

Wireless Set No 62

Working Instructions

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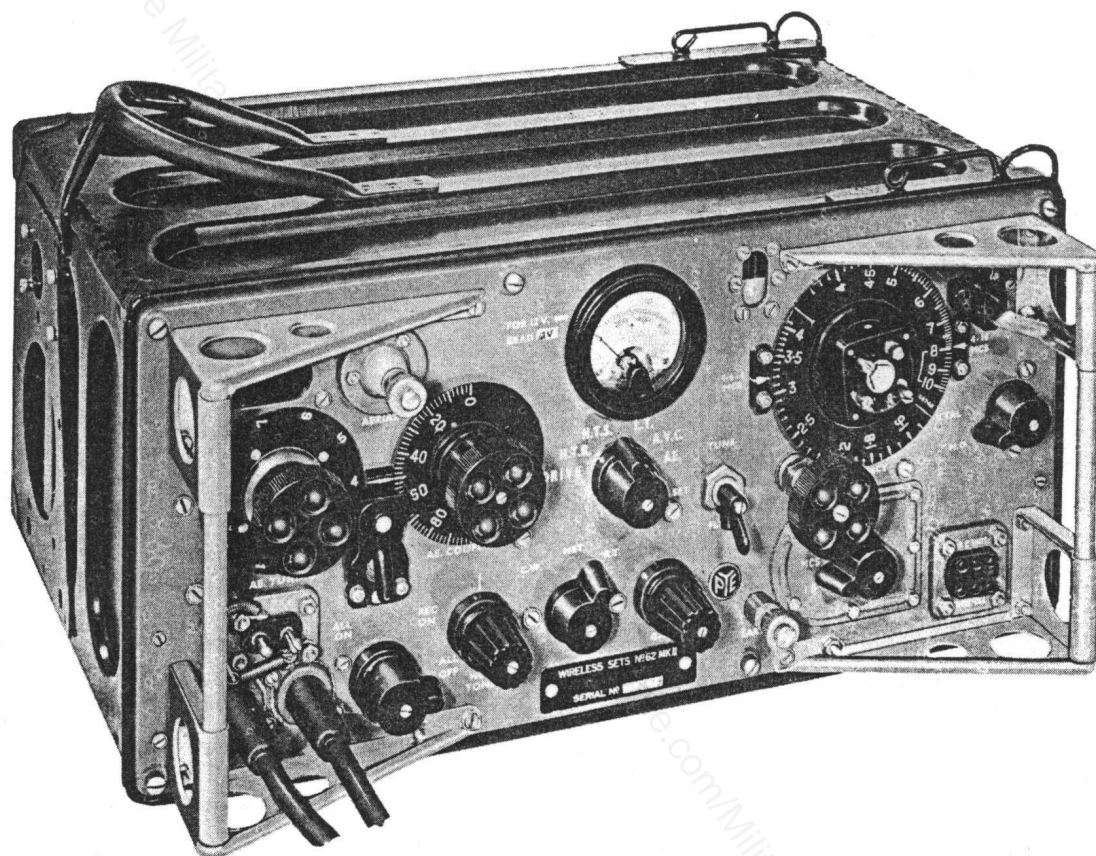
General Description

Manuals Supplied by
The Military Wireless Workshop

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PYE WIRELESS SET 62

WIRELESS SET No. 62

Working Instructions

CHAPTER I. GENERAL DESCRIPTION

1. Purpose and facilities

The purpose and facilities of the Wireless Set No. 62 are summarized below :—

- (a) **Purpose :** A tropicalized sender-receiver (with facilities for AM/RT and CW) primarily for use as a mobile station. It is considerably lighter and is easier to operate than the Wireless Set No. 22 which it is intended to replace.

Mk. I and Mk. II equipments are available : apart from a few later models of Mk. I, the Mk. II alone is suitable for airborne use. The Mk. I and Mk. II are distinguishable by their harnesses (Figs. 1 and 2).

- (b) **Stations :** (i) Vehicle/Animal
(ii) Manpack : for a few hours only ; comprises a two-man load. When charging set is included, comprises a three-man load.
(iii) Conversion kit to convert (i) to (ii).
(iv) Vehicle (Trailer).

- (c) **Range :** dependent largely on aerial in use.

Using a 14 ft. aerial, the approximate ranges under very good conditions are :—

Stationary : CW 25 miles. RT 15 miles.

On the move : CW 20 miles. RT 10 miles.

- (d) **Frequency Ranges :** 1.6 Mc/s to 10 Mc/s. MO or Crystal Control (crystal frequency 460 kc/s above signal frequency)

Two flick frequencies.

Netting by zero beat method. Single tuning control (send and receive frequencies are automatically the same).

- (e) **Remote Control :** supplied with the Vehicle/Animal station only. This may be EITHER

- (i) Junctions Remote Control Nos. 1 and 2 (as an interim measure).

Facilities : R.T. only : Lamp calling local operator
OR

- (ii) Remote Control Units L Nos. 1 and 2.

Facilities : RT
CW

Intercommunication

Buzzer calling of distant operator

Lamp calling of local operator.

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Maximum distance from set

- (i) $\frac{1}{2}$ mile using D3 cable
- (ii) $\frac{1}{4}$ mile using assault cable

(f) **Crystal Calibrator**: supplied with Vehicle/Animal station only.

(g) **Power Supply**: 12 volt: from accumulators.

Charging sets

- (i) With Vehicle/Animal Station—Charging Set Lightweight 80 Watt No. 1 Petrol driven.
- (ii) With Man-pack Station—Charging Set Pedal driven 60 Watt.
- (iii) With Trailer station—Charging Set Lightweight 80 Watt No. 1 Petrol driven.

2. Mechanical arrangement

The normal vehicle station and the normal animal station include the Wireless Set No. 62 and all its accessories, together with an 80 watt petrol driven charging set. This equipment is fitted into special metal carriers which themselves are fitted into a Car 5 cwt. 4 X 4 (Jeep) or else onto the harnesses of two pack-animals. The equipment may be taken out of the vehicle complete in its metal carriers and hooked straight onto the pack-animal harnesses, the carriers being provided with rings for this purpose.

The man-pack is carried by three men who carry respectively the Wireless Set No. 62, the batteries and a 60 watt pedal generator for charging the batteries.

When the vehicle or animal station is required to be converted to a man-pack station, two extra carriers are provided. These contain the 60 watt pedal generator and two accumulator batteries, all of which are required for the man-pack station. This extra equipment is all accommodated in the vehicle, but in the case of the animal station an extra or third animal will be required.

The fitting of the vehicle, animal and conversion station is described in the publication entitled "Wireless Set No. 62, Cars 5 cwt. 4 X 4/Animal Pack/Man-pack—Fitting Instructions."

The equipment is also available as a trailer station: the fitting for this arrangement is described in the publication "Instructions, Fitting and Loading, Wireless Set No. 62, in Trailers, Light Cargo, Amphibian, $\frac{1}{2}$ Ton."

Figs. 1 and 2 show respectively the appearance of the non-airborne and airborne versions, between which the main differences are as follows:—

- (a) The airborne equipments (i.e. all Mk. II and later models of Mk. I) have modified harnesses, the dimensions of which make the sets suitable for airborne packing.
- (b) In the airborne equipment there are minor internal mechanical modifications designed to prevent components breaking loose when the set is dropped.

A more detailed view of the front panel of the wireless set is given in Fig. 3, while the positions and uses of the various controls are indicated in Fig. 4.

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Block diagrams of the sender-receiver, the sender alone and the receiver alone are given respectively in Figs. 17, 18 and 19. A circuit diagram of the set is given in Fig. 22.

The set is housed in an aluminium case complete with a carrying harness and front cover. The power unit is mounted inside the case underneath the chassis. The various aeriels used with the set are described in the relevant sections 5 and 9, and the accessories to the set are individually described in section 7.

The set is not hermetically sealed but is unlikely to be damaged by a very quick immersion in water. It is splash-proof and rain-proof. The set will float and will support an additional weight of 20 lbs. This fact renders it most dangerous for a man to attempt to swim with the set fastened on his back, because he would most probably be forced into a face down position. In later models, the engravings on the front panel of the wireless set are treated with fluorescent paint so that they are visible in the dark when "illuminated" by means of an ultra-violet lamp (Lamp Operator 6B fitted with U.V. filter).

3. Frequency coverage

The set covers the frequency band of 1.6 Mc/s to 10 Mc/s in the following two overlapping ranges :—

- (a) 1.6 Mc/s to 4 Mc/s
- (b) 4 Mc/s to 10 Mc/s

It should be noted that the performance of the set on frequencies above 8 Mc/s is not so good as it is on frequencies between 1.6 Mc/s and 8 Mc/s. This fact is mainly due to the following reasons :—

- (a) Reduced sender output on MO and XTAL
- (b) Increased frequency drift on send and receive.

To indicate this change in performance, the tuning dial is marked with a line between these frequencies.

Facilities are available for crystal control of the master oscillator. The crystal sockets are of a special design to permit the use of three different types of crystal (CR1, 10X and FT 243). The crystal control operates on both send and receive.

