Appendix II—(Continued).

3. VIBRATOR UNIT.

Prov. No.	Vocab. Cat. No.	Designation	Description.	No. per Equipt.
		Catches, lid	See ZAP.051, ZAP.052	
320A	ZAP.149	Cover, canvas	Protecting sockets, with clamp strip	1
345	ZAP.151	Cover clamp strip, rivet 9/32 in.	Black oxidised	5
347	ZAP.152	Fuse, 15 amp.	1 working, 1 spare.	2
338	ZAP.153	Knob, metal	With pin lever, operating S1	1
322	ZAP.154	Socket, 2-pin, male	Ebonite carrying 2 pins	1
326	ZAP.155	Socket, 2-pin	Ebonite carrying 2 sockets	1
330	ZAP.156	Socket, 2-pin, cover	Metal cover for 2-pin sockets	2
331	ZAP.157	Socket, 6-pin, cover	Metal cover for 6-pin socket	1
		Socket, 2-pin, bush	See ZAP.105	2
333	ZAP.158	Socket, 6-pin, block		1
334	ZAP.159	Socket, 6-pin, contact		6
		Socket, 6-pin, bush	See ZAP.105	6
288A	ZAP.160	Socket, vibrator	7-pin, for V5211	1
314	ZAP.161	Strap, carrying	Leather, 24½ in. long	1
315	ZAP.162	Strap, carrying, brackets	Securing strap to case	2
489D	ZAP.163	Tag, spade	For terminal strip connections	10
297A	ZAP.164	Washers, cork, 1/16 in.	Mounting V.D. resistors	8

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WIRELESS SET No. 101

Mark I and Mark II

1941

(Pages 6 and 7 are missing)

WIRELESS SET No. 101

Description

CHAPTER I

Section 1—GENERAL CONSIDERATIONS

1. General:—

The Wireless Set No. 101 is designed for C.W. Wireless Telegraphy (W/T) and for Radio Telephony (R/T). It may be used as a portable field station, erected on the ground, or as a mobile station, when it may be used to send or receive messages while on the move. When using the set in a vehicle, it may be necessary to suppress interference from the ignition system and other electrical equipment.

2. Range (Distance):—

Its working ranges under average conditions are:—

(1) 6-8 miles using R/T; with the two stations erected on the ground.

(2) 4-6 miles using R/T; with both stations mounted in moving vehicles.

(3) A much greater range can be obtained using W/T, or by the use of special aerial systems.

3. Power Supply:—

The whole of the power supply is provided by means of a 6 volt 25 Ah secondary battery, which heats the filaments and provides the input power to a vibrator type of high tension unit.

4. Aerials:—

The aerial is such that it can be varied considerably in actual and effective height. It consists of a single vertical mast in sections, which is also the conductor, supporting a "Top" of four light rods radiating horizontally. It is mounted on a special insulated picket and is normally self-supporting. The normal height for a range of 6-8 miles when using two ground stations is nine feet, but greater ranges will be obtained by increasing the height to fifteen feet, using special stay plate provided.

The earth consists normally of four insulated counterpoise wires spread on the ground to form a rough cross.

The aerial used in the vehicle is an "Aerial, flexible, with base," which may be fitted to bracket provided on "Cabinets, Wireless, L.P. No. 3," or to bracket on rear of Vans, Wireless.

The metal of the vehicle chassis is used as a counterpoise when the set is used in a vehicle.

5. Range (Frequency):—

The frequency range over which the set is designed to operate is 4.28 to 6.66 Mc/s or 71.5 to 44 metres. To ensure that the accuracy of calibration is maintained, the sender should be checked periodically

against a frequency meter. An adjustment is provided by means of which the calibration may be corrected if found necessary.

6. Frequency Separation:—

Two senders working on frequencies differing by 20 Kc/s can be readily separated by a receiver, provided that both senders are one mile or so from the receiver. The distance will vary according to the height of the aerials used, the distance given in paragraph 2 being for a normal aerial 9 ft. high with a "top." If the frequency separation is increased to 100 Kc/s the interfering sender may be only 200 yards from the receiver without causing serious interference. These figures apply to R/T and may be less for W/T. They will also vary according to local conditions and should be taken only as a guide.

7. Wireless Remote Control Units "A"—

Provision for using Remote Control Units has been made in the Wireless Set No. 101.

8. Weights and Sizes—

The weights (to the nearest half-pound) and sizes of the main components of the complete station are given in Table I.

TABLE I.

Component. (1)	Weight lb. (2)	Length (3)	Overall Height (4)	Depth (5)	Remarks (6)
1. Combined Sender and Receiver (including 1 pair receivers, headgear and 1 microphone hand).	38	21¼in.	12in.	8in.	
2. Vibrator Unit No. 101 (including spare vibrator No. V-5211).	24	10⅝in.	10in.	4⅛	
3. L.T. Battery.	24	9⅜in.	9¼in.	7in.	Battery Secy. Port. 6 volt 25 Ah
4. Aerial Gear in "Bags, Aerial Gear No. 2."	13	3ft. 6in.	—	6in.	
5. Spare Valves in "Cases, Valve and Receiver."	8½	10in.	10in.	7½in.	
6. Wireless Remote Control Unit "A."	10½	9⅛in.	5¾in.	5¾in.	
7. Microphone Hand and one pair Receivers Headgear in "Bags Telephone Receiver" for use with Remote Control Units.	3				
8. Connectors, Twin No. 18.	7				Used with Remote Control Units

(ii) Bring the note to maximum strength with the TUNE AERIAL dial.

(iii) Adjust the strength to a satisfactory level with the volume control.

CHAPTER II

Information and Instructions for the Operator

Section 3—BRIEF TECHNICAL DESCRIPTION

1. General:—

For mobile operation complete station is carried in "Cabinets, Wireless L.P. No. 3."

The complete station consists of—

(i) The set, combining Sender and Receiver in one case.

(ii) Aerial gear, in "Bags, Aerial Gear No. 2."

(iii) High Tension Unit.

(iv) Batteries, Secy. Portable, 6 volt, 25 Ah in boxes.

(v) Cases, valve and receiver.

A pair of "Receivers, Headgear L.R.," and a "Microphone, Hand," No. 3, can be packed in the clips provided in the lid of the case.

2. Sender:—

The sender utilises a Master Oscillator-Power Amplifier circuit with grid-modulation of the amplifier on R/T. Three type 1K5G valves, in all, are used; one V1 as Master Oscillator and two V2 and V3 in parallel as Power Amplifier.

The Master Oscillator is of the self-excited type, using a conventional series-fed Hartley circuit. Referring to Diagram A24 or A24/1, the tuning inductor, L1, is fitted with an iron-core adjustment, which is used in conjunction with C1 to adjust the frequency calibration of the oscillator. C2 is the main tuning condenser. C4 functions also as a calibrating condenser by controlling the total band width; under normal conditions, however, it will be unnecessary to change C4 after its initial adjustment. Connections of L1 are brought out to terminals numbered 1, 2, 3 and 4 as shown.

Excitation of the Power Amplifier is made by capacitive coupling via C6 and C9. This circuit is shunt-fed through L2, the anode tuning circuit C14 and L4 being coupled through blocking condenser C13. S3 and C14 constitute the ANODE TAP and AERIAL TUNE controls, respectively, and in conjunction with the aerial inductance and capacitance, form the tuned circuit for loading the amplifier.

For W/T, the grid resistor circuits of all valves and the main H.T. negative are simultaneously keyed.

For R/T, the microphone transformer secondary is placed in series with the common grid return of V2 and V3, and connected to —18v., via S2, microphone current being derived from the filament 6v. circuit.

