

WIRELESS SET No. 17 MK. II.

WORKING INSTRUCTIONS

Z.A. 16930

NOT TO BE PUBLISHED

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WIRELESS SET No 17. MK. II.

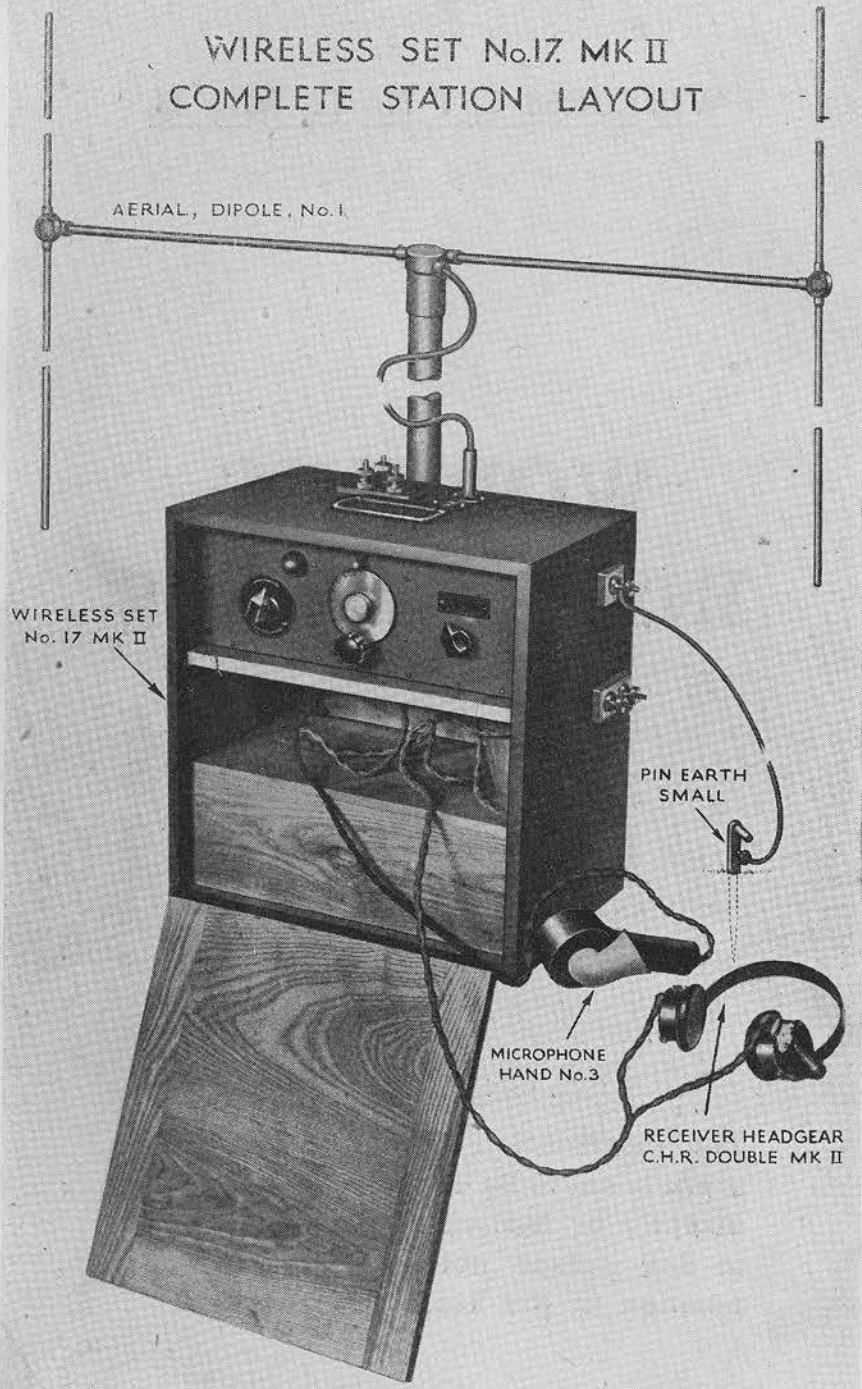
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WIRELESS SET No.17 MK II COMPLETE STATION LAYOUT



CONTENTS

CHAPTER I

GENERAL DESCRIPTION

	Page
1.1 Purpose	7
1.2 Range	7
1.3 Frequency Range	7
1.4 Power Supply	7
1.5 Knobs and Controls	8
1.6 Aerials	8
1.7 Aerial Connections	8
1.8 Wireless Set No. 17 :—Wavemeter	8
1.9 Wireless Set No. 17 :—Switchboard Charging	8
1.10 Weights and Dimensions	8

CHAPTER 2

OPERATING PROCEDURE

2.1 General	9
2.2 Strength of Signals	10
2.3 Call Signs	10
2.4 Method of Calling	10
2.5 Repetitions and Corrections	12

CHAPTER 3

OPERATING INSTRUCTIONS

3.1 General	14
3.2 Aerial Site	14
3.3 Erection of Aerials	14
3.4 Preparing Set for Operation	17
3.5 To Connect the Aerials	18
3.6 To Receive Signals	18
3.7 To Transmit Signals	18
3.8 Final Adjustments	18
3.9 Choice of Dipole Sockets	20
3.10 Normal Method of Use	20

CHAPTER 4

WIRELESS SET NO. 17 :—WAVEMETER

4.1 Accuracy	22
4.2 Frequency Adjustment	22
4.3 Netting	22

CHAPTER 5

WIRELESS SET NO. 17 :—SWITCHBOARD CHARGING

	Page
5.1 General Description	25
5.2 Instructions for Use	25

CHAPTER 6

OPERATORS' MAINTENANCE

6.1 Tests	26
6.2 Controls	26
6.3 Faults	26
6.4 Aerial Gear	26

CHAPTER 7

MAINTENANCE OF ACCUMULATORS

7.1 Instructions	27
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CHAPTER 8

TECHNICAL DESCRIPTION

8.1 General Description	27
8.2 Circuit	27
8.3 Aerial Systems	28
8.4 Batteries	28
8.5 Valves	28
8.6 Frequency Range	28
8.7 Power Output	28

CHAPTER 9

REPAIR AND SERVICE FOR THE USE OF SKILLED
PERSONNEL ONLY

9.1 Hints	30
9.2 Operating Conditions	30
9.3 Analysis of Faults	31

List of Illustrations.

	Frontispiece—Complete Station Layout	2
Fig. 1.	Wireless Set No. 17 :—Wavemeter	5
„ 2.	Range	6
„ 3.	Rhombic Aerial	15
„ 4.	H.T. Battery Connections	19
„ 5.	Wireless Set No. 17 with Wavemeter	23
„ 6.	Wireless Set No. 17 :—Switchboard Charging	24
„ 7.	Block Plan of Chassis	29
„ 8.	Circuit Diagram and Components List	Facing Page 32

