WIRELESS SET NO. 52

1. GENERAL DESCRIPTION

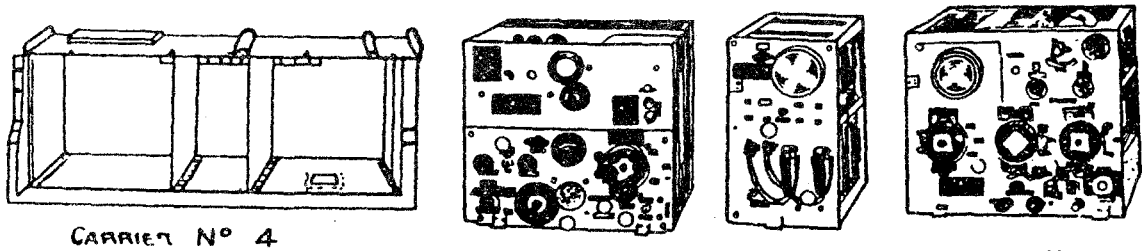
The W.S.52 is a transmitter/receiver designed for either stationary or mobile operations in a wireless vehicle or as a ground station in a tent.

The frequency range is 1.75 Mc/s - 16 Mc/s and is covered in three overlapping bands, 1.75 to 4 Mc/s, 3.5 to 8 Mc/s, and 7 to 16 Mc/s. Facilities are provided for operation on R/T, M.C.W. and C.W.

The approximate working range is 40 miles on R/T and M.C.W. or 100 miles on C.W. Various lengths and types of aerial are provided for use on the different frequencies. Remote Control operation is available using Wireless Remote Control Unit No. 1 Canadian.

Two 6 volt accumulators provide heater voltage, and drive two dynamotors and a vibrator circuit for H.T. supplies. The W.S. No.52 consists of five major distinct units, they are the sender, receiver, supply unit, Coil Aerial Tuning No.2A, and Carrier No.4. The sender, receiver and supply unit are installed in separate compartments of the carrier. The carrier is housed in a cradle which is fitted with 6 rubber shock mounts. The aerial tuning coil may be fastened to the top or the right hand side of the carrier.

Connections between the units for distribution of power, microphone, headphones, send-receive switching, etc. are made through plugs attached to the carrier and sockets on the back of each unit. The plugs and sockets are automatically engaged when the units are slid into place in the carrier. The actual inter-unit wiring is located in an enclosed channel in the carrier. The aerial tuning coil is connected to the sender aerial connection by means of Lead, Aerial No.6 and the receiver aerial connection is taken via Lead, Aerial No.C7, through relay S17A to the sender aerial circuit.



THE MAJOR UNITS

FIGURE 81

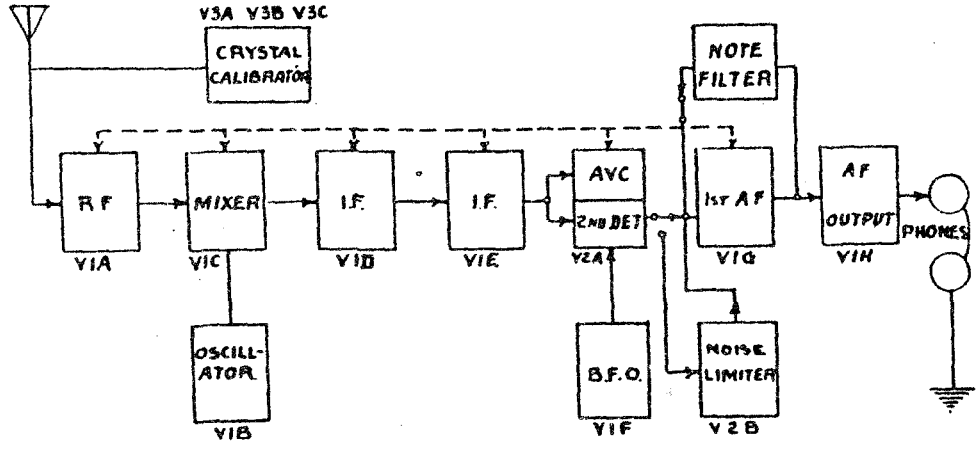
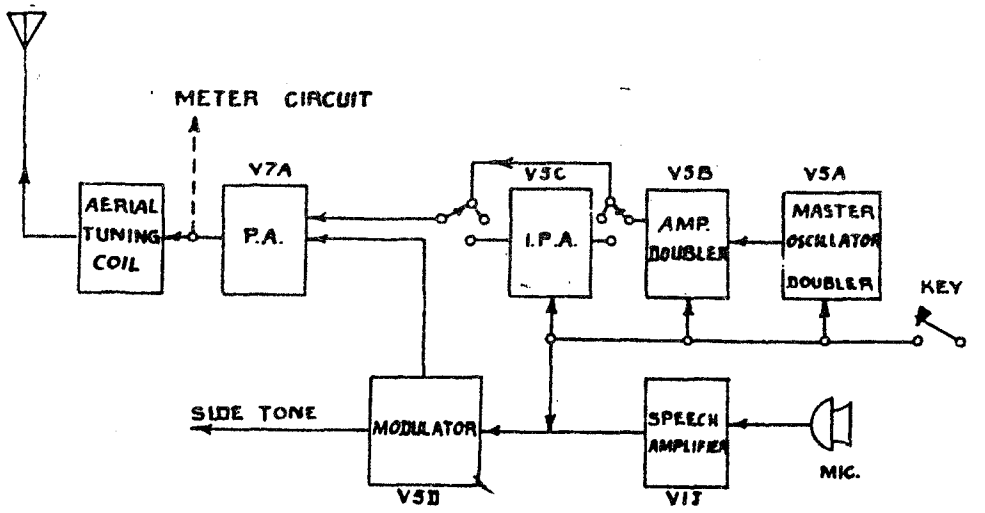
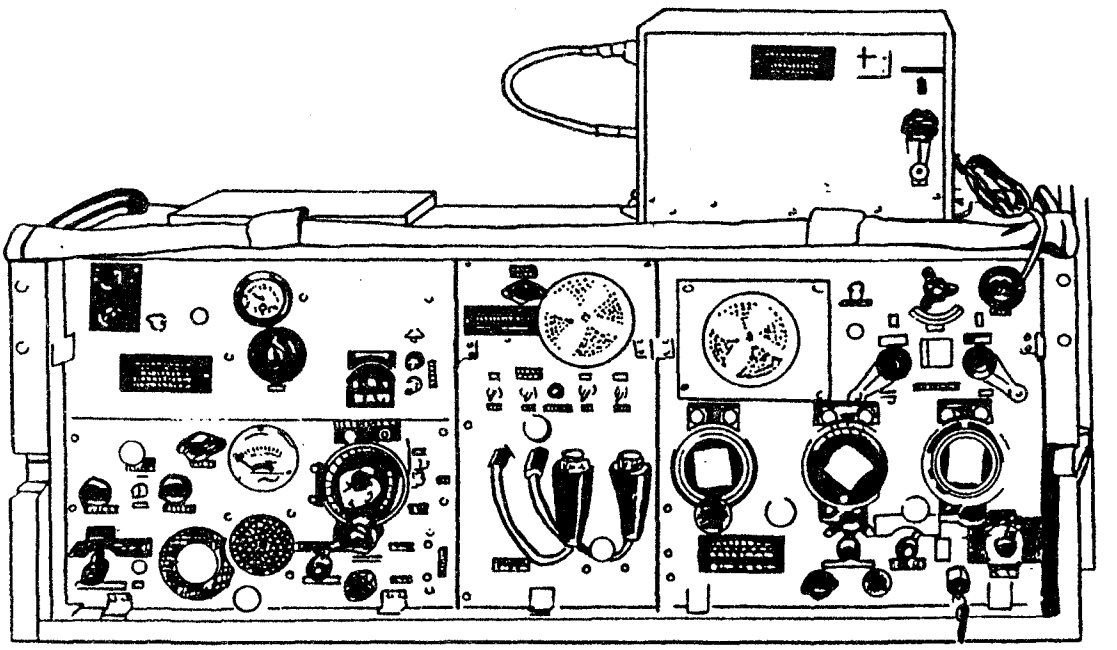


FIGURE 82 BLOCK DIAGRAM OF RECEIVER



BLOCK DIAGRAM OF TRANSMITTER

FIGURE 83



UNITS INSTALLED IN THE CARRIER

FIGURE 84

2. CIRCUIT DESCRIPTION.

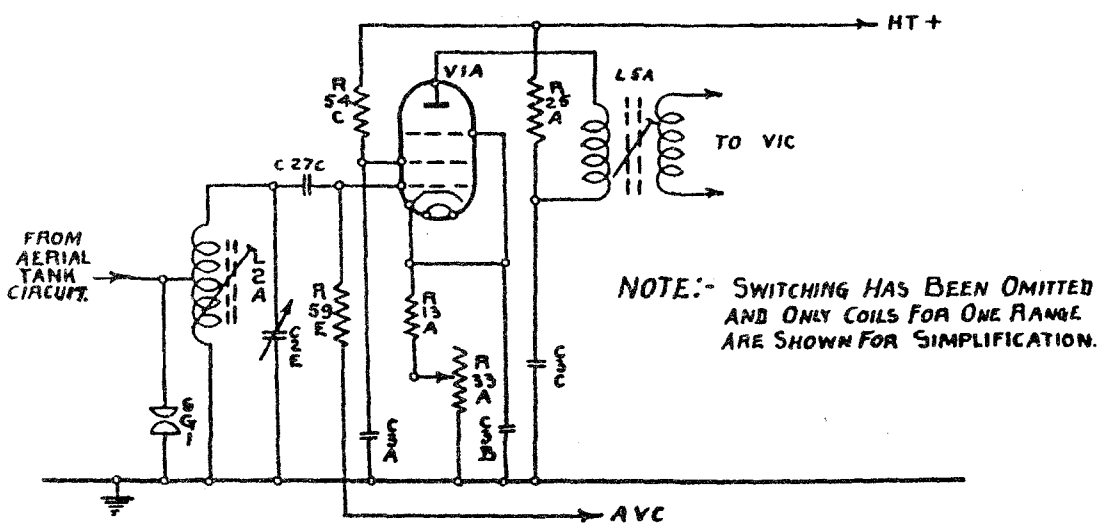
A. Receiver

(1) General. The receiver utilizes ten valves in a super-heterodyne circuit. One stage of R.F. amplification is followed by a mixer valve. In this stage oscillations from a separate Local Oscillator are caused to beat with the incoming signal to produce the intermediate frequency. There are two stages of I.F. amplification which are followed by diode detector which in turn feeds into the first audio amplifier, this is followed by the audio output valve. A beat-frequency oscillator is incorporated for the reception of C.W. signals. A noise limiter and C.W. note filter are included in the circuit as well as a three valve crystal calibrator.

