SECTION V – MAINTENANCE

SECTION V
MAINTENANCE

1. GENERAL.

a. The Models RBB/RBC radio receiving equipments have been carefully adjusted and tested by the manufacturer before shipment. If the equipment is properly installed and operated, servicing over a long period will not be necessary. When trouble does develop localize the source before changing any adjustments other than panel controls, or before disturbing the internal wiring and mounting of components. It is recommended that any major adjustments or repairs be made in a laboratory where proper tools and measuring instruments are available in order that adjustments may be made, and performance measured, with the extreme accuracy necessary to obtain the full performance capabilities of equipment. Many of the minor adjustments and replacements, however, may be made in the field, utilizing relatively simple equipment.

2. TEST EQUIPMENT.

a. The following equipment or its equivalent should serve for localizing most of the possible troubles which may be encountered in the Models RBB/RBC radio receiving equipments:

(1) Model OE Receiver Analyzing Equipment.

(2) Models LN and LP Standard Signal Generator.

(a) A standard IRE dummy antenna is included with LP or may be constructed in accordance with instructions in the Communication Equipment Maintenance Bulletin.

(3) Model OZ Vacuum Tube Analyzing Equipment.

b. The following additional equipment is required for alignment:

(1) 0-200 microampere DC meter.

CAUTION

In order to avoid shock, due to charging current in the a-c line filter capacitors, the equipment should never be operated with ground connections removed from the rectifier power unit or receiver unit cabinets. When the receiver unit is operated out of its cabinet, an additional ground connection should be made to the receiver unit chassis.

3. GENERAL CARE.

a. With ordinary care little attention will be required to keep this equipment in operation. However, to insure continued optimum performance, it is recommended that a regular schedule of inspection be established. The recommended inspection periods and points to be observed are given in Table 5-1.

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 OR 68 OF THE "BUREAU OF SHIPS MANUAL," OF THE LATEST ISSUE.

TABLE 5-1

INSPECTION PERIODS AND CHECK POINTS

Interval	Check Point
DAILY	Make visual inspection of antenna system. Check operation of receiver.
WEEKLY	Clean equipment inside and out. Record meter readings in log.
MONTHLY	Inspect all rubber used for shock mounting, replacing where necessary due to cracking or resilience. Install a complete set of tested vacuum tubes in the equipment. Test the replaced tubes and retain satisfactory tubes for further use. Measure receiver noise level in each band in accordance with current instructions issued by the Bureau of Ships. Lubricate all sliding mechanical contacts lightly with nonfluid mineral oil or petrolatum. Make insulation test to ground (with megger) of antenna and power supply circuits.

TABLE 5-1 (Continued)

Interval	Check Point
QUARTERLY	Measure the sensitivity of the receiver unit in accordance with the current instructions of the Bureau of Ships, and record in log results of tests prior to and after corrective action. Check operation of all equipment controls. Toggle switches which are not frequently used should be operated in order to clean the contacts. Potentiometers usually open circuit due to wear. The only remedy for a condition of this nature is to replace the defective potentiometer with one supplied in the spare parts box. Check the calibration of the receiver. Measure the noise level and sensitivity as outlined in Paragraph 4d. Check inventory of vacuum tubes and requisition necessary tubes to fill allowance.
SEMI-ANNUAL	Check alignment of the receiver in accordance with current instructions of the Bureau of Ships. Record condition found prior to and after alignment. The alignment procedure to be followed is given in Paragraph 5 of this section. Make inventory of spare parts boxes and contents.

4. TROUBLE SYMPTOMS AND CIRCUIT ANALYSIS.

a. A fault in some part of the equipment may usually be associated with abnormal receiver output conditions, control settings, control operation, or operation of meters and pilot lamp. Any visible deviations from normal operation of the equipment usually will assist in localizing the source of trouble. Possible causes of any troubles which might develop, and the symptoms by which they may be recognized, are described in Table 5-2.

TABLE 5-2

SYMPTOMS AND CAUSES

Symptoms	Causes
No Signal or Noise Output.	See that all knob settings are correct. Defect in rectifier power supply. If pilot lamps do not light check input to power supply. If no indication on "D-C VOLTS" meter is obtained check rectifier tube (V401) in rectifier power unit. Check headphones and associated equipment. Check to see if receiver is totally inoperative in other positions of the band switch. If receiver is inoperative in one band switch position only, refer to Figures 7-19 and 7-25, and check components in inoperative band switch position. Defective tubes (starting at audio end, check each tube). Check tube socket voltages and compare readings obtained with those given in Paragraph 4e, Tables 5-13 to 5-16.
Low Sensitivity.	See that all knob settings are correct. Check for normal noise output readings on "OUTPUT" meter. If normal indications are obtained, refer to Figures 7-19 and 7-25, and check components of antenna input stage. Defective tubes (aging tubes will cause a reduction in sensitivity). Measure inputs to various stages of receiver and compare results with those given in Paragraph 4d. Check to see if a condition of low sensitivity exists on all positions of band switch. If sensitivity is low on one band switch position only, check components in band switch position where low sensitivity is evident.