Fig. 1

WAVEMETER

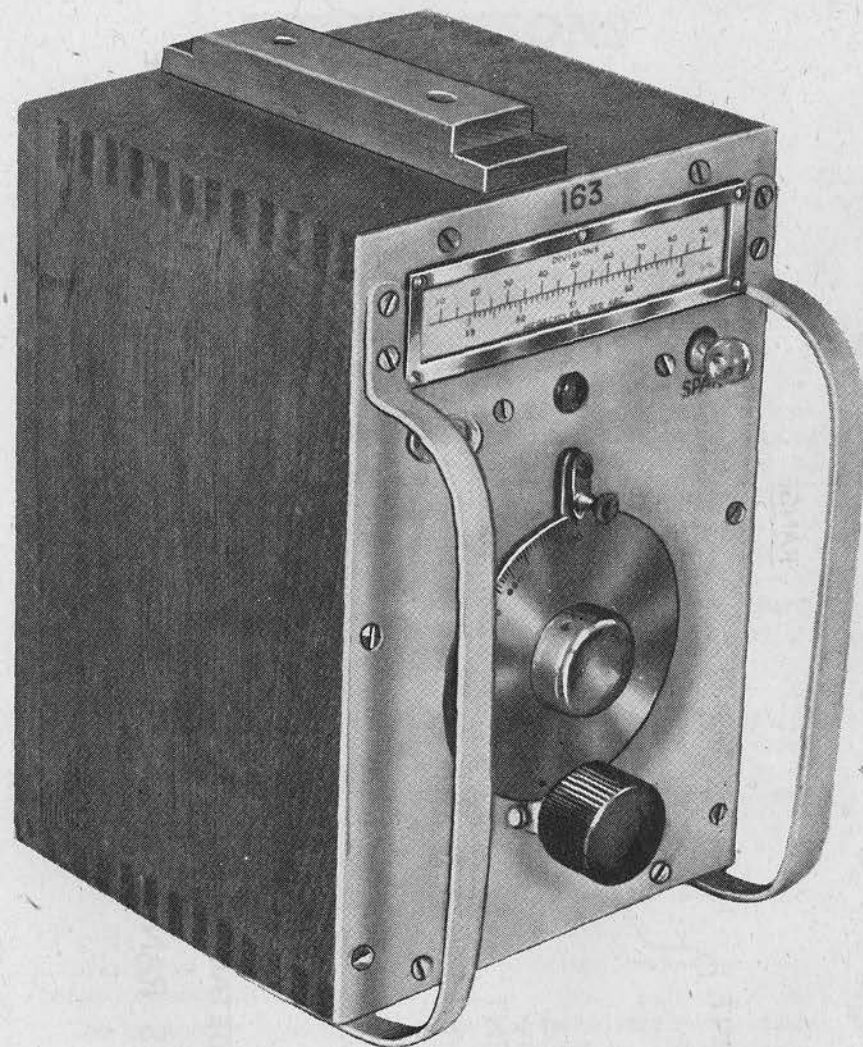
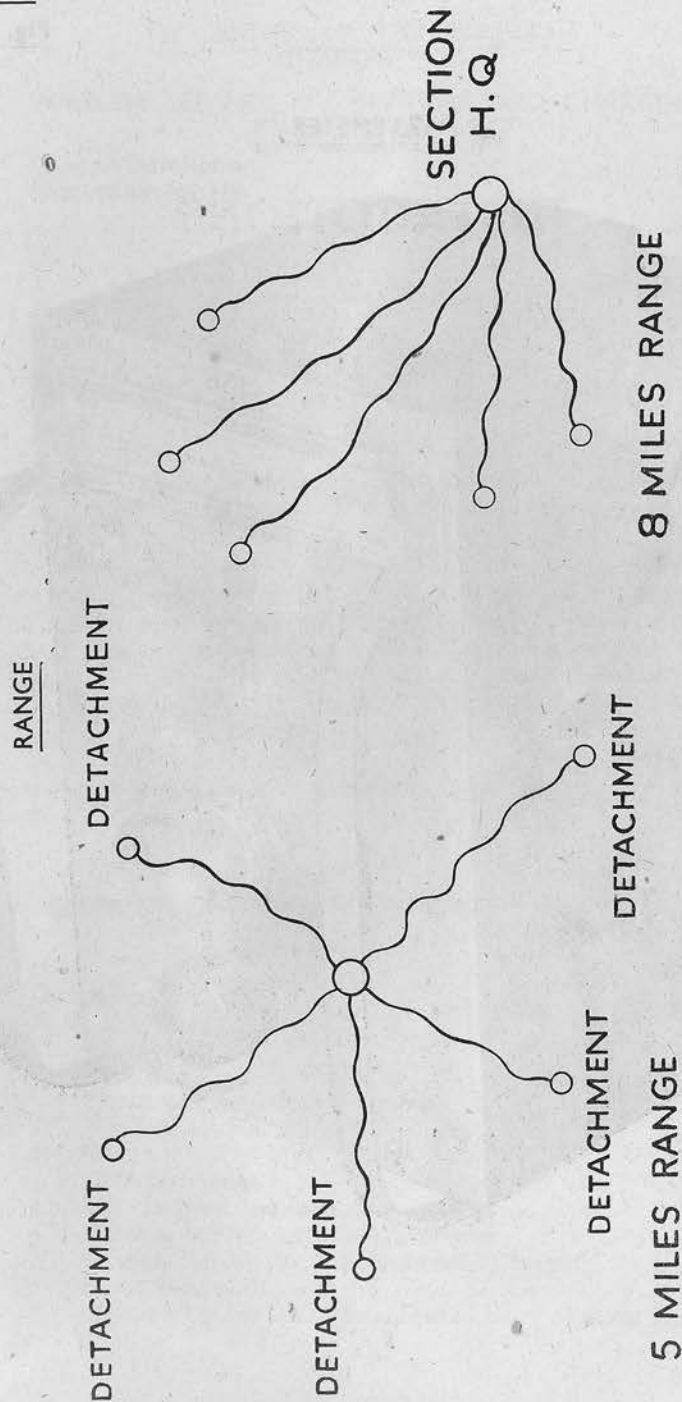


Fig. 2



WIRELESS SET No. 17 MK. II

**WORKING
INSTRUCTIONS**

CHAPTER I
GENERAL DESCRIPTION

1.1 Purpose.

The Wireless Set No. 17 is an R/T transceiver normally designed for use between Searchlight Section Headquarters and detachments.

1.2 Range.

1.2.1. When using Aerial Dipole No. 1 and under normal conditions, an all round range of from 3 to 5 miles should be obtained. Working with the reflector, a range of 8 miles can be expected. (See Fig. 2).

1.2.2. Using a Rhombic aerial as described in Fig. 3, a range of approximately 15 miles can be expected.

1.3 Frequency Range.

44.0 to 61.0 Mc/s. 0.5 Mc/s separation should be used between Sections.

1.4 Power Supply.

Filament supply is from a 2 volt accumulator. A 2 volt 75 Ah accumulator is normally supplied, allowing approximately 150 hours working before re-charging is necessary. One spare 2 volt 75 Ah accumulator is supplied. For portable use a 2 volt 16 Ah accumulator may be fitted in a compartment in the case.

High tension supply is obtained from:—

- (a) Two Batteries dry H.T. 60-V. No. 1 connected in series, or—
- (b) One 120 volt commercial type H.T. Battery.

In each case Batteries should give approximately 300 hours working before replacement is necessary.

The transceiver is designed to enable it to be kept permanently switched to "Receive", without undue drain on the H.T. Batteries, throughout the hours of darkness, and also at stated intervals during the day, as may be ordered for test and administrative purposes.

1.5 Knobs and Controls.

The set is operated with three knobs. The Regeneration control is at the left of the front panel, main tuning dial knob in the centre, and knob for switching off and to "Receive" or "Send" at the right. The main tuning dial has a scale numbered 0—100. These figures are not frequency calibrations.

1.6 Aerials.

1.6.1. *Aerials Dipole No. 1.* Special dipole aerial and reflector, which is fitted to the top of any pole cut to a diameter of $2\frac{1}{4}$ inches for the top five inches. The aerial and reflector rods are detachable. A special aerial lead 40 feet long is provided.

1.6.2. *Rhombic Aerial.* Details and layout of the Rhombic aerial are as shown in Fig. 3. Any suitable poles may be employed, those recommended are Poles, Telegraph, Wood, 17-ft. Mk. 11.

1.7 Aerial Connections.

Connections for the aerials are mounted on the top of the carrying case and comprise two sockets for Dipole Aerial and a pair of terminals with earthing strap and terminal for use with Rhombic aerial.

The two Dipole sockets give the choice of employing either a single turn of the aerial coil, or the whole of the coil. This is provided so that maximum range may be obtained. For normal working the socket marked "normal" should be used, but when signals are weak the Dipole may be connected to the socket marked "special".

1.8 Wavemeter.

The Wireless Set No. 17 Wavemeter is of the absorption type with calibrated scale. (See Fig. 1 and Chapter 4).

Frequency range is 44.0 to 61.0 Mc/s.

1.9 Charging Equipment.

This is of the switchboard type designed to charge up to 30 2V. accumulators from a searchlight generator. (See Fig. 6 and Chapter 5).

1.10 Weights and Dimensions.

1.10.1. Transceiver complete with headphones, hand microphone and H.T. battery.

With L.T. battery 2V. 75 Ah 50 lbs.

With L.T. battery 2V. 16 Ah 40 lbs.

Dimensions approx. 16" high, 15" wide, 9 $\frac{1}{2}$ " deep.

1.10.2. Wavemeter 3 lbs. 6 ozs.

Dimensions approx. 8" long, 5" wide, 6" deep, including projections.

1.10.3. Aerial Dipole No. 2 including lead-in but excluding pole, 12 lbs.

CHAPTER 2

OPERATING PROCEDURE

2.1 General.

2.1.1. The set is provided for passing short verbal messages.

As you can only speak in one direction at a time, you must switch to "receive" after sending a message to hear whether the other station has understood. You cannot interrupt as with an ordinary telephone.

Remember that conversations on these sets are not secret. They can be intercepted at distances considerably beyond the working ranges.

There is usually a control station in each group of stations working together. Other stations in the group work on the same frequency as the control stations. Frequencies are allotted by R. Signals.

The control station often needs to pass messages to several stations at once i.e. to broadcast. Speech and pronunciation must therefore be clear, and operating procedure correct, to avoid waste of time.

If you are receiving a message, write it down if possible, to ensure repeating it correctly to the person for whom it is intended.

If you are sending a message allow time for the other fellow to write it down.

2.1.2. Observe the following rules:—

(a) If you are a detachment in a group working to a control station do not, except in emergency or to pass important information, call up control. He must call you first.

(b) If you have to call control, listen first to make perfectly sure he is not working with another detachment. If you break in you will cause confusion and delay.

(c) Do not call another detachment. You must pass messages for another detachment through the control station unless he gives you special permission to work direct.

(d) You must not "chat" with other stations. It wastes time and discloses information.

(e) If you follow these simple rules you will avoid jamming the whole group.

2.1.3. When passing messages:—

(a) Say each word distinctly—do not shout or speak quickly.

(b) Read your message in suitable phrases, not one word at a time.

