WIRELESS SET CDN. No. 9 Mk. I

2nd - 4th ECHELON WORK

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WIRELESS SET CDN. No. 9 Mk. I

2nd - 4th ECHELON WORK

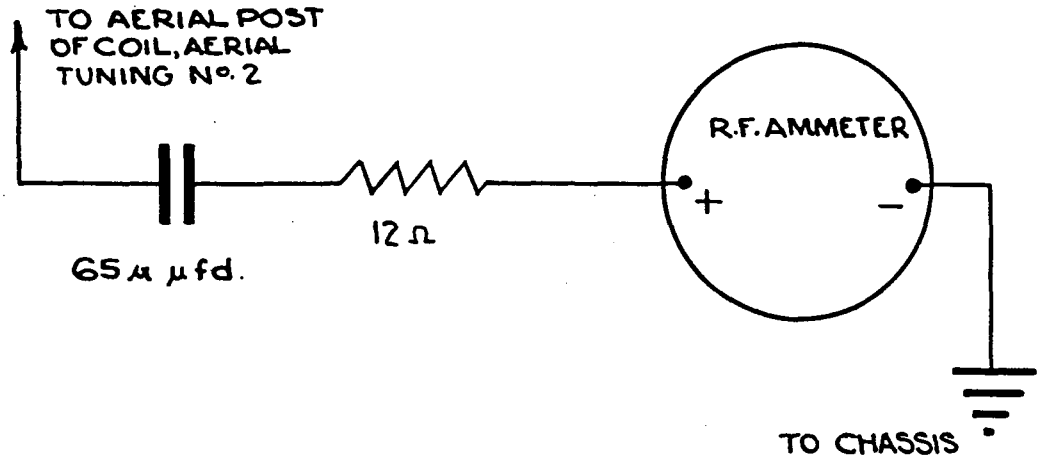
TESTING PROCEDURE

GENERAL

1. The following information is intended to serve as a guide to the location of faults that may occur during routine operation of the equipment. It is not intended to serve as a catalogue of the most likely faults to be encountered. Once a fault has been traced to any specific unit or part thereof, it will rest with the skill and ingenuity of the wireless mechanic to locate and correct the trouble. Extreme caution should be exercised when making all voltage tests as dangerous voltages are exposed. The absence of certain readings does not indicate that there is no voltage applied to the sender, but it does indicate that there is trouble of an uncertain nature, and for this reason, considerably more care than normal is required during the process of carrying out the various tests.

TEST EQUIPMENT REQUIRED

2. The following test equipment (or equivalent) may be used for testing the No. 9 set:—
   Generator, Signal Hickok No. 19X —ZB/C 00006
   Meter, Output power, G.R. No. 583A —ZB/C 00012
   Oscillator, B.F. Clough Brengle, No. 79E —ZB/C 00019
   Oscilloscope, CR. R.C.A. No. 151 —ZB/C 00021
   Test Set, Valve, Hickok No. 510X —ZB/C 00027
   Wavemeter, Type, TE-149
   Multimeter, Clough Brengle, No. 220 —ZB/C 00023
   Bulb, neon, 1 W.
   R.F. ammeter, 0-5 amps.
   Voltmeter, valve, Measurements Corp. No. 62
   Generator, Signal, Hickok, No. 188X (for F.M. Alignment).



T FZ 154/1 1-1 FIG. 1—MEASURING R.F. OUTPUT

SENDER

Visual Check

3. (a) Check for good electrical connections at the connector block and banana plugs.
   (b) Check operation of the gate safety switch.
   (c) Check operation of the aerial relay.

Voltage Tests

4. Check for proper voltage:
   (a) Between the +1000 and −1000 V. terminals on the connector block.
   (b) From the +200 V. terminal on the connector block to chassis.
   (c) From the R terminal on the connector block (+12 V. relay) to the chassis.

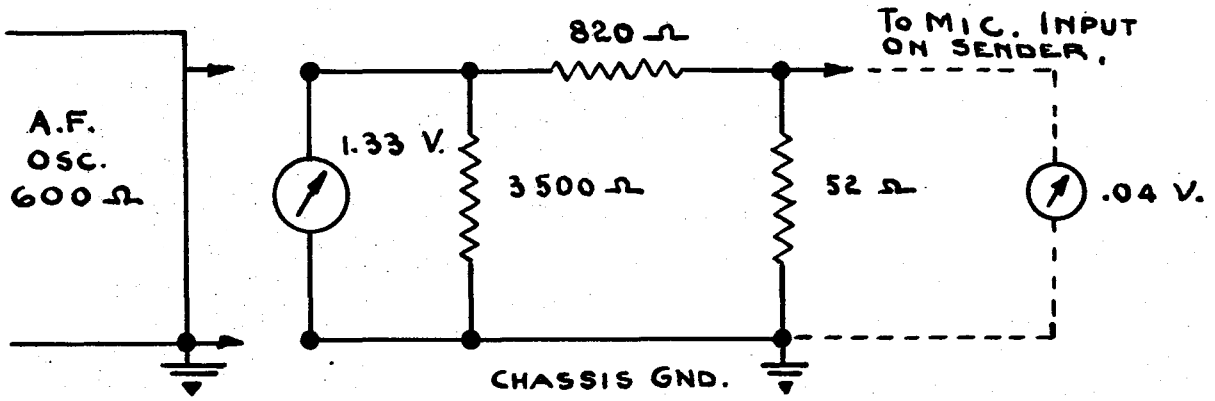


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FIG. 2—ATTENUATING NETWORK

Isolating Defective Circuit

5. If the fault is not discovered when making the visual check, or by taking spot voltage checks:
   (a) Check the operation of the M.O. stage by going on NET.
   (b) Check the operation of the Modulator with the receiver meter at the MOD. position.
   (c) Check the P.A. stage by testing for R.F. at the aerial with a neon bulb.

Component and Parts Test

6. Master Oscillator:
   (a) Check for +200 V. at Pins 3 and 4 of the M.O. valve. If there is no voltage present at these points check L16C for continuity, C3AB, C43A and C15B in the modulator unit for shorts.
   (b) Look for shorted condensers in the oscillator circuit.
   (c) Check R22A.
   (d) Check L16B and R9C.
7. Modulator Unit:
   (a) The shielding on the shielded wire used in the modulator unit may short to the inside wire. This can be checked by making a resistance test as shown in Table 1.

TABLE 1—MODULATOR UNIT RESISTANCE CHART

Selector Sw	High-Low Sw.	Resistance to Gnd. on Ohms from PL-21A, Pin No.			
		2	4	6	8
R/T	High	750	600	15000	50
	Low	10000	2100	4000	50
M.C.W.	High	4500	600	15000	5000
	Low	10000	2100	4000	5000
C.W.	High	150	150	15000	5000
	Low	10000	1700	4000	5000

   (b) Make the continuity tests outlined in Table 2. All readings should be zero ohms.
   (c) Check to see that the key and microphone are NOT plugged in. Check also for dirty contacts.
   (d) Check the HIGH-LOW switch for opens or shorts.

TABLE 2—MODULATOR UNIT CONTINIUTY TESTS

From	To
Term. 3, T3A	Term. 4, T3A
Term. 2, T3A	Term. 1, T3A
Term. 5, T3A	Term. 6, T3A
Term. 5, banana jack receptacle	Term. 3, banana jack receptacle. (Selector sw. at R/T).
Term. 5, banana jack receptacle	Term. 1, T3A
Term. 5, banana jack receptacle	Term. 2, T3A
Term. 5, banana jack receptacle	Pin 3, V3B
Term. 5, banana jack receptacle	Pin 4, V3B
Pin 5, V3B	Ground. (Selector switch at R/T).

8. Power Amplifier Unit:
   (a) Make the continuity test outlined in Table 3. All readings should be zero ohms.
   (b) Check between the plate cap of V4A and ground. This circuit should be open.
   (c) Check that the screen of V4A is not shorted to ground.
   (d) Check S12A for proper operation.

TABLE 3—P.A. UNIT CONTINUITY CHECK

From	To
Plate cap, V4A	+1000 V. term., connector block. (S10A closed).
Pin 5, V4A	Ground
Pin 3, V4A	+200 V. term., connector block.
Pin 4, V4A	(a) Term. 2, terminal strip A (rear of sender unit). (b) Term. 1, terminal strip B (rear of sender unit).
S12A	(a) Ground. (b) R term., connector block.
Stator plate, C42A	Ae. post on top of sender. (Channel Sw. to Channel A and S12A relay closed).
Stator plates C42B	Ae. post on top of sender. (Channel Sw. to channel B and S12A relay closed).

TABLE 4—SENDER RESISTANCE CHART

Selector Switch	Measure to Gnd. from Term. No. (See Fig. 5)	Resistance in Ohms	
		HIGH POWER	LOW POWER
R/T	A1	Infinity	Infinity
	A2	700	10,000
	A3	Infinity	Infinity
	A4	550	2,000
	A5	Infinity	Infinity
	A6	12,000	4,000
	A7	4	4
	A8	50	50
	2 of C33A	12,500	4,000
	1 of R19A	50	50

(Continued on Page 8)

Table 4—Contin'd.

Selector Switch	Measure to Gnd. from Term. No. (See Fig. 5)	Resistance in Ohms	
		HIGH POWER	LOW POWER
R/T	2 of R19A	50	50
	B1	800	Slightly less than 10,000
	B2	Infinity	Infinity
	B3	2	2
	B4	4	4
	−200 V., terminal block	Infinity	Infinity
	+12 V., terminal block	4	4
	R, terminal block (With 813 valve in socket)	.05	.05
	R, terminal block (with 813 valve out of socket)	50	50
	AE.	Infinity	Infinity
	ST, term. block	50	50
	MIC, term. block	4	4
	−1000 V., terminal block	550	2,000
	+1000 V., terminal block	Infinity	Infinity
	T5A	10 meg.	10 meg.
M.C.W.	A2	4,000	10,000
	A4	550	2,000
	A6	12,000	4,000
	A8	5,000	5,000
	2 of C33A	12,500	4,000
	1 of L16A	4,000	10,000
	B1	4,500	Slightly more than 10,000
	ST, terminal block	5,000	5,000
	−1000 V., terminal block	550	2,000
C.W.	A2	150	9,000
	A4	150	1,500
	A6	12,000	4,000
	A8	5,000	5,000
	2 of C33A	12,500	4,000
	1 of L16A	150	9,000
	B1	250	9,000
	ST, terminal block	5,000	5,000
	−1000 V., terminal block	150	1,650

TABLE 5—SENDER VOLTAGE CHART

Conditions:—
(a) R/T-MCW-CW switch at R/T.
(b) NET switch to OFF.
(c) HIGH-LOW switch to position shown.
(d) These average voltage readings were taken with a 5000 ohms per volt meter. Allow a tolerance of 20%.

Terminal (See Fig. 5)	Voltage to GND.	
	High	Low
A1	5.5	5.75
A2	–50	–85
A3	215	217
A4	–50	–80
A5	215	217
A6	0	0
A7	0	0
A8	0	0
B2	215	217
B3	5.75	5.75
B4	11	11
R19A-1	11	11
R19A-2	9	9
C32A-2	1,000	1,150
T5A	0	0
L17A-2	1,000	1,150
+200 V. term., PL4A	200	200
+12 V. term., PL4A	12	12
R term., PL4A	12	12
Pin 3, V3B (valve removed)	200	200
Pin 4, V3B (valve removed)	200	200
Pin 3, V3A (valve removed)	200	200
Pin 4, V3A (valve removed)	200	200

RECEIVER

General

9. If the receiver is not working and the cause is unknown:

(a) Check the connector block at the rear of the receiver unit for good electrical connections.

(b) Check the operation of all controls.

(c) Check set meter readings.

(d) Test for the proper voltage at the +150 V. terminal at PL-2A.

(e) Touch the grid caps, with the set on, working from the speaker towards the aerial. If no click is heard in the speaker when a grid cap is touched, it is an indication of a defect and the components of that stage should be checked.

Beat Frequency Oscillator

10. To check the operation of the B.F.O.:

(a) Turn the CW-R/T switch to the C.W. MAN position.

(b) Set tne SELECTIVITY switch to FLAT.

(c) Turn the H.F. GAIN control fully clockwise.

(d) Set the meter switch to TUNE.

(e) Set the FREQUENCY CHECK switch to 1000 Kc/s.

(f) Adjust the HET TONE control so that the white dot on the knob is opposite the black dot on the panel.

(g) Sweep the main tuning dial slowly from one end of the band to the other. If the B.F.O. is working properly a loud hiss will be heard in the headphones and there will be a considerable deflection of the meter needle at 2.0, 3.0, 4.0 and 5.0 Mc/s.

TABLE 6—RECEIVER VOLTAGE CHART

	Voltage to GND. from Pin No.						
Valve	1	2	3	4	5	6	7
V1A	12	0	3.5	120		120	3.5
V1B	12	0	110	110		110	2
V1C	12			50		50	2
V1D	12	0	3.2	115		115	3.2
V1E	12	0	3.1	115		115	3.1
V2A	12	0		4.3			
V1F	12	0	23	23		23	1.1
V1G	12	0	4.3	111		115	4.3

NOTE:—THESE VOLTAGES ARE TAKEN WITH THE VALVES IN THEIR SOCKETS AND THE SET OPERATING, AND WITH A 5000 OHM PER VOLT METER.

