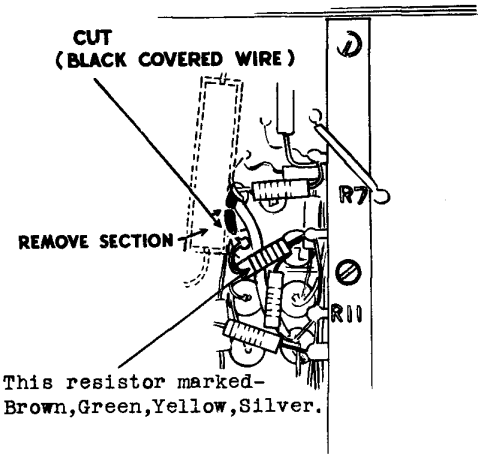

FIG. 4 - RECEIVER - TEMPORARY REMEDY FOR FAULTY MR1

REPLACEMENT OF TRANSMITTER AND RECEIVER UNITS IN CASES

NOTE:- These units will not be replaced until the packs, silica gel have been renewed.

21.(a) Slide units gently into case. DO NOT DROP.

(b) Replace the 4BA nuts and bolts and tighten securely to obtain a good seal.

TABLE 1 - TRANSMITTER - LOCATION OF FAULTY VALVES (BEFORE OPENING UNIT)

NOTE:- No aerial is used in these tests.

Stage Checked	*Test No*	*Test*	*Correct result*	*Conclusion*
BEFORE STARTING THESE TESTS ENSURE BATTERIES FULLY SERVICEABLE				
V8 and V9 RF Power Amplifier	1	Tune transmitter. Set "A-B-NET" switch to "A". Set control 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 faulty.
V7 Crystal Oscillator	2	Set "A-B-NET" switch to "NET" and control switch to "R"	Netting signal should be heard when receiver is tuned to transmitter crystal frequency	If no netting signal - (a) V7 is unserviceable, or (b) V5 in receiver is unserviceable.
V6 Modulator and CW Audio Side Tone Oscillator	3	Set control switch to "VOICE". Set "A-B-NET" switch to "A" and speak into microphone. De-tune frequency knob until aerial tuning meter reads mid scale	Needle of aerial tuning meter should flicker	If no flicker V6 is unserviceable.
	4	Set "A-B-NET" switch to "B" and speak into microphone	After de-tuning, needle of aerial tuning meter should flicker	If no flicker V6 is unserviceable.
		If set operates correctly on Test 3 but not on 4, return it to 2nd line workshops.		
	5	Set control switch to "CW" and key	Side-tone should be heard in headset	If side-tone is not heard, V6 is unserviceable.

TABLE 2 - RECEIVER - LOCATION OF FAULTY VALVES (BEFORE OPENING UNIT)

NOTE:- The rod aerial and rod tuner should be used for these tests.

Stage Checked	*Test No*	*Test*	*Correct result*	*Conclusion*
BEFORE STARTING THESE TESTS ENSURE BATTERIES FULLY SERVICEABLE				
V2 Mixer	1	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 heard on the blue band but not on the orange band, V2 is unserviceable.
V5 Detector and Heterodyne Oscillator	2	Set "A-B-NET" switch to NET and tune receiver to transmitter crystal frequency	Beat note should be heard	If no beat note V5 is unserviceable.
MR1 Limiter (Valves, Crystal CV448)	3	Set "A-B-NET" switch to "A" and operate "Frequency Band" switch with Volume Control in minimum position	When changing bands clicks should be heard in headset	If no clicks MR1 is unserviceable. See para 19 - "Temporary remedy for faulty MR1".

NOTE:- The next page is Page 1001.