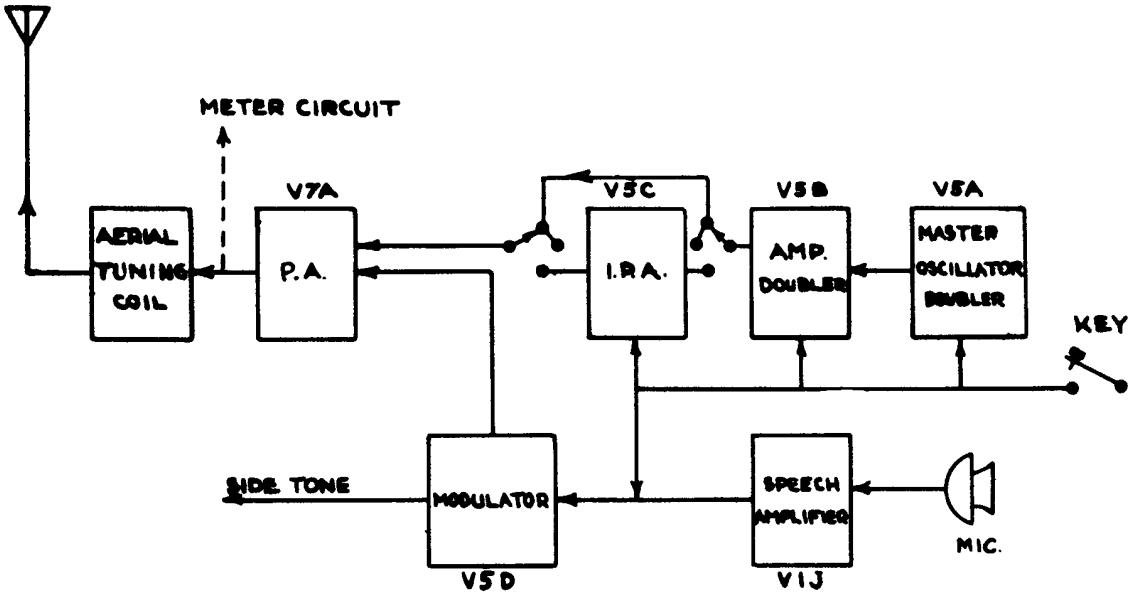
7. The sender consists of 7 valves not all of which are used on any one frequency. The master oscillator employs a Hartley type oscillator which may be converted to a Pierce type oscillator for crystal controlled operation. On Band 1, the M.O. feeds an amplifier which drives the grid of the power amplifier. On Band 2 the master oscillator acts as an oscillator-doubler. On Band 3 the master oscillator acts as an oscillator-doubler, feeding the amplifier which now acts only as a doubler. An intermediate power amplifier is used on Band 3 to drive the grid of the power amplifier. The P.A. valve is grid-modulated by the modulator which is fed, on R/T, by the speech amplifier. The aerial is tuned to resonance at the frequency being used by Coil Aerial Tuning No. 2A.

8. The power supply contains two dynamotors and a removable vibrator supply unit. 12 V., D.C. is fed to the dynamotors which develop 1430 V. and 300 V. for the transmitter valves, and to the vibrator which supplies 145 V. for the receiver valves.

Brief Mechanical Description

9. Wireless Set Canadian No. 52 comprises five major, physically distinct units. These 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. This steel carrier is housed in a cradle which is fitted with six rubber shock mounts. The aerial tuning coil may be fastened to the top or the right hand side of the carrier



T F.612 1-2

FIG. 2—BLOCK DIAGRAM OF SENDER.

10. The connections between the three major units for distribution of power, microphone, headphone, 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.

11. Lead, Aerial No. C6 connects Coil Aerial Tuning No. 2A to the aerial connection of the sender unit, while Lead, Aerial No. C7 connects the aerial post of the receiver to the sender where it is connected through the relay S17A to the aerial circuit. Low Tension Plug No. 17 connects the two 6V. batteries via a twin battery cable to the supply unit.

Controls

12. The controls are listed in Table 1.

TABLE 1—CONTROLS AND THEIR FUNCTION.

Unit	Panel Designation	Circuit Reference	Function
Supply	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. (See Para. 62).
	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.
Sender	METER SWITCH	S20A	Completes various circuits to obtain test voltage readings.
	MODE OF OPERATION	S16A	Selects the type of transmission desired. (See Paras. 23, 28 and 29.)
	BAND	S13A, 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 MC	C9A-B-C-D	Ganged tuning condenser.
	I.P.A. 7-16	C17A	Tunes the intermediate stage of the sender on Band 3.
	MED LOW HIGH	S21A	Determines power output by varying bias of sender valves.
	P.A. TUNE	C16A-B	Tunes the plate circuit of the power amplifier, V7A.
	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 M.O. XTAL 2	S23A	Used to select crystal control or master oscillator operation. (Located inside chassis at rear of sender). See Paras. 13 and 15).
Receiver	BAND	S6A	Selects appropriate coils for the frequency band in use.
	FREQUENCY MC	C4A-B-C	Ganged tuning condenser.
	FREQ ADJ	L10A	Slightly varies the frequency of the local oscillator, providing a vernier tuning control.
	SELECTIVITY	S1A	Varies the amount of selectivity in the band pass filters.

TABLE 1—CONTROLS AND THEIR FUNCTION—Continued

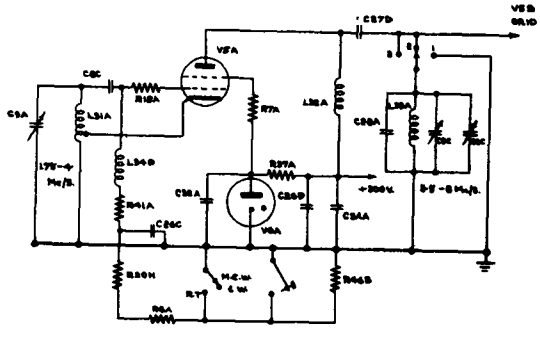
Unit	Panel Designation	Circuit Reference	Function
Receiver *(continued)*	R.F. GAIN	R33A	Provides manual bias, varying the gain of the receiver.
	SPEAKER PHONES	S4A	Permits either headphone or speaker operation.
	METER SW.	S3A	Connects the meter to various circuits to obtain L.T., H.T., and cathode voltage readings. Also connects meter to the cathode circuit of V1D to give an indication of tuning.
	C.W. NOTE FILTER	S4C	Switches into 1st audio amplifier circuit a filter network to clarify the C.W. note.
	NOISE LIMITER	S4B	Cuts down noise peaks by placing V2B between the detector and 1st audio amplifier.
	MODE OF OPER	S2A	Permits either R/T or C.W. operation by switching off or on the B.F.O. Also provides either manual or automatic volume control.
	HET TONE	R23A	Varies the pitch of the C.W. note by varying the frequency of the B.F.O.
	A.F. GAIN	R50A	Varies the input to the grid of the output A.F. Amplifier to give suitable volume.
	FREQ CHECK	S7A	Switches the L.T. and H.T. circuits to the crystal calibrator.
Aerial Tuning Coil	AERIAL TUNING	L45A	Tunes aerial to resonate at the transmitter frequency.

