Instruction Manual

for

TRANSMITTER *with* RECEIVER

Pamphlet Ref. T. 42

Printed and Published by

THE MARCONI INTERNATIONAL MARINE
COMMUNICATION COMPANY LTD.
Marconi House, Chelmsford.

MARCONI'S WIRELESS TELEGRAPH COMPANY LTD.
Marconi House, Chelmsford.

Instruction Manual

Correction Note to Pamphlet T.42.

Owing to the introduction of improved technique in the design of the Vibrator power unit, the need for the cut-out "Z4" no longer arises.

Reference to this unit should, therefore, be deleted from the text, component lists and layouts, and the diagrams amended as indicated.

Diagram WE/W.13100/D, Sheet 1A.

Delete Z4 from "View looking on underside" and from "Front View."

Diagram WZ.2856/C, Sheet 1.

Delete Relay Z4. Connection from Resistance R.63 and from Vibrator power supply proceeds direct to Z2/1.

Diagram WE/W.13100/D, Sheet 1.

Delete Relay Z4. Connection from terminal 1 (Z2) proceeds direct to R.63.

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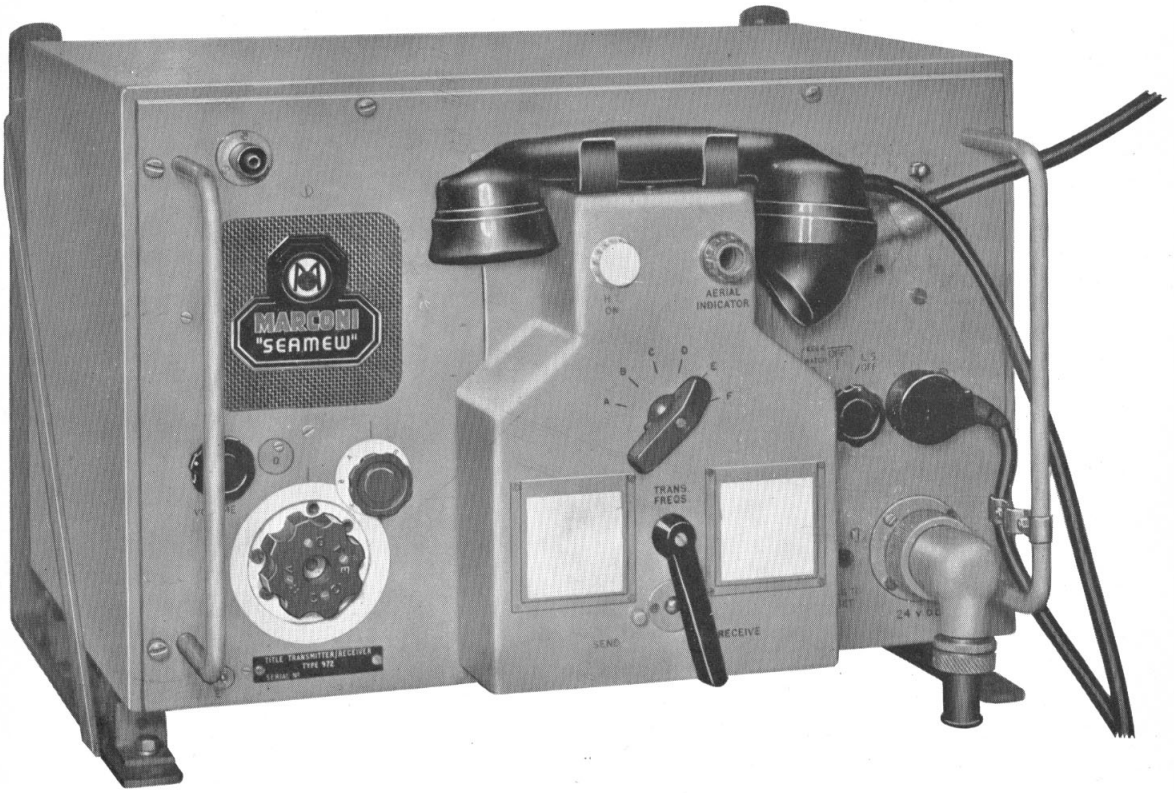


Marconi Marine "SEAMEW" Radiophone Transmitter and Receiver.

"SEAMEW" Radiophone Remote Control Unit.

CONTENTS.

SECTION 6.

INSTALLATION.

SECTION 7.

COMPONENT SCHEDULES, COMPONENT LOCATION DIAGRAM AND CIRCUIT DIAGRAM.

INTRODUCTION.

The " SEAMEW " is a self-contained Transmitter/Receiver Unit primarily developed for telephony communication between small vessels such as Drifters, Trawlers, etc., over relatively short distances. The Transmitter is crystal controlled and anode modulated.

The Receiver is a superheterodyne type with A.G.C. Rapid selection of 6 spot frequencies is provided on both the Transmitter and Receiver.

A remote control unit (Type 978) is available for distant operation of the Transmitter/Receiver Unit (excepting frequency selection).

A 24 volt battery furnishes the input power.

- DESCRIPTION -

OPERATING AND SERVICING INSTRUCTIONS

FOR

MARCONI "SEAMEW" TRANSMITTER with RECEIVER.

●

SECTION 1.

DATA SUMMARY.

1. **Installation.**

The complete equipment comprises :—

Transmitter/Receiver Unit Type No. 972.
Remote Control Unit Type No. 978 (optional).
Battery 24 volts, 144 A.H.

2. **Aerial Arrangements.**

Maximum Capacity 350 μμF.
Natural Period 170 metres.
Resistance 10 ohms.

Minimum Capacity 200 μμF.
Natural Period 70 metres.
Resistance 10 ohms.

3. **Operation** (Local/or Remote Control).

(*a*) Send/Receive.
(*b*) Receiver Constant Watch.

4. **Transmitter :—**

Frequency Range	..	1.5 to 3.5 Mc/s.
Power Output	..	5.0 watts (unmodulated) to aerial circuit.
Frequency Control	..	Crystal controlled M.O.
Frequency Tolerance	..	± 0.02%.
Spot Frequency Selection		6 spot frequencies by single control handle.
Type of Transmission	..	(Type A3) Telephony.
Modulation	.. ..	Anode modulation up to 80%, input from handset microphone type 500.
Power Supply	.. ..	24 volt, 144 A.H. Battery.
*Power Input	.. ..	4.0 amperes at 24V. D.C.
Valves	.. ..	1. Master Oscillator .. 1 EF.50.
		2. Isolator .. .. 1 EF.50.
		3. Modified Amplifier 1 807.
		4. Modulator .. .. 1 807.

5. **Receiver :—**

Frequency Range	..	1.5 to 3.5 Mc/s.
Output	..	To a low impedance handset (600 ohms) and a (3.5 ohms) loudspeaker.
Spot Frequency Selection		6 frequencies (in addition to continuous tuning control).
Sensitivity ..	..	(MCW 10 dBs 30% mod. signal/noise ratio)
		1.5 Mc/s 9 μV.
		3.5 Mc/s 2 μV.
Image Protection	..	1.5 Mc/s 65 dB.
		3.5 Mc/s 48 dB.
Input Impedance	..	Nominally 200 μμF.
Power Supply ..	..	24 volt, 144 A.H. Battery.
*Power Input ..	..	1.7 amps. at 24 V.D.C.

Valves	1.	Frequency Changer	1 X61M.
	2.	I.F. Amplifier	1 KTW.61.
	3.	2nd Detector and 1st L.F. Amplifier	1 DH.63
	4.	Output	1 6V6G.

*Total power input, Transmitter and Receiver, 5.1 amps. at 24V. D.C.
This is maximum power from mains on " SEND " with " RECEIVER " desensitised.

6. **Weights and Overall Dimensions.**

(*a*) Complete Transmitter/Receiver Unit.

Height	..	1 ft. $2\frac{1}{8}$ ins.
Width	..	1 ft. $7\frac{1}{2}$ ins.
Depth	..	1 ft. $5\frac{3}{4}$ ins.
Weight	..	81 lbs.

(*b*) Remote Control Unit :—(Optional fitting).

Height	..	10 ins.
Width	..	$11\frac{9}{16}$ ins.
Depth	..	$5\frac{7}{16}$ ins.
Weight	..	32 lbs.

SECTION 2.

OPERATING INSTRUCTIONS.

It is assumed that the equipment has been installed in accordance with the instructions in Section 3 and Section 6. The reference numbers in the instructions below are shown in drawing WZ.2834/C Sht. 1.

Safety Precautions.

If the unit has to be withdrawn for replacement of consumable parts, first remove the 24V. supply.

A. SEND/RECEIVE OPERATION.

Transmitting.

1. Set control (reference 1) to the frequency or wavelength upon which it is desired to communicate.
2. Remove handset (reference 2) from the retaining clips on the front cover.
3. Wait (approximately 30 seconds) until the " H.T. ON " indicator lamp (reference 3) lights, this shows that H.T. power is switched on.
4. Set the " SEND/RECEIVE " Switch (reference 4) to " SEND " when the AERIAL Indicator Lamp (reference 5) will glow, or to " RECEIVE " for normal S/R operation.

Reception.

1. **Spot Frequency Selection.**
   (*a*) Rotate knob (reference 7) until the required letter (indicating the spot frequency) is opposite the pointer.
   (*b*) Adjust knob (reference 8) until the click mechanism engages.
2. To obtain continuous variation of tuning, *i.e.*, spot frequency selector disengaged, turn knob (reference 7) until the blank space is opposite the pointer.
3. The volume level is adjusted by means of control knob (reference 10).
4. If reception on the earpiece of the handset only is desired set the switch (reference 6) to the position marked " L.S. OFF."

B. RECEIVER CONSTANT WATCH (LOUDSPEAKER RECEPTION).

1. See that handset (reference 2) is clipped in position on the front cover.
2. Set Switch " REC. WATCH " (reference 6) to " ON " position.
3. Wait until " H.T. ON " Indicator Lamp (reference 3) lights up showing H.T. power is on.

C. REMOTE OPERATION.

When the Remote Control is to be used, change over of control from local and remote is carried out as follows :—

1. Remove the local handset plug (reference 13) from the socket on the transmitter and insert the plug (reference 14).
2. The local handset (reference 2) must be clipped into place on the front cover.
3. Set switch (reference 6) to " OFF."
4. Set control (reference 1) on the transmitter to the spot frequency required.
5. Set receiver tuning selector (reference 7) to the spot frequency to be received and adjust the receiver tuning control (reference 8) until the " click " mechanism engages, then adjust volume control (reference 10) to give a suitable volume.

REMOTE OPERATION SEND/RECEIVE.

The reference numbers in the instructions below are shown in drawing WZ.2835/C Sht. 1.

6. Lift the cover and remove the handset (reference 4).
7. Wait until the " H.T. ON " Indicator Lamp (reference 3) lights showing H.T. power is on.
8. Set the " SEND "/" RECEIVE " switch (reference 1) to " SEND " or " RECEIVE " for normal S/R operation.
9. If reception by the earpiece of the handset only is desired set the switch (reference 2) to " L.S. OFF."

RECEIVER WATCH. (LOUDSPEAKER RECEPTION).

10. The handset (reference 4) must be on the " rest " and the cover closed, then set the " REC. WATCH " switch (reference 2) to " ON " position.
11. After approximately 30 seconds the " H.T. ON " Indicator Lamp (reference 3) will light up showing that H.T. has been switched on and that the receiver is ready.

SECTION 3.

TUNING AND SETTING UP INSTRUCTIONS.

The reference numbers in the instructions below are shown in drawing WZ.2834/C Sht. 1.

A. TRANSMITTER.

Note 1. Initial tuning of the transmitter will be carried out without the unit being in its case, with the gate switch shorted and with Aerial and Earth connection on.

Note 2. When making internal adjustments remove the gate switch short to avoid contact with H.T.

Note 3. To obtain access to tuning controls remove the front cover as follows :—

1. Take out screws securing switch handles to control shaft and withdraw handles.
2. Remove handset (reference 2) from clips.
3. Release thumb screws securing cover from rear of front panel.
4. Slightly lift front cover and remove it.
   All tuning controls are now exposed.
5. Replace switch handles and use front cover for reference to switch positions.

1. For crystal frequencies between 1.5 and 2.0 Mc/s connect a padding condenser across the appropriate isolator tuning condenser. See drawing WE/W.13100/D Sht. 1, and note 2 above. For frequencies between 2.0 Mc/s and 3.5 Mc/s the padding condenser is not required.
2. Plug test meter leads across position marked " AMP.G. " on metering panel (see note 2).
3. Set S/R switch control (reference 4) to " SEND."
4. When H.T. is on (indicated by lamp reference 3) adjust appropriate isolator tuning condenser (ABC, etc.) to give a reading of 1.5 milliamps on test meter.
5. Lock the condenser spindles in this position with the tool provided.
6. Before proceeding to tune the amplifier it is important to read the following note.

   Note.—It is very important that the procedure following this note be rigidly followed when tuning the amplifier otherwise considerable difficulty may be experienced in performing this function. This does not imply that the unit will present difficulty but it is possible to tune the output to harmonics of the crystal frequency, also since the aerial constants will vary from one installation to another it has been necessary to establish a correct tuning procedure to avoid difficulty. Therefore FOLLOW THE STEP BY STEP TUNING PROCEDURE GIVEN BELOW COMMENCING WITH THE HIGHEST FREQUENCY.

7. Inspection of the output tuning assembly will show that an Aerial, Inductance and Anode tap is provided for each spot frequency see drawing WZ.2836/C. To tune spot frequency " F."
8. Remove all tapping plugs from sockets and be certain that the free plugs do not make contact with any metal parts.
9. Set the Transmitter Spot Frequency Switch (reference 1) to the position marked " F."
10. Plug " ANODE " tap " F " into a socket at end of the coil nearest the valves.
11. Plug " IND " tap " F " in a socket about 8 turns from panel end of coil.
12. Plug test meter leads across position engraved " AMP.V7 " on metering panel (see note 2)
13. With handset (reference 2) removed from clips and S/R switch (reference 4) set to " SEND," adjust tuning condenser " F " for minimum anode current; if no indication of tune is obtained move " IND " tap two turns away from panel, repeat adjustment of condenser. Continue adjustment of " IND " tap and condenser until a tune position is obtained with the condenser approximately half in.
14. Next move " ANODE " tap " F " down the coil until V7 anode current is 11 to 12 mA retuning condenser " F " after each movement of the anode tap.

15. Now plug in " AERIAL " tap " F " one or two sockets from " IND " tap " F " towards "ANODE" tap "F" and readjust the condenser "F" to tune. Continue adjustment of "AERIAL" tap " F " until condenser " F " is at 10 O'c, *i.e.*, nearly out, or until the " AMP " V7 anode feed is 35 mA, whichever is reached first.

16. If alteration of condenser " F " to approximately 10 O'c is reached first, move " IND " tap " F " one turn at a time towards the anode tap, retuning after each movement of the tap. Continue until the condenser is half in.

17. Now move the " AERIAL " tap " F " one turn at a time until the required anode feed of 35 mA is obtained, keeping to the same condenser minimum.

18. It may be necessary to repeat 15 and 16 again in order to obtain an anode current of 35 mA.
IMPORTANT.—In no circumstances should the anode feed be allowed to exceed 38 mA, otherwise the level of modulation will be affected.
Changing the Isolator V6 and Final Amp V7 valves may render it necessary to make alterations to the circuit adjustments.