Progressive Resistance Analysis

11. To measure resistances in the receiver:

(a) Remove all valves.

(b) Turn all gain controls fully clockwise.

(c) Close all tuning condensers.

(d) Measure the resistances as outlined in Table 7. All readings are taken to chassis unless otherwise indicated.

(e) Short to ground the +12V. and the +150V. terminals.

(f) Turn S3E to MOD.

(g) Proceed with the resistance measurements as outlined in Tables 8 and 9.

TABLE 7—RECEIVER RESISTANCE CHART "A"

Terminal	Conditions	Resistance
SPKR.	S4A on PHONES	Infinity
	S4A on SPKR.	.95 ohms
AE.	S4B to NORMAL	1.2 ohms
	S4B to LONG	Infinity
S.T.	S3A to MOD.	300 ohms (Ohmmeter negative to Gnd.)
	S3A on "TUNE-BAT-HT1-TH2-BIAS"	Infinity (Ohmmeter netagive to Gnd.)
+150V.	S3A on "MOD-TUNE-BAT-HT2-BIAS"	50,000 ohms
	S3A on HT1	42,800 ohms
+12V.	Pilot light in. Flicks in S3A to "MOD-TUNE-BAT-HT2-BIAS"	30 ohms
	Pilot lights in. Flicks out	50 ohms
	Pilot lights OUT. Flicks out S3A to HT1.	30,000 ohms
TEL	S4A on SPKR.	Infinity
	S4A on PHONES	9.5 ohms
+200V.	S3A on "MOD-TUNE-BAT-HT1-BIAS"	Infinity
	S3A on HT2	600,000 ohms
BIAS	S3A on "MOD-TUNE-BAT-HT1-HT2"	Infinity
	S3A on BIAS	300,000 ohms

TABLE 8—RECEIVER RESISTANCE CHART "B"

VALVE	Switch Positions		Pin Nos.								
	S13A	S2A	1	2	3	4	5	6	7	8	Grid Cap
V1A (ARP3) R.F. Amp.	OFF	R.T.MAN.	0	0	300-8300 (R.F. Gain)	3000	—	3000	300		200,000
	OFF	C.W.MAN.									200,000
	OFF	C.W.AUTO									5.45 meg.
	OFF	R.T.AUTO									1.45 meg.
V1B (ARP3) Conversion Osc.	OFF	R.T.AUTO	0	0	5000	5000	—	5000	300		100,300
V1C (ARP3) Mixer	OFF	R.T.AUTO	0	0	100,300	50,000	—	50,000	1000		200,000
V1D (ARP3) 1st. I.F. Amplifier	OFF	R.T.AUTO	0	0	300-8300 (R.F. Gain)	3000	—	3000	300		200,000
V1E (ARP3) 2nd I.F. Amplifier	OFF	R.T. MAN.	0	0	300	3000	—	3000	300		100,000
	OFF	C.W.MAN.									100,000
	OFF	C.W. AUTO									4.6 meg.
	OFF	R.T.AUTO									600,000
V2A (ARDD1) 2nd Det., A.V.C.	OFF	C.W.MAN.	0	0	21,200	600	600,250				
	OFF	C.W.AUTO					750,000				
	OFF	R.T.AUTO					750,000				
	OFF	R.T.MAN.					278,500				
V1F (ARP3) B.F.O	OFF	C.W.MAN.	0	0	110,000	110,000	—	110,000	1000		2.2
	OFF	C.W.AUTO			Infinity						
	OFF	R.T.AUTO			Infinity						
	OFF	R.T.MAN.			Infinity						
V1G (ARP3) A.F. Output	OFF	R.T.MAN	0	0	600	6000	—	20,000	600		105,000
V5A (12SC7) Crystal Osc.	OFF	R.T.MAN	0	Inf.	500,000	500,000	Inf.	0	0	0	
	10 Kc/s.	R.T.MAN		27			132				
	100 Kc/s.	R.T.MAN					132				
	1000 Kc/s.	R.T.MAN.					Inf.				
V5B (12SC7) Multivi-brator	OFF	R.T.MAN	0	0	300,000	300,000	205,000	0	0	0	
	10 Kc/s.	R.T.MAN		15,000							
	100 Kc/s.			0							
	1000 Kc/s.			0							

TABLE 9—RECEIVER RESISTANCE CHART "C"

Component	Terminal	Check to	Resistance
L3A	1	Gnd.	0
L3A	2	Gnd.	Infinity
C4B	Stator	Gnd.	Infinity
S1A	Front section Blk.-Yel. lead	Gnd.	.8 ohms
S1A	Rear section Blk.-Yel. lead	Gnd.	.5 ohms
C38A	Bottom term.	Gnd.	500—2500 ohms (HET TONE)
T1A	2	Gnd.	4000 ohms
T1A	3	Term. 4, T1A	650 ohms
V5B	5	Left centre term., S4B	100,000 ohms

TABLE 10—RECEIVER COIL RESISTANCES

Coil	Winding	Resistance in ohms.
L1A	Primary	1.0
	Secondary	.25
L2A	Primary	1.5
	Secondary	.95
L4A	Selective Primary	9.0
	Selective Secondary	9.0
	Broad Secondary	.85
L5A	Broad Secondary	.85
	Selective Secondary	9.0
L4B	Selective Primary	9.5
	Broad Secondary	.5
L5B	Selective Secondary	9.0
	Broad Secondary	.5
L6A	Primary	9.5
	Secondary	3.0
L3A	Primary	.85
	Secondary	.5
L7A	Primary	3.0
	Secondary	8.0
T1A	Primary	4000
	Secondary	650
T2A	Primary	6000
	Secondary	60

SUPPLY UNIT

H.P. Dynamotor

12. If the H.P. dynamotor fails to start:

(a) Check the battery voltages and battery connections. Poor connections may cause H.P. dynamotor failure even though the L.P. dynamotor continues to operate.

(b) Check for continuity across the ON-OFF switch, S5A, with the switch closed.

(c) Check for continuity from S5A to ground, with the SEND-RECEIVE switch at SEND.

(d) Check for continuity from S5A to the R terminal, PL3A, holding S8A in with finger.

(e) Check for continuity across the thermal circuit breaker. Press in if necessary.

(f) Remove the H.P. dynamotor and check for continuity from +12 V. terminal to ground.

(g) Check for continuity from the +1000 to the −1000 V. terminal. These terminals are not grounded.

(h) Check from the +12 V. terminal of PL11A to ground to see if C35A is shorting.

(i) Check from the +1000 V. to the −1000 V. terminal of PL3A to see if C17B is shorting.

(j) Check from the +1000 V. terminal at PL3A to ground to see if C17A is shorting.

(k) Check from the −1000 V. terminal at PL3A to ground. This must be open.

(l) Hash or ripple will in all probability be caused by an open condenser, poorly seated brushes, or worn commutators.

L.P. Dynamotor

13. If the L.P. dynamotor is inoperative:

(a) Check to see that the correct voltage is being applied to the +12 V. input terminal at PL10A.

(b) Remove the L.P. unit from the case.

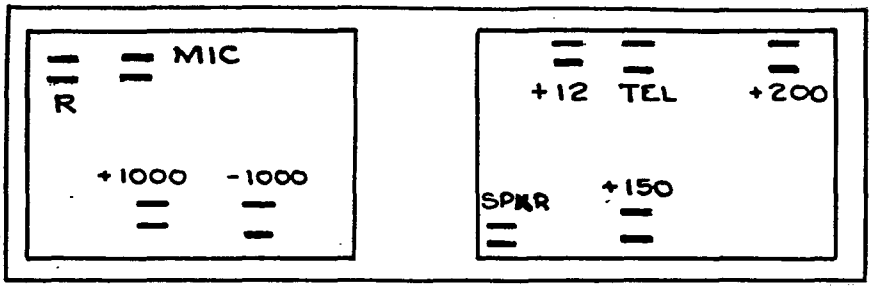
(c) Check across L8A, L9A, L10A, and L10B to see that they are not open.

(d) Check C3AA, C16A, C3X, C3Z, C3Y C20A for shorts. It will be necessary to remove the brushes to make a satisfactory check. If C3AA or C16A are found to be shorting, it will be necessary to recheck L8A. Also if either of these two condensers are shorting, it will be necessary to disconnect one end of one of them in order to determine the faulty condenser.

(e) Turn the NET switch to NET and check from the +200 V. terminal of PL2A to ground. This will show whether or not C15A is shorted.

(f) Check across C15C to see if it is shorting.

(g) Hash or interference will be caused by open condensers, poor brushes, or worn commutators.



T FZ 154/1 1-3 FIG. 3—CONNECTOR BLOCK PL1A, PL2A. (REAR OF SUPPLY UNIT)

TABLE 11—SUPPLY UNIT VOLTAGES

From	To	SEND-REC. Switch	NET Switch	When Input Voltage is:	Voltage read should be:
R	Gnd.	REC.	OFF	15	0
				13.5	0
				11.5	0
				10.5	0
R	Gnd.	SEND	OFF	15	14.5
				13.5	13.5
				11.5	11.5
				10.5	10.5
MIC.	Gnd.	SEND or REC.	OFF	15	0
				13.5	0
				11.5	0
				10.5	0
+1000	-1000	SEND	OFF	15	1700
				13.5	1600
				11.5	1350
				10.5	1225
+12	Gnd.	REC.	OFF	15	14.5
				13.5	13.5
				11.5	11.5
				10.5	10.5

(Continued on Page 14)

TABLE 11—(CONTINUED)

From	To	SEND-REC. Switch	NET Switch	When Input Voltage is:	Voltage read should be:
+12	Gnd.	SEND	OFF	15	15
				13.5	13.5
				11.5	11.5
				10.5	10.5
−150	Gnd.	REC	OFF	15	350
				13.5	305
				11.5	260
				10.5	250
−200	Gnd.	SEND	OFF	15	330
				13.5	300
				11.5	260
				10.5	240
−200	Gnd.	REC.	ON	15	330
				13.5	300
				11.5	260
				10.5	255

REMOVAL AND REPLACEMENT OF PARTS

GENERAL

14. (a) When it is necessary to remove parts from the set, tag all leads to facilitate replacement.

    (b) All wiring should be neat and short. Cable wiring should be suitably supported and laced. Where practicable, radio frequency leads should be self-supporting and should be kept clear of metal parts of other leads.

    (c) All soldering should be done neatly with the use of resin or resin and alcohol as a flux.

    (d) Boxes, chassis and soldered parts should be kept free from superfluous particles of solder, and other foreign materials.

    (e) All scratches on painted surfaces should be touched up with a similar paint.

SENDER

R/T MCW CW Switch

15. The removal procedure for S11A is obvious. However, one section of this switch may be removed without removing the whole switch. When soldering the leads, DO NOT hold the iron on the connections too long as the heat will damage the switch.

Aerial Meter

16. To remove the aerial meter:

    (a) Remove the bolts from the front panel of the P.A. unit.

    (b) Remove knobs and plates from the two channel tuning units.

    (c) Pull the P.A. unit panel forward to gain access to the connections at the rear of the meter. Remove these connections.

    (d) Remove the three screws on the front of the meter.

RECEIVER

Selectivity Switch

17. This switch may be removed in sections by taking off the rear angle plate and then sliding out the section. Avoid holding the soldering iron on the connections too long.

Receiver Tuning Unit

18. To remove the receiver tuning unit (See Fig. 4):

    (a) Set the main tuning dial to 5 Mc/s.

    (b) Unsolder the wire carrying voltage to the pilot lights.

    (c) Loosen the screw marked X.

    (d) Undo bolts, A, B, C, D and their counterparts on the other side of the unit.

    (a) Reverse the above procedure when replacing the unting unit.