In addition to normal tuning, there is a flick mechanism for the purpose of setting up any two spot frequencies on the main FREQUENCY control. One of these ("blue") is for working in a net, and the other ("red") is spare.

4. Power Supply and Consumption

The set requires a 12 volt D.C. supply which is obtained from an accumulator as follows :—

- | | | |
|----------------------------|--------|-----------------------|
| (a) Animal/Vehicle Station | ... | Batty., Secy., Port., |
| | | 12 V 22 Ah |
| (b) Man-pack Station | | Batty., Secy., Port., |
| | | 12V 14 Ah Mk. I or |
| | | Mk. II |
| (c) Trailer Station | | Batty., Secy., Port., |
| | | 12V 75 Ah |

The battery provides power for the valve heaters and for the H.T. generator. This generator is a small rotary machine housed with its components in a screening box which is flexibly mounted within the

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main chassis of the set. A fan secured to the armature circulates air through the machine and through the set generally. Attention is drawn to an important note in the maintenance section 21 (5).

The table below shows the average current drawn from the battery and the approximate number of working hours which may be obtained from each of the above types of battery when fully charged. These figures are given as a rough guide only and in practice there may be quite large differences depending in particular upon the condition of the accumulator in use.

Condition	Average current drawn (amps)	Approximate number of hours working		
		Batt. Secy. Port. 12V 22 Ah Mk. I	Batt. Secy. Port. 12V 14 Ah Mk. I	Batt. Secy. Port. 12V 76 Ah
(1)	(2)	(3)	(4)	(5)
Send RT	4.2	3	1½	18
Send CW	4.5	2½	1½	15
1:5 SEND/REC RATIO	3.5			
Receive (ALL ON) ...	3.2	5	2½	22
Listening watch (REC ON)	2.6	6½	3½	30

For charging the accumulators, the following sets are carried :—

- (a) Vehicle/Animal Station Charging Sets Light-weight 80 watt No. 1 petrol driven.
- (b) Man-pack Station Charging Sets Light-weight pedal driven 60 watt.
- (c) Trailer Station Charging Sets Light-weight 80 watt No. 1 petrol driven.

5. Aerial System

The set is normally used for ground wave working by means of a rod aerial which may be from 8 to 32 feet in length. Aerials shorter than 8 feet will not, in general, be tunable, except at higher frequencies, and, in addition, frequency limitations which are mentioned in section 9 are also imposed upon 8 ft. and 14 ft. aerials at the lower frequencies.

Provision is also made for the use of an end-fed 100 ft. horizontal wire aerial when sky wave working is required ; this aerial can of course radiate and receive ground waves as well.

The 32 ft. rod aerial is carried only on the vehicle and animal stations. The remaining aerials are carried on all stations.

Details relating to the fitting of the various aerials and the ranges to be expected are given in section 9.

CHAPTER 1—Section 6

6. Controls

Fig. 3 and Fig. 4 show the positions and uses of the controls which are also identified and described briefly in the following list.

- (a) **FREQUENCY** control ... tunes the sender and the receiver.
- (b) **XTL/MO** switch ... selects crystal or master oscillator frequency control.
- (c) **Frequency range** switch ... selects the 1.6–4 Mc/s range or the 4–10 Mc/s range.
- (d) **GAIN** ... an audio frequency gain control for RT, or a radio frequency gain control on CW and NET.
- (e) **Meter switch** ... this enables the meter on the front panel to be used for checking currents and voltages in six different parts of the equipment. These check points are :—DRIVE, H.T.R., H.T.S., L.T., A.V.C. and AE.
- (f) **RT/NET/CW** switch ... enables the selection of the working system.
- (g) **HET TONE** ... enables the beat note on CW to be varied.
- (h) **ALL OFF/REC ON/ALL ON** an on/off and listening watch switch. The set can NOT be switched to send when this switch is in the REC ON position.
- (i) **AE COUPLING** ... variable capacity coupling to aerial.
- (j) **AE TUNING** ... variable inductance which, with the AE COUPLING condenser tunes the aerial circuit to resonance.
- (k) **FLICK-SET-TUNE** ... enables the set to be operated on a pre-set " flick " frequency or by free manual tuning.

Also on the front panel are the following sockets

- (a) **XTAL** socket ... which takes three different types of crystal holder (CR1, 10X and FT 243).
- (b) **XTAL CAL** ... three point socket for supplying 300 volts and 12 volts to the crystal calibrator.
- (c) **R.C. UNIT** ... three point socket for supplying 12 volts to the remote control unit.

Notes that Lamp, Operators, Type 6B may be plugged into the XTAL CAL or R.C. UNIT socket—whichever is available.

CHAPTER I—Sections 6–8

- (d) 12V INPUT receives 12 volt supply from accumulator.
- (e) AERIAL terminal.
- (f) EARTH terminal.

There are also two 5-point drop leads for headsets, an aerial tuning window and a flick indicator window.

7. Accessories

- (a) **Microphone and Receivers, Headgear Assembly No. 10 (see Fig. 1)**
The receivers are of the normal head-hand type and a hand microphone with pressel switch connected in the same cord. Operation of the pressel changes from receive to send and vice versa. Two such assemblies may be used with the set, the connections being of the drop cord and snatch plug type.
- (b) **Key and Plug Assembly No. 19 CW key (see Fig. 1)**
This is provided with a snatch plug for inserting into one of the drop leads on the set. The key itself carries a snatch socket so that a second microphone and receiver assembly may be connected to the set in addition to the CW key. Break-in working is used on CW so that no separate send-receive control is necessary.
- (c) **Remote Control Units "L" No. 1 and 2 (see Section 19) or**
- (d) **Junctions Remote Control No. 1 and 2 (see Section 18)**
These may be used as an interim measure until Remote Control Units "L" are available.
- (e) **Crystal Calibrator**
Enables the equipment to be set up on a given spot frequency. Instructions for the use of this accessory will be published at a later date.
- (f) **Lamp Operator 6B with optional ultra-violet filter (see Figure 26 and Section 20)**
- (g) **Aerials**
The five types of aerials for use with this equipment are described in section 9 below.
- (h) **Accumulators**
These have been referred to in section 4 above
- (j) **Charging Sets**
These have been referred to in section 4 above
- (k) **Cases Spare Valve No. 4K**

8. Weights and Dimensions

The Wireless Set No. 62

Weight—30 lb. in case with carrying harness, front cover and man-pack aerial base.

- | | | |
|-------|---|---|
| Mk. I | { | Approximate overall length including man-pack aerial base—20½ in. |
| | | Approximate overall height including man-pack aerial base—10½ in. |
| | | Approximate overall width including man-pack aerial base—12½ in. |
- Mk. II :—Length and width as Mk. I.
Height 10½ in.

CHAPTERS I-II—Sections 8-9

Headgear Assembly No. 10 (each)

7 in. × 7 in. × 4 in. (approx.). Weight 1 lb. 12 oz.

Key and Plug Assembly No. 19 CW key

7 in. × 4 in. × 4 in. Weight 1 lb. 5 oz.

Remote Control Units "L"

No. 1. 6 in. × 6 in. × 2½ in. Weight 4 lb. 8 oz.

No. 2. 3 in. × 1½ in. × 1½ in. Weight 1 lb.

Junction Remote Control

No. 1. 4½ in. × 11 in. × 2½ in. Weight 7 lb.

No. 2. 4½ in. × 6 in. × 2½ in. Weight 2 lb. 6 oz.

Lamp Operator 6B (with Adaptor, Lamp, U.V. No. 1)

5 in. × 3 in. × 3 in. Weight 6 oz.

Aerials

(4 ft.) :—4 ft. No. 1. 11 in. long when folded : Weight 1 lb.

(8 ft.) :—4 ft. No. 1 plus 4 ft. No. 2 : 11 in. long when folded :
Weight 2 lb.

(14 ft.) :—14 ft. No. 1. 2 ft. long when folded : Weight 7 lb.

(32 ft.) :—32 ft. No. 1. When packed in bag : 3 ft. 6 in. × 6 in.
× (approx.). Weight 26 lb.

(100 ft.) :—100 ft. No. 5. Stowed on reel : 9 in. × 8 in.
Weight 2½ lb.

Accumulators

12 V 14 Ah (two carried on Man-pack station : one only when
mobile) each 8½ in. × 6½ in. × 6½ in. : Weight
25 lb.

12V 22 Ah (two carried with Animal/Vehicle station) each
12½ in. × 6½ in. × 10 in. : Weight 35 lb.

12V 75 Ah 16½ in. × 8 in. × 11 in. : Weight 80 lb.

Charging Sets

Lightweight 80 watt No. 1 petrol driven

14½ in. × 7½ in. × 13½ in. : Weight 45 lb. (dry).

Pedal driven 60 watt

23½ in. × 12 in. × 10½ in. : Weight 30 lb.

Cases Spare Valve No. 4K

6 in. × 6 in. × 6½ in. : Weight 5 lb.

CHAPTER II. OPERATION

9. Erecting and connecting the Aerials

There are five different types of aerial which may be used with this equipment. The choice of aerial depends upon several factors, e.g. the particular mounting of the set, the local conditions, the distance over which it is desired to communicate and the time available for erection, etc.