3. Receiver:—

The receiver utilises a supersonic heterodyne circuit consisting of five valves in all. Referring to Diagram A-23, V1, type 1C7G, is the frequency converter stage, being controlled by gang-condenser C2, which constitutes the TUNE REC. control. The trimming condenser C3 ensures tracking of the gang, and is brought out to control marked TUNE AERIAL. L1-L2 is the aerial-grid transformer, and L3-L4 the oscillator exciting transformer. The intermediate frequency of 460 Kc/s is fed into the 1st I.F. stage V2, type 1K5G, and then to V3, type 1K7G, which functions simultaneously as a reflexed I.F. amplifier, detector, A.F. amplifier and A.V.C. rectifier. A.V.C. potential from diode-anode 4 of V3 is applied to V1 and V2 when the SPEECH-CW switch is in the SPEECH position only. When the CW position of the latter switch is used, the Beat-frequency Oscillator V5, type 1C7G, is energised, mixing with the I.F. signal being obtained by plate-modulaiton of V3 via the I.F. transformer L9-L10.

The A.F. signal appearing across the diode load resistor R12 is reflexed back into the control grid of V3 via R8, C16. The A.F. signal appearing across the V3 anode load resistor R14 is fed via C24 to the control grid of the A.F. amplifier V4, type 1K7G. The output transformer T1 matches two L.R. headphones to the anode of V4.

R12 functions as VOLUME CONTROL.

R6 is ganged to R12 and provides simultaneous volume and gain control by changing the negative bias on V1 and V2.

4. Send-Off-Receive-Net Control:—

The following description is correct only for 101 sets, Mark II. In Mark I sets, the switch has four poles instead of seven, and the NET position with associated connections is omitted.

The four positions of the switch control five circuits as follows:—

(a) SEND—

(i) Aerial to sender.

(ii) 6-v. positive to sender filaments.

(iii) 210-v. negative to frame via telegraph key.

(iv) 90-v. positive to P.A. screens.

(b) OFF—All associated circuits are broken.

(c) RECEIVE—

(i) Aerial to receiver.

(ii) 6-v. positive to receiver filaments.

(iii) 210-v. negative to frame.

(iv) Negative bias to receiver.

(d) NET—

(i) Aerial to receiver.

(ii) 6-v. positive to both sender and receiver filaments.

(iii) 210-v. negative to frame.

(iv) Negative bias to receiver.

(v) M.O. grid resistor to frame.

In the NET position the Master Oscillator and receiver are energised simultaneously, with the aerial remaining connected to the receiver. Sufficient stray coupling exists between sender and receiver for the Master Oscillator signal to be heard in the receiver, and thus permits its frequency to be adjusted exactly to that of the controlling station already tuned in.

5. Vibrator Unit:—

High tension supply is derived from a vibrator type generator driven by the 6-v. accumulator. The intermittent current produced by the vibrator is passed through a step-up transformer, and the resulting A.C. in the secondary winding of the latter is rectified by synchronous contacts on the vibrator. Orthodox low-pass filters smooth the rectified current, which is subdivided in a voltage divider.

A tapping on the divider, 18 volts from the main negative, is connected to frame and designated negative on the output terminals. The main negative pole thus becomes the 18-volt negative bias terminal in the output, and this is used to bias the P.A. of the sender under R/T conditions. The total effective voltage of the H.T. unit is thus reduced from 228v. to 210v., and intermediate values are reduced by 18v. accordingly.

The frequency of the A.C. is approximately 50 cycles/sec.

A tapping switch S-2 is fitted on all Mark I power units to provide variation of screen voltage on the P.A. of the sender. This switch is omitted on Mark II units, and the screen tapping fixed on the voltage divider. Note that R3 and R5 are interchanged for this connection. Note also that all power units in which this change is made have the + 12v. and O bonded on the terminal board, and therefore the 6-v. lead to the set is actually at —18v. potential on open circuit.

Section 4—MAINTENANCE OF THE SET

1. General:—

In order to secure freedom from breakdowns, it is essential that proper care be taken of the set and its accessories. They should be examined regularly for incipient faults, so that any that are found may be put right before they can cause a breakdown at a critical moment.

The gear should be checked over in some particulars once a day.

The best time is probably when the gear is being put away at the end of the day's work, or, if the set is in continuous use, when it is taken over by the next watch. The points to examine daily are given below under the heading "Daily Maintenance."

A more thorough examination should be made at least once a week; the points to be attended to in this examination are given under the heading "Weekly Maintenance."

2. Daily Maintenance:—

The operator should see to the following points before putting the set away for the day:—

(i) Before dismantling the station, note the aerial current produced by the sender. If this is low compared with what it was when work was begun, or, if it falls off quickly, try first a spare battery in place of that in use. If the change produces a large improvement in aerial current, say from 100mA to 125mA, have the original battery tested.

(ii) Put the SEND-RECEIVE switch to RECEIVE and note whether the receiver is producing normal background noises or is becoming "noisy." If intermittent crackling noises are heard, disconnect the aerial. If the unusual noises cease they are probably due to atmospherics or some external electrical disturbance, in which case nothing further can be done. They may, however, be due to bad contacts in the aerial itself. Examine, and if necessary, tighten up all aerial screwed joints.

If the noises persist with the aerial disconnected—

(a) Examine the headphone cord for signs of damage, and see that the terminals on the headphones themselves are tight. If the noise is due to the cord, it can probably be reproduced by shaking the cord or lightly jerking on the cord either at the plug or at the headphones.

(b) Try changing the H.T. battery where such is used in lieu of vibrator unit.

(c) Try changing the valves in the receiver in turn.

(d) Examine the battery leads for signs of damage, and the plugs to see that they all fit tightly. If no external signs of damage are present, shake the leads in turn and listen for corresponding clicks or crackling noises.

(iii) When satisfied that everything is in good working order, clean and dry everything as it is put away.

(iv) Avoid opening the valve door in dusty situations, as this encourages the leakage of dust into the case through the valve sockets.

Remember that—

(a) Water or acid may cause serious leakage of current from the H.T. battery; and that leads and plugs, the battery box, its connecting socket, and the connecting socket on the set must *always* be kept as dry as possible.

(b) Dirt interferes with all screw threads. (Aerial gear which is left dirty will take longer to erect and may be very difficult to take apart later.)

(c) Dust causes damage to all moving parts such as variable condenser spindles, slow-motion controls, etc., and it must be removed from the exterior and interior of the set whenever it is noticed.

3. Weekly Maintenance:—

The weekly overhaul should take about an hour. If the set is in almost continuous use, it will not perhaps be possible to see to all points at the one time. They should be attended to one or two at a time whenever quiet periods occur.

Attention should be paid to the following points:—

(i) Examine all tuning controls and see that they work smoothly. Any control which is becoming stiff to turn should be attended to by a wireless mechanic, or it may ultimately seize. Slow-motion controls which are harsh, uncertain or noisy in action should also be attended to by the wireless mechanic.

(ii) See that each of the small lock knobs can be screwed home without disturbing the setting of the dial knob. If any of them are tight and tend to move their dial knobs, remove them by unscrewing right out of the spindle, clean thoroughly and lightly grease or oil the thread. The surfaces of the knobs should not come into contact with each other, and it may be necessary to adjust the position of the locking knob on its spindle to avoid this effect.

(iii) Clean all plug and socket contacts. Fine emery paper may be used if the contacts are badly tarnished, but must be used sparingly, and the brass dust carefully removed afterwards. Split plugs, which are loose or a very easy fit in their sockets, should be opened out slightly with a knife-blade or a small screwdriver. The spring H.T. contacts on the set, and at one end of the H.T. lead, should be squeezed in slightly if necessary.

(iv) Clean the contacts of the telegraph key (the contacts farthest from the knob are used in this set). Paper must not be used for this purpose. Readjust the key if necessary.

(v) Erect the set, and see that it works in a normal manner.

(vi) Test all the 1K5G valves, including spares, by inserting them in turn in the appropriate position in the sender, putting the

SEND-RECEIVE switch to SEND and noting the aerial current produced with the sender set for C.W. and adjusted to a middle frequency.