(c) If necessary, say a word and then spell it using the following

phonetic alphabet:—

A—Ac	J—Johnnie	S—Sugar
B—Beer	K—King	T—Toc
C—Charlie	L—London	U—Uncle
D—Don	M—Monkey	V—Vic
E—Edward	N—Nuts	W—Willie
F—Freddie	O—Orange	X—X-ray
G—George	P—Pip	Y—Yorker
H—Harry	Q—Queen	Z—Zebra
I—Ink	R—Robert	

(d) Read figures separately and precede them by the word "figures", thus—20—figures two owe, not twenty. Pronounce them :—

1—Wun	6—Six
2—Too	7—Sev-en
3—Thr-r-ee	8—Ate
4—Foer	9—Niner
5—Fife	0—Owe

2.1.4. Use the following procedure phrases :—

"Message for You"	Meaning	Be prepared to receive a message.
"I say again"	"	Sender wishes to repeat a word, etc.
"Say again"	"	Receiver wishes sender to repeat.
"Report my signals"	"	For purposes of test.
"Hear you strength"	"	Reply to "report my signals".
"O.K."	"	Correct—Message received—understood (or reception satisfactory).
"Over" (at conclusion of transmission).	"	Switching over to receive and a reply is required.
"Off" (at conclusion of working).	"	Switching over to receive but an acknowledgment is <i>not</i> expected. <i>It does not mean switch off your set and go away.</i>

2.2 Strength of Signals

Indicate the strength of the signals you are receiving as follows :—

"Strength One"	Meaning	Unintelligible, speech impossible.
"Strength Three"	"	Just workable
"O.K."	"	Reception satisfactory.

2.3 Call Signs

(a) *Selection of Call Signs.*

Each station has a call sign to identify it, and to avoid giving away particulars of Units, etc.

Call signs consist of a letter followed by two figures, for example—R24 (Robert two four).

The letter and figures may be selected as desired, but should be allotted and co-ordinated on a divisional basis.

(b) *Pronunciation of Call Signs.*

Use the phonetic alphabet and figure pronunciations given in paragraph 2.1.3. (c) and 2.1.3. (d) e.g. call sign S21 is spoken as "Sugar two one", H25 as "Harry two five".

2.4 Method of Calling.

Take as an example six detachments working in a group in which R21 is the control station of the group working to the other five detach-

ments R22, R23, R24, R25 and R26. The wireless links between control station and detachments each use a different "link-sign" which will be the call sign of the detachment. The call sign of the control station is not used. The "link-sign" to be used when R21 (control) and R22 (detachment) are working together will be "Robert two-two"; and when R21 (control) and R23 (detachment) are working together, "Robert two-three", etc.

When two stations working together are not part of a group, the link-sign is the call sign of the junior station (or subordinate headquarters).

Begin every transmission with the word "Hallo" and follow it by the "link-sign". When the transmission consists only of O.K. you omit Hallo and use only the link-sign without it.

Finish all transmissions with "over", "off" or "wait".

In an initial transmission you repeat the link-sign immediately before you say "over".

Example i. Establishing Communication.

In establishing communication for the first time the Control Station will, exceptionally, call each detachment by the appropriate link-sign. (Normally in calling all stations Control Station uses only the link-sign of the senior detachment—see example later).

Control Station calls :—

"Hallo Robert two two, Robert two three, Robert two four, Robert two five, Robert two six, report my signals, Robert two two, Robert two three, Robert two four, Robert two five, Robert two six, over".

This should allow time for each detachment to tune his receiver accurately.

Replies.

Each detachment will answer in numerical order, i.e. the order in which he was called :—

R22 detachment replies :—

"Hallo, Robert two two, hear you strength three (or otherwise) Robert two two over".

Remaining detachments will answer in turn in the same way. If for example R24 does not answer when it is his turn R25 will wait ten seconds and then give his own reply. Control Station will call R24 separately after all have answered.

Control Station on hearing reports will reply as follows :—

"Hallo Robert two two, Robert two three, Robert two four, Robert two five, Robert two six, hear Robert two two strength three, Robert two three O.K., etc." (for each detachment).
"Robert two two, Robert two three, Robert two four, Robert two five, Robert two six off".

Example ii. Control Station (R21) calls one detachment (R23) as follows :—

Control. "Hallo Robert two three, report my signals, Robert two three over".

R23. "Robert two three, O.K. off".

Example iii. R23 has an important message for Control.

R23. "Hallo Robert two three, message for you, On target, Robert two three, over".

Control. "Robert two three, O.K. off".

When control station wishes to call several but not all detachments he calls each link in order of seniority.

Example iv. Control Station (R21) calls detachments R23, R24, R26 as follows :—

Control. "Hallo Robert two three, Robert two four, Robert two six, message for you. (Message) Robert two three, Robert two four, Robert two six, over".

R23. "Robert two three, O.K. off".

R24. "Robert two four, O.K. off".

R26. "Robert two six, O.K. off".

When Control Station wishes to call all detachments in the group he sends "all stations" followed by the link-sign of the senior detachment only.

Example v. Control Station calls all detachments in the group as follows :—

Control. "Hallo all stations Robert two two, message for you (Message) All stations Robert two two over".

R22. "Robert two two, O.K. off".

R23. "Robert two three, O.K. off".

R24. "Robert two four, O.K. off".

R25. "Robert two five, O.K. off".

R26. "Robert two six, O.K. off".

2.5 Repetitions and Corrections

Assume in Example *v* above that R24 has missed all the message. When it is his turn to answer he says :—"Robert two four, say again, over".

Control Station replies :—"Robert two four, I say again", and repeats the message.

R24 replies "Robert two four O.K. off".

If only part is missed R24 says :—

"Robert two four—say again all after (or all before) *or*—say again word after (or word before) *or*—say again from—to—".

The catchword must be one which will not cause confusion. It will be repeated by the sender.

Example. The message was "Six bombers flying northwest reported passing over Hull 1730 hours".

R24 heard only "reported passing over Hull 1730 hours".

R24 asks for repetition as under :—

"Robert two four, say again all before reported over".

R21 *Control Station replies* :—

"Robert two four—I say again all before reported—six bombers flying Northwest—over".

R24 replies :—

"Robert two four, O.K. off".

When one detachment wishes to call another he listens to make sure no other station in the group is working, and then sends his own link-sign followed by "message for" and the link-sign appropriate to the called station.

Example vi. R23 calls R25 as follows :—

R23. "Hallo Robert two three message for Robert two five (Message) Robert two three over".

Control. "Robert two three, off".

R25. "Hallo Robert two five, O.K. off".

Control. "Robert two five, off".

R23. "Robert two three off".

Note. If Control Station gives permission for detachments to communicate direct, the procedure is identical but transmissions by Control Station are omitted.

Remember—CLEAR-CUT, SNAPPY PROCEDURE.

NOTES

CHAPTER 3 OPERATING INSTRUCTIONS

3.1 General

Do not remove the set from the carrying case. If this becomes necessary get a skilled instrument mechanic of R. Signals or R.E.M.E. to do it.

Keep the back of the set securely closed and the set itself protected from damp.

3.2 Aerial Site

Select your aerial site carefully, an ideal site :—

- (a) is free from trees and overhead telephone wires.
- (b) has no high ground between your set and the distant station.
- (c) has no high building within 200 yards of the aerial in the direction of transmission.

If a good site cannot be found for the Aerial Dipole No. 1 you can increase the height of the pole to the full extent of the 40 feet aerial feeder, or take the set into a house and put the aerial on the roof. Either of these will improve transmission, and communication is much better with the aerial high above the ground.

In erecting the pole dig a small hole for the base and pack it round with road metal. Coat the end of the pole with tar or paint to prevent it rotting.

If you erect the pole against the end of a hut, make sure it is securely bolted to the hut with strong metal clamps. If stays are necessary, use wood or rope in preference to wire and keep them well below the aerial.