The five available aerials are :—

- (a) The 4 ft. aerial (Aerial 4 ft. No. 1)
- (b) The 8 ft. aerial (Aerial 4 ft. No. 1 plus Aerial 4 ft. No. 2)
- (c) The 14 ft. aerial (Aerial, Vertical, 14 ft. No. 1)
- (d) The 32 ft. aerial (Aerial, Vertical, 32 ft. No. 1 or No. 1.T)
- (e) The 100 ft. aerial (Aerial 100 ft. No. 5).

CHAPTER II—Section 9

According to the aerial in use, so the setting of the controls AE COUPLING and AE TUNING will depend for each different frequency in use.

The numerical setting of the AE COUPLING control may be read directly from its calibrated dial. In the case of the AE TUNING control however, the numerical setting may be found by observing the indication in the window above the tuning dial in addition to the position of the tuning dial itself. Thus, in Fig. 3, the AE TUNING adjustment is set approximately to 267.

The following paragraphs describe briefly the erection and uses of the different aerals, which may be used respectively with (A) the Man-pack station, (B) the Vehicle station and (C) the Animal station. The Tables in Appendix I at the end of this publication show the settings of the AE COUPLING and AE TUNING controls for each frequency and for the different types of aerals and stations.

A. Aerals for the Man-pack station

(1) *Mobile with set on man's back*

- (a) 4 ft. aerial (see Table A)
- (b) 8 ft. aerial (see Table B) : Figs. 7 and 12.

Fit the aerial into the man-pack aerial base (Fig. 15) so that the aerial is vertical when the set is on the back of the man. Clamp by means of the knurled screw, and then connect the man-pack aerial base to the aerial terminal of the set by means of the length of wire which is fastened to the aerial base.

(2) *Set dismantled and placed on the ground*

- (c) 4 ft. aerial (see Table C)
- (d) 8 ft. aerial (see Table D) : Figs. 8 and 12.

The above aerals should be used with the dismantled set when the more normal 14 ft. aerial would be too conspicuous.

Connect as described in (b) above.

The counterpoise (Leads, Counterpoise No. 2 Mk. II) is normally used as an earth with this arrangement. Connect the counterpoise to the earth terminal of the set, and lay out the counterpoise wires radially from the site.

- (e) 14 ft. aerial (see Table E) : Fig. 13.

This is the normal aerial for the dismantled man-pack station.

Assemble the captive sections of the aerial and fit the larger end into the man-pack aerial base and connect as described in (b) above.

The counterpoise is normally used with this arrangement : it must be connected as described in (d) above.

- (f) 100 ft. aerial (see Table F) : Fig. 11.

This aerial is stowed on a reel. It is primarily intended for sky wave working, but will of course radiate and receive ground waves as well.

The range of the set with this type of aerial depends largely on the frequency in use, but it can generally be used for distances up to 100 miles, or for short distances where there are intervening mountains which render communication unreliable with the vertical rod type aerals.

CHAPTER II—Section 9

Referring to Fig. 11, this aerial consists of 100 ft. of copper wire which has been cut into four pieces respectively 25, 30, 20 and 25 ft. in length, and then rejoined with a single link plastic insulator between each piece. Each insulator may be bridged over by means of a flexible wire strap so that the effective length of the aerial can be made 25, 45, 75 or 100 ft. to suit the frequency in use. One end of each strap is made captive to the end of an aerial section as shown in the illustration; these straps are identified respectively A, B and C.

A two-link plastic insulator is fixed at the end of the aerial remote from the set, and another two-link plastic insulator is fitted so that it can run loose along the 25 ft. section of the wire which is terminated by a small metal lug for connection to the Wireless Set No. 62.

The aerial may be supported in an elevated position by means of suitable lengths of cordage attached to the outer link of each of the two-link plastic insulators. It should be noted, that, at the higher frequencies, the meter when switched to "AE" may indicate a very low current, even when working on CW. This does not necessarily mean that the radiation is poor. The set should always be tuned on CW and then switched to RT if so desired.

Before erecting the 100 ft. aerial, set the three short-circuiting straps A, B and C to obtain an aerial of an effective length which will be suitable for the frequency at which it is intended to operate.

Now erect the aerial in some suitable position as shown in Fig. 11. Connect the lug at the free end of the 25 ft. length of wire to the aerial terminal of the Wireless Set No. 62.

When erecting this aerial the following points should be observed:—

- (1) The "top" should be as nearly horizontal as possible. 15 ft. above the ground is a good general purpose height.
- (2) Wherever possible the down lead should be not more than half the length of the horizontal top.
- (3) The cordage should be long enough to allow the aerial good clearance from any walls or overhanging branches, etc. at both ends.

The counterpoise (Leads, Counterpoise No. 2 Mk. II) will normally be used with the 100 ft. aerial.

B. Aerials for the Vehicle station

(1) With set in vehicle (mobile)

(g) 4 ft. aerial (see Table G)

(h) 8 ft. aerial (see Table H): Figs. 5 and 12.

Fit the aerial into the Aerial Base No. 10 which itself is secured to a bracket on the vehicle. Connect the Aerial Base No. 10 to the aerial terminal on the set by means of Connector Single No. 121A.

Note that the aerial may not tune below 1.9 Mc/s.

(j) 14 ft. aerial (see Table J): Fig. 13.

Assemble the aerial and fit the lower end into the Aerial Base No. 10 as described in (h) above

Note that the aerial may not tune below 1.7 Mc/s or above 9.5 Mc/s.

CHAPTER II—Section 9**(2) With set in vehicle (stationary)**

(k) 32 ft. aerial (see Table K) : Figs. 10 and 16.

This aerial comprises a complete kit. Its erection on the aerial base W.T.B. is described pictorially in Fig. 16. The aerial is then connected to the Wireless Set No. 62 by means of a length of wire.

With this arrangement, the wireless set could, in an emergency, be driven away in the vehicle, and the aerial could be discarded.

Erect the 32 ft. aerial in the normal manner and drive the vehicle as near as possible to the aerial. Connect the 62 set aerial terminal to the aerial base terminal by means of about 5 ft. of the P11 wire which is provided. In this case, the 18 ins. length of wire attached to the aerial base must be coiled round the base, and must *not* be permitted to dangle on the ground.

If it is desired to operate the set at frequencies above 7.5 Mc/s the length of aerial must be reduced by using 6 D sections only: Erect the aerial in the normal manner but do not fit the Aerial 14 ft. No. 1 on top of the uppermost D section.

(l) 100 ft. aerial (see Table L) : Fig. 11.

The aerial is described in (f) above.

Connect the aerial terminal of the wireless set to the Aerial Base No. 10 on the vehicle by means of the wire connector normally used for the same purpose when working with the 8 ft. or 14 ft. aerial. Connect the lug on the 100 ft. aerial to the terminal of the Aerial Base No. 10 on the vehicle. Support the remote end of the 100 ft. aerial to some conveniently elevated position by means of the cordage. Then drive the vehicle away slowly until the 100 ft. aerial is reasonably taut.

(3) With set dismounted from vehicle and placed on ground

32 ft. aerial : see (p) below. Figs. 9 and 16.

100 ft. aerial : see (f) above.

C. Aerials for the Animal station**(1) With set on animal**

(m) 4 ft. aerial (see Table M).

(n) 8 ft. aerial (see Table N) : Figs. 6 and 12.

Fit the aerial into the Adaptor Aerial Base No. 1 (set at convenient angle) (see Fig. 14) and fit this into the Aerial Base No. 10 which itself is secured to the carrying case containing the equipment. Connect Aerial Base No. 10 to the aerial terminal of the set by means of Connector Single No. 121B.

(o) 14 ft. aerial (see Table O) : Fig. 13.

Assemble the aerial and fit it to the Aerial Base No. 10 by means of the Adaptor Aerial Base No. 1 exactly as described in (n) above.

(2) Set dismounted from animal and placed on ground

(p) 32 ft. aerial (see Table P) : Fig. 16.

From the animal (or vehicle) remove the carrier complete with the set and battery, and place them on the ground near the base of the aerial which has been erected as described in (k)

CHAPTER II—Sections 9-10

above. Connect the aerial base to the set by means of the captive 18 ins. lead provided with the aerial base. The counterpoise is normally used as an earth with this station. Connect the counterpoise to the earth terminal of the set and lay the counterpoise wires radially from the site.

If it is required to operate the set at frequencies above 7.5 Mc/s the length of the aerial must be reduced by using six D sections only. Erect the aerial in the normal manner but do not fit the Aerial 14 ft. No. 1 on top of the uppermost section.

100 ft. aerial (see (f) above).

10. Connecting up

A. The Man-pack Station (Equipment to be operated when on the march)

The wireless set with its own harness comprises one man-pack, and the accumulator battery together with its Everest Carrier comprises the second man-pack. The set will be operated with the two men marching side by side.

Connect the equipment as follows :—

- (i) Connect the INPUT terminals of the wireless set to the accumulator battery by means of Connector Twin No. 274.
- (ii) Connect the aerial terminal of the wireless set to the man-pack aerial base on the side of the wireless set.
- (iii) Plug the 4 ft. or the 8 ft. aerial into the man-pack aerial base and tighten by means of the gripping screw.
- (iv) Into each of the two 5-point drop leads, fit the plug from a microphone and headset assembly. If CW working is required, plug the lead from the morse key assembly into one of the drop leads and then plug the remaining headset lead into the 5-point socket on the morse key assembly.

