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SIGNAL TRAINING

Volume III

**AUSTRALIAN PAMPHLET NO. 17
(PROVISIONAL)**

WIRELESS SET NO. 108 Mk. III

1943

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GENERAL DESCRIPTION.

1. GENERAL FEATURES.

Wireless Set No. 108 Mk. III. has been designed as a low power portable equipment to provide R/T (Speech) and M.C.W. (Modulated continuous wave) communication within an infantry battalion or similar unit, and is capable of being attached to the standard web equipment for transport and operation on the move by one man. It is a combined sender and receiver and the frequency range is 2.5 to 3.5 Mc/s. (120 to 85.7 metres). Power Supply for the 108 Mk. III. is provided from a separate composite dry battery block which is accommodated in the lower portion of the case. Extension controls are provided which enable the operator, when the Set is mounted on his back, to operate the "Send-Off-Receive" Switch and the receiver tuning dial.

Provision is made for tuning the master oscillator of the sender accurately to the received frequency in order to facilitate the "Netting" of a group of stations.

The Set is equipped with six valves, one of which is common for sending and receiving.

A canvas cover is provided for general protection against dust, moisture and damage.

2. BATTERIES.

For Power supply, the Wireless Set No. 108 Mk. III. is provided with a dry battery block (Battery, Dry wireless. 1.5/99 volts) in the lower compartment of the case as follows:

Low tension	1.5 volts
High tension	99 volts

with full voltages the approximate current consumption is shown in Table I.

TABLE I.—CURRENT CONSUMPTION

Current Consumption approx. milliamperes.

<u>Sending</u>		<u>Receiving</u>	
L.T.	H.T.	L.T.	H.T.
310	19	250	10.0

The power input to the final valve of the sender varies between .5 and .6 watts (approx.) depending on the frequency and length of the aerial.

3. WEIGHTS AND DIMENSIONS.

TABLE II.

Item	Weight	Length	Width	Height
103 Mk. III Send/Rec. Unit including Battery	29 lbs.	9½"	8"	12"
Bag, accessories, (Filled)—not including battery	8 lbs.	12"	5½"	9½"
Battery (Spare)	5 lbs.	6¾"	3½"	5"
Antennae Rods "B" in Pouches (Aust)	1 lb.	13"		
Antennae Rods "F" (In carrying Strap)	2 lbs.	4'	—	—
Complete Station	40 lbs.			

4. CONNECTIONS.

The sender and receiver are assembled as one unit which is contained in the upper compartment of the case. The dry battery block for power supply is contained in the lower compartment behind a removable front plate. The battery is connected by means of a four pin plug and cable, the other end of which is permanently connected to a six point socket in the lower left hand rear corner of the chassis compartment of the case. This socket receives a corresponding plug mounted on the rear of the chassis when the latter is placed into the compartment. The removable front of the battery compartment is held in position by a lip on the bottom of the case, and two captive screws in the top of the removable front. These screws are accommodated in the dividing wall between the battery and chassis compartments. The upper edge of the removable front projects above the bottom end of the chassis when the latter is in place and thus secures it in. Removal of the front of the battery compartment thus enables the chassis to be withdrawn from the case.

Jacks for two pairs of headphones and a microphone or operating key are provided on the outside of the case on the left hand side as viewed from the front of the set. The receptacle for the SEND-OFF-RECEIVE switch key and the aerial socket are also on this side of the case, and the receptacle for the Extension Tuning Control on the other.

5. AERIALS AND COMMUNICATION DETAILS

5.1 Aerials.

The Sender-Receiver is arranged to operate with either a rod aerial, or a long wire aerial in conjunction with a counterpoise. The Sender will efficiently load into aerials having lengths up to 70 feet. Different lengths of aerial are loaded by adjusting the AERIAL TAPS Switch. The aerial equipment provided with Wireless Set No. 103 Mk. III is as follows:—

(a) Antennae rods. "B"—

Sections 10

(b) Antennae rods. "F" Sections—

No. 1 (Bottom Section) 2

No. 2 (Middle Section) 2

No. 3 (Top Section) 2

- (c) Wireless Set No. 108. Aerials (67 feet).
- (d) Leads; Counterpoise, 108 (67 feet).
- (e) Insulator, W.T. No. 1D (AUST.).

5.2 Antennae Rods "B."

The Antennae rods "B" sections are carried in a light-weight webbing pouch. The sections are 12in. in length and are identical in construction. Nine rods are supplied for operation and one as an essential spare. The effective length of the aerial when all 9 rods are used is 8 feet 4 inches.

5.3 Antennae rods, "F"

The antennae rods "F" sections are carried in a light weight webbing pouch, the No. 3 Sections (Thinnest) being carried inside the No. 1 sections. The No. 2 sections are recognisable by a rubber sleeve (Antenna rods "F" sleeves, insulating (AUST.)) on the large end. Care should be taken to see that the insulating sleeve is in place to prevent the No. 2 section coming into contact with the zip fastener on the canvas bag. The No. 1 section may be distinguished by a yellow painted band around the thick end. Lengths are made up as follows:

- 4 ft. One No. 2 section.
- 8 ft. One each No. 2 and No. 3 sections (Mobile Use).
- 12 ft. One of each Nos. 1, 2 and 3 sections.
- 16 ft. Two of No. 1 section and one of each Nos. 2 and 3 sections.

5.4 Aerials, 67 feet.

This is a rubber insulated flex wound in a figure-of-eight pattern on a dowel, and with a pin and hook terminations. To sling aerial, the hook is passed through the Insulator, W.T. No. 1D (AUST.) and hooked to the standing part.

5.5 Lead; Counterpoise 108.

This consists of 67 feet of rubber insulated flex wound in a figure-of-eight pattern on the attached winding dowel. This length may also be used as a replacement aerial in cases of emergency.

5.6 Insulator W.T. No. 1D (AUST.)

This consists of 75 feet of strong cord with weight and insulator attached and is used for slinging aerials 67 feet over branches of trees or other high obstacles which can be used as an aerial support. The insulator end is used for attaching to Aerials, 67 feet. (See paragraph 5.3). One (1) spare item is supplied in the complete station equipment. When not in use it should be wound in a figure-of-eight pattern on its respective dowel.

5.7 Factors affecting Range.

Certain general conditions tend adversely to affect the range of communication. Curtailment of range may be expected if one or both sets are operated in any of the following positions:

- (i) Against a bank or hill which lies on the line of communication.
- (ii) Against a wood, or bush, whose trees are considerably taller than the aerial.

- (iii) Under overhead power or telephone lines.
- (iv) Near steel structures, or buildings having steel frameworks.
- (v) On dry or sandy ground.

It is preferable for the site of the station to be 50 yards from such positions, to minimise their effects on range.

5.8 Interference.

Range is also affected adversely if the sets are situated where the receivers can pick up electrical interference. Severe interference of this nature may be expected from petrol engines with un-suppressed ignition (either stationary or in vehicles), and hospital apparatus—such as diathermy, X-ray, or ultra violet ray equipment. Interference may also be experienced from overhead and underground power and telephone lines, commutating motors and dynamos (such as battery charging sets). The extent to which interference is radiated from such sources varies considerably and prediction as to its exact effects is not possible.

5.9 Ranges.

The ranges that may be expected from the various types of aerials are given in Table III below.

TABLE III.

Ranges for R/T	Aerial—Type of Country		
	Average	Heavy Wooded	Jungle or Mountainous
0-500 yards	4 ft.	8 or 12 ft.	Up to 16 ft.
500 yds.-2 miles	8 ft.	12 or 16 ft.	(12 to 16 ft. or aerials 67 ft.)
2 miles-5 miles	12 to 16 ft.	16 ft. or	16 ft. or
5 miles-10 miles	16 ft.	aerials 67 ft.	aerials 67 ft.
(Erect aerials 67 ft. in a semi-vertical position in a clear site with the free end about 20-ft. from the ground. Lay the counterpoise under the aerial and connect to the set earth terminal).			

CHAPTER II.

WORKING INSTRUCTIONS.

6. VALVES.

Six valves are required for the set — these valves are shown in Table IV.

TABLE IV.—VALVES.

Type	Position	Qty.	Function
1P5GT	V1A-V1B	2	R.F. amp.—I.F. amp.
1A7GT	V2A	1	Mixer Oscillator.
1D8GT	V3A	1	2nd Det. Audio Osc. AVC & audio amp. Modulator
1Q5GT	V4A-V4B	2	Master Osc. Power amp.

Inserting the Valves.

- (i) Unscrew the captive knurled-head screws on the lower edge of the panel, and drop the front of the battery compartment forward.
- (ii) Remove the chassis by gently pulling on the handle provided for this purpose.
- (iii) See that the 1D8GT and the two 1Q5GT valves are fitted with valve shields and that the earthing lugs for the shields are affixed to the centre key and pin No. 1 of the valve base, and clamped inside the valve shield so as to make good contact with it.
- (iv) Plug the valves into their respective sockets in accordance with the disposition shown in Fig. 4.
- (v) Firmly fit on the grid contact caps on all valves except V4A and V4B.
- (vi) Secure clamps over tops of valves.
- (vii) Replace chassis in case; replace front of battery compartment and screw up captive screws.

7. CONNECTING UP.

To place the set into operation, proceed as follows:—

- (i) Ascertain the frequency allocated to the group of stations with which the set will be working.
- (ii) Plug the Microphone, hand, No. 3 or Key and plug assembly No. 2B and the Receivers, headgear into their appropriate sockets on the left hand side of the case.
- (iii) Plug the Extension tuning control into its socket on the right hand side of the case and clip the flexible cable firmly into the retaining clip provided on the side of the case.
- (iv) Plug the “-OFF-RECEIVESEND” switch key into its socket on the left hand side of the case and clip the bushing on the end of the flexible cable firmly into the retaining clip provided.

- (v) Loosen the clamp on the aerial socket and connect the selected aerial. Tighten the clamp.
The set should now be capable of sending and receiving after correct operation of the controls.

8. PRELIMINARY ADJUSTMENTS.

- (i) Erect the aerial to the desired length. If using a long wire aerial, the counterpoise is to be laid out on the ground directly beneath it and connected to the earth terminal on the set.
- (ii) Set the "RECEIVER" and "SENDER" tuning dials to the frequency which has been allocated for use. The "RECEIVER" tuning dial may be turned by operating its main knob, the thumb control vernier, or the knob on the extension control.
- (iii) Check operation of the "RECEIVER" tuning extension control by turning the knob on the end of the extension.
- (iv) Check that "VOL" and "AER" knobs turn easily and smoothly. The VOL knob should move through $3/4$ of a full turn, the "AER" knob through two full turns.

9. OPERATING INSTRUCTIONS.

9.1 Reception.

To adjust the set for reception:—

- (i) Turn the knob marked "VOL" fully clockwise.
- (ii) Turn the "RECEIVE-OFF-SEND" switch to the RECEIVE position. A hissing noise should be heard in the headphones.
- (iii) Search on the RECEIVER tuning dial around the allocated frequency until the desired station is heard. Searching should be done by means of the thumb vernier control or the knob of the extension tuning control.
- (iv) Adjust the "VOL" control to give suitable volume of received signal. Best quality speech will be achieved by this setting.
- (vi) If the set is to be operated as a mobile station, return the "VOL" control to near its maximum (clockwise) setting to compensate for the loss of volume which will occur with increasing range.
- (vii) Provision is made for connecting an extra pair of Receivers, head-gear.

