

RESTRICTED

The information given in this document is not to be communicated either directly or indirectly to the Press or to any person not authorised to receive it.

USER HANDBOOK  
*for*  
RECEPTION SET R.216

WARNING

When this equipment is operated on an AC supply the voltage employed is sufficiently high to endanger human life. Every reasonable precaution has been observed in design to safeguard operating personnel. Do not tamper with supply leads and switch the power supply off before removing connectors.

In case of electric shock refer to the inside front cover of this handbook.

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# First aid in case of electric shock

1. PROTECT YOURSELF with dry insulating material.
2. BREAK THE CIRCUIT by opening the power switch or by pulling the victim free of the live conductor.

DON'T TOUCH VICTIM WITH YOUR BARE HANDS until the circuit is broken, BUT DON'T WASTE TIME.



3. (a) Lay patient face down with head to one side, arms bent and forehead on his hands, to keep mouth and nose clear.  
(b) Give one or two firm thumps with flat of hand between his shoulders.  
(c) Kneel at his head, one knee near the head and your other foot alongside the elbow.  
(d) Place your hands on his shoulder blades with thumbs touching on the mid-line and fingers pointing towards his feet. See A.
4. Bend forward with arms straight and apply your weight lightly, counting "One, Two and Three" Time,  $2\frac{1}{2}$  seconds. See B.
5. (a) Release pressure gradually and slide your hands to grip him just above his elbows, counting "Four".  
(b) Draw his arms and shoulders towards you by leaning backwards with arms straight till you feel resistance, but without lifting his chest off the ground, counting "Five, Six, and Seven". Time,  $2\frac{1}{2}$  seconds. See C.
6. Lay his arms down and slide your hands on to the shoulder blades, counting "Eight".
7. Repeat with rhythmic rocking 9 times to the minute.
8. When breathing is re-established omit the back pressure and continue the arm raising and lowering alone, at the rate of 12 times to the minute, counting "One, Two, and Three": arm raising, "Four, Five, and Six": arm lowering.
9. While Artificial Respiration is continued, have someone else:-
  - (a) Loosen patient's clothing.
  - (b) SEND FOR DOCTOR.
  - (c) Keep patient warm.
10. DO NOT GIVE LIQUIDS UNTIL PATIENT IS CONSCIOUS.



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SYNOPSIS

The Reception Set R. 216 is a high grade lightweight superheterodyne receiver intended for general purpose reception in the high frequency - very high frequency band 20 to 155 megacycles. It includes facilities for the reception of CW, MCW and RT (AM or FM).

The reception set may be operated on an AC supply of 100-125 or 200-250 volts or on a 24 volt DC supply, separate AC and DC power units being available.

The receiver unit and both power units are hermetically sealed and are suitable for pan-climatic use.

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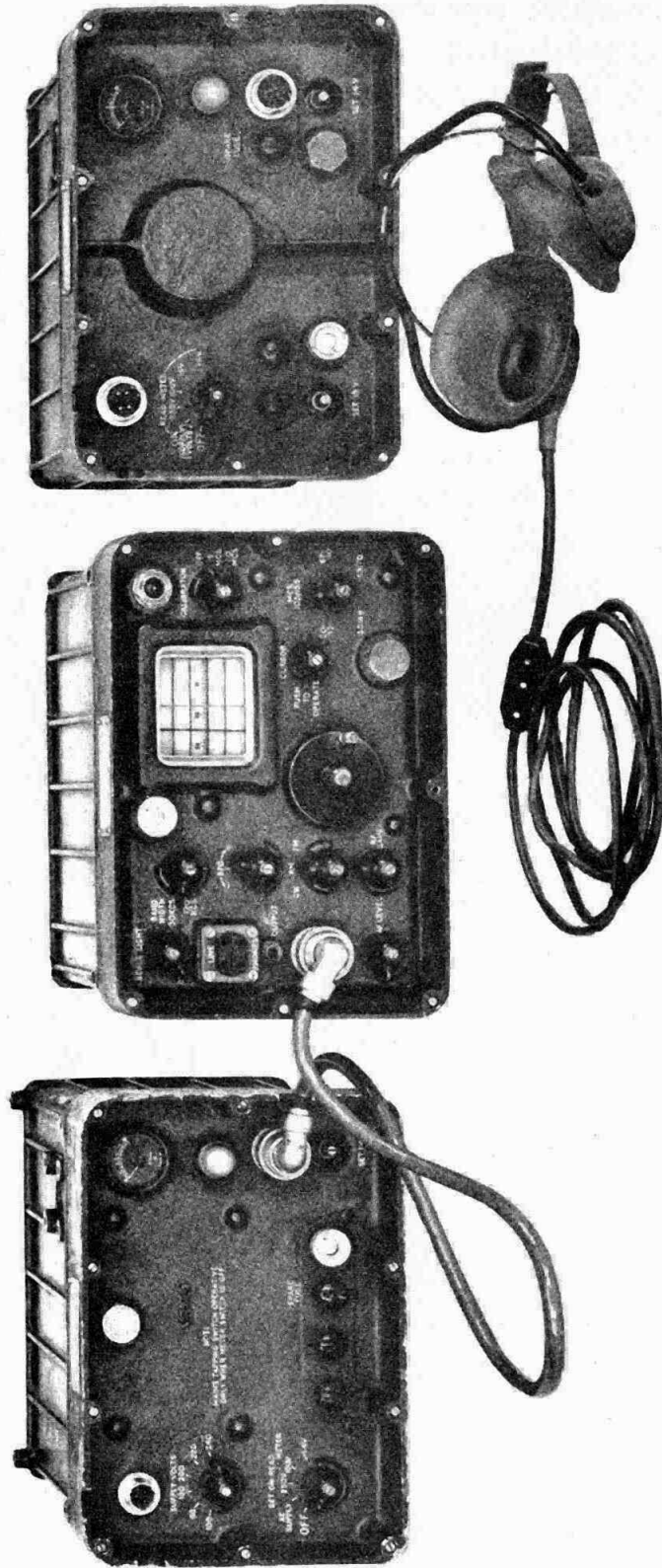


FIG. 1 - RECEPTION SET R. 216 WITH AC AND DC SUPPLY UNITS

ILLUSTRATIONS

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USER HANDBOOK  
for  
RECEPTION SET R.216

CHAPTER 1 ... .. GENERAL DESCRIPTION

1. Purpose and facilities

The Reception set R.216 is a lightweight high grade HF and VHF super-heterodyne receiver built on miniature lines and intended for general purpose use. Facilities are provided for the reception of CW and MCW, and of RT (amplitude modulated or frequency modulated). Two alternative power supply units are available, an AC unit which operates on voltages between 100 - 125 or 200 - 250 at 45 - 65 c/s, and a DC unit which requires a nominal 24 volts.

Hermetically sealed construction renders the receiver unit and the two supply units waterproof and airtight, any internal moisture being absorbed by built-in desiccators. Hence the reception set may be used in extreme tropical or arctic conditions. Its light weight, small size and relatively low consumption make it suitable for incorporation in vehicle, ground or man-portable stations in forward areas.

A specially designed frequency scale enables the receiver to be tuned to a high degree of accuracy to any transmitter from which signals have previously been received. By this means, the use of a separate wavemeter or calibration chart is avoided. The receiver requires separate headphones (Receivers headgear ITE double No. 1B or similar) which are plugged into a two-pin socket on the front panel. Sockets are also available for the transmission of signals to a line circuit. A coaxial socket on the front panel provides an IF output for use with an alternative type of detector.

The three units are shown in fig. 1. In this illustration a Connector miniature 12-point No. 6, 39 inches, connects the AC supply unit to the receiver. The headgear assembly is provided with a two-pin snatch plug which enables the headgear to be rapidly disconnected from its lead. When the headgear assembly is not in use it should be stowed in the signal satchel provided for the purpose.

A brief technical description of the receiver unit, together with a block schematic diagram is given in Section 8 on pages 12 and 13.

2. Frequency range

The frequency range covered by the receiver is nominally between 20 Mc/s and 155 Mc/s in five alternative bands as follows:-

Band 1	-	19 to 30.5	Mc/s	(extreme coverages)
"	2	- 29.5	" 47	"
"	3	- 45	" 69	"
"	4	- 67	" 103	"
"	5	- 100	" 157	"

The tuning scale is calibrated in megacycles per second for each band.

The intermediate frequency of the receiver is 4.86 Mc/s.

3. Performance

(1) Audio output

The audio output stage is designed to give up to 50 mW into a 600 ohm balanced line for 150 ohm headphones.

(2) Sensitivity

Frequency range in Mc/s	Noise figure (db) Not greater than -
19 to 30	6
30 to 46	8
46 to 68	10
68 to 101	11
101 to 157	12

Maximum output of approximately 50 mW is obtainable from signals giving a 20 db signal-to-noise ratio.

(3) Selectivity

Two alternative bandwidths are provided, as shown in the following table. They are selected by means of the bandwidth switch.

Band	Width	Panel Engraving
Narrow	±15 kc/s at -6 db.	30 kc/s
Wide	±60 kc/s at -6 db.	120 kc/s



(4) Audio characteristics

Response between 400 c/s and 3,000 c/s is flat to  $\pm 3$  db relative to one kilocycle.

(5) Frequency modulation characteristics(a) Output deviation

This is constant within  $\pm 3$  db with deviations up to 40 kc/s.

(b) Limiter

The output is constant within 2 db with input levels between 5  $\mu$ V and 1 volt.

(6) Frequency stability characteristics(a) Temperature change

Frequency variation is of the order of 40 c/s per megacycle per degree centigrade.

(b) Warm-up

The reception set settles down very rapidly. After 15 minutes warm-up the frequency drift during the following hour should be of the order of 200 c/s per megacycle.

(c) Power supply change

With a change of plus or minus ten per cent in the power supply to the receiver, the frequency does not vary by more than 300 c/s per megacycle.

(d) Input level change

At 50 Mc/s the frequency variation for an input change from 1  $\mu$ V to 100 mV does not exceed 100 c/s.

(e) Re-setting accuracy

This is such that after changing bands and rotating the tuning control to its end stop and back, a previously tuned signal at 150 Mc/s can be re-set with the gain control at zero.

4. Controls and connections

Controls and connections, all of which are located on the front panels of the three units, may be identified by means of figs. 2, 3 and 4 and the following three tables. Controls on the receiver unit have the prefix "A" while those on the AC and DC supply units are prefixed "B" and "C" respectively.

RECEIVER UNIT CONTROLS AND CONNECTIONS

Fig. 2 ref.	Item	Description
A.1	SCALE LIGHT switch	Brightness control for frequency scale lamps.
A.2.	BANDWIDTH switch	Two-position switch to provide for 120 kc/s or 30 kc/s bandwidth.
A.3.	BFO control	Capacitor for adjustment of note frequency.
A.4.	Desiccator	Contains a drying agent and an indicator which is turned pink by the presence of residual moisture in the unit.
A.5.	Tuning dial	Illuminated frequency scales with fixed and movable cursors.
A.6.	Aerial input plug	Plug termination for coaxial aerial connector.
A.7.	CALIBRATOR switch	Three-position switch, two alternative crystal positions and OFF.
A.8.	Band switch	Five-position turret switch selecting the five alternative frequency bands and controlling the frequency scale lamps.
A.9.	Cursor control	Rack and pinion drive for the movable black cursor.
A.10.	Dummy plug	Plugs an orifice used when drying out the unit. This screw must not be removed by the operator; it is for workshop use only.
A.11.	Tuning control	Variable capacitors geared through a reduction drive to the frequency scale by means of a worm and pinion.