19. Where possible a simple absorption wavemeter should be used as a final check that the correct frequencies are being radiated. The accuracy need not be of a high order as the wavemeter would only be required to indicate that the radiation is on the fundamental and not on a harmonic, which would be at least twice the crystal frequency.

20. Check anode currents and grid currents. These should be :—

V5	.. ..	4.0 milliamps.
V6	.. ..	11.0 ,,
V7	.. ..	35.0 ,,
V7	AMP GRID	1.5 ,,
V8	.. ..	54 ,,

21. Speak into microphone and note that intensity of Aerial Indicator increases.

B. RECEIVER.

Setting up of Click Spot Wave Selector. (See drawing WZ.2393/B).

1. Set click selector knob (reference 7) to required letter.
2. Rotate control (reference 8) until click engages.
3. With the aid of a small screwdriver slacken off the click locking screw which is opposite the required spot wave letter on the control knob (reference 8). (These screws, seven in number, appear in recesses around the outside of the control knob). It should now be possible to rotate the control knob without disengaging the click.
4. Rotate the control knob (reference 8) until the required frequency engraved on the scale appears opposite the pointer.
5. Tighten the appropriate screw and ensure that the click engages and disengages properly as the knob is rotated slightly.
6. **Side Tone.** Audio frequency at a suitable level is fed from the Primary of T3 to the Grid of V4 via Contact Assembly 1 on Z5 to provide side tone in the Headset and Loudspeaker.
7. **Desensitising Control.** This must be set fully counter-clockwise for normal operation.

SECTION 4.

DESCRIPTION OF COMPLETE EQUIPMENT.

A. GENERAL DESCRIPTION.

1. **General layout of Transmitter/Receiver Unit.**

   The Transmitter, Receiver and Power Pack are assembled on a common chassis which slides into a splash-proof case mounted on vibration dampeners. Cradles to which the case is secured permit either bench or bulkhead mounting.

2. **Controls : Transmitter.**

   Transmitting Tuning Controls, Crystals, Indicator Lamps, Metering Points and Send/Receive Relay are situated behind a removable cover on the front panel. The only controls exposed for normal operation are the Spot Frequency Selector Switch, Receiver Watch Switch and Handset. Sockets on the Front Panel engage the Power Plug and the Handset or Remote Control Plug.

3. **Start/Stop.**

   The Handset, when not in use, is held by clips on the removable cover and depresses the Start/Stop Switch ; on lifting the Handset the Start/Stop Switch is released and switches power to the Transmitter and Receiver.

4. **Receiver Watch.**

   A separate switch enables the Receiver to be " ON."
   H.T. and L.T. are disconnected from the transmitter to conserve battery power in this condition and the Handset is in the clips.

5. **Controls : Receiver.**

   A Spot Wave Selector Mechanism is fitted to the Receiver Tuning Control, other Receiver Controls are Volume and Receiver Desensitising.
   The Loudspeaker is built into the front panel.

6. **Frequency Charts.**

   Two Charts on the removable Front Cover enable Transmitter and Receiver Spot Frequencies to be recorded.

7. **Indicator Lamps.**

   An Indicator Lamp glows when H.T. is on, a second Indicator Lamp glows when the Aerial is energised.

8. **Replacement of Consumable Components.**

   The location of consumable components, *e.g.*, Valves, Fuses, Indicator Lamps, Crystals and Vibrator Elements are shown on drawing WE/W.13100/D Sht. 1A.

9. **Relay Adjustments.**

   The location of Relays is shown on WE/W.13100/D Sht. 1A, and particulars of adjustments are given on drawing WZ.2853/C Sht. 1.

10. **Safety Gate Switch.**

    When the Transmitter/Receiver Chassis is withdrawn from its case, Filament and H.T. power is automatically removed.

11. **Send/Receive Switch.**

    The use of troublesome Pressel switches in the Handset has been avoided, robust separate switch control on the front panel controls Send/Receive switching.

12. **Loudspeaker and Headphone Reception.**

    A switch enables simultaneous Loudspeaker and Headphone reception during Send/Receive operation, alternatively the Loudspeaker may be switched off for this condition of operation ; for Constant Watch, Loudspeaker reception only is used.

13. **Remote Control Unit.**

A weather-proof Control Unit provides alternative control of the Transmitter/Receiver Unit from a point up to 50 yards distant. This Unit contains a Handset with associated Start/Stop Switch, Loudspeaker, Constant Watch Switch, and H.T. ON Indicator Lamp, together with the facility in (12) above.

B. TECHNICAL DESCRIPTION.

The theoretical diagrams, component schedules and simplified circuit diagrams attached to these instructions should be studied with the text throughout this section.

1. **Power Pack.**

Anode voltage for the Transmitter and Receiver are obtained from a Vibrator element with Selenium Rectifier supplying approximately 160 mA at 300 volts during " SEND." A cut-out in the primary circuit of the Vibrator Transformer opens the L.T. supply if the contacts of a worn Vibrator element momentarily fuse together; the cut-out is re-set from the front panel. Noise filters are incorporated in the Vibrator Circuits.

The smoothed H.T. supply passes to the valve anodes via metering shunts. See drawing WZ.2854/C Sht. 1.

2. **Transmitter.**

(*a*) **Master Oscillator.**

The M.O. maintaining valve provides a low level stable drive to the isolator stage from any one of 6 Crystals. The Anode Circuit is aperiodic and the output capacity coupled to the isolator grid.

(*b*) **Isolator Stage.**

Two ranges enable the output circuit of the Isolator to cover the band in one range of 1.5 to 2.0 Mc/s and one of 2.0 to 3.5 Mc/s. Additional fixed padding condensers are used for the low frequency range. The Isolator is semi-aperiodic, *i.e.*, is not fully tuned but adjusted to give constant drive to the Amplifier throughout the entire range.

Six sets of tuning capacities enable Six Spot Frequencies to be set up anywhere in the band. The output is capacity-coupled to the Amplifier.

(*c*) **Amplifier.**

A tank circuit tunes the output of the Amplifier, the Aerial being directly coupled to the Inductance. Six Variable Condensers are provided for Six Spot Frequencies and Six sets of Pre-Selected Aerial, Anode and Inductance Taps are switched by the Master Spot Frequency Selector Control.

(*d*) **Modulator.**

Anode Choke Modulation is employed to modulate the screen and anode power of the Amplifier. A filter in the Microphone Transformer Circuit provides a 10 dB attenuation of all frequencies above 3,500 cycles per second.

(*e*) **Send/Receive Circuit.**

A Relay controlled by the Send/Receive Switch effects the Aerial Changeover between Transmitter and Receiver, and desensitises the Receiver during transmission and vice versa. See drawing WZ.2855/C Sht. 1.

3. **Receiver.**

Briefly summarised, the circuit comprises a frequency changer, I.F. amplifier, a combined detector and first L.F. amplifier and an output stage.

Considering the circuit in greater detail, reference to drawing WE/W.13100/D Sht. 1 will show that the aerial input circuits comprise two circuits tuned to the signal frequency, to ensure adequate image protection. The tuning of these two circuits L1C7 and L2C8 and that of the frequency change oscillator is carried out by the three gang condenser C7, C8 and C16.

The temperature compensator C38, in parallel with C16, uses a bi-metal vane which corrects for frequency drift of the 1st oscillator.

The I.F. amplifier comprises V2 and two pairs of circuits L4-L5 and L6-L7 tuned to 570 Kc/s by adjustable dust-iron cores.

The second detector and first L.F. amplifier V3 is a conventional double-diode-triode using the second diode as an A.G.C. rectifier ; auto-gain voltage is fed back to both V1 and V2.

A manual control of output level is provided by the potentiometer R.23 in the grid circuit of V3.

The output stage V4 supplies the loudspeaker and handset via separate windings on the output transformer T1. The relay Z3 switches these loudspeaker and handset outputs to either the local or remote position. The loudspeaker impedance is 3.5 ohms while that of the handset is approximately 600 ohms.

Since the primary supply voltage is 24 volts D.C., the valve heaters are arranged in a series formation ; R30 forms a parallel path to the chain V1, V2 and V3, in order to increase the current to the value of 0.45 amps. required for operation of V4. (The former valves take only 0.3 amp.)

Although no manual control of H.F. gain is required, the cathodes of V1 and V2 are returned to earth via a pre-set resistance R4, which is introduced into circuit by the send/receive relay Z5 ; this enables the receiver to be desensitised during transmission.

4. **Control Circuits.**

Individual Control Circuits of the equipment are shown on drawing WZ.2856/C Sht. 1.

C. FULL PERFORMANCE DATA : TRANSMITTER.

1. **Technical Performance.**

The following details show the general performance of the transmitter.

L.F. input at 1,000 cycles to give 80% modulation = 0.8V R.M.S.
L.F. input impedance .. .. = 45 ohms.
Distortion at 80% Modulation .. .. = 8%.
Carrier noise (with microphone connected) .. = —55 dBs.
H.T. volts. .. .. = 300V.

2. **Typical Meter Readings.**

Reference should also be made to Section 5G.

Send/Receive Conditions.

Transmitter.

Position	A	B	C	D	E	F
Frequency Mc/s ..	1.5	1.659	2.3	2.634	2.953	3.5
D.C. Volts in. ..	24	24	24	24	24	24
D.C. Amps. in. ..	5	5	5	5	5	5
H.T. Volts ..	310	309	309	310	308	308
V5 Ia mA	4	3.75	4.0	3.65	4	4.1
V6 Ia ,, ...	12	12.3	11.2	12.2	11.5	10.2
V7 Ia ,, ...	33	34	34	34	34	36
V7 Igl ,, ...	1.5	1.5	1.5	1.5	1.5	1.5
V8 Ia ,, ...	54	54	54	54	55	54

3. **Settings.**

(*a*) **Aerial** 200 $\mu\mu$F + 10 ohms.

Isolator. V6. See drawings WE/W.13100 Sht. 1, and WE/W.13100 Sht. 1A.

Position	A	B	C	D	E	F
Frequency Mc/s. ..	1.5	1.659	2.3	2.634	2.953	3.5
Padding Capacity ..	C64 in across C.58	C63 in across C.57	—	—	—	—

Output Circuit. See drawings WE/W.13100 Sht. 1, and WZ.2836/C Sht. 1.

		IND.		AERIAL		ANODE	
Position	*Frequency M/cs.*	*Bar*	*Socket*	*Bar*	*Socket*	*Bar*	*Socket*
A	1.5	4	6	2	12	4	9
B	1.659	3	8	2	13	2	11
C	2.3	2	10	1	13	4	12
D	2.634	4	10	4	12	4	12
E	2.953	4	10	3	12	1	13
F	3.5	2	12	3	13	2	14

(*b*) **Aerial** 350 $\mu\mu$F + 10 ohms.

Position	*Frequency M/cs.*	*Bar*	*Socket*	*Bar*	*Socket*	*Bar*	*Socket*
A	1.5	2	5	2	9	1	9
B	1.659	4	6	1	10	1	10
C	2.3	4	8	3	10	1	12
D	2.634	3	9	4	10	3	12
E	2.953	2	10	2	11	3	13
F	3.5	3	11	1	12	2	14

D. FULL PERFORMANCE DATA : RECEIVER.

1. **Sensitivity.**

Expressed in terms of the 30% modulated input signal required to give a 10 dB signal/noise ratio when the modulation is switched, the sensitivity for a 200 $\mu\mu$F aerial is :—

2 μV at 3.5 Mc/s.
9 μV at 1.5 Mc/s.

2. **Image Protection.**

48 dB at 3.5 Mc/s.
65 dB at 1.5 Mc/s.

3. **I.F. Selectivity.**

Total Bandwidth at 6 dB attenuation = 5 kc/s.
,, ,, 40 ,, ,, = 23 ,,

4. **A.G.C. Characteristic.**

A 60 dB rise in input signal above 50 μV will produce an increase in output of 15 dB.

SECTION 5.

MAINTENANCE AND SERVICING.

Potentials exist in this equipment which are dangerous, but H.T. is automatically removed when the unit is withdrawn from its case. It is advisable to remove the 24V power plug before removing the unit to avoid short-circuiting the 24V supply inadvertently.

Note.—When testing the unit out of its case by using a shorting bar across the safety gate switch contacts, the dangerous potentials are accessible, therefore *withdraw the 24V power plug whenever making internal adjustments.*

A. MAINTENANCE : TRANSMITTER.

1. Periodical inspection should be carried out as below :—

At three-monthly intervals.

Relay contacts and adjustments.

Valve currents.

At six-monthly intervals.

Chain adjustment and lubrication.

Note.—The send/receive relay Z5 and chain link are located behind the removable front cover (see drawing WE/W.13100/D Sht. 1A).
Other relays Z1, Z2, Z3 and Z4 are beneath the chassis.

2. **Relays.**

Send/Receive Relay Z5.

Description. See WZ.2856/C.

The receiver and transmitter aerial changeover contacts No. 2 are mounted on the "U" shaped insulating block, the left hand contact is connected to the receiver and the right to the transmitter, the moving arm or tongue is connected to the aerial.

Behind the fixed contacts are arranged two sets of auxiliary contacts, the bottom set, No. 1, controls the side tone and the top set, No. 3, the bias of the transmitter and receiver.

Adjustment.

This should be carried out in accordance with the instructions on WZ.2853/C Sht. 1.

Clean the contacts by drawing a folded piece of fine emery paper once or twice between the contacts.

The relays beneath the chassis should also have their contacts cleaned in a similar manner, no pressure on the contacts other than that which can be obtained by manually operating the armature should be used.

3. **Valve Currents.**

The meter readings should be noted and entered in a suitable log, in order that any deterioration of valve, etc., may be detected from an inspection of typical results shown under Section 4C.

4. **Chain Adjustment and lubrication.**

Any adjustment of tension required by the chain may be made by the small jockey pulley attached to the front panel.

When lubricating the chain, first wipe off any existing grease and then regrease with a small quantity of Duckham's Q.1796 grease.

5. **Batteries.**

The accumulators must not be left in an uncharged condition nor must they be allowed to be overcharged.

The cells should be inspected frequently to check specific gravity. Specific gravities, as recommended by the makers are :—

Fully charged	1.284.
Half discharged	1.204.
Fully discharged	1.113.

Gravity readings are at a temperature of 60° F. (16° C.)

The level of the electrolyte, which should be above the tops of the plates, should also be checked, distilled water being added to make up any deficiency.

All connections should be kept clean and tight with a thin film of vaseline over all surfaces.

Note.—It is highly dangerous to use naked lights near accumulator cells. Accumulators on charge should not be left unattended.

6. **Aerial.**

The aerial wire and insulators should be periodically inspected. Any mechanical weakness detected in the wire, etc., should be made good by repair or replacement. Aerial insulators are to be kept free from dirt, grease and carbon deposits. Should there be any defect in the surface glazing of insulators, such as cracks or chipping, the insulator should be replaced.

B. SIMPLE REPLACEMENT SERVICING : TRANSMITTER.

(See drawing WE/W.13100/D. Sht. 1A.)

1. **Valves.**

No difficulty should be experienced in replacing any valve which becomes defective during service. Inspection of the top of the chassis will show that the valve positions are marked V5, V6, V7 and V8, etc.

Type EF.50 valves are fitted into positions marked V5 and V6 and 807's into V7 and V8.

2. **Vibrator.**

The normal life of a vibrator which may be expected is approximately 1,000 hours. The need for replacing the vibrator will generally be indicated by the frequent necessity to reset the cut-out Z4. When replacing a vibrator it is useful to remember that the small pip moulded on the surface of the socket is between the two largest pins which are arranged parallel with the right hand side of the equipment.