9.2 Sending.

To adjust the set for sending:—

- (i) Set the sender to the frequency allocated for use by:—
 - (a) Setting the "SENDER" tuning dial at the frequency ordered, in the case of the directing station of a group.
 - (b) Following the procedure detailed in Section 10. "NETTING" in the case of an out-station of a group.
- (ii) Turn "RT-MCW" switch to RT or MCW as required.
- (iii) Set "RECEIVE-OFF-SEND" switch to SEND.
- (iv) Press the key if MCW operation is required.
- (v) Turn "AER" knob fully clockwise. Select an AERIAL TAP position, 9 or 10 for rod aerials, and in the range 1 to 10 for wire aerials.
- (vi) Adjust the "AER" knob for a dip in the tuning meter current reading, (choose the first dip back from the fully clockwise position of "AER" knob.) Tune to the minimum of this dip which should be approxi-

mately 5 milliamperes. If a higher or lower dip current is obtained select higher or lower AERIAL TAPS and re-adjust "AER" knob. Repeat until the correct current of approximately 5mA is reached. If the full length of the counterpoise is laid out under the wire aerial the final position of the "AERIAL TAPS" switch will be between taps 1 and 5. If the counterpoise is not used it may be between taps 5 and 9.

(vii) For R.T. operation press the "PRESS" switch on the microphone handle. Speak clearly without shouting with the lips not quite touching the mouthpiece. While speaking the milliammeter needle should kick slightly and sidetone should be heard in the Receivers, headgear. Release the "PRESS" switch when not speaking. If speaking for long periods, shake the microphone occasionally to prevent binding of the carbon granules in the microphone capsule.

(viii) For M.C.W. operation, press the operating key and a sidetone note should be heard in the Receivers headgear.
Note: Tuning must be checked frequently to maintain MAXIMUM RANGE.

(ix) Do not leave the "RECEIVE-OFF-SEND" switch in the "SEND" position unless actually sending to another station. This applies particularly when R/T is being used.

(x) To change to the receiver pull the "RECEIVE-OFF-SEND" switch forward to the "RECEIVE" position.

(xi) When communication is completed and if it is not required to stand-by for further calls, always return the "RECEIVE-OFF-SEND" switch to the "OFF" position.

Note: When the set is to be operated as a pack set, final adjustment of the "AER" knob should be made with the set mounted on the operator's back.

10. NETTING.

When it is desired to set the frequency of the sender exactly to that of another sender located some distance away proceed as follows:—

(i) Turn the "RECEIVE-OFF-SEND" switch to the "RECEIVE" position and tune accurately to the centre of the received signal.

(ii) Hold the netting switch "HOLD FOR NETTING" in the direction of the arrow. Rotate the "SENDER" dial until the sender frequency coincides with that of the received signal. This is clearly indicated by a whistle or beat-note heard as the sender is tuned past the received signal. The correct adjustment is at the inaudible centre of this whistle (known as zero beat).

(iii) If the netting operation is being carried out on a weak received signal the beat-note may be too faint to be heard, due to the much greater strength of signal from the local sender "blanketing" the weak signal. However, it will be noticed that when the "SENDER" is tuned past the "RECEIVER" frequency the received signal is blanketed out for approximately 0.08 to 0.1 Kc/s. as indicated on the "SENDER" dial. By setting to the centre of this "band width" approximate netting is achieved. At the exact centre of this band width it is sometimes possible to hear evidence of inter-reaction between the sender and the receiver in the form of an unsteady high pitched humming sound.

(iv) Release "HOLD FOR NETTING" switch and then check "SENDER" aerial tuning as for Sending, Paragraph 9.2.

(v) If possible proceed to check the accuracy of netting by a test transmission to the other stations of the group.

Note.—The L.T. current drain is considerably increased while the netting switch is in the "HOLD FOR NETTING" position. The switch must be held in this position for no longer than is absolutely necessary for netting.

False Beat Notes during Netting.

When carrying out the netting operation it is important to see that the dial reading of the "SENDER" is approximately the same as the dial reading of the "RECEIVER." Owing to the great strength of the signal from the local master oscillator, several false responses on beat-notes may be obtained. All these false settings may be recognised by slightly altering the "RECEIVER" dial setting. On doing this the beat-note should NOT change in pitch, but only in volume if the correct beat-note is being heard.

CHAPTER III.

TECHNICAL DESCRIPTION.

11. INTRODUCTION.

The receiver is of the superheterodyne type using an intermediate frequency of 455 Kc/s. One tuned R.F. stage, a frequency changer and one I.F. stage are followed by a diode detector, triode and pentode audio stages. The frequency changer employs a pentagrid type valve.

The sender circuit is a conventional master-oscillator power amplifier arrangement using similar valves in both stages. Fig. 1 is a circuit diagram of the combined Sender/Receiver unit.

12. RECEIVER CIRCUITS.

One of the disadvantages of superheterodyne receivers is that a signal whose frequency is higher instead of lower than that of the local oscillator by the amount of the I.F., if allowed to reach the grid of the frequency changer, will produce the same difference frequency as the wanted signal and will cause interference. In order to reject these "Images," two pre-selector circuits are employed in conjunction with a pentode V1A. This gives a much greater image rejection ratio and also increases the signal/noise ratio.

13. R.F. AMPLIFIER.

The input circuit comprises the inductance L1A and the tuning condenser C4A (12-77 mmfd.) which forms part of the 3 gang assembly operated by the receiver tuning dial, the aerial feed being taken via the series condenser C1A (15 mmfd.). The input circuit is trimmed by the condenser C3A (3-26 mmfd.). The anode of V1A is connected to the tuned circuit L2A, C4B. This circuit is trimmed by the condenser C6A (2-12 mmfd.) and fed via the condenser C7A (.0001 mfd.) to the control grid of the frequency changer valve, the grid leak of which is R1B (1 megohm).

14. FREQUENCY CHANGER.

The output of the R.F. amplifier is applied as in the preceding section to the control grid of the frequency changer valve V2A and the local oscillations are provided by the triode portion of V2A. The oscillator operates in a tuned grid feed back circuit. The tuned circuit comprises the coil L3A, one section of the 3 gang assembly C4C, the shunt trimmer condensers C3B (3-26 mmfd.) and C8A (10 mmfd.). The oscillator anode is coupled to the feed back portion of L3A by condenser C9A (.001 mfd.). H.T. is applied to the oscillator anode via resistor R4A (20,000 ohms), R5 (150,000 ohms) is the oscillator grid leak and C7B (.0001 mfd.) the grid blocking condenser. The screen grid of V2A is decoupled by R5A (50,000 ohms) and C5B (.05 mfd.). The anode load impedance of V2A is formed by the primary coil of the first I.F. transformer T1A which is permeability tuned.

15. GANGING.

To ensure that the local oscillator frequency is always higher than that of the unwanted signal by the amount of the I.F. the condensers C4A, C3A and C4C are ganged and tracking is accomplished by the trimmer condensers and the permeability trimmer screws in the oscillator tuned circuits.

16. I.F. AMPLIFIER.

The function of the I.F. amplifier is to give sufficient amplification to meet all requirements and at the same time to provide the necessary selectivity. The grid of the I.F. valve (V1B) is returned via the permeability-tuned secondary of T1A to the AVC bias line and decoupled by C5C (.05 mfd.). The screen of V1A and V1B are fed through a variable resistor R14A (1 megohm) which forms a variable voltage divider between H.T. + and earth. Decoupling is provided by C5D (.05 mfd.). The anode load of V1B is formed by the permeability-tuned primary of T2A. All suppressor grids are connected internally to the negative side of the filament of the valve, and filaments are all connected in parallel.

17. SECOND DETECTOR.

This detector is the diode portion of V3A which is a diode-triode-pentode valve. It is fed from the permeability-tuned secondary of T2A. The audio-frequency component of the detector output is developed across R1D (1.0 megohm), R5B (50,000 ohms) C7C (.0001 mfd.) and C7D (.0001 mfd.) forming the R.F. filter network of the diode return. R1C (1 megohm) is an A.F. filter in the AVC line which is fed from the junction of R5B and R1D. The grid of the triode portion of V3A is fed via C10A (.002 mfd.). The purpose of C10A is to prevent the D.C. component of the detector from affecting the bias of the triode portion of V3A.

18. AUTOMATIC VOLUME CONTROL.

The D.C. component of the diode output is applied via R1C and the decoupling filters to the grids of V1A and V1B. This D.C. component is always of such polarity that the AVC line is negative to earth, and varies in amounts according to the strength of the carrier of the signal received at the diode. Thus for large signals a large negative bias will be applied to V1A and V1B reducing the gain, and for weaker signals correspondingly less amounts of bias will be applied to those valves, causing increased gain. Thus a compensating action takes place which tends to produce a uniform input to the A.F. circuits over a wide range of signal inputs.

19. A.F. AND OUTPUT STAGES.

Audio frequency amplification takes place in the triode section of V3A, the grid leak of which is R6A (1.75 megohms). The anode load of this triode is R1E (1 megohm) and the A.F. voltage developed across this resistor is fed via condenser C10B (.002 mfd.) to the pentode grid of V3A. H.T. voltage is fed direct to the anode of the pentode portion of V3A through the primary of transformer T3A and to the screen through R8A (2,500 ohms). The pentode grid leak of V3A is R6B (1.75 megohms) which is returned direct to H.T. negative. Resistors R7A, R7B and R7C are connected between H.T. — and earth. The combined anode currents of all receiving valves thus flow through these resistors and the voltage drop produced thereby provides the negative bias for the pentode portion of V3A.

NOTE:—When the netting switch S4 is operated, a resistance R9B (10,000 ohms) is placed in parallel with R7A and R7C so as to compensate for the increased H.T. current caused by operation of the sender master oscillator valve, V4B.

The headphones are connected to the low impedance secondary of transformer T3A and when referred to the primary of T3A constitute the load impedance of V3A.

CHAPTER IV.

TECHNICAL DESCRIPTION OF SENDER CIRCUITS.

20. INTRODUCTION.

The sender circuit is a conventional master-oscillator-power amplifier arrangement, using similar valves in both stages. The power amplifier is capable of being modulated either with speech or with a continuous audio frequency tone having a frequency of approximately 1200 cycles per second. In the latter case, the carrier may be keyed thus providing M.C.W. transmission.

21. R.F. OSCILLATOR.

The R.F. oscillator is the beam power amplifier, V4B, working in a tuned grid, filament feed back circuit. The tuned circuit consists of the coil L7A and the condenser C3C (3-26 mmfd.), C16A (10-185 mmfd.) and C15B (100 mmfd.). The portion of the primary of L7A between the tap and earth together with the secondary of L7A correspond to that portion of the coil between cathode tap and earth in the more common type of circuit using an indirectly heated valve. The tuned circuit capacity is provided by the shunt trimmer C3C, the variable condenser, "SENDER" tuning C16A, and the fixed condenser C15B. C7F (.0001 mfd.) is the grid blocking condenser while R12A (25,000 ohm) is the grid leak which is returned to earth directly through the M.C.W. R/T switch S3 when switch S3 is in the R/T position, or through the operating key when switch S3 is in the M.C.W. position. Filament decoupling is provided by C2C (0.005 mfd.). The screen is supplied through R11A (100,000 ohms) which is decoupled by C10E (0.002 mfd.) whilst the plate is supplied through the M.O. R.F. choke L6A and the resistor R10A (15,000 ohm). The latter is decoupled by C10D (0.002 mfd.). The anode of the R.F. oscillator is connected to the grid of the power amplifier, V4A, via the coupling condenser C17A (0.0005 mfd.).

22. POWER AMPLIFIER.

The power amplifier valve V4A is of the same type as V4B. The grid leak R5C (50,000 ohms) is returned to earth either directly through the M.C.W. — R/T switch S3 when S3 is in the R/T position or through the operating key, when S3 is in the M.C.W. position. The screen is supplied through R9A which is decoupled by C10C (0.002 mfd.).

The anode H.T. is supplied via the high impedance secondary of T3A the closed contacts of S4A, the milliammeter M1A and the power amplifier R.F. choke L5A. The milliammeter is decoupled by the condenser C9C (0.001 mfd.).

The output of V4A is fed via the coupling condenser C9B (0.001 mfd.) to the aerial loading network consisting of L4A, C13A, C14A, C15A and the switch S2.

23. AERIAL LOADING NETWORK.

The purpose of the aerial loading network is to match the aerial impedance to that of the power amplifier. When the "AERIAL TAPS" switch S2 is in position 1, the anode of V4A is connected to the top of the coil L4A

and the aerial to the bottom of the coil. As the switch S2 is rotated from position 1 to position 8, the anode remains connected to the top of L4A whilst the aerial moves from the bottom to the top of the coil.