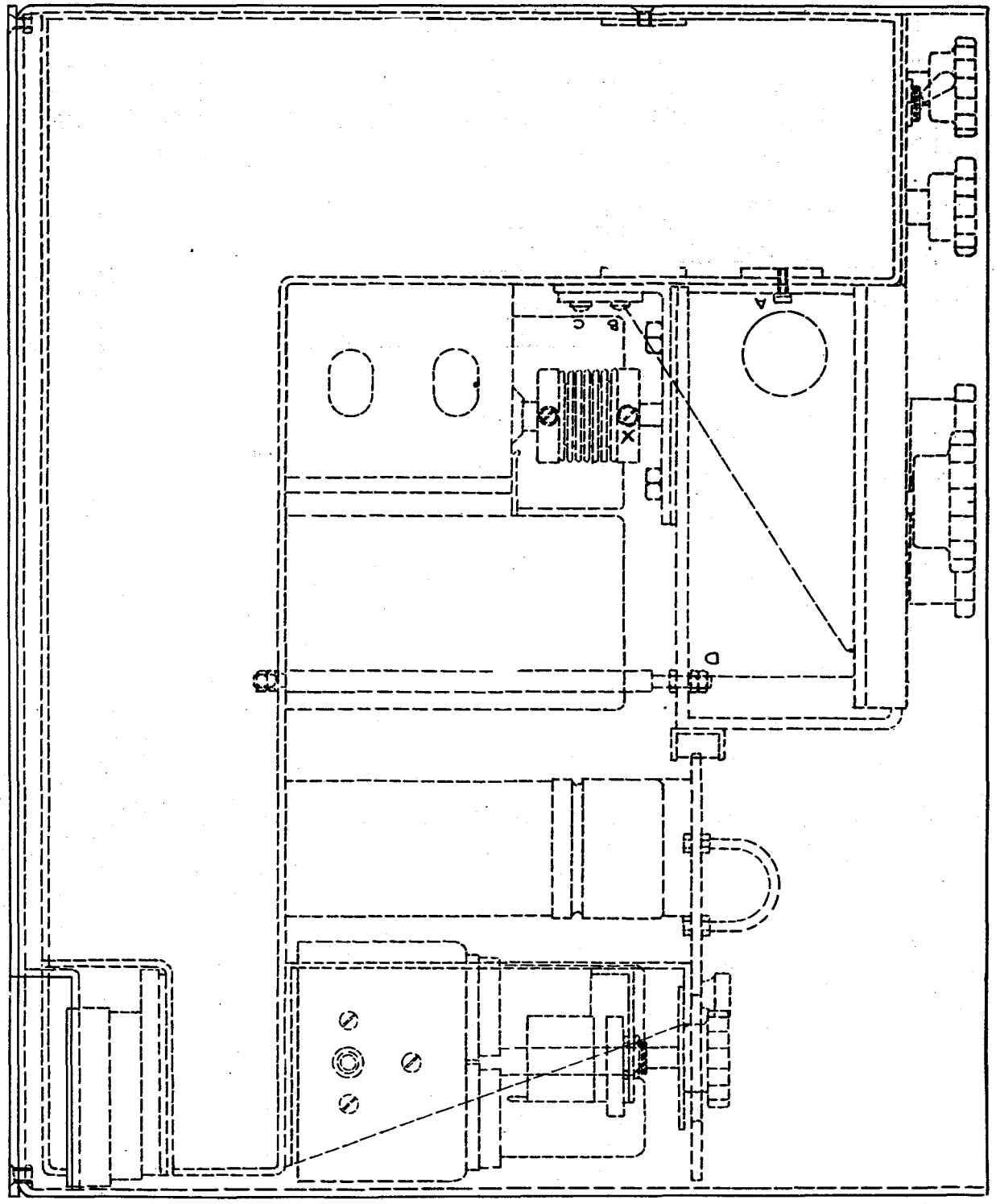
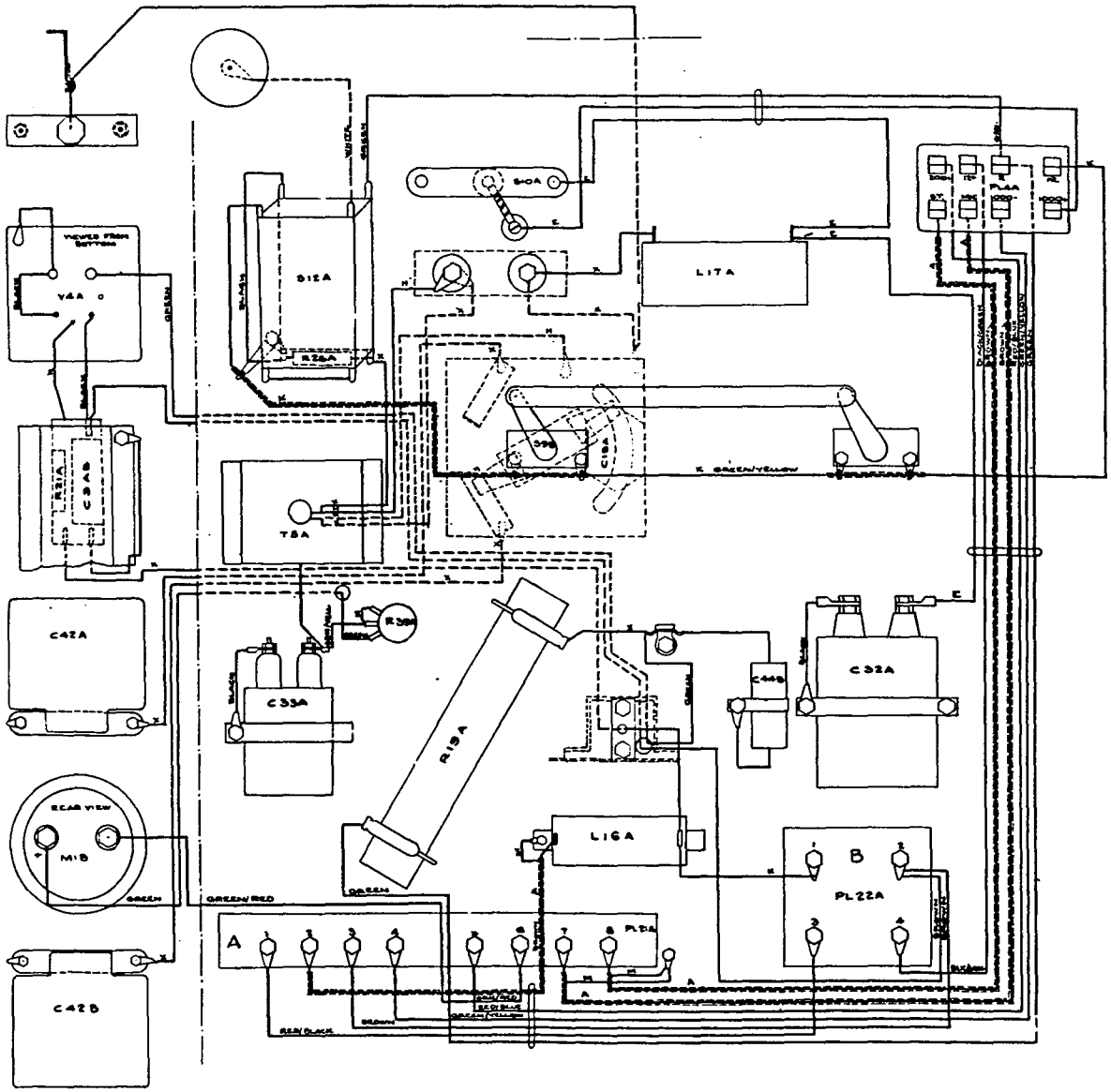


FIG. 4—SIDE VIEW OF RECEIVER



Leads marked "M" to be No. 20 B & S GE. bare tinned copper wire.

Leads marked "H" to be No. 18 B & S GE. bare tinned copper wire.

Leads marked "X" to be No. 14 B & S GE. bare tinned copper wire.

Leads marked "A" to be Northern Electric type R15131-62.

Leads marked "E" to be 70/.010 wire O.D. .275 ins. .082" rubber.

All other leads not otherwise specified to be 108-528 No. 20 B & S GE. in colors shown.

Lead marked "K" to be 108-528 B & S GE. and covered with varnished tubing 3 mm. black as shown.

Lead marked "F" to be copper braid GE. No. 24 x 2x .010" over 17 x .010" tinned—Lead to be left slack for grid cap movement.

Leads from P.A condensers C42A & C42B to band change switch S9B to be left slack.

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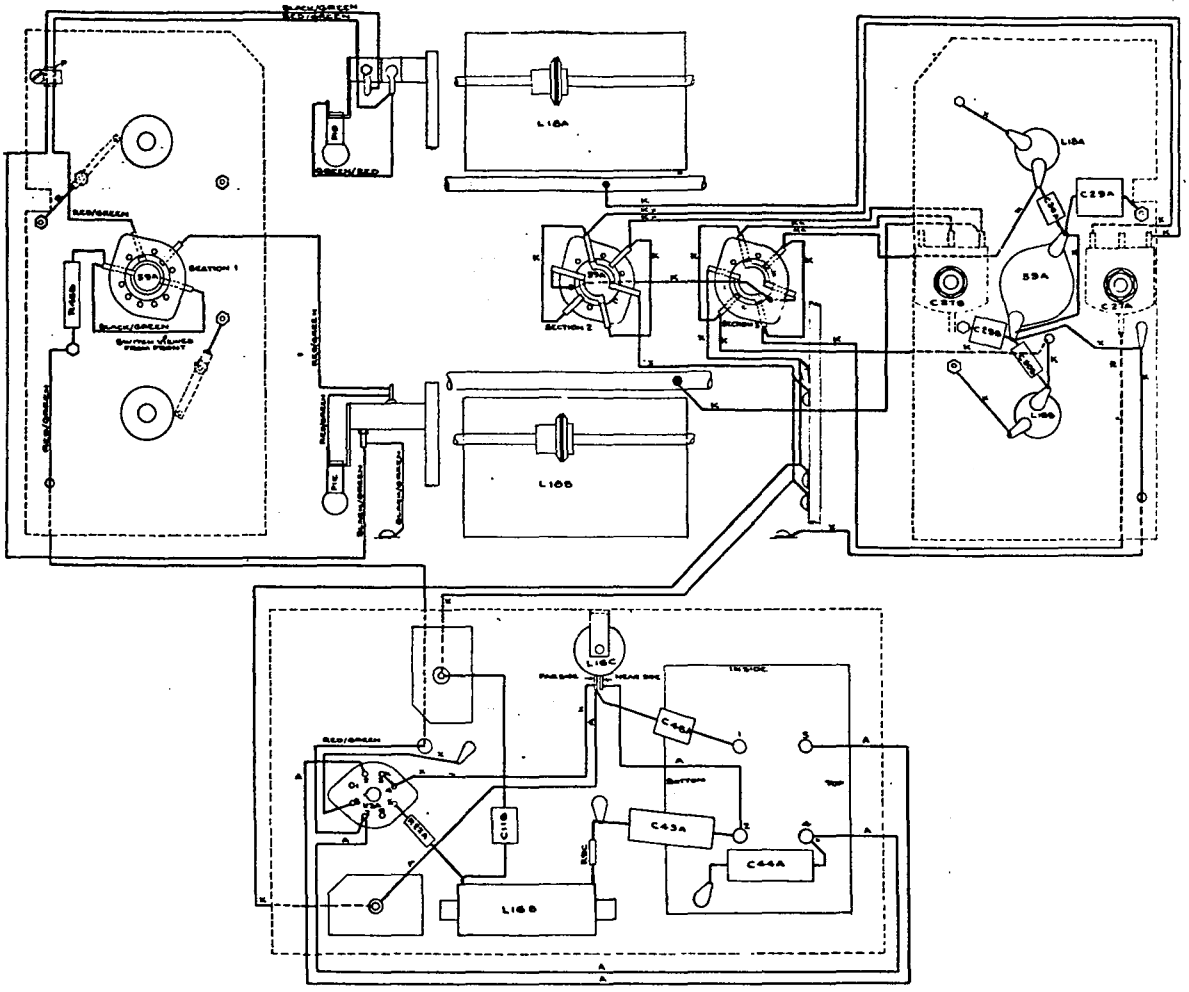
FIG. 5—WIRING LAYOUT, SENDER CHASSIS



NOTE:—Leads marked "K" to be No. 18 B & S GE bare tinned copper wire.

Leads marked "X" to be No. 14 B & S GE bare tinned copper wire.

Leads marked "R" to be No. 18 B & S GE bare tinned copper wire covered with Irv-o-lite tubing black imm-Xte 30.

Leads marked "A" to be No. 14 B & S GE bare tinned copper wire covered with Irv-o-lite tubing black Imm-xte 30.

Leads marked "P" to be covered with black varnished tubing 4 mm ¾" long.

All other leads not otherwise specified to be 108-528 No. 20 B & S GE in colours shown.