(vii) Test the 1K5G valves in the Master Oscillator position. Select the best of them for use in this position, and the next best for use in the V2 position. Valves which produce no aerial current should be rejected.

4. Locating External Faults:—

In the event of an actual breakdown the information contained in Chapter III will, in most cases, be helpful towards rapidly locating the fault. Where it appears likely that the fault is an internal one in the set itself, it must be investigated and repaired by the wireless mechanic.

5. Valve Replacement:—

The vibrator unit *must* be switched *off* before any valves are removed from the set, and *all* valves *must* be in position before using the set.

6. Vibrator Replacement:—

If unfamiliar interference is experienced on the receiver with the aerial disconnected, and if normal aerial currents cannot be obtained on the sender with the aerial connected, then the fault *probably* lies with the vibrator. It may also be due to loose battery connections which should therefore be checked carefully.

To replace a vibrator in Mark I models, loosen the clamping screw and pull the vibrator forward and then up out of the case when the pins are clear of the socket.

To fit a vibrator reverse the procedure, taking care to align the black marks on the clamp and the vibrator shell before pushing into the socket. Do not on any account force the vibrator into the wrong holes, as serious damage will result.

7. Fuse Replacement:—

A short circuit in the connections in the vibrator unit or the sender-receiver unit will melt the fuse. If the vibrator is faulty in certain ways it also will melt a fuse, but the trouble is unlikely and is easily checked by putting in a vibrator known to be good and checking for a short circuit again. A spare fuse is carried in dummy clips alongside the working fuse. The various possible causes of a fuse failure should be checked carefully before putting in the spare, so that the trouble may be rectified without melting any more fuses.

8. B.F.O. Adjustment:—

It is possible that after a long time the B.F.O. will require realignment, and this is effected very simply after the back of the S/R Unit case is removed. A steady carrier, preferably on the low frequency end of the dial and from a similar set, is tuned in carefully to give maximum output of noise or modulation in the headphones. The SPEECH-C.W. switch is then placed at C.W. and the adjusting screw

of L.12 is adjusted until "zero-beat" is obtained between the B.F.O. signal and the carrier. Variation either side of the receiver tuning control, once zero is obtained, should produce a musical note in the headphones of equal strength for similar pitch. If the B.F.O. is set off zero-beat, one side of the beat-note range will be much stronger than the other, and thus may interfere with reception of a signal on an adjacent channel or allow interference by such a signal.

CHAPTER III

Section 5—TEST SPECIFICATION

1. Dummy Aerial Load:—

The Aerial, Dummy, is provided as a vocabulary item. It consists of six 100 ohm. 2 watt resistors in parallel, and the whole connected in series with a 10-150 uuF. variable condenser. The condenser is calibrated for four positions, namely, 30, 50, 75 and 150 uuF. When this circuit is connected across the AERIAL and EARTH terminals, the condenser settings correspond with the following standard aerials:—

30 uuF. is equal to 6 feet plain vertical rod.
50 uuF. is equal to 9 feet plain vertical rod.
75 uuF. is equal to 9 feet vertical rod with spreaders.
150 uuF. is equal to 15 feet vertical rod with spreaders.

2. Sender:—

Using the dummy aerial, adjusted to 50 uuF. (and maximum screen volts with Mark I senders), the following aerial currents should be obtained:—

Freq.—Mc/s	R.F. Current—mA
4.3	215
5.5	220
6.7	225

Under modulation conditions, *i.e.*, with SPEECH-C.W. control at SPEECH, 18 volts additional negative bias is applied to the P.A. grids.

This increased bias is necessary for proper grid modulation, and the aerial current is thereby reduced by one-third from the C.W. value. 100 per cent. modulation will cause the aerial current to rise by approximately 23 per cent. on this new value. Proper operating conditions in the modulation circuit may be checked by injecting the output of the Beat-frequency Oscillator, adjusted to 400 cycles per second into the microphone circuit by means of a microphone plug connected to the 300 ohm. output terminals of the Oscillator and plugged into the microphone jack of the sender. By using the output control of the oscillator with this connection, it should be possible to cause the aerial current to increase by the necessary 23 per cent. to indicate 100 per cent. modulation.

When speaking into the microphone, in the normal connection, the aerial current will rise only 5 per cent. to 10 per cent., owing to the average modulation level on speech being considerably less than 100 per cent.

The function of the valves, looking at the front of the sender and reading from left to right is: V1 (1K5G) Master Oscillator, V2 (1K5G) and V3 (1K5G), the two paralleled power-amplifier valves.

Socket Analysis:—

Analyser tests should be made with the sender in the send condition, two sets of readings being taken, namely—

(a) SPEECH condition.
(b) C.W. condition.

MASTER OSCILLATOR, V1, 1K5G

	VOLTS					MILLIAMPERES			
Socket Terminal . .	2	3	4	7	Cap	2	3	4	Cap
Measurement	Ef+	Ep	Esg	Ef—	Eg—	If	Ip	Isg	Ig
SPEECH	3.8	210	210	1.9	0	255	8	3.1	0
C.W.	3.8	197	197	1.9	0	250	7.3	2.5	0

POWER AMPLIFIER (EACH VALVE), V2 or V3

	VOLTS					MILLIAMPERES			
Socket Terminal . .	2	3	4	7	Cap	2	3	4	Cap
Measurement . .	Ef+	Ep	Esg	Ef—	Eg	If—	Ip	Isg	Ig
SPEECH	1.9	210	117	0	—18				
C.W.	1.9	190	93	0	—14.5		4.25	1.5	

All voltage measurements are taken with reference to frame.
All readings are independent of frequency.

3. Receiver:—

The function of the valves, looking at the front of the receiver and reading from left to right, is: V5 (1C7G), Beat-frequency Oscillator; V3 (1K7G), 2nd Detector; V2 (1K5G), Intermediate Frequency Amplifier; V1 (1C7G), Frequency Converter; V4 (1K7G), Audio Frequency Amplifier.

Socket Analysis—

The following figures should be approximately the same for C.W. and SPEECH conditions, except in the case of the I.F. and Converter valves, where the different readings are shown. VOLUME CONTROL at maximum in all cases.

BEAT FREQUENCY OSCILLATOR: V5 1C7G

	VOLTS								MILLIAMPERES			
Socket Terminal	2	3	4	5	6	7	Cap	2	3	4	5	6
Measurement	Ef+	Ep	Esg C.W. only	Eog	Eop C.W. only	Ef—	Eg	If	Ip	Isg	Iog	Iop
Reading	5.8	92	12	3.2	107	3.95	4V+	127	7.5	.67	1	.31

DETECTOR AND REFLEX AMPLIFIER V3 1K7G

	VOLTS								MILLIAMPERES			
Socket Terminal	2	3	4	5	6	7	Cap	2	3	4	5	6
Measurement	Ef—	Ep	Ed1	Ed2	Esg	Ef—	Eg1	If	Ip	Id1	Id2	Isg
Reading	4	93	0	0.3	72	2	0	130	0.75	0	3	0.27

I.F. AMPLIFIER V2 1K5G

	VOLTS					MILLIAMPERES		
Socket Terminal	2	3	4	7	Cap	2	3	4
Measurement	Ef+	Ep	Esg	Ef—	Eg	If	Ip	Isg
SPEECH	2	142	72	0	1.5	130	1.4	.5
C.W.	2	139	52	0	0	130	1.9	.6

FREQUENCY CONVERTER V1 1C7G

	VOLTS								MILLIAMPERES			
Socket Terminal	2	3	4	5	6	7	Cap	2	3	4	5	6
Measurement	Ef+	Ep	Esg	Eog	Eop	Ef—	Eg—	If	Ip	Isg	Iog	Iop
SPEECH	1.9	140	90	0	96	0	0	130	2.7	1.2	0	2.3
C.W.	1.9	140	90	0	95	0	0	130	2.6	1.2	0	2.2

A.F. AMPLIFIER V4 1K7G

	VOLTS					MILLIAMPERES		
Socket Terminal	2	3	6	7	Cap	2	3	6
Measurement	Ef+	Ep	Esg	Ef—	Eg—	If	Ip	Isg
Reading	5.9	142	142	4	0	127	2.2	.87

4. Alignment:—

The Intermediate Frequency is 460 Kc/s. The oscillator portion of the frequency converter, V1, operates at a frequency 460 Kc/s higher than the signal circuit.