(ii) Controls. The controls on the receiver and their functions are as follows:-

Panel Designation	Circuit Reference	Function
Band	S6A	Selects coils for frequency in use.
Frequency MC	C4A-B-C	Ganged tuning condenser.
Freq. ADJ.	L10A	Gives slight variation of L.O. freq., providing a vernier tuning control.
Selectivity	S1A	Varies the selectivity of the band-pass filters.
R.F. Gain	R33A	Provides manual control of bias on R.F. and I.F. amplifiers.
Speaker phones	S4A	Permits either speaker or headphone operation.
Meter S.W.	S3A	Connects the meter to various parts of the circuit.
C.W. note filter	S4C	Switches a filter into circuit to clarify C.W. note.
Noise limiter	S4B	Cuts down noise peaks.
Mode of oper.	S2A	Permits R/T or C.W. operation-and manual or A.V.C.
Het Tone	R23A	Varies the pitch of the C.W. note.
A.F. Gain	R50A	A.F. volume control.
Freq. check	S7A	Switches on the Crystal Calibrator.

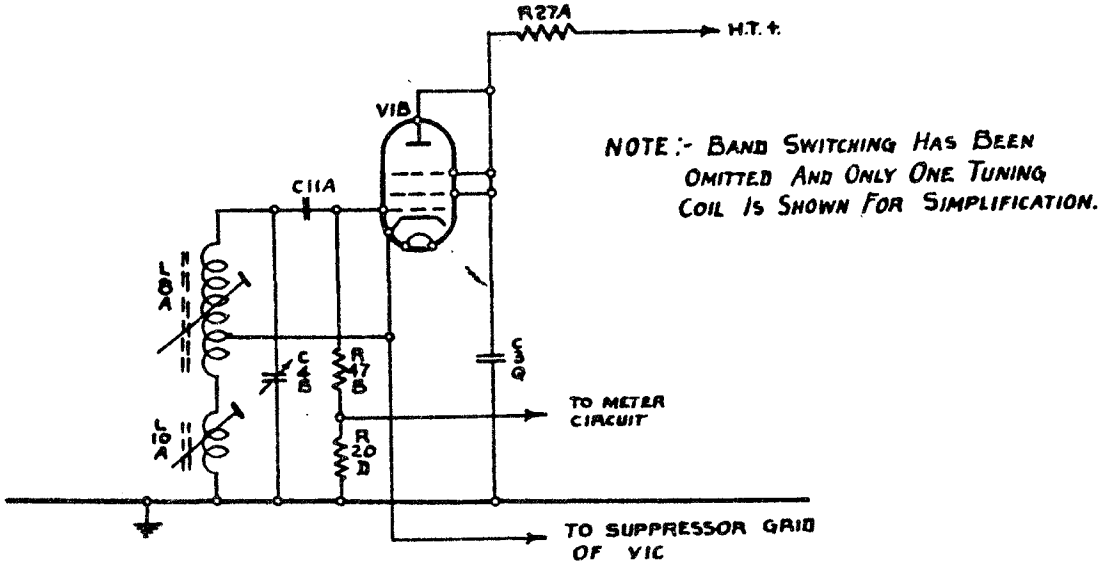
(iii) R.F. Amplifier, V1A (ARP3). The input to V1A is taken from the sender tank circuit and is applied to the grid of the R.F. amplifier via the tuned circuits L1A, L2A or L3A according to the frequency band in use. The tank circuit should be tuned to the receiver frequency if possible, as its resonant characteristics assist the receiver tuned circuits and increase sensitivity. S6A selects the appropriate coil for the frequency in use. The amplifier output of this stage is taken via transformer coupling to the mixer valve. H.T. is fed to the anode of V1A via R25A and the primary of the transformer in use. R54C is the screen-grid feed resistor. Bias is obtained by means of R13A and R33A in the cathode circuit. A gas filled discharge gap, SG1, is connected across the input terminals.



SIMPLIFIED CIRCUIT OF R.F. AMPLIFIER

FIGURE 85

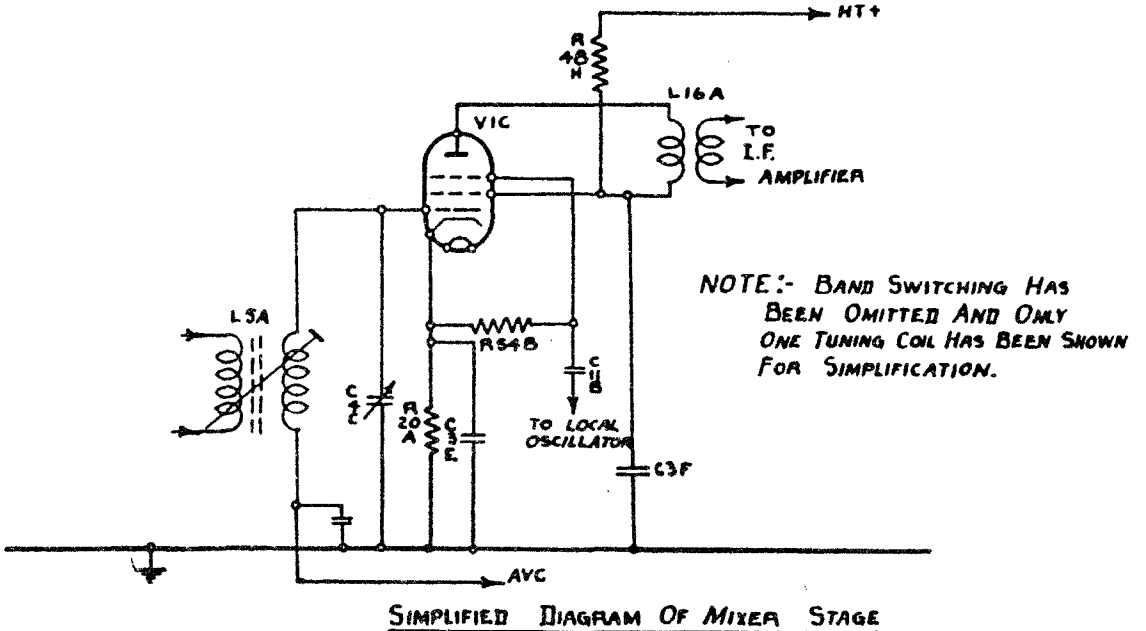
(iv) Local Oscillator, V1B (ARP3). This valve is connected as a triode in a Hartley oscillator circuit, its frequency being always 420 Kc/s higher than the signal frequency. Part of a small, tapped inductance, L10A, is connected in series with each of the oscillator tuning coils. The iron-dust core of this can be varied by means of the "FREQ. ADJ" control, which provides a vernier control of frequency. The voltage developed in this circuit is taken from the cathode to the suppressor grid of V1C, which is the mixer stage. H.T. is fed to the anode circuit via R27A.



SIMPLIFIED DIAGRAM OF LOCAL OSCILLATOR

FIGURE 86

(v) Mixer Stage. V1C(ARP3). The control grid of the mixer valve is connected to the tuned secondary at the R.F. transformer L4-6A, one of which is selected by S6A according to the frequency band in use.

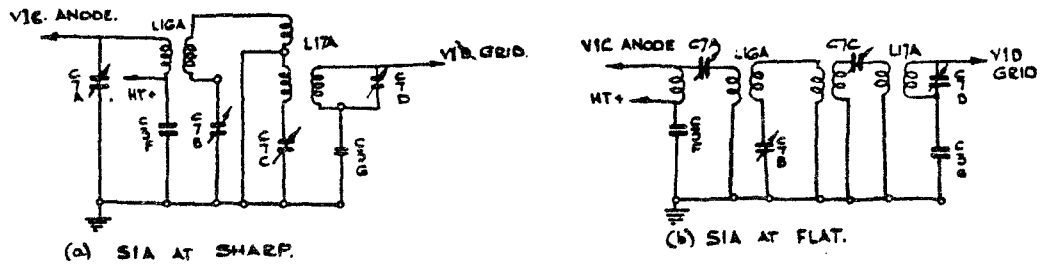


SIMPLIFIED DIAGRAM OF MIXER STAGE

FIGURE 87

The R.F. voltage developed by the local oscillator is fed into the mixer valve suppressor grid, and this beats with the incoming signal in the control grid circuit to produce the intermediate frequency of 420 Kc/s, which is the difference between them. The output from the mixer valve is taken through a screened lead to the input of the I.F. amplifier stage. H.T. is fed to both the anode and screen via R48A which is decoupled by C3F. Grid bias is obtained by means of R20A in the cathode lead.

(vi) Intermediate Frequency Amplifiers. V1D-E (ARP3). There are two stages of I.F. amplification coupled by pairs of transformers arranged as band-pass filters. The bandwidth of the I.F. channel may be changed from narrow to broad by means of the selectivity switch, SA1. This switch changes the coupling of the I.F. transformer from loose to tight coupling as required. Other than the selectivity switch the circuits are conventional amplifiers. The output from the second I.F. valve is taken via L20A to V2A, which is the detector - A.V.C. stage.

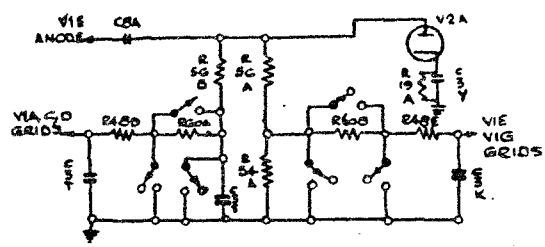


BAND PASS FILTER CIRCUIT.

FIGURE 88.