The equipment is now ready for use.

B. The Vehicle Station (Equipment to remain fitted into the vehicle during operation)

This is fully described in the publication "Wireless Stations No. 62, Cars 5-cwt. 4 × 4/Animal Pack to Man-pack—Fitting Instructions."

If not already done, connect the various parts of the equipment as follows :—

- (i) Connect the INPUT terminals of the wireless set to the accumulator battery by means of Connectors Twin No. 274.
- (ii) Connect the aerial terminal of the set to the Aerial Base No. 10 on the vehicle by means of Connector Single No. 121A.
- (iii) Assemble the appropriate aerial as described in section 9 B (1) and (2) and fit or connect it to the Aerial Base No. 10.
- (iv) Connect the earth terminal of the set to the metal carrying frame by means of Connector Single No. 121.

CHAPTER II—Section 10

- (v) Into each of the two 5-point drop leads, fit the plug from a microphone and headphone assembly. If CW working is required, plug the lead from the morse key assembly into one of the drop leads, and then plug the remaining headset lead into the 5-point socket on the morse key assembly.

The equipment is now ready for operation.

C. The Animal Station (Equipment to be operated while actually fitted on the back of the animal)

The equipment may be already mounted on the pack-animal or it may be fitted originally into a vehicle (as above) from which it must first be removed and then fitted on to the animal. Illustrations and details relating to the position of various parts of the equipment in the vehicle are given in the publication "Wireless Stations No. 62, Cars 5-cwt., 4 × 4/Animal Pack to Man-pack—Fitting Instructions."

To fit the equipment to an animal, remove from the vehicle the entire metal carrying case (Carriers, Set No. 40) which itself contains the Wireless Set No. 62 together with an Aerial Base No. 10 and a 12 volt accumulator battery.

Sling the carrying case and its contents to the near side of the harness of the pack-animal.

Now remove from the vehicle the metal Carrier, Battery, Secondary, Portable No. 9 which itself contains another 12 volt accumulator, a spare parts case and a Satchel Signal No. 1. Sling the carrying case and its contents to the off side of the harness of the pack-animal. In addition, sling the Bags, Aerial Gear No. 2, complete with contents, on to the off side of the harness of the pack animal. The weight on each side of the animal will now be reasonably equal.

For full details of transferring the vehicle and animal stations, reference should be made to the publication "Wireless Stations No. 62, Cars 5 cwt., 4 × 4/Animal Pack to Man-pack—Fitting Instructions."

Connect the various parts of the equipment as follows :—

- (i) Connect the INPUT terminals of the wireless set to the accumulator battery by means of Connector Twin No. 274.
- (ii) Connect the aerial terminal of the set to the Aerial Base No. 10 (which is mounted on the metal carrying frame) by means of Connector No. 121B. This aerial base will support the Adaptor, Aerial Base No. 1 (see Fig. 14), so that the aerial may then be set at any convenient angle.
- (iii) Assemble the appropriate aerial as described in section 9 C (1) and fit it to the Adaptor, Aerial Base No. 1 which must then be fitted to the Aerial Base No. 10 on the metal carrying frame.
- (iv) Connect the earth terminal on the set to the metal carrying frame by means of Connector Single No. 121.
- (v) Into each of the two 5-point drop leads fit the plug from a microphone and headphone assembly. If CW working is required, plug the lead from the morse key assembly

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into one of the drop leads, then plug the remaining headset lead into the 5-point socket on the morse key assembly.

The equipment is now ready for operation.

D. The Ground Station (Equipment to be removed from the vehicle, the animal or the man-pack).

Remove the Wireless Set No. 62 and a 12 volt accumulator from whichever mounting is available and place them close together on the ground. In the case of the vehicle and animal mountings, the set and the accumulator are strapped onto the metal carrying case (Carriers, Set No. 40) and there is no need to remove these individual items from the metal frame.

Connect the various parts of the equipment as follows :—

- (i) Connect the INPUT terminals of the wireless set to the accumulator by means of Connector Twin No. 274.
- (ii) If use is to be made of the 8 ft. or the 14 ft. rod aerial, connect the aerial terminal on the set to the man-pack aerial base by means of the captive lead provided.
- (iii) Assemble the appropriate aerial as described in section 9 A (2), 9 B (3) or 9 C (2). Plug the 4 ft., 8 ft. or the 14 ft. rod aerial into the man-pack aerial base on the side of the set : alternatively connect the 32 ft. or the 100 ft. aerial to the aerial terminal.
- (iv) Connect the counterpoise (Leads, Counterpoise No. 2 Mk. II) to the earth terminal of the set, and lay out the counterpoise wires radially underneath the aerial.
- (v) Into each of the two 5-point drop leads, fit the plug from a microphone and headphone assembly. If CW working is required, plug the lead from the morse key assembly into one of the drop leads, and then plug the remaining headset lead into the 5-point socket on the morse key assembly.

The equipment is now ready for use.

11. Switching on

Set the ALL ON/REC ON/ALL OFF switch to its ALL ON position and wait at least half a minute for the valves to warm up. The RECON position of the switch is used for a listening watch on RT only. To receive CW signals at any time set the switch to the ALL ON position. The equipment should be run for fifteen minutes before the netting drill is attempted.

12. Netting

The adjustments of the various controls for the purpose of operating the equipment at a given frequency are described in the following paragraphs.

Adjustment of the equipment when using crystal control is described in section 14.

The netting drill for the Wireless Set No. 62 is as follows :—

(1) General procedure

- (a) The drills given below are to be used by outstations when netting to control or by any station when netting to a wavemeter.

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(b) The timing of the netting drill will be as follows :—

Operation	In harbour	At a distance
Tuning call	1 minute	1 minute
Netting call	1 minute	1 minute
Pause		$\frac{1}{2}$ minute

Group call from control to check net follows immediately.

(c) (i) If netting on RT the tuning call will be sent on RT and will consist of the code sign of the outstation first in order of answering. It will terminate with the words "Hear netting call, net now." The netting call will be sent with pressel switch pressed and will terminate with the words "Netting call ends."

(ii) If netting on CW the tuning call will be sent on CW and will consist of the code sign of the outstation first in order of answering. The netting call will be sent by keeping the key pressed and will be terminated by sending the code sign of that outstation once, on the key.

(d) Opening up drill (if not already done)

(i) Erect the aerial and check that aerial base is thoroughly clean and dry.

(ii) Remove the waterproof cover from the set and connect the aerial to the set.

(iii) Connect both headsets to drop leads.

(iv) Connect battery lead to battery and set.

(v) Put ALL OFF/REC ON/ALL ON switch to ALL ON.

(vi) If time permits carry out daily maintenance tasks for wireless set.

(vii) Where applicable test remote control units.

(2) Control station

The control station either sets its frequency using a wave-meter or crystal calibrator.

(a) Setting by wavemeter

(i) First set up the wavemeter for the required frequency and arrange its operation so that a sender may be tuned to this frequency.

(ii) Carry out the "prepare to net" drill as given under (3) (a) operations (i) to (ix) below. When operation (ix) has been completed proceed as follows instead of operation (x).

(iii) Depress the pressel switch or the morse key and turn the FREQUENCY MC/S dial until the beat note in the wave-meter headphones falls to zero.

(iv) Lock BLUE screws on FREQUENCY MC/S dial.

(v) If there is a whistle unlock the blue screws on FREQUENCY MC/S dial and adjust for zero beat in phones again. Then re-lock. Repeat until locking is satisfactory.

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- (vi) Turn SYSTEM switch to system required (RT or CW).
- (vii) Turn GAIN fully up.
- (viii) Adjust AE COUPLING and AE TUNING controls to the figures given in the appropriate table in Appendix I and then proceed as in para. 3 (b) (viii) to (xv) (During Pause).
- (ix) Lock these controls by putting lever to one side.

IMPORTANT NOTE : If wireless silence is being observed do not adjust the AE COUPLING control but keep it tuned to 100. Carry out the later operations when the silence has been lifted.

SUB PARA.(b) DELETED.

(3) Outstation

- (a) Prepare to net drill.
 - (i) Set MO-XTAL switch to MO and HET TONE control opposite mark on panel.
 - (ii) METER switch to AVC.
 - (iii) SYSTEM switch to RT or CW depending on which system is being used for netting.
 - (iv) GAIN fully clockwise.
 - (v) Frequency range switch (MC/S) to required range.
 - (vi) TUNE/SET/FLICK lever to FLICK.
 - (vii) Turn square knob until white shows in blue window.
 - (viii) Hold square knob and loosen blue screws one half turn only.
 - (ix) TUNE/SET/FLICK lever to SET.
 - (x) Turn FREQUENCY MC/S dial to ordered frequency.
 - (xi) Unlock AE COUPLING dial (i.e. lever to mid position).
 - (xii) Set AE COUPLING dial to position indicated in the appropriate table in Appendix I.
 - (xiii) Adjust AE TUNING (in the region of the position indicated in the appropriate table in Appendix I) UNTIL MUSH IN PHONES IS LOUDEST.