The alignment procedure is as follows:—

(a) Connect Dummy Aerial, set at 50 uuF. across AERIAL and EARTH terminals.

(b) Connect active wire of 300 ohm. output of Signal Generator to V1 cap, leaving normal clip in position; connect shield of signal feeder to EARTH.

(c) Short-circuit terminal 5 (oscillator grid) of V1 to frame.

(d) Adjust output of Signal Generator to 460 Kc/s.

(e) Connect Output-Meter to headphone jack by temporary headphone plug.

(f) Adjust set to RECEIVE; turn on power to Signal Generator.

(g) Adjust output control of Signal Generator and VOLUME control of set to cause half-scale deflection on Output-Meter.

(h) The I.F. transformers should now be adjusted to cause maximum deflections of the output-meter. This adjustment is made by means of the adjusting screws on the top of each transformer case. The sequence of adjustment will be L9-L10, L7-L8.

(i) Having peaked the I.F. transformers, remove short-circuit from oscillator grid and connect the shielded wire from the Signal Generator direct to AERIAL terminal of Receiver.

(j) Adjust frequency of Signal Generator and receiver to 6.7 Mc/s.

(k) Adjust AERIAL TUNE of Receiver to 30.

(l) By means of the trimmer condenser, C5, adjust for maximum reading on output meter, making small adjustments simultaneously to AERIAL TUNE condenser C3. If C3 has to be moved appreciably from a dial setting of 30, adjustment of L1-L2 inductance should be made by means of its movable core. It may be necessary also to adjust the inductance of L3-L4 in a similar manner if peaking cannot be obtained by adjustment of C5.

(m) Check calibration of C2 dial in a similar manner at 4.3 Mc/s, making new adjustments of L1-L2 and L3-L4 inductances as necessary.

(n) Recheck calibration of C2 dial at 6.7 Mc/s, and 4.3 Mc/s alternately, the object being to obtain adjustments which give the least error at each end of the dial.

The following readings were taken to check the action of A.V.C. at different signal strengths. These figures were obtained by connecting the meter directly in the socket leads.

Actual Readings at Valve Base

I.F. AMPLIFIER 1K5G V2

Generator Ratio	Attenuator	Ip	Isg
DIRECT	Zero	1.7 mA	.5 mA
	100°	1.7 mA	.5 mA
X 10	50°	1.4 mA	.5 mA
	100°	1.15 mA	.5 mA
X 100	50°	.8 mA	.4 mA
	100°	.65 mA	.3 mA
X 1000	50°	.5 mA	.2 mA
	100°	.35 mA	.1 mA

FREQUENCY CONVERTER 1C7G V1

Generator Ratio	Attenuator	Ip	Isg	Iop
DIRECT	Zero	1.5 mA	1.4 mA	2.8 mA
	100°	1.5 mA	1.5 mA	2.8 mA
X 10	50°	1.0 mA	1.5 mA	2.8 mA
	100°	.8 mA	1.5 mA	2.9 mA
X 100	50°	.45 mA	1.5 mA	3.1 mA
	100°	.34 mA	1.5 mA	3.2 mA
X 1000	50°	.28 mA	1.5 mA	3.25 mA
	100°	.22 mA	1.5 mA	3.3 mA

Sensitivity Readings—

Connect Signal Generator with modulated signal to AERIAL and EARTH terminals with dummy aerial in parallel, and set at 50 uuF. Connect Output Meter to headphone output. Adjust receiver to SPEECH with VOLUME at maximum.

SIGNAL GENERATOR		OUTPUT METER
Ratio	Attenuator	db.
DIRECT	10	+5.0
	20	+15.0
	30	+15.5
	40	
	50	
	60	
	70	Constant at +15.5
	80	
	90	
	100	

5. Vibrator Unit:—

Voltage Divider Mark I

Taps on voltage divider should be adjusted to the following approximate values and, under various loadings, the stated voltages should be obtained, all values being referred to the negative terminal and taken direct off the voltage divider.

Voltage Divider Tapping Ohms.	VOLTS												
	OFF	REC.	SPEECH				SEND		C.W. (KEY DOWN)				
			Screen Tap No.						Screen Tap No.				
			1	2	3	4	1	2	3	4			
160	4.7	7.7	8.4	8.5	8.75	9	9.5	9.7	10.5	10.55			
760	10	13.5	19.8	20.2	21	21.5	23.5	24.5	25.5	26.5			
9000	103	81	93.5	93.5	93.5	93.5	87	88	90	90			
10500	117	90	106	104	105	105	102	98	100	100			
12250	140	106	128	126	123	122	122	120	112	114			
13800	152	118	142	140	136	133	136	133	127	124			
20000	205	153	193	191	189	188	187	185	182	180			
25000	260	245	238	238	237	237	236	235	234	232			

Voltage Divider Mark II

Taps on voltage divider are fixed at junctions of R4, R6, R5 and R3.

Voltage Divider Tapping Ohms.	VOLTS			
	OFF	REC.	SEND	
			SP.	C.W. (key down)
800	8 V	15	20	23
15000	150	120	130	115
20500	205	160	187	180
25000	250	242	237	232

Note that on Mark II vibrator units the negative and +12-v. terminals on the terminal strip are tied, and therefore 18 volts negative bias is available across the sensitivity control R16 in the receiver. On Mark I power units this bias is 6v.

Note that all above voltages are measured with the Service Analyser and will be different if a voltmeter of lower resistance is used.

(See opposite page)

REMARKS.

(a) Normally carried in Bag, Aerial Gear No. 2.
(b) One carried in set, one in Case, valve and receiver, two in Satchels, signal.
(c) Fitted in Batteries, 6-volt, 25 Ah, Boxes.
(d) Carried in set.
(e) Carried in Case, valve and receiver.
(f) Will only be issued when set mounted in Vans, wireless.
(g) Carried in Vibrator Unit No. 101.
(h) Normal issue is 2: 4 will be issued to Batteries, R.A.A. only.
(i) Used with Wireless Remote Control Units, A.
(k) Fitted in Wireless Remote Control Units, A.
(l) One carried in set, one in Satchels, signal.
(m) For use on Receivers, headgear, double.

APPENDIX I

Wireless Sets No. 101, Complete Stations List.