(vii) Detector - A.V.C. Stage. V2A (1274 or ARDD1). The output from V1E is fed through a single, tuned I.F. transformer L20A, to the detector diode of V2A, where it is rectified, the audio frequency signal is then fed to the control grid of V2G, which is the first A.F. amplifier. A portion of the output of V1E is coupled to the A.V.C. diode of V2A through C8A. This diode has a fairly high negative bias applied to it, so no rectification will take place until the applied signal voltage is greater than this bias, thus giving delayed A.V.C. When the signal voltage is sufficient to cause rectification at the A.V.C. diode, a negative voltage will be built up at the plate end of the A.V.C. load resistors, R56A and R54A. This negative voltage is used to bias the control grids of V1A, V1C and V1D. A smaller value of bias voltage is taken from the junction of R56A and R54A to bias the grids of V1E and V1G.

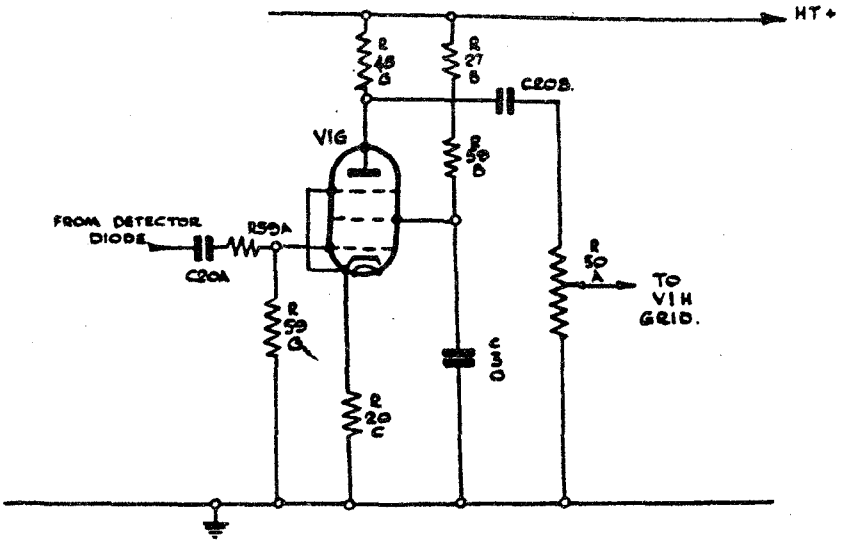
When the switch S2A is at "C.W. MAN" position both A.V.C. lines are earthed to chassis and the gain is controlled manually by the H.F. Gain control R33A. The circuit is similar with S2A at "R.T. MAN" position.



SIMPLIFIED AVC CIRCUIT.

FIGURE 89.

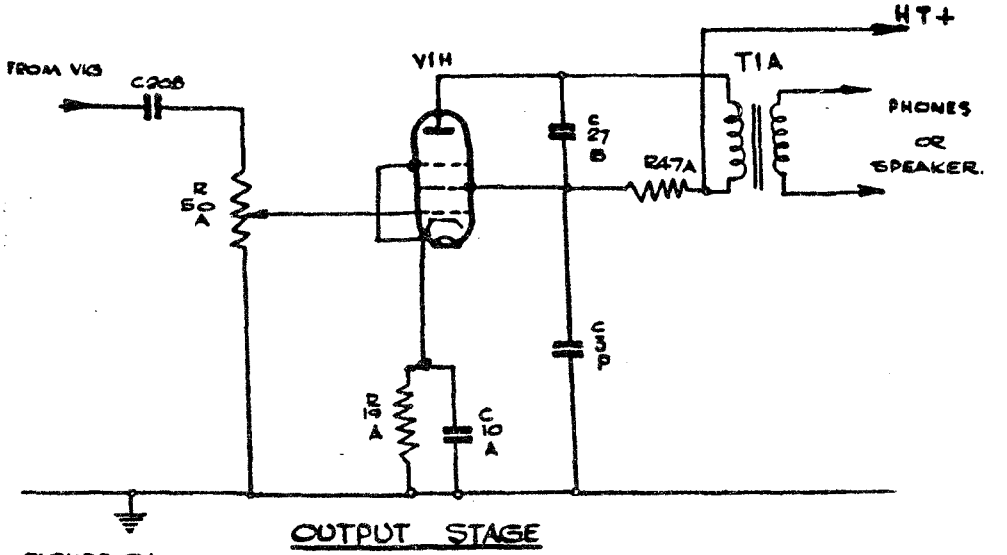
(viii) First A.F. Amplifier, V2G (ARP3). Input in the first audio frequency amplifier is taken from the detector diode of V2A via C20A. The amplified A.F. voltage is taken from the anode of V1G to the control grid of V1H through C20B and the potentiometer R50A (A.F.GAIN), which varies the amount of A.F. fed to the grid. Bias is developed across R20C. R48G is the anode load resistor through which H.T. is fed. H.T. to the screen is fed through R27B and R59B.



SIMPLIFIED CIRCUIT OF A.F. AMPLIFIER.

FIGURE 90.

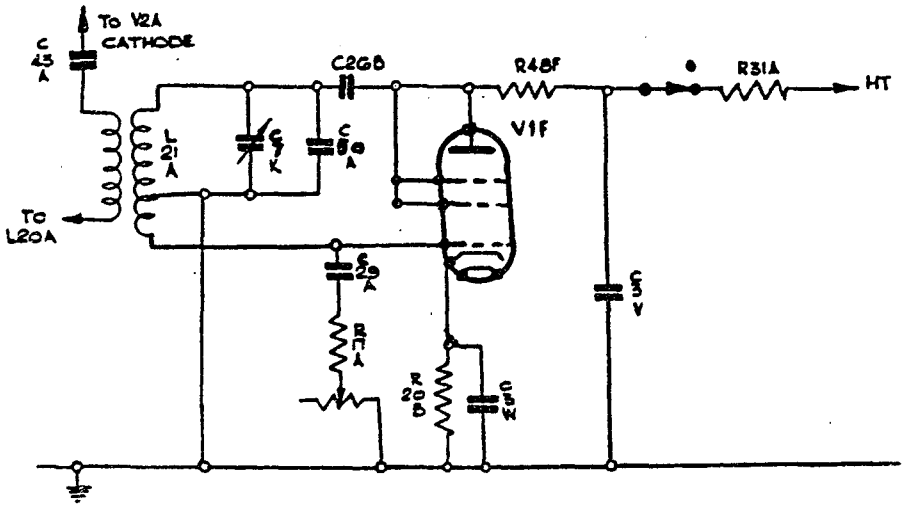
(ix) Audio Output Stage. V1H(ARP3). The audio frequency voltage developed across the A.F. volume control R50A is fed to the control grid of V1H via the sliding contact on this resistor. The amplified A.F. signal is then taken from the anode of V1H to the primary of T1A. The secondary of this transformer feeds either 'phones or speaker depending upon the position of S4A. On C.W. and M.C.W. "break-in" operation a negative bias from the - 1430 V. line is applied to the grid of this valve, this "blanks-out" the receiver. Normal bias is obtained by means of resistor R19A in the cathode lead.



OUTPUT STAGE

FIGURE 91.

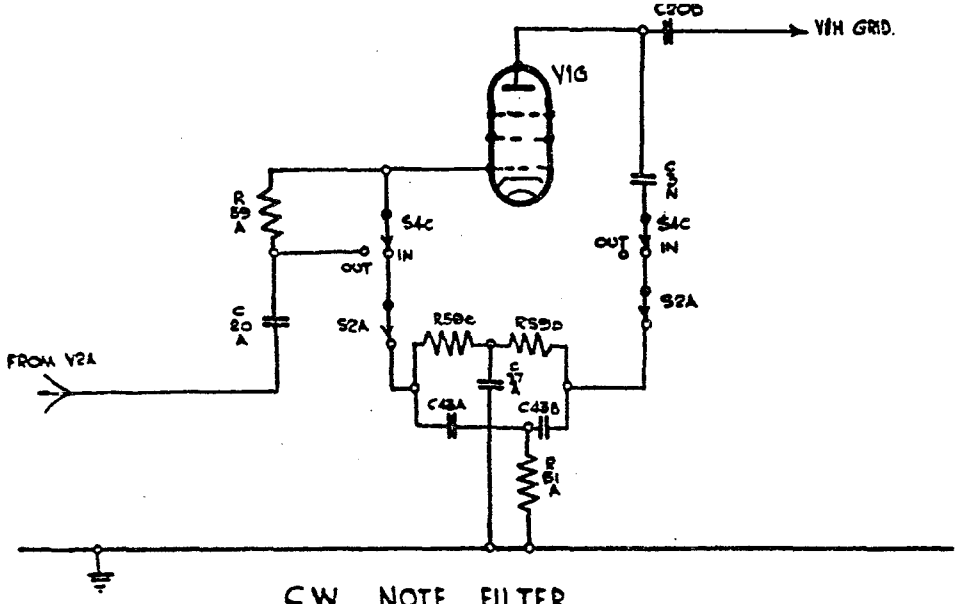
(x) Beat Frequency Oscillator. V1F (ARP3). This valve is connected as a triode in a shunt-fed, modified Hartley oscillator circuit on a frequency which is very close to the intermediate frequency but which can be varied slightly by means of the HET TONE control, R23A. The voltage generated in this circuit is injected into the cathode circuit of V2A where it mixes with the incoming signal and produces an audible note in the phones when C.W. is being received.



SIMPLIFIED CIRCUIT OF BEAT FREQUENCY OSCILLATOR.

FIGURE 92.

(xi) C.W. Note Filter. When S2A is in either of the C.W. positions and S4C is in the 'IN' position, a small amount of the audio output from the first A.F. amplifier is fed back to the grid through a filter network. The phase relationship and component values are such as to allow all signals of a frequency other than 1000 c/s to neutralise themselves in the input circuit.