3. **Fuses.**

L.T. input fuse of 10 amps. (FZ1) and 250 mA (FZ.4) H.T. fuse, together with two spares of each size are carried inside the equipment.

4. **Electrolytic Condensers.**

When replacing the condensers (reference C.85 and C.86) it is important to see that the insulating washer between the cases of the condensers and the chassis is retained in position, if this is not done the transmitter bias resistances R.56 and R.57 will be shorted, see drawing WE/W. 13100/D Sht. 1.

Care should also be taken in mounting condensers C76, C77 and C78 in the correct way on the sub-panels, otherwise incorrect polarity will be applied to the condensers.

C. MAINTENANCE : RECEIVER.

Routine Inspection.

Little attention is called for in normal use, and maintenance work will usually be restricted to periodical valve replacements.

It should be noted that valve feeds can readily be checked with an ordinary " AVOMETER " by connecting the latter across the metering shunts located on a group board above the crystal sockets (see drawing WE/W.13100/D Sht. 1A); average values of valve feeds are set out on page 22.

D. SIMPLE REPLACEMENT SERVICING : RECEIVER.

(See drawing WE/W.13100/D Sht. 1A).

1. **Valve Replacement.**
   The relative positions of the four receiver valves are shown on the above drawing.

2. **Electrolytic Condensers.**
   Care should be used when replacing condensers C22, C30 and C33, it is important to see that they are mounted the correct way round, *i.e.*, correct polarity.

E. CIRCUIT CHECKS : TRANSMITTER.

1. **Resistance Tests.**
   In the following resistance tests the valves should be removed.

Valveholder Resistances Test Points.	**Resistance Value** (tolerance ± 25%). (Ohms)			
	V5	V6	V7	V8
H.T. + ve to valve pin No. 2 ..	33,000	10,000	33,000	20,000
,, ,, ,, ,, ,, 3 ..	33,000	43	—	—
,, ,, ,, ,, ,, 4 ..	33,000	—	—	—
,, ,, top cap connection ..	—	—	126	140
Earth to valve pin No. 7	100,000	10,000	—	—
,, ,, ,, ,, 3	—	—	100,000	1,600
,, ,, ,, ,, 6	0	330	—	—
,, ,, ,, ,, 4	—	—	0	165

F. CIRCUIT CHECKS : RECEIVER.

1. **Resistance Tests.**
   In the following resistance tests the receiver volume control should be turned fully clockwise, and the pre-set desensitising potentiometer set fully counter-clockwise. Valves should be removed.

Test Points.	**Resistance Value** (tolerance ± 25%).
H.T. + ve to Earth	33,000 ohms.
H.T. + ve to output transformer tag 5	33,000 ohms.
H.T. + ve to Speaker (output transformer tag 7)	33,000 ohms.

Valveholder resistances (tolerance ± 25%). (Ohms).

Test Point	**V1**	**V2**	**V3**	**V4**
H.T. + ve to valve pin No. 3 ..	3,600	3,600	100,000	630
,, ,, ,, ,, ,, 4 ..	25,000	25,000	630,000	0
,, ,, ,, ,, ,, 6 ..	100,000	2.0 Megohm	—	—
,, ,, ,, ,, ,, 5 ..	130,000	33,000	1.0 Megohms	1.0 Megohms
,, ,, ,, ,, ,, 2 ..	∝	∝	∝	∝
,, ,, ,, ,, ,, 7	∝	∝	∝	0
H.T + ve to top cap connection ..	2.1Megohms	2.1 Megohms	2.2Megohms	—
Earth to top cap connection ..	2.1 ,,	2.1 ,,	2.2 ,,	—
Earth to valve pin No. 4	25,000	25,000	600,000	33,000
,, ,, ,, 5	100,000	100	1.0 Megohms	1.0 Megohms
,, ,, ,, 8	168	168	1,000	1,000

Heater Wiring.

(*a*) Continuity should be given between V1 pin 2 and V2 pin 7
V2 ,, 2 ,, V3 2
V3 ,, 7 ,, V4 2
V4 ,, 7 ,, earth.

(*b*) Resistance from V1 pin 7 to V4 pin 2 should be 120 ohms ± 5%.

G. FULL TESTS : TRANSMITTER.

It is assumed that the receiver is working and that the unit is switched to " SEND." The results given below are those obtained on an average set, and in the majority of cases may be checked with nothing more elaborate than an Avometer.

		"AVO" Universal Model	"AVO" Universal Model No. 7	"AVO" Minor D.C.	Tolerance
1.	**D.C. Input Volts**	24V	24V	24V	
2.	**Valve Heaters.**				
	Heater Volts V5 EF.50 Oscillator	6.2V	6.2V	6.2V	± 5%
	V6 ,, Isolator	6.1V	6.1V	6.1V	± 5%
	V7 807 Amplifier	6.6V	6.6V	6.6V	± 5%
	V8 ,, Modulator	6.6V	6.6V	6.6V	± 5%
	Heater current by measurement of voltage across series resistance R.44 for the E.F.50's and R.59 for the 807 valves.				
3.	**Power Input Conditions.**				
	D.C. volts in	24V	24V	24V	
	D.C. current in	5.0a	5.0a	—	± 5%
	The total input current may be measured by connecting the meter across the gate switch contacts.				
4.	**H.T. Supply Unit.**				
	A.C. volts across primary of transformer T2	39.3V	39.3V	—	± 5%
	A.C. volts across secondary of transformer T2	332V	332V	—	± 5%
	Secondary current transformer T2	.19a	.19a	—	—
	This may be measured by removing the H.T. fuse FZ4 and substituting meter.				
	H.T. D.C. volts output from common of R.39 and R.42	310V	310V	310V	± 5%
5.	**Valve Currents.** "AVO" RANGE	0.01a	0.012a	6 mA	
	V5 Anode current measure across R.39	3.0	3.0	1.7	± 10%
	"AVO" RANGE	1,200V	1,000V	300V	
	Screen voltage measure across C.49	100	128	75	± 10%
	"AVO" RANGE	0.12a	0.1a	30 mA	
	V6 Anode current measure across R.42	11	11	9.5	± 10%
	"AVO" RANGE	1,200V	1,000V	300V	
	Screen voltage measure across C.50	240	260	240	± 10%
	"AVO" RANGE	0.12a	0.1a	120 mA	
	V7 Anode current measure across R.47	35 mA	35 mA	35 mA	± 10%
	"AVO" RANGE	0.012a	0.01a	6 mA	
	V7 G1 grid current measure across points marked "AMP G" on metering panel	1.5 mA	1.5 mA	1.5 mA	± 5%
	"AVO" RANGE	1,200V	1,000V	300V	
	V7 G2 volts measure across C.66	175	190	170	± 5%
	"AVO" RANGE	0.12a	0.1a	120 mA	
	V8 Anode current measure across R.51	56 mA	56 mA	56 mA	± 10%

	"AVO" Universal Model	"AVO" Universal Model No. 7	"AVO" Minor D.C.	Tolerance
"AVO" RANGE	12V	10V	60V	
V8 G1 volts (bias) measure across R.52	9.3V	9.3V	9.3V	± 5%
"AVO" RANGE	1,200V	1,000V	300V	
V8 G2 volts measure across C.74 ..	190V	200V	185V	± 5%
6. **Microphone** H.M.T.1.				
"AVO" RANGE	12V	10V	6V	
Microphone volts measure across R.60	3.5V	3.5V	3.5V	± 10%
7. **Microphone Transformer** (T3)				
"AVO" RANGE	12V	10V	—	
Input volts (1,000 cycles)	0.8V	0.8V	—	± 2%
Output ,, ,, ,, ...	5.4V	5.4V	—	± 5%
8. **Modulation Choke Volts** (L.13)				
"AVO" RANGE	1,200V	1,000V	—	—
	141V	141V	—	± 5%
9. **Bias Volts across R.56, R.57** ..				
"AVO" RANGE	1,200V	1,000V	300V	
With Unit on "RECEIVE" ..	100V	100V	100V	± 5%
10. **Aerial Current** throughout band in an artificial load of 200 μμF + 10 ohms D.C. .. .. (Artificial Aerial Type No. 1009)		(Thermo-meter) 0.6a		± 10%

H. FULL TESTS : RECEIVER.

1. Voltage and Feed Checks.

With the receiver switched on with volume control and desensitising control set fully clockwise the following figures should be obtainable (using a high resistance meter for voltage checks).

(*a*) **Test Points.** **Voltage.**

H.T. + ve (common side of feed metering board) and Earth	250 volts ± 10%.
Pin 4 of V1 and Earth	78 ,,
,, ,, V2 ,, ...	74 ,,
,, ,, V4 ,, ...	250 ,,

(*b*) **Valve Feeds.**

These can be conveniently checked by placing a milliameter across between the H.T. + line and the individual metering shunts grouped on the feed metering board.

Valve.	Current.
V1 (hexode)	2.8 mA ± 20%.
V1 (triode)	1.6 mA ,,
V2	9.8 mA ,,
V3	1.1 mA ,,
V4	17 mA ,,

Desensitising Control.

With the relay Z5 held in the "transmit" position rotation of the pre-set desensitising control in a counter-clockwise direction should reduce the feeds of V1 (hexode) and V2 to nearly zero.

2. **L.F. Amplifier Stages.**

The response and stage gains of the L.F. portion of the receiver circuits quoted below are valid under the following conditions.

L.F. Volume Control at fully clockwise position.
Output connected directly from tags 4 and 6 of the output transformer to an output meter adjusted for 5,000 ohms input.
Input from a tone generator connected via a 0.1 μF condenser.

For an output of 10 mW the following inputs should be required :—

Frequency	Input at V3 Grid (Top Cap).	Input at V4 Grid (pin 5).
400 cycles	25 mV ± 30%	1.2V ± 20%.
1,000 ,,	22 mV ,,	1.0V ,,
5,000 ,,	19 mV ,,	1.0V ,,

3. **I.F. Amplifier Stages.**

The I.F. circuits should be aligned to a mid-band frequency of 570 kc/s Stage gain and response tests should be made under the following conditions :—

1. L.F. volume set fully clockwise and desensitising control set fully counter-clockwise.
2. Output meter set to 5,000 ohms connected to tags 4 and 6 of output transformer.
3. In this and all subsequent tests an output level of 10 mW should be used.
4. The signal input should be modulated 30% at 400 c.p.s. and injected via a 0.1 mfd. isolating condenser.

(*a*) After correct alignment the levels required should be approximately :—

Input at V2 Grid =1.2 mV.
,, V1 ,, =18 μV (with tuning control at lower frequency end).

(*b*) **Bandwidth and Adjacent Channel Protection.**

The total bandwidths should be as follows, measured at V1 grid.

Attenuation.	Bandwidth.
— 6 dB	7.5 kc/s ± 1 kc/s.
— 40 dB	30 ,, ,, 3 kc/s,

(*c*) **I.F. and L.F. Fidelity of Response.**

With the test conditions as above using a separate tone generator to modulate the signal generator the fidelity should conform to the following :—

Level with ± 3 dB from 250 c.p.s. to 1,500 c.p.s.
Attenuated by at least 10 dB above 3,000 c.p.s.
,, ,, ,, 10 ,, below 60 c.p.s.

4. **Frequency-Changer Stage.**

(*a*) **Setting of 1st Oscillator.**

As a preliminary to checking the correct tuning frequencies, the setting of the compensator condenser should be checked by a feeler gauge. The correct gap is 0.05 inches.

If out of adjustment the inductance L3 and the capacity trimmer C15 should be adjusted to correspond to input signal frequencies of 1.5. Mc/s and 3.6 Mc/s at the extreme ends of travel of the main tuning control.

(*b*) **1st Oscillator Volts.**

The voltage developed by the 1st Oscillator across the front section of the tuning condenser should approximate to the following values :—

Signal Frequency.	Voltage.
1.5 Mc/s	6.7 volts.
3.6 ,,	9.2 ,,

(*c*) **Signal Frequency Circuit Alignment.**

The inductance L1 and L2 and the trimmers C2 and C5 should be ganged at signal frequencies of 1.7 Mc/s and 3.3 Mc/s respectively, using a dummy aerial of 200 $\mu\mu$F between the signal generator and the receiver aerial terminal.

During alignment the Inductance adjusting cores should be checked for adequate firmness, all spiral trimmers should finally be sealed by an application of " Philitine " wax or an approved substitute.

(*d*) **Conversion Efficiency.**

With the signal generator connected via a 0.1 μF to the grid of V1 the conversion efficiency can be checked in terms of the ratio of the input required at I.F. compared to that required at signal frequency for a given output. This ratio should be as follows :—

Signal Frequency.	**Conversion Ratio.**
1.7 Mc/s.	0.7 $\pm$ 20%
3.3 ,,	0.75 ,,

(*e*) **S.F. Circuit Step-Up.**

The ratio of inputs required at 1st grid and aerial (via 200 $\mu\mu$F) for a constant output should be at least :—

5 times at 1.7 Mc/s.
15 times at 3.3 Mc/s.

Note.—For these latter tests in order to avoid errors due to 1st circuit and valve noise, input levels at the aerial should be of the order of 20 μV.

Overall Performance.

(*a*) **Sensitivity.**

Conditions of Test.

Input modulated 30% by 400 c.p.s. connected to aerial terminal via 200 $\mu\mu$F.
Output adjusted to 1 mW (Meter set for 5,000 ohms connected across tags 4 and 6 of output transformer).

Method of Test.

Input adjusted to give a 10 dB reduction in output when the modulation is switched off.

Frequency.	**Input Required** (μV).
1.7 Mc/s	4.0 μV $\pm$ 30%.
3.3 ,,	1.5 μV ,,

(*b*) **Image Protection.**

Frequency.	**Image Ratio.**
1.7 Mc/s	65 dB
3.3 ,,	48 dB

(*c*) **A.G.C. Characteristics.**

Conditions of Test.

Input signal, 30% modulated, at 3.3 Mc/s of 50 μV at aerial.
Output adjusted (by L.F. volume control) to 1 mW into 5,000 ohms.

Test Procedure.

With the input signal advanced by 60 dB, *i.e.*, to 50 mV, the rise in output should not exceed 15 dB.

SECTION 6.

INSTALLATION.

The complete installation comprises :—

(*a*) Transmitter/Receiver Unit Type 972.
(*b*) Supply Battery and Cable.
(*c*) Remote Control Unit (Type 978) and Cable (if required).
(*d*) Aerial System.
(*e*) Earth System.

(*a*) Transmitter/Receiver Unit Type 972.

The case of this Unit is supplied with vibration dampeners mounted in cradles, holes in the arms of the cradles enable the case to be secured to a bench or bulkhead as desired. The chassis should be withdrawn from its case, and the case complete with Shock Absorbers, positioned on bench or bulkhead to mark off the position for the fixing bolts. The screws securing the vibration dampeners to the case must now be removed, and the two cradles bolted in position with fixing bolts supplied, after this the case is screwed back on to the vibration dampeners and the chassis replaced in the case.

For bulkhead mounting it may be necessary to bolt the cradles to battens which, in turn, will be bolted to substantial members of the cabin structure.

(*b*) Batteries and Supply Cable.

The power cable connecting the battery to the Transmitter/Receiver Unit must be 2 core 162/.0076 or 2 core 65/.012 tinned copper wire, outside diameter 13mm. The maximum permissible length of cable between battery and Transmitter/Receiver Unit is 12 yards, should this be exceeded the volt drop in the cable will impair the performance of the equipment. The cable is soldered into the 7 pin plug provided with the transmitter, each lead soldered to 3 contacts as shown on drawing WE/W.13100/D Sht. 1 Ref. P.S1.