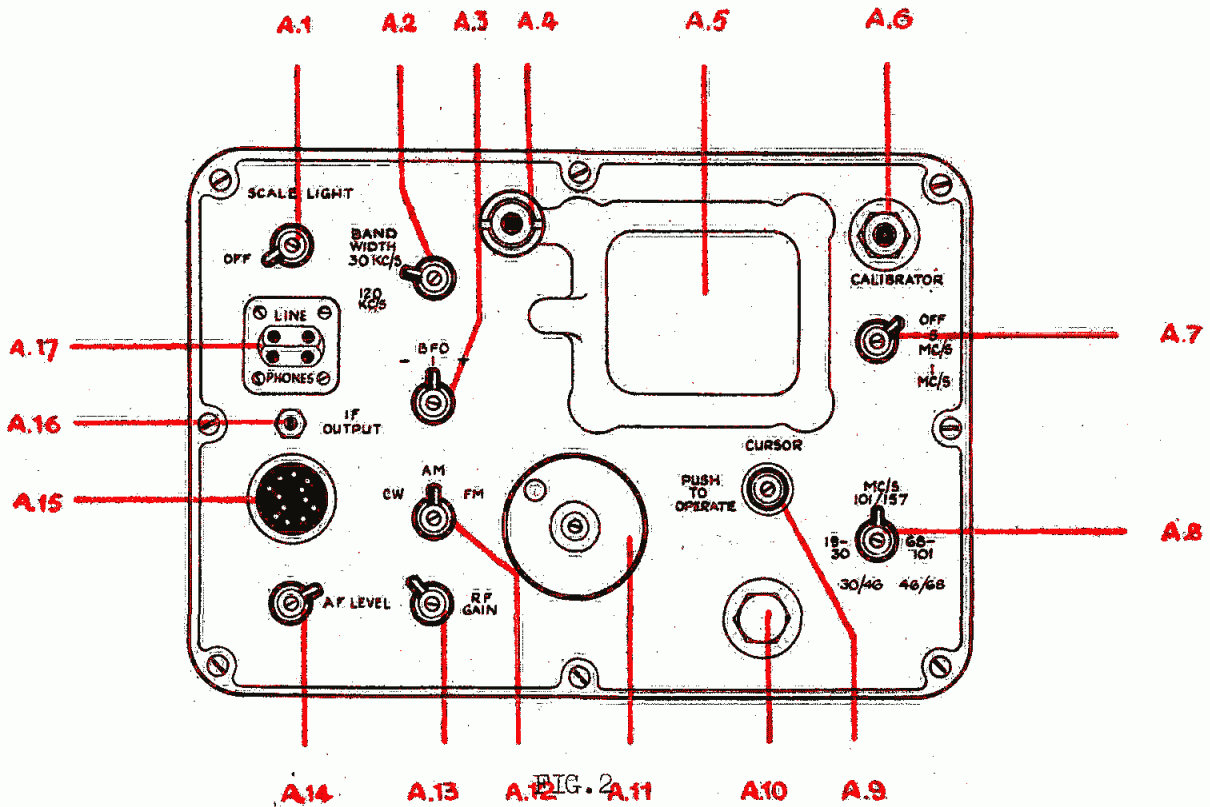


Fig. 2 ref.	Item	Description
A.12	CW-AM-FM switch	Three-position system switch; CW position switches in BFO, AM and CW positions switch in additional AF amplifier.
A.13	RF GAIN control	Adjustable resistor for control of RF and IF amplification.
A.14	AF LEVEL control	Variable resistor for output level adjustment.
A.15	12-way plug	Miniature Mk.4 plug for power supply input and earth connection through Connector Min. 12-pt. No.6, 39".
A.16	IF OUTPUT socket	Coaxial socket termination
A.17	LINE/PHONES sockets	Two two-pin moulded rubber output sockets.



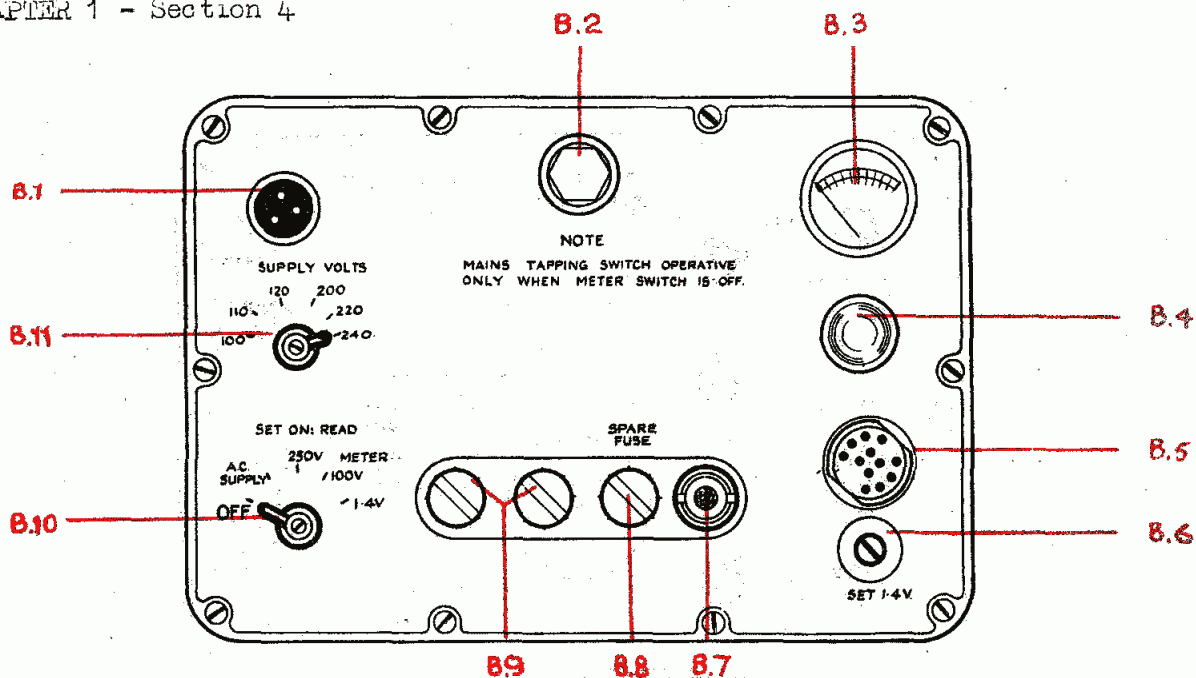


FIG. 3

AC SUPPLY UNIT CONTROLS AND CONNECTIONS

Fig. 3 ref.	Item	Description
B.1.	Three-way plug	Mains input plug for connection to supply.
B.2.	Dummy plug	Plugs an orifice used when drying out the set. This screw must not be removed by the operator; it is for workshop use only.
B.3.	Meter	Measures input, HT and LT voltages.
B.4.	Pilot lamp	Red indicator lamp which lights when the power supply unit is switched on.
B.5.	12-way socket	HT, LT and grid bias output to receiver; and receiver earth connection.
B.6.	SET 1.4 V	Adjustment for 1.4-volt supply.
B.7.	Desiccator	Contains a drying agent and indicates the presence of residual moisture in the unit.
B.8.	Fuse	Spare fuse.
B.9.	Fuses	Two one-amp input fuses.
B.10	Meter switch	Five-position switch.
B.11.	SUPPLY VOLTS switch	Six-position switch to match the unit to the supply voltage.

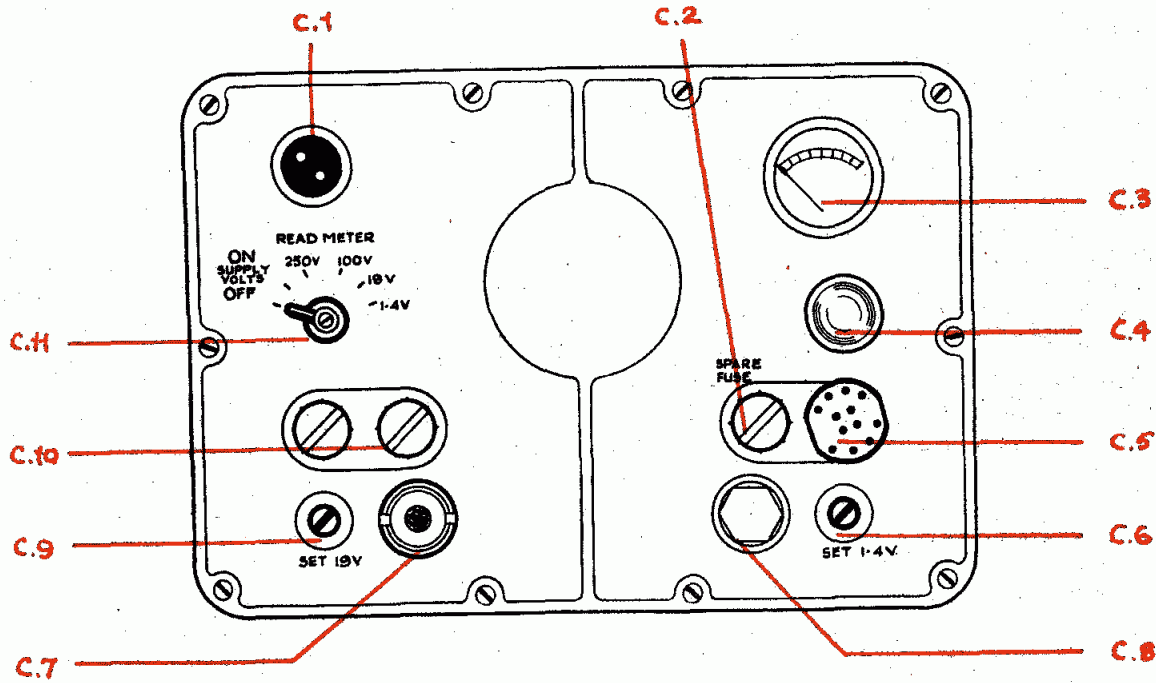


FIG. 4.

DC SUPPLY UNIT CONTROLS AND CONNECTIONS

Fig. 4 ref.	Item	Description
C.1.	Two-way plug	DC input plug for connection to batteries.
C.2.	Fuse	Spare fuse.
C.3.	Meter	Measures HT and LT voltages.
C.4.	Pilot lamp	Red indicator lamp which lights when the power supply is switched on.
C.5.	12-way socket	HT, LT and grid bias output to the receiver, and the receiver earth connection.
C.6.	SET 1.4V	Adjustment for 1.4-volt supply.
C.7.	Desiccator	Contains a drying agent and indicates the presence of residual moisture in the unit.
C.8.	Dummy plug	Plugs an orifice used when drying out the set. This screw must not be removed by the operator; it is for workshop use only.
C.9.	SET 19V	Pre-set control adjustment.
C.10.	Fuses	Two seven-amp input fuses.
C.11.	READ METER switch	Five-position meter switch.

5. Power supply and consumption(1) Two alternative supply units

Two alternative external power supply units are available for use with the receiver. One unit is intended for use with an AC supply at voltages between 100 and 125, or between 200 and 250, 45 - 65 c/s, obtained either from a mobile generator or from an AC mains source. The other unit requires a DC supply at a nominal voltage of 24 volts. Power units are housed in cases similar to that of the receiver unit, all controls and connections being arranged on the front panels. Output from either of these power supply units is taken to the receiver unit by means of cables in the 12-way connector which links the receiver to the supply unit in use. One type of supply unit may be substituted for the other without making any alterations to the receiver.

(2) AC supply unit

The designated title of the AC supply unit is Supply unit rectifier No.24. Fig1 shows this unit connected to the receiver. Controls and connections on the AC supply unit may be identified by means of fig.3 and the table on page 6.

(3) AC unit input voltages

The AC supply unit may be adjusted to take input voltages of 100, 110, 120, 200, 220 or 240 volts at a frequency between 45 and 65 c/s. Before the equipment is switched ON the SUPPLY VOLTS switch must be set to the position appropriate to the AC supply voltage, as instructed in Section 12(4) on page 20.

(4) AC unit output

Outputs to the receiver are as follows:-

Output	Volts	Current
LT (indirectly heated valves)	6.3	3.0 A
LT (directly heated valves)	1.4	0.4 A
HT (indirectly heated valves)	250	43mA
HT (directly heated valves)	100	26mA
Grid bias (RF and LF valves)	19	15 $\mu$ A
Dial lamps	19	0.3 A variable

A pre-set control on the front panel of the unit enables allowance to be made for the tolerances in the selenium rectifiers used in the 1.4-volt line.

(5) AC power consumption

Total power consumption of the reception set using the AC supply unit is approximately 60 watts.



(6) DC supply unit

The DC supply unit, designated Power supply unit No.45, is shown on the right-hand side of the receiver in fig.1. Controls and connections on the DC supply unit may be identified by means of fig.4 and the table on page 7.

(7) DC unit input voltages

DC input voltage is nominally 24 volts but a carbon pile regulator is fitted to enable the unit to work from any source of DC supply between 21 volts and 29 volts. This regulator controls the whole of the input to the supply unit and gives a constant output of 19 volts.

