ELECTRICAL AND MECHANICAL
ENGINEERING REGULATIONS

TELECOMMUNICATIONS JY101 F 481 AND JY102 F 482

WIRELESS SET No. 48, MARK I

OPERATING INSTRUCTIONS AND GENERAL AND THEORETICAL DESCRIPTION

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1. The designations of these E.M.E.Rs. have been changed from Telecommunications F 481 and F 482 to Telecommunications JY 101 and JY 102 respectively. The recipient will appropriately amend all pages accordingly.

2. This issue supersedes Telecommunications F 482, Issue 1, which should now be disposed of as salvage.

3. Distribution of this E.M.E.R. will be to:-

Distribution - Code 4

June 15, 1943

WIRELESS SET No. 48, MARK I
OPERATING INSTRUCTIONS

PREPARATION FOR USE

1. See that the batteries are in good order by checking them with the test meter on the sender panel. Set the BATTERIES switch on the sender to ON. Rotate the METER SWITCH to L.T. and H.T. in turn. The meter should read between the red line and the blue line, for either position. (If either is below the red line, the battery pack should be replaced, or the range of the set will be curtailed. Open the Satchel, signals, and remove the microphone, telephone receiver and the ground aerial, if required, and insert the appropriate plugs in the jacks marked MICROPHONE and PHONES. (Either British low impedance fitted with Plug No. 9 or American 4000 ohm impedance headphones with Plug PL-55) may be used. The jacks on the set will connect the phones to the correct circuit. Erect the desired aerial and connect to the set.

INSTALLATION

2. Unpack equipment carefully and inspect for damage, and place the set on a table or on the flattest ground convenient, seeing that it stands and does not rock. Undo the retaining strap and open the front flaps. The set is normally issued complete with batteries and valves and is ready for operation. If, however, the battery pack is not fitted loosen the two round knurled nuts on the case inside of the lower door and pull both forward. This will unlatch the battery compartment door which will then swing open on its hinges. Insert the battery so that the outlet socket is at the left rear corner facing up. Insert the battery plug in its socket, the cable pointing toward the door end of the case. Swing the compartment door shut and tighten the two knurled nuts.

OPERATION

Tuning the sender

3. (a) Throw the BATTERIES switch to ON.

(b) Turn the C.W. PHONE NET CAL. switch to PHONE and the meter switch to Æ.

(c) Release the knurled locking screw at the edge of the MO. TUNING control and carefully set the dial to the required frequency. Lock the adjustment by tightening the locking screw.

(d) Keep the pressel switch on the hand microphone closed while performing operations (e) and (f) below.

(e) Release the knurled locking screw at the edge of the AERIAL TUNING dial and adjust the dial for maximum aerial current reading on the front panel meter. Vary the position of the AERIAL SWITCH and rotate the AERIAL TUNING dial, alternately, until maximum aerial current is indicated on the test meter. When the set is used with ground aerial alone, the best position for the AERIAL SWITCH is usually at taps 6, 7 or 8. The instructions in this section refer to tuning when the vertical aerial or ground aerial or a combination of both is used.

(f) Speak into the microphone in a normal voice with the microphone held close to the lips. As the set is radiating, kicks of the set meter needle should be observed.

(g) Release the pressel switch on the hand microphone.

(h) For C.W. operating insert the key into the jack marked C.W. KEY. Turn C.W.-PHONE-NET-CAL. switch to C.W. Throw the switch of the key to SEND. Press the key and proceed to tune as in preceding instructions. Always keep the key pressed when tuning.

Tuning the receiver

4. It is assumed that the BATTERIES switch is ON and the pressel switch on the microphone handset is released.

(a) Turn control marked L.F. GAIN so that the dot on it is towards the right side of the set.

(b) Throw the BEAT FREQ. OSC. switch to the OFF position.

(c) Release the knurled locking screw at the edge of the RECEIVER TUNING dial and turn to the desired frequency. Then slowly rotate the dial a little either side of the calibration mark until the desired signal is heard. Carefully adjust this control for maximum signal strength, if necessary reducing the setting of the L.F. GAIN control to permit the RECEIVER TUNING control to be set accurately.

(d) For C.W. signals, set the BEAT FREQ. OSC. switch to ON and proceed as outlined in (c).

(e) Lock the RECEIVER TUNING dial by tightening the locking screw.

Send-Receive switching

5. With the BATTERIES switch at ON and both sender and receiver tuned, send-receive switching is effected entirely by pressing or releasing the switch on the microphone. When the switch is pressed the sender operates, releasing the switch operates the receiver. When using C.W. the send-receive switch embodied in the key is used. It is important to allow a second or two when changing from receive to send before commencing the transmission of a message, otherwise the valve filaments may not be hot enough and the opening words of the message may not be received.

Calibration check

6. By means of the calibrating device the frequency calibration of the M.O. TUNING dial may be checked. The calibrating device used in Wireless Set No. 48 consists of a rotary switch by which the master-oscillator valve of the sender and a crystal-controlled one megacycle oscillator, may be turned on while the set is in the receiving position. When calibrating, the master oscillator frequency is adjusted so that a loud beat note is heard between the master oscillator and the 9th harmonic of the crystal oscillator.

NOTE: After use always make sure that the batteries switch is in the OFF position.