In positions 9 and 10 the aerial remains connected to the top of L4A whilst the anode of V4A moves to the 1st tap from the top in position 9, and to the 2nd tap from the top in position 10. Thus in position 1 of the "AERIAL TAPS" switch, the power amplifier will load into an aerial having a very low impedance whilst in position 10 it will load into a high impedance aerial. On intermediate switch positions, aerials having impedances between the above low and high limits may be correctly loaded. The three condensers C13A (1000 mmfd.), C14A (11-436 mmfd.) and C15A (100 mmfd.) form a band-spread circuit, which prevents the aerial loading network being turned to a harmonic of the M.O. frequency.

24. MODULATOR STAGE.

Anode modulation of the power amplifier stage is employed, the pentode portion of V3A functioning as microphone amplifier and modulator when R/T is used, and as audio oscillator and modulator when M.C.W. is used. The circuit components necessary in order that the valve may perform the above functions are selected by the "R/T-MCW" switch S3.

When the "R/T-MCW" switch S3 is in the R/T position, one side of the primary of the microphone transformer T4A is connected to the microphone jack through R13A (20 ohms) and section C of S3. The other side of the primary of T4A is connected to the positive side of the transmitter filament supply line. The resistor R13A (20 ohms) is inserted to prevent accidental short circuiting of the L.T. battery should the "R/T-MCW" switch be left in the R/T position while the key is being operated. Section B of S3 connects one side of the secondary of T4A to earth while section A leaves R15A (70,000 ohms) and C18A (.003 mfd.) disconnected. The other side of the secondary of T4A is connected via section F of the "RECEIVE-OFF-SEND" switch S1 to the control grid of the pentode section of V3A. S1E shorts out R7C (1000 ohms) thus maintaining the bias on the pentode section of V3A at the correct value, whilst S1G connects the output of the low impedance winding of the output and modulation transformer T3A, through the resistor R5D (50,000 ohms) to the headphones, thus providing side tone on M.C.W. and R.T. S3B also connects one end of the bias resistor R7C (1000 ohms) and the grid leaks of V4A and V4B to earth. The plate of V3A is supplied from the H.T. + terminal through the primary of T3A. Thus the A.F. output of the microphone is amplified by V3A and impressed on the plate current of V4A which flows through one secondary of T3A. Depth of modulation is not variable.

If the "R/T-MCW" switch S3 is in the M.C.W. position V3A operates as an audio frequency oscillator when a key plugged into the "MICROPHONE OR KEY" jack is closed. The output of this oscillator is impressed on the plate current of V4A as before. Oscillation of V3A in this condition takes place between the control grid and the screen. T4A functions as the feedback transformer.

One side of the primary of T4A remains connected to the L.T. positive side of the transmitter filament supply line whilst the other side is connected via C12A (0.25 mfd.) to the screen of V3A. The H.T. supply to the screen is shunt fed via R8A (2,500 ohm). One side of the secondary of T4A remains connected through C2D (0.005 mfd.) and S1F to the control grid of the pentode section of V3A whilst the other side in addition to remaining connected to H.T. — through the bias resistor R7A and R7C and the grid leaks R5C and R12A of V4A and V4B respectively is connected through S3B to the "MICROPHONE OR KEY" jack. The resistor R15A and the

condenser C18A are also connected to the MICROPHONE OR KEY jack via S3A. R15A which has a much lower resistance than R6B, functions as the grid leak of V3A when this tube is used as an audio oscillator. The secondary of T4A is tuned by the condenser C2D (0.005 mfd.) and C18A (0.003 mfd.) the following circuits are completed to earth:—

- a. H.T. negative through the bias resistors.
- b. The M.O. grid leak R12A.
- c. The P.A. grid leak R5C.
- d. The audio oscillator grid leak R15A.
- e. The audio oscillator tuning condenser C18A.
- f. One side of the secondary of the audio oscillator feedback transformer T4A.

Thus both the R.F. and modulator sections are keyed.

25. "RECEIVE-OFF-SEND" SWITCH. (S1).

The functions of the "RECEIVE-OFF-SEND" switch, which consists of seven single pole 3 position sections S1A-G, are as follows:—

Wafer No. 1.

- Section A.—Switches the aerial to the appropriate position.
- Section C.—Switches the L.T. circuit to the filament of Sender or Receiver or to the "OFF" position as required.
- Section D.—Switches the H.T. supply to the Sender, to the Receiver or "OFF" as required; H.T. is permanently connected to the screen and anode of the pentode section of V3A.

Wafer No. 2.

- Section B.—Switches L.T. to the filament of V3A in both "SEND" and "RECEIVE" positions.
- Section E.—Connects one end of the back bias resistor R7C to earth in the "RECEIVE" position or short circuits this resistor and thus connects one end of R7A and R7B in parallel to S3B in the "SEND" position.
- Section F.—Connects the microphone transformer T4A to the pentode control grid of V3A in the "SEND" position.
- Section G.—Completes the headphones circuit through the low impedance secondary of T3A either directly in the "RECEIVE" position, or through R5D in the "SEND" position.

26. "AERIAL TAPS" SWITCH (S2).

The "AERIAL TAPS" switch consists of the two single pole 10 position sections S2A and S2B. The functions of this switch are as follows:—

- Section A.—Connects the output of the P.A. to the top of the P.A. tank coil L4A in positions 1 to 8. In position 9 the P.A. output is connected to the 1st tap from the top of L4A and in position 10, it is connected to the 2nd tap from the top.
- Section B.—Switches the aerial from the bottom of L4A in position 1 to all taps in turn finishing at the top in position 8. In positions 9 and 10, the aerial remains connected to the top of the coil.

27. "R/T-MCW" SWITCH (S3).

The "M.C.W.—R/T" Switch consists of the three single pole two position sections S3A-C, which perform the following functions:—

Section A.—Switches the grid leak R15A and the condenser C18A across the secondary of T4A in the "M.C.W." position.

Section B.—Switches one side of the secondary of T4A and one end of the bias resistor R7C from the "MICROPHONE AND KEY" jack to the earth when S3 is turned from the "M.C.W." position to the "R/T" position.

Section C.—Switches one side of the primary of T4A from the screen of the pentode section of V3A via C12A to the "MICROPHONE OR KEY" jack via the resistor R13A.

28. "NETTING" SWITCH (S4).

The "Netting" Switch consists of five single pole two position non-locking sections. Its functions are as follows:—

- (a) In the normal resting position, it completes the H.T. circuit from the modulation secondary of T3A to the anode of V4A and breaks the netting circuits detailed in sub. para. (b) below.
- (b) When held in the netting position against the pressure of its return spring, it completes the L.T. circuit to the filament of the sender valves V4A and V4B, connects R9B in parallel with the back bias resistor R7A and R7C, to compensate for increased H.T. current consequent on the operation of the M.O. valve V4B, connects R11C (100,000 ohms) in series with M.O. valve V4B grid leak R12A (25,000 ohms) breaks the H.T. circuit of the P.A. valve V4A and applies H.T. voltage to the anode of V4B through R11B.

In consequence, the master oscillator will operate, and can be tuned while the receiver is still operating.

NOTE.—The L.T. current drain is considerably increased while the netting switch is in the "HOLD FOR NETTING" position. The switch must be held in this position for no longer than is absolutely necessary for netting.

CHAPTER V.

MAINTENANCE AND REPAIR.

29. INTRODUCTION.

This chapter deals only with items of maintenance and repair that can be undertaken by Regimental Signals Personnel and Signal Units in the field, using a minimum of test equipment. The occurrence of serious defects when the set is in use will be minimised if the daily and weekly routines given below are carried out, and if symptoms of trouble are reported immediately they are discovered.

30. DAILY MAINTENANCE.

30.1 Batteries.

The dry battery used for L.T. and H.T. supply should be tested daily on load with the set at "RECEIVE". If the L.T. reading is below 1.2 volts or H.T. 99v. block reads below 75 volts, the battery should be replaced. If no voltmeter is available, a comparison should be made of receiver performance and tuning "dip" at "SEND" with a fresh battery. A large discrepancy indicates that replacement is required.

A note should be taken of the tuning "dip" at the beginning and end of each period of work. A gradual decrease of the amount of "dip", other conditions, such as aerial length, frequency and location being unchanged, is a general indication that batteries require replacement. When the "Off Tune" current falls below 6.5 ma the battery is usually useless and should be replaced.

30.2 Antennae Rods F.

- (i) See that each section is straight.
- (ii) See that ends are clean, straight and that they fit tightly together. Apply a little vaseline or grease to the ends. If the ends fit too loosely pinch slightly about one inch from the outside end with square-nosed pliers.
- (iii) Make sure that the insulating sleeve is in position on the No. 2 section.

30.3 Aerial Base.

Clean and check the spring socket and insulator of the Aerial base and see that the Antennae rods "F" Nos. 1 and 2 sections are held firmly and are seating correctly in the socket.

30.4 General.

Turn "RECEIVE-OFF-SEND" switch to "RECEIVE" and turn volume control to maximum volume. Check that the character and volume of the background noise and any known regular signals are normal, and that there are no intermittent noises. If intermittent noises exist, but cease on removal of the aerial, they are probably due to extraneous causes and not to any fault in the set.

If such noises persist after removal of the aerial, examine headphone cords and terminals for looseness or signs of wear. Also examine battery terminals and valve grid clips and socket seating for looseness or bad contacts. If noises still persist try using different battery. Switch to "SEND," tune aerial and see that meter needle kicks slightly on loud speech, and that sidetone is normal in the Receiver, headgear.

When satisfied that the set is in good working order, thoroughly clean and dry all exposed parts before putting the set away in store. Every opportunity should be taken to remove all traces of dust, dirt and water, otherwise these will cause serious damage later.

31. WEEKLY MAINTENANCE.

1 Removal of Set from Case.

To remove the set from the case, unscrew the knurled-headed captive screws retaining the front of the battery compartment, remove the front of the battery compartment and withdraw the chassis.

2 Miscellaneous.

Clean the aerial insulator socket on the case to prevent leakage. See that the milliammeter pins are making good contact. See that all components are mechanically tight, and examine all electrical connections and switches, but do not disturb the wiring.

See that all valve shields are secure, and that the valve grid clips and earthing clips are making good contact to the valves, caps and shields respectively.

Examine the battery plug and sockets on the chassis and case respectively for continuity and damage. Examine the extension tuning controls for freedom of movement and damage.

1.3 Tuning Drives.

Examine the "Send," "Receive" and "Aerial" tuning drives for binding and backlash. Examine the worm drive of the "Receive" dial and the split half-cogs on each spindle. If the anti-backlash spring is properly tensioned one of the half-cogs will be slightly in advance of the other—whichever one is immaterial. See that all grub screws are tight.

If backlash is excessive or if the drive jumps on fine tuning the set should be returned to store for repair by Signals or Ordnance Workshops.

1.4 Replacement of Valves.

If performance is found to deteriorate even when fresh batteries are used this may be due to wear and tear on valves. If present, this fault may best be determined by substitution of known "good" valves, normally carried with the set as spares. Care should be taken that only equivalent valve types are interchanged and that batteries are disconnected during the process.

DO NOT put faulty valves back in spare valve case; exchange them for sound ones as soon as possible and put sound ones back in the case.