(8) DC unit output

LT output is 19 volts for indirectly heated valves which are in this case connected automatically in banks of three across the 19-volt line. 1.4 volts for the directly heated valves are obtained via fixed and pre-set dropping resistors from the 19-volt line. The transformer winding, copper-oxide rectifier and dial lamps are fed directly from the 19-volt line.

HT output of 250 volts is obtained in a rectified form direct from a synchronous vibrator. 100 volts is obtained from the synchronous vibrator via a selenium bridge rectifier.

(9) DC power consumption

The total battery drain of the reception set using the DC supply unit is nominally 2.5 amps at 24 volts. The 12-volt batteries provided with the apparatus are of 75 ampere-hour capacity.

(10) Meters and indicator lamps

Meters mounted on the front panels of each of the supply units enable output voltages to be checked by the use of the METER switches. On the AC supply unit the AC input voltage may be measured by means of the same meter and meter switch. A red warning lamp should glow when the power supply is connected to the unit and the METER switch is in the ON position, provided the supply unit is connected to the receiver.

(11) Fuses

Two fuses are incorporated in the input side of each power supply unit. These fuses are not interchangeable between AC and DC supply units; the fuses used with the AC supply unit are rated at one amp and those used with the DC supply unit are rated at seven amps. Four spare fuses are provided with each supply unit, one carried in the dummy fuse-holder on the panel and three in the spare parts case, and operators must ensure that working and spare fuses used with each supply unit are always of the correct value.

## 6. Aerials

### (1) Special purpose dipole aerials

The Reception set R.216 is intended primarily for operation with dipole aerials designed for special purposes.

### (2) Aerials for general purpose use

The receiver input circuit is designed to be most efficient when connected to an aerial having a resistive impedance of 80 ohms. For this reason a resonant dipole such as Aerial dipole No.4 may be used, and at the frequencies concerned (20 - 160 Mc/s.) an aerial of this type is not too cumbersome.

To determine the approximate length of aerial dipole use the following formula:-

$$\text{Length in feet of each half of dipole} = \frac{240}{\text{Frequency to be received in Megacycles per second}}$$

Efficiency of reception falls off fairly rapidly on both sides of the dipole resonant frequency and if the signals for which the operator is listening are very weak an aerial should be used which is resonant at the frequency concerned. With stronger signals this is not so important.

### (3) Rod aerials

When rod aerials are used their length for maximum efficiency should correspond to the length of half a dipole as calculated in paragraph (2) above. The length should be adjusted for each received frequency.

### (4) Tape aerials

A tape aerial has been designed for use with the Reception set R.216. It consists of a strip of metal tape with a scale setting, which can be continuously varied in length directly or by remote control to tune efficiently to any frequency between 20 and 160 Mc/s.

### (5) Aerial input

An aerial input plug (A.6) on the front panel of the receiver is for use with a coaxial cable having a resistive impedance of approximately 80 ohms. A suitable coaxial connector is provided with the equipment.

## 7. Construction

### (1) Die-cast cases

The receiver unit and both the power supply units are contained in die-cast cases similar to each other in size. The construction is such that all parts of the unit are supported from the front panels, the cases

themselves functioning only as sealed covers. When the reception set is in use the front panel should be elevated to facilitate the operation of the controls, and for this purpose two screws  $2\frac{1}{2}$  inches in length are provided. These screws (Screws  $3/8$ -inch 24 tpi, UNF.2A hex. hd.  $2\frac{1}{2}$ -inch long) should be inserted in the tapped holes on the underside of the panel flange, and locked with nuts.

(2) Receiver unit

The receiver itself consists of three sub-units which comprise respectively the RF unit, the IF-AF unit and the crystal calibrator unit.

(3) RF sub-unit

This unit supports the RF valves, the turret, the crystal mixer and the local oscillator, together with its associated neon HT stabiliser. Also on this sub-unit is fitted the specially designed frequency scale and drive assembly which is described in paragraph (6) below.

(4) IF-AF sub-unit

This unit consists of a single chassis on which are mounted all the components of the IF, detector and audio circuits.

(5) Crystal calibrator sub-unit

This unit contains a small chassis on which are mounted the two crystals and one oscillator valve. The front panel calibrator control (A.7 in Fig.2) actuates a switch in this unit.

(6) Frequency scale and drive assembly

The scale consists of an 8 ft. length of 70 mm. film with the five frequency band scales printed (in Mc/s) parallel to each other so that portions of all five scales are visible through the window on the front panel. Each frequency scale is illuminated by an individual lamp at the rear, the lamps being controlled by additional contacts on the range switch so that at any one time the operational range scale alone is illuminated. The brilliance of the dial light is controlled from zero to maximum by means of the SCALE LIGHT control. The drive mechanism of the scale is linked to the main tuning control by a system of gears, the reduction ratio of the tuning control to the condensers being 60 to 1. Over the frequency scale is a fixed red cursor, and also a movable black cursor which is controlled by a rack and pinion drive and which is used in conjunction with the crystal calibrator.

(7) Power supply units

These units are of conventional design and call for no special comment. The AC supply unit SUPPLY VOLTS switch incorporates an interlocking device which prevents this switch being adjusted whilst the supply unit is switched on at the METER SWITCH.

The DC supply unit is so designed that it will not function until it is connected to the receiver. This has been arranged to prevent damage to the carbon pile regulator and vibrator off load. Correct polarity must be



## CHAPTER 1 - Sections 7 - 8

observed in the connection between the DC supply unit and the DC supply or the reception set will not work. The negative side of the supply is earthed to the supply unit case and reversal of this polarity may cause damage to the set.

### (8) Desiccators

Removable desiccators are screwed into the front panels of the receiver and each supply unit. The purpose of the desiccator is to absorb residual moisture from the hermetically sealed case. When dry the indicating material inside the desiccator head is bright blue in colour, but after subjection to moisture it becomes pink. The indicator may be observed through a small window in the front of the desiccator.

### (9) Panel covers

A metal panel cover (Covers metal 12.1/4" x 7.3/4" x 9/16") is provided with each unit and should always be fitted over a panel when a unit is not in use, in order to protect the controls. The covers provided with the three units are identical and are suitably drilled to enable a spares case to be attached to each cover issued with a supply unit, or four spring clips when the cover is issued with a receiver. The spring clips (Clips type No. 80/00) are attached to the cover by means of No. 8 BA screws and nuts and secure the two 2 1/2-inch screws which are used to elevate the front of the receiver. The panel covers should be temporarily secured to the backs of the units when in operation.

### (10) Spares case:

A spares case (Cases spare parts 4" x 1.5/8" x 13/16") specially shaped to accommodate three fuses and three lamps is provided for attachment to each supply unit panel cover.

### (11) Weights and dimensions

The approximate weights and overall dimensions of the main items of equipment are as follows:-

UNIT	WEIGHT (lb.)	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)
Receiver unit	25	8 1/2	12 1/2	9
AC supply unit	20	8 1/2	12 1/2	9
DC supply unit	25	8 1/2	12 1/2	9

## 8. Brief technical description

Referring to the block schematic diagram of the reception set shown in fig. 5, it will be seen that the signal from the aerial is fed into two RF amplifiers (V1 and V2), the tuning of which is effected by means of the five-position range switch and the main tuning condenser. The gain of these stages is adjustable by the RF gain control.

A silicon crystal mixer is fed by the output from the second RF amplifier and also by the output from the local oscillator valve V3. The output from the mixer is taken to a four-valve IF amplifier (V6, V7, V8 and V10) which is tuned to 4.86 Mc/s and has alternative wide and narrow bandwidths controlled by a switch. Bias for the first three IF valves is controlled by the RF gain control. AVC is not used.

From the last IF amplifier (V10) the signal passes to the valve V11 which, in the case of AM reception, functions as a detector, the rectified output then passing through the noise limiter (V15) to an AF stage V14) and thence by way of the AF LEVEL control to the output valve V16. In the case of FM reception, however, the signal from the limiter (V11) is passed to the discriminator (V13) and then directly to the AF LEVEL control and the output valve V16. For the reception of CW the output from a beat frequency oscillator (V9) is fed to the grid of the fourth IF valve V10.

Following the third IF stage, provision is made for an external low impedance IF output from the valve V12 to enable an alternative type of detector to be used if the normal output facilities are inadequate - for example, when receiving a multi-channel signal.

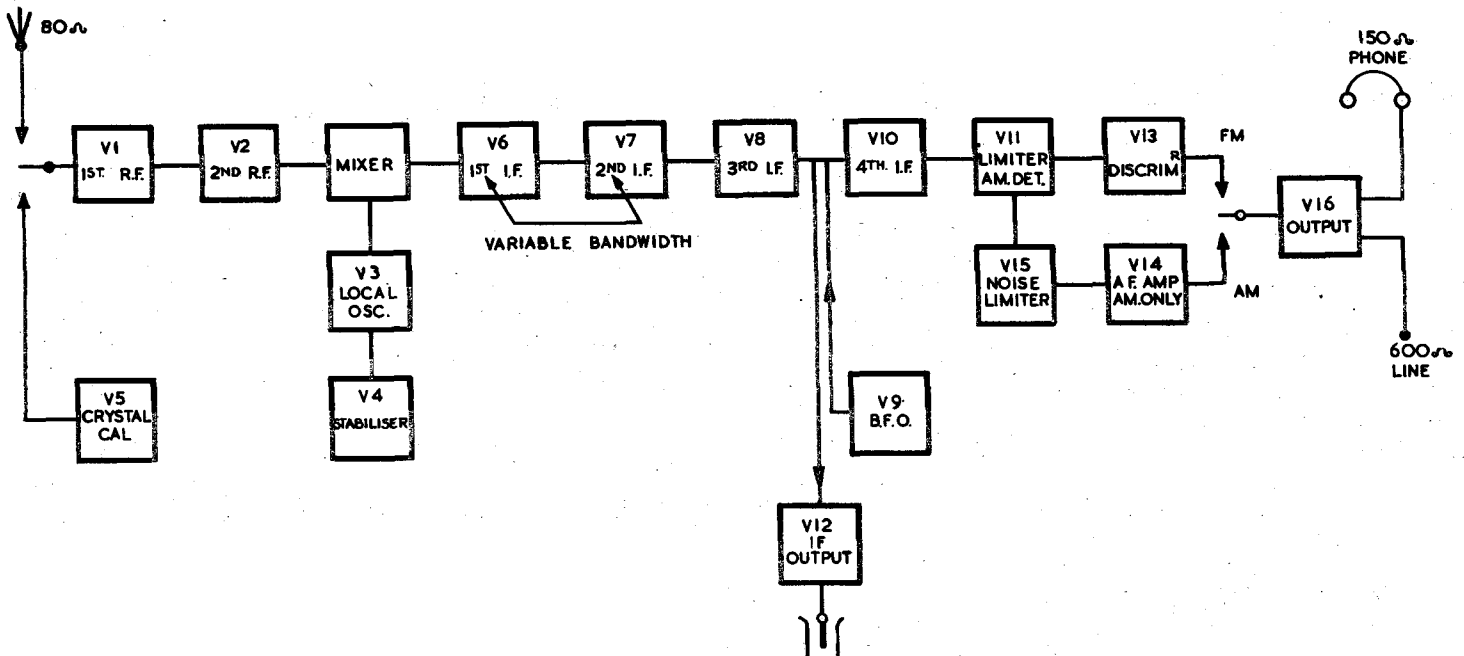


FIG.5 - BLOCK SCHEMATIC DIAGRAM OF RECEIVER UNIT

A built-in crystal calibrator (V5, XL.1 and XL.2) used in conjunction with the movable cursor enables the receiver to be tuned to any desired frequency with an accuracy within  $\pm 50$  kc/s at 150 Mc/s or within  $\pm 15$  kc/s at 30 Mc/s, these figures being within half a bandwidth for the wide and narrow band respectively. The method of operation is described fully in Chapter 2.