(*c*) Remote Control Unit and Cable.

The Control Unit will be bolted in position at a suitable height above deck level. The maximum length of cable between the Transmitter Unit and the Remote Control Unit is 50 yards, and must not be exceeded. A 10 core cable is used to connect the Remote Control Unit to the Transmitter Receiver Unit each core is 9/.012 tinned copper wire with an overall diameter of 13 mm., the cores having individual colour sleeving. The method of terminating the cable is shown on drawings WE/W.13290/C Sht. 1 and Sht. 1A and WE/W.13100/D Sht. 1.

(*d*) Aerial System.

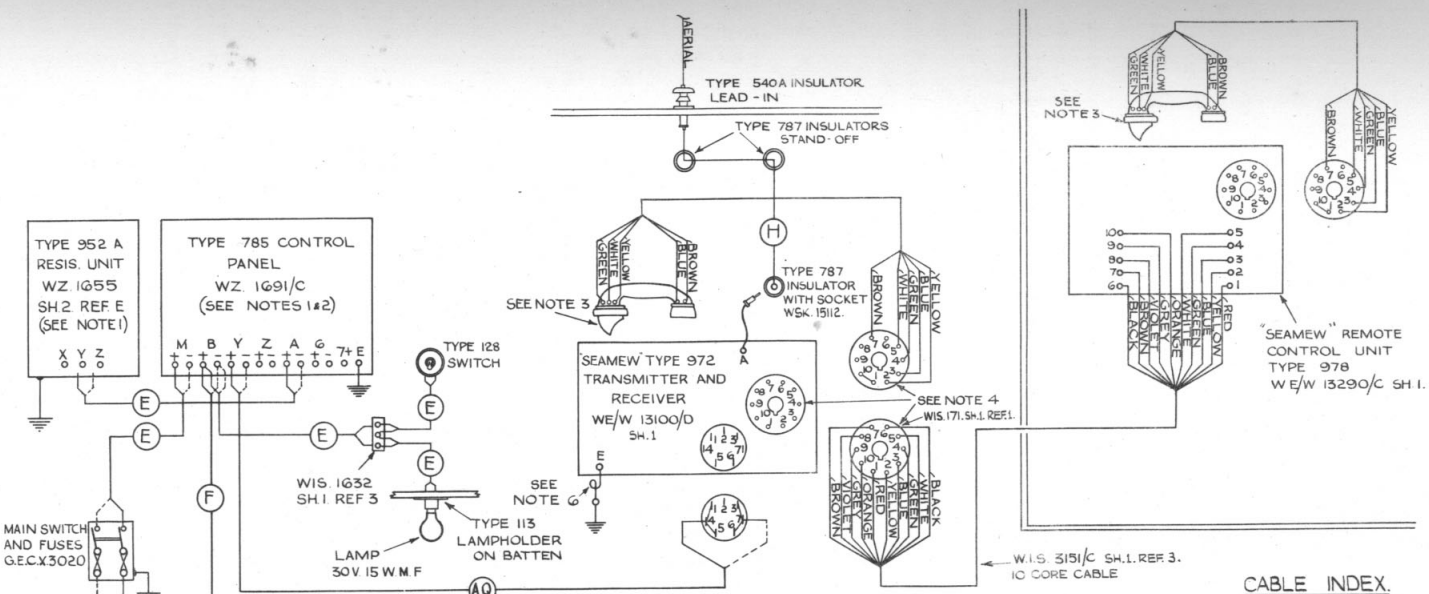
A suitable aerial rig for this equipment would be 100 feet $\frac{7}{16}$ Phosphor Bronze Aerial Wire, supported from 30 ft. masts.

Alternatively, 60 to 100 feet of wire sloping from a single 30 ft. mast, to the aerial lead-in Insulator sited on the vessel's charthouse will be satisfactory.

The Aerial Lead from the Transmitter/Receiver Unit is terminated in a plug which connects with a socket mounted on a stand-off insulator, the insulator being screwed to the bulkhead of the cabin. The position of the insulator must be such that the 3 ft. length of lead can be easily plugged into the socket without leaving the lead in any form of strain.

(*e*) Earth System.

The earth connector should consist of 7/.028 copper wire which must be securely bonded to the ship's metal structure to ensure a good earth. At the Transmitter Receiver the connector must be secured close beneath the earth terminal on the front panel of the unit. A flexible loop must be made in the connector between the securing point and the earth terminal on the panel. The flexible loop is necessary to allow the vibration dampeners to be free to function properly, and to ease the withdrawal of the chassis when the earth is disconnected.



NOTES

1. FOR 110V D.C. MAINS CHECK THE FOLLOWING:-
   a) 785 CONTROL PANEL, WITHDRAW PANEL FROM CASE & CHECK THAT LINK SHORT CIRCUITING OUTER RESISTANCE IS IN POSITION.
   b) 952A RESISTANCE UNIT, INCOMING LEADS CONNECTED TO TERMS Y&Z & LINK BETWEEN X&Z IN POSITION.

   FOR 220V D.C. MAINS CHECK THE FOLLOWING:-
   a) 785 CONTROL PANEL, WITHDRAW PANEL FROM CASE AND REMOVE LINK WHICH SHORT CIRCUITS OUTER RESISTANCE.
   b) 952A RESISTANCE UNIT, INCOMING LEADS CONNECTED TO TERMS X&Z AND LINK BETWEEN X&Z REMOVED
2. 785 CONTROL PANEL IS SUPPLIED WITH VOLTMETER CONNECTED FOR 2 OR 4 VOLT BATTERIES. REMOVE FLEX LEAD FROM 5V. TERM. ON VOLTMETER AND CONNECT IT TO THE 30 V. TERMINAL.
3. HANDSETS COMPLETE WITH PLUGS SUPPLIED WITH UNITS 972 & 978
4. FOR LOCAL CONTROL OF SEAMEW TYPE 972 PLUG HANDSET SUPPLIED INTO SOCKET SHOWN. FOR REMOTE CONTROL REMOVE HANDSET PLUG & INSERT REMOTE CONTROL PLUG
5. ALL SCREENING & LEAD COVERING TO BE SECURELY BONDED TO EARTH IN ACCORDANCE WITH T/N 1342 (36)
6. ALL EARTH WIRE TO BE 7/.023" BARE OR TINNED COPPER. EARTH WIRE TO BE LOOPED BEFORE CONNECTING TO "SEAMEW" TYPE 972 TO ALLOW EASY REMOVAL FROM TERMINAL.
7. THIS CABLE OR APPROVED EQUIVALENT TO BE RUN BY SHIPBUILDER

CABLE INDEX.

(E)	3/.029" L.C. CIRCULAR. TWIN.
(F)	7/.036" L.C. CIRCULAR TWIN
(AQ)	162/0076 OR 65/.012 BLACK P.V.C. CIRCULAR TWIN (M.W.T. CODE NO. V.C.B/1Y)
(H)	COPPER TUBE, SOFT DRAWN 5/16" O/D x 20 S.W.G.

Issue No. 1
Sheet No. 1

N/WD.1276

INSTALLATION WIRING DIAGRAM OF "SEAMEW" WITH OR WITHOUT REMOTE CONTROL

COMPONENTS SCHEDULE

FOR TRANSMITTER / RECEIVER TYPE 972 "SEAMEW" WE/W.13100/A
Issue No. 1

NOTE.—Symbols C1, C2, etc., correspond to those on circuit diagram and on Component Location drawing. When ordering spares quote reference number, value and drawing number, e.g., R.30—3,300 Ω ± 20%, *WIS.2630. Sht.* 1. *Ref.* 7.

Ref.	Description	Nominal Value	Drg. No.	Remarks
	CONDENSERS, (RECEIVER SECTION)			
C1	Condenser	33 μμF ± 10% 500V. D.C. Wkg.	WIS.3450/B Sht. 1. Ref. 7	Erie Type N.750.K
C2	Condenser. Trimmer	3-30 μμF 150V. D.C. Wkg.	WIS.2848 Sht. 1 Ref. 1	Mullard Type 7864/01
C3	Condenser	0.01 μF ± 10% 350V. D.C. Wkg.	WIS.1565 Sht. 2	Dubilier Type S.691.W
C4	Condenser	As C3		
C5	Condenser. Trimmer	As C2		
C6	Condenser	22 μμF ± 10% 500V. D.C. Wkg.	WIS.3450/B Sht. 1 Ref. 7	Erie Type N.330.K
C7	Condenser. Variable	443 μμF Sweep 3 Gang. Ganged with C8, C16	WIS.3632/C Sht. 1 Ref. 1	Wingrove & Rogers. Type E.2
C8	Condenser	443 μμF Sweep Ganged with C16, C7		
C9	Condenser	0.1 μF ± 20% 350V. D.C. Wkg.		T.C.C. Type CP.45.N
C10	Condenser	As C9		
C11	Condenser	220 μμF ± 5% 350V. D.C. Wkg.	WIS.185	Dubilier Type S.690.W
C12	Condenser	As C9		
C13	Condenser	100 μμF + 100%—0% 350V. D.C. Wkg.	WIS.2442	Dubilier Type 635
C14	Condenser	As C1		
C15	Condenser	As C2		
C16	Condenser	443 μμF Sweep Ganged with C7, C8		
C17	Condenser	1,200 μμF ± 2% 350V. D.C. Wkg.	WIS.1565 Sht. 1	Dubilier Type S.691.W
C18	Condenser	As C9		
C19	Condenser	As C11		
C20	Condenser	As C9		
C21	Condenser	As C9		
C22	Condenser	25 μF + 100—20% 25V. D.C. Wkg.	WIS.3201/C Sht. 1 Ref. 5	T.C.C Type C.E.17.C
C23	Condenser	As C11		
C24	Condenser	As C9		
C25	Condenser	As C9		
C26	Condenser	As C11		
C27	Condenser	As C13		
C28	Condenser	0.01 μF + 100%—0% 350V. D.C. Wkg.	WIS.1609	Dubilier Type 691.W

Ref.	Description	Nominal Value	Dwg. No.	Remarks
C29	Condenser	As C13		
C30	Condenser	As C22		
C31	Condenser	100 μμF ± 20% 350V. D.C. Wkg.	WIS.2442	Dubilier Type 635
C32	Condenser	As C9		
C33	Condenser	As C22		
C34	Condenser	5,000 μμF + 100—0% 350V. D.C. Wkg.	WIS.1609	Dubilier Type 691.W
C35	Condenser	As C9		
C36	Condenser	As C28		
C37	Condenser	As C13		
C38	Condenser Temp. Compensator		W.13078 Sht. 1 Ed.A	
C38A	Bi-Metal Vane		2/WSK. 12922/C	
C38B	Adjustable Vane		4/W.6893/C	
C38C	Ins. Block (Ceramic)		12/W.13078/C	
C39	Condenser	4 μF + 100%—20% 150V. D.C. Wkg.	WIS.3201/C Sht. 1 Ref. 9	T.C.C. Type CE.17.G
C40	Condenser	As C9		
C41	Condenser	1.5 μμF ± 0.5 μμF		T.C.C. Type C.C. 20y
C42	Condenser	As C41		
C43				
C44				
C45				
	CONDENSERS. (TRANSMITTER SECTION).			
C46	Condenser	0.0001 μF ± 5% 500V. D.C. Wkg.		T.C.C. Type CC.31.Y
C47	Condenser	As C46		
C48	Condenser	0.001 μF ± 15% 750V. D.C. Wkg.		T.C.C. Type MBU
C49	Condenser	As C48		
C50	Condenser	As C48		
C51	Condenser	As C48		
C52	Condenser	As C46		
C53	Condenser. Variable	4.8—100 μμF.	WIS.3040 Sht. 1 Ref. 9	Wingrove & Rogers Type C.803
C54	Condenser	As C53		
C55	Condenser	As C53		
C56	Condenser	As C53		
C57	Condenser	As C53		
C58	Condenser	As C53		
C59	Condenser	As C46		
C60	Condenser	As C46		
C61	Condenser	As C46		
C62	Condenser	As C46		
C63	Condenser	As C46		
C64	Condenser	As C46		
C65	Condenser	As C48		

Ref.	Description	Nominal Value	Dwg. No.	Remarks
C66	Condenser	As C48		
C67	Condenser	As C48		
C68	Condenser	12-150 μμF	WIS.3627/C Sht. 1 Ref. 1	Cyldon Special Type MHD.150
C69	Condenser	As C68		
C70	Condenser	As C68		
C71	Condenser	As C68		
C72	Condenser	As C68		
C73	Condenser	As C68		
C74	Condenser	0.5 μF 350V. D.C. Wkg.		T.C.C. Type C.P.47.N.
C75	Condenser	As C74		
C76	Condenser	25 μF—20% + 50% 25V. D.C. Wkg.	WIS.3201/C Sht. 1 Ref. 5	T.C.C. Type CE.17.C
C77	Condenser	As C76		
C78	Condenser	As C76		
C79	Condenser	As C74		
C80	Condenser	As C74		
C81	Condenser	As C74		
C82	Condenser	As C74		
C83	Condenser	8.0 μF 500V. D.C. Wkg.	WIS.3299/C Sht. 1 Ref. 2A	T.C.C. Type 512
C84	Condenser	As C83		
C85	Condenser	As C83		
C86	Condenser	As C83		
C87	Condenser	4 μF 100V. D.C. Wkg.	WIS.3025 Sht. 1	T.C.C. Type 8522
C88	Condenser	As C74		
C89	Condenser	As C88		
C90	Condenser	0.01 μF ± 15% 750V. D.C. Wkg.		T.C.C. Type M4U
C91	Condenser	As C90		
C92	Condenser	As C88		
C93	Condenser	As C88		
C94	Condenser	As C88		
C95	Condenser	As C90		
C96	Condenser	As C88		
C97	Condenser	As C90		

Ref.	Description	Nominal Value	Dwg. No.	Remarks
	INDUCTANCES. (RECEIVER SECTION).			
L1	Inductance. Aerial CCT.		W.13087/B Sht. 1	
L2	Inductance. Signal Grid CCT.		W.13092/B Sht. 1	
L3	Inductance. Osc. CCT.		W.13088/B Sht. 1	
L4	Inductance. 1st I.F. Anode CCT.		W.13091/B Sht. 1	
L5	Inductance 1st I.F. Grid CCT.		W.13089/B Sht. 1	
L6	Inductance. 2nd I.F. Anode CCT.		W.13090/B Sht. 1	
L7	Inductance. 2nd I.F. Diode CCT.		W.13089/B Sht.	
L8				
	INDUCTANCES. (TRANSMITTER SECTION).			
L9	Choke. H.F.	1.5 MHS.	WIS.3069 Sht. 1	Stratton Cat. No. 1022
L10	Inductance. Isolator		W.13292/B Sht. 1	
L11	Choke	12-13 MHS. at 1,000 c.p.s.	WIS.1601 Sht. 1	Stratton Cat. No. 1066
L12	Inductance. Aerial CCT.		W.13120 Sht. 1 Ed.A	
L13	Choke. L.F.	4H.	WSK.11981 Sht. 1 Ed.A	
L14	Inductance. Filter		W.13107/C Sht. 1 Ed.A	
L15	Choke	As L13		
L16	Choke	60 μH. $\pm$ 5%	P.22539 WDW.215 Ed. F.	
L17	Choke	As L16		
L18	Choke	2.37 μH.	WDW.680 Ed. A	
L19	Choke	As L18		
L20	Choke	As L18		
L21	Choke	1,100 μH $\pm$ 10%	WSK.12594 Ed. A WDW.681 Ed. A	
LS1	Loudspeaker	5" M.C. P.M.	WIS.3586 Sht. 1 Ref. 1	Goodman's Type T5/508, 4-6