TECHNICAL

Sender

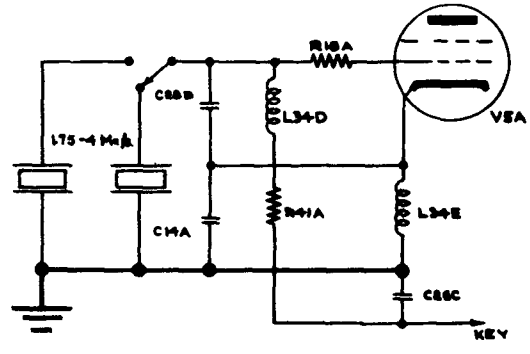
Master Oscillator, V5A (6V6G)

13. The master oscillator operates as a Hartley oscillator or as a Pierce (crystal controlled) oscillator, depending on the position of the XTAL 1—M.O.—XTAL 2 switch, S23A.



T F·612 / 1-3

FIG. 3—V5A AS A HARTLEY OSCILLATOR.



T F·612 / 1-4

FIG. 4—V5A AS A PIERCE OSCILLATOR.

14. On M.O. operation, the oscillator tank circuit, comprising L31A; C9A and C9B (17—540 μμfd. each), two sections of the ganged tuning condenser in parallel; and trimmers C6A (7—45 μμfd.) C6B (7—45 μμfd.) and C12A (150 μμfd.); may be tuned to any frequency between 1.75 and 4 Mc/s.
15. 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 connected to the junction of feedback condensers C28B (30 μμfd.) and C14A (150 μμfd.) and to ground through R.F. choke, L34E.
16. H.T. voltage is supplied for the screen and plate of V5A from the +300 V. line; V6A, a gaseous voltage regulator, being used to stabilize the screen voltage.
17. On Band 1, the R.F. developed in V5A is fed to the grid of V5B through coupling condensers C27D (500 μμfd.) and C11C (100 μμfd.) and parasitic suppressor, R10A (150 ohms). However, on Bands 2 and 3, a tuned circuit comprising L33A; C9C (17–540 μμfd.), a section of the ganged tuning condenser; trimmer C6C (7–45 μμfd.) and padder C28A (30 μμfd.); is placed in the plate circuit of V5A. This circuit may be tuned from 3.5 to 8 Mc/s., double the frequency of the oscillator, the second harmonic of the R.F. developed in the oscillator being applied to the grid of V5B.

Driver, V5B (6V6G)

18. On Bands 1 and 2, the output of the master oscillator is amplified by the cathode-biased, shunt fed driver, V5B, and applied to the grid of the power amplifier. On Band 3, the input frequency to V5B is doubled in the plate tuned circuit and applied to the grid of the intermediate power amplifier, which, in turn, drives the P.A. stage.

Intermediate Power Amplifier V5C (6V6G)

19. V5C, a cathode-biased, shunt fed intermediate power amplifier, is used to drive the P.A. stage on Band 3 only, since, on this band, V5B is used as a frequency doubler. The plate tuned circuit is resonated by C17A (330 μμfd.), the I.P.A. 7-16 control.

Speech Amplifier, V1J (ARP 3)

20. The set is designed to use a dynamic microphone (Microphone and Receivers Headgear No. 1 Canadian). The microphone voltages are applied through microphone transformer, T2A, to the cathode-biased speech amplifier valve, V1J, where amplification takes place. The output of V1J is resistance-coupled to the grid of the modulator valve.
21. In an emergency a carbon microphone may be used, microphone current being supplied through R47C (50,000 ohms) from the filament to V7A. C19C (100 μfd.) acts as an audio filter.

Modulator & M.C.W. Oscillator, V5D (6V6G)

22. On R/T, the cathode-biased, series fed modulator, V5D, amplifies the audio output of V1J, and modulates the grid of the P.A. valve, V5D being inductively coupled to the P.A. stage by the modulator transformer, T3A. The primary of T2A is coupled to T3A producing inverse feedback. R31D (10,000 ohms) is a feedback limiting resistor.
23. On M.C.W. and C.W., the MODE OPER switch, S16A, removes the H.T. from the screen and plate of V1J and converts V5D to a Hartley oscillator at 1000 cycles. On M.C.W. the grid of V7A is modulated from the secondary of T3A through Section 4 Front of S16A. Sidetone is provided by the sidetone winding of T3A. On C.W., V5D acts as a source of sidetone only, V7A grid being connected to the zero signal side of T3A secondary by Section 4 Front of S16A. The stage is keyed by grounding the centre tap of L42A.

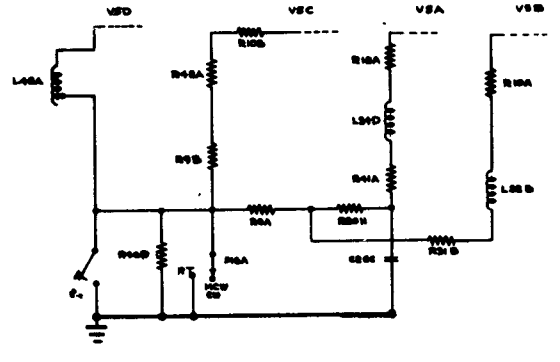
Power Amplifier, V7A, (813)

24. As the filament of V7A requires 10 V., R1A (.4 ohms) is used to drop the voltage from the 12 V., L.T. supply. 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 high, medium or low power output by successively increasing the P.A. grid bias and simultaneously lowering the plate and screen voltages of the audio valves.
25. A bleeder network consisting of R53A-B-C-D (250,000 ohms each) prevents V7A from oscillating when switching from send to receive. While the dynamotor is slowing down, it still delivers voltage to the 813 valve, making this bias necessary.
26. On Band 1, the P.A. plate tuned circuit consists of L40A, L38A and the P.A. TUNE condensers, C16A-B (13–215 μμfd., each section). L40A is shorted out of the circuit by the band switch on Band 2. On Band 3, L39A replaces L38A. The loading effect of L38A or L39A may be varied by the appropriate P.A. LOADING control. A part of these coils can be short-circuited, S18A being operated by a cam on the P.A. TUNE condenser shaft, so that at the higher frequencies the inductance of the coil is lowered.