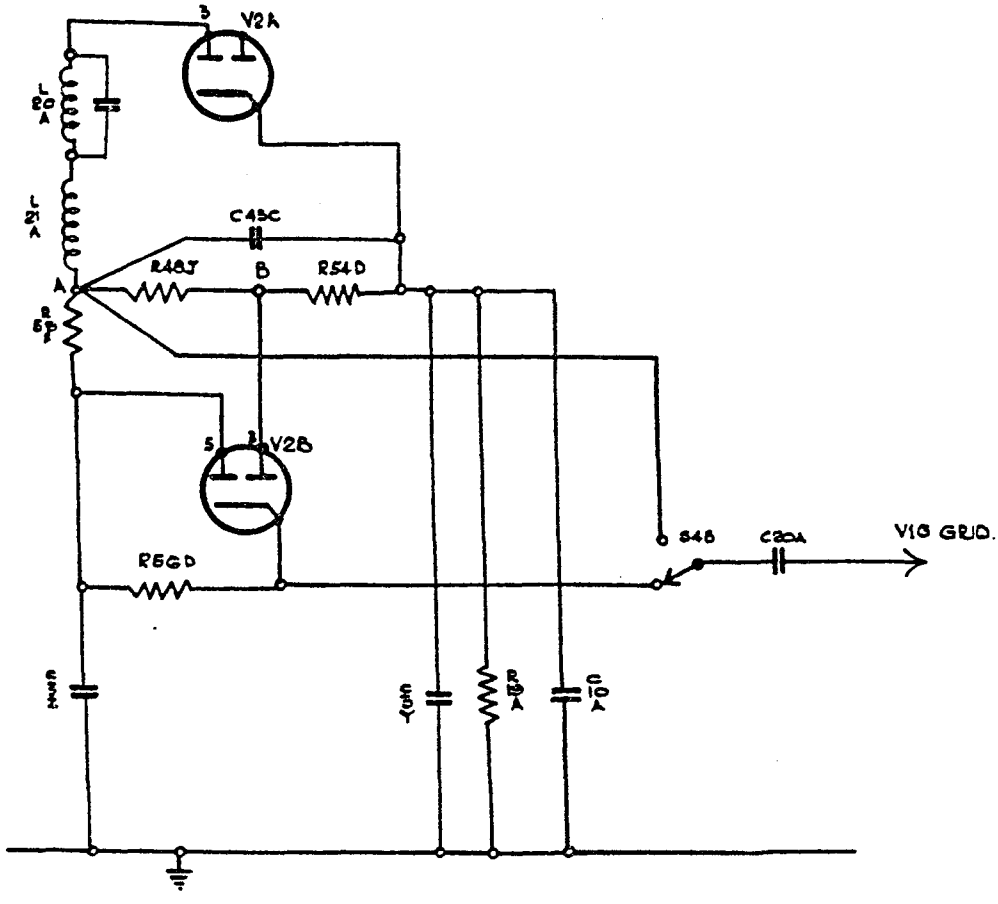
C.W. NOTE FILTER.

FIGURE 93.

(xii) Noise Limiter. V2B.(ARDD1). This stage is brought into action by S4B which provides audio voltage to the grid of V1G, either directly from the diode load resistors R48J and R54D ("OUT" position), or from the diode load through valve V2B ("IN" position).

Assuming that no sudden noise peaks are present, that S4B is at the "IN" position, and that the received signal is of sufficient strength to make point A (Fig.94) 12V negative; point B will then be 8 volts negative. Since R59F and R56D draw only a very small current the cathode of V2B will be at approximately the same potential as point A. Thus, anode 3 of V2B being 4V positive with respect to cathode, conducts, and the audio frequency voltages are applied to the grid of V1G.

If a noise peak occurs with sufficient strength to double the voltages across the diode load, point A will become 24 volts negative and point B, 16 volts negative. Due to the long time constant of R59F and C3Z, the cathode of V2B cannot attain any new potential until approximately 1/10th of a second has elapsed. Thus diode 3 is negative with respect to cathode and does not conduct.



NOISE LIMITER CIRCUIT.

FIGURE 94.

(xiii) The Crystal Calibrator. This is incorporated in the receiver unit. It is a miniature sender which includes three separate oscillators. The frequencies of these oscillators are 1000Kc/s, 100Kc/s and 10Kc/s. Each oscillator generates harmonics of its fundamental frequency, and these harmonics can be heard in the receiver. The three valves used are double triodes, type 12SQ7.

One triode of V3A is used as the 1000Kc/s, the other triode being used for 100Kc/s. These oscillators are crystal controlled by a dual frequency crystal The signal of 100Kc/s is slightly more accurate than that of 1000Kc/s.

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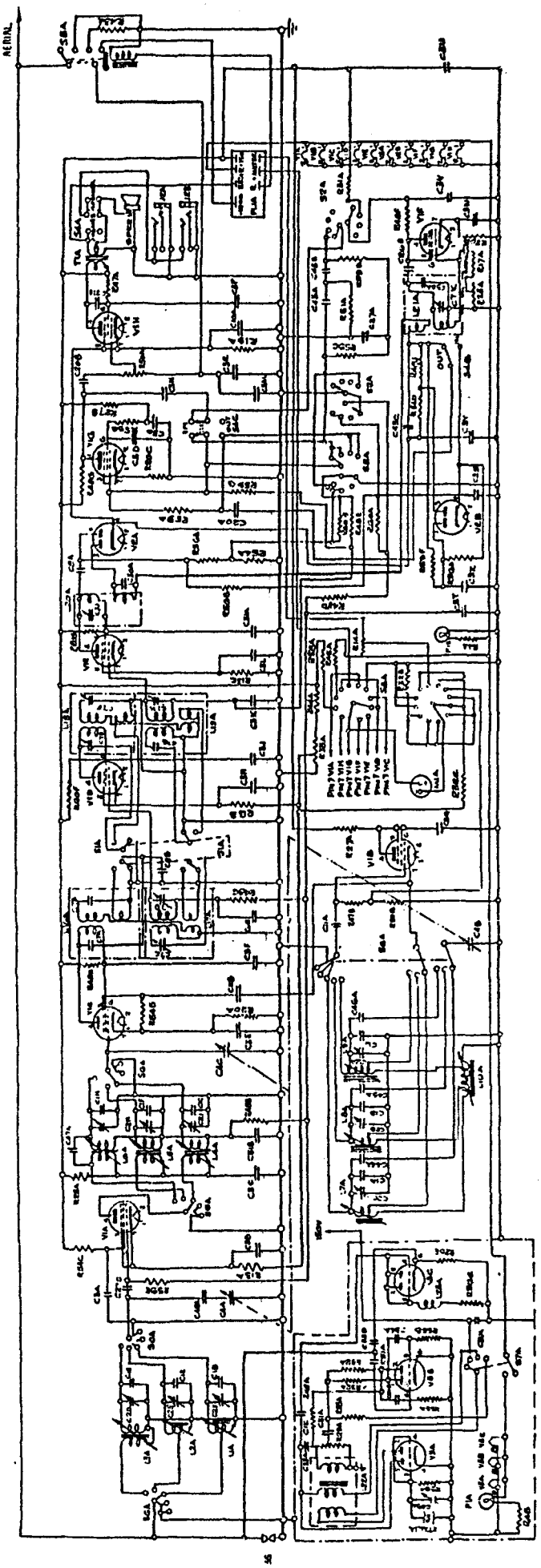

CIRCUIT DIAGRAM OF RECEIVER.

FIGURE 25.

The 10Kc/s oscillator uses both triodes of V3B in a multivibrator circuit which is controlled by applying the output of the 100Kc/s oscillator to one of the anodes of the multivibrator.

V3C acts as a buffer valve for the 1000Kc/s oscillators, and, because it is coupled to act as a diode, it exaggerates the harmonic content of the signals.

When the calibrator is switched off all voltage supplies are disconnected from it.

B. THE SENDER.

(i) General. The sender consists of 7 valves, not all of which are used on anyone frequency, The Master Oscillator employs a Hartley type oscillator which may be converted to a Pierce type oscillator for crystal controlled operation.

On Band 1 the M.O. feeds an amplifier which drives the grid of the power amplifier. On Band 2 the M.O. acts as an oscillator-doubler. On Band 3 the M.O. acts as an oscillator-doubler, feeding the amplifier which now acts as a further doubler. A further valve now acts as the amplifier to drive the P.A. on this band. On R/T the speech amplifier feeds the Modulator which in turn modulates the grid of the P.A.

The aerial is tuned to resonance at the frequency being used by Coil Aerial Tuning No. 2A.

(ii) Controls. The controls on the sender and their functions are as follows:-

Panel Designation	Circuit Reference	Function
METRE SWITCH	S20A	Completes various circuits to obtain test voltage readings.
MODE OF OPERATION S16A	S16A	Selects the type of transmission desired.
BAND	A13A S15A	Selects the appropriate inductances for the frequency being used, and, on Band 3, completes the H.T. circuit to the Intermediate Power Amplifier.
FREQUENCY M.C.	C9A-B-C-D	Ganged tuning control.
I.P.A. 7.16	C17A	Tunes the Intermediate Power Amplifier on Band 3.
MED LOW HIGH	S21A	Determines power output by varying the bias on valves.
P.A. TUNE	C16A-B	Tunes the anode circuit of the power amplifier.
P.A. LOADING	L38A L39A	Used to load the aerial.
A.E. METER SENS	S19A	Adds meter multipliers to increase the range of the aerial meter.
XTAL 1.		Used to select crystal control or master
M.O.		oscillator operation. (Located inside
XTAL 2.		chassis at rear of Sender).

(iii) The Master Oscillator. V5A (6V6G). The master oscillator operates as a Hartley or Pierce oscillator, depending upon the position of S23A.

On M.O. operation the oscillator tank circuit consisting of L31A; C9A and C9B in parallel; and trimmers C6A; C6B and C12A; may be tuned to any frequency between 1.75 and 4 Mc/s.

With S23A at XTAL 1 or XTAL 2 position a crystal, resonant to some frequency between 1.75 and 4 Mc/s, replaces the oscillator tank circuit, and the cathode which was connected to the tap on L31A is now connected to the junction of the feedback condensers C28B and C14A, and to earth through R.F. choke, L43E.

H.T. is supplied to the anode and screen from the +300V., line V6A, a gaseous voltage regulator, being used to stabilise the screen voltage.