Ref.	Description	Nominal Value	Dwg. No.	Remarks
	PLUGS AND SOCKETS.			
P1	Plug. Power	7 pin.	W.9565/C Sht. 1 Ed.A	
P2	Plug. Handset	10 Pin	WIS.171 Sht. 1 Ref. 1	Belling Lee Type L.1244/T
P3	Plug. Aerial	Complete with Ae. Lead	W.14420/B Sht. 1 Ed.A	
PS1	Socket	7 Pin	W.9564/C Sht. 1 Ed.A	
PS2	Socket	10 Pin	WIS.794 Sht. 1	Belling Lee Type L.332/T.
PS4	Socket. Receiver			A.M. Type 56. Ref.10H/10330
	RESISTANCES. (RECEIVER SECTION).			
R1	Resistance	10 Ohms. ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRAJJ
R2	Resistance	100,000 Ohms. ± 20% ¼ Watt	WIS.2630 Sht. 1. Ref. 8	Erie Type RMA 9
R3	Resistance	33,000 Ohms. ± 20% ½ Watt	WIS.2630 Sht. 1 Ref. 7	Erie Type RMA 8
R4	Potentiometer	50,000 Ohms. Inverse Log	WIS.2239/C Sht. 1, 1a, 2. Ref. 25	Dubilier Type CT.
R5	Resistance	100 Ohms ± 20% ¼ Watt	WIS.2630 Sht. 1 Ref. 8	Erie RMA 9
R6	Resistance	As R2		
R7	Resistance	As R3		
R8	Resistance	330 Ohms. ± 20% ¼ Watt	WIS.2630 Sht. 1 Ref. 8	Erie Type RMA 9
R9	Resistance	3,300 Ohms ± 20% ½ Watt	WIS.2630 Sht. 1 Ref. 7	Erie Type RMA 8
R10	Resistance	As R8		
R11	Resistance	As R2		
R12	Resistance	100,000 Ohms ± 20% 1 Watt	WIS.2630 Sht. 1 Ref. 3	Erie Type RMA 2
R13	Resistance	As R8		
R14	Resistance	As R8		
R15	Resistance	As R9		
R16	Resistance	As R5		
R17	Resistance	As R3		
R18	Resistance	As R3		
R19	Resistance	As R8		
R20	Resistance	As R2		
R21	Resistance	2.2 Megohms ± 20% ¼ Watt	WIS.2630 Sht. 1 Ref. 8	Erie Type RMA 9
R22	Resistance	As R2		

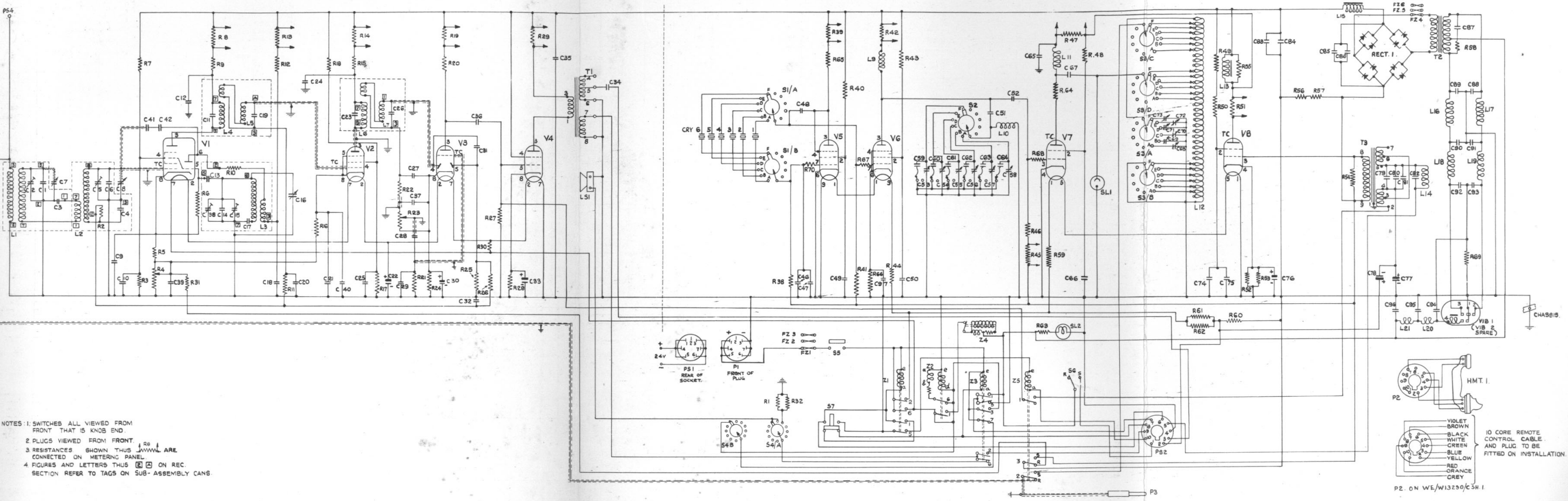
Ref.	Description	Nominal Value	Dwg. No.	Remarks
R23	Potentiometer	500,000 Ohms Log.	WIS.2239/C Sht. 1, 1a, 2. Ref. 10	Dubilier Type CT.
R23A	Handle for R23	$1\frac{1}{4}$" dia. Black	WSK.13613 Sht. 1 Ed.L	With White Spot
R24	Resistance	1,000 Ohms ± 20% $\frac{1}{4}$ Watt	WIS.2630 Sht. 1 Ref. 8	Erie Type RMA 9
R25	Resistance	1 Megohm ± 20% $\frac{1}{4}$ Watt	WIS.2630 Sht. 1 Ref. 8	Erie Type RMA 9
R26	Resistance	As R25		
R27	Resistance	As R25		
R28	Resistance	1,000 Ohms ± 20% 1 Watt	WIS.2630 Sht. 1 Ref. 3	Erie Type RMA 2
R29	Resistance	As R8		
R30	Resistance	120 Ohms. ± 5% 3 Watts		Berco Type 26
R31	Resistance	68 Ohms ± 20% $\frac{1}{4}$ Watt	WIS.2630 Sht. 1 Ref. 8	Erie Type RMA 9
R32	Resistance	As R1		
R33				
R34				
R35				
R36				
R37				
	RESISTANCES. (TRANSMITTER SECTION).			
R38	Resistance	100,000 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRAJD
R39	Resistance	33 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRCCJ
R40	Resistance	330,000 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRCCD
R41	Resistance	10,000 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRAJC
R42	Resistance	As R39		
R43	Resistance	As R41		
R44	Resistance	38 Ohms ± 10% 12 Watts	WIS.2606 Sht. 1 Ref. 2	Welwyn Type AW.3112
R45	Resistance	1,000 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRAJB
R46	Resistance	As R38		
R47	Resistance	As R39		
R48	Resistance	33,000 Ohms ± 20% 2 Watt	WIS.2210 Sht. 1	Morganite Code WRCCC
R49	Resistance	As R41		
R50	Resistance	As R41		
R51	Resistance	As R39		
R52	Resistance	330 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRCCA
R53	Resistance	As R52		
R54	Resistance	As R41		
R55	Resistance	As R38		

Ref.	Description	Nominal Value	Dwg. No.	Remarks
R56	Resistance	1,000 Ohms ± 10% 30 Watts	WIS.2737 Sht. 1 Ref. 1	Welwyn Type AW.3192
R57	Resistance	As R56		
R58	Resistance	8.0 Ohms ± 10% 12 Watts	WIS.2606 Sht. 1 Ref. 2	Welwyn Type AW.3112
R59	Resistance	11.4 Ohms ± 10% 30 Watts	WIS.2737 Sht. 1 Ref. 1	Welwyn Type AW.3192
R60	Resistance	100 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRAJA
R61	Resistance	As R45		
R62	Resistance	As R45		
R63	Resistance	100 Ohms ± 20% 2 Watt	WIS.2210 Sht. 1	Morganite Code WRAJA
R64	Resistance	As R39		
R65	Resistance	33,000 Ohms ± 20% 1 Watt	WIS.2210 Sht. 1	Morganite Code YRCCC
R66	Resistance	As R52		
R67	Resistance	As R60		
R68	Resistance	As R60		
R69	Resistance	As R39		
R70	Resistance	As R60		
Rect. 1	Rectifier Unit	Selenium Double Voltage Type	WIS.3783/B Sht. 1 Ref. 1	Westinghouse Type 14A.233
	SWITCHES			
S1	Switch	2 Wafer. 11 Posn.	WIS.1197/C Sht. 356	Oak H Type
S1A	Wafer with Contacts for S1		WIS.1197/C Sht. 299	Oak H Type
S1B	As S1A			
S2	Switch	1 Wafer. 11 Posn.	WIS.1197/C Sht. 299	Oak H Type
S3	Switch	4 Wafer. 11 Posn.	WIS.3456/B Sht. 9	Oak T Type
S3A	Wafer with Contacts for S3		WIS.3420/C Sht. 2	Oak T Type
S3B	As S3A			
S3C	As S3A			
S3D	As S3A			
S3E	Handle for S3	2¼" Lever Blue	WSK.9599 Sht. 1 E.A	
S4	Switch		WIS.1197/C Sht. 353	Oak T Type
S4A	Wafer with Contacts for S4		WIS.1197/C Sht. 299	Oak H Type
S4B	As S4A			
S4C	Handle for S4	1¼" dia. Block	WSK.13613 Sht. 1 Ed.L	
S5	Switch, Gate		W.13118/B Sht. 1 Ed.A	

Ref.	Description	Nominal Value	Dwg. No.	Remarks
S6	Switch, S/R.	2P.	WIS.3784/C Sht. 1. Ref. 1	Oak Type 23 Pattern 7597
S6A	Handle for S6	3″ Lever (Black)	W.13115/C Sht. 1. Ref. 1	
S7	Switch, Push Button		W.13433/B Sht. 1. Ed. A	
	TRANSFORMER. (OUTPUT).			
T1	Transformer. Output		WIS.2528 Sht. 1	Celestion
T2	Transformer. Power		W.5623 Sh. 2 Ed.D	
T3	Transformer. Microphone		WIS.3414/C Sht. 1	Parmeko Type B.2038
SL1	Lamp. Neon	S.E.S.	WIS.2729 Sht. 1	G.E.C. Button Tuneon
SL1A	Holder for SL1	S.E.S. Clear Lens	WIS.3427/C Sht. 1 Ref. 2	Arcolectric Type SL.84/28
SL2	Lamp. H.T. Indicator	16V. 3W. M.E.S.	WIS.3181/C Sht. 1 Ref. 6	G.E.C. or Siemens
SL2A	Holder for SL2	M.E.S. White Lens	WIS.3226/C Sht. 1 Ref. 3	Arcolectric Type SL.82/16
FZ1	Fuse. L.T.	10A. $1\frac{1}{4}$″ Cartridge	WIS.2497 Sht. 1 Ref. 12	Belling Lee Type L.1055
FZ2	Fuse. Spare for FZ1	As FZ1		
FZ3	Fuse. Spare for FZ2	As FZ1		
FZ3A	Holder for FZ1, FZ2, FZ3		WIS.1952 Sht. 1	Belling Lee Type L.510
FZ4	Fuse. H.T.	250 mA $1\frac{1}{4}$″ cartridge	WIS.2497 Sht. 1 Ref. 4	Belling Lee Type L.1055
FZ5	Fuse	As FZ4		
FZ6	Fuse	As FZ4		
FZ6A	Holder for FZ4, FZ5, FZ6		WIS.1952 Sht. 1	Belling Lee Type L.510
	VALVES.			
V1	Type X.61.M.			
V2	Type KTW.61			
V3	Type DH.63			
V3A	Top Cap Connector for V1, V2, V3	6.3 mm.	WIS.2412 Sht. 1	Benjamin Elec. Type 75/999

Ref.	Description	Nominal Value	Dwg. No.	Remarks
V3B	Screening Can for V1, V3		WIS.2345 Sht. 1	H. G. Sanders & Co.
V4	Type 6V6G.			
V4A	Holder for V1, V4	Octal	WIS.1894 Sht. 1	Celestion Type SP8/US
V5	Type EF.50			
V6	Type EF.50			
V6A	Holder for V5, V6	9 Pin	WIS.3550/B Sht. 1 Ref. 1	British Mechanical Productions Ltd. Type VH.369/9
V6B	Valve Retainer for V5, V6		W.14418/C Sht. 1 Ed. A	
V7	Type 807			
V8	Type 807			
V8A	Holder for V7, V8	5 Pin American	WIS.2454 Sht. 1	Celestion Type SP5/US
V8B	Valve Retainer for V7, V8		WIS.3516/C Sht. 1 Ref. 1	Hart Cushion Co. Type BP
V8C	Top Cap Connector for V7, V8	9 mm.	WIS.3488/C Sht. 1 Ref. 2	Lenjamin Elec. Type 75/648
VIB.1	Vibrator	24V.	WIS.2497 Sht. 1 Ref. 5	Wright & Weare Type NS.24
VIB.1A	Holder for VIB.1	4 Pin American	WIS.2532 Sht. 1	Celestion Type SP4/US
VIB.1B	Retaining Ring for VIB.1		WIS.2731 Sht. 1 Ref. 1	Masteradio or Wright & Weare
VIB.2	Vibrator	Spare for VIB.1	As VIB.1	
VIB.2A	Retaining Ring for VIB.2		As VIB.1B	
HMT.1	Handset. Micro-Tel. Complete with Plug. P.2 and Lead		W.10014/B Sht. 1. Ed. D	
HMT.1A	Handset		N/P.3961/B	
HMT.1B	Inset only for HMT.1	Type 500	Part of N/P.3961/B	
HMT.1C	Lead only for HMT.1		W.10015/B Sht. 1. Ed. H	
	RELAYS.			
Z1	Relay. Power Control		W.13113/8 Sht. 1 Ref. 2	
Z2	Relay. H.T. Delay		W.13442/B Sht. 1 Ed. A	
Z2A	Relay		WIS.1829 Sht. 1, 18, 13 Ref. 158	Standard Tele. Code 4673 A.D.E

Ref.	Description	Nominal Value	Dwg. No.	Remarks
Z2B	Heater Element		W.13443/B Sht. 1 Ed. A	
Z3	Relay. Remote Control		WIS.1829 Sht.1 1A, 13. Ref.157	Standard Tele.
Z4	Cut-Out		W.9785/C Sht. 1 Ed. C	
Z5	Relay. Send-Receive		WSK.2110 Sht. 14 Ed. AN	
Z5A	Spring Assy. for Z5	Ae. C.O.	WCP.670	
Z5B	Contact Term. for Z5		WCP.655	
Z5C	Spring Assy. for Z5	Fixed L.H.	WCP.466	
Z5D	Spring Assy. for Z5	Fixed R.H.	WCP.465	
Z5E	Spring Assy. for Z5	Moving	WCP.510	
	CRYSTALS.			
CRY.1	Crystal Holder	2 Pin	WSK.13866 Sht. 1 Ed. A	
CRY.2	Crystal Holder	As CRY. 1		
CRY.3	Crystal Holder	As CRY. 1		
CRY.4	Crystal Holder	As CRY. 1		
CRY.5	Crystal Holder	As CRY. 1		
CRY.6	Crystal Holder	As CRY. 1		
CRY.6A	Crystal Holder Mounting For CRY.1-CRY.6		W.7703/C Sht. 1 Ed. A	
	MISCELLANEOUS.			
	O.Z. Plug for Isolator Padding Cond. and Ae. Coil Units		WIS.3657/C Sht. 1 Ref. 1	Belling Lee Type L.513
	Handles, etc., for Rec. Cond. Drive (C7, C8, C16).		W.13078 Sht. 1 Ed. A	
	Res. Mtg. for R56, R57		WP.16	



NOTES: 1. SWITCHES ALL VIEWED FROM FRONT THAT IS KNOB END.
2. PLUGS VIEWED FROM FRONT.
3. RESISTANCES SHOWN THUS R6 ARE CONNECTED ON METERING PANEL.
4. FIGURES AND LETTERS THUS (E)(A) ON REC. SECTION REFER TO TAGS ON SUB-ASSEMBLY CANS.