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(b) Netting Drill.

During Tuning Call

- (i) Search boldly with FREQUENCY MC/S dial. Adjust to give maximum signal or maximum meter rise (RT only). Reduce signal strength to R2 using GAIN control. (It may not be possible to get a rise at a distance).

During Netting Call

- (ii) Turn SYSTEM switch to NET.
- (iii) Adjust FREQUENCY MC/S dial for zero beat in phones. keeping signal at strength R2 by means of GAIN. During this operation it must be noted that zero beat can be approached *gradually*. If zero beat suddenly occurs turn AE COUPLING control towards "100"
- (iv) Lock BLUE screws on FREQUENCY MC/S dial.
- (v) If there is a whistle unlock FREQUENCY MC/S dial and do (iii) and (iv) again. Repeat until locking is satisfactory.

In harbour and/or when
netting to a wavemeter
during wireless silence.

At a distance and/or
when netting to a wave-
meter NOT during wire-
less silence.

During Netting Call.

During Pause.

NOTE: If AE COUPLING control has been turned towards 100 as in (iii) above it must be set back to the reading given in the table before adjusting AE TUNING as below.

- | | |
|--|--|
| (vi) System switch to RT | (vi) Turn SYSTEM switch to system required. |
| (vii) Adjust AE TUNING for MAXIMUM meter rise. | (vii) GAIN fully up. |
| (viii) Turn system switch to system required. | (viii) METER switch to AE |
| (ix) Write down AE TUNING and AE COUPLING readings on tablet. | (ix) Press pressel switch or key. |
| (x) Turn AE COUPLING to 100. This is essential at close ranges (below 1,000 yards) in order to obtain a sufficiently weak signal. | (x) Adjust AE TUNING in neighbourhood of figures given in appropriate table in Appendix I for maximum meter rise. |
| (xi) After wireless silence has been lifted proceed as in (vii) to (xv) of right hand column, having previously set the AE COUPLING control to the figure given in the tables. | (xi) Make successive adjustments (of about one scale division at a time) of the AERIAL COUPLING control above and below the position suggested in the table: for each setting adjust AE TUNING control to produce a maximum reading in the meter. The correct adjustments of these two |

CHAPTER II—Sections 13-14

controls will be those which have produced the maximum meter reading.

- (xii) Set AE COUPLING and AE TUNING to settings that give maximum meter readings.
- (xiii) Release pressel switch or key.
- (xiv) Lock AE TUNING and AE COUPLING (lever to one side).
- (xv) Write down AE TUNING and AE COUPLING readings on tablet.

The adjustments to the flick dial during netting are illustrated in Fig. 21.

13. Establishing communication

Communication will then be established, control sending a group call to which the outstations reply. The above drills may then be repeated on the other (RED) flick setting in accordance with previous arrangements or on receipt of instructions from control. *When working the FLICK lever must always be at SET.* When changing frequency it may be put to FLICK for rapid movement of the dial but it must always be put to SET again before communicating.

Put the meter switch to AVC for normal working.

Put the system switch to RT or CW as required.

On RT, press the microphone pressel switch to send and speak into the microphone. To receive, release the pressel switch and listen in the headphones.

On CW, operating the morse key will keep the sender operating. On ceasing to key, the set is in the receiving condition. When receiving CW turn HET TONE control until a beat note of adequate pitch is heard in the headphones.

On RT, sidetone can be heard in the headphones when sending, but on CW, only key clicks will be heard.

NOTE: If RT sidetone becomes very weak during work examine aerial, and try re-adjusting AE TUNING control. If aerial current becomes jumpy or loud crackling is heard in the phones, send the set to have the aerial tuning inductance cleaned.

14. Crystal working

The crystal used must have an operating frequency 460 kc/s above the required frequency. For instance, if the ordered frequency is 4,200 kc/s, a crystal of 4,660 kc/s must be used.

To operate the set on crystal working proceed as follows :—

- (1) Insert the crystal into the socket on the front panel and lock with clip.
- (2) Set MO-XTAL switch to XTAL.
- (3) Set meter switch to DRIVE.

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- (4) With system switch at CW depress pressel switch on hand microphone.
- (5) Tune FREQUENCY MC/S dial near the ordered frequency to obtain maximum deflection on the meter.
- (6) Set AE COUPLING control to position indicated in appropriate table of Appendix I.
- (7) Put meter switch to AE and tune for maximum aerial current as shown by the meter.
- (8) Adjust AE COUPLING and AE TUNING controls alternately (as described in 3 (b) (xi) (during pause) of netting drill on page 18 above) until the maximum aerial current is obtained.

IMPORTANT NOTE : If wireless silence is being observed do not adjust the aerial coupling control but leave it at 100. Do operations (6)—(8) when the wireless silence has been lifted.

15. Netting to a Wavemeter

For netting by wavemeter proceed as in section (2) (a) on page 16.

16. Closing down Drill

- (1) Carry out daily maintenance tests.
- (2) Inspect all fixing bolts and bonding strips. Rock set on its mounting and listen in headphones for any signs of loose connections.
- (3) Ensure set is clean and dry. If so switch OFF. If dampness is suspected leave set ON to dry out.
- (4) Inspect all connections—aerial, battery, earth leads, headsets and key. Clean and dry headsets and stow. Clean and dry contacts if used.
- (5) Inspect aerial and aerial insulator. Clean and dry aerial base and sections and stow.
- (6) Replace and secure the waterproof cover.
- (7) Clean and inspect all charging equipment. Run charging plant for battery charging as required.
- (8) Check spare parts—replace faulty valves, etc.

17. Miscellaneous Hints

(1) Checking the net ; re-netting

On account of the variation of atmospheric temperature, the condition of the battery and, for other reasons, the frequency of the set may shift slightly during a long period of working. This will put the set off net, and this state may be recognized by a rise in the pitch of the control operator's voice which will also become shrill and slightly distorted. A rise in the pitch of the general background hiss also denotes a probable deterioration in the netting.

To correct this, wait until the control operator is heard communicating to another station, then turn the system switch to NET. If the net is satisfactory, nothing should be heard except perhaps a very low pitched note. If, however, a high pitched note or whistle is audible, then the net is unsatisfactory and the set

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must be re-netted by going through the operations described in section 12 paragraphs (1) and (3) above. It is essential that the control station continues to send throughout the operation of re-netting.

(2) Use of the TUNE position of flick lever

If the set goes off net very frequently, set the flick lever to TUNE when checking the net. Now adjust the dial with the fine adjuster without loosening the flick screws each time. But note that on turning back to SET, the tuning dial will be back at its old setting and not at its corrected setting. The first opportunity should be taken to re-set the flick device, but this should NOT be attempted unless the set is stationary and unless control is making a long transmission to another station. The flick having been re-set, the lever should be left at SET until the set is next observed to be going off frequency.

(3) The AERIAL TUNING control and AERIAL COUPLING control

These require re-adjusting whenever the frequency of the set or length of aerial is altered. Typical settings with rod aerials are tabulated and these should be used when the sender-receiver is initially being set up.

The tuning and coupling controls should be rocked successively around the values indicated until the aerial current is maximum at CW. This gives the correct aerial adjustment. When normal and spare frequencies are being set up, the AE TUNING setting for each flick position should be noted to enable re-adjustment to be made quickly.

(4) If, while working, the signals continue to deteriorate, check the following points :—

(a) Check the netting. If the set is going off net, re-net it on the control station.

(b) Check the accessories—batteries, headset and aerial and their connections. Check the meter reading on AE. Check that the sidetone is present. Check the meter reading on L.T.

(c) Call a nearer station to check the suspected set.

(d) If there is still no answer and if a rod aerial is being used, increase the length of the aerial, and call again after re-setting the AERIAL TUNING and AERIAL COUPLING for maximum radiation.

(5) Economy in battery drain

If it is required to listen for RT signals for a long period, but omitting the necessity of having to send without warning, turn the ALL ON/REC ON/ALL OFF switch to the REC ON position : before sending, switch to ALL ON, press pressel switch and wait for an aerial current reading in the meter before speaking : this will save the battery and enable the set to be worked for a longer period. When standing by for CW signals the ALL ON position must be used.

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(6) Drying out set

If the set has been exposed to very heavy rain for some hours, it is advisable at the first opportunity (i.e. when climatic conditions are reasonably dry) to remove the set from its case and pour out any accumulated water. If the set fails to function due to water inside the case, drying out will usually be found sufficient to restore the performance of the set.

18. Junction Remote Control Nos. 1 and 2

A circuit diagram of these units is given in Fig. 23. To connect the units proceed as follows :—

(a) Connecting up

- (i) Plug the snatch plug from the local unit (No. 1) into the snatch socket on one of the drop leads of the Wireless Set No. 62.
- (ii) Plug the set type headgear No. 10 into the snatch socket on the drop lead of the local unit (No. 1).
- (iii) Plug the 3-point moulded rubber plug into the R.C. UNIT socket on the Wireless Set No. 62.
- (iv) Connect the slotted terminals on the local unit (No. 1) to the corresponding terminals on the remote unit (No. 2) by means of the required length of twin cable.
- (v) Plug the set type headgear No. 10 into the snatch socket on the drop lead of the remote unit.