3.3 Erection of Aerials.

3.3.1. In assembling the Aerial Dipole No. 1 proceed as follows :—

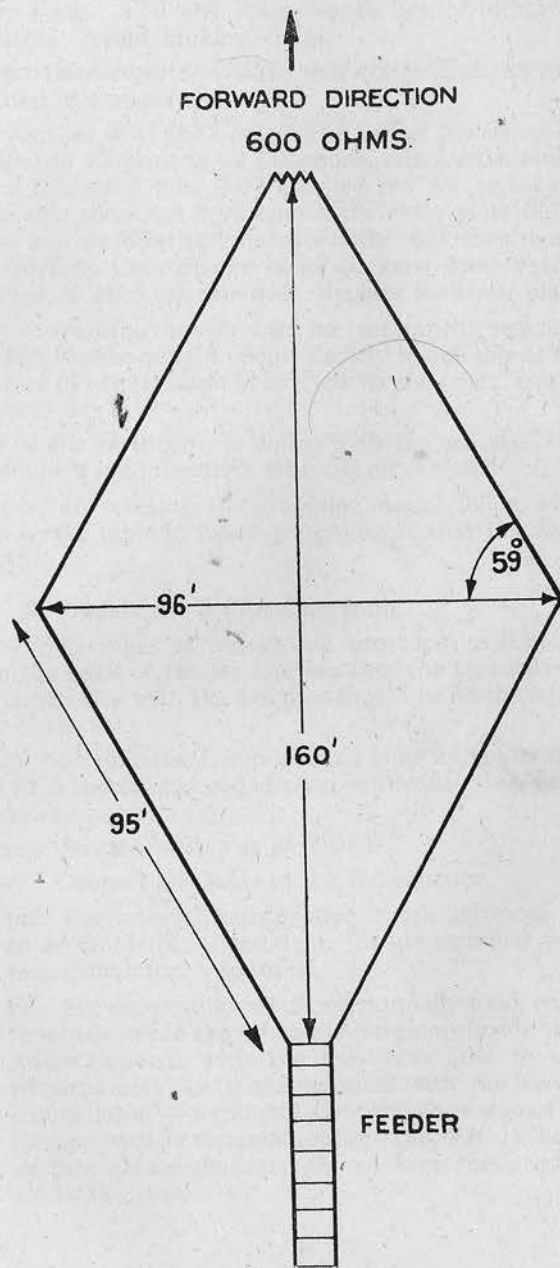
Remove the round cover plates, secured by two screws, at each end of the long aerial tube. Take care not to lose the rubber washers (or the screws).

Screw the four numbered rods into the corresponding numbered sockets on the ends of the main tube, forming a broad letter H. You will find a number on each rod and socket.

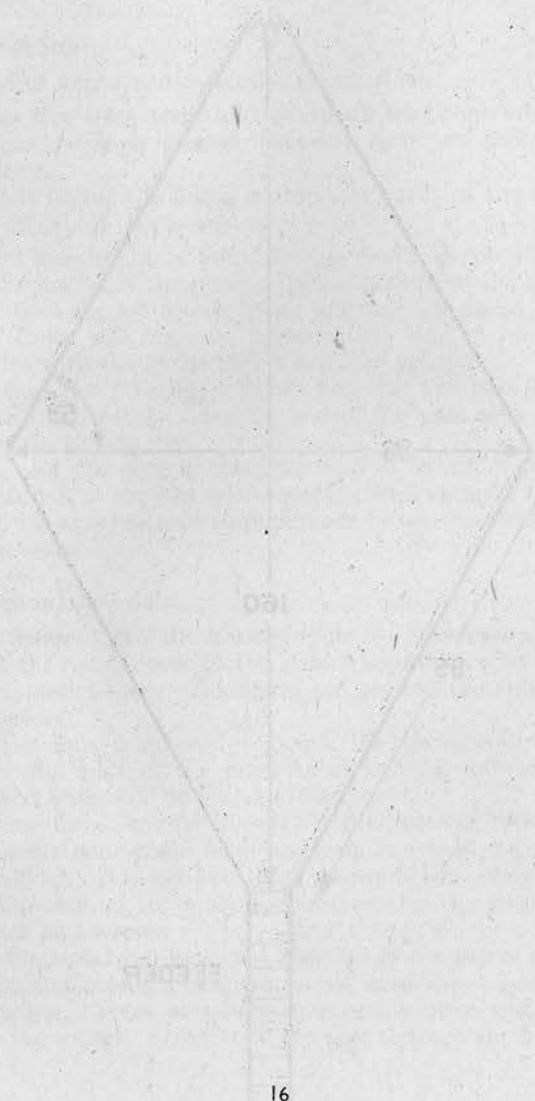
Do not use force—gently does it—and adjust the rods so that the flattened inner ends come level and can be joined together by the screws provided. (Do not lose these screws either—they are important). After making these connections replace the rubber washers, cover plates and screws.

Attach the aerial you have put together to the top of a pole about 20 feet long and having a diameter of not more than $2\frac{1}{4}$ inches for the top five inches. (Some aerials have an angle piece with holes in it welded to the socket. Screw it to the pole through the holes).

DETAILS OF RHOMBIC AERIAL FOR
W.T. SET No. 17 MK.2.



NOTES ON RHOMBIC AERIAL



Bind the aerial lead to the pole with string 18 inches below the aerial and at intervals of about 4 feet to prevent it rubbing, or receiving a direct pull. Do not cut the aerial lead, or add a length to it. This is important. Coil any spare length lightly in turns about 2' 6" diameter. Avoid kinking.

Erect the complete aerial so that the red painted end points in the direction of transmission.

If your set is at the Control Station, or the centre of a group and required to transmit in all directions, remove the two rods from the end of the aerial tube NOT painted red, i.e. remove the reflectors. To do this you must first remove the cover plate (do not forget the screws and washers) and disconnect the rods, then remove them from their sockets. Cork up the holes (sockets) from which the rods are removed, to keep the rain out. Replace the cover plate.

If you are using the reflectors, for transmitting in a definite direction try swinging the aerial to point slightly to one side or the other of the direction of transmission before you fix the pole. You may get better results.

Drive the earth pin, provided with the set, well into the ground and connect it to the earth terminal on the set.

3.3.2. In erecting the Rhombic Aerial follow closely the data given in the table in figure 3 and ensure that the aerial is correctly directed.

3.4 To Prepare the Set for Operation.

(I) Two types of valves are provided, A.R.6. and A.R.P.18. Open the back of the set and see that the two valves are in place. The large valve with the five pins should be on the left looking at the back of the set.

(II) See that the Lamp Tuneon is in its holder and screwed up fully (it is a small flat ended neon bulb which does not light but acts as a safety resistance).

(III) See the switch is at "OFF".

(IV) Connect the leads to the accumulator.

(a) For internal accumulator, spade terminal with *red* sleeve to accumulator + terminal. Spade terminal with *black* sleeve to accumulator - terminal.

(b) For external accumulator, normally used, connect the spade terminals inside the set to the terminals inside the cabinet. The spade terminal with the *red* sleeve goes to accumulator + terminal and the spade terminal with the *black* sleeve goes to accumulator - terminal. Connect the external accumulator to the appropriate terminals outside the case. When you are using an external accumulator do not keep the internal accumulator inside the case.

- (v) Connect leads to the H.T. battery as shown in figure 4.
- (vi) Set the aerial coupling coil halfway in line with the other two coils.

3.5 To Connect the Aerial

(I) When using the Aerial Dipole No. 1 connect the plug at the end of the aerial feeder to the socket on the set cabinet marked "Normal" and see that the earthing strap is connected to the right hand terminal marked Rhombic. Push the plug in carefully and make certain that the terminals clamping the earthing strap are screwed down tight.

(II) When using the Rhombic Aerial disconnect the earthing strap from the Rhombic terminal and connect the two ends of the feeder to the terminals marked Rhombic. Screw terminals down tight and make sure that the earthing strap is kept clear of the Rhombic terminals.

3.6 To Receive Signals.

- (I) Turn the S.R./OFF switch to "Receive".
- (II) Turn regeneration control fully anti-clockwise.
- (III) Turn main dial until speech from the distant station is heard, advancing the regeneration control if necessary.
- (IV) Adjust the regeneration control until maximum strength of signal is obtained.
- (v) Lock the main dial by means of the locking device.

3.7 To Transmit Signals.

- (I) Turn switch to "Send".
- (II) Press down the switch on the hand microphone. Speak with a loud (not shouting) voice. You should hear this faintly in your own telephones.

3.8 Final Adjustments.

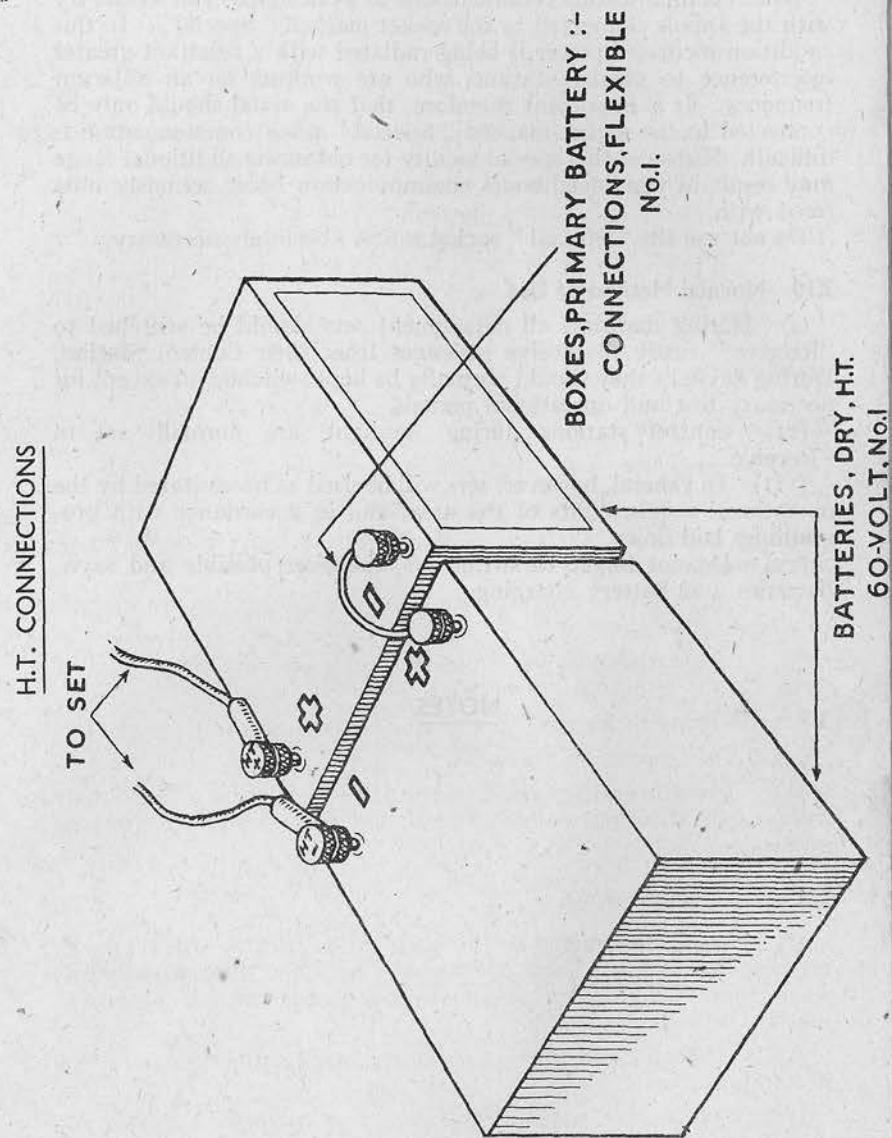
(I) Minor adjustments to the coupling coil (para. 3.4.(vi)) may improve speech. Try these but do not play about unnecessarily and waste time. The distant station will tell you if you have improved matters or not.