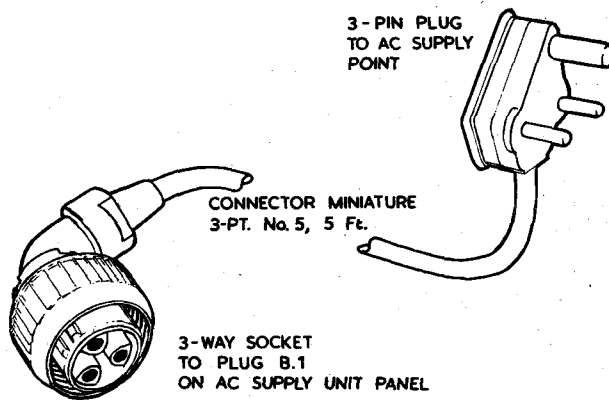


FIG. 6 - AC POWER SUPPLY CONNECTOR

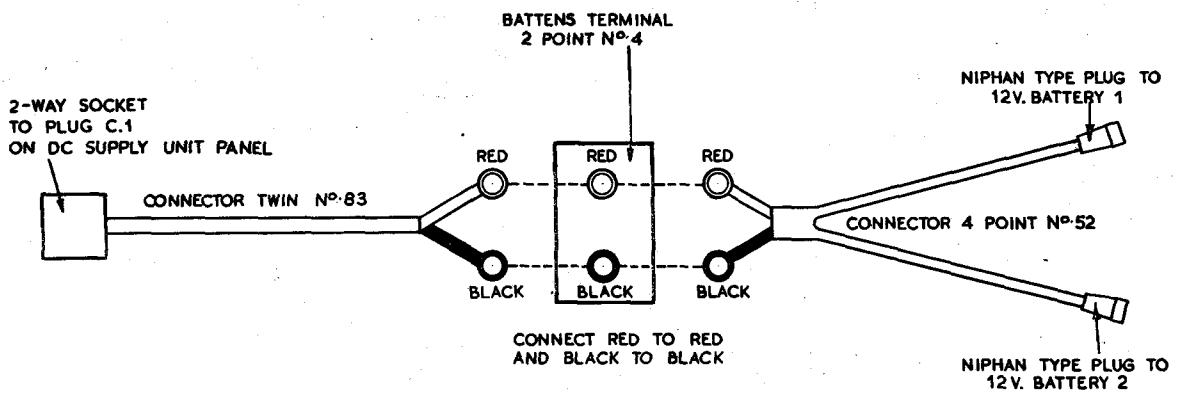


FIG. 7 - DC POWER SUPPLY CONNECTOR

**WARNING**

When this equipment is operated on an AC supply the voltage employed is sufficiently high to endanger human life. Every reasonable precaution has been observed in design to safeguard operating personnel. Do not tamper with supply leads and switch the power supply off before removing connectors.

A copy of the standard drill for the first aid treatment of electric shock is printed on the inside front cover of this handbook. Operators should know these instructions, and should also know the whereabouts of the mains switches controlling AC power to the equipment.

9. Electricity Supply - IMPORTANT

- (1) It is essential that the receiver is connected to the supply unit that corresponds with the power supplies available, i.e. the AC supply unit when power supplies are obtained from an AC mains source or mobile AC generator, and the DC supply unit when batteries supplying 24 volts are to be used. Check that the AC voltage is within the range 100 - 125 or 200 - 250 volts.

(2) AC supply

With every AC supply unit a Connector miniature 3-point No.5, 5-ft. is provided. This connector, which is illustrated in fig.6, has a socket termination at one end to fit the miniature Mk.4 input plug on the supply unit panel (B.1) and a plug at the other end to fit the AC socket at the source of supply. If this latter plug is not fitted, or if it has to be changed, ensure that the three inner cables are connected to the power plug in the correct manner, with the red lead to the small pin marked "L" or "RED", the black lead to the small pin marked "N" or "BLACK", and the green or yellow earth lead to the large pin marked "EARTH". In no circumstances must the green or yellow earthing lead be connected to one of the smaller pins, which must be used for the red and black wires.

(3) DC supply.

When the DC supply unit is to be used, assemble a special connector from Connector twin No.83, Connector 4-point No.52 and Battens terminal 2-point No.4. This connector is illustrated in fig.7, and the component parts are provided with the DC supply unit.

**ENSURE CORRECT POLARITY WITH THESE CONNECTORS**

The receiver will not work if this polarity is reversed. In addition a DC supply of incorrect polarity may cause damage to the reception set. Place the red terminations of the two connectors on the red pole of the terminal batten and secure with the terminal; connect the black terminations on the black pole and secure. The negative (-) side of the DC supply is earthed internally to the case of the DC supply unit.

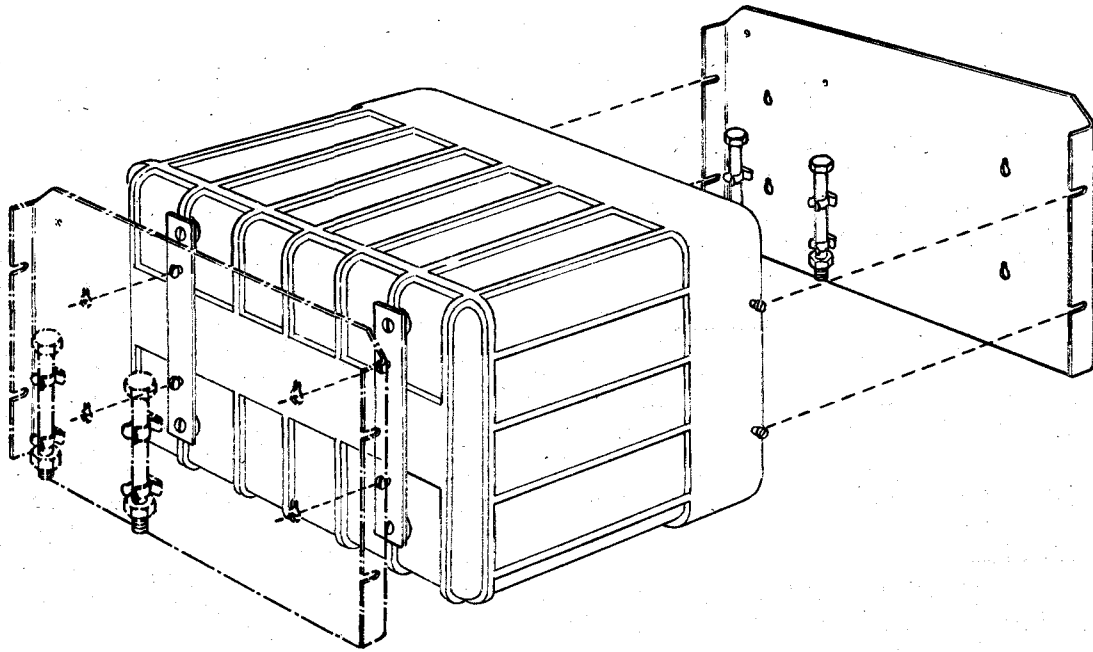


FIG.8 - REMOVING A PANEL COVER

10. Preliminary setting up instructions

- (1) Having ascertained what source of power supply is to be used, ensure that the correct power supply unit is installed for either AC or DC working.
- (2) When DC supplies are to be used and the DC power supply unit is installed, two 12-volt 75 Ah batteries are required. Install these batteries near the DC supply unit in a position which can be conveniently reached by the DC power supply connector.
- (3) Remove the metal panel cover from the front panel of the receiver unit, as shown in fig.8. Attach it to the back of the receiver by means of the slotted holes and four captive screws held on strips secured to the receiver. The two  $2\frac{1}{2}$ -inch elevating screws are now on the outside. Tighten the four captive screws to secure the cover to the back of the receiver.
- (4) Remove the similar cover from the panel of the supply unit which is to be used, and attach it to the back of the supply unit. The spares case, which should remain attached to the supply unit cover, is now on the outside and easily accessible.



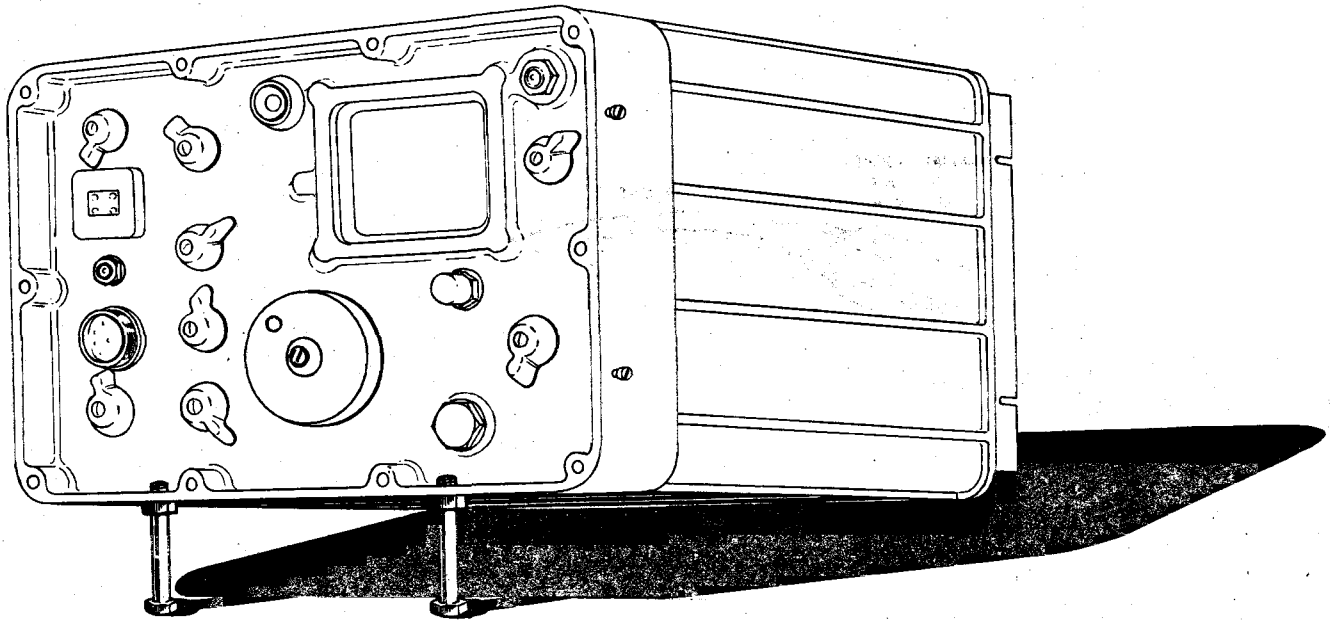


FIG.9 - ELEVATING THE RECEIVER PANEL

- (5) Before setting up the reception set make a general mechanical inspection and ensure that the units are in a sound condition. If the receiver and power supply unit are to be installed in set carriers or mounted in any way, check that they are secure in their mountings.
- (6) If the receiver is to be operated on a table or level surface, and no suitable set carrier is available, the front panel should be elevated to facilitate manipulation of the controls. Remove the two  $2\frac{1}{2}$ -inch screws from the spring clips on the cover attached to the rear of the receiver case. The stowed position of these two screws is shown in fig.8. Referring to fig.9, insert these screws into the tapped holes on the underside of the front panel flange. Screw them in to the thickness of the flange and lock them with the nuts provided.
- (7) Observe the colour of the indicator in the desiccator in both the receiver unit and the power supply unit. If it is bright blue in colour then the interior of the unit is dry. But if it has turned pink it is evident that the unit is damp. When the desiccator appears pink the unit should be sent to workshops for drying out and re-sealing if necessary, and the fitting of a replacement desiccator of the correct type under dry conditions.

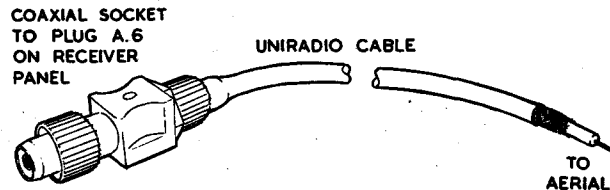


FIG.10 - AERIAL CONNECTOR

- (8) Check that the aerial connector is suitable for the installation. This connector is illustrated in fig.10. The aerial end of this connector may be provided with different types of termination to suit different aerial arrangements.
- (9) If the station is installed in a vehicle ensure that the carriers for the receiver and supply unit are earthed. Copper braid earthing strips connect the set carriers to the vehicle chassis.

11. To set up the receiver unit

Refer to fig.11.