LIST OF MAIN COMPONENTS

Vocab. Cat No.	Designation.	Symbol.	Description.	R.C. Part No.	Assoc. with Valve.	Value.	Remark and Type
ZAA 2916	Cond., fixed, Y.15.C. (Aust.)	C1A	Aerial Series Coupling	PC177	V1A	15 uuF.	Ducon Cera. N750 A15±10
ZAA 252	" " R.5 (Aust.)	C2A	R.F. Grid Return	PC249	V2A	0.005 uuF.	Simplex Mica. S/M
" "	" " " "	C2B	" " "	"	V4B	"	"
" "	" " " "	C2C	Filament Decoupling	"	"	"	"
" "	" " " "	C2D	Modulation (MCW) Tun.	"	"	"	"
" "	" " " "	C2E	H.T. By Pass	"	"	"	"
ZAA 331	" variable, No. 17 (Aust.)	C3A	Aerial Trimmer	PC342	V1A	3.26 uuF.	Radio Corp. 7 pl. Midget
" "	" " " "	C3B	Oscillator Trimmer	"	V2A	"	"
" "	" " " "	C3C	M.O. Trimmer	"	V4B	"	"
ZAA 377	" " No. 57 (Aust.)	C4A	Aerial Tuning	PC172	V1A	12.77 uuF.	" 11 " 3 gang
" "	" " " "	C4B	R.F. Tuning	"	V2A	"	"
" "	" " " "	C4C	Oscillator Tuning	"	"	"	"
ZAA 224	" fixed, Q.5 (Aust.)	C5A	A.V.C.	PC494	"	0.05 uuF.	Chan. Tub. Trop. Treat PP25
" "	" " " "	C5B	Screen Decoupling	"	"	"	"
" "	" " " "	C5C	R.F. Grid Return	"	V1B	"	"
" "	" " " "	C5D	Screen Decoupling	"	V1A-B	"	"
ZAA 333	" variable, No. 19 (Aust.)	C6A	R.F. Trimmer	PC361	V2A	2.12 uuF.	Radio Corp. 4 plate Midge
ZAA 258	" fixed, X.I.B. (Aust.)	C7A	Control Grid Coupling	PC110	"	100 uuF.	Simplex Mica. type P/T
" "	" " " "	C7B	Oscillator Grid Coupling	PC110	V2A	100 uuF.	Simplex Mica P/T.
" "	" " " "	C7C	R.F. Filter Diode Load	"	V3A	"	"
" "	" " " "	C7D	" " " "	"	"	"	"
" "	" " " "	C7E	" " Triode Grid	"	"	"	"
" "	" " " "	C7F	Oscillator Coil Coupling	"	V4B	"	"
ZAA 2917	" " Y.I.F. (Aust.)	C8A	Oscillator Tuning	PC331	V2A	10 uuF.	Ducon Ceram. N750 A10±1
" "	" " " "	C9B	P.A. Tank Coil Coupling	"	V4A	"	"
" "	" " " "	C9C	Anode R.F. Filter	"	"	"	"
" "	" " " "	C10A	Tank Coil Coupling	PC168	V3A	0.002 uuF.	"

ZAA 2917	"	"	"	C9B	P.A. Tank Coil Coupling	"	V4A	"	"
"	"	"	"	C9C	Anode R.F. Filter	"	"	"	"
ZAA 253	"	"	R.2 (Aust.)	C10A	Triode Grid Coupling	PC168	V3A	0.002 uF.	"
"	"	"	"	C10B	Pentode Grid Coupling	"	"	"	"
"	"	"	"	C10C	Screen Decoupling	"	V4A	"	"
"	"	"	"	C10D	Anode R.F. Filter	"	V4B	"	"
"	"	"	"	C10E	Screen Decoupling	"	"	"	"
"	"	"	"	F11A	Bias Resistor Bypass	PC462	"	25 uF.	Ducon Dry Elect. EG1081
ZAA 2005	"	"	25.D (Aust.)	C12A	Modulation Coup. MCW	PC488	V3A	0.25 uF.	Chanex Tro. Tr. Paper PP2
ZAA 219	"	"	P.25B (Aust.)	C12B	H.T. Bypass	"	"	"	"
"	"	"	"	C13A	P.A. Coil Series Tuning	PC171	"	1000 uuF.	Ducon Cera. N750 F1000-
ZAA 2914	Cond., fixed, R.I.P. (Aust.)	"	"	C14A	Tuning	PC377	"	11-436 uuF.	Radio Corp. Single Gang
ZAA 334	" variable, No. 24 (Aust.)	"	"	C15A	" Coil (Parallel Tun.)	PC437	"	100 uuF.	Ducon Ceramicon N750 B1
ZAA 2915	" fixed, X.I.L. (Aust.)	"	"	C15B	M.O. " (")	"	V4B	"	"
"	"	"	"	C16A	Tuning	PC185	"	10-185 uuF.	Radio Corp. Single Gang
ZAA 378	" variable, No. 58 (Aust.)	"	"	C17A	Grid Coupling Cond.	PC144	V4A-B	0.0005 uff.	Simplex Type P/T.
ZAA 256	" fixed, X.5 (Aust.)	"	"	C18A	Mod. (MCW) Tuning	PC480	"	0.003 uff.	"
ZAA 2364	" R.3 (Aust.)	"	"						
INDUCTANCES									
ZAA 4751	Inductance, No. 36 (Aust.)	L3A	Oscillator Coil	PT445	V2A	Radio Corp.			
ZAA 4660	" " 90 (Aust.)	L7A	M.O. Tank Coil	PT616	V4B	"			
ZAA 4661	" " 91 (Aust.)	L4A	P.A. Tank Coil	PT617	V4A	"			
ZAA 474	" " 35 (Aust.)	L2A	R.F. Coil	PT444	V2A	"		1.6mH.	4 pi Type
ZAA 197	Choke R.F. No. 13 (Aust.)	L5A	P.A. R.F. Choke	PT340	V4A	"		.82mH.	"
ZAA 196	" " 12 (Aust.)	L6A	M.O. " "	PT338	V4B	"		—	"
ZAA 4651	Inductance No. 34 (Aust.)	L1A	Aerial Coil	PT443	V1A	"			"
AMMETERS D.C.									
ZAA 073	Ammeters, D.C. No. 2A (Aust.) 10 mA.	M1A	Anode Current	PM489	V4A	Triplet 2" face. Moving c		0-10 mA.	

[illegible]

COMPONENTS (continued)

ZAA — 1038 — Wireless Sets No. 108 Mk. III

APPENDIX 1/

Vocab. Cat No.	Designation.	Symbol.	Description.	R.C. Part No.	Assoc. with Valve.	Value.	Remark and Type
RESISTORS							
ZAA 704	Res., ½ W. No. 3 or No. 4 1 megohm	R1A	A.V.C. Line	PR246	V1A	1 Meg.	IRC Type BT½
"	Res., ½ W. No. 3 or No. 4 1 megohm	R1B	Response Levelling	"	V2A	"	"
"	Res., ½ W. No. 3 or No. 4 1 megohm	R1C	A.V.C. Line	"	"	"	"
"	Res., ½ W. No. 3 or No. 4 1 megohm	R1D	Diode Load	PR246	V3A	1 Megohm	I.R.C. Type BT½
"	Res., ½ W. No. 3 or No. 4 1 megohm	R1E	Triode Load	"	"	"	"
ZAA 694	Res., ½ W. No. 3 or No. 4 5000 ohm	R2A	Anode Feed	PR250	V2A	5000 ohm	"
ZAA 701	Res., ½ W. No. 3 or No. 4 150000 ohm	R3A	Osc. Grid Leak	PR273	"	150000 ohm	"
ZAA 696	Res., ½ W. No. 3 or No. 4 20000 ohm	R4A	" Anode Feed	PR166	"	20000	"
ZAA 698	Res., ½ W. No. 3 or No. 4 50000 ohm	R5A	Screen Feed	PR160	"	50000	"
"	Res., ½ W. No. 3 or No. 4 50000 ohm	R5B	Diode R.F., Filter	"	V3A	"	"
"	Res., ½ W. No. 3 or No. 4 50000 ohm	R5C	Grid Leak (PA)	"	V4A	"	"
"	Res., ½ W. No. 3 or No. 4 50000 ohm	R5D	Sidetone	"	V3A	"	"
ZAA 706	Res., ½ W. No. 3 or No. 4 1.75 M. ohm	R6A	Triode Grid	PR248	"	1.75 M.	"
"	Res., ½ W. No. 3 or No. 4 1.75 M. ohm	R6B	Pentode "	"	"	"	"
ZAA 693	Res., ½ W. No. 3 or No. 4 1000 ohm	R7A	Bias Network	PR262	"	1000 ohm	"

ZAA 693	Res., 1/2 W. No. 3 or No. 4 1000 ohm	R7A	Bias Network	PR252		1000 ohm	"	"
"	Res., 1/2 W. No. 3 or No. 4 1000 ohm	R7B	"	"		"	"	"
"	Res., 1/2 W. No. 3 or No. 4 1000 ohm	R7C	"	"		"	"	"
ZAA 6809	Res., 1/2 W. No. 3 or No. 4 2500 ohm	R8A	Screen Feed	PR300		2500 ohm	"	"
ZAA 695	Res., 1/2 W. No. 3 or No. 4 10000 ohm	R9A	Grid Leak	PR164		10000	"	"
"	Res., 1/2 W. No. 3 or No. 4 10000 ohm	R9B	Bias Network, Netting	"		"	"	"
ZAA 6805	Res., 1/2 W. No. 3 or No. 4 15000 ohm	R10A	Anode Feed	PR500		15000	"	"
ZAA 700	Res., 1/2 W. No. 3 or No. 4 100000 ohm	R11A	Screen Feed	PR103		100000	"	"
"	Res., 1/2 W. No. 3 or No. 4 100000 ohm	R11B	Anode Feed, Netting	"		"	"	"
"	Res., 1/2 W. No. 3 or No. 4 100000 ohm	R11C	Grid Leak (Section of)	"		"	"	"
ZAA 697	Res., 1/2 W. No. 3 or No. 4 25000 ohm	R12A	"	PR155		25000	"	"
"	Res., 1/2 W. Wire wound 20 ohm	R13A	Limiting Resistor	PR231		20	"	W.W. BW 1/2
"	Res., variable, No. 1 (Aust.) 1 megohm	R14A	Volume Control (screen voltage)	PR275		1 megohm	"	R. Corp. Midget Type Carbon
ZAA 699	Res., 1/2 W., No. 3 or No. 4 70000 ohm	R15A	B.F.O. Grid Leak	PR256		70,000 ohms	"	I.R.C. Type BT 1/2

COMPONENTS (continued)

ZAA — 1088 — Wireless Sets No. 108 Mk. III

APPENDIX I/

Vocab. Cat No.	Designation.	Symbol.	Description.	R.C. Part No.	Assoc. with Valve.	Value.	Remark and Type
SWITCHES							
ZAA 771	Switch, 7 p. 3-way B (Aust.)	S1A-G	Send-off-receive	PM278			Radio Corp. 7P 3W (2 deck) Rotary disc
ZAA 7503	Wafer 1.	S1BEFG		PM327			Radio Corp. No. 1 4P 3W.
ZAA 7504	" 2.	S1ACD		PM328			" " No. 2 3P 3W.
ZAA 7501	Switch, 2P 10W B (Aust.)	S2A-B	Aerial Taps	PM254			" 1P 10W (2 deck) Rotary disc.
ZAA 7502	Wafer 1.	S2A		PM329			Radio Corp. 1P 10W No. 1
ZAA 7511	" 2.	S2B		PM330			" 1P 10W. No. 2
ZAA 7505	Switch, 4P 2W G (Aust.)	S3A-C	M.C.W.-R.T.	PM740			" 4P 2W (1 deck) Rotary disc
ZAA 7506	Wafers.	"		PM323			" " 5P 2W (1
ZAA 763	Switch, 5P 2W B (Aust.)	S4A-E	Hold for Netting	PM275			deck) Rotary disc (with return spring)
ZAA 7507	Wafers.	"		PM324			Radio Corp. 5P 2W.
TRANSFORMERS							
ZAA 8101	Transformer I.F. A.C. (Aust.)	T1A	1st I.F.	PT618			" 455 Kc
ZAA 8102	" " AH (Aust.)	T2A	2nd "	PT619			" "
ZAA 8034	" Telephone V (Aust.)	T3A	Output and Modulation	PT617			" Isocore.
ZAA 813	" Microphone D (Aust.)	T4A	Microphone and Mod.	PT303	V3A		" "
VALVES							
				DM453			Variable Mu RF Pentode

(Aust.)