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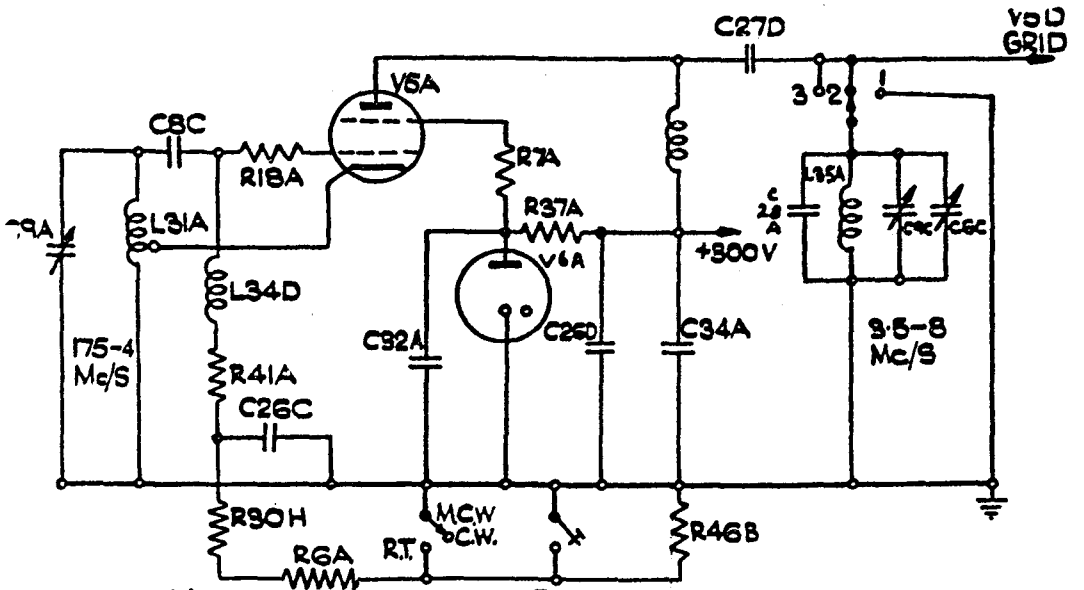
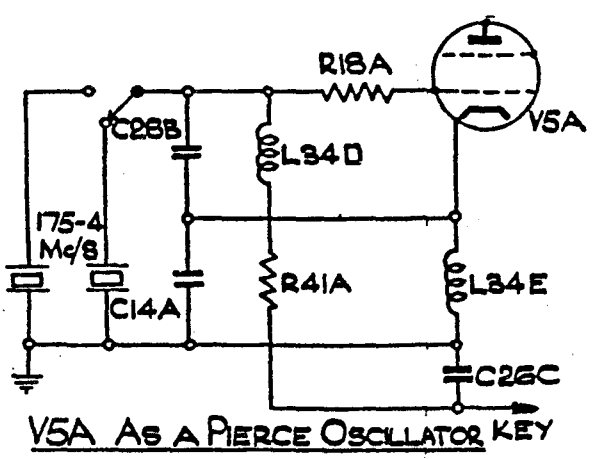
On Band 1 the R.F. voltage which is developed by V5A is fed to the grid of V5B through coupling condensers C27D, C11C, and R10A. On Bands 2 and 3 a tuned circuit, L33A, C9C, C6C and C28A, is placed in the anode circuit of V5A. This circuit may be tuned to any frequency between 3.5 and 8 Mc/s, i.e. double the oscillator frequency. The second harmonic of the oscillator frequency being applied to the grid of V5B.



V5A AS A HARTLEY OSCILLATOR

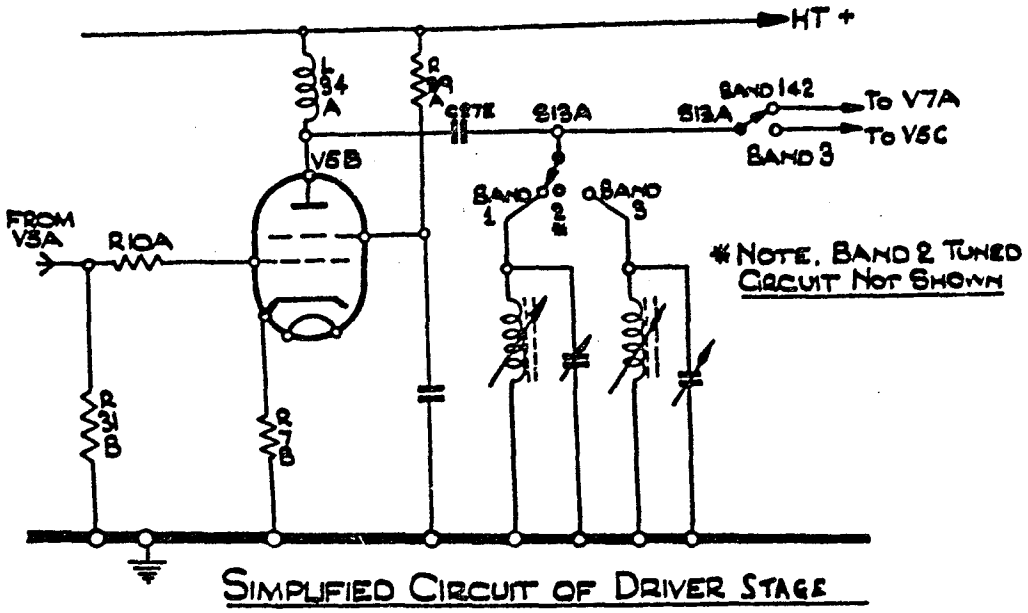
FIGURE 96 (a)



V5A AS A PIERCE OSCILLATOR

FIGURE 96(b)

(iv) The Driver Valve. V5B (6V6G). On Bands 1 and 2 the output of the H.O. is amplified by V5B and applied to the grid of the power amplifier. On Band 3 the input frequency is doubled by the anode tuned circuit and applied to the grid of the intermediate power amplifier, which in turn, drives the power amplifier. R7B in the cathode lead of V5B provides bias for the valve. H.T. is again obtained from the +300 V. line.



SIMPLIFIED CIRCUIT OF DRIVER STAGE

FIGURE 97

(v) Intermediate Power Amplifier. V5C (6V6G). This stage is used on Band 3 only as on this band, the Driver acts as a frequency doubler. S13A makes the necessary anode and grid circuit connections. When on Band 1 and 2 H.T. is disconnected from its anode and screen. Bias is obtained by means of R7D in the cathode lead. The anode circuit is tuned to resonance by C17A, the I.P.A. 7-16 control.

(vi) Power Amplifier. V7A (S13). The power amplifier operates as a Class C amplifier on C.W. and as a grid modulated Class C amplifier on R/T and M.C.W. The MED LOW HIGH switch, S21A, provides the choice of medium, low or high power output by changing the grid bias voltage and by varying the anode and screen volts of the A.F. valves.

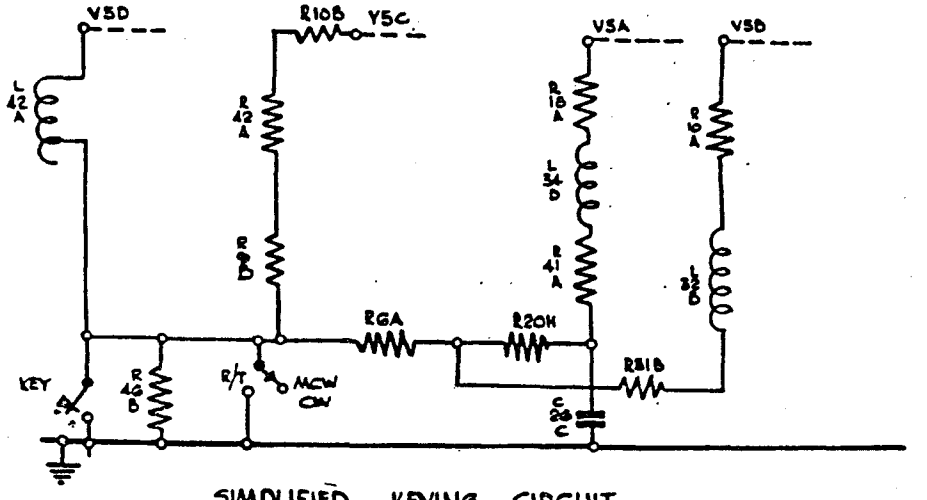
The output tuning indicator comprises a current transformer, T5A, a wide band-pass filter and a full wave copper oxide rectifier which rectifies a small amount of the induced R.F. The resulting D.C. potential is measured by the meter.

(vii) Speech Amplifier. V1J (ARP3). The microphone is coupled to the grid of the speech amplifier via transformer T2A. This valve amplifies the audio frequencies applied to it and then passes them on to the Modulator via C20C. Bias is obtained by means of R27D in the cathode lead.

(viii) Modulator and M.C.W. Oscillator. V5D (6V6G). On R/T this stage amplifies the audio output of V1J, and modulates the grid of the P.A. valve. It is inductively coupled to the P.A. stage by the modulator transformer, T3A. The primary of the microphone transformer, T2A, is coupled to T3A and obtains negative feedback over the two stages.

On M.C.W. and C.W. the MODE OPER switch, S16A, removes H.T. from the anode and screen grid of V1J and converts V5D into a Hartley oscillator operating at 1000 c/s. On M.C.W. the grid of V7A is modulated in the normal way, but on C.W. V5D acts as a source of sidetone only. Sidetone is obtained from the sidetone winding of T3A when operating on M.C.W.

(ix) Keying. On M.C.W. and C.W. operation one end of the 1430 V. supply is not taken to earth direct but is taken through R34A and R46B. Either R21A or R40A is placed in parallel with R34A by operation of the MED LOW HIGH switch. Thus a negative voltage is applied from the negative end of R46B to the grids of V5A and V5B, rendering these valves inoperative. Keying is accomplished by earthing the negative end of R46B, so making these valves operative. The centre tap of L42A is also earthed by operation of the key thus causing V5D to operate as a Hartley oscillator, modulating the P.A. on M.C.W. and acting as a source of sidetone only on C.W.



SIMPLIFIED KEYING CIRCUIT.

FIGURE 98.

(x) Break-in Operation. This is accomplished through the functioning of two relays; the muting relay, S5A, in the receiver; and the aerial transformer relay, S17A, in the transmitter.