- (1) With the receiver installed in its working position make the following connections.
- (2) Attach the socket end of the Connector miniature 12-point No.6, 39", to the twelve-way plug (A.15) on the left-hand side of the receiver front panel. Make the connection carefully to ensure that the plugs and sockets engage in the correct positions, and tighten the locking ring to secure the connector.
- (3) Attach the aerial connector between the co-axial plug (A.6) on the receiver panel, and an aerial of 80 ohms resistive impedance. When the aerial input consists of two balanced aerial feeders and a balanced-to-unbalanced aerial transformer, attach the aerial connector to the unbalanced side of the aerial transformer. If an aerial of other than 80 ohms

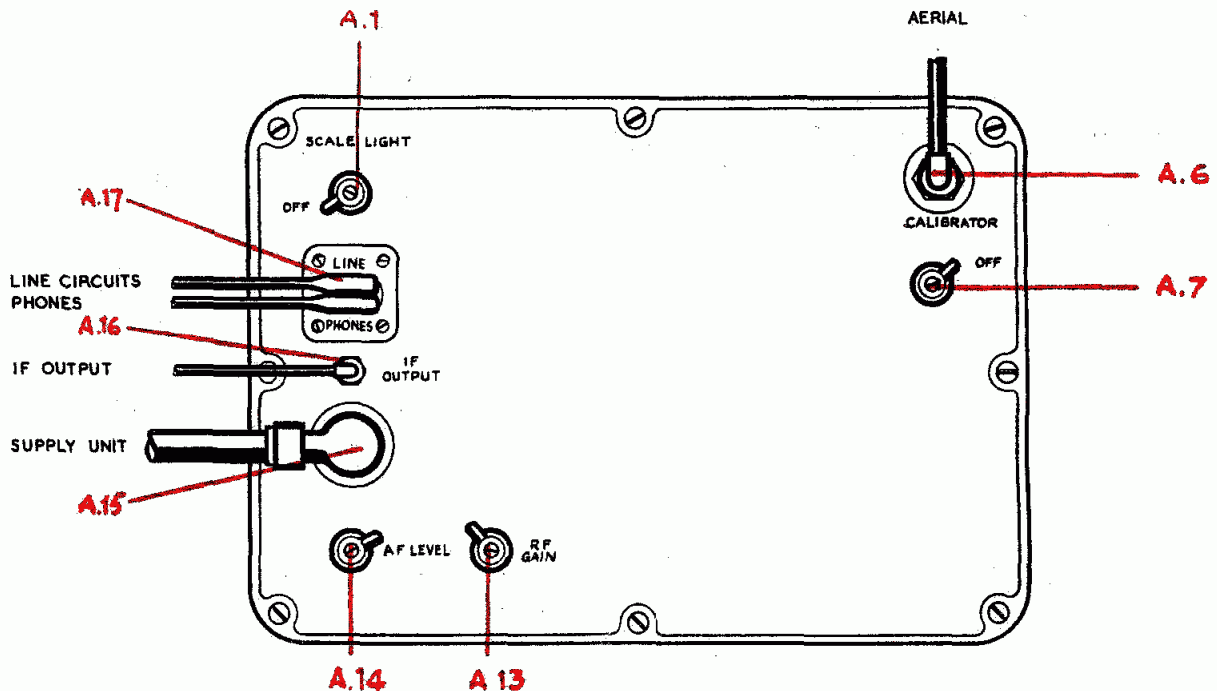


FIG. 11

impedance is used, for example a 600 ohms rhombic aerial, a matching transformer should be inserted between the aerial and the receiver.

- (4) Connect the headphones to the two-way socket engraved PHONES (A.17). Ensure that the snatch plug and socket in the headphones lead are correctly connected.
- (5) If the transmission of signals to line is required, connect the termination of the line circuit to the two-way socket engraved LINE (A.17).
- (6) If an IF output to an alternative type of detector is required, use a coaxial lead connected to the coaxial socket engraved IF OUTPUT (A.16).
- (7) Set the CALIBRATOR control (A.7) to its OFF position.
- (8) Set the SCALE LIGHT control (A.1) to its OFF position.
- (9) Set the RF GAIN control (A.13) to its fully anti-clockwise position.
- (10) Set the AF LEVEL control (A.14) to the mid-position of its traverse.

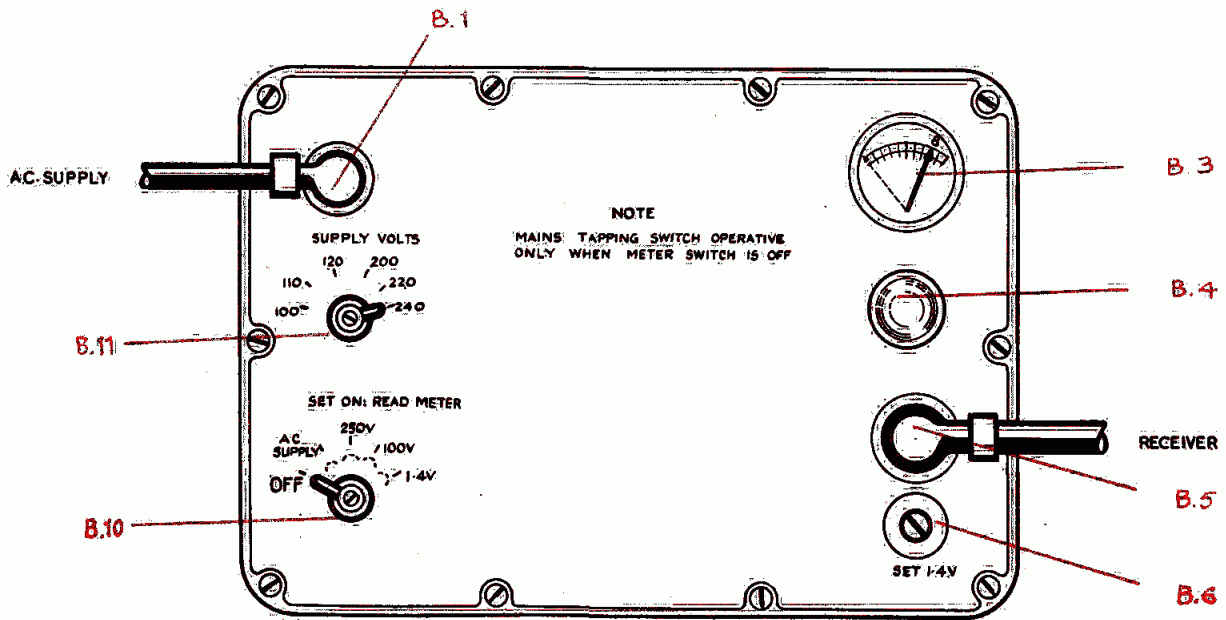


FIG. 12

12. To set up the AC supply unit

Refer to fig.12.

- (1) Set the meter switch (B.10) to its OFF position.
- (2) Attach the AC power supply connector (Connector min. 3-point No.5 5 ft.) between the power input plug (B.1) and the AC supply point.
- (3) Insert the plug end of Connector min. 12-point No.6, 39" from the reception set into the twelve-way socket (B.5) on the supply unit.
- (4) Set the SUPPLY VOLTS switch (B.11) to the position corresponding with the AC supply voltage. When the AC supply voltage is not known set switch (B.11) to the highest or 240 volts position. After power is connected turn this switch anti-clockwise until the correct position is found; this position is indicated when the meter (B.3) reads eight divisions. An interlocking device on this switch prevents it being turned when the meter switch (B.10) is at "AC SUPPLY". Switch (B.10) must therefore be moved to OFF each time the SUPPLY VOLTS switch is adjusted. A note to this effect is engraved on the panel of the AC supply unit.
- (5) Set the meter switch (B.10) to its AC SUPPLY position and observe that the indicator lamp (B.4) glows.
- (6) Set the meter switch (B.10) to its 1.4V position and adjust the pre-set control SET 1.4V (B.6) so that there is a deflection of eight divisions on the meter (B.3).
- (7) Set the meter switch (B.10) in turn to 250V and 100V. In each case the meter needle should be deflected approximately eight divisions.
- (8) To switch off the equipment, turn the meter switch (B.10) to OFF.

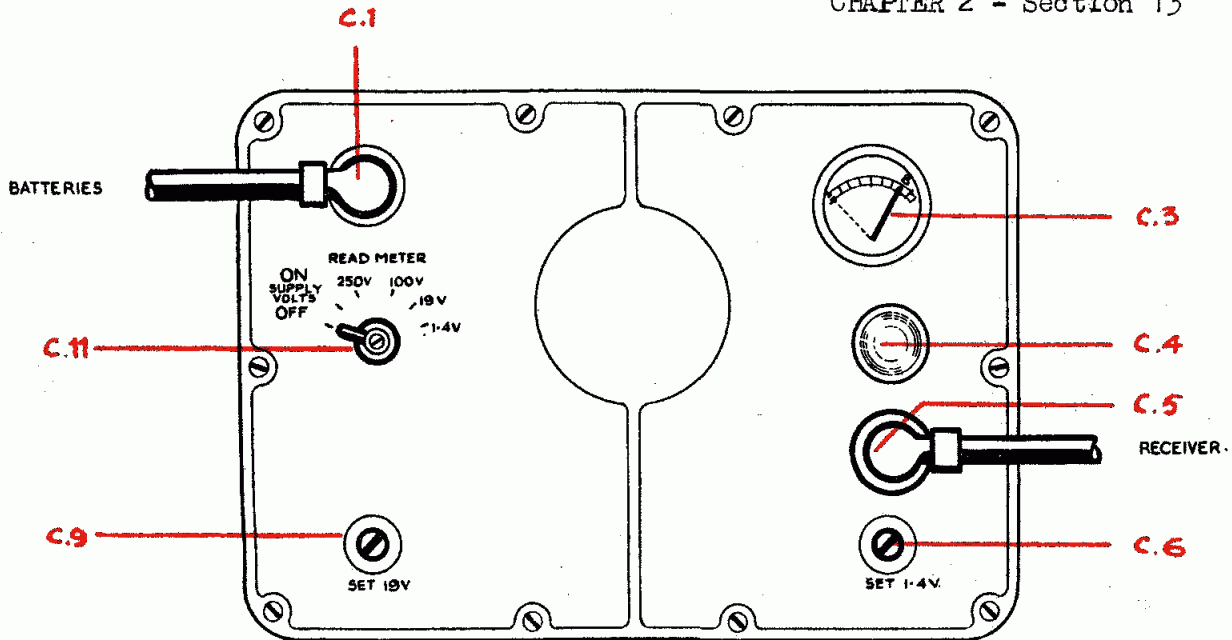


FIG.13

### 13. To set up the DC supply unit

Refer to fig.13.

- (1) Set the METER switch (C.11) to its OFF position.
- (2) Insert the plug end of Connector min. 12-point No.6, 39" from the reception set into the twelve-way socket (C.5) on the right-hand side of the supply unit panel.
- (3) Attach the DC power supply connector between the power input plug (C.1) on the top left-hand corner of the panel and the two 12 volt batteries from which the 24 volt DC supply is to be obtained, after making sure that the two connectors are joined red to red (positive) and black to black (negative) at the terminal batten. The assembly of this connector is illustrated in fig.7.
- (4) Set the METER switch (C.11) to its ON position, and observe that the indicator lamp glows.
- (5) Set the METER switch (C.11) to its 19V. position and adjust the pre-set control SET 19.V (C.9) so that there is a deflection of eight divisions on the meter. (C.3)
- (6) Set the METER switch (C.11) to its 1.4V. position and adjust the pre-set control SET 1.4V. (C.6) so that there is a deflection of eight divisions on the meter (C.3)
- (7) Set the METER switch (C.11) to 250V and 100V. In each case the meter needle should be deflected approximately eight divisions.
- (8) To switch off the equipment, turn the METER switch (C.11) to OFF.



14. To tune the receiver for search purposes  
using AM or FM systems

Refer to fig. 14.