27. 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. The time constant of the output filter is chosen so that the meter reading is nearly proportional to the peak R.F. current. Therefore, the meter reading increases during modulation. The AE. SENS. switch, S19A, controls the resistance in series with the meter.

Keying

28. On M.C.W. and C.W. operation, one end of the 1430 V. supply is not grounded, but is returned to ground through R46A (40,000 ohms), and R34A (10,000 ohms). Either R21A (1,500 ohms) or R40A (15,000 ohms) is placed in parallel with R34A by one section of the MED-HIGH-LOW switch, S21A. 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 grounding the top of R46B and the grids of V5A and V5B through Section 2, S16A and the key. The centre tap of L42A is also grounded through Section 2 of S16A and the key, causing V5D to operate as a Hartley audio oscillator, and modulate the grid of V7A through Section 4, Front of S16A, on M.C.W. only.



T F·612 1-5

FIG. 5—SIMPLIFIED KEYING CIRCUIT.

Break-In Operation

29. Break-in operation is accomplished through the functioning of two relays; the muting-relay, S5A, in the receiver and the aerial transfer 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. On pressing the key, S5A grounds the receiver aerial post and applies a negative bias from the −1430 V. line to the grid of the 2nd A.F. stage in the receiver. 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 plate of the power amplifier, V7A; shorts R46B, thus lifting the killing bias on the grids of V5A and V5B; and transfers the phones from the receiver output to the sidetone secondary of V5D output transformer, T3A.

Receiver

R.F. Amplifier, V1A (ARP3)

30. The input to the tuned R.F. amplifier is taken from the P.A. tank circuit in the sender. When the sender tank circuit is tuned to the receiver frequency, its resonant characteristics contribute to the image frequency attenuation and slightly to the sensitivity. A gas-filled discharge gap, SG1, is connected across the input terminals.

31. The BAND switch, S6A, selects the appropriate permeability-tuned aerial transformer for the frequency desired, and tuning is effected by C4A (12–441 μμfd.), a section of the three-gang main tuning condenser.

32. The amplified output of V1A is inductively-coupled to the grid of the mixer valve; the R.F. transformer in use being tuned by C4C, a section of the ganged tuning condenser.

Conversion Oscillator, V1B (ARP3)

33. The oscillator valve ix connected as a triode in a Hartley circuit. Its frequency is always 420 Kc/s. higher than the signal frequency. Part of a small, tapped coil, L10A, is connected in series with the low potential end of each oscillator tank coil. The position of an iron core in this coil can be adjusted by turning the FREQ ADJ knob. This narrow range of control of inductance provides a vernier control of frequency. The range is not large enough to cause serious mistracking in the R.F. tuned circuits. The oscillator tank circuit is tuned by C4B (12–441 μμfd.), a section of the ganged tuning condenser. The R.F. developed in this stage is taken from the cathode and fed to the suppressor grid of the mixer valve.

Mixer, V1C (ARP 3)

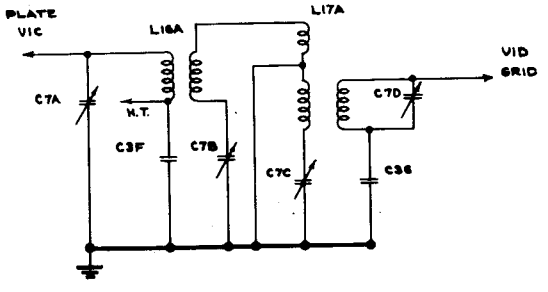
34. The output of the mixer valve at 420 Kc/s. is fed through a shielded lead to the primary of the input I.F. stage.

I.F. Channel

35. There are two stages of I.F. amplification coupled by pairs of I.F. transformers arranged as band pass filters.

36. The band width of the I.F. channel may be changed from narrow to broad by means of the SELECTIVITY switch, SA1.

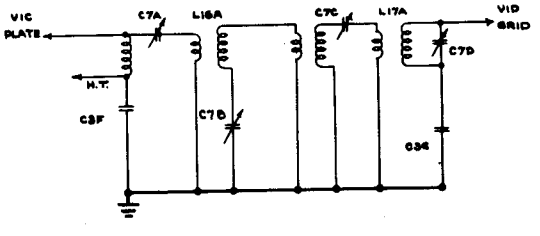
37. With S1A at SHARP position, the primary of L16A is loosely, inductively coupled to the secondary. The secondary of L16A is link-coupled to the primary of L17A, which is inductively coupled to the secondary of L17A. This results in a band width of less than 7 Kc/s. (See Fig. 6).



T F·612 1-6

FIG. 6—BAND PASS FILTER (S1A AT SHARP).

38. With S1A at FLAT, the primary of L16A is link-coupled as well as inductively coupled to the secondary of L16A. The tighter coupling between primary and secondary of L16A, and the fact that the primary is slightly detuned due to the addition of the coupling coil, results in a greater band width. (See Fig. 7).



T F·612 1-7

FIG. 7—BAND PASS FILTER (S1A AT FLAT).