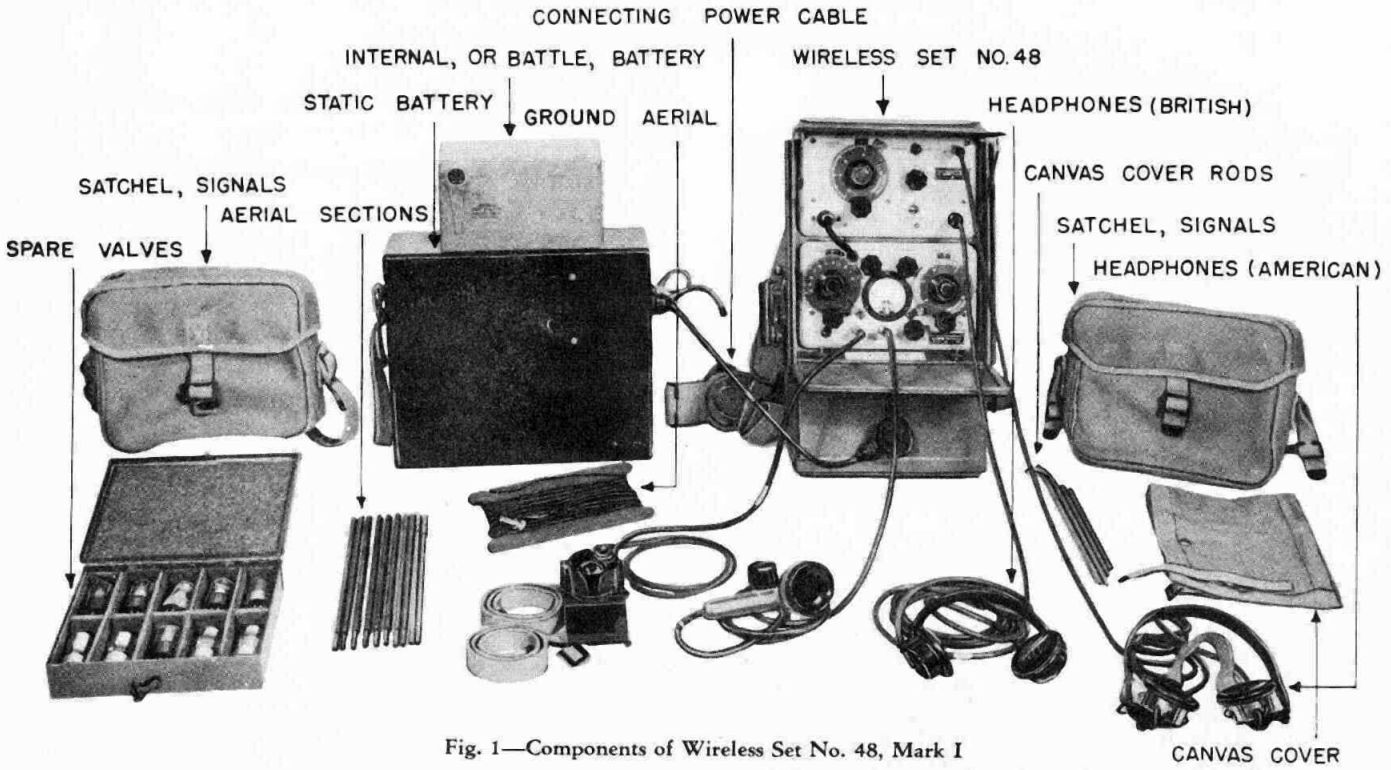


Fig. 1—Components of Wireless Set No. 48, Mark I

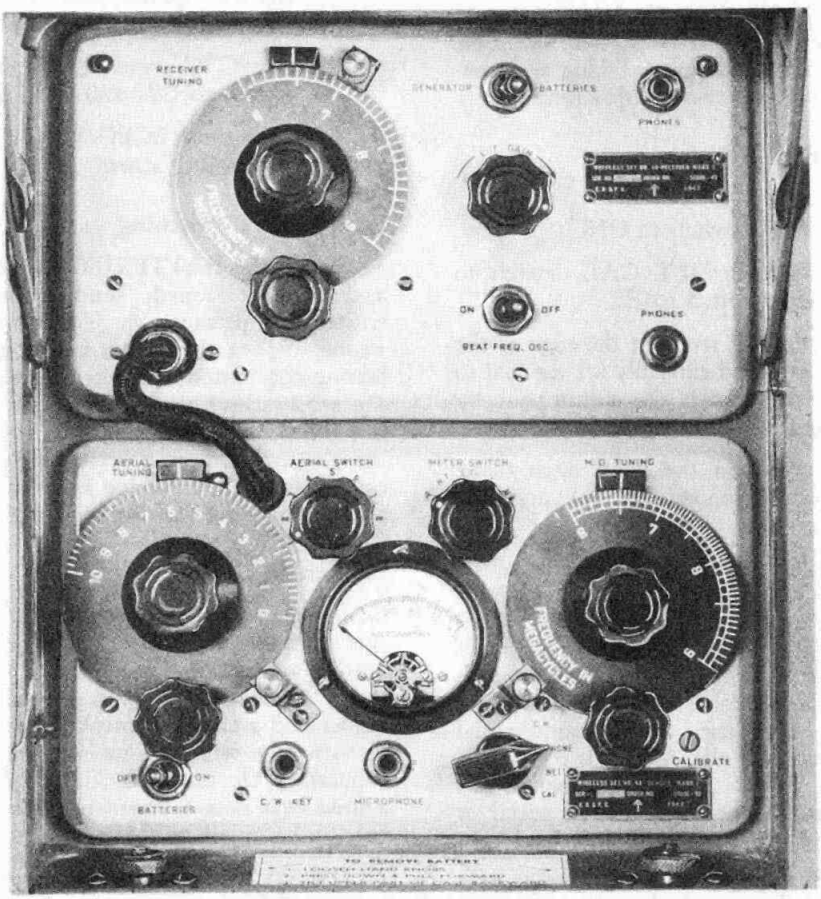


Fig. 2—Receiver and Sender Control Panels of Wireless Set No. 48, Mark I

7. Procedure for checking the frequency is as follows:

(a) Remove the aerial.

(b) Set the BATTERIES switch to ON.

(c) Set C.W. PHONE-NET CAL. switch to CAL.

(d) Set the B.F.O. switch to OFF.

(e) Set the M.O. TUNING dial to 9 Mc/s and lock.

(f) Listen in the receiver headphones.

(g) Adjust CALIBRATE control to obtain zero beat in the headphone.

(h) Unlock the M.O. TUNING dial and check that zero beat is also obtained at 6, 7 and 8 Mc/s.

(i) If the error exceeds 30 Kc/s at 6 Mc/s readjust CALIBRATE control until this figure is obtained. Recheck at 9 Mc/s and ensure that error here does not exceed 45 Kc/s. If it is found impossible to correct the errors within the above limits, the set should be returned to 1st echelon workshop at the earliest opportunity. (Note: one small division of the M.O. TUNING dial equals 50 Kc/s).

Netting

8. Netting means the tuning of a group of stations to a common frequency, thus forming a network, so that all stations in the group netted can inter-communicate freely without retuning. In practice one set, usually the one at headquarters, becomes the control station establishing the group frequency, all the remaining stations in the group, netting on (i.e. tuning to) the control station. When netting, the master oscillator frequency is adjusted so that a beat note is heard between the master oscillator and the incoming signal. Zero beat indicates that the frequency of the master oscillator is the same as that of the incoming signal.

Netting the out station

9. During the test period each of the out stations in the group proceed as follows:

(a) Tune the receiver to the control station.

Turn the C.W. PHONE NET CAL. switch to NET and slowly rotate the M.O. TUNING control on the sender slightly on either side of the group frequency until a whistle is heard. Then further adjust this control until the pitch of the whistle is as low as possible. (i.e., until zero beat frequency is evident). Lock the M.O. TUNING dial at this (zero beat) position.

(b) Return the C.W. PHONE NET CAL. switch to PHONE and await the announcement of the cessation of the test transmission from the control station. (This is important: Out stations must not radiate during this period or interference with the other out stations will occur).

(c) Press the Pressel switch in the microphone hand set and tune the sender in the manner indicated in para. 3 without altering the setting of the M.O. TUNING dial. The station is now netted with the control station.

Netting the control station

10. The control station operator now tunes his receiver to the group frequency by either of the following methods:

(a) The control station asks for a transmission from one of the out stations, and tunes his receiver to the requested transmission.

(b) With the control station receiver operating (i.e., Pressel switch on the microphone released), the control station operator sets his METER SWITCH to MA turns his C.W. PHONE NET CAL. switch to NET and rotates the RECEIVER TUNING dial until a dip is observed in the panel meter reading; he then carefully adjusts the RECEIVER TUNING dial to give maximum dip in meter reading.

11. Once the net is established, the control station operator must on no account alter the position of his M.O. TUNING control, otherwise the whole net will be destroyed. The control station operator may, however, adjust his RECEIVER TUNING control when necessary.