VALVES

Valve,	W.T.	Type	Valve	Function	Tube	Notes
ZAA 914		1P5GT	V1A	RF Amplifier	PM453	Variable Mu RF Pentode
"	"	1P5GT	V1B	IF "	"	"
ZAA 902	"	1A7GT	V2A	Mixer	PM454	Pentagrid converter
ZAA 905	"	1D8GT	V3A	2nd Detector AVC 1st audio and output (Rec.) and audio osc. (MCW) and modulator (Sender)	PM422	Diode-Triode-Pentode
"				Power Amplifier	PM435	Beam power amplifier
ZAA 915	"	1Q5GT	V4A	Master Oscillator	PM435	"
"	"	1Q5GT	V4B			"

APPENDIX II.

ZAA 1080 WIRELESS SETS, No. 108 Mk. III. COMPLETE STATIONS

Item No.	Vocab. Cat. No.	Designation	Quantity Items	
			"X"	"Y"
1		Signal Equipment Card, No. 38 (Aust.)	(b)	1
SECTION W2				
2	WBA 063	Batteries, dry, wireless — 1.5/99 volts (Aust.)	(a)	2(b)
SECTION Y				
3	YA 1077	Microphones, capsule, Mk. IV.	(b) (c)	
SECTION Z1				
Antennae rods, "B"				
2A	ZAA 8886	Adaptors (Aust.)	—	1
3B	ZAA 8887	Pouches (Aust.)	—	1
3C	ZA 0479	Sections	(k)	10
Antennae rods, "F"				
Sections—				
4	ZA 0894	No. 1	(d)	2
5	ZA 0895	No. 2		2
6	ZA 0896	No. 3		2
7	ZAA 8876	Sleeves, insulating (Aust.)	(e)	1
8	ZAA 8871	Straps, carrying (Aust.)		1
9	ZAA 499	Insulators, W.T. No.1D (Aust.)	(b)	1
10	ZA 4500	Key and Plug assemblies, No. 2B	(b)	1
11	ZAA 8882	Covers waterproof (Aust.)	(f)	1
12	ZA 5371	Microphones, hand, No. 3	(b)	
13	ZAA 569	Receivers, headgear, C, L.R., double Mk. III (Aust.)	(g) (b)	1
Valves W.T. Type—				
14	ZAA902	1A7GT	(h)	2
15	ZAA 905	1D8GT		2
16	ZAA 914	1P5GT		4
17	ZAA 915	1Q5GT		4
Wireless Sets, No. 108—				
18	ZAA1088	Mk. III	(b)	1
19	ZAA 8872	Aerials, 67-ft.		1
20	ZAA 8874	Bags, accessories		1
21	ZAA 8875	Straps, No. 1		1
22	ZAA 8877	Covers, canvas, Mk.III	(i)	1
23	ZAA 8878	Extension tuning control, Mk.III	(b)	1
24	ZAA 8885	Instruction Book		
25	ZAA 8879	Leads, counterpoise, 108	(b)	1
26	ZAA 8881	Send-receive switch key, Mk.III.	(b)	1
Wireless sets, No. 208—				
27	ZAA 2084	Cases spare, valves	(b)	1

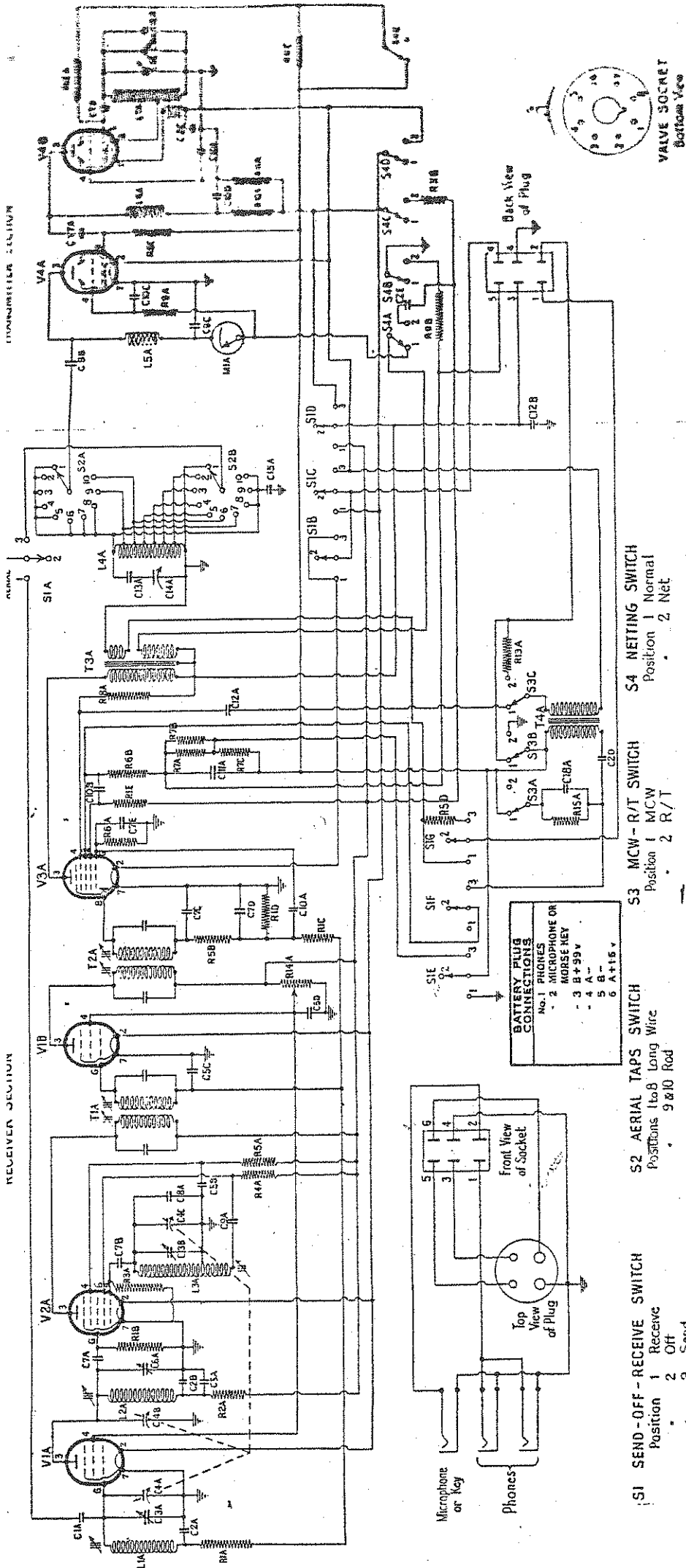
(a) Includes 1 essential spare—working battery carried in set, spare in bags, accessories.

(b) Carried in bags, accessories.

(c) Essential spare for microphone, hand No. 3 — Packed in damp-proof container.

APPENDIX II.—(continued)

- (d) No. 3 sections carried inside No. 1 sections: a normal aerial consists of one No. 2 section (with sleeve) and one No. 3.
- (e) Fitted on No. 2 sections.
- (f) Fitted on key.
- (g) Fitted with plug, single No. 9.
- (h) 50% are essential spares, carried in spare valves case; working valves fitted in set.
- (i) Fitted on set—carries instruction sheet.
- (k) Includes one essential spare.



**FIG.1 WIRELESS SET
No.108 MK III
SCHEMATIC**

Doc. 37/341

108 Mk III. LEGEND

C1A 15 μ fd.	C16A 10-185 μ f.	R14 A	I.O. M.V. Volume Control	S1 A-B Send-Off-Receive Switch
C2A-E 0.005 μ fd.	C17A 0.0005 μ f.	R15 A	70,000 ohm	S2 A-B Aerial Tap Switch
C3A-C 3-26 μ f.	C18 A 0.003 μ f.	L1 A	Aerial Coil	S3 A-C M.C.W.-R/T. Switch
C4A-C 12-77 μ f.	R1 A-E 1.0 megohm	L2 A	R.F. Coil	S4 A-E Netting Switch
C5A-D 0.05 μ f.	R2 A 5000 ohm	L3 A	Osc. Coil	V1 A-B IP5GT
C6A 2-12 μ f.	R3 A 150,000 ohm	L4 A	P.A. Tank Coil	V2 A IA7GT
C7A-F 0.0001 μ f.	R4 A 20,000 ohm	L5 A	P.A. R.F. Choke	V3 A 108GT
C8A 10 μ f.	R5 A-D 50,000 ohm	L6 A	M.O. R.F. Choke	V4 A-B IQ5GT
C9A-C 0.001 μ f.	R6 A-B 175 megohm	L7 A	M.O. Coil	M1A 0-10 MA. DC.
C10A-E 0.002 μ f.	R7 A-C 1000 ohm	T1 A	1st I.F. Trans.	
C11 A 25 μ f.	R8 A 2500 ohm	T2 A	2nd " "	
C12 A-B 0.25 μ f.	R9 A-B 10,000 ohm	T3 A	Output	
C13 A 1000 μ f.	R10 A 15,000 ohm	T4 A	Microphone Trans.	
C14 A 11-436 μ f.	R11 A-C 100,000 ohm			
C15 A-B 100 μ f.	R12 A 25,000 ohm			
	R13 A 20 ohm			

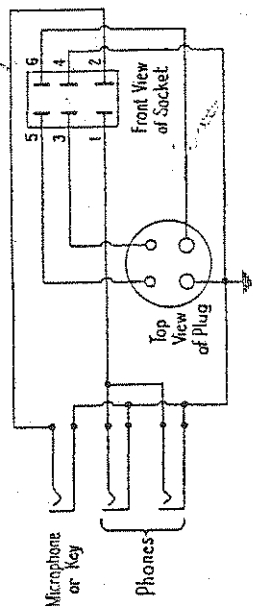
S1 SEND-OFF-RECEIVE SWITCH
Position 1 Receive
2 Off
3 Send