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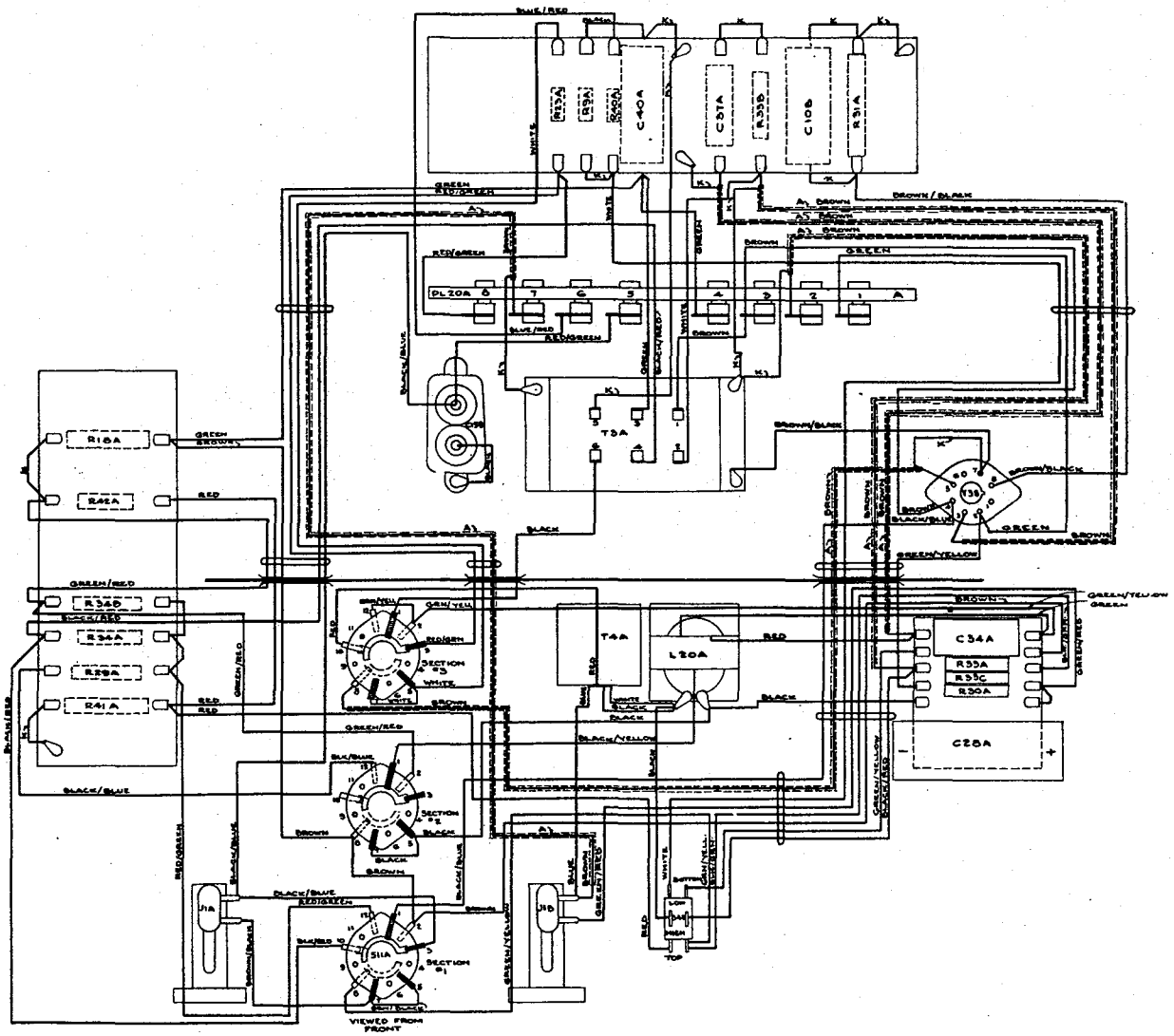
FIG. 6—WIRING LAYOUT, MASTER OSCILLATOR UNIT



NOTES:—

Leads marked "A" to be shielded cable Northern Electric type R15131-62.

Leads marked "K" to be No. 20 B & S GE. bare tinned copper wire.

All other leads not otherwise specified to be 108-528 No. 20 B & S GE in colors shown.

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FIG. 7—WIRING LAYOUT, MODULATOR UNIT

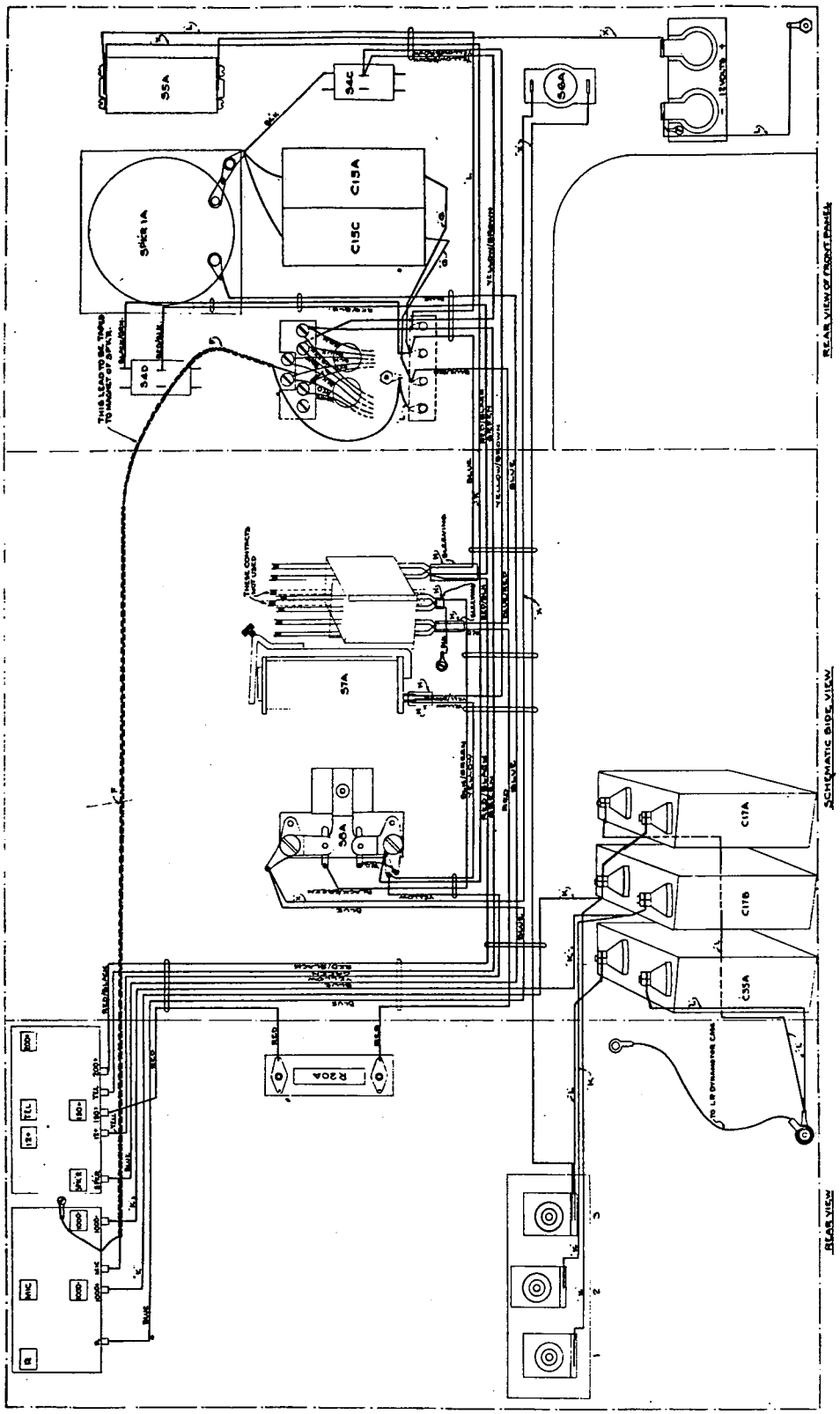
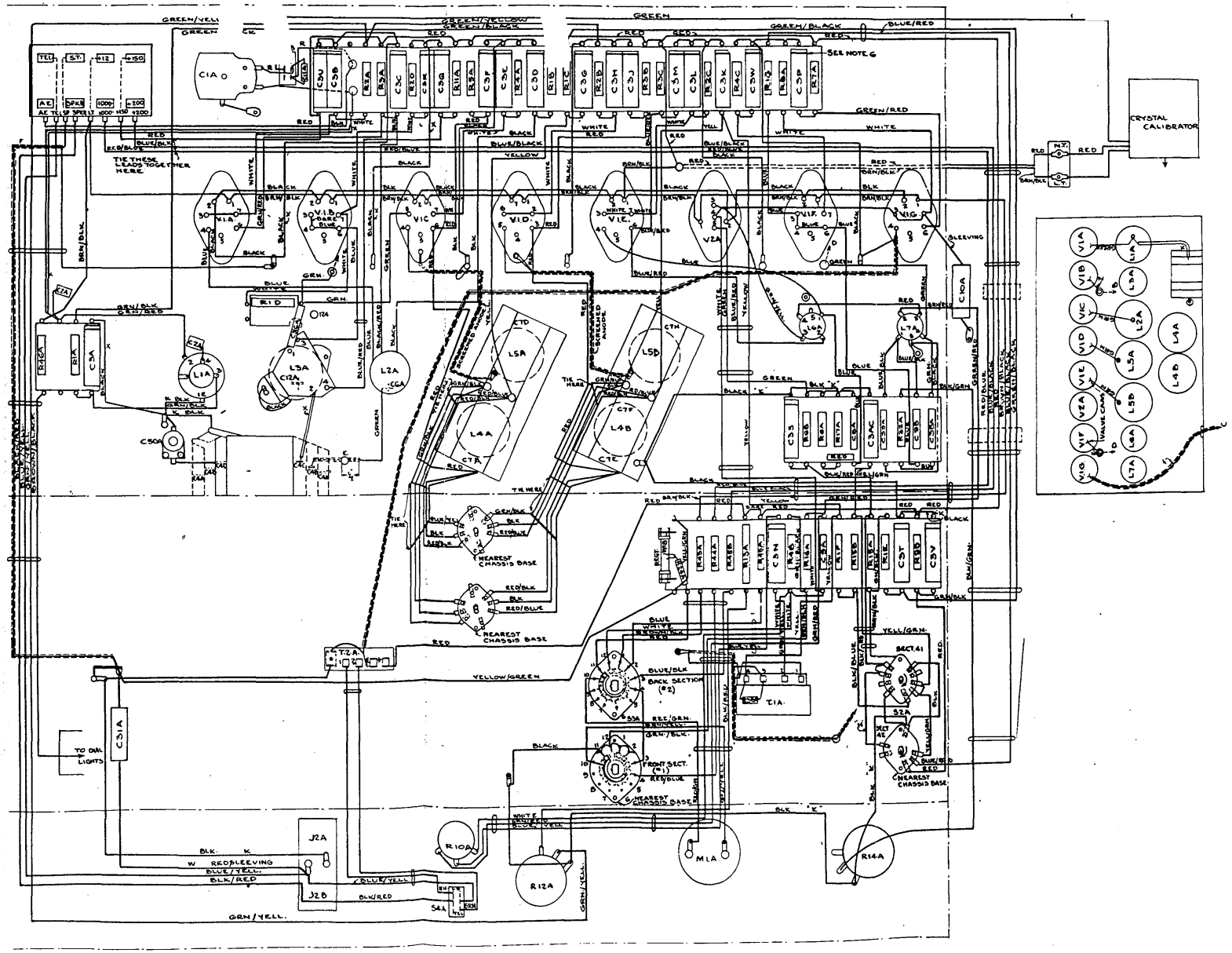


FIG. 9—WIRING LAYOUT, SUPPLY UNIT

T FZ 154/1 1-9



NOTES:—

Two leads marked "Z" to protrude 5″ from base of the chassis and to be knotted on rear. One lead marked Y to be 3½″ long, and lead marked "F" to be 7½″ long.

Leads marked "XX" to be No. 14 B & S GE. bare tinned copper wire covered with 3 mm. xte 30 tubing.

Wires marked "K" to be No. 20 B & S GE. BTC wire covered with 1 mm. black Xte tubing.

Wires marked "W" to be No. 20 B & S GE. BTC wire covered with 1 mm. red Xte tubing.

All other wiring not otherwise specified to be 108-528 No. 20 B & S GE. in colours shown.

At points marked, wires to be taped together with ½″ wide white cotton tape and clamped on chassis by cleats provided, to be wires in accordance with sample.

Line across end of C3 by pass condensors indicate outside foil.

Leads marked "F" to be shielded wire R15162-61.

Leads marked "R" to be covered with 3 mm. black Xte 30 tubing.

FIG. 8—WIRING LAYOUT, RECEIVER

ADJUSTMENT AND REALIGNMENT

SENDER

General

19. It is necessary to realign the sender on both the "A" and the "B" band. Since both bands are the same, the procedure outlined in the following paragraphs applies to either band.

20. As the receiver employs a crystal calibrator, it is not necessary to use any other equipment to realign the sender providing the complete No. 9 set is available. However, two methods of sender alignment are outlined in the following paragraphs; one, using a wavemeter and one using the No. 9 set receiver.

Mechanical Adjustments

21. Prior to aligning the sender:

    (a) Remove the M.O. unit from the sender case and loosen the two lock nuts in the slotted shafts of the two trimmer condensers, C27A and C27B.

    (b) Turn the tuning knobs right across the band, at the same time making certain that the contact wheel on both tuning coils travels the full length of the tuning coils.

    (c) Make sure that the pilot light is travelling in the right slot. If not, it is liable to jam the tuning control.

    (d) Replace the M.O. unit.

    (e) Take sender out of cradle and remove back plate. Return sender to cradle and tighten bonding bolts.

Sender Alignment

22. To align the sender, using the crystal calibrated receiver:

    (a) Set up the sender for R/T operation.

    (b) Turn the Receiver ON. Turn the CW - R/T switch to R/T MAN and the SELECTIVITY switch to SHARP.

    (c) Turn the FREQUENCY CHECK to 1000 Kc/s.

    (d) Turn the meter switch to TUNE.

    (e) Adjust the receiver main tuning dial for maximum meter reading at approximately 2 Mc/s.

    (f) Turn the crystal calibrator OFF and the NET switch to NET.

    (g) Set the master oscillator tuning dial to 2 Mc/s.

    (h) Adjust trimmer condenser, C27A (for A band) or C27B (for B band) for maximum on receiver meter.

    (i) Turn NET switch OFF.

    (j) Turn the receiver main tuning dial to 5 Mc/s.

    (k) Turn the crystal calibrator to 1000 Kc/s.

    (l) Adjust the receiver main tuning dial for maximum reading on the receiver meter.

    (m) Turn the crystal calibrator OFF and the NET switch to NET.

    (n) Turn the master oscillator tuning dial to 5 Mc/s. and adjust for maximum reading on receiver meter. Note the amount of error.

    (o) Remove the master oscillator unit from the case and adjust the M.O. dial to half the amount of error. Note the amount and the direction that the dial is turned.