12. Operators, other than the control station operator, should check the netting of their stations if communication is unsatisfactory. This is done by setting the C.W. PHONE NET CAL. switch to NET while listening to the control station. If the whistle then heard is high pitched, appropriate adjustment of the M.O. TUNING dial must be made. It will not be necessary to readjust any other sender control.

13. As an alternative to tuning to zero beat, the receiver may be netted on very strong signals by setting the METER SWITCH to MA and adjusting the RECEIVER TUNING handle to give maximum dip on the meter, care being taken to check by signals from the properly identified control station only.

END

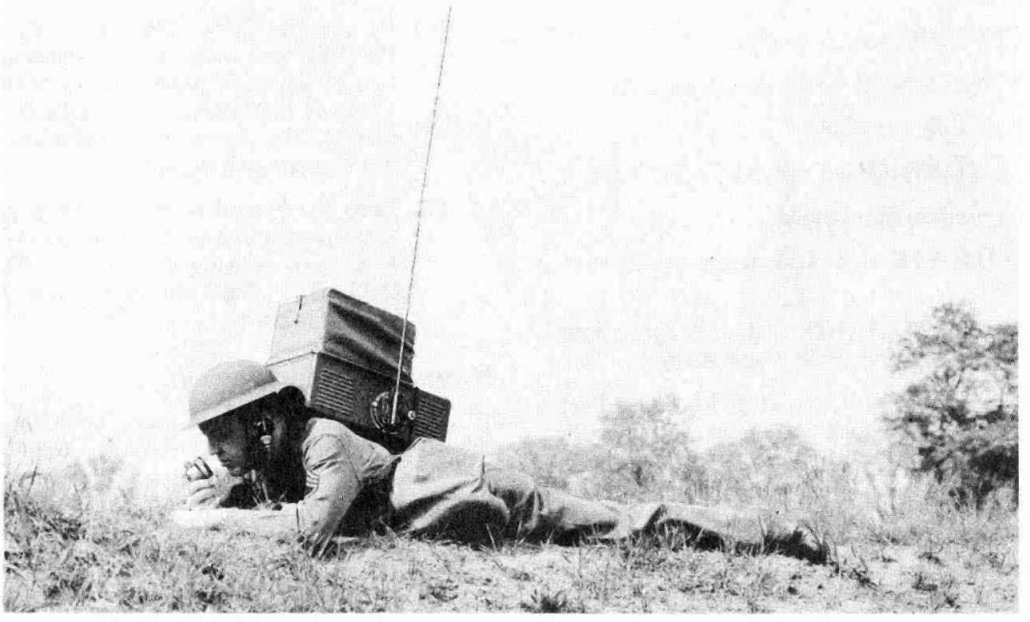


Fig. 3—Wireless Set No. 48, Mark I, in use—prone position

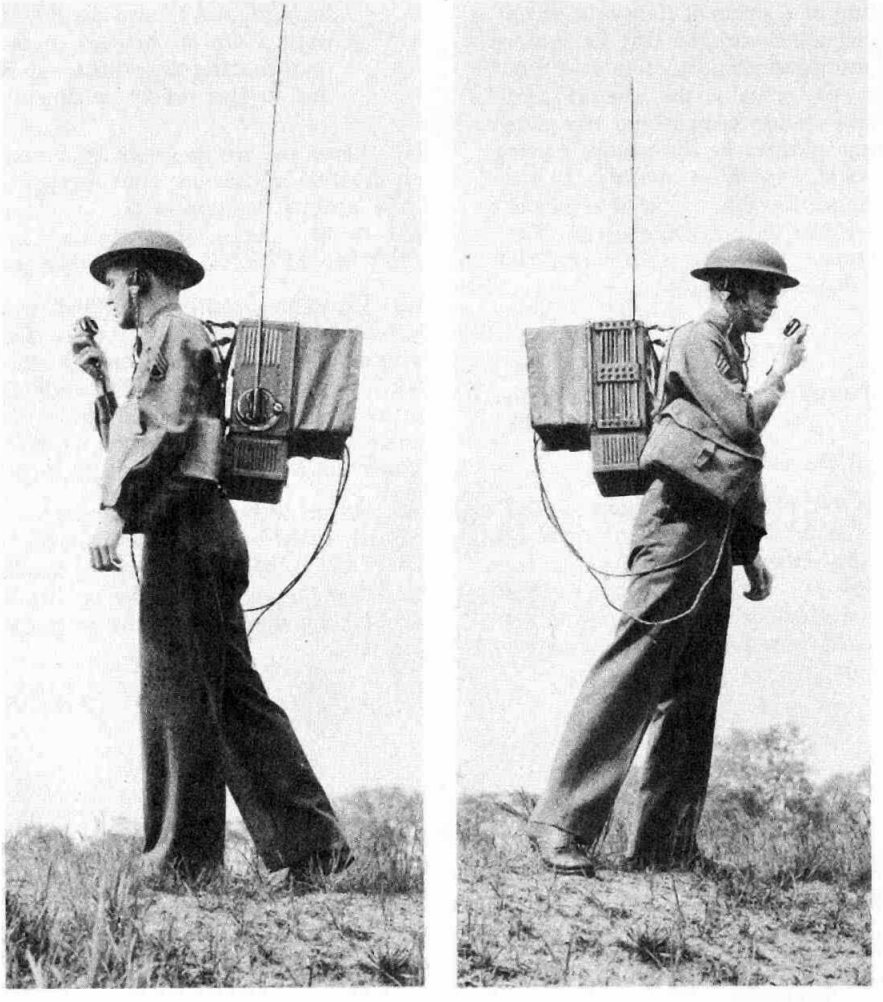


Fig. 4—Wireless Set No. 48, Mark I, in use—upright position

WIRELESS SET No. 48, MARK I
GENERAL AND THEORETICAL DESCRIPTION

Purpose

1. Wireless Set No. 48 is intended primarily for short-range communication within infantry battalions and R.A. regiments and provides facilities for radio telephony and continuous wave telegraphy. It may be used as a ground station for working in the open or from cover, as a man-carried pack set for working on the move, and from vehicles either at rest or on the move, provided that they are suppressed to eliminate interference from their electrical systems.

Basic data

2. The sender, receiver, rod aerial and battery are all carried in one case which is fitted with straps to allow it to be carried on a man's back. A separate battery, which is larger than the one that fits into the set, is provided for use when necessary. The microphone, headphones, key and ground aerial are all carried in a satchel, signals.

3. Frequency range ..... 6.0-9.0 Mc/s

Intermediate frequency ..... 455 Kc/s

Receiver valves: V.1.A.—R.F. amplifier 1LN5
V.1.B.—I.F. amplifier 1LN5
V.2.A.—Frequency changer 1LA6
V.3.A.—2nd detector/BFO 1LD5
V.3.B.—1st L.F. amplifier/AVC 1LD5
V.4.A.—Output 1A5GT

Sender valves: V.4.B.—Master oscillator 1A5GT
V.5.A. and B.—Power amplifier (2 valves) 1299
V.3.C.—Modulator/crystal oscillator 1LD5

Power supply: Battle battery ..... 162/3V.
or Generators, Hand, 10 watts, Mark II

Consumption at 150 V H.T. and 3 V L.T.