(II) You may also have to make minor adjustments to this coil if you replace valves.

(III) When detachments' sets have been correctly adjusted and dials locked, do not alter adjustments.

(iv) Control Station operators may have to make minor dial adjustments after switching to "Receive" but should return to original adjustment when at "Send".

Fig. 4



3.9 Choice of Dipole Sockets.

When communication is difficult due to weak signals you should try with the Dipole connected to the socket marked "Special". In this condition increased power is being radiated with a resultant greater interference to nearby stations who are working on an adjacent frequency. It is important therefore, that the aerial should only be connected to the socket marked "Special" when communication is difficult. Misuse of this special facility for obtaining additional range may result in your neighbours communication being seriously interfered with.

Do not use the "Special" socket unless absolutely necessary.

3.10 Normal Method of Use.

(I) During darkness all detachment sets should be switched to "Receive" ready to receive messages from their Control Station. During daylight they should normally be kept switched off except for necessary test and operational periods.

(II) Control stations during daylight are normally set to "Receive".

(III) In general, however, sets will be used as necessitated by the operational requirements of the area, and in accordance with programmes laid down.

(IV) Do not forget to switch off whenever possible and save batteries and battery charging.

NOTES

NOTES

CHAPTER 4

WIRELESS SET NO. 17 WAVEMETER

4.1 Accuracy

The wavemeter "Frequency—Dial reading" conversion chart is only accurate when the wavemeter is in its correct position in relation to the set.

4.2 Frequency Adjustment.

To set the transceiver to a given frequency :—

(a) Ascertain from the wavemeter chart, the wavemeter dial reading for the frequency required, and set the dial accordingly.

(b) Place the wavemeter in its working position, inside the set in the following manner :—

(i) Open the back flap of the set.

(ii) Turn the wavemeter on its side, panel to the right, and wooden projection facing into the set.

(iii) Insert the wavemeter as far as it will go (about $1\frac{1}{2}$ "') into the centre compartment of the transceiver chassis, i.e. between the two valves (See Fig. 5.). The wooden projection on the wavemeter fits between the two upright aluminium screens. The wavemeter is now in its working position.

(c) Switch set to "Send"—rotate the *transceiver tuning dial* slowly until the maximum glow is observed in the wavemeter lamp. Lock the dial. The set is now tuned to the desired frequency.

4.3 To Net a Group of Stations on One Frequency.

Netting is important for good working. Do it carefully and quickly.

Tune the Control Station set by the method in 4.2. above.

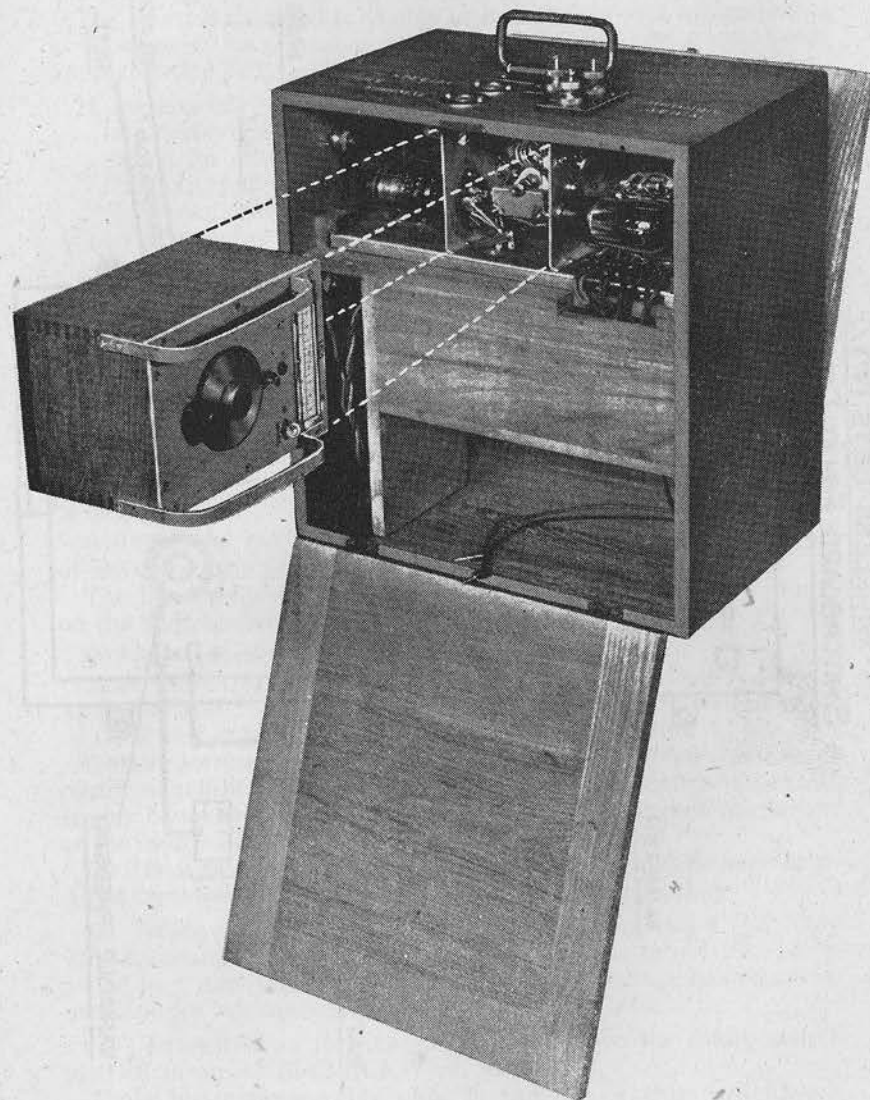
Then transmit a call from the Control Station as in Chapter 2, para. 2.4., Example i.

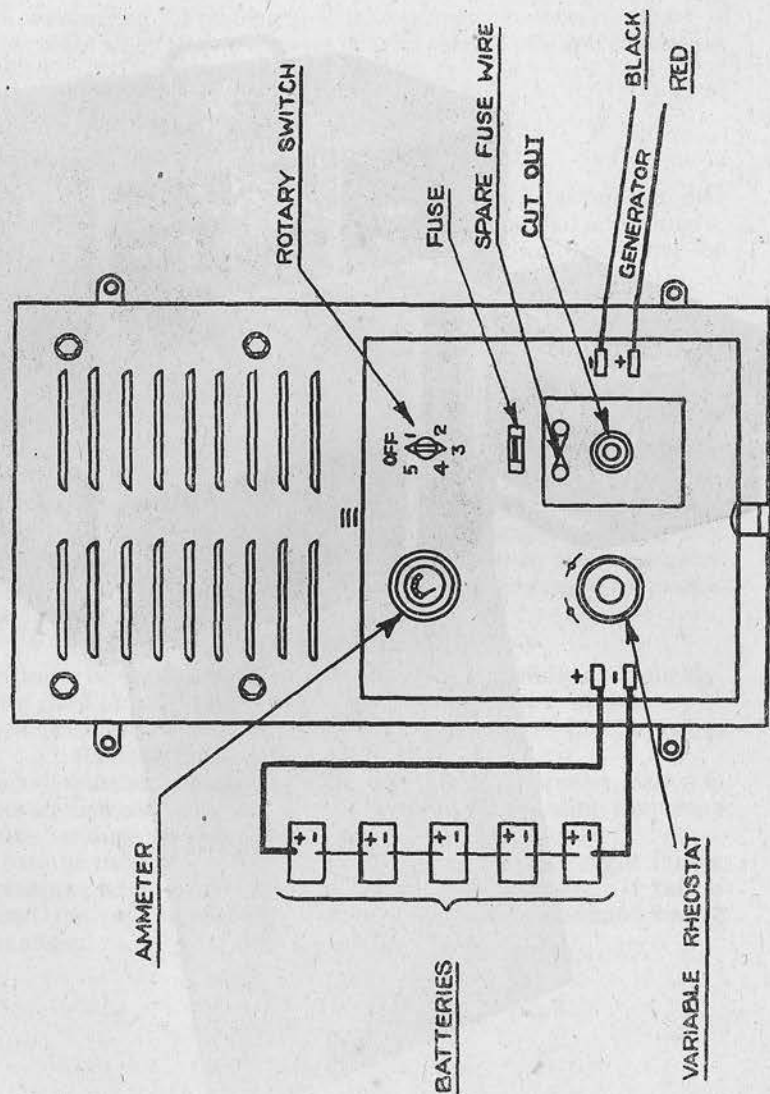
Each detachment tunes his set as explained in Chapter 3, para.3.6. All detachments should then be found to be on the same frequency for both sending and receiving, as the Control Station.