- (1) Set the power supply unit meter switch (B.10 on the AC unit fig.12 or C.11 on the DC unit fig.13) to its ON position and observe that the indicator lamp glows.
- (2) Set the SCALE LIGHT control in the top left-hand corner of the receiver panel (A.1 in fig.14) to the required degree of brilliance, turning the switch clockwise to increase.
- (3) Check that the CALIBRATOR switch (A.7 in fig.14) is turned to the OFF position.
- (4) Check that the RF GAIN control (A.13) is in its fully anti-clockwise position.
- (5) Check that the AF LEVEL control (A.14) is at approximately the mid-point of its traverse.
- (6) Set the frequency band switch (A.8) to select the frequency band, over which it is intended to search. The frequency scale covering this band will then be illuminated by the scale light.
- (7) Set the system switch (A.12) to AM or FM as required. It should be noted that when listening on AM, an FM signal may be recognised by the fact that it will be distorted at the mid-tuning point but will become intelligible on either side of this point.
- (8) Set the BANDWIDTH switch (A.2) to "30 KCS" for AM, or to "120 KCS" for FM.
- (9) Turn the RF GAIN control (A.13) in a clockwise direction until receiver noise is heard.
- (10) Search for the required transmission by rotating the tuning control (A.11) slowly until a signal is heard in the headphones. If the approximate frequency of the required transmission is known, set the tuning dial to this frequency before commencing to search.
- (11) Adjust the RF GAIN control (A.13) to obtain a maximum output without overloading the set. This control will not necessarily be set to its fully clockwise position to obtain maximum output.
- (12) Adjust the AF LEVEL control (A.14) until the received signal is at a comfortable level.
- (13) When the transmission of signals to line is required and the operator at the remote end of the line requests an adjustment of level, this adjustment should be made by means of the AF LEVEL control and not the RF GAIN control.

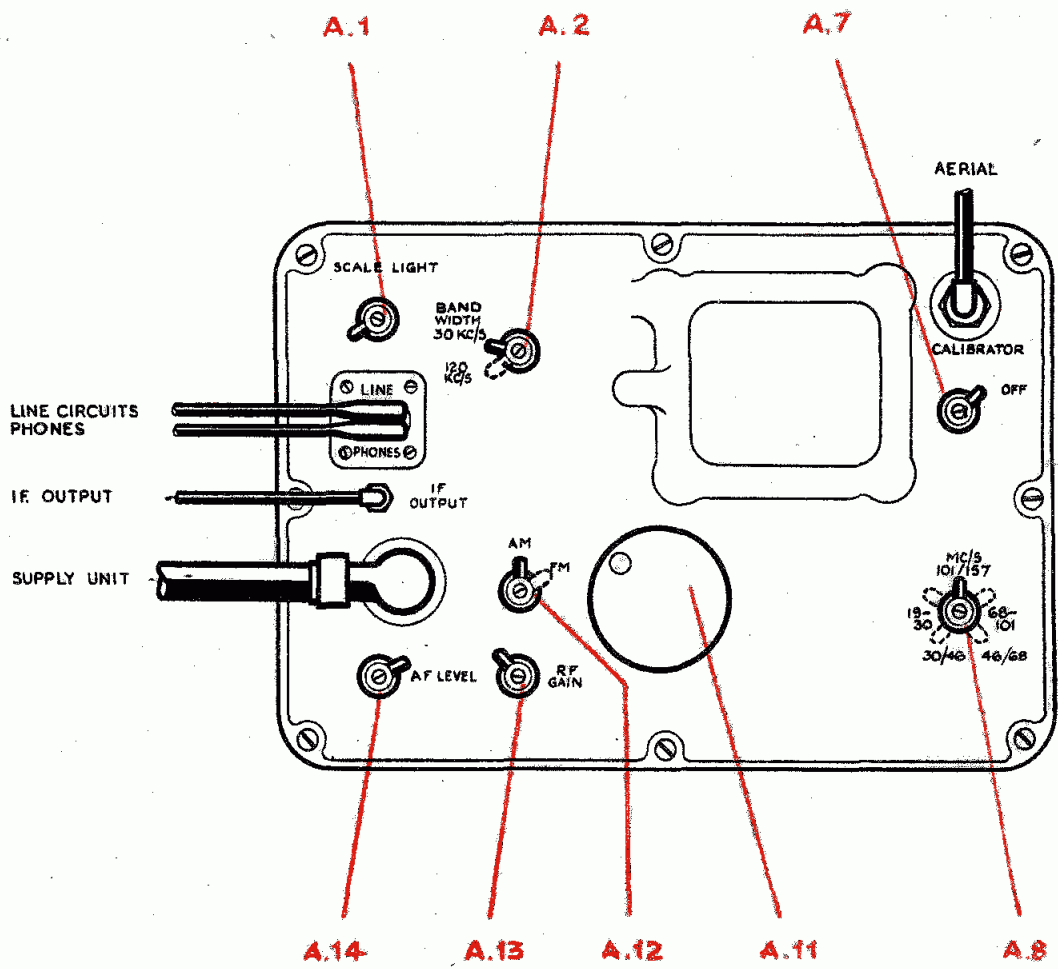


FIG. 14. TO TUNE THE RECEIVER FOR SEARCH PURPOSES  
(AM OR FM)

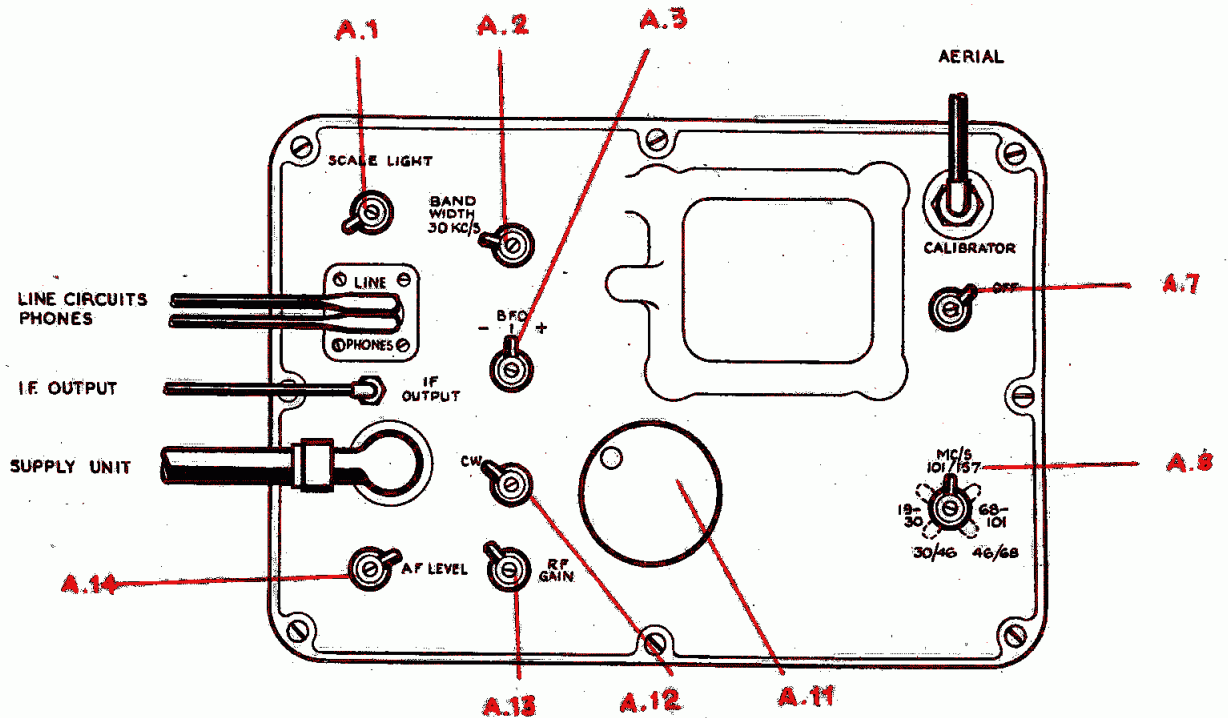


FIG. 15

15. To tune the receiver for search purposes using CW

Refer to fig.15.

- (1) Set the power supply unit meter switch (B.10) or (C.11) to its ON position and observe that the indicator lamp glows.
- (2) Set the SCALE LIGHT control (A.1) to the required degree of brilliance, turning the switch clockwise to increase.
- (3) Check that the CALIBRATOR switch (A.7) is in its OFF position.
- (4) Check that the RF GAIN control (A.13) is fully anti-clockwise.
- (5) Check that the AF LEVEL control (A.14) is at approximately the mid-point of its traverse.
- (6) Set the frequency band switch (A.8) to the required band.
- (7) Set the system switch (A.12) to the CW position.
- (8) Set the bandwidth switch (A.2) to the "30 KCS" position.

- (9) Turn the pointer of the BFO pitch control (A.3) to the central position.
- (10) Turn the RF GAIN control (A.13) in a clockwise direction until receiver noise is heard.
- (11) Search for the required transmission by rotating the tuning control (A.11) slowly until a signal is heard in the headphones. If the approximate frequency of the required transmission is known set the tuning dial to this frequency before commencing to search.
- (12) Adjust the tuning control (A.11) to zero beat, i.e. until the pitch of the note is reduced to zero.
- (13) Then adjust the BFO control (A.3) to obtain a note of convenient pitch.
- (14) Adjust the RF GAIN control (A.13) to obtain maximum output without overloading the set. This control will not necessarily be set to its fully clockwise position to obtain maximum output.

16. To tune the receiver accurately to a required frequency using the calibrator and the movable cursor (CW system)

Refer to figs. 15 and 16.

- (1) The limits of accuracy to which a frequency may be set up are within  $\pm 50$  kc/s at 150 Mc/s or within  $\pm 15$  kc/s at 30 Mc/s, these figures being within half a bandwidth for the wide and narrow bands respectively.
- (2) The following paragraphs describe as an example the method of setting the receiver to a frequency of 102.9 Mc/s.
- (3) Set the power supply unit meter switch (B.10 in fig.12 or C.11 in fig.13) to its ON position and observe that the red indicator lamp glows.
- (4) Set the SCALE LIGHT control (A.1) to the required degree of brilliance, turning the switch clockwise to increase.
- (5) Check that the CALIBRATOR switch (A.7) is turned to the OFF position.
- (6) Check that the RF GAIN control (A.13) is in its fully anti-clockwise position.
- (7) Check that the AF LEVEL control (A.14) is at approximately the mid-point of its traverse.
- (8) Set the frequency band switch (A.8) to the required frequency band. The scale covering this band will then be illuminated.
- (9) Set the system switch (A.12) to the CW position.

CHAPTER 2 - Section 16

- (10) Set the BFO pitch control (A.3) so that the pointer is in the central position.
  - (11) Rotate the tuning control (A.11) and adjust the frequency scale until the printed 5 Mc/s division nearest to the required frequency is exactly in line with the fixed red cursor - i.e. the 105 Mc/s division in the present case.
  - (12) Turn the pointer of the CALIBRATOR switch (A.7) to the "5 MC/S" position.
  - (13) Turn the RF GAIN control (A.13) in a clockwise direction until receiver noise is heard.
  - (14) Adjust the receiver control (A.11) to obtain zero beat. This will, of course, move the frequency scale, unless the control happens to be already on zero.
- NOTE: The RF GAIN control (A.13) must not be in its fully clockwise position. This will cause overloading and the receiver may go quiet.
- (15) Push the cursor control (A.9) and adjust the movable black cursor to coincide with the new position of the 105 Mc/s division on the frequency scale.
  - (16) Rotate the tuning control (A.11) and adjust the frequency scale until the printed 1 Mc/s division nearest to the required frequency is exactly in line with the black cursor - i.e. the 103 Mc/s division in the present case.
  - (17) Turn the pointer of the CALIBRATOR switch (A.7) to the "1 MC/S" position.
  - (18) Re-adjust the receiver tuning control (A.11) and again obtain a zero beat.
  - (19) Push the cursor control (A.9) and adjust the movable black cursor to coincide with the new position of the 103 Mc/s division on the frequency scale.
  - (20) Turn the pointer of the CALIBRATOR switch (A.7) to the OFF position.
  - (21) The movable black cursor is now accurately set at 103 Mc/s and the receiver tuning may be adjusted to fractions of megacycles per second about this frequency by observing the scale sub-division against the black cursor.