TABLE 5-2 (Continued)

Symptoms	Causes
Low Maximum Noise Output and No Signal Output.	Defect in first (heterodyne) oscillator circuit. Replace oscillator tube (V103 or V203) with one of known condition. Refer to Figures 7-19 and 7-25, and check components of this circuit. Refer to Table 5-19 and check to see that resistance measurements obtained agree with those given.
Low Signal - to - Noise Ratio is Obtained with Normal Output Readings (see Paragraph 4c).	Check the "ANT. COMP." knob setting. Check the antenna circuits. Check the external transmission line connections. Check the connections of other receivers to the same antenna. Check the receiver circuits preceding the grid of the first r-f tube V101 or V201. Check that the condition is not due to external noise pick-up, or interference from local transmitters or other electrical equipment. Check the antenna link connections as shown in Figure 2-4. **NOTE** A condition of poor signal-to-noise ratio may be caused also by a noisy condition in the receiver circuits or failure of the r-f amplifier tubes and circuit. These conditions, however, may be detected usually by the use of the noise measurement tabulation in Paragraph 4c.
No Output or Low Sensitivity for Particular Control Settings.	Defect in circuit affected by particular control setting. Refer to Figure 7-19 and 7-25, and check components associated with the control. If faulty operation is obtained with the "RECEPTION" knob on "CW" or "CW-OL," and the equipment operates normally on the "MOD" position of the switch, check the cw oscillator tube (V304) and its associated circuit. Normal operation of the cw oscillator is indicated by reception of cw signals, and by an increase in receiver noise output of approximately 6 db, when the "RECEPTION" knob is changed from "MOD" to the "CW" position. Check the contacts of the band switch by switching back and forth through affected band several times. If intermittent operation is evident check band switch contacts. If trouble is experienced with "RADIO SELECTIVITY" switch check input to various stages with the values given in Paragraph 6d. Abnormal operation when the "NOISE LIMITER" switch is placed in the "ON" position, may be due to defective noise limiter tube (V306) or other components of the circuit. Normal operation of the a.v.c. system is indicated by the "INPUT" meter operation and by an essentially constant output from signals of widely different intensity, except the output of very weak signals. Faulty operation of the a.v.c. system may be evidenced by distortion of strong signals. Make certain that the "OUTPUT LEVEL" control is sufficiently retarded. Failure of the "INPUT" meter to operate indicates trouble in the meter circuit, first i-f grid circuit (V301) or a.v.c. diode tube (V305) and associated circuits. If the "INPUT" meter operates, but trouble is still evident in the a.v.c. system the grid circuits of the first a-f stage, second i-f stage, or first and second r-f stages should be investigated. Normal operation of the silencer circuit is indicated, if with the "RECEPTION" transfer switch in the "MOD-AVC-SIL" position, a high background noise is obtained with the "SILENCER," control at minimum and the "OUTPUT LEVEL" control sufficiently advanced. The noise output should remain constant as the "SILENCER" control is advanced to a setting of approximately "30." At this setting the noise output should be reduced approximately 20 db and remain cut off as the "SILENCER" control is further advanced to maximum. A fault in the silencer circuit is indicated by failure of the silencing action, abnormal hum output in the silenced condition, and by wide deviations of the control setting at which silencing action occurs. Check the circuit

TABLE 5-2 (Continued)

Symptoms	Causes
No Output or Low Sensitivity for Particular Control Settings — Continued.	by reference to Paragraphs 4e and 4f. The silencer-output limiter-amplifier tube (V308), and silencer-output limiter diode tube (V309) should be checked with reference to Paragraph 4g, or replaced. Normal operation of the output limiter circuit ("RECEPTION" transfer switch in the "CW-OL" position) is indicated if this circuit holds the receiver output essentially constant for wide variations in signal level or "GAIN" control setting except for very weak signals. If faulty operation is obtained, the output limiter circuit should be analyzed by reference to Paragraphs 4e and 4f. The silencer-output limiter-amplifier tube (V308), noise limiter-output limiter diode tube (V306), and silencer-output limiter diode tube (V309) should be checked with reference to Paragraph 4g. Difficulty with operation of the "AUDIO SELECTIVITY" switch in the "SHARP" position would indicate a fault in the audio band-pass filter unit and associated circuit.
Selectivity Low and Interference High.	A faulty condition of selectivity or signal interference is difficult to recognize since the strength of the interfering signal is usually unknown. An approximate measure of selectivity may be made, by noting approximate signal and interference input levels as indicated on the "INPUT" meter, and the frequency separation indicated by receiver tuning dial readings. Reduction in selectivity will be accompanied normally by reduction in sensitivity, and the trouble may be analyzed in the manner described above for low sensitivity conditions. Interference conditions from local transmitters may be attributed usually to faulty shielding, poor ground connections, or line filter defects. The panel thumbscrews should be tightened and all ground connections examined. Refer to Paragraph 6.
Noisy Operation.	Should a condition of noisy operation arise, check the effect of removing the antenna connection, to determine whether the noise originates within the equipment. The trouble may be located in some cases by measurement of noise outputs with successive tubes removed (Paragraph 4c). Loose connections, imperfect shielding, or noisy tubes may be located by tapping various suspected parts.