	H.T.	L.T.
Receiving R.T.	7mA	160mA
Receiving C.W.	8mA	160mA
Sending R.T.	27mA	385mA
Sending C.W. (key down)	59mA	300mA
Netting	15mA	240mA
Calibrating	25mA	225mA

Weights and dimensions

Wt. lb.	Overall Dimensions		
	Breadth in.	Length in.	Height in.
(a) 29	11⅜	10½	17⅜
(b) 5	9	11½	3
(c) 23½	11½	14½	4

(a) Set and battery in case.

(b) Satchel Signals containing 2 Rcrs., headgear, 1 microphone, 1 ground aerial, key and plug.

(c) External battery case.

Range

4. The set is designed to work under all conditions up to a range of 2,000 yds., the following being the approximate ranges with the different types of aerial normally used.

Type of aerial	Range for R/T (miles)	Range for W/T (miles)
10-ft. rod (11 sections)	5	10
6-ft. rod (7 sections)	2-5	4-10
Ground aerial	1-3	2-6

5. If horizontal aerials, either windom or end-fed, are used, considerably greater ranges can be obtained. Owing to the possibility of interference with distant stations, such aerials should be used only if special orders are issued to do so.

MECHANICAL DETAILS

6. Wireless Set No. 48 is housed in a ribbed steel case embodying a rucksack frame. The front of the case is closed by hinged metal flaps and a canvas hood. This hood, which is open when operating the controls of the set, gives protection against bad weather conditions. The canvas is easily detached for decontamination. The sender slides into the lower section of the case, and the receiver into the upper. Both are held in position by securing screws and may be readily withdrawn for inspection. The rod aerial consists of sections of painted steel tubing. Eleven are carried in a rack at the side of the set. The rod aerial is mounted on a rotatable moulded plug at the side of the case which allows it to take up a vertical or horizontal position, so that whether the operator is upright or in the prone position the aerial will be vertical. The rotatable moulded aerial mounting plug is fitted with a spring the purpose of which is to restore the aerial to its normal vertical position if it should be deflected by contact with low-hanging tree branches or other similar obstructions. Provision has been made for fixing its position at different points in the arc of the track for the fixing screw and knurled nut which secures the aerial in position. The aerial sections are spigoted and may be firmly joined together to form a rod aerial up to 10 feet in height. Three tubings of different diameters are used to make up the rod aerial; the largest, of darkest colour, should be at bottom and the smallest, of lightest colour, at the top, when they are assembled. Connection between battery and sender unit and sender and receiver units is completed by using cables terminating in suitable plugs.

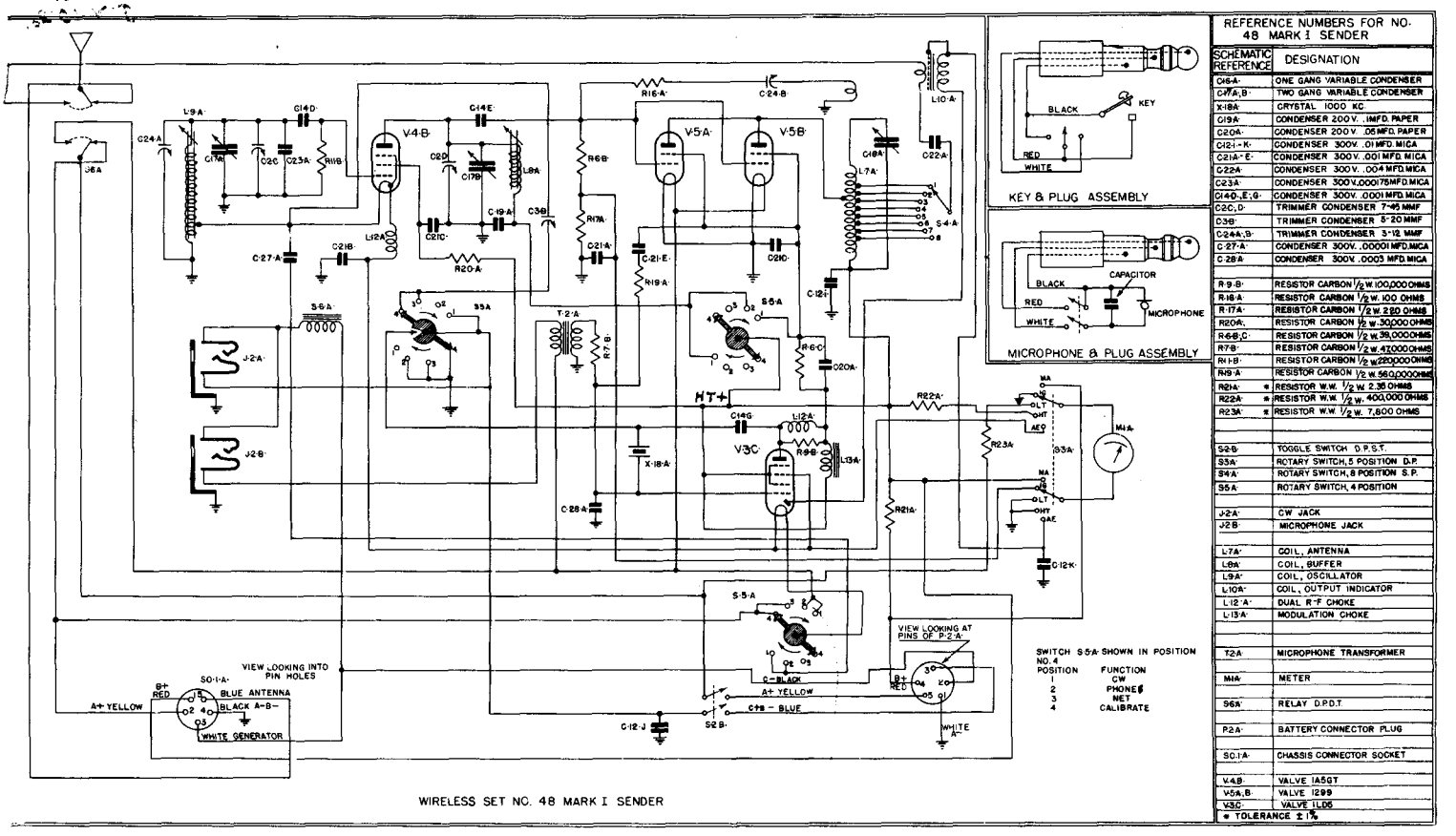


Fig. 1—Circuit diagram, Sender

ELECTRICAL DETAILS

General

7. The frequency range, from 6.0 megacycles to 9.0 megacycles (50 metres to 33 metres), is covered in a single band. The signal frequency of the sender is generated by a master oscillator circuit followed by a single power amplifier. The aerial is autocoupled to the power amplifier by aerial taps on a parallel tuned output circuit. There are thus three tuning controls, the M.O. TUNING, AERIAL TUNING and Æ SWITCH.