S2 AERIAL TAPS SWITCH
Positions 1 to 8 Long Wire
9 & 10 Rod

S3 MCW-R/T SWITCH
Position 1 MCW
2 R/T

S4 NETTING SWITCH
Position 1 Normal
2 Net

BATTERY PLUG CONNECTIONS
No. 1 PHONES
- 2 MICROPHONE OR MORSE KEY
- 3 B+9V
- 4 A+
- 5 B-
- 6 A+1.5V



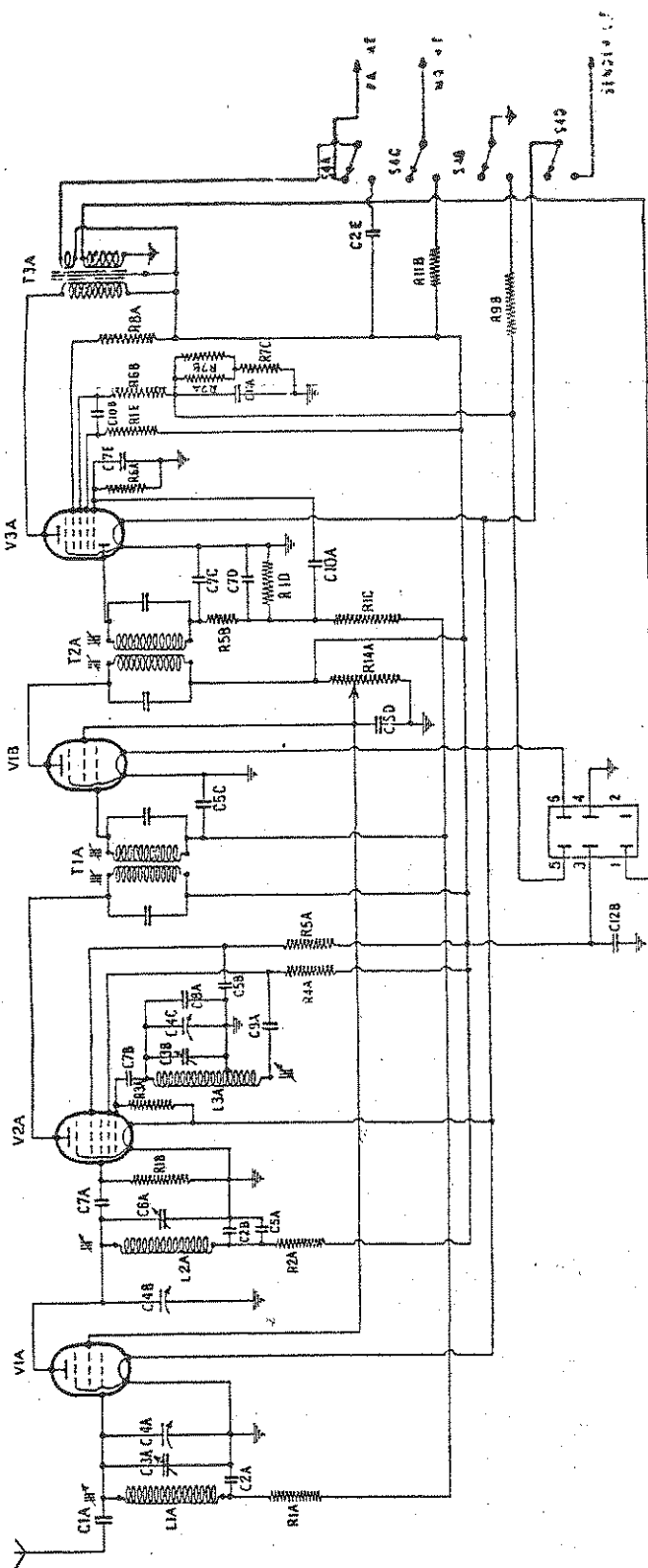


FIG.2 WIRELESS SET No.108 MK.III SIMPLIFIED CIRCUIT DIAGRAM OF SETAS RECEIVER

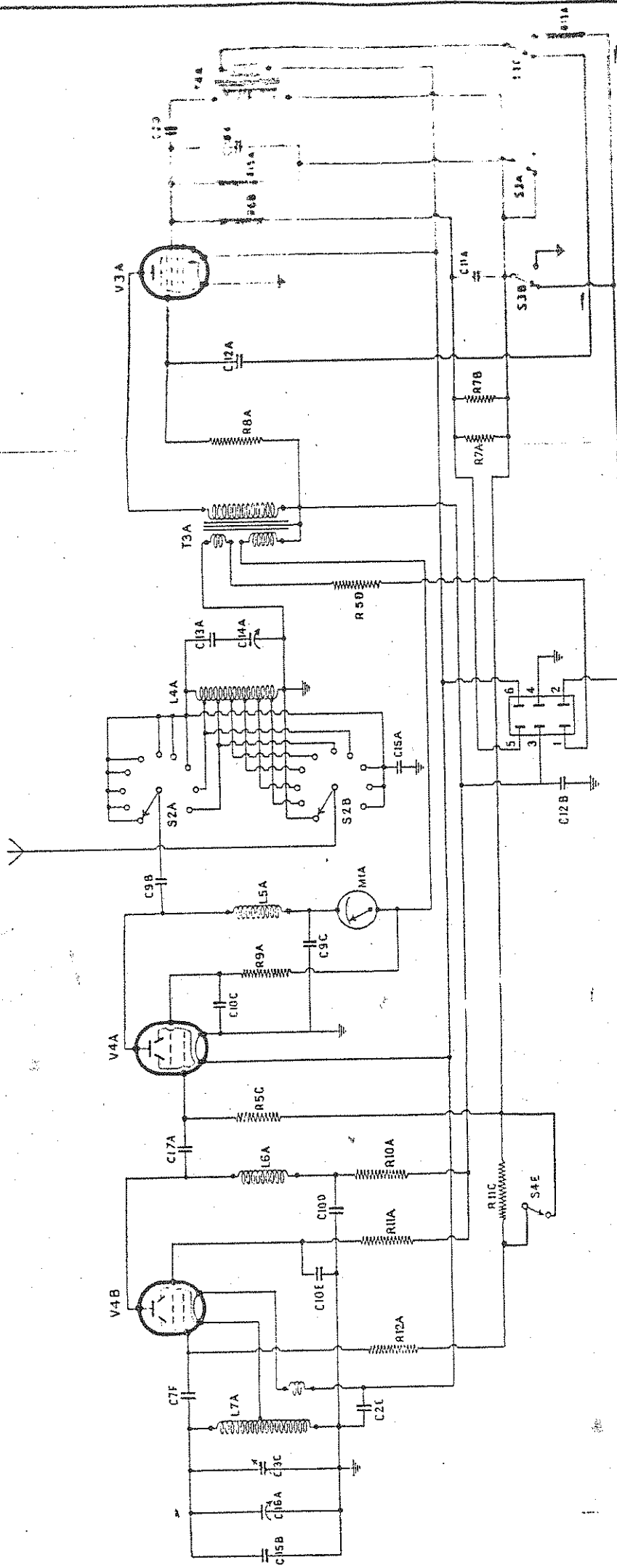
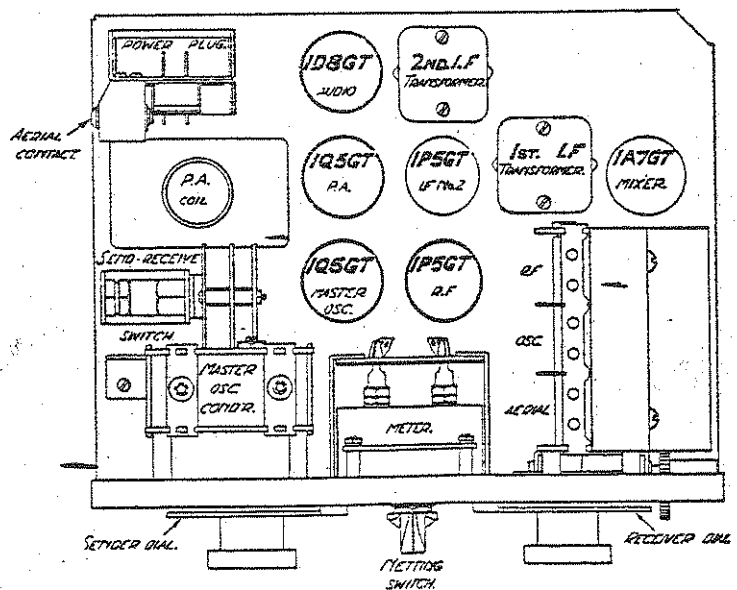
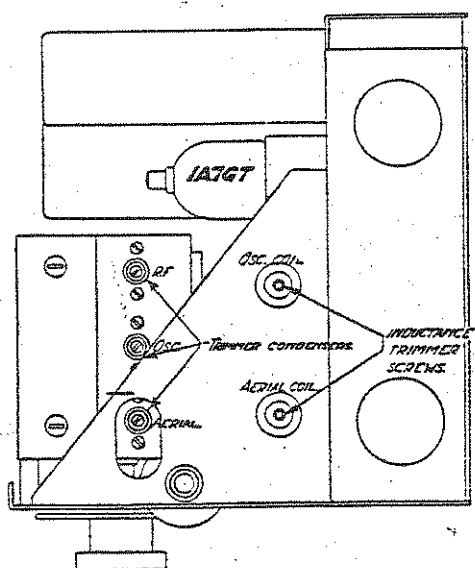
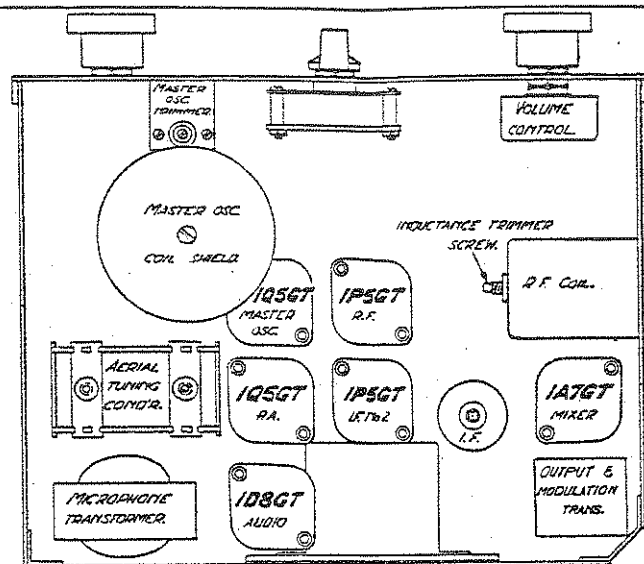


FIG.3 WIRELESS SET No.108 MK III SIMPLIFIED CIRCUIT DIAGRAM OF SET AS SENDER

DRG 66/561

**GENERAL COMPONENTS
PLACEMENT DIAGRAM**
FIELD WIRELESS SET 170 108 MK.III



DRG No. 35 File No. 279

FIG. 4 VALVE LAYOUTS.