Issue No. 1
Sheet No. 1. cont. on 1A

WE./W.13100/D

TRANSMITTER-RECEIVER TYPE 972 "SEAMEW." DIAGRAM OF CONNECTIONS

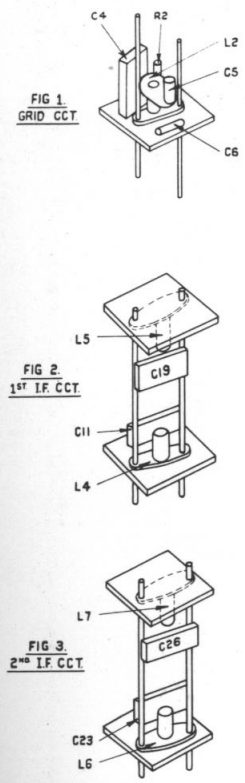


FIG 1.
GRID CCT.

FIG 2.
1ST I.F. CCT.

FIG 3.
2ND I.F. CCT.

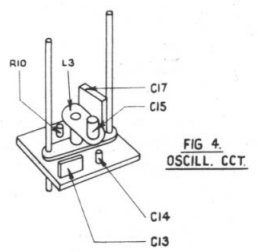
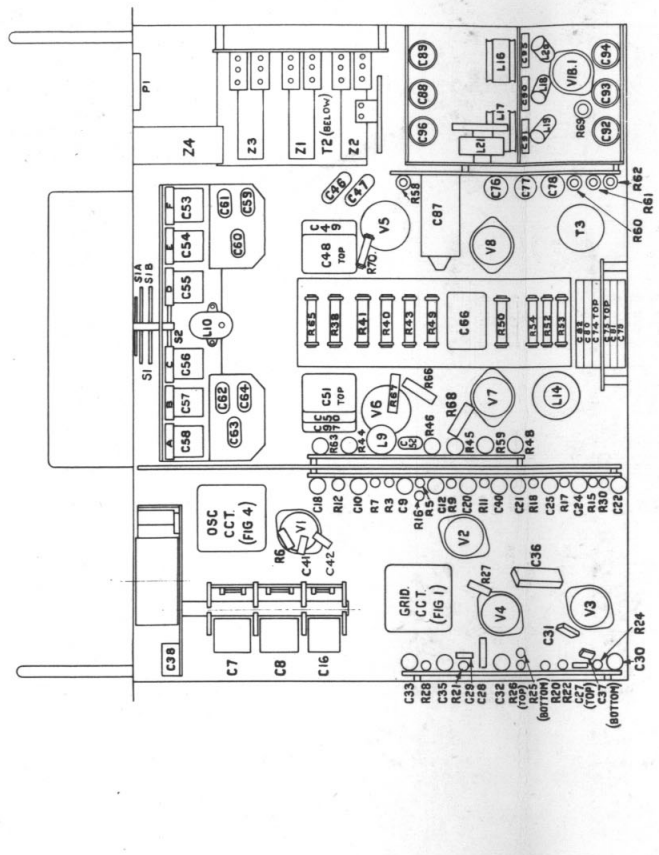
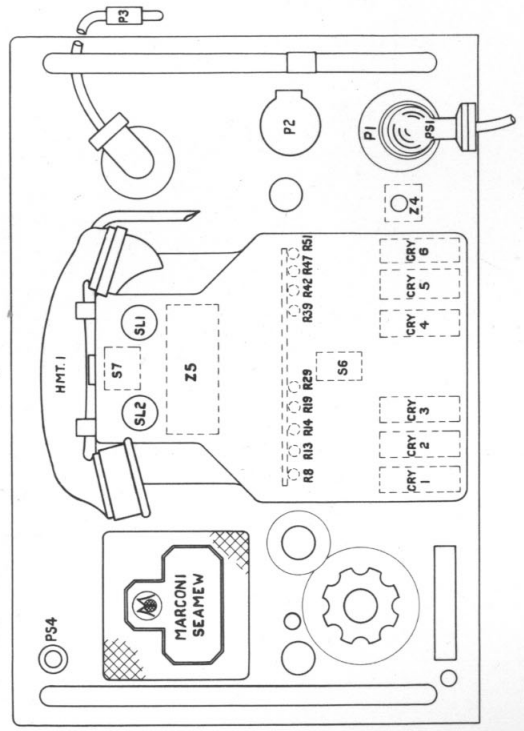


FIG 4.
OSCILL. CCT.

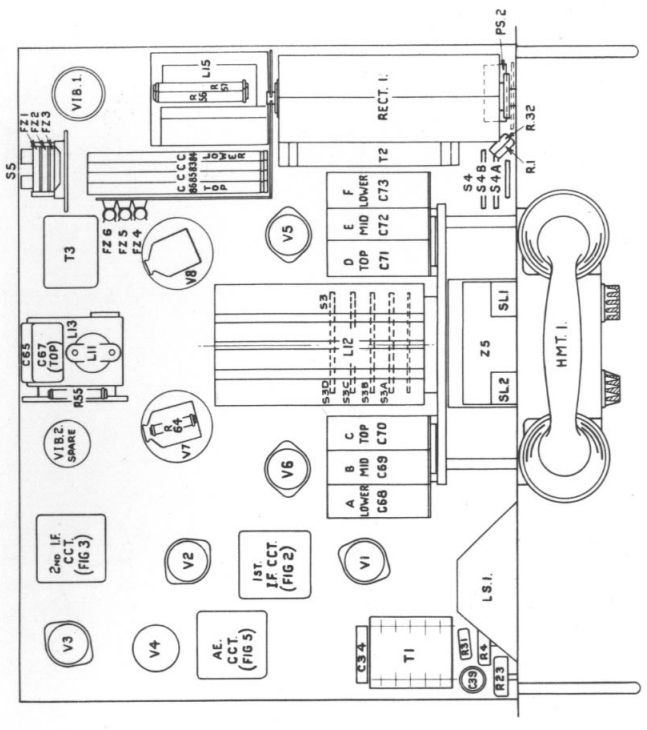
FIG 5.
AERIAL CCT.



VIEW LOOKING ON UNDERSIDE.



FRONT VIEW.



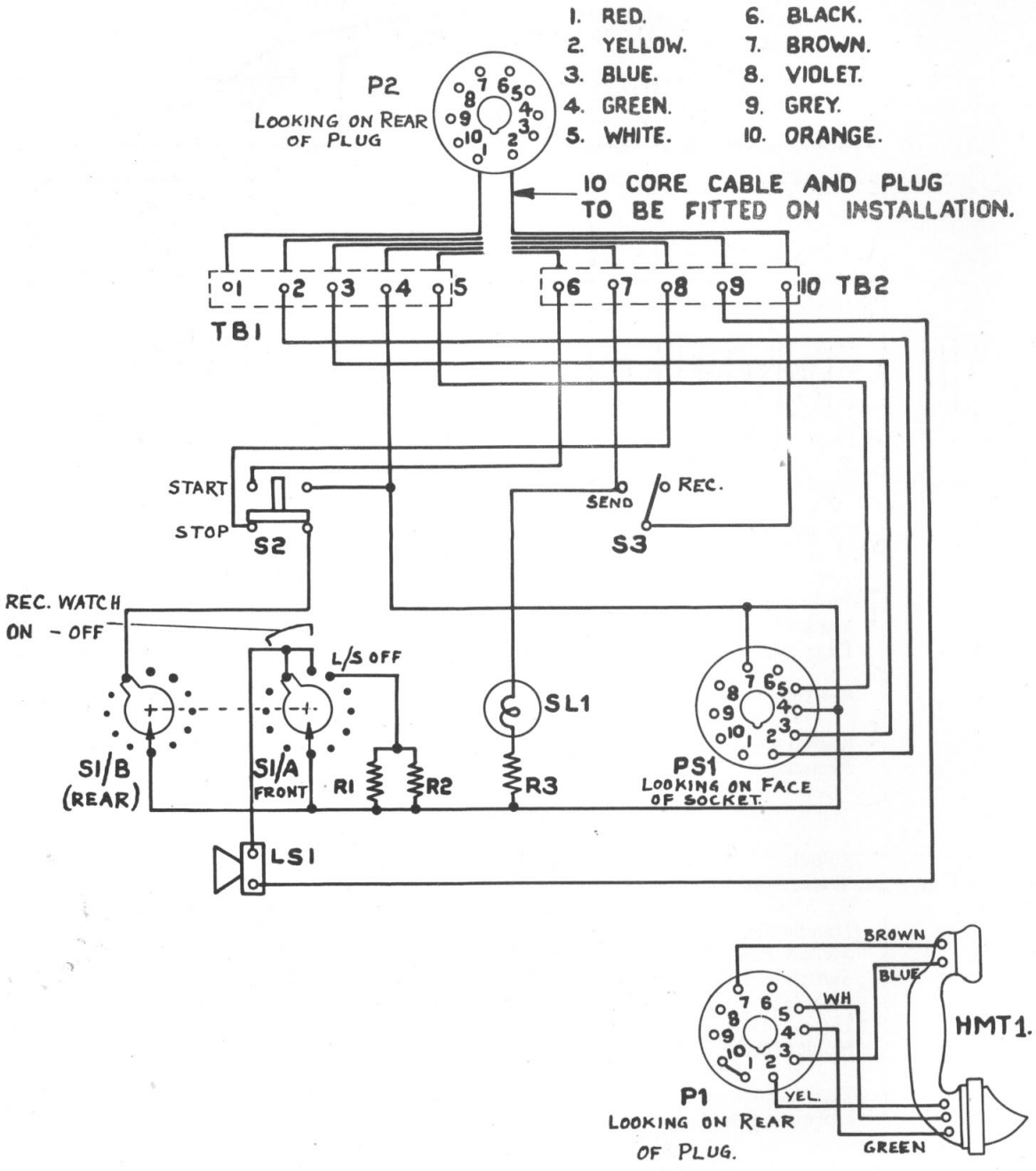
PLAN VIEW.

COMPONENTS SCHEDULE

REMOTE CONTROL UNIT TYPE 978, "SEAMEW" WE/W.13290/A
Issue No. 1

NOTE.—It is essential when ordering spares to quote Ref. Nos. on Schedule thus RI/WE/W.13290/A Sht. 2. Refs. C1, C2, etc. refer to symbols on diagram.
Refs. with suffix thus : RIA, RIB, etc., do not appear in diagram.

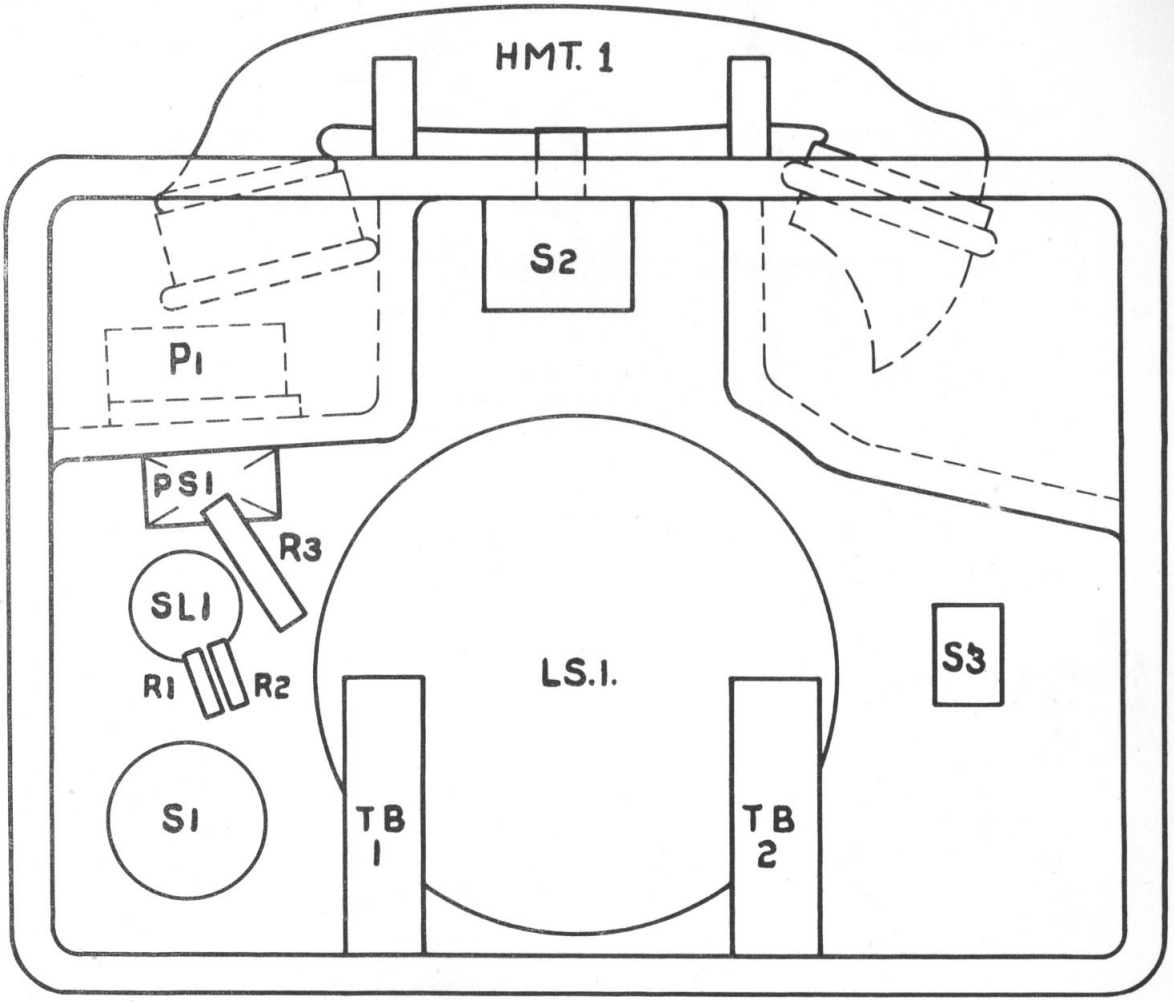
Ref.	Description	Nominal Value	Dwg. No.
	REMOTE CONTROL.		
HMT.1	Handset. Micro-Tel. Complete with Plug P1 & Lead		W.10014/B Sht. 1 Ed. D
HMT.1A	Handset		N/P.3961/B
HMT.1B	Inset only for HMT.1	Type 500	Part of N/P.3961/B
HMT.1C	Lead only for HMT.1		W.10015/B Sht. 1 Ed. H
LS1	Loudspeaker	5" M.C. P.M.	WIS.3586. Sht. 1. Ref. 1
P1	Plug. Handset	10 Pin	WIS.171. Sht. 1. Ref. 1
PS1	Socket	10 Pin	WIS.794. Sht. 1
P2	Plug. Remote Cable	10 Pin	As P1.
R1	Resistance	10 Ohms ± 20% 1 Watt	WIS.2210. Sht. 1
R2	Resistance	As R1	As R1
R3	Resistance	100 Ohms ± 20% 2 Watt	WIS.2210. Sht. 1
S1	Switch	2P.11 Position	WIS.1197/C. Sht. 363
S1A	Wafer with Contacts for S1		WIS.1197/C. Sht. 299
S1B	As S1A		As S1A
S1C	Handle for S1	2¼" Lever. Black	WSK. 9599. Sht. 1. Ed. D
S2	Switch Push Button		W.13433/B. Sht. 1. Ed. A
S3	Switch. S/R	2.P	WIS.3784/C. Sht. 1. Ref. 2
S3A	Handle	3" Lever. Black	W.13115/C. Sht. 1. Ref. 1
SL1	Lamp. H.T. Indicator	16V. 3W.	WIS.3181/C. Sht. 1. Ref. 6
SL1A	Holder for SL1		WIS.3226/C. Sht. 1. Ref. 3
TB1	Terminal Board	Nos. 1-5	WSK.13762 Sht. 9. Ref. 49
TB2	Terminal Board	Nos. 6-10	WSK.13762. Sht. 9. Ref. 50



Issue No. 1
Sheet No. 1. cont. on 1A

WE./W.13290/C

REMOTE CONTROL UNIT TYPE 978 "SEAMEW." DIAGRAM OF CONNECTIONS



REAR VIEW.