Designation	Essential for Work	Essential Spares	Total	Remarks
Section F				
Brushes, sash tool, No. 2	1		1	(a)
Hammers, ball pane, 12-oz.	1		1	(a)
Section W.2				
Cells, dry, X Mk. II	4		4	(k)
Section Y				
Receivers, headgear, double (S.T.C.), L.R.	4		4	(b)
Section Z				
Antennae, Rod, "A"—				
Pegs	3	1	4	(a)
Peg Bags	1		1	(a)
Reamers	1		1	(a)
Stay Plates	1		1	(a)
Stay Plates, Special (N.I.V.)	1		1	(a)
Bags, aerial gear, No. 2	1		1	
Batteries, Secy., Port., 6-volt, 25 Ah Boxes	1	2	3	
Cases, Valve and Receiver	1		1	
Cells, Secy., Port., 2-volt, 25 Ah	3	6	9	(c)
Connectors, Twin, No. 13	4		4	(h)
Twin, No. 16	2		2	(i)
Plug, No. 1, Mk. II	2		2	(i)
Keys, W.T, 8 amp., No. 2	1		1	(d)
Leads, Counterpoise, No. 1	2		2	(a)
Microphones, Hand, No. 3	2		2	(l)
Plugs, Single, No. 9	4		4	(m)
Satchels, Signal	2		2	(i)
Valves, W.T.—				
Type 1K5G	4(d)	2(e)	6	
Type 1C7G	2(d)	1(e)	3	
Type 1K7G	2(d)	1(e)	3	
Watches, non-magnetic	1		1	(d)
Wireless Sets, No. 101 (N.I.V.)	1		1	
Aerial bases, flexible	1		1	(f)
Aerial bases, with spike	1		1	(a)
Aerials, flexible, jointed	1		1	(f)
Clamps, spoke, mast	1		1	(a)
Connectors, twin, No. 11A	2		2	(a)
Connectors, twin, No. 12A	1		1	(f)
Connectors, 6 point, No. 1A	1		1	(a)
Connectors, 6 point, No. 2A	1		1	(f)
Leads, aerial	1		1	(a)
Mast Sections	3	2	5	(a)
Spokes, mast	4	1	5	(a)
Vibrator Units, No. 101	1		1	
Vibrators, 6 volt, V5211		1	1	(g)
Wireless Remote Control Units, "A"	2		2	
Section M.T.13				
Cabinets, Wireless, L.P., No. 3	1		1	(f)
Stationery				
SIGNAL TRAINING, Vol. III, Australian Pamphlet No. 3		1	1	

(See opposite page)

APPENDIX II

Wireless Sets, No. 101, Mk. I and Mk. 11

NOTE.—The "Provisional Nos." in the first column are those appearing in the Provisional Handbook as "Item Nos.," and on the tags of spares provisioned as "Cat. Nos." It is important that both the Prov. Nos. and Vocab. Cat. Nos. be quoted when demanding spares.

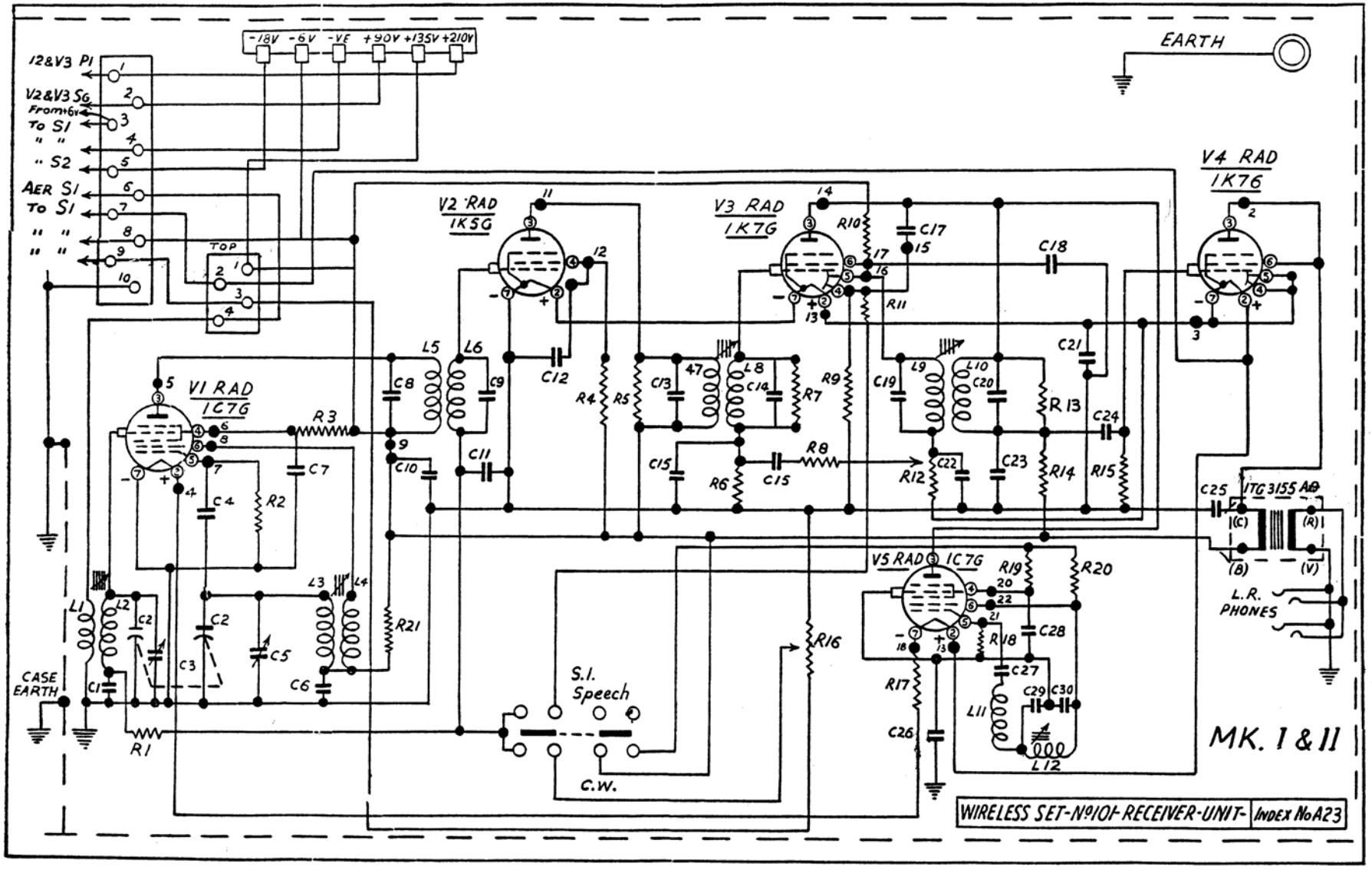
A. CIRCUIT COMPONENTS, as shown on Schematic Diagrams.

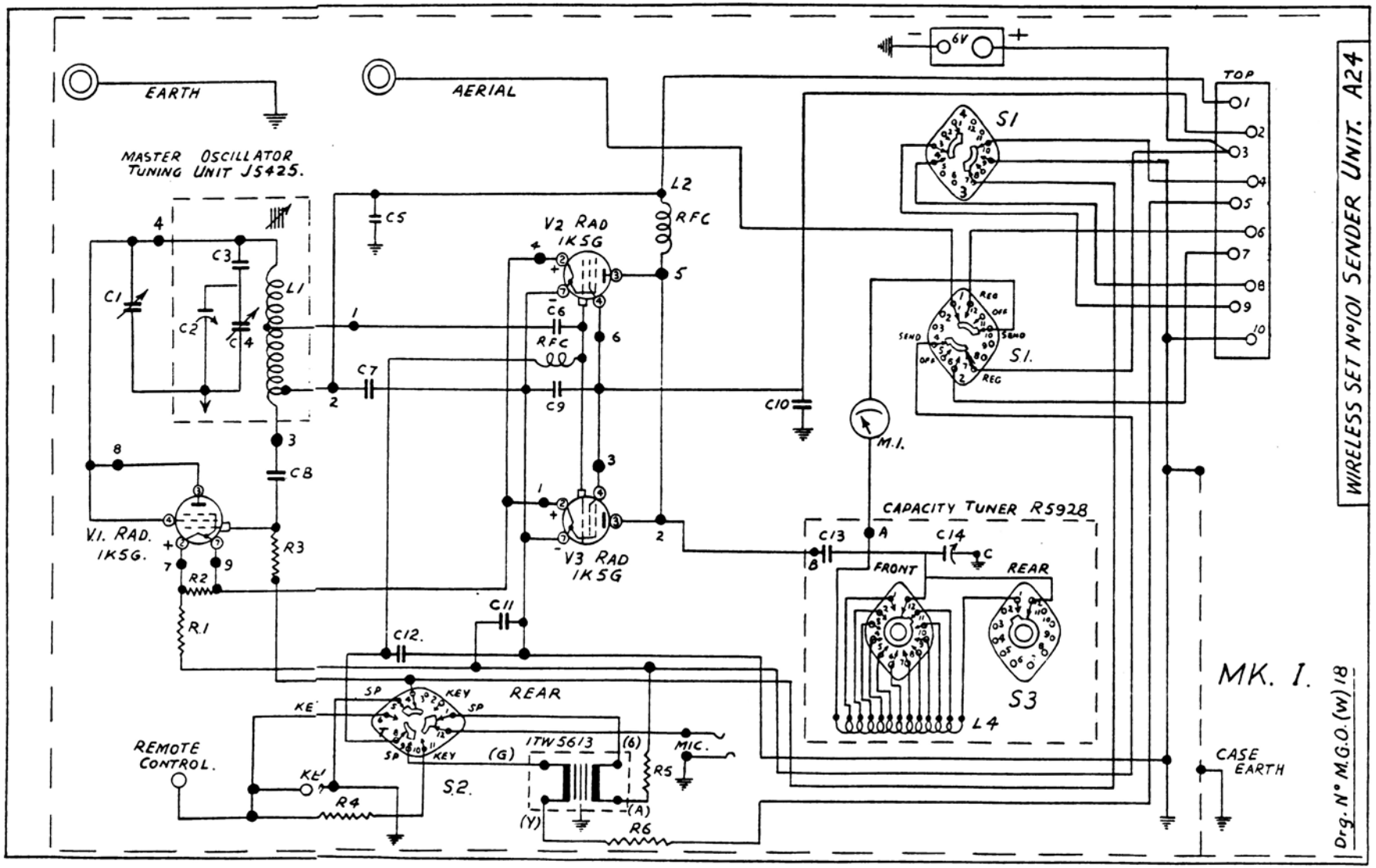
1. SENDER.