b. VOLTAGE TABLES.—

(1) The following voltages apply to a single receiver unit operated from a rectifier power unit which is connected to a 110/115/120-volt 60-cycle supply. It is imperative that the link in the transformer primary circuit be set to correspond, as closely as possible, to the line voltage. The "RECEPTION" transfer switch (S304) should be in the "CW" position. Variations in the order of ±20% may be expected in the following values due to normal tube and circuit variations.

TABLE 5-3
TERMINAL VOLTAGES
("Gain" Control in the Maximum Position)
IF-AF UNIT RECEPTACLE J301
MODELS RBB/RBC EQUIPMENTS

Terminal of J301	Volts
S-P	115* — Power Switch "OFF"
A-Gnd	17*
D-Gnd	6.3*
E-Gnd	105
G-Gnd	200
B, C, or F-Gnd	0

* A-C Voltages — All others D-C.

TABLE 5-4
TERMINAL VOLTAGES
(Measured to Ground)
IF-AF UNIT TERMINAL BOARD TB308

	Model RBB Equipment		Model RBC Equipment	
Terminal	"GAIN"		"GAIN"	
	Max.	Min.	Max.	Min.
1	105	105	105	105
2	17.0*	17*	17.0*	17.0*
3	202	212	202	212
4	0	0	0	0
5	0	0	0	0
6	0	13.5	0	23
7	6.1*	6.1*	6.1*	6.1*
8	0	0	0	0
9	95	120	95	120

* A-C Voltages — All others D-C.

TABLE 5-5
COIL BOX TERMINAL VOLTAGES
(Measured to Ground)
MODEL RBB EQUIPMENT

Box Terminal	Ant. Box		1st R-F Box		2nd R-F Box		Osc. Box	
	"GAIN"		"GAIN"		"GAIN"		"GAIN"	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	0	0	0	0	0	0	0	0
2	—	—	6.1*	6.1*	6.1*	6.1*	6.3*	6.3*
3	—	—	0	0	0	13.5	105	105
4	—	—	0	13.5	202	212		
5	—	—	202	212				

* A-C Voltages — All others D-C.

TABLE 5-6
COIL BOX TERMINAL VOLTAGES
(Measured to Ground)
MODEL RBC EQUIPMENT

Box Terminal	Ant. Box		1st R-F Box		2nd R-F Box		Osc. Box	
	"GAIN"		"GAIN"		"GAIN"		"GAIN"	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	—	—	0	0	0	0	0	0
2	—	—	6.1*	6.1*	6.1*	6.1*	6.3*	6.3*
3	—	—	0	0	0	0	105	105
4	—	—	0	23	0	23		
5	—	—	202	212	202	212		
6	—	—			105	105		

* A-C Voltages — All others D-C.

c. NOISE OUTPUT VOLTAGES.—

(1) Tables 5-7 and 5-8 are tabulations of normal receiver background noise outputs as indicated on the "OUTPUT" meter. These voltages apply with the receiver input disconnected from the antenna, and terminated in a standard dummy antenna, shielded sufficiently to avoid any external noise pick-up. These values apply with the "GAIN" control knob at maximum, the "RADIO SELECTIVITY" control knob in the "BROAD" position, and the "RECEPTION" knob in "MOD." Considerable variation may be expected in these values due to normal tube and circuit variations.

TABLE 5-7
NOISE OUTPUT VOLTAGES — MODEL RBB EQUIPMENT
Noise Output in DB (Zero Level—60 Microwatts)

Band	Freq. mc	Overall Noise	1st R-F Tube Removed	2nd R-F Tube Removed	Osc. Plate Voltage Removed
1 LF	0.5	22	16	11	0
HF	0.84	30	24	14	0
2 LF	0.84	20	16	13	0
HF	1.41	26	20	14	0
3 LF	1.41	22	15	11	0
HF	2.37	29	21	14	0
4 LF	2.37	23	16	12	0
HF	4.00	31	23	18	0

TABLE 5-8
NOISE OUTPUT VOLTAGES — MODEL RBC EQUIPMENT
Noise Output in DB (Zero Level—60 Microwatts)

Band	Freq. mc	Overall Noise	1st R-F Tube Removed	2nd R-F Tube Removed	Osc. Plate Voltage Removed
1 LF	4.0	26	18	13	1
HF	6.45	28	22	20	1
2 LF	6.45	25	16	11	1
HF	10.3	28	24	20	1
3 LF	10.3	14	11	6	1
HF	16.5	27	20	17	1
4 LF	16.5	16	6	4	1
HF	27.0	21	16	16	1

d. SIGNAL INPUT TO VARIOUS STAGES REQUIRED TO PRODUCE STANDARD OUTPUT (6 milliwatts in 600 ohms—10 db signal-to-noise ratio when noise equals 60 microwatts. Standard output is obtained when, with a 600 ohm non-inductive load connected across the output jack and with the ADD DECIBELS switch in the +10 position, the OUTPUT meter indicates zero db).—In the following tabulations (Tables 5-9 to 5-12) considerable variation may be expected in these values due to normal tube and circuit variations.