It may be necessary for the Control Station to make slight tuning adjustments when receiving from certain detachments. If this is required the original dial setting must always be resumed before transmission.

Fig. 5

SET AND WAVEMETER





WIRELESS SET NO. 17 :—SWITCHBOARD CHARGING

5.1 General Description.

The board is designed to charge from 6 to 30 2-volt accumulators at 10 amperes max. from a searchlight generator giving current at approximately 80V.

It consists of

- Series resistances which can be varied by a rotary 5 position switch for coarse adjustment and by a variable resistance for fine adjustment.
- An Ammeter to indicate the charging current.
- A reverse current cut out to prevent the accumulators discharging through the Generator if it accidentally stops.
- A protective fuse, the holder of which is removed by sliding to the right and *not* pulling.

5.2 Instructions for Use.

(a) Connect the two 30 foot leads between the Switchboard and the Generator, positive terminal to positive terminal and negative to negative. The Red lead is connected to positive and the Black to negative.

(b) Connect the accumulators by the leads provided, positive of one cell to the negative of the next and so on.

The free positive terminal is connected to the positive terminal on the Switchboard and the negative to the negative. (See Fig. 6).

(c) See switch is OFF and start the Generator.

Move switch to position 1 and push in button on cut out when Ammeter should show a reading. If reading is reversed switch again to OFF and check battery and generator connections.

Obtain correct charging rate, i.e. 10 Amps, by adjustment of rotary switch in clockwise direction, and by the variable resistance. It may be necessary to push in the cut out switch at each movement of the rotary switch.

(d) During charge, the current will fall. It should be kept at 10 Amps by adjusting the Switchboard controls as necessary.

(e) When voltage of the cells reaches approximately 2.35v. they will be gassing freely. At this point, the charging rate should be reduced to 5 Amps, and kept there till the cell voltage has remained constant for approximately 2 hours at about 2.6v.

(f) To switch off the charging current move the rotary switch to OFF in an ANTI-CLOCKWISE direction.

These instructions apply only to the use of this Switchboard when charging cells of 50 Ah capacity and above.

OPERATORS' MAINTENANCE

It is strictly forbidden for anyone but an instrument mechanic, R. Signals or R.E.M.E. to remove the transceiver chassis from the case.

6.1 Tests.

	Indicator lamp when fitted	Sound in Phones
Switch at "Send"	On	Operator's voice
Switch at "Receive"	On	Mush (H.F. hiss).

When a dummy aerial is used it should be fitted into the dipole aerial socket. With switch at "Send" the lamp should glow and the brightness of the glow vary on speaking into the microphone.

6.2 Controls.

The operator should report at once any faults he may notice whilst using the set such as:—

- (i) Knobs becoming hard to turn.
- (ii) Backlash or occasional failure of slow motion control.

6.3 Faults

Weak or intermittent signals or loud cracklings may be due to a simple fault which can be easily corrected by the operator:—

- (i) Make sure aerial plug is pushed home into its socket.
- (ii) Check L.T. leads are making proper contact on both battery and set, also spades inside set.
- (iii) Check H.T. battery voltage, and see that plugs are making proper contact. If voltage has fallen below 85 volts the battery should be replaced.
- (iv) If no improvement change L.T. Battery.
- (v) If still no improvement, replace set and send faulty set for repair.

All leads and plugs should be examined weekly to ensure connections are clean and leads not damaged.

6.4 Aerial Gear

Aerial gear must always be cleaned when it is dismantled. The threaded portions of aerial assembly should be wiped down with a paraffin rag and lightly greased.

MAINTENANCE OF ACCUMULATORS

7.1 Instructions.

- (i) Read carefully the makers' instruction on the outside of the accumulator.
- (ii) Keep the outside of the accumulator clean and dry.
- (iii) Keep accumulator terminals clean and well covered with vaseline.
- (iv) Keep the electrolyte at the correct level by topping up with distilled water.
- (v) Never add undiluted sulphuric acid to correct the specific gravity.
- (vi) If electrolyte is spilled, the accumulator must be filled up with electrolyte of the correct specific gravity to be ascertained from the label on the battery.
- (vii) If after charging, the specific gravity is below the correct figure, the nearest Ordnance workshop should immediately be asked for advice.
- (viii) Remove the vents before charging, replace vents after charging, and wipe the accumulator clean.
- (ix) Avoid naked lights or smoking near cells on charge or an explosion may result.
- (x) Once an accumulator has been charged, it will only remain in a healthy condition if given continuous work.

IT MUST NEVER REMAIN IN A DISCHARGED STATE.

CHAPTER 8

TECHNICAL DESCRIPTION

8.1 General Description

Wireless Set No. 17 is a two valve, battery operated, ultra-short wave transceiver.

8.2 Circuit.

With the switch in the "Receive" position the first valve acts as a self-quenched super-regenerative detector, and the second as an audio amplifier feeding the 'phones. In the "Send" position the second valve acts as a speech amplifier, fed by the hand microphone, and plate-modulates the output of the first valve, which in this position functions as a radio frequency oscillator feeding power to, instead of picking up voltage from, the aerial. The circuit diagram is given in Fig. 8, and a list of components in Table 1 facing Page 32.

8.3 Aerial Systems.

Two aerial systems can be used. The first a half-wave current fed dipole with reflector, connects through a 40-ft. concentric cable and socket to either of the two dipole sockets situated on the top of the cabinet. The second is a Rhombic aerial which connects through its feeder to the two terminals marked "Rhombic" also on the top of the cabinet. A terminal and earth link is provided for disconnecting the normal earth from Rhombic terminals. The aerial coil is adjustable and consists of three turns of 14 gauge wire. The coil is tapped at one turn and connected to the Dipole socket marked "Normal", the whole of the coil is connected to the Dipole socket marked "Special" and to the two terminals marked "Rhombic".

8.4 Batteries.

H.T. is normally supplied by two 60v. batteries in series in the lowest compartment of the case, and the filaments of the valves are heated either by a 16 Ah 2-v. accumulator which fits into the vertical space at the side of the case, or for more prolonged use by an external 75 Ah 2-v. accumulator.

8.5 Valves.

V.1. is A.R.6., and V.2 is A.R.P. 18.