THE SENDER

8. The controls are as follows:—The ON-OFF SWITCH S2B breaks the 3 V L.T., the 150 V H.T., and the 12 V supplies, from both the sender and receiver units. The AERIAL TUNING dial is associated with the variable condenser C16A, which controls the tuning of the output circuit of the power amplifier, in conjunction with the AERIAL SWITCH. The AERIAL SWITCH selects the correct tapping point on the inductance coil of the power amplifier. The M.O. TUNING dial is connected to a two-ganged condenser C17A, C17B, which controls the tuning of the master oscillator circuit, and is the main control for the setting of the emitted frequency.

The master oscillator

9. The master oscillator V4B is of the electron-coupled type, the inner grid and screen operating as the oscillator. The filament is tapped into the grid coil at a suitable point, thus including the lower end in the screen circuit. The oscillator circuit consists of L9A and the trimmer C2C tuned by variable condenser C17A. A suitable bias voltage is maintained by C14D and R11B, and by a careful choice of value, the anode current which follows the control grid variation, has a considerable harmonic content. The second harmonic or double frequency component is developed across the appropriate tuned anode circuit consisting of L8A and the trimmer C2D, tuned by the variable condenser C17B. Coupling between the master oscillator and power amplifier is by means of the condenser C14E. The two variable condensers, C17A and C17B are ganged together.

The power amplifier

10. The power amplifier, V5A, V5B has its drive voltage developed across R6B. A suitable bias voltage is maintained by R6B. The anode circuit consists of L7A and is tuned by C16A. Neutralizing of the grid anode capacity is accomplished by several turns on anode coil L7A which are coupled to grid circuit of V5A and V5B by means of trimmer condenser C24B.

Modulation and keying

11. Screen grid modulation is used. The pentode section of V3C operates as an audio amplifier, the anode of which is coupled to the screen grid of the power amplifier through C20A and R6C. Microphone transformer T2A matches the 200 Ω microphone to the grid of the audio amplifier. A negative feedback voltage applied to the grid of the audio amplifier through C21E and R19A, serves to reduce the distortion introduced by the audio amplifier at high percentages of modulation. Keying is accomplished in the negative return circuit of the high tension supply.

The aerial tuning

12. The No. 48 set is designed for use with several types of aerial, and in order to obtain the maximum power output from the sender (and therefore the greatest range) the aerial in use must be correctly matched to the output stage. In order to obtain the best results under conditions that are likely to be met in practice, an aerial matching circuit is provided. This consists of aerial switch S4A which can select any one of 8 taps on P.A. anode coil L7A. In practice the tap which gives the highest reading on the aerial current meter is used.

The send-receive relay

13. The send-receive relay is spring loaded so as to return to the receive position as indicated in the circuit diagram. In this position, the contacts connect the aerial to the receiver and connects the filament supply to the filaments of the receiver. When the pressel switch on the microphone is pressed, or the switch on the key plug assembly operated, the relay coil is energized by the 12 volt supply causing the relay to operate and changing the contacts over to the send position. The aerial is now connected to the sender and the filament supply is connected to sender filament.

The C.W. PHONE NET CALIBRATE switch (function switch)

14. The Sender is switched to its various operating conditions by means of the C.W. PHONE NET CAL. switch. In the PHONE and C.W. position the entire transmitter is operating. In the NET and CAL. position the master oscillator filaments are connected to receive side of filament contacts on the send-receive relay permitting both the receiver and master oscillator to operate simultaneously. Detailed circuit functions in the three switch positions are given in succeeding paragraphs.

R/T position of the function switch (Fig. 2)

15. The screen grid of the P.A. valves, with the switch in the R/T position, are not connected direct to the H.T. line, but through an L.F. choke in common with the anode circuit of the modulator valve, thus setting up the circuit for screen grid modulation of the power amplifier. The negative of the 120 V H.T. and the positive of the 12 V battery are connected direct to earth (Fig. 1, Switch S5A, Section 2). The change in the working conditions of the P.A. valves when the direct H.T. is removed from the screen grids has a small reflected effect on the frequency of the master oscillator, this is compensated for by the disconnection of the .00001μF condenser from the cathode portion of the oscillator tuning coil.

16. When the pressel switch of the microphone is operated the microphone is joined in series with the L.T. battery (3 V) and the primary of the microphone transformer. At the same time the other contact of the pressel switch earths the relay S6A to complete the circuit for the 12 V battery. The relay is operated to switch the aerial and the 3V filament battery to the sender. When the pressel switch of the microphone is released, the microphone is removed from the transformer, and the relay contacts fall back, switching the aerial and the L.T. battery from sender to receiver.

C.W. position of the function switch (Fig. 3)

17. In the C.W. position the circuit connections are shown in skeleton form in fig. 3. The oscillator tuned circuit is coupled between the signal grid and filament (cathode) of V4B (1A5GT). The amplified oscillatory voltage in the anode circuit is fed to the grids of V5A and V5B. (Two valves are connected direct to the H.T. line, thus short-circuiting the audio frequency modulator stage (fig. 1, Switch S5A, Section 3, contact 1). The oscillatory power in the anode circuit of the P.A. is applied to the aerial through the aerial switch, the blocking condenser, .004μF, and the make contact of relay S6A.

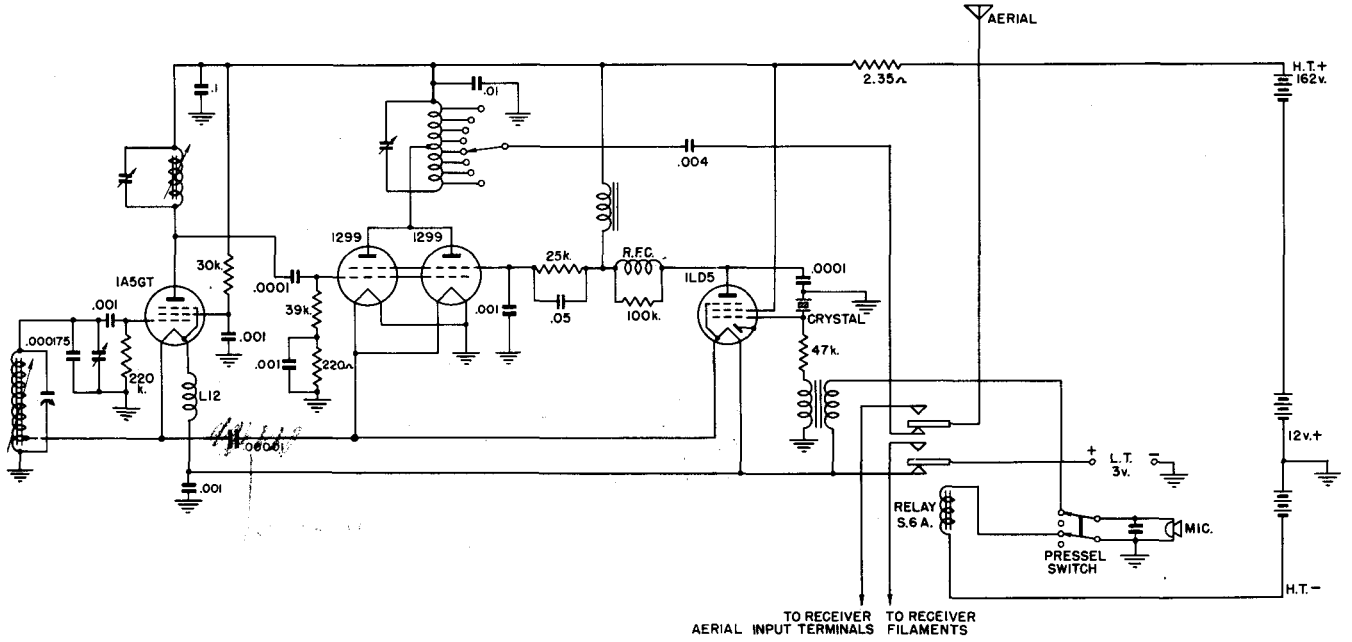


Fig. 2—Skeleton Diagram of Circuit Connections with Function Switch at R/T Position