39. The second band pass filter, L18A–L19A, is similar to that described in Paras. 37 and 38.

40. V1D and V1E, type ARP3 valves, are used in conventional I.F. amplifier circuits.

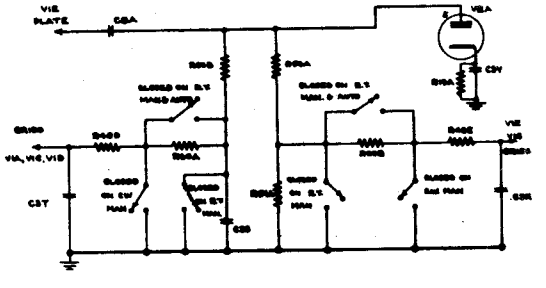
Detector—A.V.C., V2A (12Y4 or ARDD1)

41. The output of V12 is fed through the single, tuned I.F. output transformer, L20A, to the detector diode of V2A, where it is rectified. The audio signal is fed to the grid of V1G, the 1st A.F. amplifier.

42. A portion of the output of V1E is coupled to the A.V.C. diode of V2A through C8A (50 μμfd.). No rectification takes place until the I.F. voltages applied to the A.V.C. diode plate are great enough to overcome the positive potential placed on the cathode by R19A (600 ohms), in the cathode of V1H. Thus, no bias voltage is developed until the signal input reaches a predetermined level (delayed A.V.C.).

43. When the strength of the incoming signal is sufficient to cause rectification at the A.V.C. diode, a negative voltage will built up at the plate end of the A.V.C. load resistors, R56A (500,000 ohms) and R54A (250,000 ohms). 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. R60A (4 meg.) and R60B (4 meg.) are used to increase the time constant on C.W. AUTO operation, so the A.V.C. voltage does not follow the large input changes between key up and key down conditions.

44. When the MODE OF OPERATION switch, S2A, is at C.W. MAN position, both A.V.C. lines are grounded and the gain is controlled manually by the H.F. GAIN control, R33A (10,000 ohms). At C.W. AUTO position, A.V.C. voltage is applied to all the valves mentioned in Para. 43. When S2A is at R.T. AUTO, A.V.C. voltage is applied to these same valves but R60A and R60B are shorted out of the circuit reducing the time delay. In the R.T. MAN. position, both A.V.C. lines are again grounded.



T F·612 1-8

FIG. 8—SIMPLIFIED A.V.C. CIRCUIT.

1st A.F. Amplifier, V1G (ARP 3)

45. The 1st audio amplifier stage is resistance-coupled to the audio output stage, R50A (100,000 ohms), the A.F. GAIN control, varies as desired the amount of audio fed to the grid of V1H.

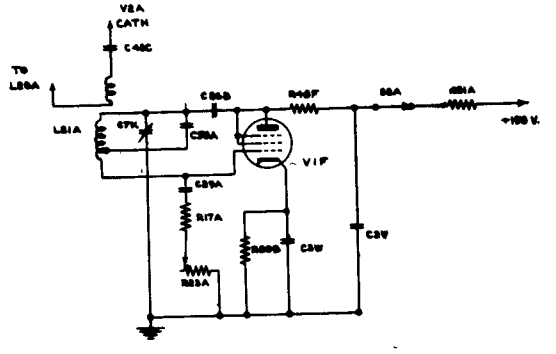
Audio Output Amplifier, V1H (ARP 3)

46. On M.C.W. and C.W. break-in operation, a negative bias from the −1430V. line is applied to the grid of V1H when the key is pressed.

47. The amplified output of V1G is fed to the primary of the audio output transformer, T1A, and the voltages induced in the secondary are fed to the speaker or headphones depending on the position of the SPEAKER-PHONES switch, S4A.

Beat Frequency Oscillator, V1F (ARP 3)

48. V1F is connected as a triode in a shunt-fed, modified Hartley circuit. The frequency may be varied slightly by adjusting the HET TONE control, R23A (2,000 ohm potentiometer).

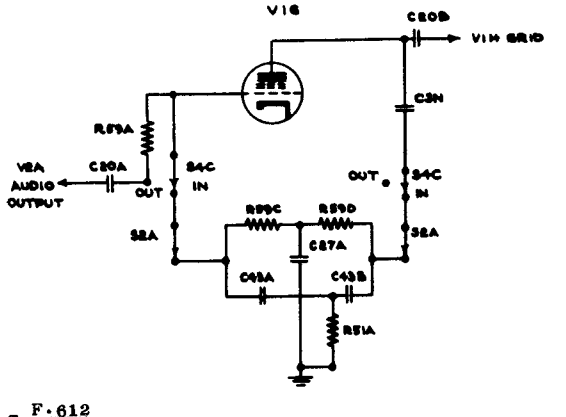


T F·612 1-9

FIG. 9—SIMPLIFIED B.F.O. CIRCUIT.

C.W. Note Filter

49. A small proportion of the audio output of the 1st audio amplifier, V1G, is taken from the plate, and, when S2A is in either of the C.W. positions and S4C is in the IN position, is fed back to the grid through a filter network 180° out of phase. The components of the filter network are of such a value as to allow through all signals except the desired one at 1000 cycles. Hence, signals of any other frequency are fed back and neutralize each other. R59A (1 meg.) is switched into the grid circuit of V1G to prevent this action carrying on into the previous stages of the receiver. The filter is composed of two opposite "T" pads in parallel. One pad is formed by R59D (1 meg.), C27A (500 μμfd.) and R59C (1 meg.); the other by C43B (250 μμfd.), R51A (150,000 ohms) and C43A (250 μμfd.). C3N (.1 μfd.) is a plate feedback coupling condenser.



T F·612 1-10

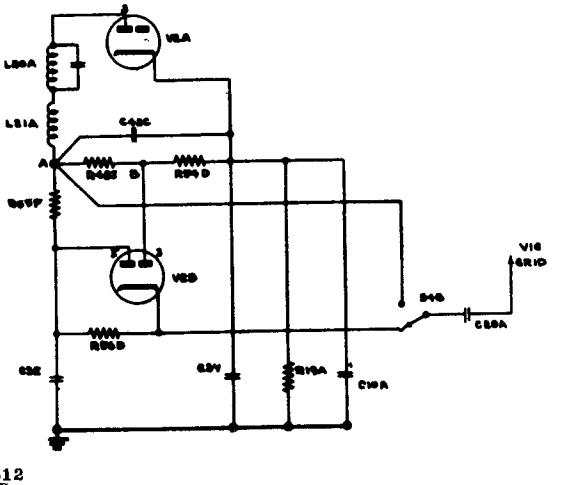
FIG. 10—C.W. NOTE FILTER.

Noise Limiter, V2B (12Y4 or ARDD1)

50. 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).