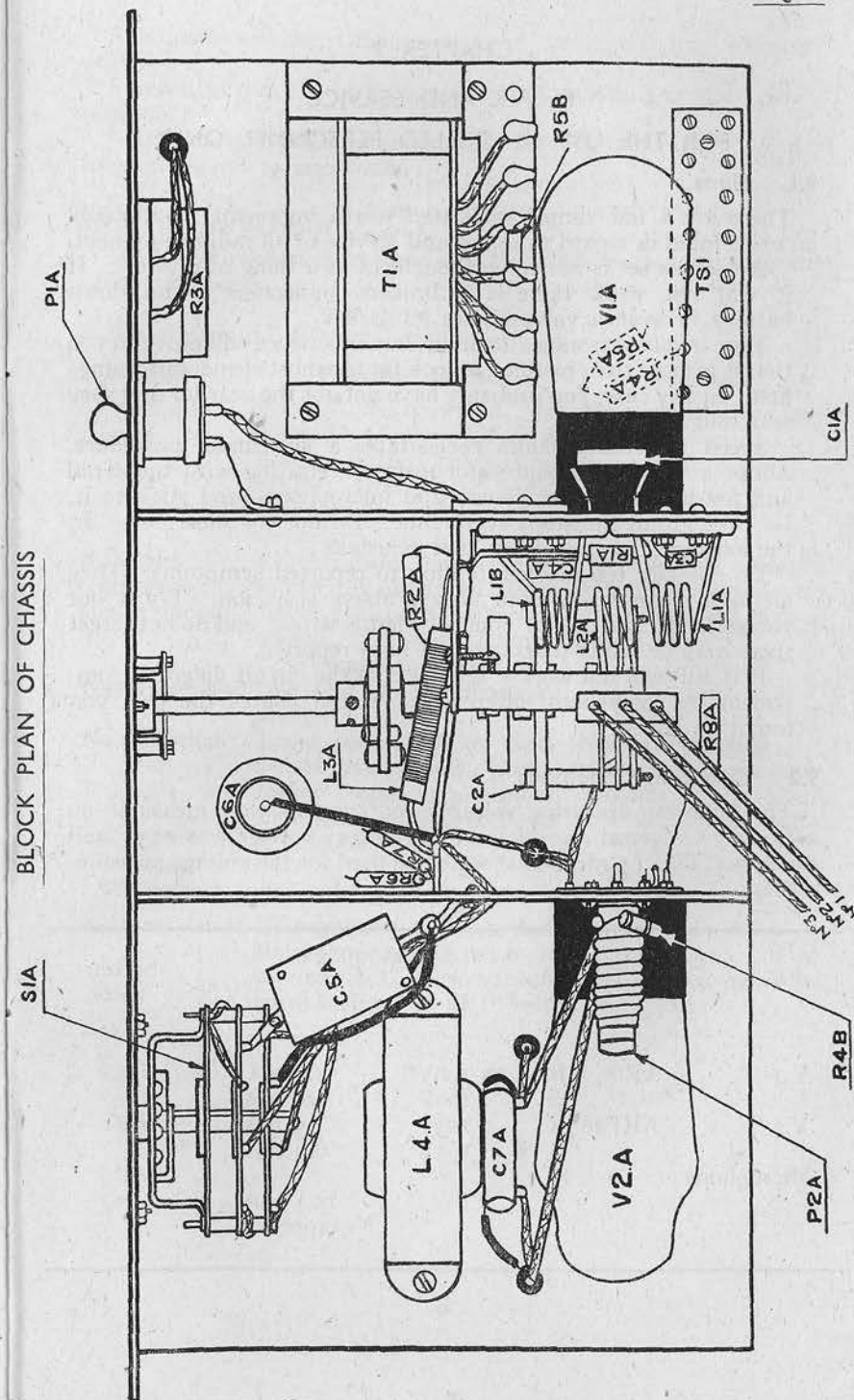
8.6 Frequency Range.

The set covers a frequency range 44 to 61 mc/s. The dial is marked in degrees 0—100; at 100 the vanes of the tuning condenser should be fully meshed.

Owing to the appreciably different functions performed by the valves in the "Receive" and "Send" positions, a slight change in frequency occurs on switching from and to the other. This should not exceed 5 dial divisions.

8.7 Power Output.

The power output of the set when used as a transmitter is about 0.3 watts. It is thus obvious that care should be taken in the selection of the site, not neglecting to avoid where possible any high land between stations. Ideally, the sending and receiving aerials should be visible from each other.



CHAPTER 9

REPAIR AND SERVICE

FOR THE USE OF SKILLED PERSONNEL ONLY

9.1 Hints.

There are a few simple rules well worth impressing continually on one's mind in regard to repair and service of all radio equipment.

A wireless set is not to be thought of as a thing of mystery. If it will not work there is a broken connection, a run down battery, or even a valve not in its socket.

More involved troubles do occur, but experience will prove to you that it is more than justified to look for the most elementary things first. In any case, you probably have not got the gear for any very searching analysis.

Speed in tracing faults necessitates a systematic procedure. Adopt a logical procedure—for instance, starting with the aerial and finishing with the phones and microphone—and stick to it. Go through all the steps every time. Do not try short cuts. In the long run they are snares and delusions.

Do not pay too much attention to reported symptoms. They are well meaning, but not always above suspicion. Try it out yourself, and find out for yourself what is wrong, and do not forget there may be faults that have not been reported.

If it still will not work a reference to the circuit diagram, component by component, often helps remind you of the part you forgot to check.

9.2 Operating Conditions.

The following operating voltages and currents were measured on a Model 7 Universal Avo-Meter. The battery voltage was 115v. and the 1000v. D.C. (.5 megohms) scale was used for the voltage measurements.

Valve	Type	Anode		Screen Volts	
		Volts	Current		
V.1	AR6	R	25-100V*	1.0 mA	
		S	100V	16 mA	
V.2	ARPr8	R	115V	1.5 mA	110V
		S	105V	6.0 mA	
Microphone		R			110V
		S		15. mA (approx.)	

R indicates that the ' Off-Receive-Send ' switch is in the " Receive " position.

S indicates that the ' Off-Receive-Send ' switch is in the " Send " position.

* This variation occurs on rotating the " Regeneration " control from minimum to maximum.

9.3 Analysis of Faults.

The following table lists some of the possible faults with suggested causes and cures.

With switch in " Receive " position.

Fault	Possible Causes	Remarks
No sound in phones	Phones disconnected or shorted. Valve filament broken. Battery connection broken. Open circuit audio transformer, primary or secondary.	Make continuity check Check voltage at valve holders
No super-regenerative hiss in phones.	Regeneration control not sufficiently advanced. Condenser C.1 open or disconnected. R.2 open circuit. Low emission from V.1	Check switch contacts. Filament voltage must not be allowed to drop below 1.8V.
Weak reception	One half of V.2 filament broken	
No reception.	Loose set screws on condenser drive spindle. Aerial feeder open or short circuited. Coupling coil out of position.	Normal operating position is shown in diagram.

With switch in " Send " position.

No transmission Microphone disconnected. Microphone switch not making contact. " No reception " faults. Low H.T. volts

Fault	Possible Causes	Remarks
Weak transmission.	One half of V.2 filament open circuit	As a rough check of output, unscrew the dial light P.1 and connect it between the centre pin and flange of the dipole socket. With the coupling coil half way engaged the lamp should glow fairly brightly. A 6V c.04amp. dial light should glow faintly with the coupling coil almost clear of the tuned windings. If V.2 filament has burnt out, check the tuneon bulb and see that it is tightly screwed into its socket. It functions as a surge voltage limiter.
Poor quality speech	Low L.T. or H.T. Too tight aerial couplings. Low emission. Disconnected Audio transformer	

NOTES

TABLE I.

<i>Schematic Reference</i>	<i>Value</i>	<i>W.O. Cat. No.</i>	<i>Designation</i>
P2A		ZA 0608	Bulbs, Tuneon No. 1
P1A		WB 0068	" 3.5 volt, K
L4A		ZA 1159	Chokes, A.F., No. 26
		ZA 16963	" A.F., No. 26A <i>or</i>
		ZA 16964	" A.F., No 26B <i>or</i>
L3A		ZA 1161	" R.F., No. 32
C6A	40mfd.12 volt	ZA 1451	Condensers, 40, A <i>or</i>
	50 ,, 12 ,,	ZA 1739	" 50, C
C4A	.002 mfd	ZA 1462	" R.2, G <i>or</i>
		ZA 1516	" R.2, J
C7A	.002 ,,	ZA 11184	" R.2, R
C5A	.004 ,,	ZA 2257	" R.4, B
C1A	.0001 ,,	ZA 1439	" X.1, J <i>or</i>
	.0001 ,,	ZA 1678	" X.1, U <i>or</i>
	.0001 ,,	ZA 15304	" X.1, AL
C3A	.0003 ,,	ZA 1452	" X.3, E <i>or</i>
	.0003 ,,	ZA 11190	" X.3, L
C2A	25 p.f.	ZA 1453	" variable, Y.25, A
L1A-B		ZA 15013	Inductances, U.H.F. No. 6
L2-A		ZA 15014	" " " 7
R7-A	100 ohms	ZA 6132	Resistors, No. 6
R3-A	50,000 ,,	ZA 6118	Resistances, variable, No. 5
R8-A	1,000 ,,	ZA 6424	Resistors, No. 3A $\frac{1}{2}$ watt
R6-A	2,000 ,,	ZA 6516	" " " "
R4A-B	50,000 ,,	ZA 6346	" " " "
R5A-B	500,000 ,,	ZA 6437	" " " "
R2-A	2 megohms	ZA 6471	" " " "
R1-A	3,000 ohms	ZA 6021	" No. 3B "
S1-A		ZA 6111	Switches, rotary disc, 6 pole, 3 pos. No. 1
T1-A		ZA 6153	Transformers, intervalve, A.F. No.9 <i>or</i>
		ZA 16966	" " " No.9a <i>or</i>
		ZA 16967	" " " No.9b