(1) A-F Inputs Required to Produce Six Milliwatts Output (an indication of zero db on the OUTPUT meter when a 600 ohm non-inductive load is connected across the receiver output jack and the ADD DECIBELS switch is placed in the +20 position). — The following voltages (Table 5-9) apply with the "RECEPTION" transfer switch (S304) on "MOD" and the "AUDIO SELECTIVITY" switch (S305) in the "BROAD" position.

TABLE 5-9
A-F INPUTS
MODELS RBB/RBC

*Input to:	Input Volts:
1st A-F	0.15
2nd A-F	0.8
Output	1.5

*1,000 cycle signal applied to control grid of indicated tube.

(2) I-F Input Required to Produce Standard Output. — The following inputs (Table 5-10) apply with "RECEPTION" transfer switch on "MOD," "GAIN" control maximum, band 1, and with plate voltage removed from the first oscillator.

TABLE 5-10
I-F INPUT MICROVOLTS
(400 kc Signal, Modulated 30% Modulation—1000 cycles)
MODELS RBB/RBC

*Input to:	Broad	Med.	Sharp
1st Detector	38	40	25
1st I-F	190	290	220
2nd I-F	4800	10,300	9200
3rd I-F	115,000	90,000	84,000

*Apply signal to control grid of indicated tube.

(3) R-F Inputs to R-F Stages Required for Standard Output. — These inputs (see Table 5-11) apply with the "RECEPTION" transfer switch set at "MOD," "RADIO SELECTIVITY" on "BROAD" and "GAIN" control set to produce 60 microwatts noise output.

TABLE 5-11
R-F INPUT MICROVOLTS
(30% modulated)
MODEL RBB

Band	*Freq. mc	1st Det. grid	2nd R-F Box	1st R-F Box	Dummy Ant.
1 LF	0.5	320	100	24	2.3
HF	0.84	1100	150	28	3.2
2 LF	0.84	290	100	25	2.5
HF	1.41	670	100	28	3.1
3 LF	1.41	360	104	26	2.4
HF	2.37	1000	130	37	4.9
4 LF	2.37	460	110	26	3.9
HF	4.0	1200	120	28	5.3

*Modulation—1,000 cycles. Apply signal to receiver input terminals through dummy antenna (70 ohms effective shunt resistance).

TABLE 5-12
R-F INPUT MICROVOLTS
(30% modulated)
MODEL RBC

Band	Freq. mc	2nd R-F Box	1st R-F Box	Dummy Ant.
1 LF	4.0	111	15	6.8
HF	6.45	140	20	7.0
2 LF	6.45	110	10	7.2
HF	10.3	160	15	7.4
3 LF	10.3	100	9.5	8.8
HF	16.5	150	13	6.8
4 LF	16.5	130	12	8.4
HF	27	95	12	8.0

NOTE

Inputs to the first detector grid have been omitted from the table of inputs for the Model RBC equipment, since in the Model RBC equipment the oscillator excitation is fed into the first detector grid circuit. If a low impedance generator is applied to the first detector grid, the oscillator excitation is so reduced as to preclude measurement.

e. TUBE SOCKET VOLTAGES AND CURRENTS.—

(1) The following tabulations (Tables 5-13 to 5-16) indicate normal tube socket voltages and currents as measured with the Model OE Receiver Analyzing Equipment. Readings on different equipments may be expected to vary by approximately ±20% due to normal variations in components, tubes, meter resistance and calibration. The values tabulated apply for a single receiver operated from the rectifier power unit with a 110/115/120-volt a-c supply and the corresponding primary tap connection in the rectifier power unit. The receiver unit should be set on Band 1 at the nominal high frequency end of the band, "RECEPTION" transfer switch on "MOD," except as noted under "test conditions." USE LOWEST POSSIBLE VOLTAGE SCALE WHICH WILL GIVE ON-SCALE READINGS.

CAUTION

Before removing the first heterodyne oscillator tube (V103 or V203) turn off power or remove regulator tube (V106 or V206) in order to avoid overload of the potentiometer R116 or R219.