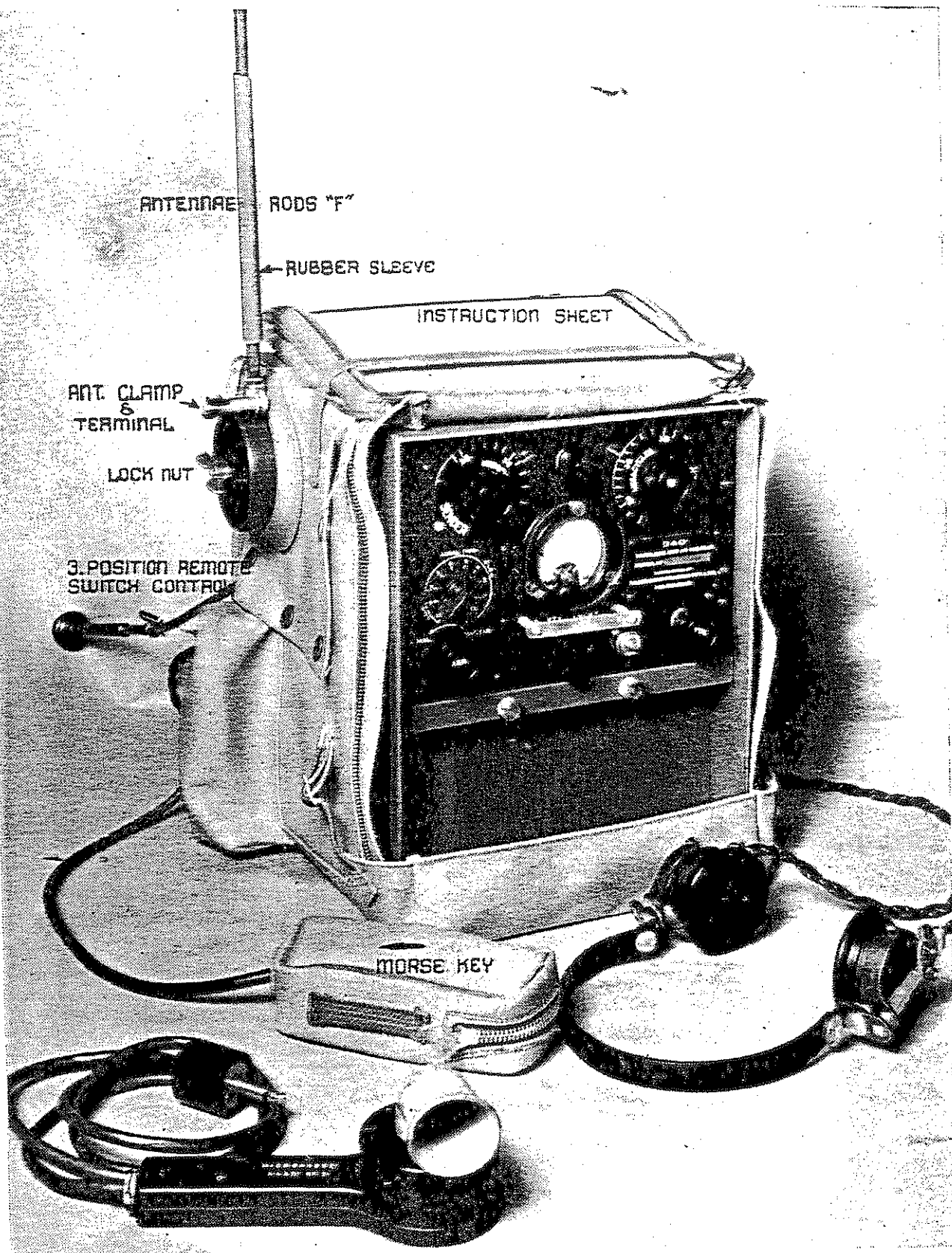


PLATE I - WIRELESS SET NO 108 MK. III FRONT VIEW

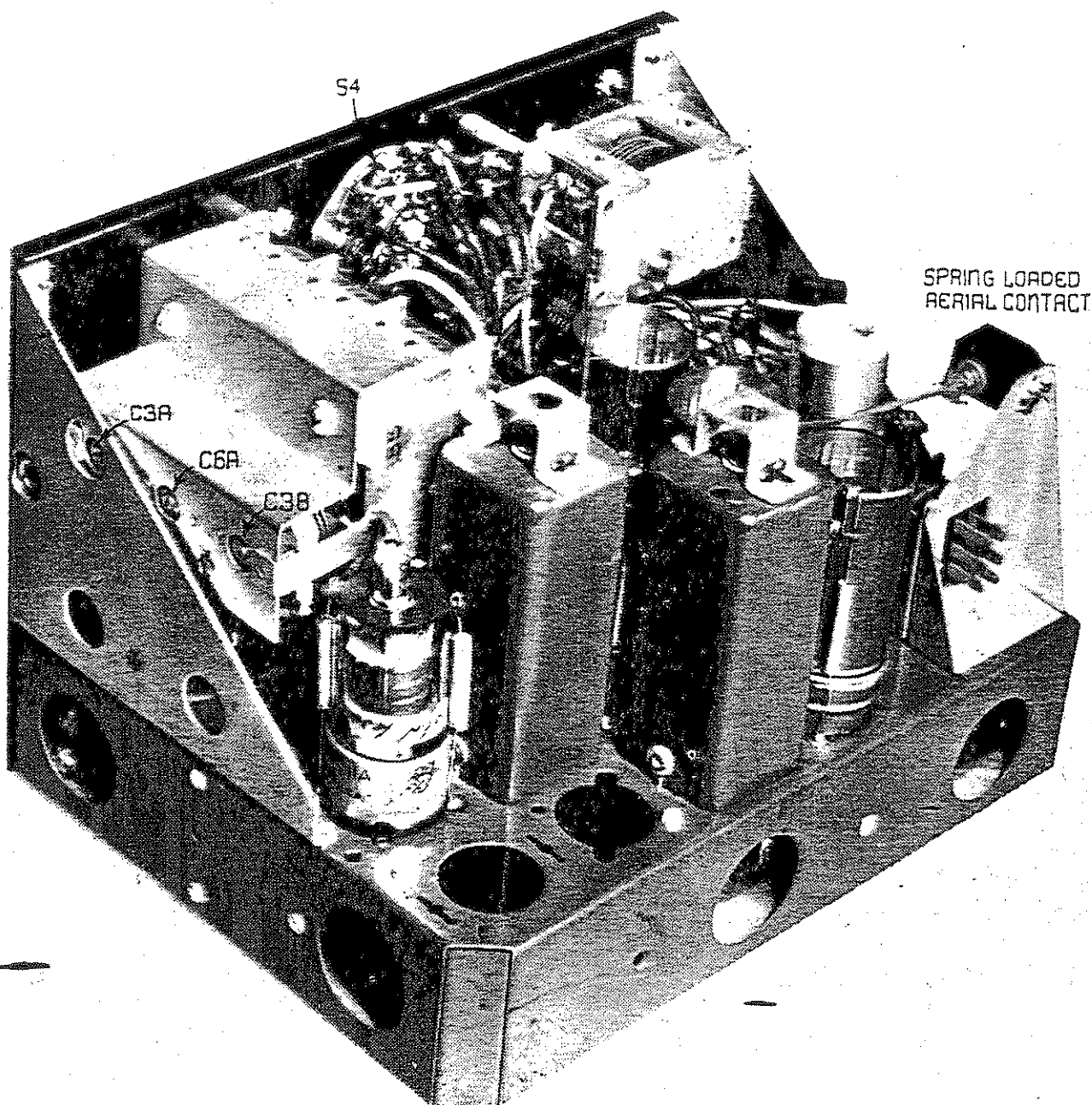


PLATE 2 - WIRELESS SET NO 108 MK. III REAR VIEW

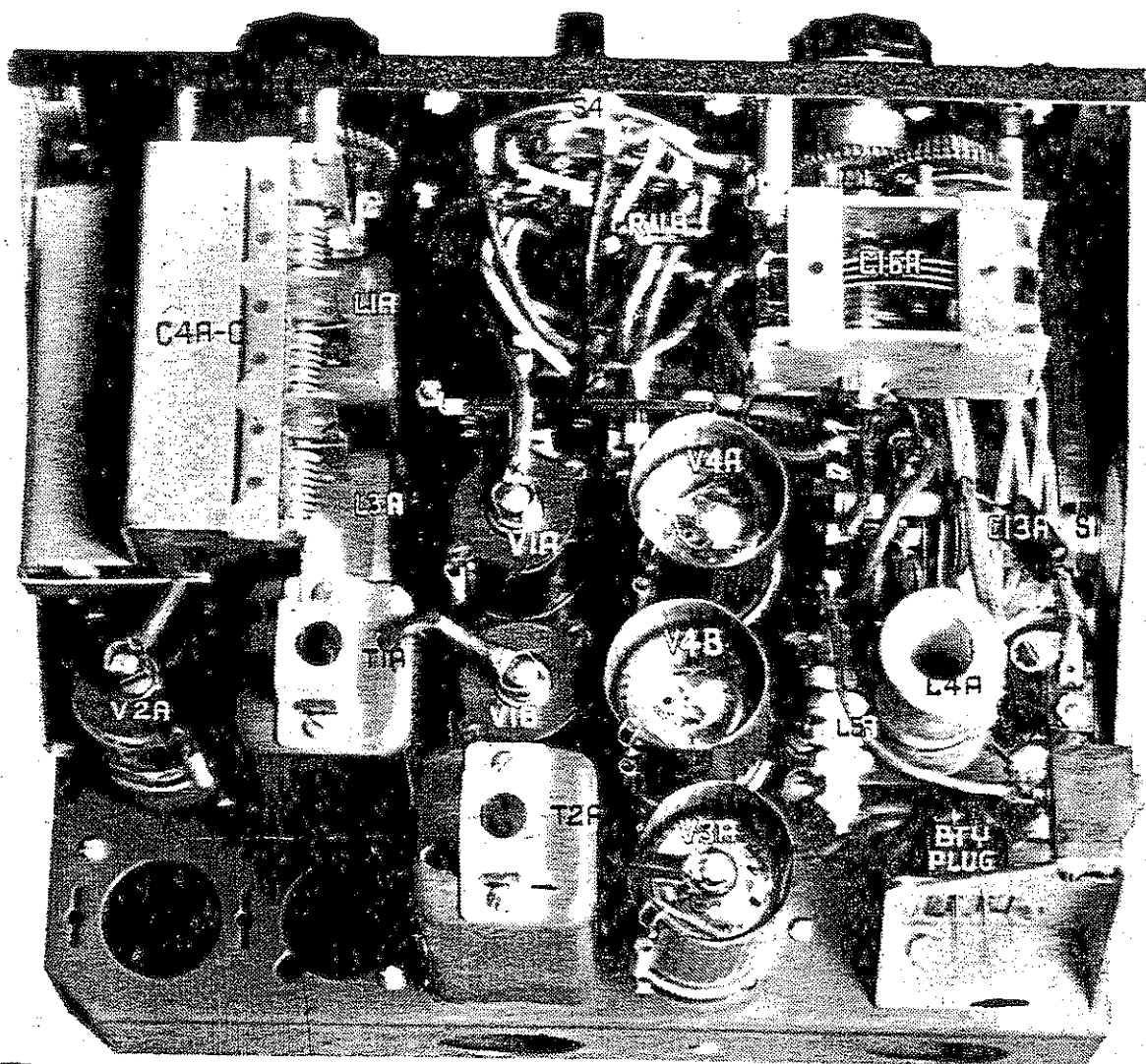


PLATE 3 - WIRELESS SET NO 108 MK. III Top View CHASSIS

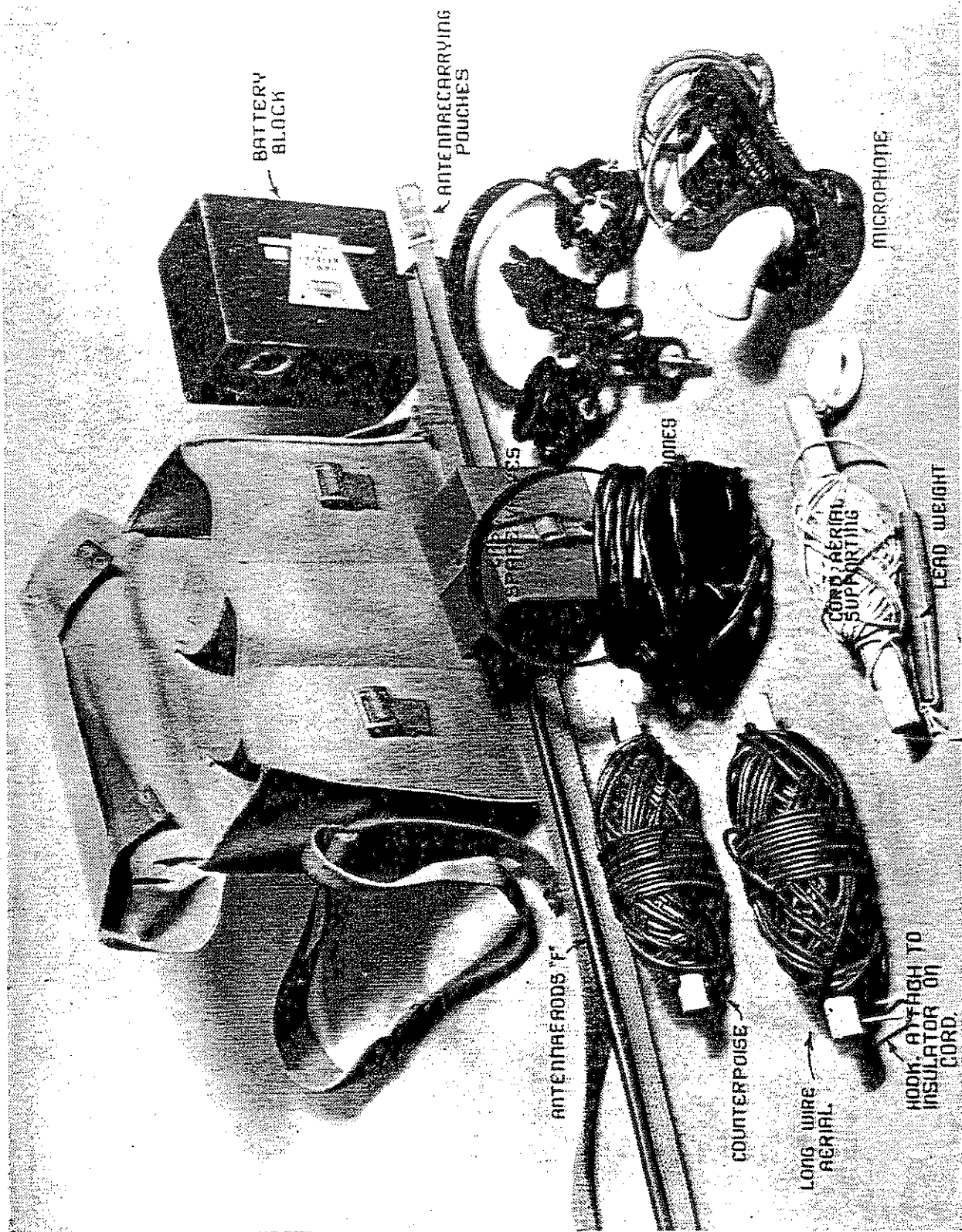


PLATE 4 - WIRELESS SET NO 108 MK. III ACCESSORIES EQUIPMENT

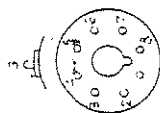
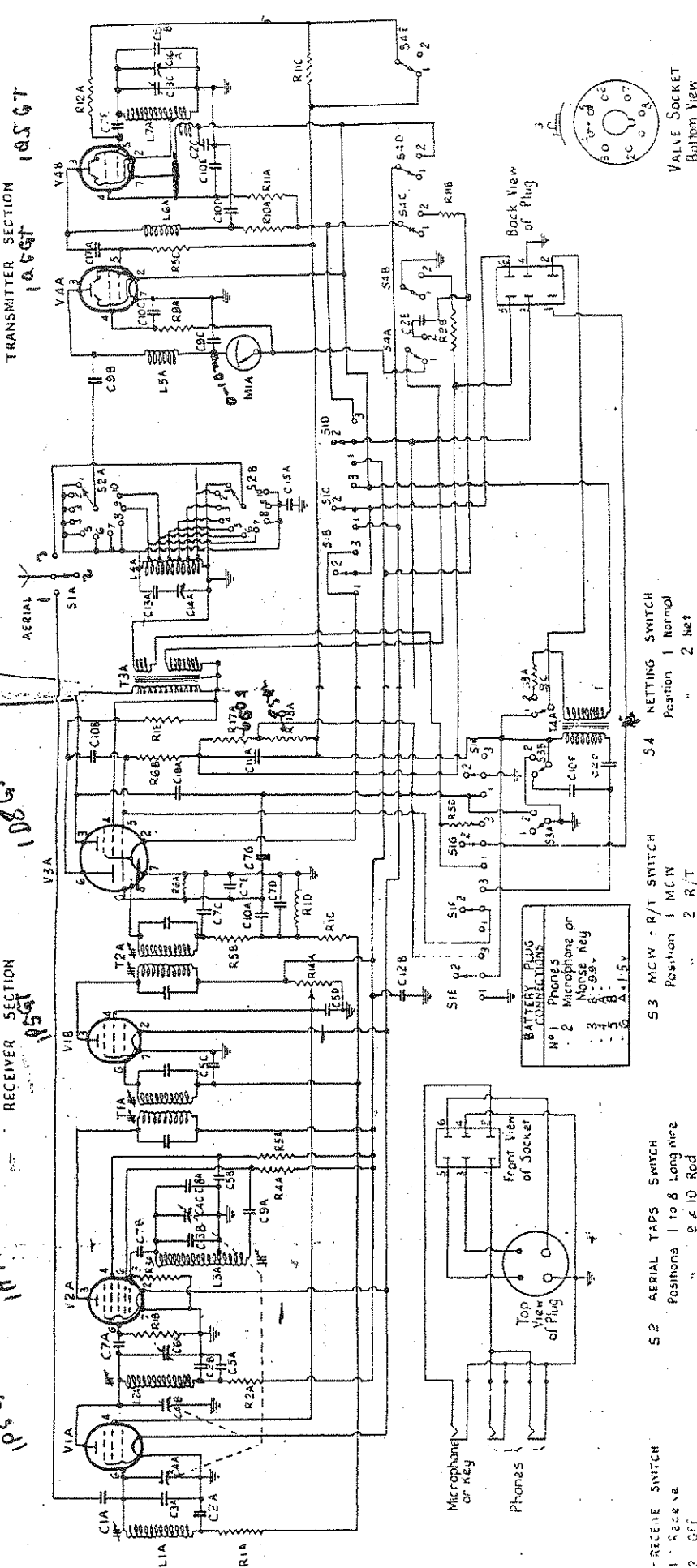
A high-contrast, black and white photograph of the internal components of a radio receiver. The image shows a dense arrangement of electronic parts, including capacitors, resistors, and a transformer, all labeled with alphanumeric codes. A large, circular component, likely a speaker or a large capacitor, is prominent in the center-left. The top of the unit features a "EARTH TERMINAL" label. The overall appearance is that of a technical manual or a detailed photograph of a vintage electronic device.

PLATE 5 - WIRELESS SET NO 108 MK. III Bottom View

1926
1926

1085

TRANSMITTER SECTION
106gt



ALVE SOCKET
Bottom View

Note:- This redesigned circuit omits the following resistors and condensers - R7A-C, R8A, R15A, R16A, C12A, C18A.

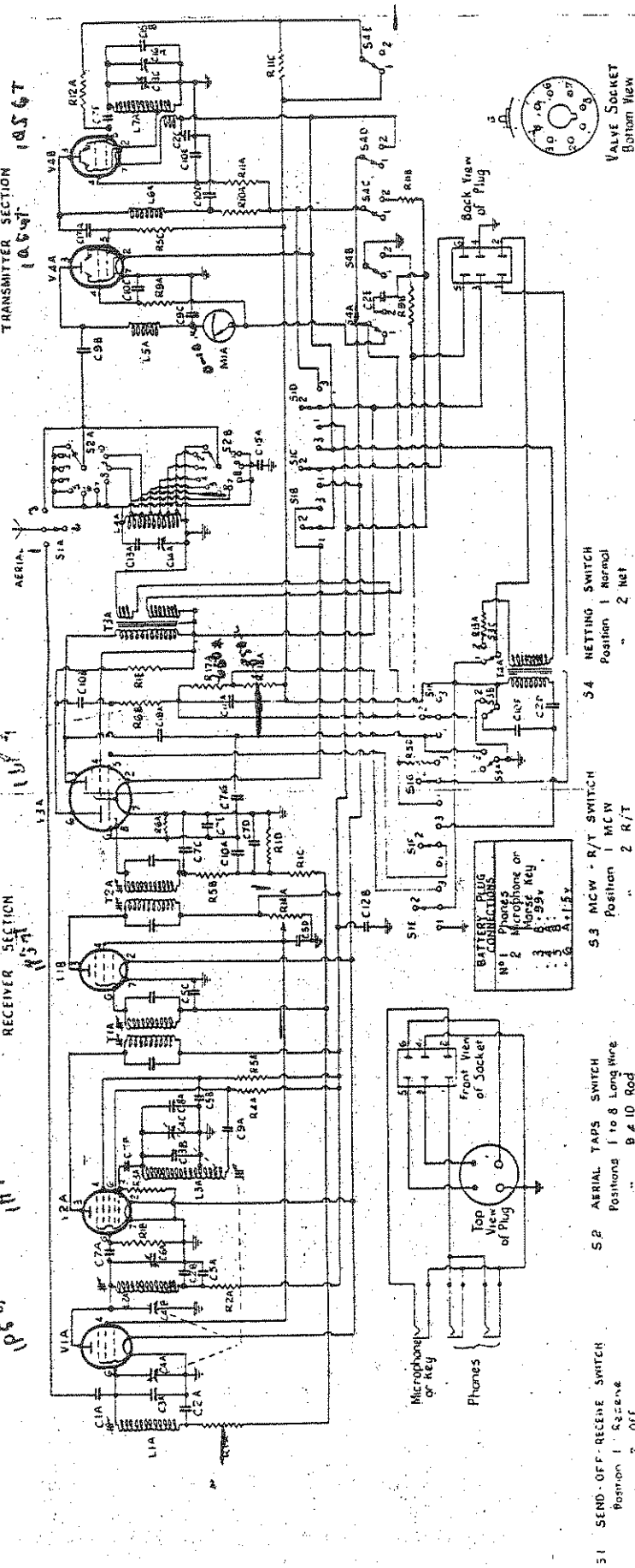
IOB MK.3 LEGEND									
C 1 A	15	μ fd	C 16 A	10-185	μ f	R 14 A	I.O. M.A. Volume Control	S 1 A-H	Send-Off-Receive Switch
C 2 A-E	0-005	μ fd	C 17 A	0.0005	μ f	R 17 A	650	S 2 A-B	Accel. Taps Switch
C 3 A-C	3-26	μ f				R 18 A	850	S 3 A-C	M.C.W. -R/T Switch
C 4 A-C	12-77	μ f				L 1 A	Aerial Coil	S 4 A-E	Netting Switch
C 5 A-D	0-05	μ f				L 2 A	R.F. Coil		
C 6 A	2-12	μ f				L 3 A	Osc. Coil	V 1 A-B	IP56T
C 7 A-G	0-0001	μ f				L 4 A	P.A. Tank Coil	V 2 A	IA76T
C 8 A	10	μ f				L 5 A	P.A. RF Choke	V 3 A	ID86T
C 9 A-C	0-001	μ f				L 6 A	MORF Choke	V 4 A-B	IQ55T