51. Assuming that no sudden noise peaks are present, that S4B is at IN position, and that the received signal is of sufficient strength to make point "A" (Fig. 11) 12 V. negatve; point "B" will then be 8 V. 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, diode 3 of V2B being 4 V. positive with respect to cathode, conducts and the audio voltages are applied to the grid of V1G.

52. If a noise peak occurs of sufficient strength to double the voltages across the diode load, point "A" will become 24 V. negative and point "B", 16 V. negative. Due to the long time constant of R59F and C3Z, the cathode of V2B cannot reach any new potential until approximately 1/10 of a second has elapsed. Thus diode 3 is negative with respect to cathode and does not conduct. At the same time diode 5 is at the same potential as the cathode and due to the initial velocity of electron emission (Edison effect) there will be a momentary flow of electrons to diode 5 which shunts R56D and grounds the A.F. line through C3Z, thus accelerating the cut-off of the noise peak.



T F·612 1-11

FIG. 11—NOISE LIMITER CIRCUIT.

Crystal Calibrator

53. The crystal calibrator is a miniature sender which includes three separate oscillators. The frequencies of these are 1000 Kc/s., 100 Kc/s. and 10 Kc/s. Each oscillator generates harmonics which are heard in the receiver. The three valves of the crystal calibrator are double triodes, type 12SC7.

54. Separate triodes of V3A are used for the 1000 Kc/s. and 100 Kc/s. oscillators. The frequencies are controlled by a dual frequency crystal which vibrates at 1000 Kc/s. in one direction and at 100 Kc/s. in another direction. The 100 Kc/s. is more accurate in frequency than the 1000 Kc/s. signal. It is provided with a frequency adjustment, C49A, which is set at the factory.

55. The 10 Kc/s. oscillator uses both triodes of V3B in a multivibrator circuit. The output voltage of the 100 Kc/s. oscillator is applied to one multivibrator plate and controls the frequency and the frequency of all its harmonics are as accurate as the frequency of the 100 Kc/s. oscillator.

56. The frequency at which the multivibrator is controlled depends upon the magnitude of the 100 Kc/s. voltage which is applied to it. At low voltages, the multivibrator oscillates at 9.09 Kc/s. As the control voltage is increased, a value is attained at which the multivibrator frequency suddenly alters to 10 Kc/s. As the control voltage is further increased a value is attained at which the frequency suddenly changes to 11.1 Kc/s. This control voltage can be adjusted by a potentiometer, R29A, which is properly set at the factory.

57. V3C is an output valve which separates the 1000 Kc/s. and 100 Kc/s. oscillator from their load, and, because it is itself a diode load, exaggerates the harmonic content of the signals.

58. When the calibrator is switched OFF it is severed from all voltage supplies.

Supply Unit

59. The supply unit comprises two distinct units; a dynamotor supply unit for the sender and a removable vibrator supply unit for the receiver.

60. The dynamotor unit consists of a low power and a high power dynamotor, starting and send-receive relays, filters, an exhaust fan, switches and leads necessary for voltage distribution. The L.P. dynamotor, MG1A, supplies 300 V., D.C. for all purposes in the sender except the P.A. plate and grid voltages. The H.P. dynamotor, MG2A, supplies 1430 V., D.C. for the P.A. plate and grid.

61. A thermostat mounted above the L.P. dynamotor closes when the temperature reaches 100°F. and starts the fans in the supply unit and the sender.

62. The NET switch starts the L.P. dynamotor and applies voltage to all stages of the sender except the power amplifier. The SEND RECEIVE switch operates a light duty relay which closes the 300 V. supply line to the sender, and closes the heavy duty relay which starts both dynamotors and applies voltage to the P.A. filament. The SENDER-HEATER switch controls the supply of voltage to all of the sender circuit. When it is OFF, only the receiver can operate.

63. The receiver supply unit contains an interrupter type vibrator, a step-up transformer, a full wave cold cathode rectifier V4A (OZ4A) and various input and output filters. F1B, the fuse in the input circuit which protects the transformer and battery, is mounted on the main panel.

TABLE 1001—DETAILS OF COMPONENTS (SENDER)

Circuit Ref.	Function or Value	Tol %	Rating
CONDENSERS			
C3AA–AF	.1 μfd	± 20	500 V.
C6A–C	7–45 μμfd. var		500 V.
C7L–N	100 μμfd. var	± 10	
C8C–E	50 μμfd	± 20	500 V.
C9A–D	540 μμfd. var		
C10B	12 μfd	+ 100 − 0	50 V.
C11C	100 μμfd	± 15	500 V.
C12A	150 μμfd	± 2	500 V.
C13A	150 μμfd	± 5	500 V.
C14A	150 μμfd	± 10	500 V.
C15A	500 μμfd	± 20	3500 V.
C16A–B	225 μμfd. var		
C17A	320 μμfd. var		
C18A	.005 μfd	+ 30 − 20	2500 V.
C19C–D	100 μfd	+ 50 − 10	15 V.
C20C	.01 μfd	± 20	600 V.
C26C–M	.002 μfd	± 20	500 V.
C27D–G	500 μμfd	± 10	500 V.
C28A–B	30 μμfd	± 5	500 V.
C32A	.01 μfd	± 20	500 V.
C35A	.001 μfd	± 20	500 V.
C36A	1.75 μfd	± 20	25 V.
C37A	.02 μfd	± 20	1000 V.
C38A	2. μfd	+ 100 − 0	400 V.
C39A	5. μfd	+ 50 − 10	300 V.
RESISTORS			
R1A	.4 ohms	± 5	40 W.
R2A	.84 ohms	± 2	½ W.
R3A	1.67 ohms	± 5	½ W.
R5A	8.5 ohms	± 5	½ W.
R6A	17 ohms	± 5	½ W.
R7A–E	50 ohms	± 20	½ W.
R8A	50 ohms	± 20	2 W.
R9A–B	100 ohms	± 5	½ W.