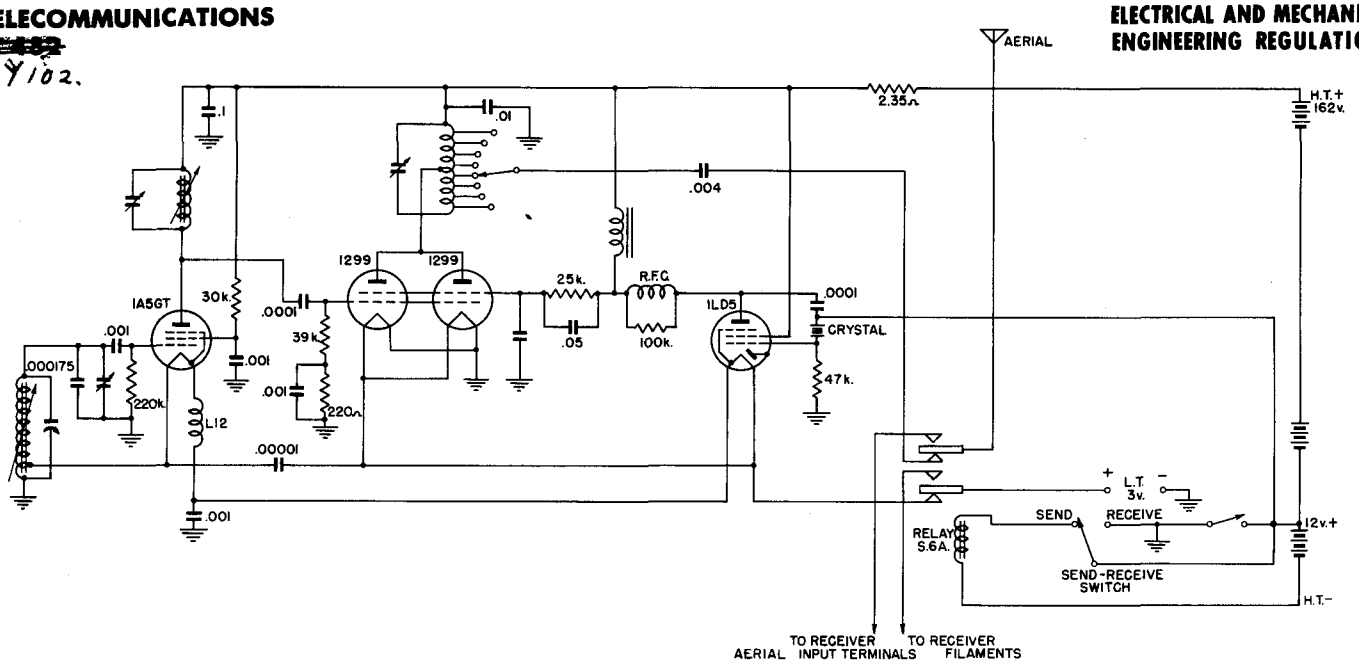


Fig. 3—Skeleton Diagram of Circuit Connections with Function Switch at C.W. Position

NET position of the function switch (Fig. 4)

18. In this position the filaments of the P.A. valves are disconnected from the L.T. battery, while the master oscillator, modulator and all the receiver valve filaments are together connected to the L.T. battery. This enables the master oscillator frequency to be adjusted so that a beat note is heard between the incoming signal and the master oscillator. When zero beat is obtained, the sender is adjusted to radiate exactly the same frequency as the signal being received. The calibrating crystal is rendered inoperative by an earth connection. In both the NET and CAL. position of the function switch there is no H.T. on the anode of the master oscillator valve (1A5GT), the screened grid, however, is still connected to the H.T. and the valve functions as a triode. This change in the working condition has a small effect on the frequency of the master oscillator, a small trimmer condenser (5-20pF) is therefore switched in parallel with the cathode portion of the master oscillator tuning coil, during the netting and calibration operations, to compensate for this change.

CAL. position of the function switch

19. The connections in this position are identical with those on NET except that the earth connection is removed from the calibrating crystal. The modulator valve now becomes a crystal controlled 1 Mc/s oscillator which can be heterodyned with the master oscillator, there being sufficient coupling in the wiring for the beat note to be heard in the receiver. The trimmer condenser C24 (3-12pF) across the oscillator tuning coil is provided to align the dial at the 9, 8, 7 and 6 Mc/s points.

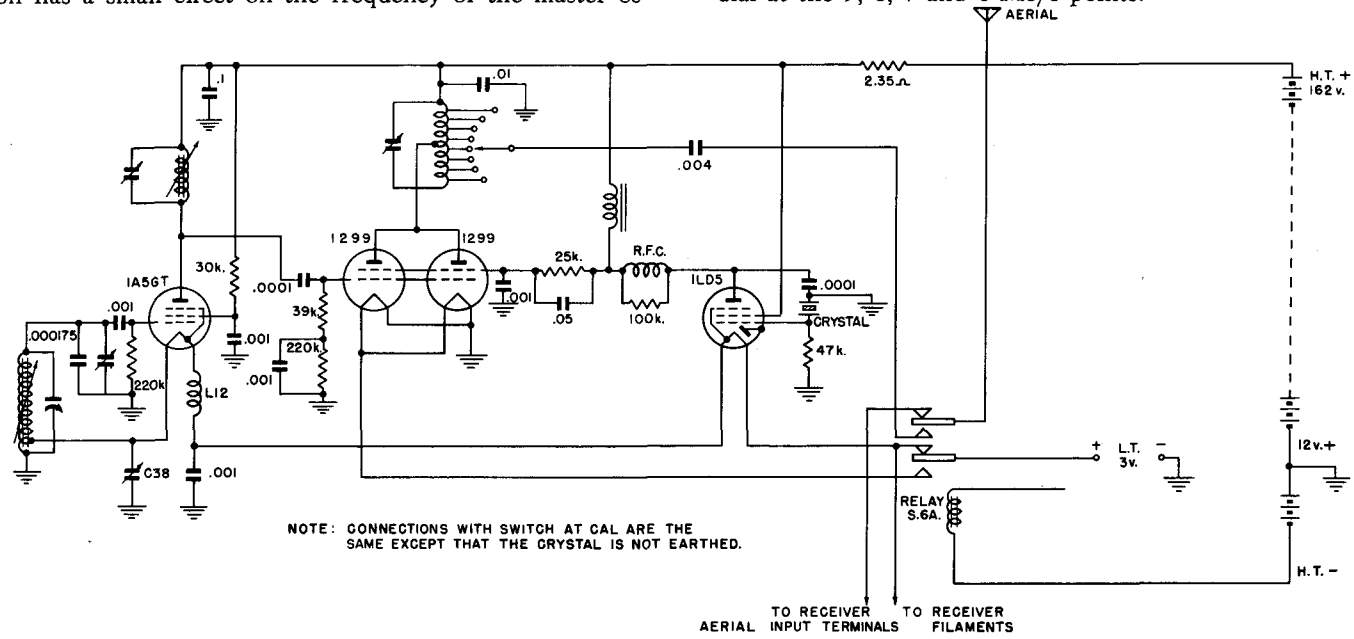


Fig. 4—Skeleton Diagram of Circuit Connections with Function Switch at NET Position