TABLE 5-13
TUBE SOCKET VOLTAGES AND CURRENTS
Preselector Unit (Voltage Measured to Ground)
MODEL RBB EQUIPMENT

Tube and Function	Pin	1	2	3	4	5	6	7	8	Test Conditions "GAIN" control setting
	Conn.	S	H	G3	G1	K	G2	H	P	
-6SK7, 1st R-F	Volts	0	6.1†	0.76	0	2.1	66	0	180	*Max.
	Ma	0		0	0	6.0	1.4		5.0	*Max.
	Volts	0	6.1†	13.5	0	13.5	85	0	208	Min.
	Ma	0		0	0	0.5	0.1	0	0.4	Min.
-6SK7, 2nd R-F	Volts	0	6.1†	0.7	0	2.0	66	0	180	*Max.
	Ma	0		0	0	5.7	1.3		4.6	*Max.
	Volts	0	6.1†	13.5	0	13.5	85	0	208	Min.
	Ma	0		0	0	0.34	0.06	0	0.3	Min.
-6AB7, Oscillator	Volts	0	6.3†	0	0	0	90	0	40	*Max.
	Ma	0		0	0	14	3.7		11	*Max.
-6AB7, Detector	Volts	0	0	0	0	7.8	160	6.1†	195	Max.
	Ma	0	0	0	0	1.2	0.2		1.1	Max.

Regulator tube, V106 (pins 1 to 4) = 10 volts a.c.
*Grid grounded.
†A-C voltages — All others d-c.

TABLE 5-14
TUBE SOCKET VOLTAGES AND CURRENTS
Preselector Unit (Voltage Measured to Ground)
MODEL RBC EQUIPMENT

Tube and Function	Pin	1	2	3	4	5	6	7	8	Test Conditions "GAIN" control setting
	Conn.	S	H	G3	G1	K	G2	H	P	
–6AB7, 1st R-F	Volts	0	6.1†	1.3	0	1.3	73	0	182	*Max.
	Ma	0		0	0	5.6	1.1		4.7	*Max.
	Volts	0	6.1†	23	0	23	208	0	211	Min.
	Ma	0		0	0	0	0		0	Min.
–6SK7, 2nd R-F	Volts	0	6.1†	1.25	0	1.25	55	0	182	*Max.
	Ma	0		0	0	5.5	1.2		4.3	*Max.
	Volts	0	6.1†	23.5	0	23.5	155	0	206	Min.
	Ma	0		0	0	1.55	0.34		1.2	Min.
–6AB7, Oscillator	Volts	0	6.3†	0	0	0	85	0	66	*Max.
	Ma	0		0	0	8.8	2.15		8	*Max.
–6SK7, 1st Detector	Volts	0	0	13	0	13	140	6.1†	194	Max.
	Ma	0	0	0	0	2.8	0.64		2.2	Max.

Regulator tube, V106 (pins 1 to 4) = 10 volts a.c.
*Grid grounded.
†A-C voltages — All others d-c.

TABLE 5-15
TUBE SOCKET VOLTAGES AND CURRENTS
IF/AF Unit, IF and CW Oscillator Section
(Voltage Measured to Ground)
MODELS RBB/RBC

Tube and Function	Pin	1	2	3	4	5	6	7	8	Test Conditions "GAIN" control setting
	Conn.	S	H	G3	G1	K	G2	H	P	
–6SK7, 1st I-F	Volts	0	0	4.5	0	4.5	95.0	6.1†	202	*Max.
	Ma	0		0	0	5.8	1.35		4.8	*Max.
	Volts	0	0	23.5	0	23.5	120.0	6.1†	212	*Min.
	Ma	0		0	0	0.24	0.04		0.2	*Min.
–6SK7, 2nd I-F	Volts	0	0	3.5	0	3.5	80.0	6.1†	182	*Max.
	Ma	0		0	0	5.8	1.27		4.8	*Max.
	Volts	0	0	23.5	0	23.5	120.0	6.1†	212	*Min.
	Ma	0		0	0	0.27	0.05		0.22	*Min.
–6SK7, 3rd I-F	Volts	0	0	2.9	0	2.9	70.0	6.1†	180	Max.
	Ma	0		0	0	5.6	1.25		4.4	Min.
	Volts	0	0	24.5	0	24.5	170	6.1†	205	Min.
	Ma	0		0	0	1.8	0.35		1.5	Max.
–6AB7, CW Oscillator	Volts	0	0	125	0	4.2	125	6.1†	145	Max.
	Ma	0		0.08	0	1.85	0.34		1.5	Max.
										"RECEPTION" transfer switch on "CW"

*Grid grounded.
†A-C voltages — All others d-c.