TABLE 1001—(Continued)

Circuit Ref.	Function or Value	Tol %	Rating
RESISTORS—(*cont'd.*)			
R10A–B	150 ohms	± 20	½ W.
R11A–B	200 ohms	± 10	½ W.
R12A	250 ohms	± 20	½ W.
R15A	350 ohms	± 10	50 W.
R16A	400 ohms	± 20	1 W.
R17B	500 ohms	± 10	¼ W.
R18A	500 ohms	± 20	½ W.
R20H–J	1000 ohms	± 10	¼ W.
R21A	1500 ohms	± 10	50 W.
R22A	2000 ohms	± 10	¼ W.
R24A	2500 ohms	± 10	10 W.
R26A	4300 ohms	± 10	25 W.
R27C–D	5000 ohms	± 20	¼ W.
R30A–B	7500 ohms	± 10	10 W.
R31B–D	10,000 ohms	± 20	¼ W.
R34A	10,000 ohms	± 10	10 W.
R37A	10,000 ohms	± 20	20 W.
R39A–C	15,000 ohms	± 20	2 W.
R40A	15,000 ohms	± 10	10 W.
R41A–B	20,000 ohms	± 20	½ W.
R42A	20,000 ohms	± 10	4 W.
R46A–B	40,000 ohms	± 15	1 W.
R47C	50,000 ohms	± 20	¼ W.
R48K–L	100,000 ohms	± 10	¼ W.
R49A	100,000 ohms	± 20	½ W.
R53A–D	250,000 ohms	± 20	2 W.
R56E	500,000 ohms	± 15	¼ W.
R57A–C	600,000 ohms	± 10	½ W.
R61A	1 megohm	± 20	¼ W.
CONNECTORS			
PL2A	8 pt. socket		
PL3A	7 pt. socket		
PL20A	Aerial socket		
PL21A	Tuning coil socket		
JACKS			
J1A	Microphone		
J1B	Key		

TABLE 1001—(Continued)

Circuit Ref.	Function or Value	Tol %	Rating
RECTIFIERS			
W1A	Copper oxide		
TRANSFORMERS			
T2A	Microphone		
T3A	Modulation		
T4A	Coupling transformer		
T5A	R.F. transformer		
INDUCTANCES			
L30B	R.F. choke		
L31A	M.O. coil		
L32A-B	R.F. chokes		
L33A	Tank coil, (Band 3)		
L33B	Tank coil (Band 2)		
L34A-E	R.F. chokes		
L35A	Tank coil (Band 1)		
L36A	Tank coil (Band 3)		
L37A	R.F. choke		
L38A	Tank coil (Band 2)		
L39A	Tank coil (Band 3)		
L40A	Tank coil (Band 1)		
L41A	R.F. choke		
L42A	M.C.W. tuning		
L43A	Tank coil (Band 3)		
L44A	Audio choke		
L45A	Aerial tuning coil		
VALVES			
V1J	ARP3 Microphone pre-amplifier		
V5A	6V6G Master oscillator-doubler		
V5B	6V6G Amplifier-double		
V5C	6V6G Intermediate power amplifier		
V5D	6V6G Modulator		
V6A	VR150-30 Voltage regulator		
V7A	813 Power amplifier		
SWITCHES			
S13A	Band change (R.F.)		
S15A	Band change (Output)		
S16A	Mode of Oper		
S17A	Aerial relay		
S18A	L/C ratio		
S19A	Ae. meter sensitivity		
S20A	Meter		
S21A	High-Med.-Low		
S22A	Gate		
S23A	M.O.-Xtal		

TABLE 1002—(Continued)

Circuit Ref.	Function or Value	Tol %	Rating
RESISTORS (*cont'd.*)			
R29A	5,000 ohms var	± 20	
R31A	10,000 ohms	± 20	¼ W.
R32A–C	10,000 ohms	± 20	¼ W.
R33A	10,000 ohms var	± 20	
R43A	25,000 ohms	± 20	¼ W.
R44A	30,000 ohms	± 15	1 W.
R45A	30,000 ohms	± 2	¼ W.
R47A–B	50,000 ohms	± 20	¼ W.
R48A–J	100,000 ohms	± 10	¼ W.
R50A	100,000 ohms var	± 20	
R51A	150,000 ohms	± 10	¼ W.
R52A	200,000 ohms	± 5	¼ W.
R54A–D	250,000 ohms	± 20	¼ W.
R55A–B	300,000 ohms	± 5	¼ W.
R56A–D	500,000 ohms	± 15	¼ W.
R58A	600,000 ohms	± 5	¼ W.
R59A–H	1 megohm	± 10	¼ W.
R60A–B	4 megohms	± 20	¼ W.
INDUCTANCES			
L1A	Antenna coil (Band 1)		
L2A	Antenna coil (Band 2)		
L3A	Antenna coil (Band 3)		
L4A	Detector coil (Band 1)		
L5A	Detector coil (Band 2)		
L6A	Detector coil (Band 3)		
L7A	Oscillator coil (Band 1)		
L8A	Oscillator coil (Band 2)		
L9A	Oscillator coil (Band 3)		
L10A	Oscillator frequency vernier		
L16A	1st I.F. transformer		
L17A	1st I.F. transformer		
L18A	2nd I.F. transformer		
L19A	2nd I.F. transformer		
L20A	Diode I. F. transformer		
L21A	B.F.O. coil		
L22A	Tank coil assembly		
L23A	Output choke		

TABLE 1002—(Continued)

Circuit Ref.	Function or Value	Tol %	Rating
VALVES			
V1A	ARP 3 R.F. amplifier		
V1B	ARP 3 Conversion oscillator		
V1C	ARP 3 Mixer		
V1D	ARP 3 1st I.F. amplifier		
V1E	ARP 3 2nd I.F. amplifier		
V1F	ARP 3 Beat frequency oscillator		
V1G	ARP 3 1st A.F. amplifier		
V1H	ARP 3 Output		
V2A	12Y4G (ARDD1) Detector—A.V.C.		
V2B	12Y4G (ARDD1) Noise limiter		
V3A	12SC7 Crystal oscillator		
V3B	12SC7 Multivibrator		
V3C	12SC7 Harmonic exaggerator		
SWITCHES			
S1A	Selectivity		
S2A	Mode of Oper		
S3A	Meter		
S4A	Speaker/Phone		
S5B	Noise limiter		
S4C	Tone filter		
S5A	Relay		
S6A	Wave change		
S7A	Crystal calibrator		
MISCELLANEOUS			
T1A	Audio output transformer		
SG1	100 W. neon discharge gap		
SPKR-1A	Speaker		
XTAL-1A	Crystal		
J2A	Headphone jack		
J2B	Headphone jack		
P1A	Pilot lamp		
P1B	Pilot lamp		
PL1A	Receiver connector		
PL19A	Aerial connector		
MA1	O-.5 mA. meter		