THE RECEIVER

20. The receiver is of the superheterodyne type covering a frequency range of 6 to 9 megacycles. The signal, upon passing through the aerial matching transformer, L4A secondary of which has an adjustable iron core and is tuned by the first section of the gang condenser C1A and its trimmer C2A, is applied to the control grid of the R.F. amplifying valve, V1A. Coupling between the R.F. amplifier and the frequency changer V2A is via the condenser C10A, and the anode impedance L5A, which has an adjustable iron core and is tuned by the second section of the gang condenser C1B and its trimmer C2B. The triode portion of the frequency changer functions as the local oscillator producing a frequency which is 455 Kc/s lower than the signal frequency. The oscillator circuit comprises the adjustable iron core transformer, L6A, which is tuned by the third section of the gang condenser, C1C, and its trimmer C3A, and includes a temperature compensated condenser C15A having a fixed value of 25 pF. The injection of oscillator voltage is accomplished internally by the electron stream.

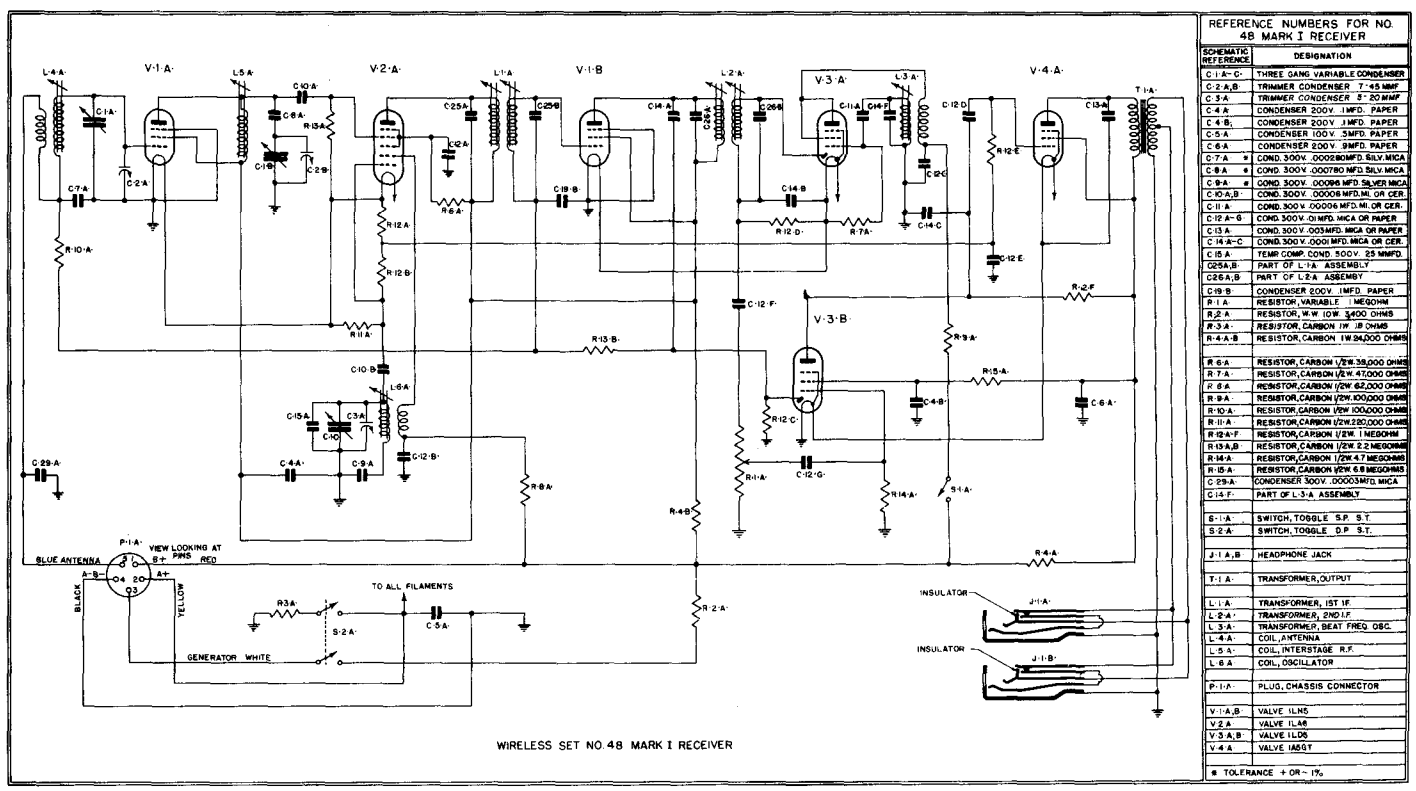
21. I.F. transformers tuned to the intermediate frequency of 455 Kc/s are used to couple the frequency changer, V2A, and the I.F. amplifying valve, V1B, to the single-diode-pentode, V3A, which provides signal rectification and the heterodyne note for the reception of C.W. signals. The heterodyne note is obtained by operating the pentode section of V3A in an oscillating circuit (screen grid connected to plate to form a triode) tuned to 455 Kc/s. Injection into the signal rectifier diode from the beat frequency oscillator is accomplished through the internal coupling capacity inherent in V3A. The audio component obtained from the signal rectifier diode in V3A is applied to the grid of the first L.F. amplifier valve, V3B, through the L.F. volume control, R1A. AVC voltage is obtained by coupling the intermediate frequency signal voltage through C14A to the diode contained in valve, V3B. The D.C. component produced by carrier rectification supplies a control bias to the grids of valve V1A and V1B.

22. Additional audio amplification, obtained in valve, V4A, is matched into a tapped output transformer, T1A, to operate headphones having an impedance of either 4000Ω or 200Ω.

23. Bias for valve V4A is obtained from the frequency changer valve, V2A, by tapping a portion of the D.C. voltage present in the oscillator grid. Switch S2A, when in generator position, supplies the required voltage to operate the send-receiver relay through R2A. R3A is also introduced to present a constant load to the generator filament supply.

Power supply

24. The set may be operated from either a dry battery power supply or a manually operated generator. Both of these power supply units supply 150 V H.T., 3 V L.T. and 12 V for relay operation.