TABLE 5-16
TUBE SOCKET VOLTAGES AND CURRENTS
IF/AF Unit Audio System (Voltages Measured to Ground)
Models RBB/RBC

Tube and Function	Pin	1	2	3	4	5	6	7	8	Control Settings			
	Conn.	S	H	G3	G1	K	G2	H	P	"Gain"	"Reception"	"Silencer"	"Output Level"
–6SK7, 1st A-F (V307)	Volts	0	0	0	0	1.55	28.0	6.1*	68.0	Max.	"MOD"	Max.	——
	Ma	0		0	0	1.45	0.36		1.1	Max.	"MOD"	Max.	——
–6AB7, 2nd A-F (V310)	Volts	0	0	0	0	1.35	47.0	6.1*	68.0	Max.	"MOD"	Max.	——
	Ma	0		0	0	1.56	3.2		1.25	Max.	"MOD"	Max.	——
–6SK7, SIL-OL-AMP (V308)	Volts	0	0	0	0	1.4	15.0	6.1*	60	Min.	"CW-OL"	Max.	——
	Ma	0		0	0	0.32	0.08		0.25	Min.	"CW-OL"	Max.	——
	Volts	0	0	0	0.06	3.4	55.0	6.1*	7	Max.	"MOD-AVC-SIL"	Max.	——
	Ma	0		0		0.7	0.34		0.38	Max.	"MOD-AVC-SIL"	Max.	——
	Volts	0	0	0	–0.2	0	0	6.1*	180	Max.	"MOD-AVC-SIL"	Min.	——
	Ma	0		0		0	0		0	Max.	"MOD-AVC-SIL"	Min.	——

Tube and Function	Pin	1	2	3	4	5	6	7	8	Control Settings			
	Conn.	NC	H	P	G2	G1	NC	H	K-G3	"Gain"	"Reception"	"Silencer"	"Output Level"
–6K6-GT, Output (V311)	Volts		0	192	200			6.1*	13.5	Max.	"MOD"	Max.	——
	Ma			18.5	2.8				22	Max.	"MOD"	Max.	——

Tube and Function	Pin	1	2	3	4	5	6	7	8	Control Settings			
	Conn.	S	H	PD2	KD2	PD1	NC	H	KD1	"Gain"	"Reception"	"Silencer"	"Output Level"
–6H6, NL-OL (V306)	Volts	0	0	0.4	60.0	–4.61		6.1*	0.2	Min.	"CW-OL"	——	Max.
	Ma	0		0.03	0.03	0			0	Min.	"CW-OL"	——	Max.
	Volts	0	0	0	0	–4.6		6.1*	0.2	Max.	"CW-OL"	——	Min.
	Ma	0		0.11	0.11	0			0	Max.	"CW-OL"	——	Min.
–6H6, SIL-OL (V309)	Volts	0	0	0	0.4	0		6.1*	0	Min.	"CW-OL"	——	Max.
	Ma	0		0.03	0.03	0			0	Min.	"CW-OL"	——	Max.
	Volts	0	0	0	0	0		6.1*	0	Max.	"CW-OL"	——	Min.
	Ma	0	0	1.2	1.2	0			0	Max.	"CW-OL"	——	Min.
	Volts	0	0	0	0.4	0.2		6.1*	130	Max.	"MOD-AVC-SIL"	Max.	Max.
	Ma	0		0.02	0.02	0			0	Max.	"MOD-AVC-SIL"	Max.	Max.
	Volts	0	0	0	0.4	156		6.1*	160	Max.	"MOD-AVC-SIL"	Min.	Min.
	Ma	0		0.02	0.02	0.02			0.02	Max.	"MOD-AVC-SIL"	Min.	Min.
–6H6, DET-AVC (V305)	Volts	0	6.1	0	30	–0.3		0	0.02	Max.	"MOD"	Max.	Max.
	Ma	0	0	0	0	0		0	0	Max.	"MOD"	Max.	Max.

*A-C voltages—All others d-c.

RESTRICTED

f. POINT TO POINT RESISTANCE MEASUREMENTS.—

(1) The following tables (5-17 to 5-22) indicate normal point to point resistance values as measured with the Model OE Receiver Analyzing Equipment. Readings on different equipments may be expected to vary in the order of ±20 per cent. The values indicated apply when the receiver unit is **disconnected** from the rectifier power unit, and in the case of tube socket terminals, apply with the particular tube removed and all other tubes in place.

TABLE 5-17
OUTPUT PLUG J302
MODELS RBB/RBC

Terminal	Ohms
1 — Gnd.	0
2 — Gnd.	1.3
3 — Gnd.	1.3

TABLE 5-18
I-F/A-F UNIT RECEPTACLE J301
MODELS RBB/RBC

	MODEL RBB EQUIPMENT	MODEL RBC EQUIPMENT
Terminal	Ohms	Ohms
A — Gnd.	7.0	7.0
B — Gnd.	0	0
C — Gnd.	0	0
D — Gnd.	0.3	0.3
E — Gnd.	open	open
F — Gnd.	0	0
G — Gnd.	10,000	15,000
S — Gnd.	open	open
P — Gnd.	open	open