WIRELESS SET N°17 MK II SCHEMATIC DIAGRAM

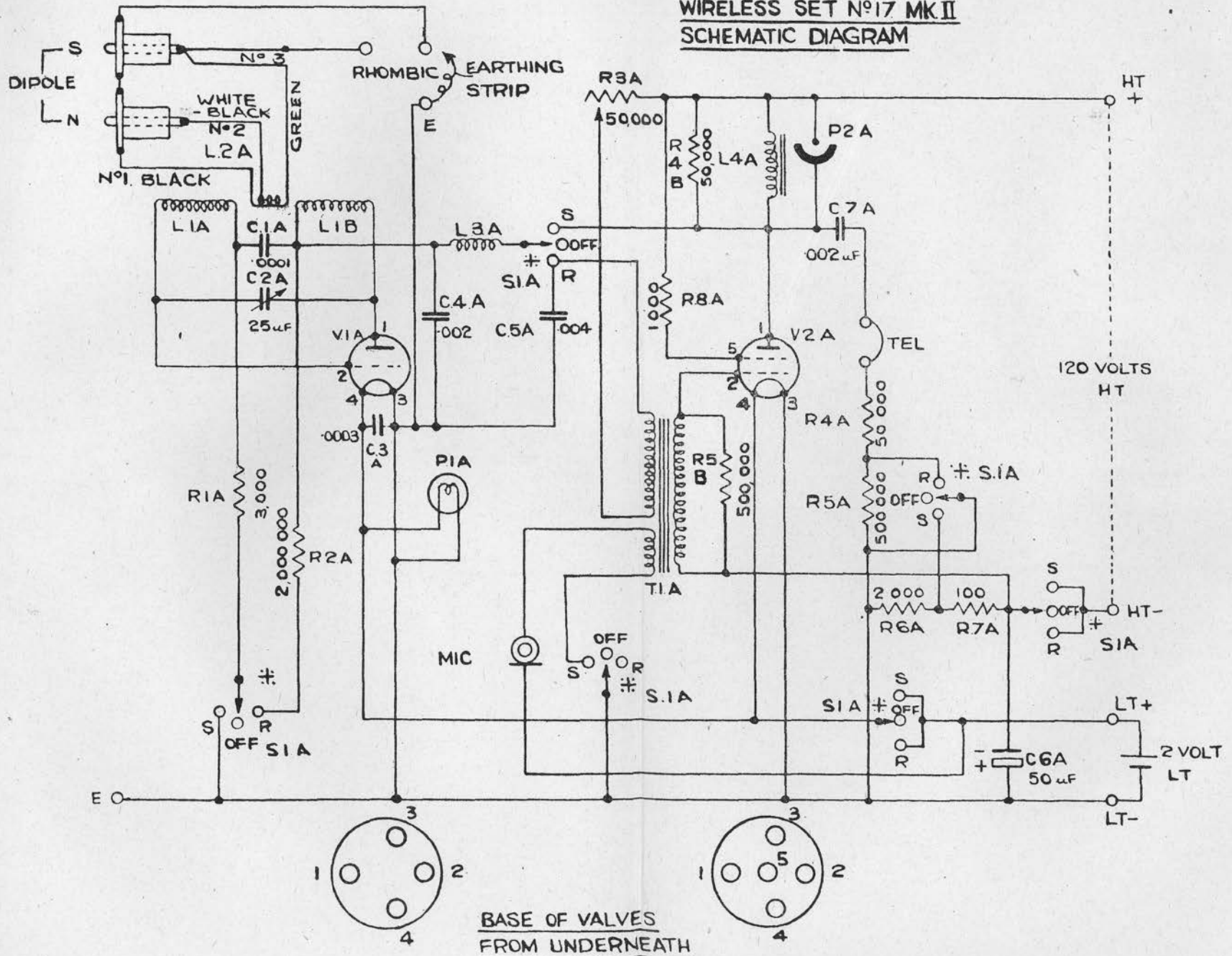
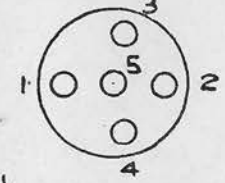
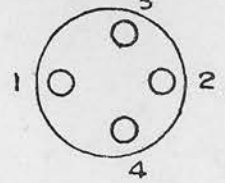
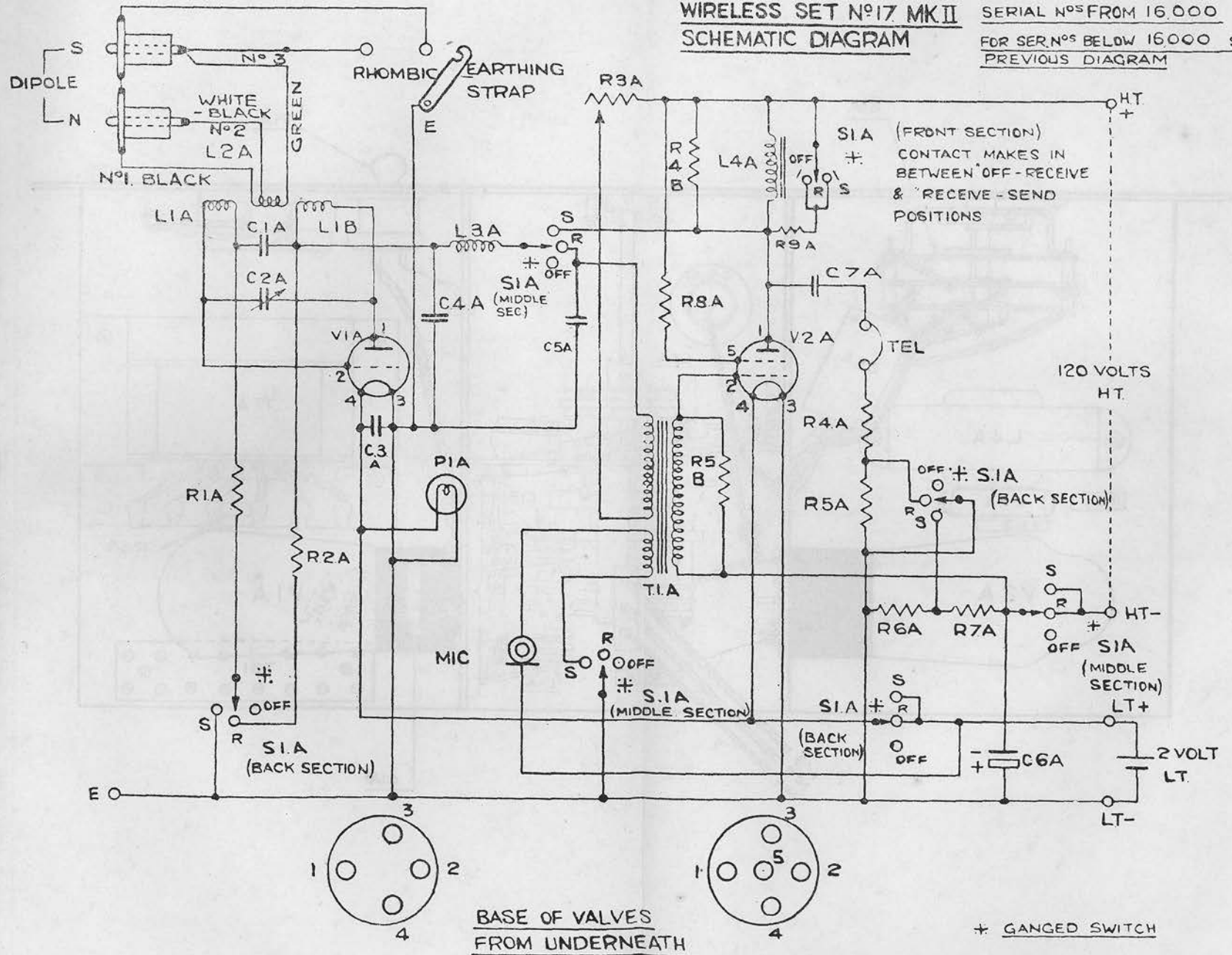


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L ₄ A		ZA 1159	Chokes, A.F., No. 26
		ZA 16963	„ A.F., No. 26A <i>or</i>
		ZA 16964	„ A.F., No 26B <i>or</i>
L ₃ A		ZA 1161	„ R.F., No. 32
C ₆ A	40mfd.12 volt	ZA 1451	Condensers, 40, A <i>or</i>
	50 „ 12 „	ZA 1739	„ 50, C
C ₄ A	.002 mfd	ZA 1462	„ R.2, G <i>or</i>
		ZA 1516	„ R.2, J
C ₇ A	.002 „	ZA 11184	„ R.2, R
C ₅ A	.004 „	ZA 2257	„ R.4, B
C ₁ A	.0001 „	ZA 1439	„ X.1, J <i>or</i>
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C ₃ A	.0003 „	ZA 1452	„ X.3, E <i>or</i>
	.0003 „	ZA 11190	„ X.3, L
C ₂ A	25 p.f.	ZA 1453	„ variable, Y.25, A
L ₁ A-B		ZA 15013	Inductances, U.H.F. No. 6
L ₂ -A		ZA 15014	„ „ „ 7
R ₇ -A	100 ohms	ZA 6132	Resistors, No. 6
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R ₉ -A	5,000 „	ZA 6425	„ „ „
R ₄ A-B	50,000 „	ZA 6346	„ „ „
R ₅ A-B	500,000 „	ZA 6437	„ „ „
R ₂ -A	2 megohms	ZA 6471	„ „ „
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WIRELESS SET N°17 MK II
SCHEMATIC DIAGRAM

SERIAL N°S FROM 16.000
 FOR SER. N°S BELOW 16.000 SEE
 PREVIOUS DIAGRAM



BASE OF VALVES
FROM UNDERNEATH

+ GANGED SWITCH