The relays are actuated by the 12 V. relay supply through the key when S16A is in the C.W. or M.C.W. break-in position. When the key is pressed, S5A earths the receiver aerial terminal and applies high value of negative bias to the grid of the second A.F. valve in the receiver, V1H. this completely blanks out the receiver and protects it from the signal to be transmitted. S17A transfers the aerial from the receiver input to the output circuit of the P.A., V7A; short circuits R46B, thus removing the extra bias from the grids of V5A and V5B; and transfers the phones from the receiver output to the sidetone winding of T3A.

C. POWER SUPPLY UNIT.

(i) General. The initial source of power is a 12V. accumulator. This is used to drive two motor-generators for Sender H.T. and a vibrator unit for Receiver H.T. 12V. is used for all the valve heater supplies, but it should be noted that certain heaters in the sender are in a series-parallel arrangement.

(ii) Controls.

Panel Designation	Circuit Reference	Function.
ON OFF	S8A	Master on-off switch.
Sender Heaters	S8B	Opens and closes the sender heater circuit.
REC. H.T.	F1B	Fuse in vibrator input circuit to protect circuit if vibrator sticks.
NET OFF	S9A	Opens and closes the L.T. circuit to MG1A and the H.T. circuit to the master oscillator for netting purposes.
SEND REC.	S8C	Actuates a relay which closes the H.T. circuit to the sender when on SEND and opens the aerial circuit to the receiver.

(iii) The Motor-Generator Unit. This consists of a low power and a high power Motor-Generator, starting and send-receive relays, filters, an exhaust fan, switches and leads necessary for voltage distribution.

The low power generator, MG1A, supplies 300 volts,D.C. for all purposes in the sender except the P.A. anode and grid bias voltages, which are supplied by the high power generator, MG2A. A thermostat mounted above the L.P. generator closes when the temperature reaches 100 degrees F. and starts the fans in the supply unit and the sender.

When the "NET" switch is closed the L.P. generator is brought into operation. The "SEND RECEIVE" switch operates a light duty relay which closes the 300 V. line to the sender, and closes the heavy duty relay which starts both generators and applies voltage to the P.A. filament.

The "SENDER HEATER" switch controls the supply of voltage to all valve heaters in the sender. When it is "OFF" only the receiver can operate.

(iv) The Vibrator Unit. A vibrator unit supplies H.T. to the receiver. This unit consists of an interrupter type vibrator, a step-up transformer, a full wave, cold cathode rectifier valve, V4A, type OZ4A, and various filters.

The fuse, F1B, in the input circuit, which protects the transformer and battery, is mounted on the main panel.

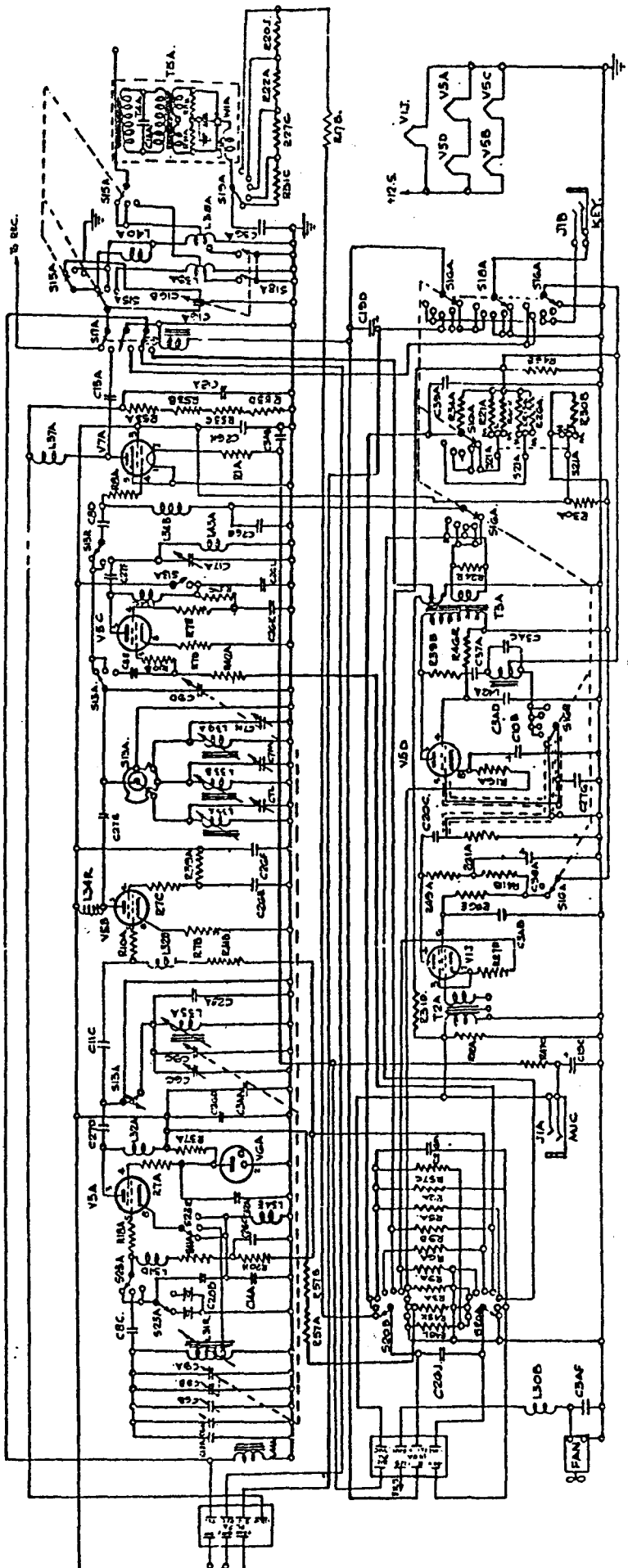
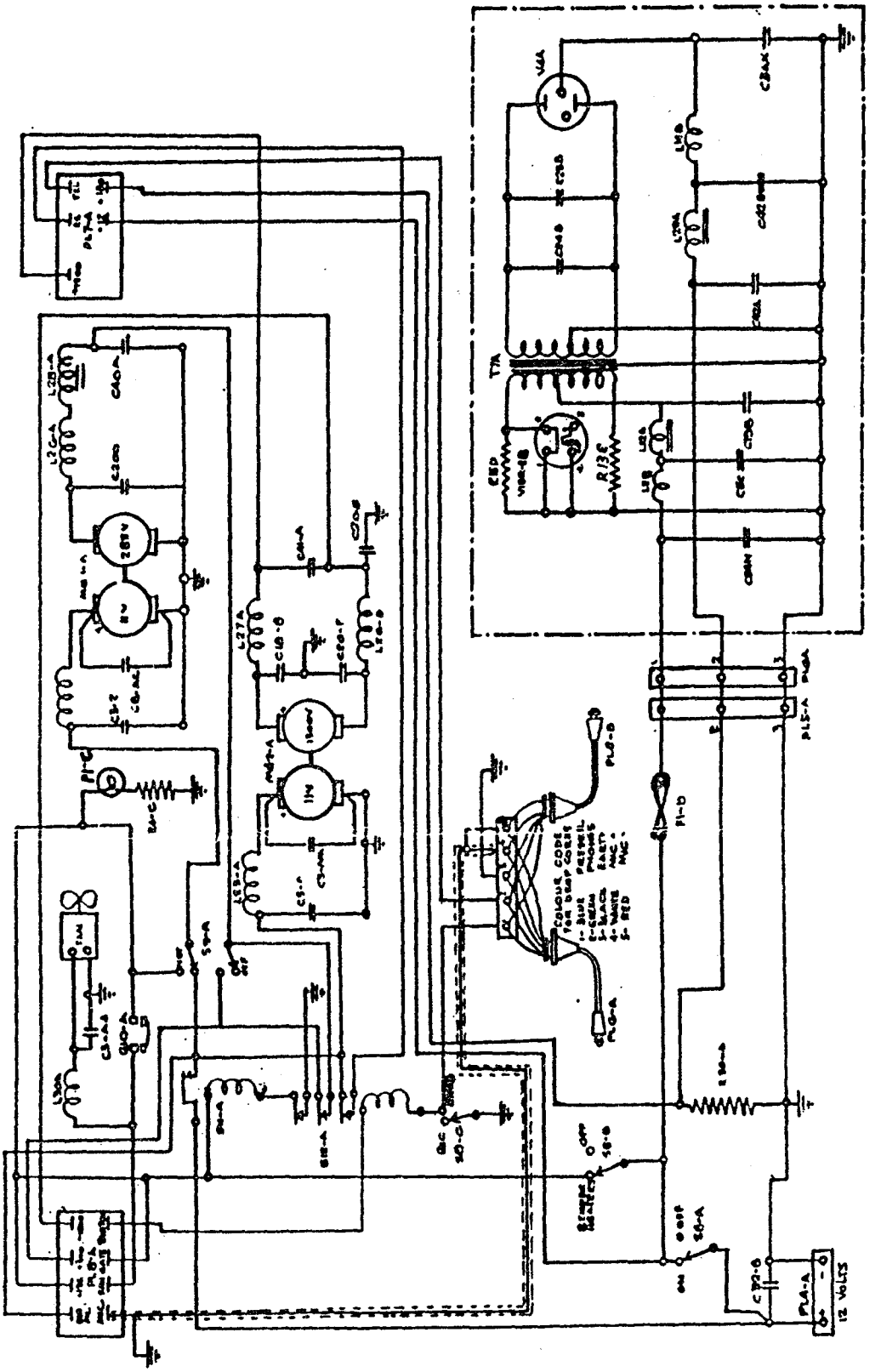


FIGURE 99



CIRCUIT DIAGRAM OF SUPPLY UNIT.

FIGURE 100.