TABLE 5-19
COIL BOX TERMINALS

Box	Terminal	Band 1	Band 2	Band 3	Band 4
		Ohms	Ohms	Ohms	Ohms
MODEL RBB EQUIPMENT					
Antenna	Ant.-Gnd.	4.3	2.4	1.2	0.6
	Line-Gnd.	0.2	0.2	0.2	0.2
	C149-A-Gnd.	3.0	1.6	1.0	0.6
	C149-B-Gnd.	300,000	300,000	300,000	300,000
1st R-F	Input-Gnd.	300,000	300,000	300,000	300,000
	C149-C-Gnd.	300,000	300,000	300,000	300,000
	Output-Gnd.	300,000	300,000	300,000	300,000
2nd R-F	Input-Gnd.	300,000	300,000	300,000	300,000
	C149-D-Gnd.	100,000	100,000	100,000	100,000
	Output-Gnd.	100,000	100,000	100,000	100,000
Oscillator	C149-E-Gnd.	Open	Open	Open	Open
	Output-Gnd.	Open	Open	Open	Open
MODEL RBC EQUIPMENT					
Antenna	Ant.-Gnd.	0.2	0.15	0.15	0.1
	Line-Gnd.	0.1	0.15	0.15	0.15
	C257-A-Gnd.	0.2	0.15	0.1	0.1
1st R-F	Input-Gnd.	0.2	0.15	0.1	0.1
	C257-C-Gnd.	0.2	0.15	0.1	0.1
2nd R-F	Input-Gnd.	1,400,000	1,400,000	1,400,000	1,400,000
	C257-D-Gnd.	Open	Open	Open	Open
Oscillator	C257-E-Gnd.	Open	Open	Open	Open

TABLE 5-20

TUBE SOCKET RESISTANCE MEASUREMENTS TO GROUND

(Tube Removed from Socket Under Test)

(All Other Tubes in Place)

MODEL RBB EQUIPMENT

Tube Function	Socket Pin Number								"RECEPTION" Switch Setting
	1	2	3	4	5	6	7	8	
	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	
1st R-F (V101)	0	0.3	120	300,000	340	15,000	0	15,000	"MOD"
2nd R-F (V102)	0	0.3	120	300,000	340	15,000	0	15,000	"MOD"
Oscillator (V103)	0	40	0	47,000	0	Open*	0	Open*	"MOD"
1st Det. (V104)	0	0	0	100,000	6,000	110,000	0.3	15,000	"MOD"
Regulator (V106)	Open*	No conn.	No conn.	4.5					——
1st I-F (V301)	0	0	680	220,000	680	8,000	0.3	10,000	"MOD"
2nd I-F (V302)	0	0	470	100,000	470	18,000	0.3	15,000	"MOD"
3rd I-F (V303)	0	0	470	1,500,000	470	110,000	0.3	15,000	"MOD"
CW Osc. (V304)	0	0	140,000	68,000	1,950	140,000	0.3	47,000	"CW"
1st A-F (V307)	0	0	0	3,200,000	1,000	480,000	0.3	120,000	"MOD"
SIL-OL-AMP (V308)	0	0	0	50,000	3,900	2,200,000	0.3	500,000	"CW-OL"
SIL-OL-AMP (V308)	0	0	0	50,000	950	500,000	0.3	120,000	"MOD"
2nd A-F (V310)	0	0	0	2,700,000	3,900	250,000	0.3	500,000	"MOD-AVC-SIL"
Output (V311)	No. conn.	0	10,000	10,000	1,000,000	No conn.	0.3	680	"MOD"
Det.-AVC (V305)	0	0.3	700,000	7,800	540,000	No conn.	0	15,000	"MOD"
NL-OL (V306)	0	0	Open	25,000	270,000	No conn.	0.3	2,300,000	"MOD"
SIL-OL (V309)	0	0	0	Open	1,600,000	No conn.	0.3	1,100,000	"MOD"

* These circuits are open only when the Power Unit is disconnected from the Receiver.

TABLE 5-21
TUBE SOCKET RESISTANCE MEASUREMENTS TO GROUND
(Tube Removed from Socket Under Test)
(All Other Tubes in Place)
MODEL RBC EQUIPMENT