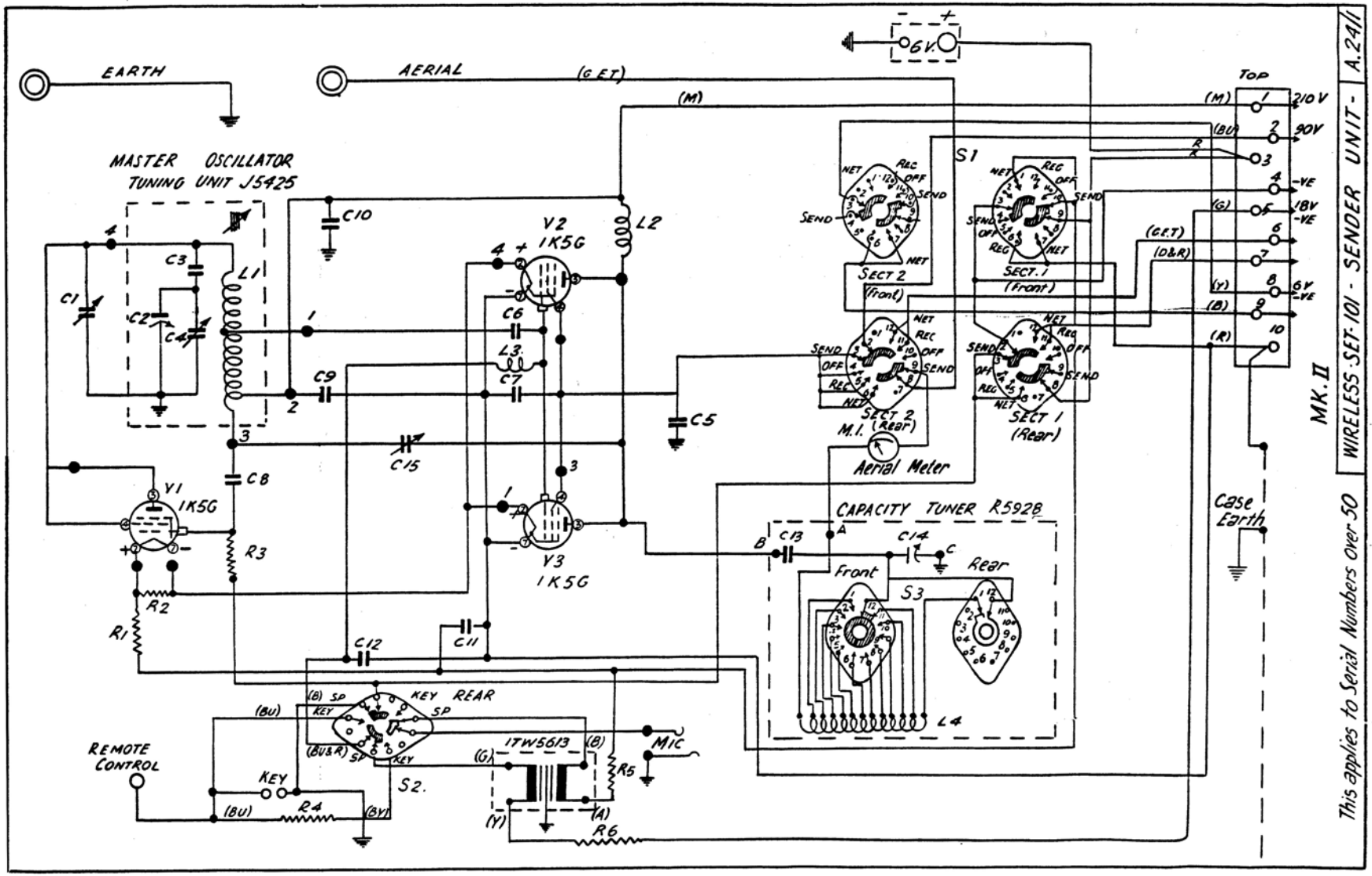
Prov. No.	Vocab. Cat. No.	Designation	Description	Circuit Reference
72	ZAP.301	Condenser, semi-fixed, No. 2	M.O. calibrating	C1
73	ZAP.315	Condenser, variable, No. 1	11 plate, M.O. tuning	C2
74	ZAP.280	Condenser, fixed, R, 1, C, AP	.001 mica, A.W.A., M.O. tuning and aerial coupling	C3, C13
75	ZAP.300	Condenser, semi-fixed, No. 1	M.O. trimmer.	C4
76	ZAP.213	Condenser, fixed, 1, AP	1 uF., metal cased, bypass	C5, C10
77	ZAP.235	Condenser, fixed, Y, 5, B, AP	50 uuF., A.W.A., P.A. grid coupling	C6
78	ZAP.228	Condenser, fixed, Q, 1, C, AP	.01 uF., A.W.A., R.F. bypass	C7, C9, C11, C12
79	ZAP.256	Condenser, fixed, X, 5, AP	500 uuF, mica, SM, M.O. grid	C8
85	ZAP.316	Condenser, variable, No. 2	Aerial tuning	C14
86	ZAP.302	Condenser, semi-fixed, No. 3	Neutralising, Mk. II equipments only	C15
92	ZAP.640	Resistor, No. 2, 3 watt, 8.4 ohms.	I.R.C., AA, filaments series feed	R1
93	ZAP.641	Resistor, No. 2, 3 watt, 16.6 ohms.	I.R.C., AA, filaments, parallel feed	R2
94	ZAP.667	Resistor, No. 3, 1 watt, 20,000 ohms.	I.R.C., BT1, M.O. grid	R3
95	ZAP.668	Resistor, No. 3, 1 watt, 25,000 ohms.	I.R.C., BT1, P.A. grids, KEY	R4
96	ZAP.642	Resistor, No. 2, 3 watt, 20 ohms.	I.R.C., AA, microphone series feed	R5
97	ZAP.670	Resistor, No. 3, 1 watt, 40,000 ohms.	IR.C., BT1, P.A. grids, SPEECH	R6
87	ZAP.450	Inductance, No. 1, AP	M.O. coil	L1
90	ZAP.460	Inductance, No. 2, AP	Aerial coil	L4
88	ZAP.185	Choke, R.F., No. 1, AP	R.F.C.	L2, L3
101	ZAP.812	Transformer, microphone, C, AP	Microphone input, 1TW5613	T1
91	ZAP.070	Ammeter, R.F., 300 mA., AP	Palec, aerial current meter	M1
98	ZAP.772	Switch, 8 pole, 4 way, AP	SEND-OFF-REC-NET	S1
99	ZAP.758	Switch, 3 pole, 2 way, AP	SPEECH-KEY	S2
100	ZAP.754	Switch, 1 pole, 12 way, AP	AERIAL-TAP	S3
102	ZAP.906	Valve, W/T, 1K5G	M.O. and P.A.	V1, V2, V3
	ZA.4510	Key, W/T, 8 amp.	Sending key, C.W.	KEY