(BACK PLATE AND LID REMOVED.)

Issue No. 1
Sheet No. 1A

WE./W.13290/C

REMOTE CONTROL UNIT TYPE 978 "SEAMEW." COMPONENT LOCATION

FIG. 1. FRONT APPEARANCE OF CLICK SPOT WAVE SELECTOR MOUNTED ON PANEL

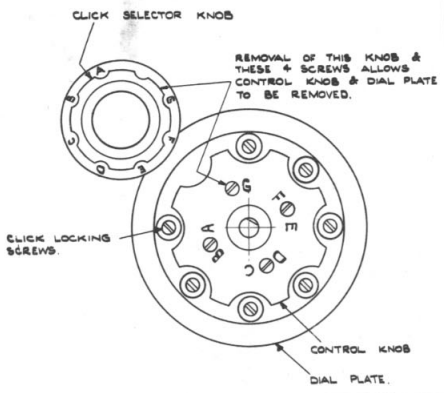


FIG. 3 VIEWS OF CLICK SPOT WAVE SELECTOR MOUNTED ON BRACKET & REMOVED FROM FRONT PANEL. SHOWN WITH DIAL PLATE & CONTROL KNOBS REMOVED.

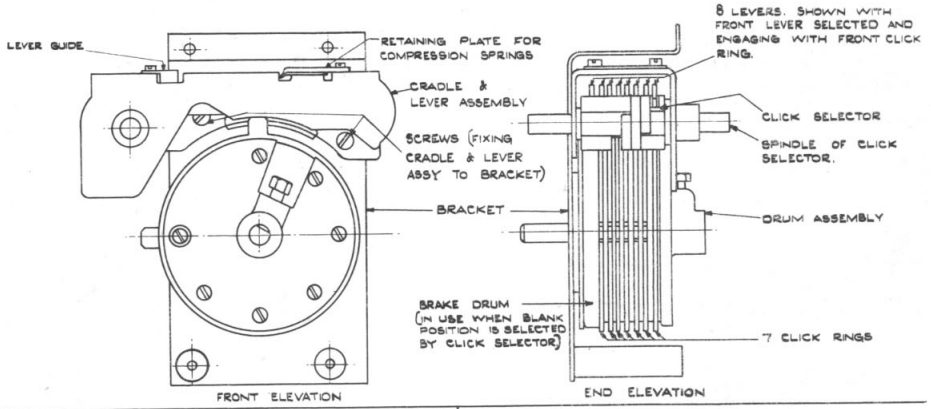


FIG 2 FRONT APPEARANCE OF CLICK SPOT WAVE SELECTOR WITH DIAL PLATE AND CONTROL KNOBS REMOVED.

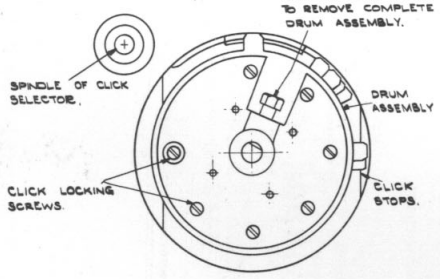


FIG 4 DIAGRAM SHOWING OPERATION OF CLICK SPOT WAVE SELECTOR

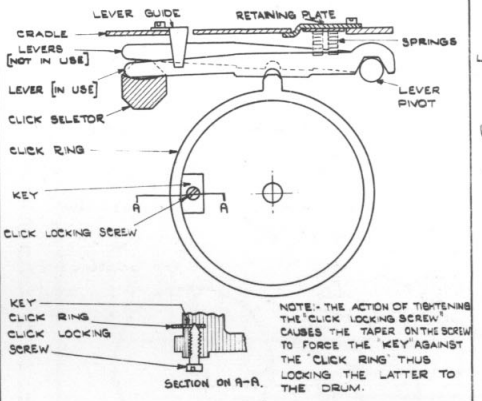
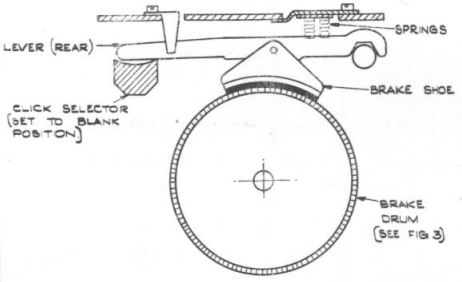


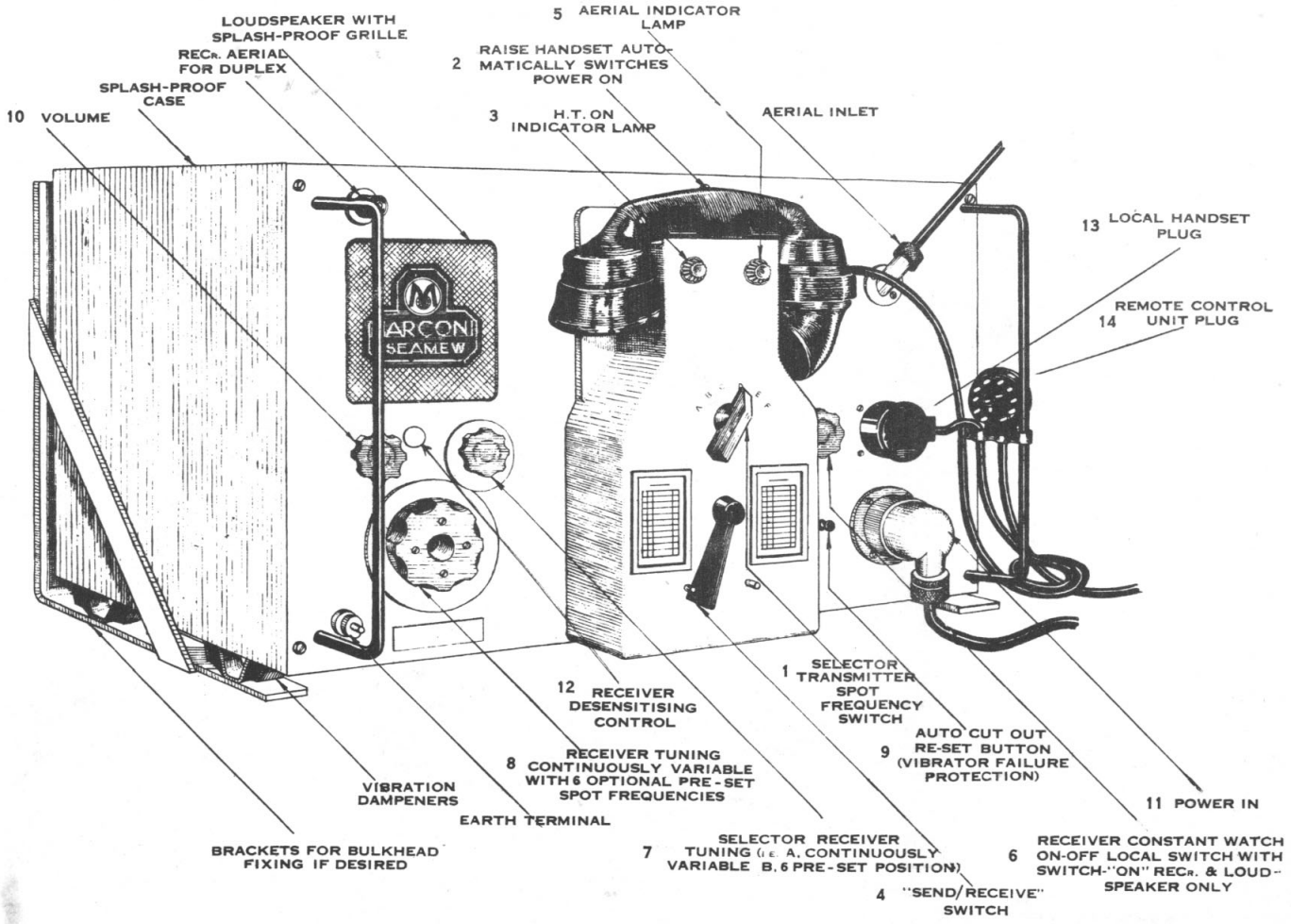
FIG 5 DIAGRAM SHOWING OPERATION OF THE BRAKE MECHANISM (IN USE WHEN BLANK POSITION IS SELECTED BY THE CLICK SELECTOR KNOB)



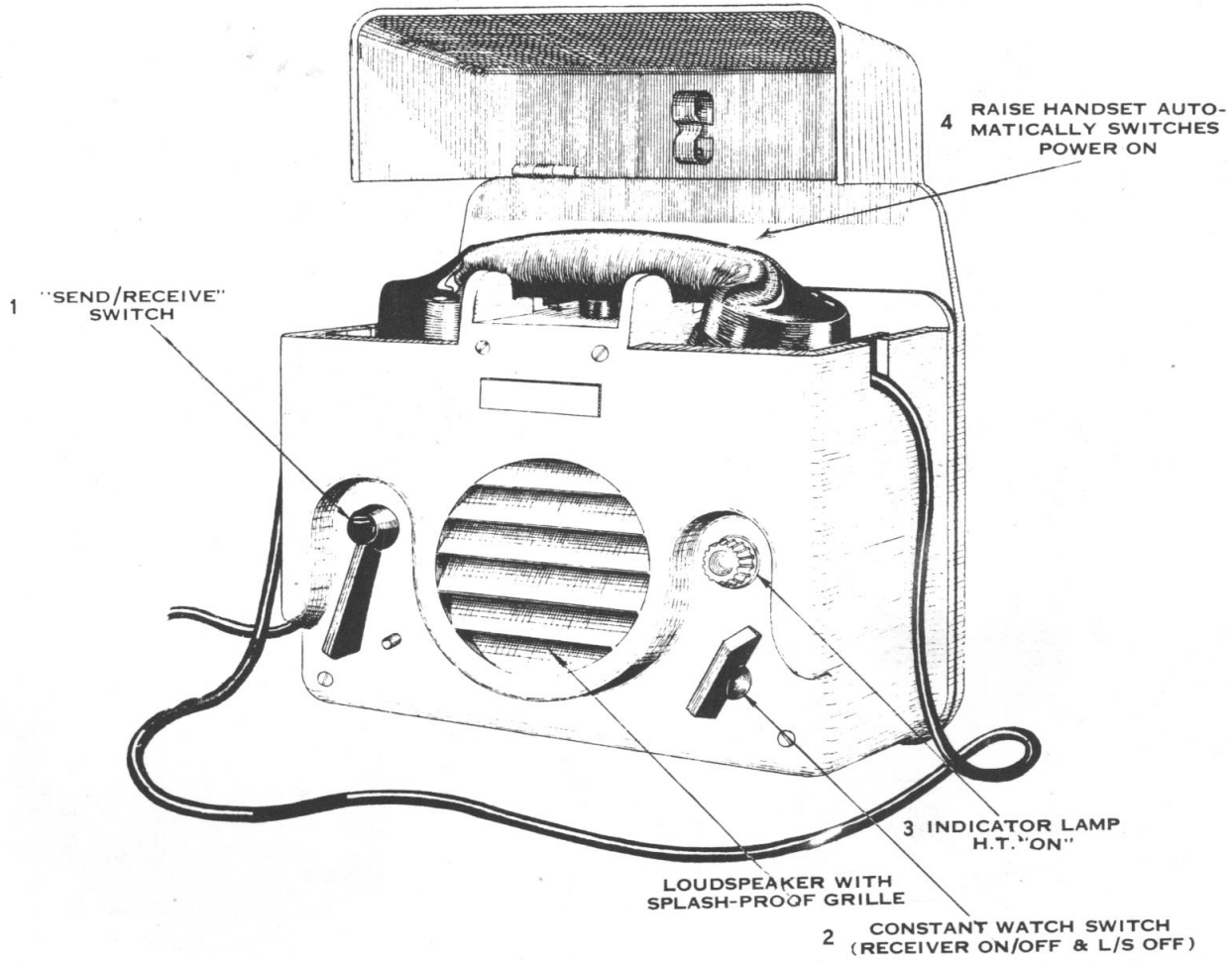
Issue No. 1
Sheet No. 1

WZ.2393/B

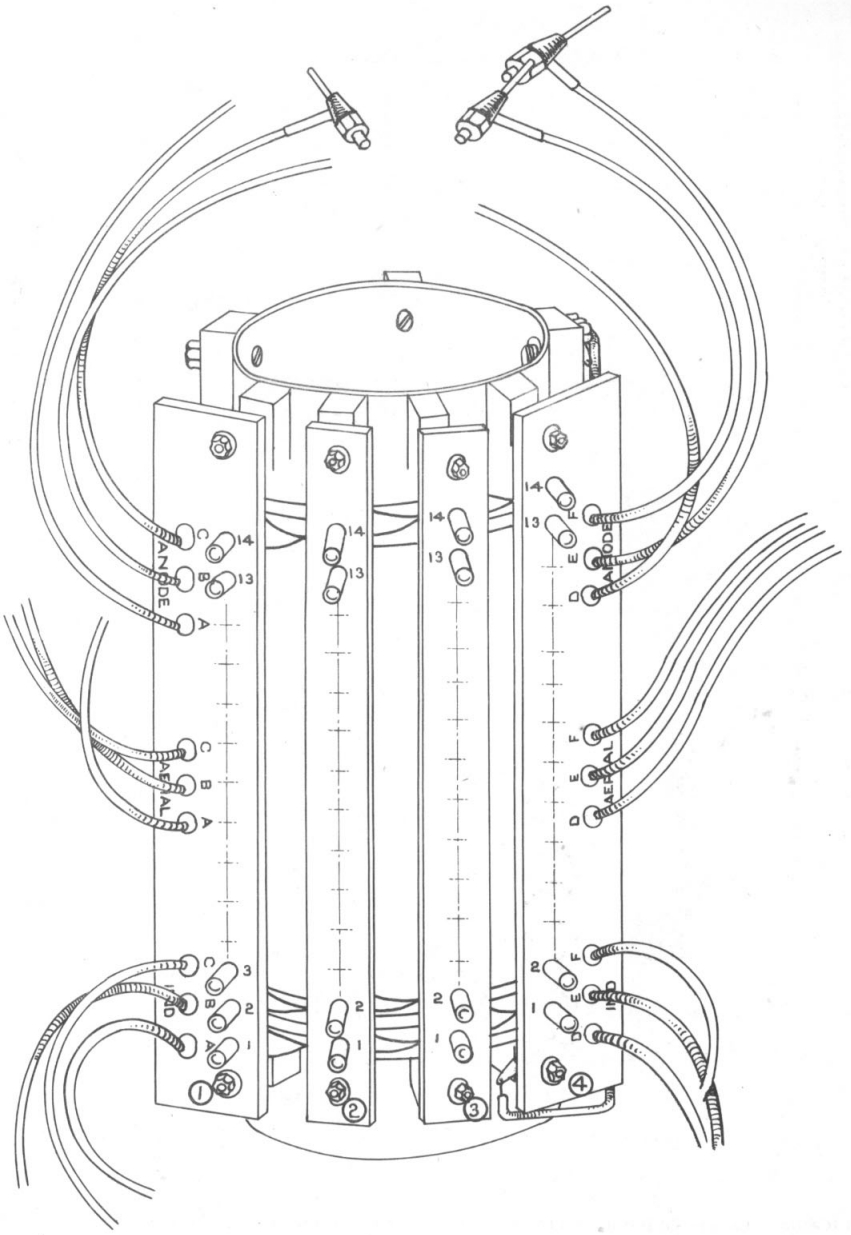
OPERATION OF CLICK SPOT WAVE SELECTOR



TRANSMITTER-RECEIVER WZ.2834/C



REMOTE CONTROL UNIT WZ.2835/C



NOTE :- THE NUMERALS SHOWN ON THE PLUG BOARDS ARE NOT ACTUALLY ENGRAVED THEREON BUT ARE GIVEN IN THIS DRAWING TO FACILITATE REFERENCES IN THE SETTING UP DESCRIPTION.