TABLE 1003—DETAILS OF COMPONENTS (SUPPLY UNIT)

Circuit Ref.	Function or Value	Tol %	Rating
CONDENSERS			
C3AG–AK	.1 μfd	± 20	500 V.
C5E–G	.5 μfd	± 20	100 V.
C18B	.005 μfd	+ 30 − 20	2500 V.
C19B	100 μfd	+ 50 − 10	15 V.
C20D–F	.01 μfd	± 20	600 V.
C23B	.004 μfd		1600 V.
C24B	.0075 μfd		1600 V.
C26N	.002 μfd	± 20	500 V.
C32B	.01 μfd	± 20	500 V.
C40A	2 μfd	± 20	600 V.
C41A	.5 μfd	± 20	2500 V.
C42A–B	20 μfd	+ 50 − 10	300 V.
RESISTORS			
R4C	8 ohms	± 10	5 W.
R13D–E	300 ohms	± 10	½ W.
R38A	10,000 ohms	± 10	8 W.
INDUCTANCES			
L11B	R.F. choke		
L12A	R.F. choke		
L14B	R.F. choke		
L24A	R.F. choke		
L25A	R.F. choke		
L26A-B	R.F. chokes		
L27A	R.F. choke		
L28A	Audio choke		
L29A	A.F. filament choke		
L30A	R.F. choke		
SWITCHES			
S8A	ON-OFF		
S8B	SENDER HEATERS OFF		
S8C	SEND-REC		
S9A	NET OFF		
S10A	Thermal switch		
S11A	Send-Rec. relay		
S12A	Send-Rec. filament relay		

TABLE 1003—(Continued)

Circuit Ref.	Function or Value	Tol %	Rating
CONNECTORS			
PL4A	L.T. input		
PL5A	Vibr. banana plug		
PL6A-B	Snatch plugs		
PL7A	Connector block		
PL8A	Connector block		
PL9A	Vibr. banana plug		
MISCELLANEOUS			
F1B	10 amp. fuse		
P1C	12 V. pilot lamp		
T7A	Power transformer		
4VA	OZ4A gaseous rectifier		
VIBR-1B	Nonsynchronous vibrator		
MG1A	300 V. dynamotor		
MG2A	1200 V. dynamotor		