NOTE: When the receiver is being tuned to a comparatively low frequency (below 100 Mc/s), the operations described in paragraphs (11) to (15) above may be omitted. In this case the tuning process may be started directly with the CALIBRATOR switch in its "1 MC/S" position (see paragraph 17), after setting the frequency scale as described in paragraph (16)



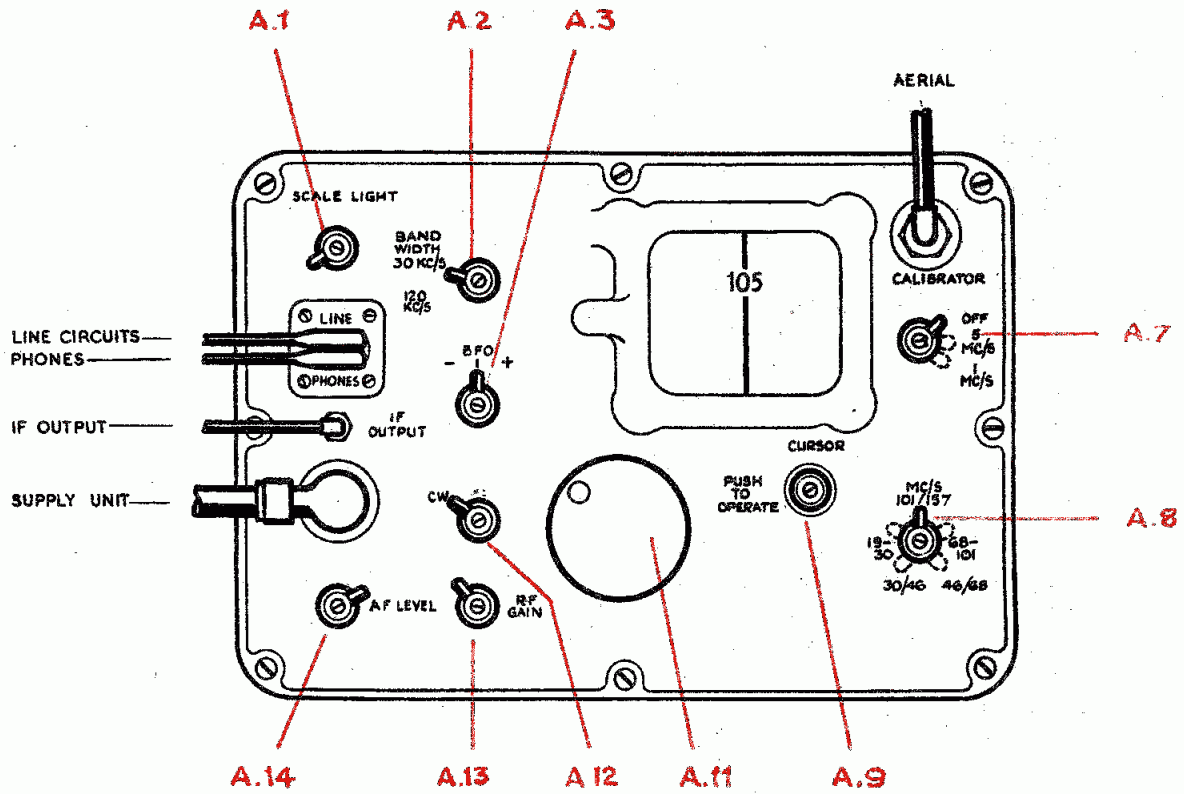


FIG. 16 - TO TUNE THE RECEIVER ACCURATELY TO A REQUIRED FREQUENCY

17. To measure the exact frequency of a received signal using the calibrator and the movable cursor

Refer to fig. 17.

- (1) Set the system switch (A.12) to the CW position.
- (2) Make a note of the scale reading of the signal against the fixed red cursor.
- (3) Set the CALIBRATOR switch (A.7) to its "1 MC/S" position.
- (4) Adjust the receiver tuning control (A.11) to obtain a zero beat in the neighbourhood of the nearest 1 Mc/s point marked on the frequency scale.
- (5) Push the cursor control (A.9) and adjust the movable black cursor to coincide with the new position of the 1 Mc/s division on the frequency scale.
- (6) The difference in reading between the red and black cursors is the correction to be made to the original scale reading in order to obtain the actual frequency. If the red cursor reads above the original 1 Mc/s position, then the difference must be deducted. If, however, the red cursor reads below the original 1 Mc/s position, then the difference must be added.

Two examples are given below:-

(a)	Original station reading	...	...	...	...	...	40.8 Mc/s
	Nearest 1 Mc/s position	...	...	...	...	...	41.0 Mc/s
	Fixed red cursor position after tuning for zero beat	...	...	...	...	...	41.3 Mc/s
	Actual frequency of station	...	...	...	...	...	40.5 Mc/s
(b)	Original station reading	...	...	...	...	...	40.8 Mc/s
	Nearest 1 Mc/s position	...	...	...	...	...	41.0 Mc/s
	Fixed red cursor position after tuning for zero beat	...	...	...	...	...	40.7 Mc/s
	Actual frequency of station	...	...	...	...	...	41.1 Mc/s

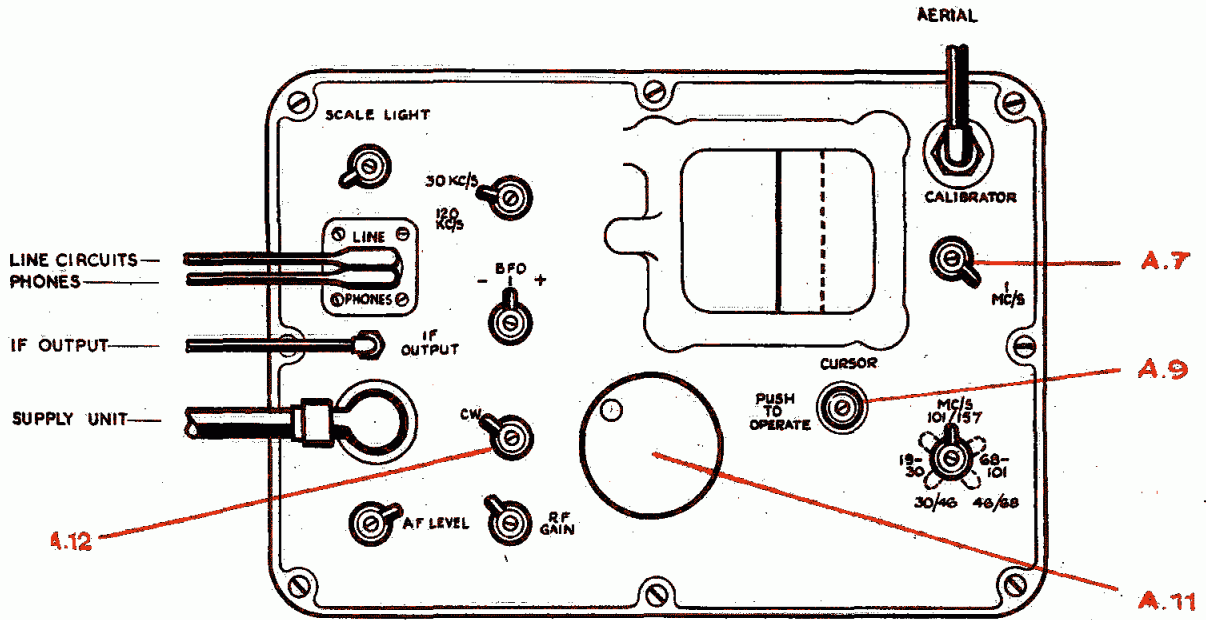


FIG.17 - TO MEASURE THE FREQUENCY OF A RECEIVED SIGNAL



18. Unit maintenance log

- (1) No equipment or installation can be expected to work properly unless it is kept in first-class condition by regular maintenance, conscientiously carried out. This maintenance is the responsibility of the NCO or man who is in direct charge of the equipment and responsible for its operation, NOT of workshop or repair staffs, though workshop personnel may be called upon to carry out certain maintenance tasks.
- (2) To guide the NCO or man responsible for maintenance, and to ensure that it is done, it has been laid down that Signal equipment will be maintained on the task system, and that the completion of each task will be recorded on Army Form B.2661 - Unit Maintenance Log.
- (3) This log is reproduced on the opposite page. Completion of maintenance tasks will be recorded by initialling in the spaces provided on the front of the form; all repairs and replacements will be recorded on the reverse. The form lasts 24 weeks, and replacements should be obtained on indent in the normal way. Current and completed forms should be kept in the pocket in the back cover of this handbook.
- (4) The maintenance tasks to be carried out for the equipment are listed in the following sections, which show the full operator maintenance required for an equipment in continuous use. The frequency with which each task is carried out will be detailed by the commander concerned. ACI 1076 of 1945 gives further instructions on the subject.

19. Sealing

- (1) The receiver unit and the power supply units are hermetically sealed and operators must not loosen any fixing screws or in any way attempt to remove a unit from its case. Furthermore, none of the control knobs must be tampered with as the spindle sealing glands might become damaged thereby.
- (2) When adjustments or replacements are required which involve opening a unit, this unit must be sent to workshops.

20. General maintenance

- (1) Keep the receiver unit, power supply units and other equipment in a clean condition.
- (2) Examine all leads for fraying, paying special attention to the points where they enter plugs or sockets.
- (3) Check that the switches and controls work smoothly and firmly throughout their range of movement.
- (4) Check that reception is normal as judged by signals or background noise.



### 21. Batteries

- (1) The batteries issued with the reception set are Batteries secondary portable 12-volt 75 Ah Mk.2. Four of these batteries are provided, two being connected in series to give 24 volts for the DC supply unit, and two being held as spares.
- (2) If the installation is being operated on DC supplies, attend to battery maintenance daily, as follows:-
- (3) Test the battery voltage with the supply unit and reception set switched on. If the total voltage is below 22, replace the batteries at once. A battery should be recharged when the specific gravity of the electrolyte in any cell read with a hydrometer falls below 1.18.
- (4) Check the level of the electrolyte in each cell of the batteries, and add distilled water as necessary according to the instructions printed on the lids of the batteries.
- (5) Keep the battery tops clean and dry. Clean the terminals and bars and smear lightly with grease.
- (6) Ensure that the two 12-volt batteries held as spares are always maintained in a fully charged condition.
- (7) When the installation is being operated on AC supplies, the four 12-volt batteries will not normally be issued, but if they are held in reserve with the DC supply unit then they must be inspected and checked at weekly intervals to ensure that they are always maintained in a fully charged condition.

### 22. Desiccators

- (1) Inspect the desiccators installed in the front panels of the receiver unit and the supply units, and observe the colour of the indicator in the small circular window.
- (2) If this indicator is bright blue in colour then the desiccator remains serviceable and the interior of the equipment is dry.
- (3) If the indicator has turned pink then the desiccator is exhausted and must be replaced, for moisture inside the equipment has been absorbed by the drying agent and this in turn has affected the indicator and changed its colour from blue to pink. Return the unit to workshops as soon as possible, where drying apparatus is available and where a replacement desiccator of the correct type may be fitted.
- (4) It is important to remember that when a desiccator is removed from the panel the interior of the unit is exposed, and moisture may enter through the orifice. Therefore desiccators should only be changed under suitable dry conditions.

- (5) Unless the unit requires drying out, a replacement desiccator must be properly screwed in immediately an exhausted one is withdrawn, and the rubber sealing ring must be correctly positioned to ensure that the sealing is effective. A replacement desiccator should not be taken from its sealed package until the moment it is to be inserted into a unit, or the atmosphere will affect its condition.

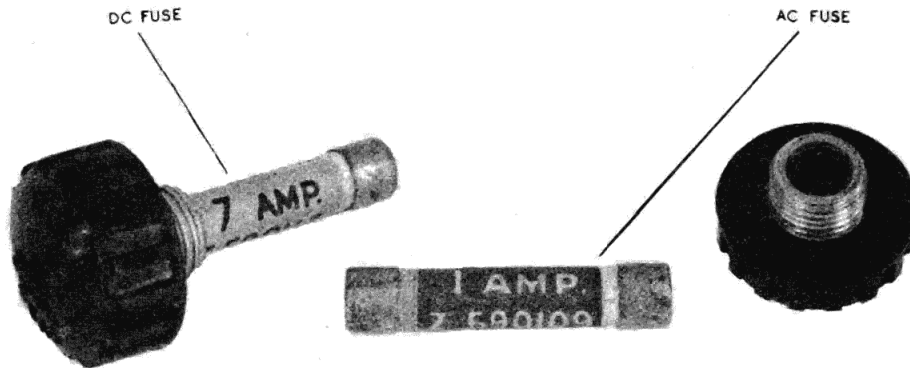


FIG.18

### 23. Fuses

IMPORTANT

THE AC AND DC FUSES ARE  
NOT INTERCHANGEABLE.