(b) Operation

- (i) To transmit, either operator may press his pressel and speak.
- (ii) A lamp on the local unit lights to warn the operator when the sender operator puts the set to "send".
- (iii) Each operator hears what the other sends, but no intercommunication is possible without redicting.

19. Remote Control Units L Nos. 1 and 2

Remote control of the Wireless Set No. 62 will eventually be accomplished by means of Remote Control Units L Nos. 1 and 2.

A circuit diagram of these units is given in Fig. 24 and a schematic diagram is given in Fig. 20.

(a) Connecting up

- (i) A twin power supply lead from the local unit is terminated by a three point rubber moulded plug. Fit this plug into the socket marked R.C. UNIT on the front panel of the wireless set.
- (ii) Connect the snatch plug of the local unit to one of the drop leads of the wireless set.
- (iii) Into the snatch socket of the local unit fit the plug of an ordinary type of headgear No. 10.
- (iv) Into the 4 point socket on the local unit fit the plug of a type 4A microphone (with capsule No. 8). It is most important that this separate microphone is used, and NOT the microphone which is attached to the headgear No. 10.
- (v) Connect the two slotted terminals on the local unit to the corresponding terminals on the remote unit by the appropriate length of wire. This may be up to $\frac{1}{2}$ mile of assault cable or $\frac{1}{2}$ mile of D3.

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- (vi) To the appropriately marked 4 and 2 point sockets on the remote unit, fit respectively the plug of a microphone type 4A (with capsule No. 8) and a pair of headphones D.L.R. double No. 5L.

A CW key is built into the remote unit.

(b) Facilities

(i) Remote end

Send/Receive switching (by key or pressel).

RT (Microphone type 4A with capsule—headphone D.L.R. double No. 5L).

CW (with built-in remote key).

Call local operator and intercommunication.

(ii) Local end.

Send/Receive switching.

RT (Microphone Receiver Assembly No. 10—carbon microphone).

CW (with set key).

Call remote operator by buzzer. Intercommunication may be carried on even with the set power switch to its ALL OFF position provided that the batteries are plugged into the set.

When local unit is on IC, signals from the wireless set break through at reduced level.

(c) The local unit (No. 1)

This has a lamp which lights automatically when the remote operator presses his key or his pressel switch. There is a three position switch marked WORK-IC-CALL. The CALL position is spring loaded so that after being held in the CALL position the switch automatically returns to the IC position.

The facilities provided by the three position switch are as follows :—

(i) WORK

All facilities are available : the set automatically goes on "send" when either the local or the remote operator depresses his key or pressel switch. The two operators can intercommunicate, but their speech will be radiated. The remote operator may call the local operator by depressing his key or pressel switch. This will cause the lamp in the local unit to glow.

(ii) IC

The operators can intercommunicate, and the set will not radiate when key or pressel switch is operated at either the local or the remote units. The set can however be operated normally from its other snatch plug.

The output from the 62 set receiver is fed to the remote control units at reduced level.

Calling facilities are still available. The remote operator may call the local operator by depressing his key or pressel switch. This will cause the lamp in the local unit to glow.

N.B.—The units should normally be left in the IC position (except when actually working from the remote end) so that the remote operator may call the local operator without causing the set to radiate.

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(iii) CALL (spring loaded).

Local to remote : The buzzer becomes audible in the remote operator's headphones. The sound will break through at a reduced level when the remote operator is speaking, both on WORK and on IC.

(d) *The Remote Unit (No. 2)*

This has key, microphone and phones only.

20. Lamp Operator 6B (with Adaptor, Lamp, U.V. No. 1)

This is illustrated in Fig. 26. To fit the ultra violet adaptor to the Lamp Operator 6B, remove the plastic and the metal shields and also the normal low wattage bulb. Fit on the high wattage bulb and then screw on the ultra violet adaptor. These operations are illustrated in Fig. 26.

The three pin plug may be fitted to the socket marked R.C. UNIT or to the socket marked XTAL CAL on the panel of the Wireless Set No. 62, and the lamp itself may be clipped to a convenient position by means of the metal clip provided. The ultra violet lamp will illuminate the engravings on the panel of the equipment.

If when using the ultra violet adaptor, a limited source of white light is required, this may be obtained by pressing the spring loaded button on the body of the adaptor and then rotating the collar.

The Lamp Operator No. 6B and the ultra violet adaptor are normally carried in a satchels signal. The plastic and metal screen and the low wattage bulb are however carried in the Cases, Spare Valves when not in use.

CHAPTER III. MAINTENANCE

Appendix II has been designed as a means of recording completion of maintenance tasks, repairs and inspections. It has been produced separately as Army Form B 2661—Unit Maintenance Log and will cover a period of 24 weeks. The completed and current sheets will be kept in the pocket provided in the back cover of this publication. When the form has been promulgated in Army Orders it may be obtained on indent in the normal manner.

The completion of maintenance tasks will be recorded by initialling in the space provided under days, 1, 2, 4, 5, 6 and 7 for the daily tasks, and under days 3 and 7 for the weekly and monthly tasks respectively. (The spaces provided for the weekly and monthly maintenance tasks are indicated by heavy lining and these spaces may also be used in addition for daily tasks as the Unit Commander may direct.) Minor repairs and valve replacements will be recorded on the reverse of Army Form B 2661.

Further instructions for the Unit Commander are promulgated in A.C.I. 1076 of 1945.

The following is a list of maintenance tasks to be carried out by the operator. The frequency with which they will be carried out will be detailed by the Unit Commander. The tasks are laid down as suggestions to the Unit Commander and he may omit or add to them at his discretion. It is advised however that all these tasks are carried out especially in the case of new equipments.

21. Suggested daily tasks

Mechanical check

- (a) See that the exterior of the set and the glasses covering the meter, aerial tuning indicator and the flick indicator are clean.
- (b) See that the exterior nuts, bolts and plugs and the aerial and earth connections are tight, dry and sound.
- (c) Examine the case and associated webbing for wear or damage. See that the case has no holes in it.
- (d) Check all tuning controls for smooth working. See that the clutch slips at the end of travel of the AE TUNING control and that the indicator operates correctly. The slow motion

CHAPTER III—Section 21

drive of the FREQUENCY control should turn without slip or backlash. See that the slow motion drive releases on FLICK and takes up on SET and TUNE. The HET TONE control should turn stiffly and smoothly through 360°

- (e) Check that all switches move correctly into their various positions and, *without forcing them*, ensure that they bed firmly against their end stops. Take particular care when checking the XTAL-MO switch as this requires less pressure than the other switches.
- (f) See that all tuning controls and switches are secure on their shafts and, if necessary, tighten the grub screws.
- (g) Examine all controls and see that the waterproof sealing is intact. Check that grease is not escaping from the washers.
- (h) Clean and dry the plastic insulator on the AERIAL terminal.

Power Supply—Batteries

- (i) Clean the vent of each cell in the batteries and check that the electrolyte covers the plates.
- (j) Test the specific gravity of each cell ; if any cell gives a reading below 1180, have the battery charged.
- (k) Remove any corrosion from the terminals, connecting plugs and sockets, etc.
- (l) Check that the straps to the cells are tightly connected.
- (m) Examine the battery leads and see that they are not frayed.

Power Supply—Charging set, Lightweight, Pedal driven, 60W and Charging set, Lightweight, 80W, No. 1, Petrol driven

- (n) Perform normal daily tasks as given in the respective working instructions.

Receiver

- (o) Switch to REC ON and to RT. Switch the XTAL-MO switch to MO.
- (p) Switch meter switch to LT ; a meter reading greater than 11 volts should be obtained.
- (q) Switch meter switch to HTR ; a meter reading of about 140 volts should be obtained.
- (r) With the range switch at 1.6-4, tune in to any strong RT signal. Check signal to noise ratio from previous experience. If the noise level is higher than normal, disconnect the aerial and note if the noise persists. Repeat this item with the range switch at 4-10.
- (s) At the first sign of an erratic meter reading of HTS or HTR or if there is any marked increase of noise on "receive" (even with the aerial disconnected) the set should be handed over to the appropriate maintenance unit so that the rotary transformer (H.T. generator) may be overhauled. Earlier generators will normally give up to 500 hours service before this becomes necessary. Later improved generators should give up to 1,000 hours service.
- (t) Check that a smooth increase in volume is obtained by rotation of the GAIN control.
- (u) Switch the meter switch to AVC and check that the meter reading rises when the station is tuned correctly. The reading should be about 5V, rising to 9V when the signal is tuned in.

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- (v) Switch to ALL ON and to NET. Check that zero beat is obtained when tuning in to a signal.
- (w) Switch to CW and check that a beat note is obtained on CW signals. Check that the HET TONE gives, in both directions, smooth variations of the pitch of the beat note.
- (x) Use a second Wireless Set No. 62 with crystal to transmit an R.T. signal. Tune the set being tested to this signal. Switch the XTAL–MO switch to XTAL. Test the signal to noise ratio as in (r) above.