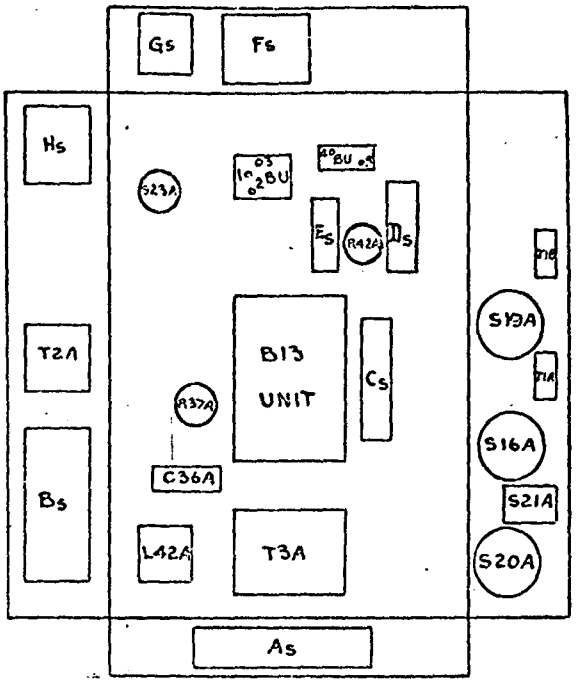
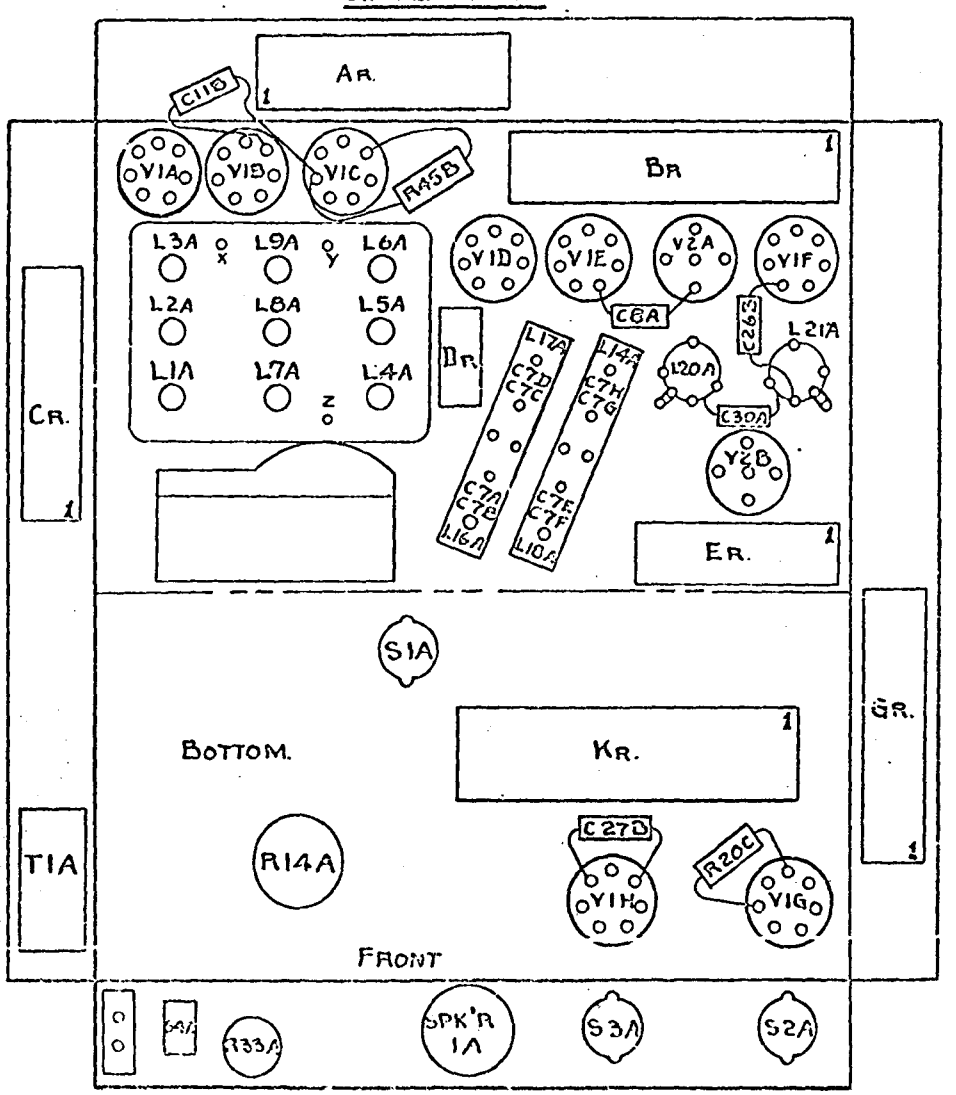


FIGURE 101 SENDER LAYOUT



NOTE:- PANEL TERMINAL NUMBERING STARTS AT 1

FIGURE 102 RECEIVER LAYOUT

DN 633½/1

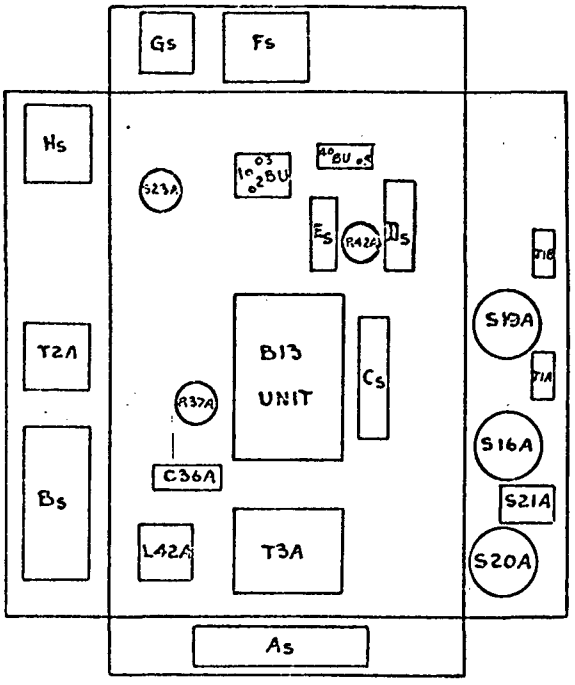
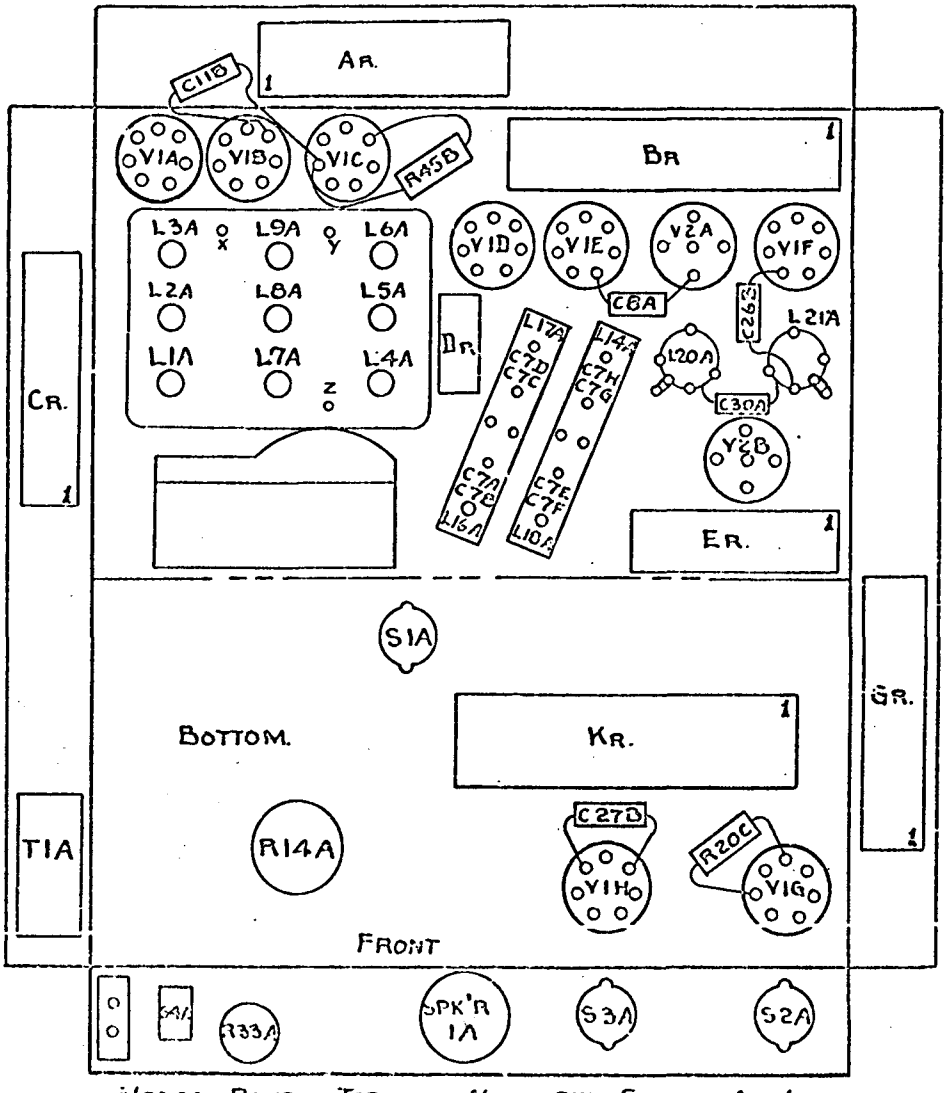


FIGURE 101 SENDER LAYOUT



NOTE:- PANEL TERMINAL NUMBERING STARTS AT 1

FIGURE 102 RECEIVER LAYOUT

Circuit Ref.	Value	Circuit Ref.	Value
	CONDENSERS		
C1A-K	20 pF	C30A	150 pF
C2A-J	4-30 pF var	C31A-B	.01 µF
C3A-Z	.1 µF	C31A-B	2 pF
C3AL	.1 µF	C34A-B	80 pF
C4A-C	441 pF var	C43A-C	250 pF
C7A-K	100 pF var	C44A	1004 pF
C8A-B	50 pF	C45A	1060 pF
C10A	12 µF	C46A	1349 pF
C11A-B6	100 pF	C47A	7 pF
C20A-B	.01 µF	C48A	.002 µF
C26B	.002 µF	C49A	25 pF. var
C27A-C	500 pF	C50A	150 pF
C29A	350 µF	C51A	1 pF
	RESISTORS		
R4A-B	8 ohms	R43A	25,000 ohms
R13A-C	300 ohms	R44A	30,000 ohms
R14A	300 ohm var	R45A	30,000 ohms
R17A	500 ohms	R47A-B	50,000 ohms
R19A	600 ohms	R48-J	100,000 ohms
R20A-G	1,000 ohms	R50A	100,000 ohms var
R23A	2,000 ohms var	R51A	150,000 ohms
R25A	3,000 ohms	R52A	200,000 ohms
R27A-B	5,000 ohms	R54A-D	250,000 ohms
R28A	5,000 ohms	R55A-B	300,000 ohms
R29A	5,000 ohms var	R56A-D	500,000 ohms
R31A	10,000 ohms	R58A	600,000 ohms
R32A-C	10,000 ohms	R59A-H	1 megohm
R33A	10,000 ohms var	R60A-B	4 megohms