    (p) Lift the spring gear behind the M.O. dial until the gear is out of mesh and turn the knob back in the opposite direction from the preceding step by the same amount so that the dial again reads 5 Mc/s. Lower the spring gear so that it engages the small gear on the shaft.

    (q) Repeat (n) to see if error has been halved.

    (r) Turn back to 2 Mc/s. and repeat the whole of the foregoing procedure until the master oscillator tracks properly.

    (s) When the alignment is completed, take the master oscillator unit out of the sender case and tighten up the lock nuts on the slotted shafts of the trimmer condensers. Take sender out of cradle and replace the back plate.

23. To align the sender, using a wavemeter:

    (a) Set up the sender for operation at 1.87 Mc/s.

    (b) Set wavemeter to receive a signal of 1.87 Mc/s.

    (c) Connect a dummy load consisting of 65 uufd. condenser and a 50 ohm resistor between the aerial post and ground. Have the resistor at the grounded side.

(d) Peak the sender at 1.87 Mc/s. by adjusting the trimmer C27A (on a band) or C27B (on B band).

(e) Turn the master oscillator tuning knob to 5 Mc/s. and adjust to peak by lifting the spring gear in the tuning mechanism and turning the dial slightly (See Para .22 (p).)

(f) Repeat several times, if necessary, to secure tracking at both ends of the dial.

(g) Tighten the lock nuts on the trimmer condensers when alignment is completed.

R. F. Output

24. To check the R.F. output:

(a) Connect an R.F. meter as illustrated in Fig. 1.

(b) Set up the sender for operation on 3.5 Mc/s.

(c) On HIGH power the output should be 1.44 amps. on M.C.W. and 1.82 amps. on C.W.

(d) On LOW power the output should be .81 amps. on either M.C.W. or C.W.

RECEIVER

Checking Audio Stage

25. To check the audio stage:

(a) Set the main tuning dial of the receiver to 3.5 Mc/s.

(b) Turn the H. F. GAIN and the OUTPUT controls fully clockwise.

(c) Set the SELECTIVITY switch to FLAT.

(d) Feed the output of the audio oscillator set at 400 c.p.s. through a .1 ufd. condenser to the points mentioned in (h) below.

(e) Connect an output power meter across the phone jack, and adjust for 100 ohm impedance.

(f) Adjust the input to obtain an output of 10 mW.

(g) Connect a V.T.V.M. at the output of the audio oscillator.

(h) With the audio oscillator at the points listed below, the input for 10 mW. output should be, approximately:

Grip cap, V1G..... .5 V.
Pin 7, V1G.....9.5 V.
Pin 4, V2A.....9.5 V.

I. F. Alignment

26. To align the I.F. stages:

(a) Set the signal generator at 420 Kc/s., 30% modulated by a 400 cycle note.

(b) Use an output power meter, set for 100 ohm load plugged into the phone jack.

(c) Set the SELECTIVITY switch to SHARP, the OUTPUT and H.F. GAIN controls fully clockwise, the CW - R/T switch to R.T. MAN. and the meter switch to TUNE.

(d) Remove the shield cap from V1E and feed the output of the signal generator to the grid cap of V1E through a .1 ufd. condenser. Adjust C7J for maximum output and replace shield cap on V1E.

(e) Remove shield cap from V1D and feed the signal generator output through a .1 ufd. condenser to the grid cap of V1D. Adjust, in order, C7H, C7G, C7F, and C7E for maximum output. Replace shield cap on V1D.

(f) Remove the shield cap from V1C and feed the signal generator output to the grid cap through a .1 ufd. condenser. Adjust, in order, C7D, C7C, C7B and C7A for maximum output. Replace shield cap.

(g) It may be necessary to readjust slightly the I.F. trimmers to obtain maximum output.

(h) Feed the output of the signal generator through a .1 ufd. condenser to the points shown below. The maximum allowable input for 10 mW. output read on an output meter adjusted for 100 ohms impedance is as follows:

Grid cap, V1E.....47,000 uV.
Grid cap, V1D.....1,300 uV.
Grid cap, V1C.....150 uV.
Grid cap, V1C (SELECTIVITY switch to FLAT).....100 uV.

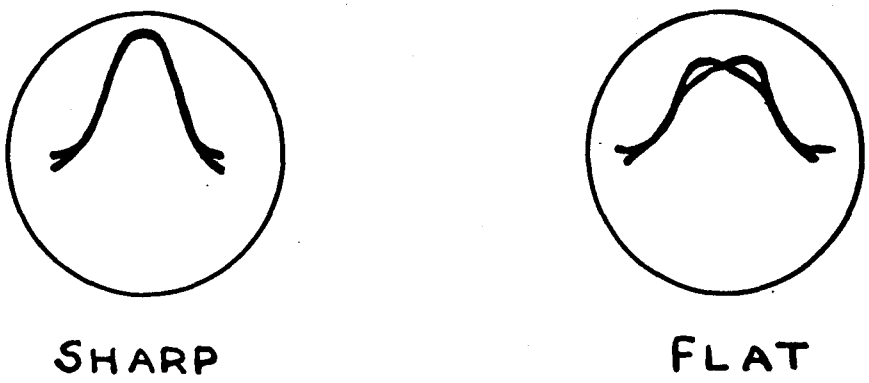
(i) With the SELECTIVITY switch to FLAT, there will be a reduction in the output but this should not exceed 10 Db.

Visual I. F. Alignment

27. To perform I.F. alignment using the oscilloscope:

(a) Set the signal generator to 420 Kc/s., frequency modulated by a 20 cycle note (or 25 cycle) with a 30 Kc/s. sweep.

(b) Set the frequency control on the oscilloscope to 50 -120 Kc/s. and turn the horizontal and vertical amplifiers ON. Connect EXTERNAL SYNC SIGNAL output of Generator to EXTERNAL SYNC terminal of C.R.O. and throw SYNC SWITCH of C.R.O. to EXTERNAL.



T FZ 154/1 1 - 10 FIG. 10—OSCILLOSCOPE PATTERNS (I. F. RESPONSE)

R. F. Alignment

28. (a) Set the SELECTIVITY switch to SHARP.

(b) Turn the CW R/T switch to R.T. MAN.

(c) Adjust the dial stop of the receiver main tuning dial so that the first line of the dial scale (below 2 Mc/s.) is directly below the dial pointer.

(d) Set the signal generator to 2 Mc/s. and feed the output through a 50 uufd. condenser to the aerial of the receiver.

(e) Connect an output power meter set for 100 ohm load to the phone jack of the receiver.

(f) Set the receiver main tuning dial to 2 Mc/s.

(g) Adjust in order L3A, L2A and C1A for maximum output.

(h) Turn the receiver and signal generator to 4.3 Mc/s.

(i) Adjust in order; C50A, C41B, and C41A for maximum output.

(j) Turn the receiver and the signal generator to 3.5 Mc/s. and check for tracking. It may be necessary to repeat the above procedure several times in order to get the set to work properly.

(k) Check the calibration of the receiver at 2, 3, 4, and 5 Mc/s. using the crystal calibrator at the 1000 Kc/s. position.

(l) Turn the crystal calibrator to 100 Kc/s. and check.

(m) Turn the crystal calibrator to 10 Kc/s. and check. There should be 10 beats exactly between each 100 Kc/s.

(n) Set the signal generator to 3.5 Mc/s., 30% modulated by a 400 cycle note.

(o) Feed the output of the signal generator to the AE. post through a 65 uufd. condenser. An input of 3 uV. should give 10 mW. output.

(p) Feed the output of the signal generator to the grid cap of V1A through a .1 ufd. condenser. 12 uV. should give an output of 10 mW.

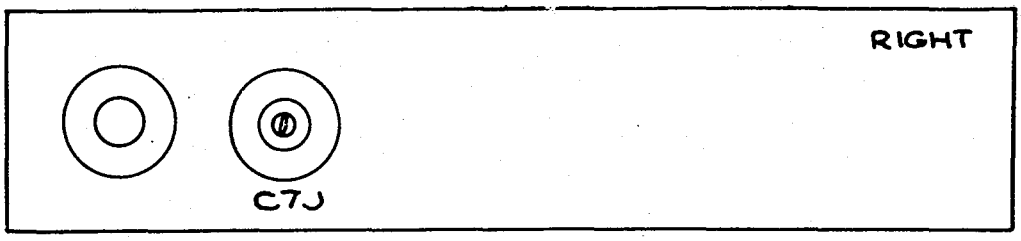
B.F.O. Adjustment

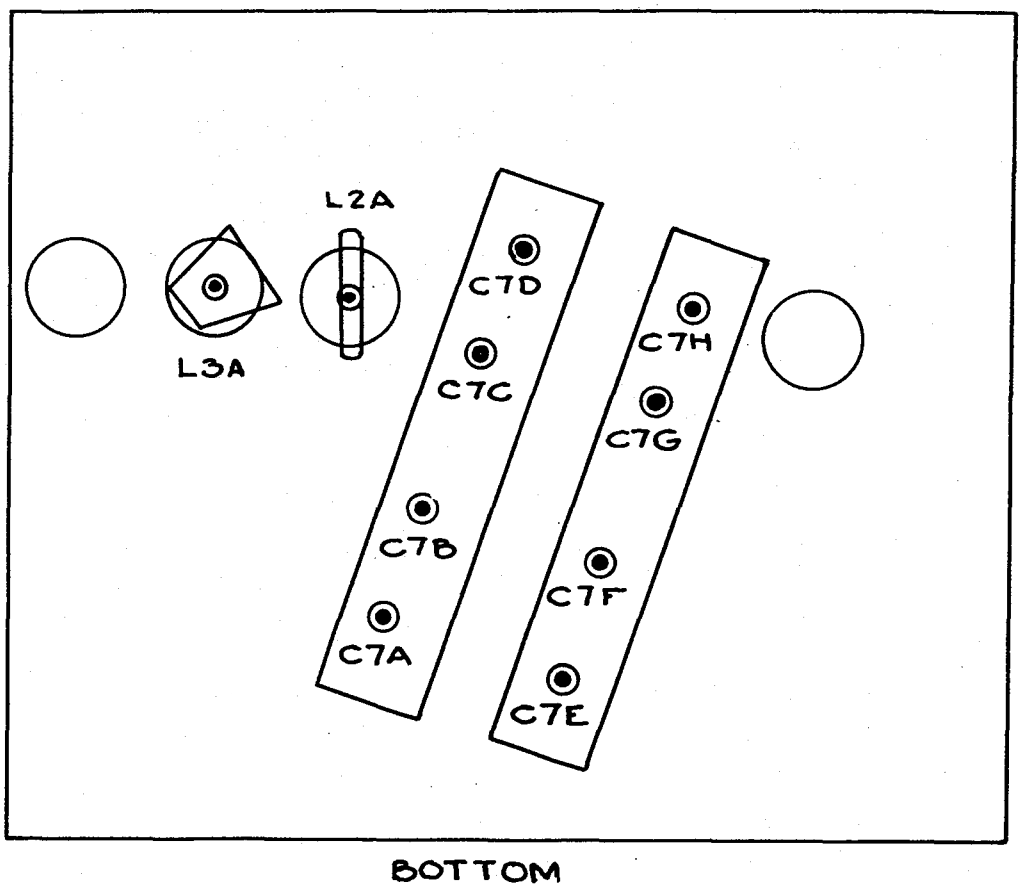
To adjust the B.F.O. proceed as follows:

29. (a) Turn the SELECTIVITY switch to SHARP.

(b) Turn the OUTPUT and H.F. GAIN controls fully clockwise.

(c) Turn the CW R/T switch to C.W. MAN position.





T FZ 154/1 1 - 11 FIG. 11—LOCATION OF RECEIVER ALIGNMENT ADJUSTMENTS

(d) Align the dot on the HET TONE control with the dot on the panel.

(e) Apply an unmodulated signal of 420 Kc/s. to V1C grid cap through a .1 ufd. condenser and adjust C7K to zero beat.

(f) Vary the HET TONE control in either direction. The frequency of the audio note should increase continuously and should be greater than 1500 c.p.s. when the control is in either the extreme clockwise or counterclockwise position.

Checking Modulation

30. To check the modulation of the sender:

(a) Connect the audio oscillator to the microphone input of the sender through the attenuating network illustrated in Fig. 2.

(b) Adjust the output of the audio oscillator to give a reading of 1.33 V. on the voltmeter. The input to the sender will be .04 V.

(c) Set the oscillator to 400 c.p.s.

(d) Connect across the phones on the receiver either one of the following:
(i) An output meter adjusted for 100 ohms impedance.
(ii) An A.C. voltmeter (0 - 5) in parallel with a 100 ohm resistor.
(iii) A decibel meter in parallel with a 100 ohm resistor.

(e) If the percentage of modulation is satisfactory, the following readings should be obtained.
(i) 1.0 mW. on R/T and 3 mW. on M.C.W. and C.W. (Output meter.)
(ii) .316 V. (R.M.S.) on R/T and .548 V. (R.M.S.) on M.C.W. and C.W. (A.C. voltmeter).
(iii) -14.79 Db. on R/T and -10 Db. on M.C.W. and C.W. (Db. meter).

31. To check modulation using an oscilloscope:

(a) Turn the No. 9 set OFF and couple the scope very loosely to the aerial lead.