Sender

- (y) Switch to ALL ON and meter switch to HTS ; a meter reading of about 300 volts should be obtained.
- (z) Switch to CW, and meter switch to DRIVE. Press pressel switch or key and check that a fairly constant drive reading is obtained throughout both bands. The normal drive reading varies from 8 volts to 12 volts between 2 Mc/s and 9 Mc/s.
- (aa) Switch meter switch to AE. Press key and tune for maximum reading in the aerial current meter. Operate key and check that keying is satisfactory.
- (ab) Switch to RT. Press pressel switch and check that an aerial current meter reading is obtained. Speak into microphone ; check that sidetone is heard and that the meter reading shows slight variations.
- (ac) Switch the XTAL–MO switch to XTAL and repeat item (z).

Meter readings and dial settings

- (ad) Tune up the set on CW for maximum aerial current, using a 14 foot rod aerial, on each of the frequencies listed below. Compare the meter readings and dial settings obtained with those quoted.

Frequency Mc/s	1.6–4 Band		4–10 Band	
	2.0	4.0	4.0	9.0
Drive Volts ...	11.0	11.0	10.0	9.5
Aerial m/A ...	260	300	240	200
Aerial Coupling ...	60	30	25	0
Aerial Tuning ...	700	300	300	110

NOTE : The figures in the above table are intended for use only as a guide to readings that should be expected. Reasonable variations may be tolerated above or below the figures quoted.

22. Suggested weekly tasks**AP equipment—(Wireless Set No. 62 and RC Units "L")**

- (a) Check that connections to leads of headphones are tight.
- (b) Examine for fraying, the leads to headphones, microphones and key.
- (c) See that snatch plugs make good connections and that they are not damaged.
- (d) Connect all microphones and headphones, including spares, and check that they are in working order.
- (e) Clean key contacts with dry cloth or clean paper.

CHAPTER III—Section 22

Aerial gear

- (f) See that the ends of the aerial rod sections are clean and straight and that they fit together.
- (g) Inspect wire aerials ; clean them (but do not polish) and carefully remove any kinks.
- (h) Inspect all poles, stays and pickets. See that stays are free from knots and are neatly coiled.
- (j) Inspect aerial base for damage and ensure that connections are tight and leads in good condition.

Vehicle suppression (IF APPLICABLE)

- (k) Check that all bonding connections on the vehicle are tight.
- (l) Check that a good connection exists between the earth terminal on the set and the vehicle chassis.
- (m) Start windscreen wiper and check that it does not cause noise in the receiver.
- (n) With vehicle stationary, listen on receiver for noise when engine is running normally and when speeded up.
- (o) Check that there is no noise in receiver when the vehicle is moving over rough ground with the engine switched off. (If it is inconvenient to move the vehicle out of position, this test may be made by rocking the body of the vehicle on its suspension.)

Remote Control Units "L"

- (p) Check leads to No. 1 unit and see that they are not frayed and that connections are secure.
- (q) Connect No. 1 unit to the set and connect No. 2 unit to No. 1 unit.
- (r) Connect up microphones and headphones to both units.
- (s) With Wireless Set No. 62 at REC ON and tuned to any strong signal and with switch on Remote Control Unit No. 1 at WORK, check that the signal can be heard in headphones of No. 1 unit.
- (t) With Wireless Set No. 62 at ALL ON and RT, speak into microphone of No. 1 unit. Check that sidetone is heard and that the aerial current reading on the Wireless Set No. 62 shows slight variations.
- (u) On the No. 1 unit, switch to CAL.; a buzz should be heard in the No. 2 unit.
- (v) Switch to IC, and check that the signal can be heard in headphones of No. 2 unit.
- (w) Switch to WORK and, with Wireless Set No. 62 at ALL ON and CW, check that keying is satisfactory on No. 2 unit. Check that the lamp lights on the No. 1 unit when the key is pressed on the No. 2 unit.
- (x) With switch still at WORK and with Wireless Set No. 62 at ALL ON and RT, speak into microphone of No. 2 unit. Check that sidetone is heard and that the meter reading on the Wireless Set No. 62 shows slight variations.

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Flick mechanism

(y) Net the receiver to any strong signal and lock the *blue* screws of the flick mechanism. Turn away from this setting and then return to the flick position to check that the signal is heard as before, with the SET-FLICK-TUNE lever at the SET position.

(z) Repeat operation (y) using the *red* screws.

Station check

Check all equipment against the signal equipment card and record any deficiencies.

Internal inspection

Where maintenance has to be done which involves opening the set, the equipment should be placed in the care of an Electrician Signals or Radio Mechanic. If, however, such personnel are not available the operator may try to get the set working himself. In such a case the procedure is as follows :—

- (a) Remove the set from the case.
- (b) Clean and dry the interior of the set, and inspect for loose or dirty connections. When cleaning the set, care must be taken to avoid disturbing the position of wires as this might affect the calibration.
- (c) Using a *clean*, dry and soft cloth, carefully clean the rod, wheel and wire of the aerial tuning inductance, the flick mechanism, and the plates of the tuning condenser.
- (d) Check spare fuses.
- (e) Ensure that all valves and top cap connections are secure. Pay particular attention to the sender valves (ARP35 and VT510), and check that they are clamped firmly in position.
- (f) See that screening cans are in position and that lids fit securely.
- (g) Examine the aerial tuning inductance for signs of arcing (burning or pitting).

The completion of the daily maintenance tasks on days 1 to 7 will be recorded in a form shown as APPENDIX II—UNIT MAINTENANCE LOG by initialling under the relevant spaces.

The spaces indicated by the thick lining are for weekly and monthly maintenance record, and they may or may not include the daily tasks for that day. Minor repairs, valve and other replacements are indicated under REPAIR RECORD on the reverse side of this form.

This Appendix II will be produced as a separate Army Form, supplies of which will be demanded in the normal manner when production has been duly notified.

The copy in current use will be retained in the pocket flap in the back cover of this book.

23. Fault Location

Because of the series parallel wiring of the valve filaments, a fault may have widespread effects on the set : in such cases it is often necessary, as a precaution against burning out several filaments, to change more than one valve at the same time. When this becomes necessary, if the required valves are not all available, the set must be handed to the appropriate maintenance personnel.

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Before replacing valves always switch the set to "ALL OFF".

Under the heading "Receiver" it is assumed unless otherwise stated that the Sender is functioning normally. Similarly under the heading "Sender" it is assumed that the Receiver is functioning normally.

If a fault occurs for which no action is included—*report*.

If the action given for any particular symptom has been completed and the set is still not functioning—*report*.

Whenever possible check the set by attempting to communicate with another set which is known to be good.

A detailed fault location table for operator's use is given below.

Symptom	Possible Fault	Action
(1)	(2)	(3)
General		
1. On switching on, rotary transformer does not run.		
(A) No reading or low meter reading at LT	(i) Battery connector not properly plugged in or faulty.	(a) Check that all plugs and sockets are clean and making a stiff fit. <i>Push right home.</i> (b) Replace battery lead.
	(ii) Batteries discharged or faulty.	(a) Do paras. 21 (i) to (l) in daily maintenance schedule. (b) Replace battery.
(B) Normal meter reading at LT	Internal	Report
2. Rotary transformer runs, but no receiver output or sender sidetone audible in phones.		
(A) No meter readings except at LT.	Fuse blown	Replace fuse. If fuse blows again, report.
(B) Meter readings normal. Aerial current can be obtained on send (drive decreases on switching from M O to XTAL), and AVC readings normal	(i) Headset or leads ...	(a) Check that snatch plug and socket are pushed right home. (b) Connect headset to the other drop lead. (c) Replace headset.
	(ii) Faulty AF valves (V ₂ A and V ₃ A)	Replace V ₁ B (ARP ₁₂), V ₂ A (AR8), V ₃ A (CV65) and V ₃ B (CV65) <i>all at the same time.</i>

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(1)	(2)	(3)
General—contd.		
	(iii) Faulty RF valve (V _{1A})	Replace V _{1A} , V _{1D} and V _{1F} (all ARP12) <i>all at the same time</i> , in addition to the valves under fault (ii). If the set now functions, try replacing <i>all four</i> original valves changed under fault (ii).
(C) Aerial current <i>cannot</i> be obtained.	Faulty local oscillator (V _{1C}) and some receiver valve.	(a) Replace V _{1A} , V _{1C} , V _{1D} <i>all at the same time</i> . (b) Then, if necessary, replace V _{1B} , V _{2A} , V _{3A} and V _{3B} <i>all at the same time</i> .
3. Receiver noise only can be heard with GAIN max. No sender output.	Faulty local oscillator (V _{1C}).	Replace V _{1C} (ARP12).
4. Set will not switch to send.	Switch settings ...	Check that the main 12V supply switch is at ALL ON and that the system switch is at CW or RT: i.e. <i>not</i> at NET.
Receiver		
1. No receiver output, but sender gives normal aerial current and sidetone.	Gain control ...	Check gain control is fully clockwise.
(A) Meter reading at A V C high (should lie between 3.0–5.5).	Faulty 2nd IF valve (V _{1E})	(a) Replace V _{1E} (ARP 12). (b) If set does not function, but AVC reading now normal, proceed as for symptom (B).
(B) All meter readings normal.	(i) Faulty 1st IF valve (V _{1D}) (ii) Some other receiver valve faulty	Replace V _{1D} (ARP12). Replace in order given : V _{1B} (ARP12), V _{1A} (ARP12), V _{1E} (ARP 12) and V _{2A} (AR8).
2. Signal or mush cannot be peaked by adjustment of aerial tuning controls.	(i) Aerial and earth ...	(a) Check that aerial and earth leads are connected and that all terminals and lugs are clean.