REFERENCE NUMBERS FOR NO. 48 MARK I RECEIVER

SCHEMATIC REFERENCE	DESIGNATION
C-1 A-C	THREE GANG VARIABLE CONDENSER
C-2 A,B	TRIMMER CONDENSER 7-45 MMF
C-3-A	TRIMMER CONDENSER 5-20 MMF
C-4-A	CONDENSER 200V. .1 MFD. PAPER
C-4-B	CONDENSER 200 V. .1 MFD. PAPER
C-5-A	CONDENSER 100 V. .5 MFD. PAPER
C-6-A	CONDENSER 200 V. .9 MFD. PAPER
C-7-A *	COND. 300V. .00028 MFD. SILV. MICA
C-8-A *	COND. 300V. .00078 MFD. SILV. MICA
C-9-A *	COND. 300V. .00096 MFD. SILVER MICA
C-10-A,B	COND. 300V. .00008 MFD. MI. OR CER.
C-11-A	COND. 300 V. .00006 MFD. MI. OR CER.
C-12-A-G	COND. 300V. .01 MFD. MICA OR PAPER
C-13-A	COND. 300 V. .003 MFD. MICA OR PAPER
C-14-A-C	COND. 300 V. .001 MFD. MICA OR CER.
C-15-A	TEMP. COMP. COND. 500 V. 25 MMFD.
C25A,B	PART OF L-1-A ASSEMBLY
C26A,B	PART OF L-2-A ASSEMBLY
C-19-B	CONDENSER 200V. .1 MFD. PAPER
R-1-A	RESISTOR, VARIABLE 1 MEGOHM
R-2-A	RESISTOR, W.W. 10W. 3,400 OHMS
R-3-A	RESISTOR, CARBON 1W. 1/2 OHMS
R-4-A-B	RESISTOR, CARBON 1W. 34,000 OHMS
R-6-A	RESISTOR, CARBON 1/2W. 39,000 OHMS
R-7-A	RESISTOR, CARBON 1/2W. 47,000 OHMS
R-8-A	RESISTOR, CARBON 1/2W. 62,000 OHMS
R-9-A	RESISTOR, CARBON 1/2W. 100,000 OHMS
R-10-A	RESISTOR, CARBON 1/2W. 100,000 OHMS
R-11-A	RESISTOR, CARBON 1/2W. 250,000 OHMS
R-12-A-F	RESISTOR, CARBON 1/2W. 1 MEGOHM
R-13-A,B	RESISTOR, CARBON 1/2W. 2.2 MEGOHMS
R-14-A	RESISTOR, CARBON 1/2W. 4.7 MEGOHMS
R-15-A	RESISTOR, CARBON 1/2W. 6.8 MEGOHMS
C-29-A	CONDENSER 300V. .00003 MFD. MICA
C-14-F	PART OF L-3-A ASSEMBLY
S-1-A	SWITCH, TOGGLE S.P. S.T.
S-2-A	SWITCH, TOGGLE D.P. S.T.
J-1 A,B	HEADPHONE JACK
T-1-A	TRANSFORMER, OUTPUT
L-1-A	TRANSFORMER, 1ST I.F.
L-2-A	TRANSFORMER, 2ND I.F.
L-3-A	TRANSFORMER, BEAT FREQ. OSC.
L-4-A	COIL, ANTENNA
L-5-A	COIL, INTERSTAGE R.F.
L-6-A	COIL, OSCILLATOR
P-1-A	PLUG, CHASSIS CONNECTOR
V-1 A,B	VALVE 1L N5
V-2-A	VALVE 1L A6
V-3 A,B	VALVE 1L D5
V-4-A	VALVE 1A5GT

* TOLERANCE + OR - 1%

Fig. 5—Circuit Diagram—Receiver

AERIALS

The rod aerial and ground aerial

25. The aerials normally used with Wireless Set No. 48 are the rod aerial or ground aerial. The rod aerial sections may be mounted on the set for a self-supporting aerial up to 10 ft. in height. The ground aerial consists of 25 ft. of insulated wire, connected to the aerial socket on the set by a single plug at one end of the wire. It is intended primarily for working from trenches and other forms of cover where a vertical rod would be too conspicuous. It is thrown along the ground in the general direction in which communication is desired and may be used in conjunction with the rod aerial. It is normally carried in the satchel, signals with the headphones and hand microphone.

Rod aerial control

26. The section rod aerial is carried, dismounted, on the right-hand side of the case when not in use. The normal operating position, with aerial sections assembled, is vertical in the aerial connector assembly, with the knurled nut on the connector assembly left loose. The aerial may then be adjusted to any position between vertical and 90° from vertical (towards the doors) by grasping and rotating the connector assembly to the desired position and tightening the knurled nut. At the 90° position, however, the aerial will remain in position with the nut loose. With a seven section rod aerial in use, pressing inward on the knurled nut will automatically spring the aerial back to its original vertical position. Provision is made for adjusting the spring tension of the antenna housing to accommodate a full eleven section rod aerial. This adjustment should be made in the workshop. (See Tels. F 493, Para. 15).

CAUTION. With less than a seven-section aerial in use, the automatic release from the 90° position to the vertical position by pressing inward on the knurled nut should not be used. The lowest section should be grasped in one hand and the aerial then allowed to slowly return to the desired position. Failure to do this may result in injury to the operator and damage to the equipment.

Use of a counterpoise earth

27. Wireless Set No. 48 does not normally require an earth connection. In certain circumstances, however, slightly better results are possible using a counterpoise earth attached to the earth terminal fitted on the left-hand side of the sender case. This earth may be an earth mat, a bunch of wires or any convenient metallic object large enough in size. If the ground aerial is not otherwise in use it may serve as a counterpoise when connected to the earth terminal on the set and extended on the ground beneath or near the aerial. To use a counterpoise earth with the ground aerial, connect about 25 ft. of insulated wire to the earth terminal and extend it on the ground in the direction opposite to that of the ground aerial. The straight line formed by the ground aerial and its counterpoise earth should be roughly in the direction of the desired station.

END

APPENDIX I

Various changes have been made in design, and a new Mark of Set has consequently been introduced. Mark I* Sets are marked Order No. 7597—PHILA-43. The changes introduced are as follows:—

SENDER

1. (a) R6C, Resistor carbon ½ W 39,000 Ω has been omitted.

   (b) R5A, Resistor carbon ½ W 25,500 Ω has been added across C2OA to increase R/T power output by 25%.

   (c) Design of dial lock has been changed to eliminate dial shift when locks are tightened.

   (d) R24A, Resistor carbon ½ W 16,000 Ω has been added in series with meter when switched to AE, in order to equalise AE current readings.

RECEIVER

2. (a) Dial lock change as for sender.

   (b) C15A, temperature compensating condenser has been changed in value from 20 pF to 25pF to assure the necessary capacity range for alignment.

3. The following changes have been introduced within the new Mark and affect serial Nos. 3676-8000 inclusive:—

   (a) Condenser C19C; 200V 0.1μF has been added to the receiver in parallel with C4A.

   (b) A slight change in mechanical design of I.F. Transformers L1A and L2A has been made, but this does not affect interchangeability.