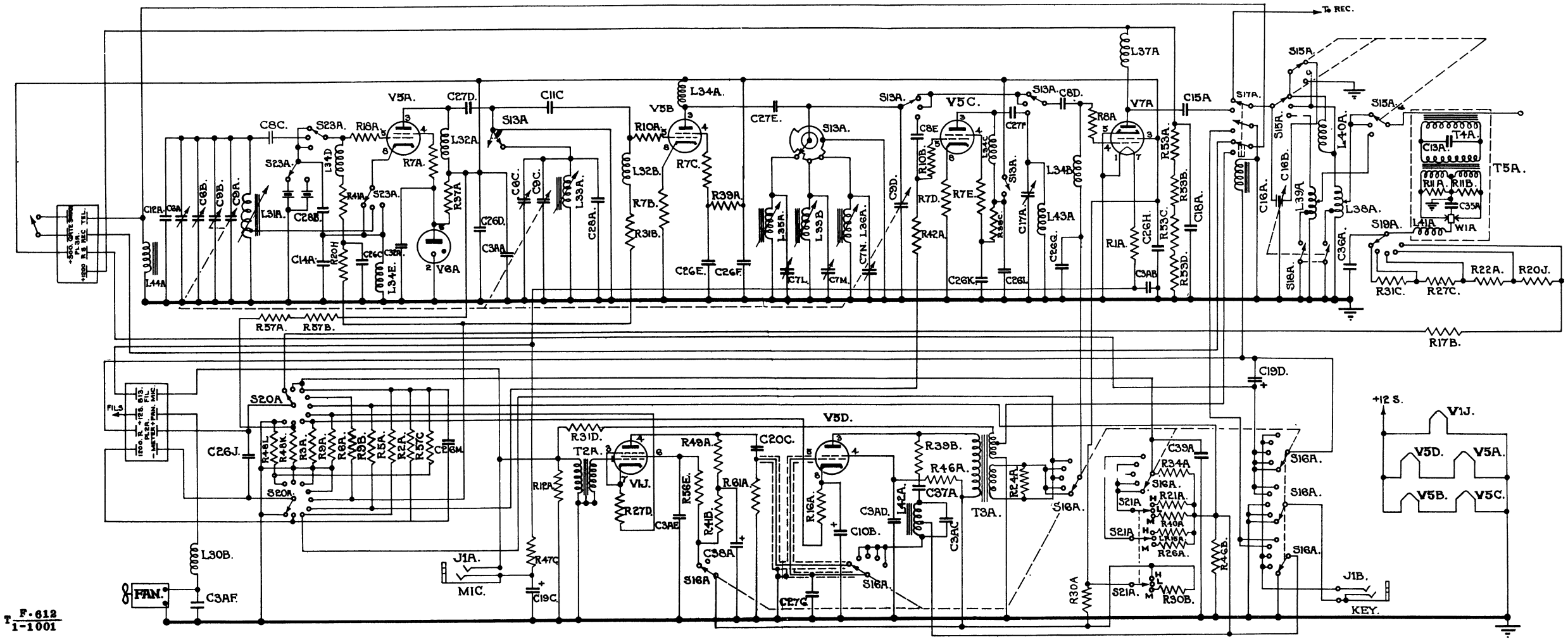
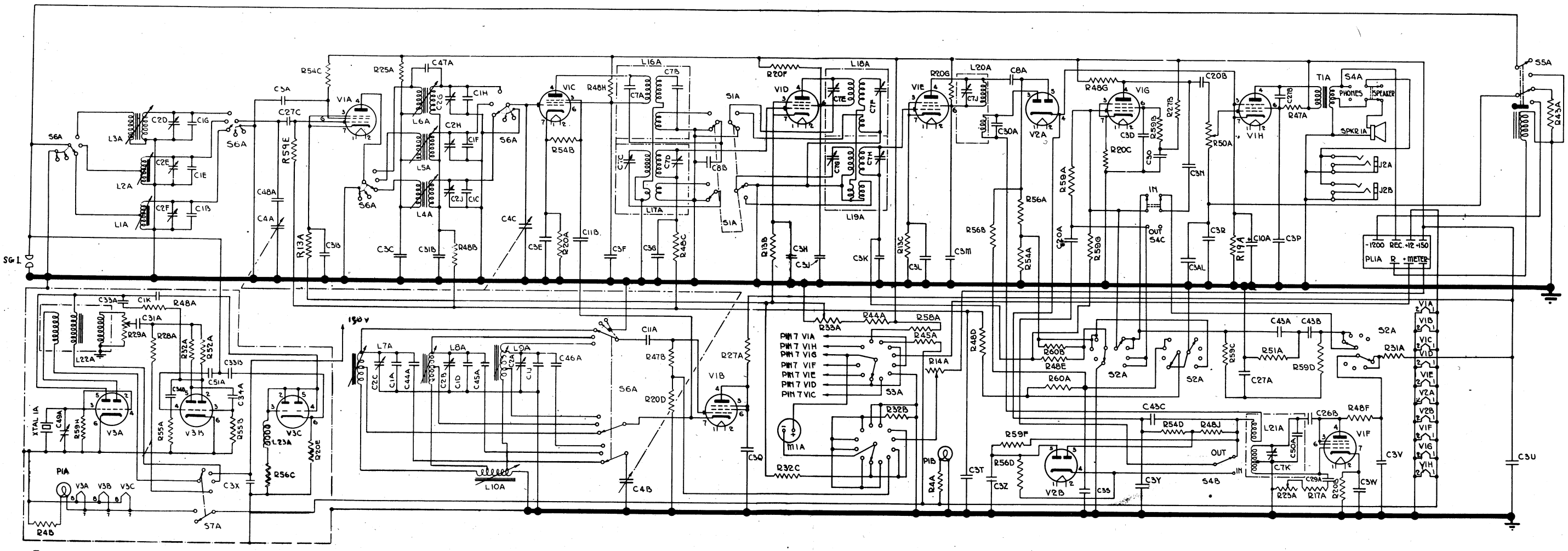
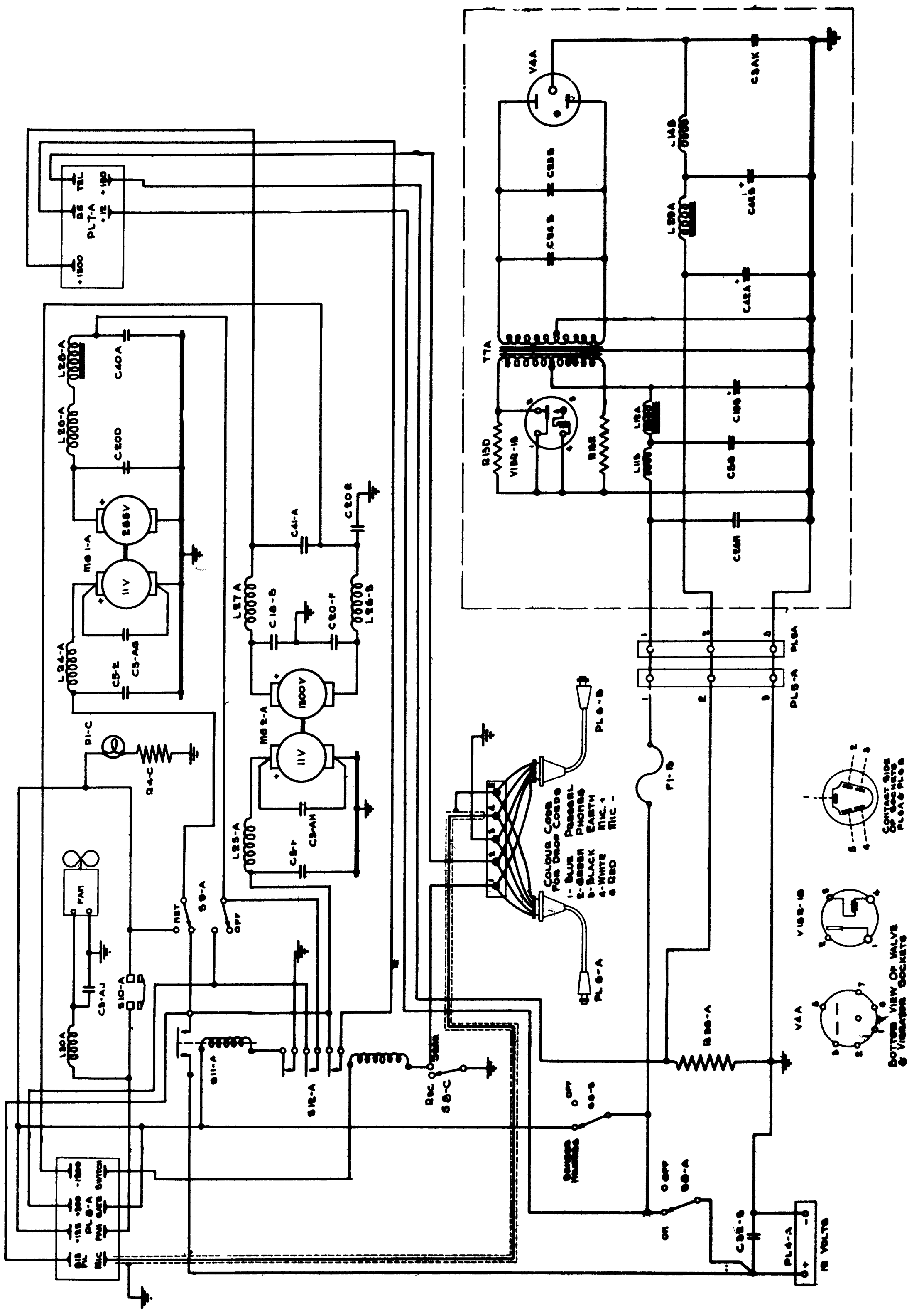


FIG. 1001—CIRCUIT DIAGRAM OF SENDER.



T F·612
1-1002

FIG. 1002—CIRCUIT DIAGRAM OF RECEIVER.



T F.612 / 1-1003

FIG. 1003—CIRCUIT DIAGRAM OF SUPPLY UNIT.

END