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(1)	(2)	(3)
Receiver—contd.		<p>(b) Check that aerial section joints are clean and fitting firmly together.</p> <p>(c) Replace aerial and earth leads.</p> <p>(ii) A.T.I. carrier ... Examine the A.T.I. If the contact wheel carrier is not in place on the guide rod, report.</p>
<p>3. With a station tuned in on RT no whistle can be obtained when the set is switched to CW and the HET TONE control rotated.</p> <p>(A) The set functions normally at send.</p> <p>(B) The set does not function at send.</p>	<p>(i) GAIN control too high.</p> <p>(i) Main supply switch at REC ON.</p> <p>(ii) See sender faults 1 (D).</p>	<p>Rotate the GAIN control slowly anti-clockwise at the same time varying the HET TONE control.</p> <p>Switch to ALL ON.</p>
<p>4. Noise level excessively high even when aerial is disconnected.</p>	<p>Rotary transformer ...</p>	<p>Report.</p>
<p>Sender</p> <p>1. No aerial current.</p> <p>(A) All other meter readings normal, drive reading shows appreciable decrease on switching from MO to XTAL (no crystal in socket).</p>	<p>(i) Aerial and earth ...</p> <p>(ii) A.T.I. carrier ...</p>	<p>(a) Check that aerial and earth leads are connected and that all terminals and lugs are clean.</p> <p>(b) Check that aerial section joints are clean and fitting firmly together.</p> <p>(c) Replace aerial and earth leads.</p> <p>Examine the A.T.I.</p>

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(1)	(2)	(3)
<p><i>Sender—contd.</i></p> <p>(B) No reading or very low meter reading at DRIVE.</p> <p>(C) Meter reads at DRIVE but reading does not change on switching from MO to XTAL. Receiver functions normally on CW—i.e. can hear tuneable whistle on each station.</p> <p>(D) As (C) above, but no whistle can be obtained when a station is tuned in on receive, CW.</p>	<p>Faulty P.A. valve (V6A).</p> <p>Faulty sender buffer valve, V5A.</p> <p>Faulty BFO and sender mixer (V4A).</p>	<p>Replace V6A (VT510).</p> <p>Replace V5A (ARP35). If output of sender is still low, replace buffer and sender mixer, V4A (ARTH2).</p> <p>Replace V4A (ARTH2) and V5A (ARP35) at the same time.</p>
<p>2. On speaking loudly into the microphone with the set at RT no sidetone is audible in the headphones.</p> <p>(A) Aerial current reading on set meter does not vary with loud speech.</p> <p>(B) Aerial current reading varies with speech.</p>	<p>Aerial circuits not tuned.</p> <p>(i) Faulty modulation amplifier, V3B.</p> <p>(ii) Faulty microphone amplifier, V2A.</p> <p>Internal</p>	<p>Tune the set into one of the standard aerials.</p> <p>Replace V3B (CV65).</p> <p>Replace V2A (AR8).</p> <p>Report.</p>

APPENDIX I

Tables indicating the settings of the AE COUPLING and AE TUNING controls for different frequencies for the different types of aerials and stations.

TABLE A—Man-pack station (mounted : mobile) : 4 ft. aerial

Freq. Mc/s ...	2	3	⁴ L.F.	⁴ H.F.	5	6	8	10
AE COUPLING	90	34	18	17	12	6	0	0
AE TUNING ...	980	595	421	420	317	256	180	140

TABLE B—Man-pack station (mounted : mobile) : 8 ft. aerial

Freq. Mc/s ...	2	3	⁴ L.F.	⁴ H.F.	5	6	8	10
AE COUPLING	45	28	18	17	11	3	0	0
AE TUNING ...	946	533	382	382	290	236	165	127

TABLE C—Man-pack station (dismounted : on ground) : 4 ft. aerial*

Freq. Mc/s ...	2	3	⁴ L.F.	⁴ H.F.	5	6	8	10
AE COUPLING	62	33	18	18	11	7	0	0
AE TUNING ...	980	571	404	401	305	246	176	136

TABLE D—Man-pack station (dismounted : on ground) : 8 ft. aerial*

Freq. Mc/s ...	2	3	⁴ L.F.	⁴ H.F.	5	6	8	10
AE COUPLING	49	35	19	19	13	7	0	0
AE TUNING ...	898	517	366	367	278	228	164	126

TABLE E—Man-pack station (dismounted : on ground) : 14 ft. aerial*

Freq. Mc/s ...	2	3	⁴ L.F.	⁴ H.F.	5	6	8	10
AE COUPLING	51	34	17	17	10	5	0	0
AE TUNING ...	750	439	324	323	251	214	145	108

* also Vehicle/Animal station dismounted.

APPENDIX I—contd.

TABLE F—Man-pack station (dismounted : on ground) : 100 ft. aerial
Also Vehicle/Animal station dismounted (see Fig. 11)

Freq. Mc/s ...	1.6	2.0	2.5	3.0	3.0	3.5	4.0	4.0
Aerial length (ft.)	100	100	100	100	75	75	75	45
Straps open ...	—	—	—	—	A	A	A	AB
Straps closed ...	ABC	ABC	ABC	ABC	BC	BC	BC	C
AE COUPLING	45	30	20	10	25	10	0	11
AE TUNING ...	650	450	350	250	270	250	190	255
Freq. Mc/s ...	4.5	5.0	5.5	5.5	6.0	6.5	7.0	7.5
Aerial length (ft.)	45	45	45	100	100	100	100	100
Straps open ...	AB	AB	AB	—	—	—	—	—
Straps closed ...	C	C	C	ABC	ABC	ABC	ABC	ABC
AE COUPLING	6	0	0	0	0	0	0	0
AE TUNING ...	220	195	160	250	205	165	135	100
Freq. Mc/s ...	7.5	8.0	8.5	9.0	9.0	9.5	10.0	
Aerial length (ft.)	75	75	75	75	25	25	25	
Straps open ...	A	A	A	A	ABC	ABC	ABC	
Straps closed ...	BC	BC	BC	BC	—	—	—	
AE COUPLING	0	0	0	0	0	0	0	
AE TUNING ...	180	155	135	105	100	090	080	

TABLE G—Vehicle station (mobile) : 4 ft. aerial

Freq. Mc/s ...	2	3	4 L.F.	4 H.F.	5	6	8	10
AE COUPLING	51	36	19	20	15	9	0	0
AE TUNING ...	950	537	385	380	287	234	169	129

Table H—Vehicle station (mobile) : 8 ft. aerial

Freq. Mc/s ...	1.8	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5
AE COUPLING ...	70	55	50	45	40	30	22	18	15
AE TUNING ...	960	850	640	480	390	340	290	250	230
Freq. Mc/s ...	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
AE COUPLING ...	12	10	7	5	3	0	0	0	0
AE TUNING ...	200	180	160	150	140	130	125	120	115

APPENDIX I—cont.

TABLE J—Vehicle station (mobile) 14 ft. aerial

Freq. Mc/s ...	1.7	2.0	2.5	3.0	3.5	4.0 L.F.	4.0 H.F.	4.5	5.0	5.5
AE COUPLING	70	60	55	50	40	30	25	23	20	17
AE TUNING	920	720	530	420	330	290	300	250	225	200
Freq. Mc/s ...	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	
AE COUPLING	14	11	8	6	5	3	0	0	0	
AE TUNING	180	160	150	140	130	120	110	105	100	

TABLE K—Vehicle station (set retained in vehicle: stationary):
32 ft. aerial

Full 32 ft. aerial	Freq. Mc/s ...	1.6	2.0	2.5	3.0	3.5	4.0	4.5
	AE COUPLING ...	73	70	60	50	43	30	23
	AE TUNING ...	670	485	360	290	245	215	195
	Freq. Mc/s ...	5.0	5.5	6.0	6.5	7.0	7.5	8.0
	AE COUPLING ...	18	13	8	4	0	0	0
	AE TUNING ...	175	155	140	120	110	100	090
Reduced 18 ft. aerial	Freq. Mc/s ...	7.0	7.5	8.0	8.5	9.0	9.5	10.0
	AE COUPLING ...	10	5	0	0	0	0	0
	AE TUNING ...	130	120	110	100	090	080	070

TABLE L—Vehicle station (set retained in vehicle: stationary)
100 ft. aerial (see Fig. 11)

Freq. Mc/s ...	1.6	2.0	2.5	3.0	3.0	3.5	4.0 L.F.	4.0 H.F.
Length (ft.) ...	100	100	100	100	75	75	75	45
Straps open ...	—	—	—	—	A	A	A	AB
Straps closed ...	ABC	ABC	ABC	ABC	BC	BC	BC	C
AE COUPLING	60	50	40	20	35	20	8	20
AE TUNING	575	395	280	205	245	195	160	225