CAUTION: DO NOT MAKE AN ELECTRICAL CONNECTION. HEAVY INSULATION SHOULD SEPARATE THE TWO LEADS.

(b) Carry out steps, (a), (b), and (c) of Para. 30.

(c) Check for 75% modulation on the oscilloscope. (See Fig. 12).

(d) Turn audio oscillator to 200 c.p.s.

(e) Adjust the attenuator control for 75% modulation. The input volts should not be greater than 5.4 V.

(f) At 3000 c.p.s. the input volts required for 75% modulation should not be greater than 13.5 V. It is impossible, however, to test at this frequency with the equipment being used.

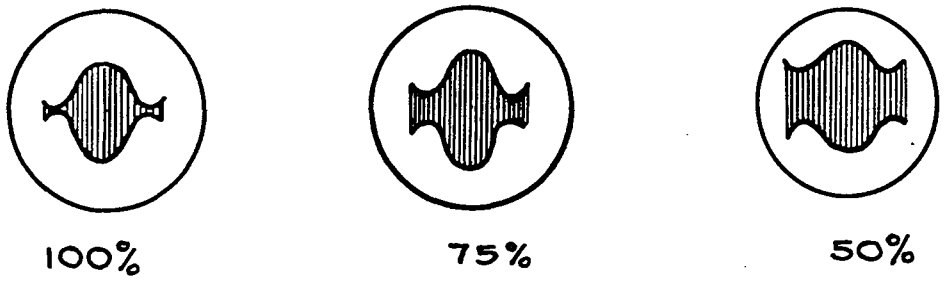


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FIG. 12—MODULATION PATTERNS

TABLE 12—CRYSTAL CALIBRATOR FAULTS

Symptom	Possible Fault	Remedy
Works at 1000 Kc/s. but not at 100 Kc/s. OR Works at 100 Kc/s. but not at 1000 Kc/s.	Faulty V5A	Replace with known good valve.
	Winding in L21A open	Replace L21A.
	Faulty FREQUENCY CHECK switch	Check for continuity. Clean or repair.
	Poor crystal	Replace.
	Shorted turns in L21A	Replace L21A.
Will not operate at either 100 Kc/s. or 1000 Kc/s.	Faulty V5A	Replace.
	Faulty crystal	Replace.
	L21A open	Replace.
	Faulty FREQUENCY CHECK switch	Check for continuity. Clean or repair.
	C46A open	Replace.
Operates unstably and delivers improper number of beats at 10 Kc/s.	Output from 100 Kc/s. is not locking in with multivibrator properly	Readjust R37A to give 10 beats 10 beats to every 100 Kc/s.
	C45A open	Replace C45A.
Not operating at 10 Kc/s.	Faulty FREQUENCY CHECK switch	Check for continuity. Clean or repair.
	R25A open	Replace.
	R44B, R44C, R48A, or or R47A open	Check and replace any open open resistor.
	C47A or C47B open	Check and replace if faulty.
	R1H open	Check and replace if faulty.

SPECIFICATIONS

General

32. The conditions under which tests are made are as follows:

(a) The receiver measurements shall be made at a signal to noise power ratio of 10 to 1 and an output of 10 mW.

(b) If a modulated signal is required, the modulation frequency shall be 400 c.p.s., 30% modulated.

(c) The receiver output circuits shall be terminated in a 100 ohm, non-inductive resistance.

(d) All audio test voltages shall be measured at the source with an impedance matching network connected between the source and the set.

(e) For all receiver measurements the H.F. circuits in the sender shall be adjusted exactly as for normal operation of the sender at the receiver frequency.

(f) All tests shall be performed with the complete equipment properly mounted in the carrier.

Battery Drain

33. The battery drain at 12 V. input shall not be greater than 6 amps. when the receiver only is being used, 27 amps. for the sender when on R/T. and 34 amps. when the sender is on C.W. and the key is down.

Dial Calibration

34. The dial calibration of both sender and receiver shall be accurate within ¼ of a division. Test at 2, 3, 4 and 5 Mc/s. on R/T.

Frequency Shift

35. The frequency shift when operating the flick mechanism shall not exceed 3 divisions of the vernier scale. The frequency shift of the sender due to operation of the channel switch shall not be greater than 300 cycles.

Receiver Sensitivity

36. The receiver sensitivity shall be better than 5 uV. on R/T and better than 3 uV. on C.W. (SELECTIVITY switch at FLAT and the A.F. and R.F. GAIN controls fully on) to give an output of 10 mW.

Receiver Selectivity

37. The measurement shall be made at a frequency of 2.5 Mc/s. with an input of 10 mW. The OUTPUT control shall be fully clockwise and the H.F. GAIN control shall be adjusted to 40 mW. The CW R/T switch shall be turned to C.W. AUTO. The band width in Kc/s. shall be as follows:

For 2 Times Output

SHARP..... Not more than 6.5.
FLAT..... Not less than 7.

For 1000 Times Output

SHARP..... Not more than 20.
FLAT..... Not less than 30.

Power Output of Receiver

38. The measurements shall be made on R/T at approximately 3 Mc/s. The receiver shall be capable of delivering into two pairs of headphones not less than 40 mW. with a total harmonic distortion not in excess of 20%.

Automatic Volume Control

39. Turn the CW R/T switch to R/T AUTO. Adjust the receiver using the lowest convenient signal input. Increase the input to 100,000 uV. and adjust the OUTPUT control to 40 mW. output. The input shall then be reduced, and the output shall not decrease below the values shown below:

100,000 uV.....40 mW.
100 uV.....10 mW.
10 uV..... 5 mW.

Intermediate Frequency

40. The I.F. rejection ratio at any frequency shall be greater than 90 Db.

Heterodyne Oscillator

41. When a signal has been tuned in for greater meter deflection with the controls at R/T MAN and TUNE, the audio note which is heard when the CW R/T switch is turned to C.W. AUTO shall pass through zero frequency when the dot on the HET TONE control is aligned with the dot on the panel. As the control is turned in either direction, the frequency of the audio note shall continuously increase and shall be greater than 1500 cycles when the control is either in the extreme clockwise or the extreme counter-clockwise position.

Fidelity

42. The controls shall be adjusted to give 10 mW. output at 400 cycles. With the SELECTIVITY switch in the FLAT position, the output must not decrease below 1 mW. at either 150 cycles or 3000 cycles.

Sender Power Output

43. With the dummy aerial connected as shown in Fig. 1 the output shall not be less than the figures shown in Table 13.

TABLE 13—SENDER OUTPUT READINGS

Frequency in Mc/s.	Output in Amps			
	HIGH Power		LOW Power	
	M.C.W.	C.W.	M.C.W.	C.W.
1.87	1.44	1.82		
3.50	1.44	1.82	.81	.81
5.00	1.29	1.58		

Modulation of Sender

44. The source voltage required for 75% modulation of the sender on R/T at 400 c.p.s. shall not be more than .04 V. The ratio of the values required at 200 c.p.s. and at 3000 c.p.s. to the value of 400 c.p.s. shall not be greater than 4 to 1 and 10 to 1 respectively. The M.C.W. note frequency shall be between 700 and 1300 cycles and the depth of modulation shall be from 90% to 120%.

Sidetone

45. The sidetone output from the sender to the receiver headphones shall be not less than 1 mW. on R/T, or .3 mW. on M.C.W. or C.W.

Netting Error

46. The netting error at 5 Mc/s. shall not be greater than 0.02%.

Accuracy of Crystal Calibrator

47. The frequency of the crystal calibrator shall be accurate within .07% at 1000 Kc/s. and within +.05% and −.01% at 100 Kc/s.

Output of Crystal Calibrator

48. With the receiver adjusted to its standard sensitivity, the CW R/T switch at C.W. AUTO and the HET TONE control adjusted to approximately 1000 cycles, the output of the crystal calibrator shall be not less than 25 mW. at either 1000 100 or 10 Kc/s.

Loudspeaker

49. A listening check only shall be made on the loudspeaker to ensure satisfactory operation.

Supply Unit Output

50. With 11 V. input and a load of approximately 5,600 ohms, the output of the L.P. Dynamotor should be 225 V. ± 5% at 40 Ma. drain and not less than 195 V. for 2600 ohm load, and 75 Ma. drain. The efficiency of the L.P. dynamotor should be not less than 33%.

51. With 11 V. input and a load of approximately 13,500 ohms, the output of the H.P. Dynamotor should be 1100 V. ± 5% at 80 Ma. drain and not less than 990 V. for 8250 ohm load, and 120 Ma. drain. The efficiency of the H.P. Dynamotor should be not less than 50%.

MECHANICAL ADJUSTMENTS AND MAINTENANCE

Cleaning Crystal

52. It takes very little dirt to stop the operation of the crystal and it requires only a minute particle of dirt to change the frequency of the crystal. When it is necessary to clean the crystal:

    (a) Remove the crystal from the holder and wash with warm soap and water.

    (b) After washing, immerse the crystal in a clean solution of carbon tetrachloride.

    (c) Remove from the solution of carbon tetrachloride being careful to prevent any dirt or oil from the fingers getting on the crystal. Hold it by the corners and, if possible, use a rubber glove when handling it.

    (d) When the crystal is quite dry, replace in the holder, making sure that no dust is present and that no dirt will get into the crystal holder.

    (e) When the crystal is assembled, make sure that the crystal is able to move in the holder. Shake the crystal gently to ascertain if there is any movement.

    NOTE: IF THE CRYSTAL APPEARS TO BE CHIPPED, DO NOT THROW IT AWAY. AS AN EXPERIENCED CRYSTAL MAN CAN REPAIR OR REMEDY IT IN SOME CASES. IT IS VERY DIFFICULT FOR AN INEXPERIENCED MAN TO TELL THE DIFFERENCE BETWEEN A CHIP AND A FRACTURE. A CHIP CAN BE REMEDIED BUT A FRACTURE CANNOT.

Faults Peculiar to W/S (Cdn.) No. 9, Mk. I

53. The shielding on the shielded wire used in the modulator unit often becomes shorted to the inside wire (See Para. 7).

54. The modulator and master oscillator valve filaments are connected in series and the resistance of the tungsten filaments may vary to such a degree that the oscillator valve ceases to operate. Replacing the oscillator valve with a new 6V6G may not always correct this fault. Replace both 6V6G valves.

55. The aerial meter will not operate properly on very low L.T. voltage. If the meter is not working check the battery voltage. It should be at least 11 V.

RECONSTRUCTION DATA

TABLE 14—L1A DATA

Form	Bakelite
Turns	91½.
Conductor	No. 22 Copper Enamel (S.W.G.)
Winding Length	3-7/16"
Treatment	First and last three turns to be coated with polystyrene after adjustments have been made.
Test Data	Resonating capacity—407.5 uufd. at 1500 Kc/s. Q – 97.

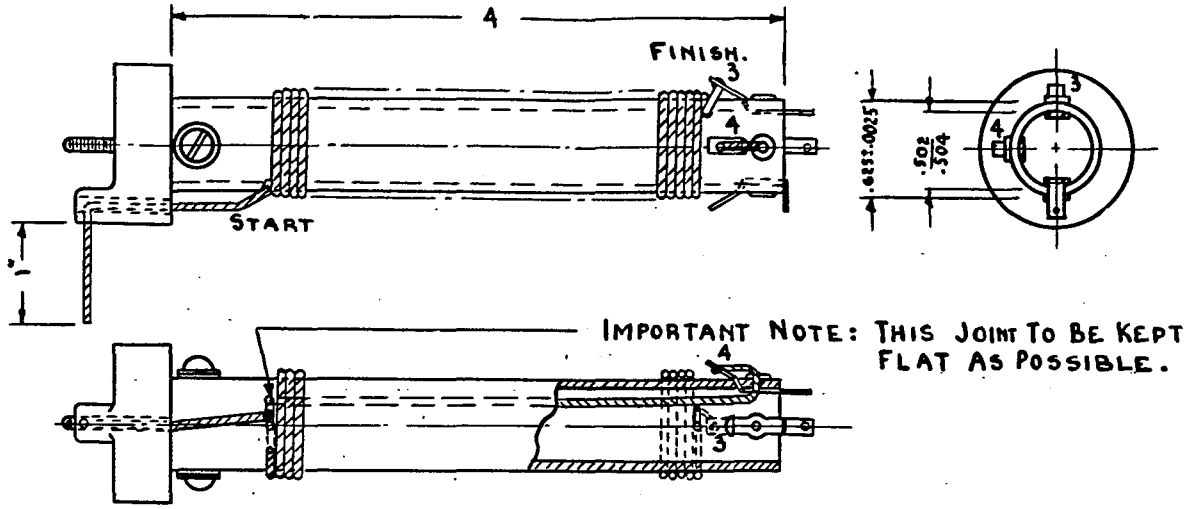

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FIG. 13—L1A, AERIAL COUPLING TRANSFORMER.

TABLE 15—L2A DATA

Winding	Primary	Secondary
Form	Bakelite.	
Turns	18 (Close wound)	35 (60 turns per inch).
Conductor	No. 36 Copper Enamel	No. 30 Copper Enamel.
Winding Length	1/8"	19/32".
Treatment	Light coat of glyptal cement.	
Test Data	Inductance = ± 5% of standard at 3 Mc/s. Q = 57 ± 5%	Inductance = ±1% of standard at 2 Mc/s. Q = 92 ± 5%.