C 10 A-F	0-002	μ f				L 7 A	M.O. Coil	M 1 A	0-10 Ma DC
C 11 A	25	μ f				T 1 A	1st I.E. Trons		
C 12 B	0.25	μ				T 2 A	2nd "		
C 13 A	1000	μ f				T 3 A	Output		
C 14 A	11-436	μ f				T 4 A	Microphone Trans.		
C 15 A-B	100	μ f							

1936
1936

RECEIVER SECTION

五

TRANSMITTER SECTION
1956-1957



Note: This redesigned circuit omits the following resistors and condensers - R74-C R8A R15A R16A C12A C18A.

108 MK3
CIRCUIT
REDESIGN
27/8/45

DESIGN DIRECTORATE
DEPARTMENT OF THE ARMY
BELLEVILLE

WIRELESS SETS No 108
MK 3

ADD(W)1602

DRAWN	DATE	MATERIAL	PART NAME
TRACED	27-8-65	SPEC N	CIRCUIT SCHEMATIC
CHECKED	NJB		OFF PER
APPROVED	179-1-65		ASSY. DWG.
SEALING	APPROVED BY: [Signature]		

IOB MK 3 LEGEND		IO M Volume Control		S1 A-H Send-Off-Receive Switch		S2 A-B Aerial Taps Switch		S3 A-C M Ch R/T Switch		S4 A-E Netting Switch	
A	15 μ uf	C 16 A	10-185 μ uf	R 14 A	10 M Volume Control	S1 A-H	Send-Off-Receive Switch	S2 A-B	Aerial Taps Switch	S3 A-C	M Ch R/T Switch
A-E	0.005 μ uf	C 17 A	0.0005 μ f	R 17 A	650 "	S4 A-E	Netting Switch	V1 A-B	1P5GT	V2 A	1A7GT
A-C	3-26 μ uf	C 19 A	200 μ uf	R 18 A	850 "	V3 A	1D5GT	V4 A-B	135GT	N/A	C-12 MIA BC
A-D	12-77 μ uf	R 1 A-E	10 μ uf	L 1 A	Aerial Coil						
A	0.05 μ f	R 2 A	5000 ohm	L 2 A	R F Coil						
A	2-12 μ uf	R 3 A	150,000 "	L 3 A	Osc Coil						
A-G	0.0001 μ f	R 4 A	20,000 "	L 4 A	PA Tank Coil						
1A	10 μ uf	R 5 A-D	50,000 "	L 5 A	PA R F Choke						
J A-C	0.001 μ f	R 6 A-B	175 megohm	L 6 A	M O R F Choke						
J A-F	0.002 μ f	R 7 A	15,000 ohm	L 7 A	M O Coil						
1A	25 μ f	R 8 A-B	15,000 "	L 8 A	1st I F Trans						
2 B	0.25 μ	R 10 A	100,000 "	L 10 A	2nd "						
3 A	1000 μ uf	R 11 A-C	100,000 "	L 11 A	Circuit						
4 A	11-436 μ uf	R 12 A	25,000 "	L 12 A	Microphone Trans						
5 A	100 μ uf	R 13 A	20 "	L 13 A							

DATE

DETAILS OF A MENDMENT

[illegible]