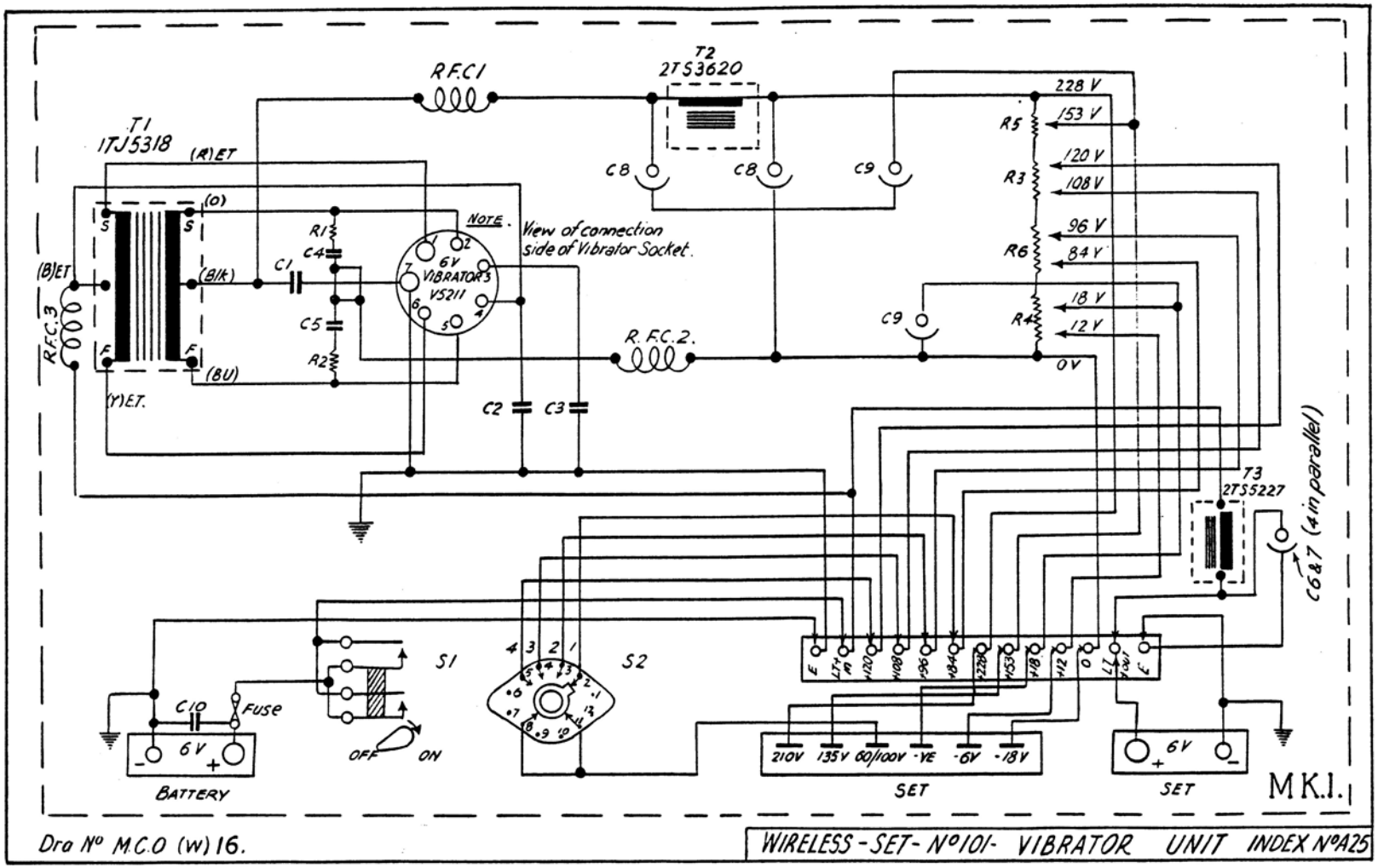
2. RECEIVER.

Prov. No.	Vocab. Cat. No.	Designation	Description	Circuit Reference
175	ZAP.223	Condenser, fixed, P, 1, C, AP	1 uF., paper, tubular, bypass	C1, C7, C11, C12, C18, C28
176	ZAP.317	Condenser, variable, No. 3	2 gang, 7 plate, tuning	C2
177	ZAP.318	Condenser, variable, No. 4	19 plate, TUNE REC AERIAL	C3
178	ZAP.257	Condenser, fixed, X, 2, AP	200 uuF., mica, SM	C4, C15, C17, C22, C27
179	ZAP.303	Condenser, semi-fixed, No. 4	Oscillator trimmer	C5
180	ZAP.281	Condenser, fixed, X, 9, AP	900 uuF., mica, A.W.A.	C6, C23, C25, C30
184	ZAP.220	Condenser, fixed, P, 25, AP	.25 uF., paper, tubular, bypass	C10, C21, C26
190	ZAP.229	Condenser, fixed, Q, 1, D, AP	.01 uF., paper, tubular, coupling	C16, C24
203	ZAP.253	Condenser, fixed, R, 2, AP	.002 uF., mica, SM	C29
211	ZAP.675	Resistor, 1 watt, 100,000 ohms.	I.R.C., BT1, A.V.C. line, V1 and I.F.T. suppressors	R1, R5, R13, R7
212	ZAP.671	Resistor, No. 3, 1 watt, 50,000 ohms.	I.R.C., BT1, Osc. grid leak, V1 and B.O., grid leak	R2, R18
213	ZAP.657	Resistor, No. 3, 2 watt, 75,000 ohms.	I.R.C., BT2, screen feed, V1 and plate feed, V3	R3, R14
214	ZAP.659	Resistor, No. 3, 2 watt, 150,000 ohms.	I.R.C., BT2, screen feed, V2	R4
216	ZAP.682	Resistor, No. 3, 1 watt, 2 megohms	I.R.C., BT1	R6, R9, R19
218	ZAP.678	Resistor, No. 3, 1 watt, 300,000 ohms.	I.R.C., BT1, R.F. stopper	R8
220	ZAP.660	Resistor, No. 3, 2 watt, 250,000 ohms.	I.R.C., BT2, screen feed, V3	R10
221	ZAP.680	Resistor, No. 3, 1 watt, 1 megohm	I.R.C., BT1, A.V.C. line	R11
222	ZAP.603	Resistance, variable, .5 megohm	Yaxley, volume control	R12
225	ZAP.679	Resistor, No. 3, 1 watt, 500,000 ohms.	I.R.C., BT1, grid, V4	R15
226	ZAP.600	Resistance, variable, 500 ohms.	A.W.A., C.W. bias, ganged with R12	R16
227	ZAP.641	Resistor, No. 2, 3 watt, 16.6 ohms.	I.R.C., AA, filament series feed	R17
230	ZAP.658	Resistor, No. 3, 2 watt, 100,000 ohms.	I.R.C., BT2, B.F.O. plate feed	R20
231	ZAP.654	Resistor, No. 3, 2 watt, 200,000 ohms.	I.R.C., BT2, Osc. plate feed, V1	R21
205	ZAP.465	Inductance, No. 3, AP	Aerial coil assembly	L1-L2
206	ZAP.475	Inductance, No. 4, AP	Oscillator assembly	L3-L4
207	ZAP.801	Transformer, I.F., A, AP	Intermediate transformers, Nos. 1 and 2	L5-L6, L7-L8
208	ZAP.802	Transformer, I.F., B, AP	Intermediate transformer, No. 3	L8-L9
210	ZAP.480	Inductance, No. 18, AP	B.F.O. coil assembly	L12
209	ZAP.186	Choke, R.F., No. 2, AP	B.F.O. choke	L11
233	ZAP.818	Transformer, telephone, D, AP	Output to 'phones, 1TG3155	T1
232	ZAP.755	Switch, 2 pole, 2 way, AP	SPEECH—C.W.	S1
235	ZAP.906	Valve, W/T, 1K5G	Intermediate amplifier	V2
236	ZAP.907	Valve, W/T, 1K7G	Reflexed detector and output	V3, V4
237	ZAP.904	Valve, W/T, 1C7G	Oscillator mixer and B.F.O.	V1, V5