- (1) Before removing a suspected cartridge fuse, set the power supply unit meter switch to OFF ((B.10) in fig. 12 or (C.11) in fig. 13 according to the supply unit in use). A fuse must never be changed with the equipment switched ON.
- (2) Insert a spare fuse in the fuse holder in place of the blown fuse, and screw the fuse holder firmly into the panel. Obtain a replacement spare fuse as soon as possible.
- (3) Remember that the fuses used with the AC supply unit are rated at one amp, and those used with the DC supply unit are rated at seven amps. Make sure that the working and spare fuses used with each supply unit are always of the correct value.

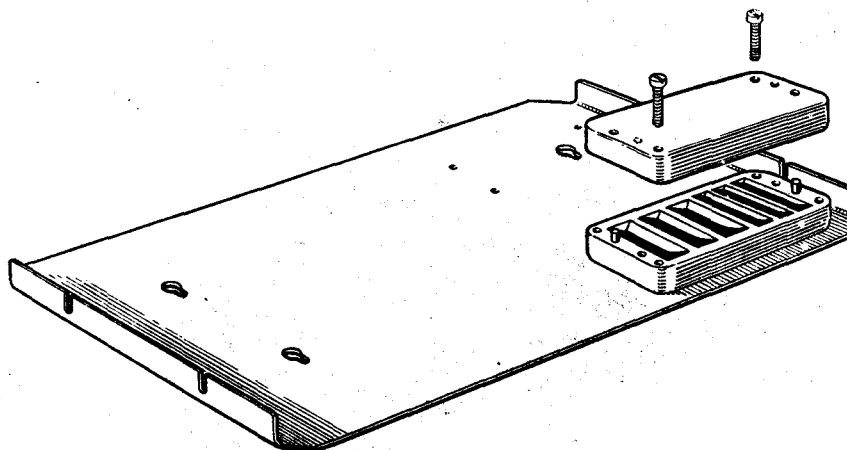


FIG. 19

#### 24. Spare parts case

- (1) A Case spare parts 4" x 1.5/8" x 13/16", as illustrated in fig.19, is secured to the inside of each power supply unit panel cover.
- (2) The case should contain three spare indicator lamps (Lamps filament vac MESC clear 6V. 0.35W), and three spare fuses of the correct rating for the supply unit to which the spares case is attached. These are Fuses cartridge No.1, 1-amp for the AC unit and Fuses cartridge 7-amp for the DC unit.

#### 25. Fault location

- (1) The following fault location tables are intended as an operator's guide to the simpler faults which might occur on the reception set.
- (2) Fault finding tables describe the action to be taken when various symptoms are recognised; these instructions may be carried out without special apparatus and will enable most simple faults to be localised. Other faults must be reported in order that they may be repaired by workshops personnel equipped with suitable apparatus.
- (3) It is important that the tests are performed methodically and in the correct order. As a fault is discovered, correct it, and see that the test that led to its discovery gives satisfactory results before proceeding to the next test.
- (4) It should be remembered that external faults are much more common than internal faults. If the equipment fails, look for faults in the following order:-
  - (a) Faults in the setting of switches or controls.
  - (b) External faults due to connectors, etc.
  - (c) Internal faults.

26. Fault location in the receiver unit

Symptom	Possible fault	Action
(1) Desiccator appears pink.	Moisture in the interior of the receiver	Report and have the desiccator changed.
(2) No illumination of a frequency scale when the power supply unit is switched on.	(a) SCALE LIGHT control fully anti-clockwise. (b) Defective scale lamp.  (c) Faulty connection between receiver and supply unit. (d) Faulty SCALE LIGHT control or faulty contact on the frequency band switch.	(a) Adjust SCALE LIGHT control. (b) Switch to another frequency band. If the scale is now illuminated, report the defective position. (c) Check (d) Report
(3) No output when the power supply unit is switched on, the AF LEVEL and RF GAIN control knobs both turned in a clockwise direction and the system switch moved to FM and then to AM.	(a) Defective headphones (b) Defective output valve (V.16) (c) Defective IF valves (V.6, V.7, V.8, V.10) (d) Defective limiter valve (V.11) (e) Internal fault.	(a) Replace (b) } (c) } Report (d) } (e) }
(4) No output when the system switch is in the AM position.	Overloading caused by the RF GAIN control being too far advanced.	Turn RF GAIN control anti-clockwise.
(5) No output when the system switch is in the FM position.	The set may be tuned to a strong unmodulated carrier.	Vary the tuning control.

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Symptom	Possible fault	Action
(6) No output when the system switch is in the AM position, but output present when this switch is in the FM position	(a) Defective AF amplifier valve. (V.14) (b) Defective noise limiter valve (V.15)	(a) ) ) Report (b) ) )
(7) No output when the system switch is in the FM position, but output present when this switch is in the AM position.	(a) Defective discriminator valve <sup>13</sup> . (b) Defective limiter oscillator valve (V.11)	(a) ) ) Report (b) ) )
(8) No reception of signals and only reduced noise when AF LEVEL and RF GAIN controls are turned clockwise and the system switch set to any position.	Defective local oscillator valve (V.3)	Report
(9) Receiver appears to be very insensitive. System switch in AM position.	Defective RF valves (V.1 and V.2)	Report
(10) No output at the IF OUTPUT socket, but normal output at the PHONES socket.	Defective IF output valve (V.12)	Report
(11) No beat note obtained when the system switch is in the CW position and the receiver tuned to a signal.	(a) Set overloaded (b) Defective BFO valve (V.9)	(a) Turn RF GAIN control anti-clockwise (b) Report
(12) Excessive frequency drift.	Defective neon stabiliser (V.4)	Report

Symptom	Possible fault	Action
(13) No output from the crystal calibrator when the receiver tuning is adjusted	(a) Defective calibrator valve (V5)	Report
	(b) Defective crystals	Report
NOTE: The RF GAIN must not be fully clockwise, or overloading will occur, and the set will go quiet.		

27. Fault location in the AC power supply unit

Symptom	Possible fault	Action
(1) Desiccator appears pink.	Moisture in the interior of the unit.	Report, and have the desiccator changed.
(2) Pilot lamp does not glow when the power supply unit is connected to the receiver unit and switched on.	(a) Pilot lamp defective	(a) Change pilot lamp.
	(b) Defective connection to mains.	(b) Check the input voltage by means of the meter on the unit.
	(c) No mains power supply	(c) Check input voltage on the meter.
(3) No deflection of meter needle when the meter switch is at the "AC SUPPLY" position.	(a) Fuse blown.	(a) Replace the fuse.
	(b) No mains supply.	(b) Check supply source
	(c) Internal fault.	(c) Report.
(4) No deflection of meter needle when the meter switch is at the "250V" position.	Defective rectifier valve(s).	Report
(5) No deflection of meter needle when the meter switch is at the "100V" position.	Defective rectifier valve(s).	Report
(6) No deflection of meter needle when the meter switch is at the 1.4V position.	(a) Fault on 12-way connector.	(a) Check
	(b) Internal fault.	(b) Report.



28. Fault location in the DC power supply unit

Symptom	Possible fault	Action
(1) Desiccator appears pink.	Moisture in the interior of the unit.	Report, and have the desiccator changed.
(2) Pilot lamp does not glow when the power supply unit is switched ON. Supply unit must be connected to a receiver unit and to a 24 volt DC source of supply.	(a) Pilot lamp defective (b) Defective connection to the 12-volt batteries. (c) Batteries discharged	(a) Change pilot lamp (b) Check (c) Check the battery voltage.
(3) No deflection of meter needle when the meter switch is at the ON position.	(a) Fuse blown. (b) Battery or batteries discharged. (c) DC supply lead not properly fixed to input plug. (d) Receiver not connected to the supply unit. (e) Internal fault.	(a) Replace the fuse. (b) Check battery voltage. (c) Secure the supply lead. (d) Check receiver connections. (e) Report.
(4) No deflection of meter needle when the meter switch is at the 250V position.	(a) Faulty vibrator. (b) Internal fault.	Report. Report.
(5) No deflection of meter needle when the meter switch is at the 100V position.	As (4) above.	Report.
(6) No deflection of meter needle when the meter switch is at the 1.4V position.	Internal fault.	Report.

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### IMPROVEMENT OF SIGNAL EQUIPMENT

Do you think YOU can improve ANY Signals Equipment ?

Can you suggest :

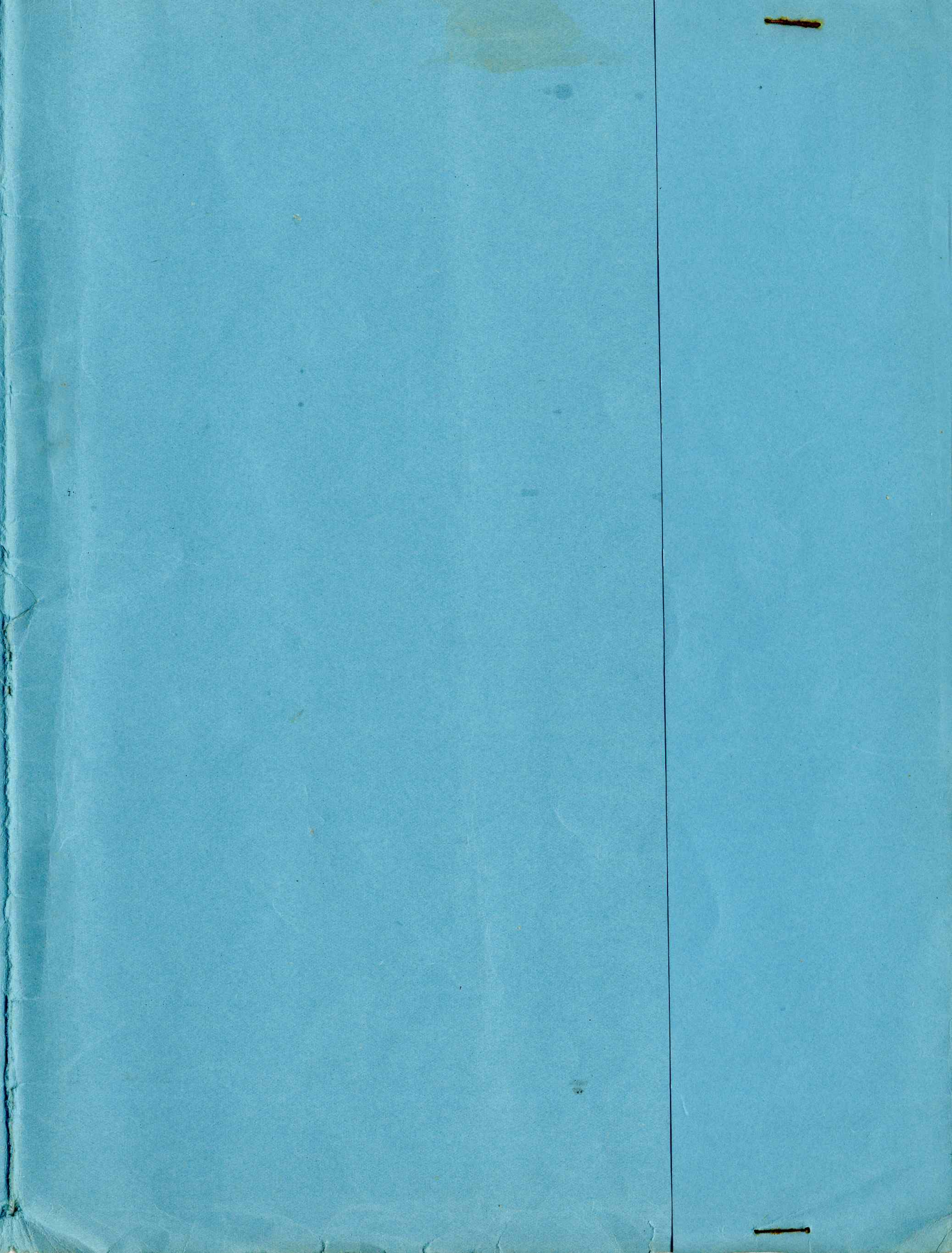
- (a) An improvement in design or shape ?
- (b) A better method of installation, operating or maintenance including the tools you use ?
- (c) Other equipments which might do the job better ?

The War Office is interested in your ideas. Apply to your Troop Commander for details of the method whereby suggestions may be passed by YOU to the War Office.

War Office Memorandum to C.S.Os, reference 42540 (Signals 3(c)) dated 30th March 1948 refers.

Suggestions from Other Arms of the Service will be welcomed but should be passed to the nearest Chief Signal Officer.







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