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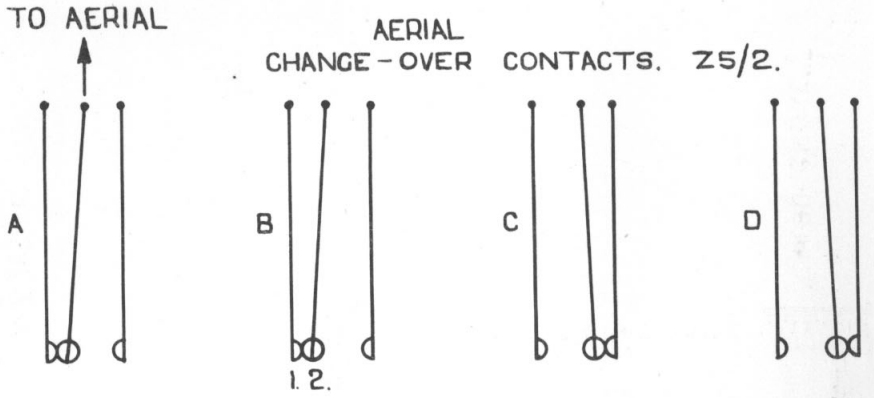
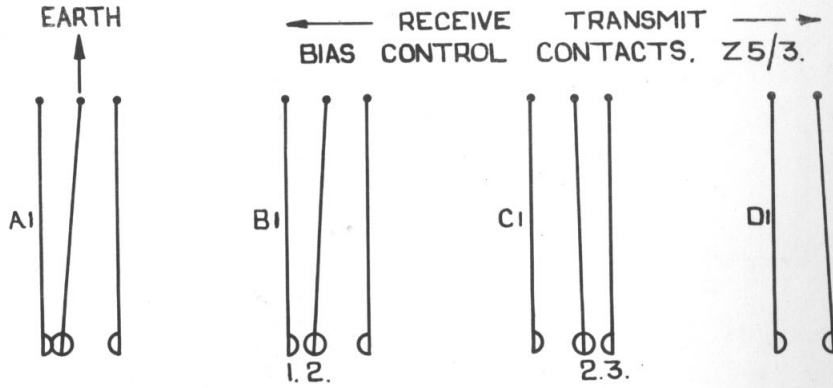
WZ.2836/C

AMPLIFIER TUNING INDUCTANCE FOR "SEAMEW" TRANSMITTER-RECEIVER.





NOTES.

1. POSITIONS A, A1 SHOW CONTACTS IN "RECEIVE" POSITION.
2. POSITIONS B, B1 SHOW CONTACTS JUST AFTER SWITCHING TO "SEND." CONTACTS (1&2) B1 OPEN BEFORE (1&2) AT B OPEN.
3. POSITIONS C, C1 SHOW CONTACTS A LITTLE LATER CONTACTS C HAS CHANGED OVER BEFORE CONTACTS (2&3) ON C1 HAVE MADE.
4. POSITIONS D, D1 SHOW CONTACTS AT COMPLETION OF RELAY OPERATION AND IN "SEND" POSITION.
5. CONTACT ASSEMBLY 1. OPERATES IN SYNCHRONISM WITH CONTACT ASSEMBLY 2.

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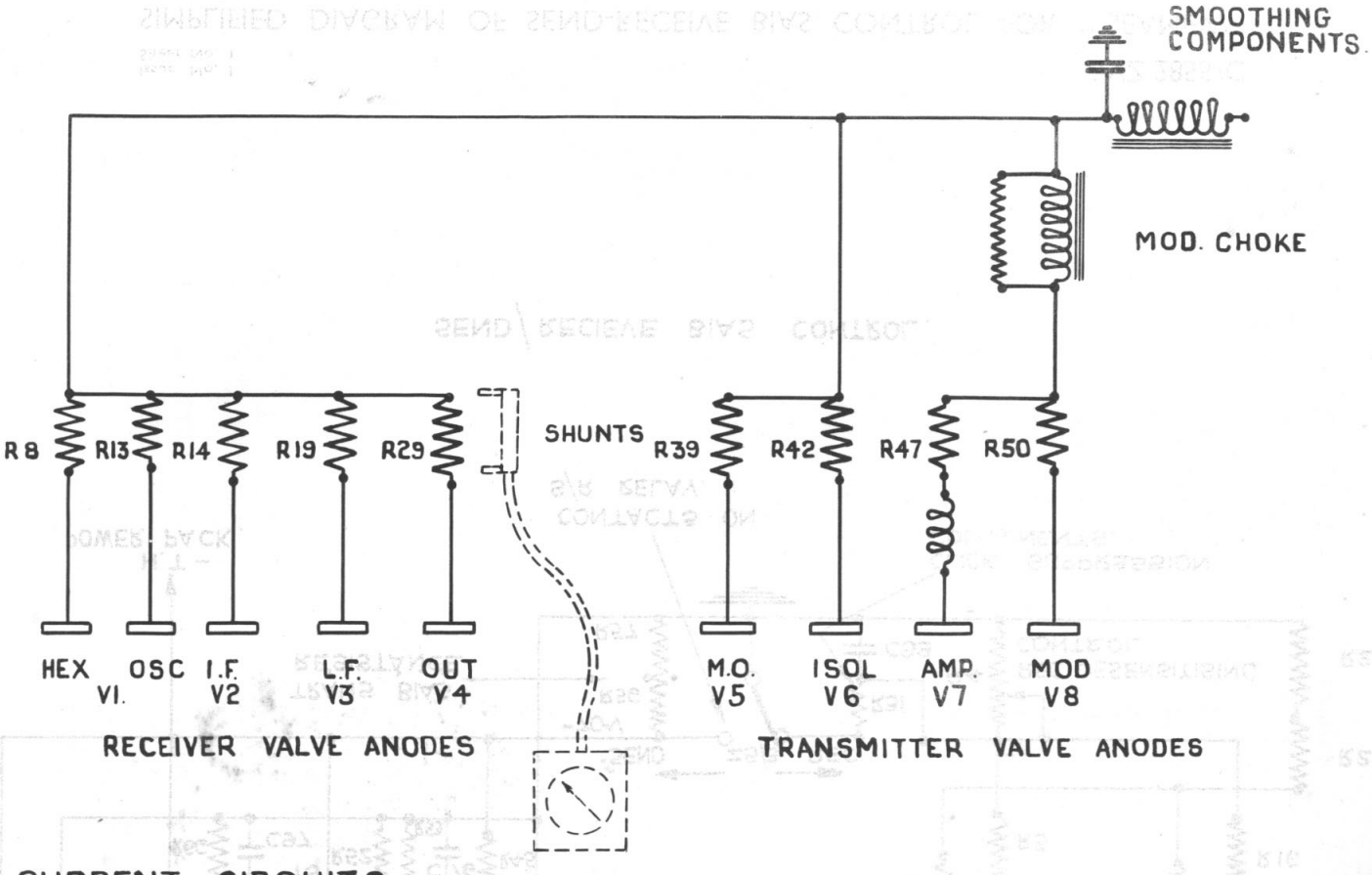
WZ.2853/C

SEND-RECEIVE RELAY (Z5) CONTACT ADJUSTMENT
ON "SEAMEW" TRANSMITTER-RECEIVER



H.T. CURRENT CIRCUITS.

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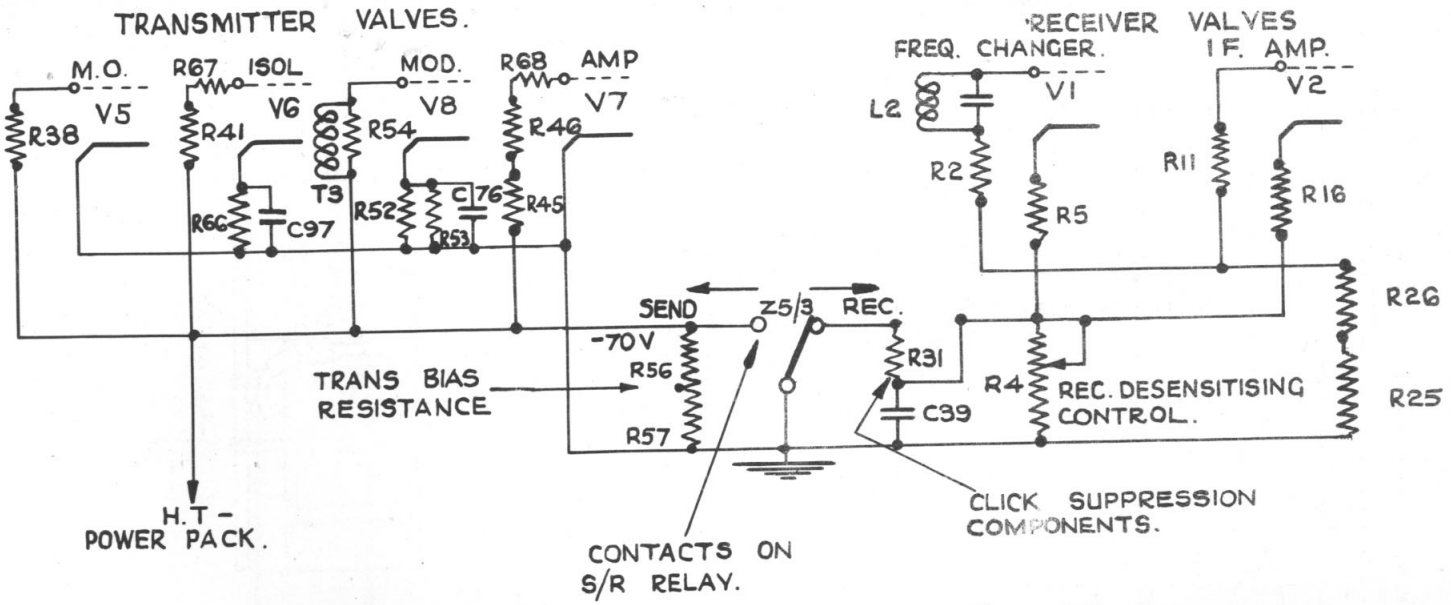
WZ.2854/C

SIMPLIFIED DIAGRAM OF H.T. CURRENT MEASURING DETAILS ON " SEAMEW "
TRANSMITTER-RECEIVER



SEND/RECIEVE BIAS CONTROL.

WZ.2855/C

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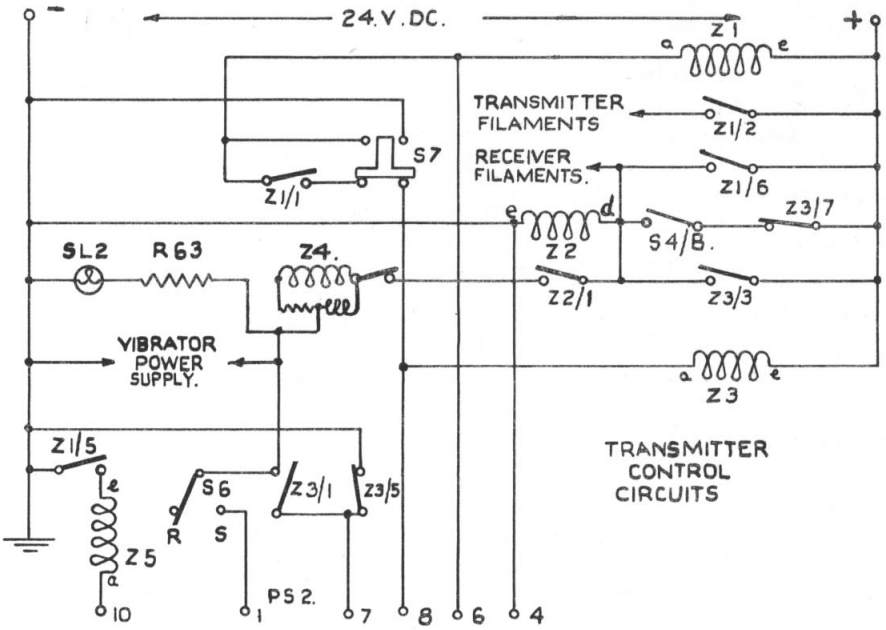
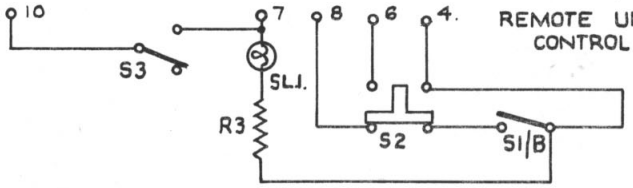
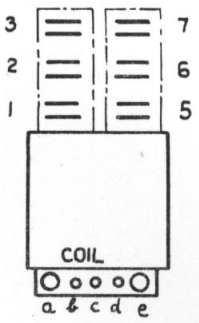
SIMPLIFIED DIAGRAM OF SEND-RECEIVE BIAS CONTROL FOR "SEAMEW" TRANSMITTER-RECEIVER



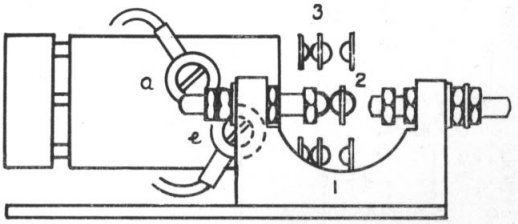


REMOTE UNIT TYPE 978 CONTROL CIRCUIT.

KEY FOR RELAY CONTACT IDENTIFICATION.



RELAYS Z_1 Z_2 & Z_3.
TAG END.



RELAY Z5.

Issue No. 1
Sheet No. 1

WZ.2856/C

SIMPLIFIED CONTROL CIRCUIT DIAGRAM FOR "SEAMEW" TRANSMITTER-RECEIVER