COMPONENT VALUES (RECEIVER)

Circuit Ref.	Value	Circuit Ref.	Value
CONDENSERS		RESISTORS	
C3AC-AK	1 µF	R4C	8 ohms
C5E-G	5 µF	R13D-F	300 ohms
C18B	.005 µF	R38A	10,000 ohms
C19B	100 µF		
C20D-F	.01 µF		
C23B	.004 µF		
C24B	.0075 µF		
C26N	.002 µF		
C32B	.01 µF		
C40A	2 µF		
C41A	.5 µF		
C42A-B	20 µF		

COMPONENT VALUES (SUPPLY UNIT)

Circuit Ref.	Value	Circuit Ref.	Value
	CAPACITORS		
C3AA-AF	.1 µF	C18A	.005 µF
C6A-C	7-45 pF var	C19C-D	100 µF
C7L-N	100 pF var	C20C	.01 µF
C8C-E	50 pF	C26C-M	.002 µF
C9A-D	540 pF var	C27D-G	500 pF
C10B	12 µF	C28-B	30 pF
C11C	100 pF	C32A	.01 µF
C12A	150 pF	C35A	.001 µF
C13A	150 pF	C36A	1.75 µF
C14A	150 pF	C37A	.02 µF
C15A	500 pF	C38A	2. µF
C16A-B	225 pF var		
C17A	320 pF var	C39A	5 µF

	RESISTORS		
		R24A	2500 ohms
R1A	.4 ohms	R26A	4300 ohms
R2A	.84 ohms	R27C-D	5000 ohms
R3A	1.67 ohms	R30A-B	7500 ohms
R5A	8.5 ohms	R31B-D	10,000 ohms
R6A	17 ohms	R34A	10,000 ohms
R7A-E	50 ohms	R37A	10,000 ohms
R8A	50 ohms	R39A-C	15,000 ohms
R9A-B	100 ohms	R40A	15,000 ohms
R10A-B	150 ohms	R41A-B	20,000 ohms
R11A-B	200 ohms	R42A	20,000 ohms
R12A	250 ohms	R46A-B	40,000 ohms
R15A	350 ohms	R47C	50,000 ohms
R16A	400 ohms	R48K-L	100,000 ohms
R17B	500 ohms	R49A	100,000 ohms
R18A	500 ohms	R53A-D	250,000 ohms
R20 H-J	1000 ohms	R56E	500,000 ohms
R21A	1500 ohms	R57A-C	600,000 ohms
R22A	2000 ohms	R61A	1 megohm

COMPONENT VALUES (SENDER)

3. Fault Finding.

Before carrying out the fault finding proceedure as given below place following controls to the positions indicated.

CONTROL	POSITION
ON-OFF	OFF
SENDER HEATERS-OFF	OFF
NET-OFF	OFF
SEND-RECEIVE	REC.
A.F. GAIN	FULLY CLOCKWISE.
R.F. GAIN	FULLY CLOCKWISE.
SPEAKER-PHONES	SPEAKER
SELECTIVITY	SHARP
MODE OF OPER	R.T. MAN
NOISE LIMITER	OUT
C.W. NOTE FILTER	OUT
FREQ. CHECK	OFF
HET TONE	DOTS ALIGNED
BAND	7-16

PART TESTED	TEST NO.	TEST ACTION	CORRECT RESULT	INCORRECT RESULT	PROBABLE CAUSE	ACTION REQUIRED
Supply Unit	1	Turn on-off switch on	REC ON pilot lamp lights up and faint hum is heard. in supply unit.	No hum heard and/or REC ON Lamp does not light.	Battery not connected properly.	Correct
					Dirty or loose battery connections.	Clean and tighten
					Fuse burnt out. L.T. leads to supply unit faulty..	Replace Check
					REC ON pilot lamp burnt out.	Replace
					Open circuit in input to vibrator.	Report
	2	Turn SENDER HEATERS-OFF Switch to SENDER HEATERS.	SENDER HEATERS Pilot lamp lights.	Lamp does not light.	Lamp burnt out.	Replace
					R4C open circuit.	Replace
					Open circuit to P.E.	Check
	3	Turn NET-OFF switch to NET.	Motor generators run.	Motor generators run noisily or do not run.	Brushes worn.	Report. In emergency check.
					Short or open circuit to MG1A.	Check.
				Fans start up.	Loose bonding between units.	Check anchor bolts.
					Broken S10A.	Replace.
	4	Turn NET-OFF switch to OFF and SEND-REC switch to SEND.	Relay click heard and motor generators run.	No click heard. Motor generators do not run and fans start.	Low battery voltage.	Check batteries and replace if low.
					Short in MG2A circuit.	Check.
Sender	5	Turn MODE OF OPERATION switch to M.C.W. and C.W.	Motor generators speed up	Motor generators do not speed up.	Open in S16A circuit.	Check.
					Fault in V7A circuit.	Report.
	6	Turn MODE OF OPERATION switch to C.W. BREAK IN.	Receiver operates.	Receiver does not operate.	Open in S16A circuit.	Check.
	7	Turn MODE OF OPERATION switch to C.W.	Receiver ceases to operate. Relay click heard.	Receiver continues to operate and no click heard.	Key closed.	Open key.
					Short in S16A circuit.	Check.

WIRELESS SET NO. 52

1. GENERAL DESCRIPTION

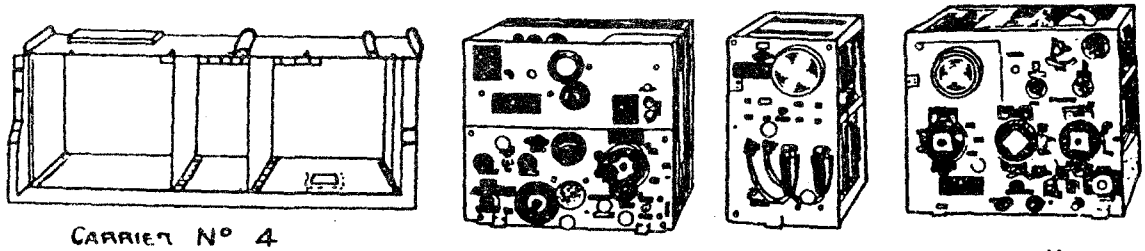
The W.S.52 is a transmitter/receiver designed for either stationary or mobile operations in a wireless vehicle or as a ground station in a tent.

The frequency range is 1.75 Mc/s - 16 Mc/s and is covered in three overlapping bands, 1.75 to 4 Mc/s, 3.5 to 8 Mc/s, and 7 to 16 Mc/s. Facilities are provided for operation on R/T, M.C.W. and C.W.

The approximate working range is 40 miles on R/T and M.C.W. or 100 miles on C.W. Various lengths and types of aerial are provided for use on the different frequencies. Remote Control operation is available using Wireless Remote Control Unit No. 1 Canadian.

Two 6 volt accumulators provide heater voltage, and drive two dynamotors and a vibrator circuit for H.T. supplies. The W.S. No.52 consists of five major distinct units, they are the sender, receiver, supply unit, Coil Aerial Tuning No.2A, and Carrier No.4. The sender, receiver and supply unit are installed in separate compartments of the carrier. The carrier is housed in a cradle which is fitted with 6 rubber shock mounts. The aerial tuning coil may be fastened to the top or the right hand side of the carrier.

Connections between the units for distribution of power, microphone, headphones, send-receive switching, etc. are made through plugs attached to the carrier and sockets on the back of each unit. The plugs and sockets are automatically engaged when the units are slid into place in the carrier. The actual inter-unit wiring is located in an enclosed channel in the carrier. The aerial tuning coil is connected to the sender aerial connection by means of Lead, Aerial No.6 and the receiver aerial connection is taken via Lead, Aerial No.C7, through relay S17A to the sender aerial circuit.



THE MAJOR UNITS

FIGURE 81

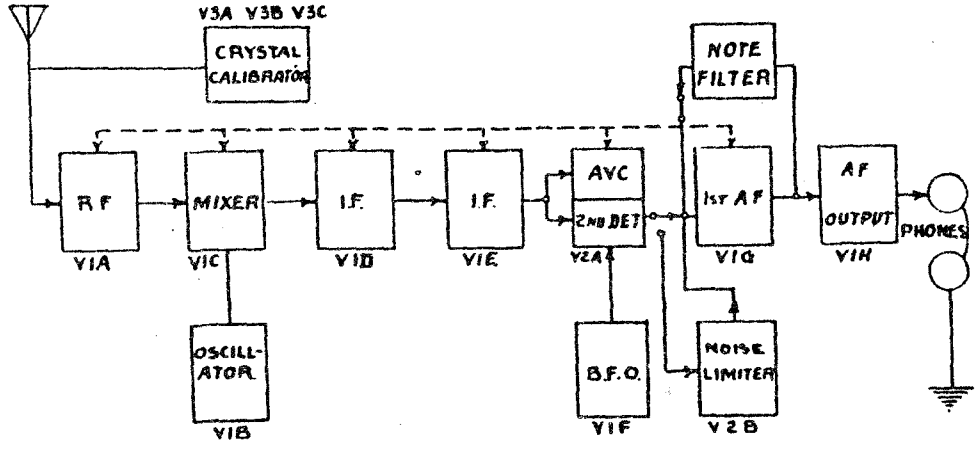


FIGURE 82 BLOCK DIAGRAM OF RECEIVER