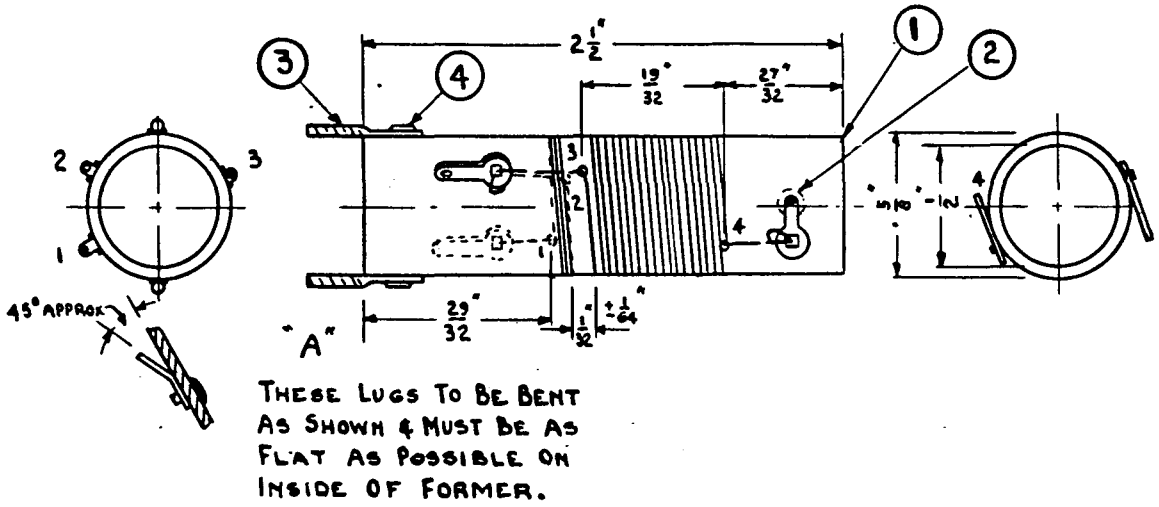

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FIG. 14—L2A, R.F. COUPLING TRANSFORMER

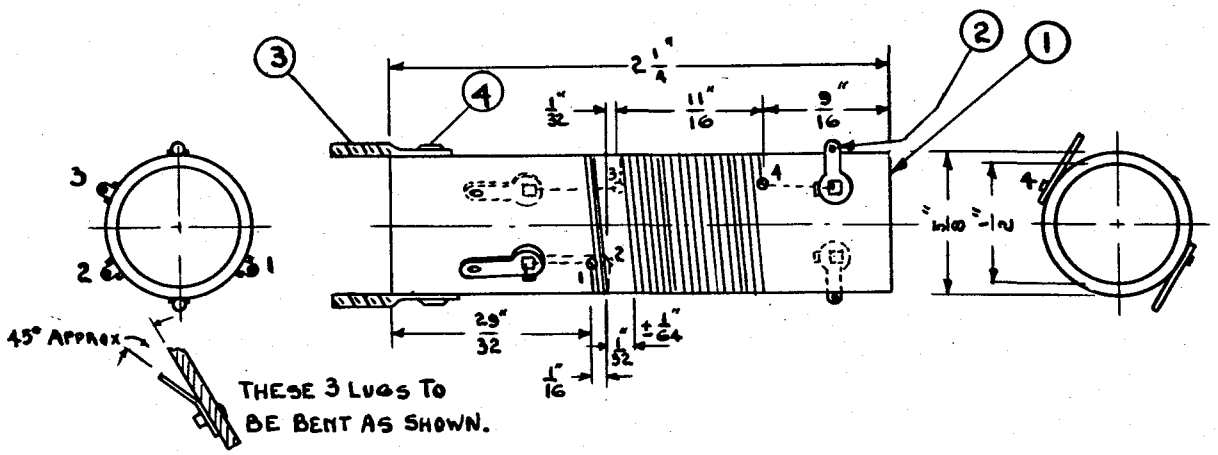

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FIG. 15—L3A, OSCILLATOR COIL

TABLE 16—L3A DATA

Winding	Primary	Secondary
Form	Bakelite.	
Turns	8 (Close wound)	32 (48 turns per inch).
Conductor	No. 36 Copper Enamel	No. 28 Copper Enamel.
Winding Length.	1/16"	11/16"
Treatment	Light coat of glyptal cement.	
Test Data	Inductance = ± 5% of standard at 5 Mc/s. Q =45 ±5%	Inductance = ± 1% of standard at 2.5 Mc/s. Q = 100 ± 5%.

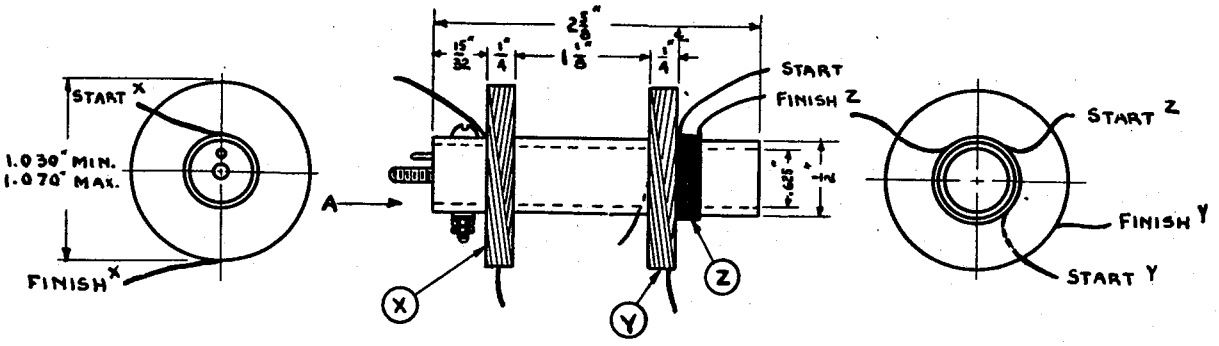

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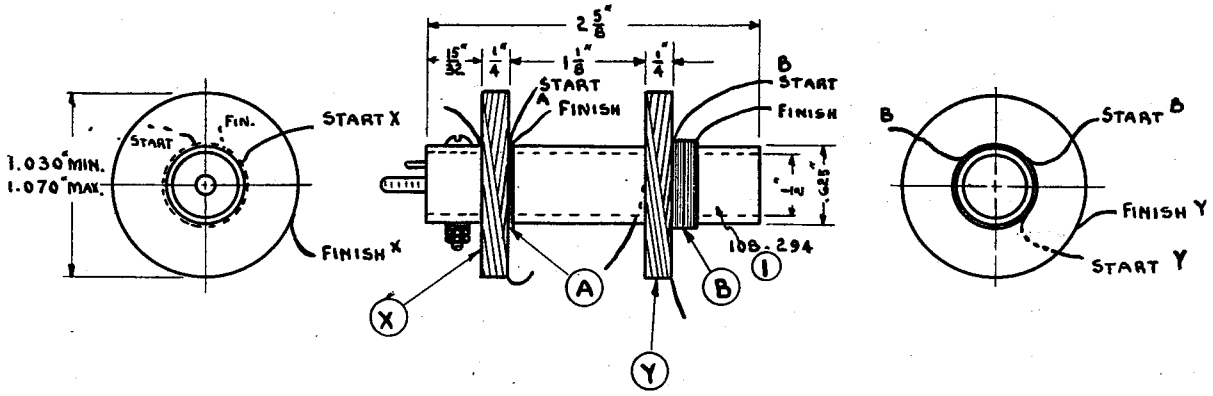
FIG. 16—L4A & L4B, INPUT TRANSFORMERS, (BAND PASS FILTERS)

TABLE 17—L4A AND L4B DATA

Winding	X	Y	Z
Form	Bakelite		
Turns	272, single wave bank	272, single wave bank	9
Conductor	10/41 B & S, S.S.C., twisted Litz		No. 32 B & S D.S.C. Copper Enamel.
Winding Length	¼"	¼"	Close wound.
Treatment	Dip in Zophar Mills No. 1436 wax at 250° F. The coils must be given a thin, even coating. After cooling, cement and allow eight hours for the cement to dry. Use C.I.L. Duco Household Cement.		
Test Data	Inductance = ±2% of standard at 200 Kc/s.		



T FZ 154/1 1 - 17 FIG. 17—L5A & L5B, OUTPUT TRANSFORMERS (BAND PASS FILTERS)

TABLE 18—L5A & L5B DATA

Winding	X & Y	A & B
Turns	272, single wave, bank	A—4 turns; B—9.
Conductor	10/41 B & S., S.S.C., twisted Litz	No. 32, B & S, D.S.C., Copper Enamel.
Winding Length	¼"	Close wound.
Treatment	Dip in Zophar Mills No. 1436 was at 250° F. The coils must be given a thin, even coating. After cooling, cement and allow eight hours for the cement to dry. Use C.I.L. Duco Household Cement.	
Test Data	Inductance to be ±2% of standard at 200 Kc/s.	

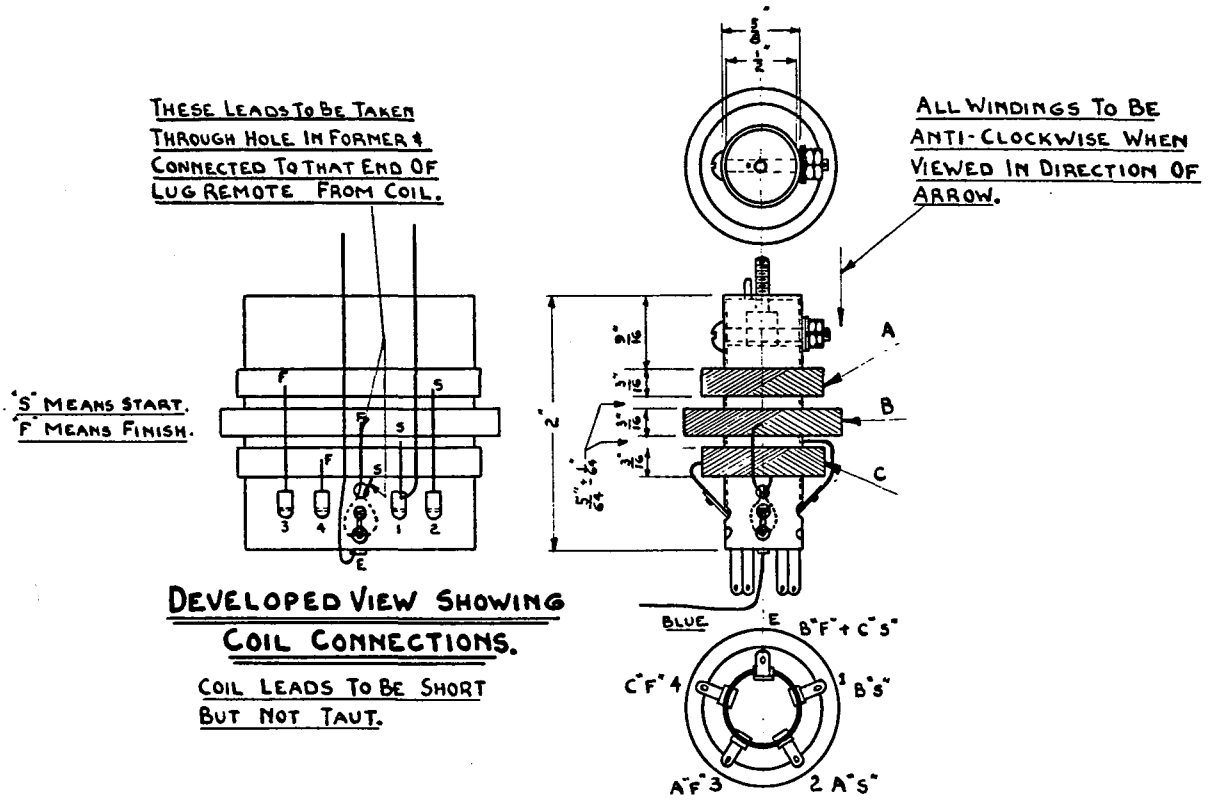


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FIG. 18—L7A, B.F.O. TANK COIL

TABLE 19—L7A DATA

Winding	A	B	C
Form	Paper Base Bakelite.		
Turns	102 (2 crosses per turn in each winding).	165	95
Conductor	10/41, B &S , C.E., S.S.C., twisted Litz.		
Winding Length	3/16"	3/16"	3/16"
Treatment	Dip in Zophar Mills No. 1436 wax at 250° F. The coils must be given a thin even coating. After cooling, cement and allow eight hours for the cement to dry. Use C.I.L. Duco Household Cement.		
Test Data	Inductance = ±2½% at 350 Kc/s. Q = 100 ±5%	Inductance = 2½% at 300 Kc/s. Q = 120 ±5% Q at 350 Kc/s. = 115 ±5%	Inductance = 2½% at 300 Kc/s. Q = 120 ±5%

TABLE 20—L8A, R.F. CHOKE

Form	Bakelite, 1-15/16″ x 27/32″.
Turns	40.
Conductor	No. 20 Copper Enamel.
Winding Length	1-3/8″
Treatment	Shellac.
Testing	Test for shorts and continuity.
Note	Ends of winding to be soldered to screws on each end of form.