-18V -6V -VE +90V +135V +210V
EARTH
12&V3 P1
V2&V3 SG From+6V
To S1
" "
" S2
AER S1
To S1
" "
" "
TOP
V1 RAD 1C7G
V2 RAD 1K5G
V3 RAD 1K7G
V4 RAD 1K76
V5 RAD 1C7G
S.I. Speech
C.W.
CASE EARTH
ITG 3155 A/B
(C)
(R)
(B)
(V)
L.R. PHONES
MK. 1 & II
WIRELESS SET-No10/1-RECEIVER-UNIT- | INDEX No A23


WIRELESS SET No 101 SENDER UNIT. A24
Drg. N° M.G.O.(W) 18
MK. I.
EARTH
AERIAL
6V
MASTER OSCILLATOR TUNING UNIT J5425.
V1. RAD. 1K5G.
V2 RAD 1K5G
V3 RAD 1K5G
M.I.
S1
S1.
S2.
S3
CAPACITY TUNER R5928
FRONT
REAR
L4
TOP
CASE EARTH
REMOTE CONTROL.
MIC.
1TW5613
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12.
C13
C14
L1
L2
RFC
R1
R2
R3
R4
R5
R6


EARTH
AERIAL
(G.E.T.)
(M)
6V.
MASTER OSCILLATOR
TUNING UNIT J5425
C1
C2
C3
C4
L1
C10
V2
1K5G
L2
C6
L3
C7
C9
C5
C15
C8
V1
1K5G
R3
R2
R1
V3
1K5G
C12
C11
S1
SECT 2 (Front)
SECT. 1 (Front)
SECT 2 (Rear)
SECT 1 (Rear)
M.I.
Aerial Meter
CAPACITY TUNER R592B
C13
C14
Front
Rear
S3
L4
TOP
210V
90V
-VE
18V
-VE
6V
-VE
(BU)
(G.E.T.)
(D&R)
(Y)
(B)
(R)
Case Earth
KEY REAR
(BU)
(BU&R)
REMOTE CONTROL
KEY
S2.
R4
ITW5613
MIC
R5
R6
MK. II
WIRELESS SET 101 - SENDER UNIT - A.241
This applies to Serial Numbers over 50


R.F.C.1
T2
2TS3620
T1
1TJ5318
(R)ET
(O)
(B)ET
(Blk)
(BU)
(Y)ET.
R.F.C.3
R1
C4
C1
C5
R2
NOTE. View of connection side of Vibrator Socket.
6V VIBRATOR VS211
R.F.C.2.
C2
C3
C8
C8
C9
C9
228 V
153 V
120 V
108 V
96 V
84 V
18 V
12 V
0V
R5
R3
R6
R4
T3
2TS5227
C64 (in parallel)
S1
S2
C10
FUSE
6V
BATTERY
OFF
ON
210V
135V
60/100V
-VE
-6V
-18V
SET
6V
SET
M.K.I.
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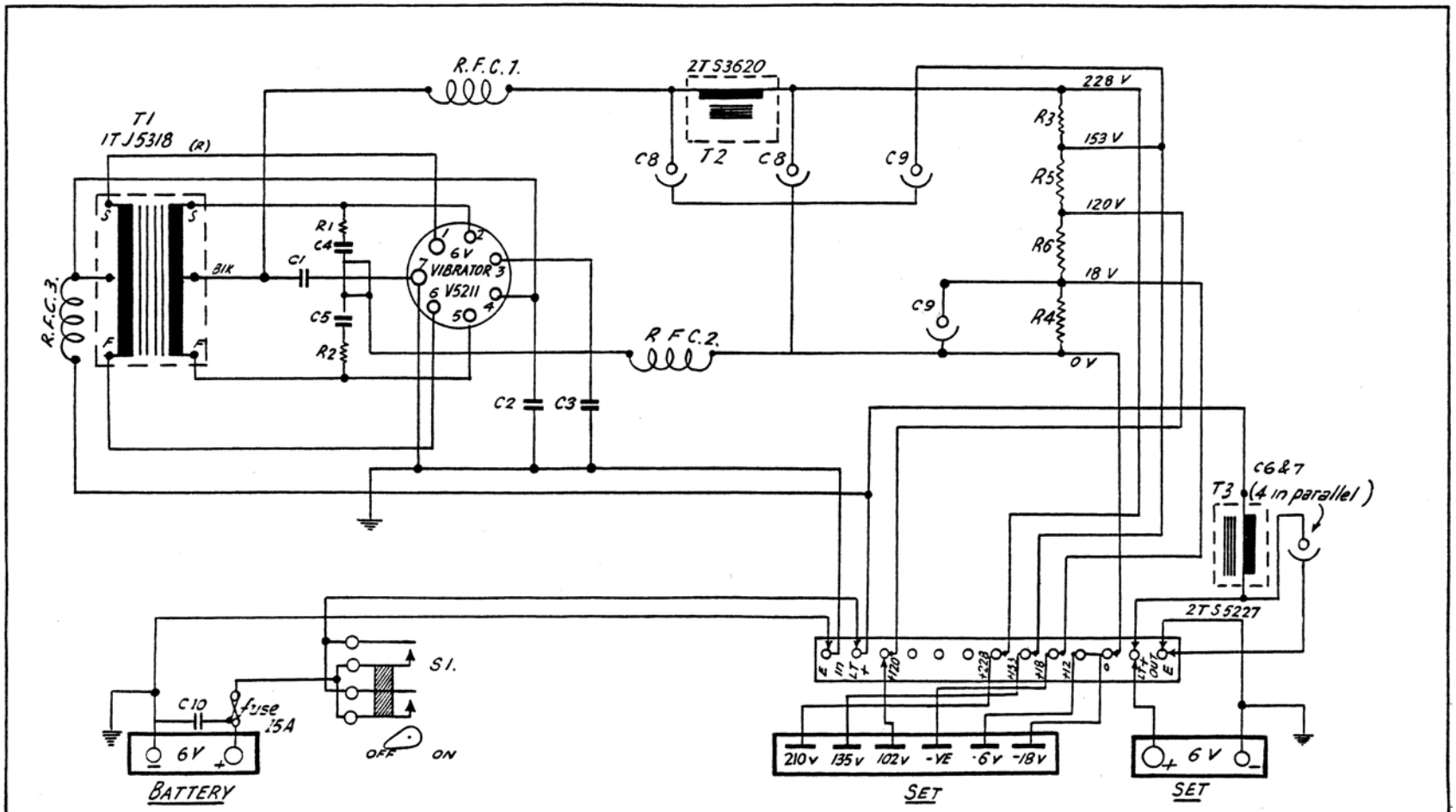

Applies to Serial Nos. Over 50 —

MK. II.

WIRELESS SET No 101. VIBRATOR UNIT	INDEX No A. 25/1