TABLE 21—L9A, FILTER CHOKE

Form	1/32″ paper base, 19/32″ x 1″ x 1-1/64″.
Turns	5096.
Conductor	No. 34, B & S, Copper Enamel.
Winding Length	49/64″.
Turns per Layer	98.
Paper Layers	.001″ glassine.
Laminations	.025″ RAD. 4C Stack to 7/8″.
Gap	1 Layer, .002″ glassine.
Treatment	Varnish core edges.
Test Data	Inductance = 12 H. at .05 amps., 20 V., 60 cycle. Resistance = 500 ohms ± 20%.

TABLE 22—L10A & L10B, FILTER CHOKES

Form	1/64″ paper base, 35/64″ x 3 4″ x 25 32″.
Turns	768.
Conductor	No. 30, B & S., Copper Enamel.
Winding Length	19/32″.
Turns per Layer	48.
Paper Layers	.001″ glassine.
Laminations	.025″ RAD. 4C, Stack to 5/8″. Keep tight and reverse ends to act as keepers.
Treatment	Varnish core edges.
Test Data	Inductance = 6 H. at 60 Ma., D.C., 1 V., 60 cycle, or 5 V. 1000 cycle. Resistance = 24 ohms.

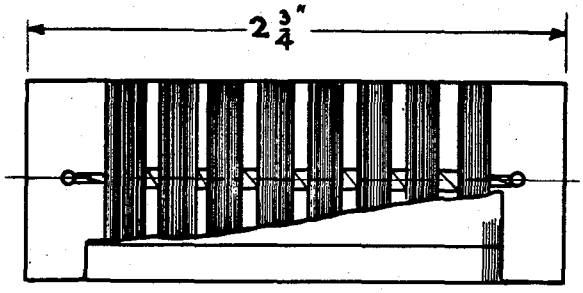

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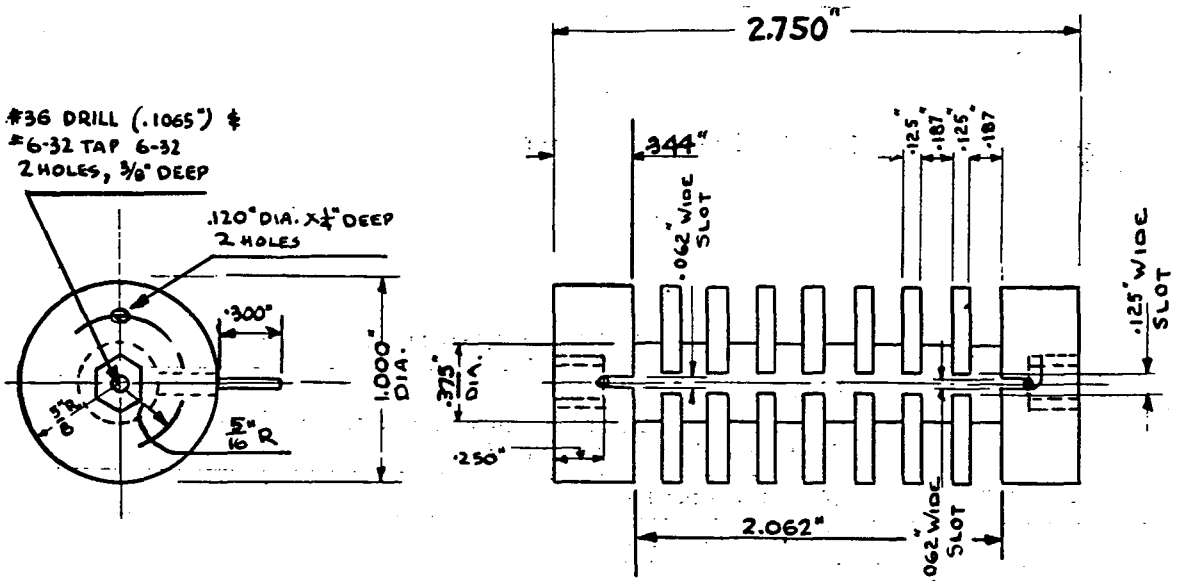
FIG. 19—L16A, B & C, FILTER CHOKES

TABLE 23—L16A, B & C DATA

Turns	3150.
Conductor	No. 33 B & S, D.S.C. Copper.
Winding Length	8 slots, each .187".
Wrapper	1 turn of black leatherette, .005" x 2-3/16" x 3½".
Treatment	Glue along joint of wrapper and at both ends. Cover chokes with clear lacquer.

TABLE 24—L17A DATA

Turns	1528.
Conductor	No. 27, B & S, S.C. Copper.
Winding Length	8 slots, each .187".
Wrapper	1 turn of black leatherette, .005" x 2-5/8" x 4-1/4".
Treatment	Glue along joint of wrapper and at both ends. Cover choke with clear lacquer.



COIL FORM (MOULDED)

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FIG. 20—L17A, R.F. CHOKE

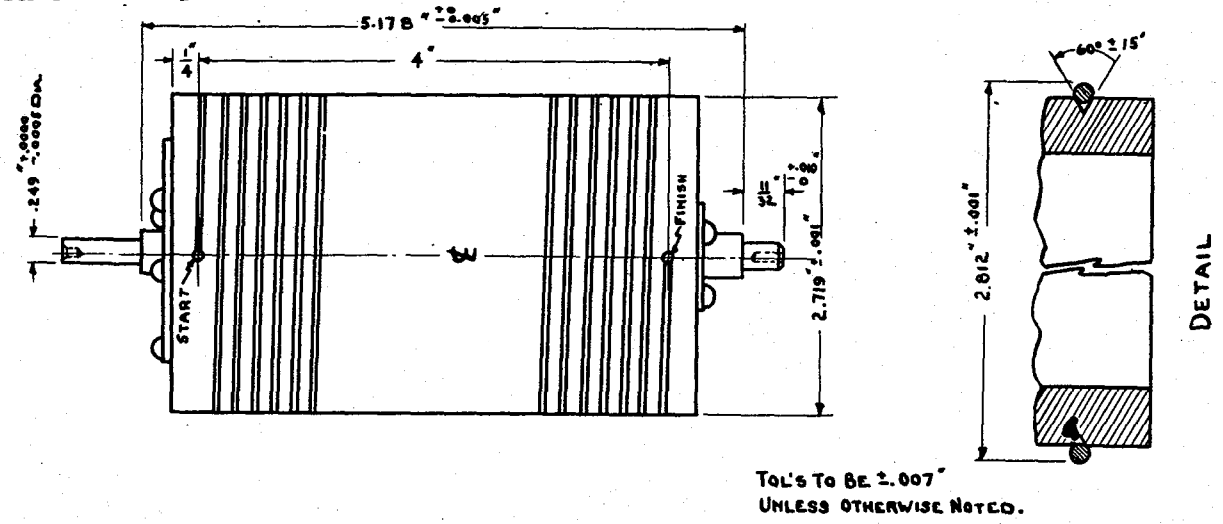

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FIG. 21—L18A & B, MASTER OSCILLATOR COILS

TABLE 25—L18A & L18B DATA

Form	Bakelite. Grooved from start hole to finish hole with 60° V cut. Start hole and finish hole drilled with No. 32 drill.
Turns	24—6 turns per inch.
Conductor	No. 14 (.064"), B & S, Bare tinned copper.
Winding Length	4".
Treatment	Hook ends of wire into start and finish holes and soft solder. Mask outside surface of wire and varnish coil.

TABLE 26—L19A, AERIAL TUNING COIL

Form	3/16" Natural bakelite, Grade XX. Length 8-1/4". Outside Diameter 6". Inside diameter 5.75".
Turns	45-1/4.
Conductor	No. 12, tinned, bare copper.
Winding Length	7-1/2".
Treatment	Wire secured in groove with ambroid cement.
Note:	45-1/4 turns of 60° V groove cut. Start 3/8" from one end of form and finish 3/8" from other end. Measurement taken from centre of groove.

TABLE 27—L20A, OSCILLATOR COIL.

Form	1/64″ pressboard, wrapped with 1 layer of .002″ glassine 35/64″ x 3/4″ x 3/4″
Turns	1180.
Conductor	No. 33, B & S, Copper Enamel.
Winding Length	1/2″.
Turns per Layer	59″.
Paper Layers	1 Layer of .001″ glassine.
Taps	At 236-1/2.
Laminations	.014″ RAD. 4C, Stack to 5/8″.
Gap	5/32″ ± 1/64″.
Treatment	Varnish Core Edges.
Test Data	Inductance =.48 H. at 20 V., 60 cycle. Resistance =75 ohms.

R.F. Choke, L21A

56. See E.M.E.R., YZ 664 for reconstruction data on L21A, R.F. Choke.

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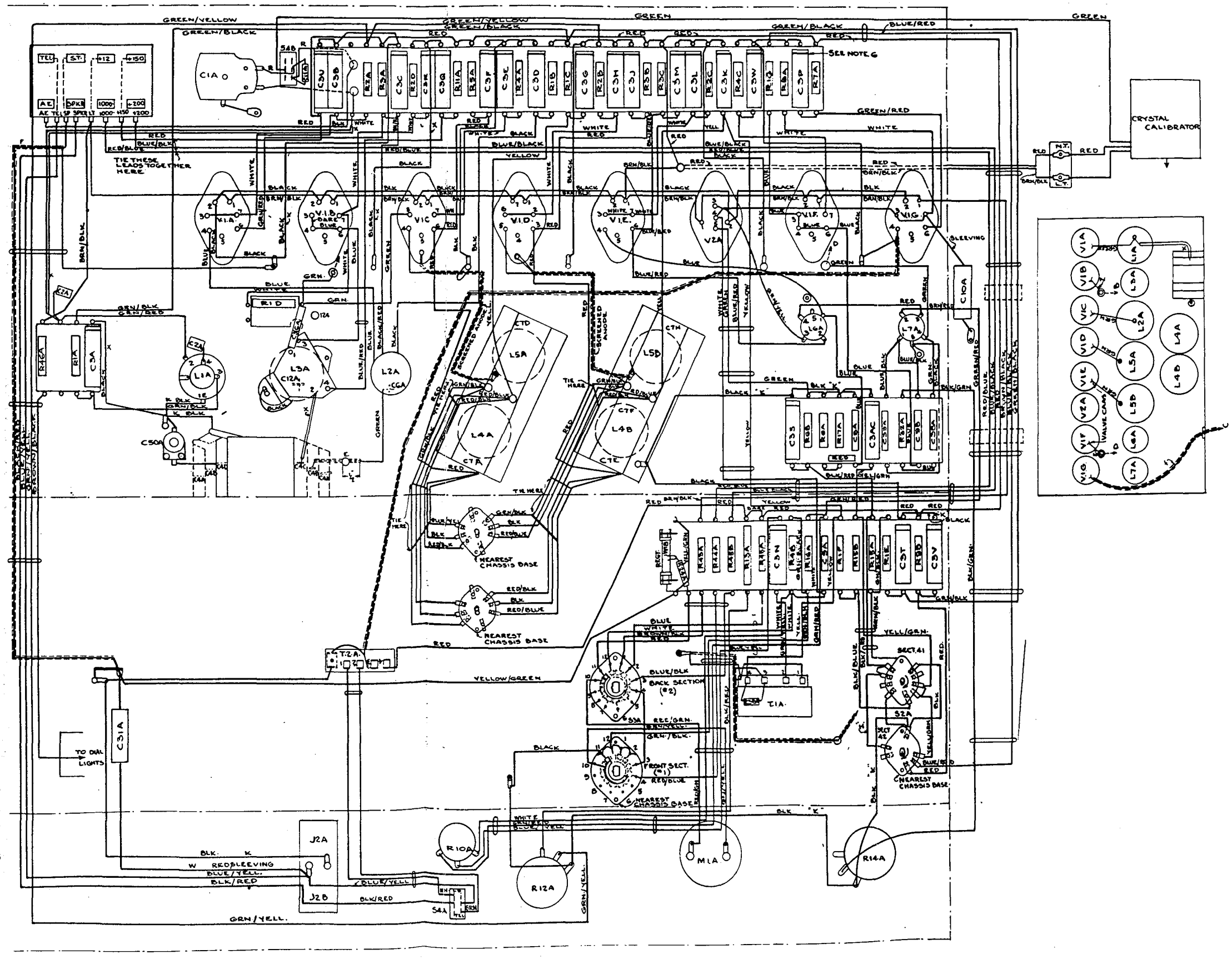
END



NOTES:—

Two leads marked "Z" to protrude 5" from base of the chassis and to be knotted on rear. One lead marked Y to be 3½" long, and lead marked "F" to be 7½" long.

Leads marked "XX" to be No. 14 B & S GE. bare tinned copper wire covered with 3 mm. xte 30 tubing.

Wires marked "K" to be No. 20 B & S GE. BTC wire covered with 1 mm. black Xte tubing.

Wires marked "W" to be No. 20 B & S GE. BTC wire covered with 1 mm. red Xte tubing.

All other wiring not otherwise specified to be 108-528 No. 20 B & S GE. in colours shown.

At points marked, wires to be taped together with ½" wide white cotton tape and clamped on chassis by cleats provided, to be wires in accordance with sample.

Line across end of C3 by pass condensors indicate outside foil.

Leads marked "F" to be shielded wire R15162-61.

Leads marked "R" to be covered with 3 mm. black Xte 30 tubing.

FIG. 8—WIRING LAYOUT, RECEIVER