Tube Function	Socket Pin Number								"RECEPTION" Switch Setting
	1	2	3	4	5	6	7	8	
	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms	
1st R-F (V201)	0	0.3	220	1,300,000	220	140,000	0	20,000	"MOD"
2nd R-F (V202)	0	0.3	220	1,300,000	220	140,000	0	20,000	"MOD"
Oscillator (V203)	0	40	0	47,000	0.1	Open*	0.15	Open*	"MOD"
1st Det. (V204)	0	0	4,700	1,000,000	4,700	120,000	0.3	20,000	"MOD"
Regulator (V206)	4.5	No conn.	No conn.	Open*					——
1st I-F (V301)	0	0	680	220,000	680	11,000	0.3	15,000	"MOD"
2nd I-F (V302)	0	0	470	100,000	470	21,000	0.3	20,000	"MOD"
3rd I-F (V303)	0	0	470	1,500,000	470	115,000	0.3	20,000	"MOD"
CW-OSC. (V304)	0	0	140,000	68,000	1,950	140,000	0.3	52,000	"CW"
1st A-F (V307)	0	0	0	3,200,000	1,000	480,000	0.3	125,000	"MOD"
SIL-OL-AMP (V308)	0	0	0	50,000	3,900	2,200,000	0.3	500,000	"CW-OL"
SIL-OL-AMP (V308)	0	0	0	2,700,000	3,900	250,000	0.3	500,000	"MOD-AVC-SIL"
2nd A-F (V310)	0	0	0	50,000	950	500,000	0.3	125,000	"MOD"
Output (V311)	No conn.	0	15,000	15,000	1,000,000	No conn.	0.3	680	"MOD"
Det.-AVC (V305)	0	0.3	700,000	7,800	540,000	No conn.	0	15,000	"MOD"
NL-OL (V306)	0	0	Open	25,000	270,000	No conn.	0.3	2,300,000	"MOD"
SIL-OL (V309)	0	0	0	Open	1,600,000	No conn.	0.3	1,100,000	"MOD"

* These circuits are open only when the Power Unit is disconnected from the Receiver.

RESTRICTED

5. CIRCUIT ALIGNMENT.

a. GENERAL.—

(1) Under normal operating conditions the Models RBB/RBC radio receiving equipments will maintain adjustment over long periods of time. A periodic test, however, is advisable in order to insure realization of full performance capabilities of the equipment. It is recommended that tests and alignment should be performed under conditions where precision laboratory test equipment is available.

(2) A recheck of circuit alignment and adjustment is advisable, after changes have been made in tubes, components, or wiring. However, in most cases it will be necessary to readjust only the particular portions of the circuit affected by the change.

b. I-F AMPLIFIER.—To align the three i-f amplifier stages, proceed as follows:

(1) Throw the "POWER" switch to the "OFF" position.

(2) Throw the "AUDIO SELECTIVITY" switch to "BROAD."

(3) Turn the "NOISE LIMITER" knob to the "OFF" position.

(4) Turn the "FREQUENCY VERNIER," "OUTPUT LEVEL," "ANT. COMP.," and "SILENCER" knobs to zero.

(5) Turn the "ADD DECIBELS" knob to "OFF."

(6) Turn the "RADIO SELECTIVITY" knob to the "SHARP" position.

(7) Rotate the "GAIN" control knob to "95" (approximately).

(8) Turn the "RECEPTION" knob to the "MOD" position.

(9) Remove the plate supply lead (white with red and green tracer) from the first oscillator box terminal.

(10) Insert a fifty microampere meter in place of the link connector located on the i-f/a-f unit chassis between tubes V310 and V311.

(11) Apply an unmodulated 400-KC ±0.1 per cent input signal to the grid of the first detector tube (V104 or V204 in r-f unit).

(12) Throw the "POWER" switch to "ON."

(13) Adjust the gain control of the signal generator to maintain an output reading (on the microammeter) of seven microamperes.

(14) Adjust the i-f transformers in the order T305, T304, T303, and T302 for maximum output as indicated on the microammeter. These adjustments are made by means of adjustment screws at the top and bottom of each i-f transformer.

(15) No further adjustment is required for the "MEDIUM" and "BROAD" positions of the "RADIO SELECTIVITY" switch, if the i-f transformers and circuits are operating correctly.

c. CW OSCILLATOR ALIGNMENT.—To align the cw oscillator, proceed as follows:

(1) The cw oscillator is adjusted with a 400-KC ±0.1 per cent input signal applied to the control grid of the first detector tube (V104 or V204).

(2) The conditions are the same as specified in Paragraphs b (1) to (12) above for i-f alignment except that the "RECEPTION" knob is set on "CW."

NOTE

Be sure that the "FREQUENCY VERNIER" knob is set at zero (center scale).

(3) Adjust the inductance adjustment screw at the top of i-f transformer T306 until an audible output beat note (approximately 1000 cycles) is obtained.

(4) When the audible beat note is heard, turn the inductance adjustment screw in whichever direction is necessary to obtain zero beat; (zero) beat will be recognized as the setting from which an audible note will be heard when the adjustment screw is turned in either direction.

(5) Turn the adjusting screw clockwise until a note of approximately 1000 cycles is heard.

(6) When the note is near 1000 cycles, throw the "AUDIO SELECTIVITY" switch to "SHARP" and turn the inductance adjustment screw until the loudest signal is heard in the headphones.

(7) If an accurate source of 400 KC input signal is not available, the input signal should first be accurately tuned to the "SHARP" i-f band center with the "AUDIO SELECTIVITY" switch in the "BROAD" position.

(8) The "SHARP" position of the "AUDIO SELECTIVITY" should be used to determine the correct setting for the adjustment of T306 to produce 1,000 cycle output (Paragraph 6).

d. BAND-PASS FILTER PAD.—This adjustment, potentiometer R364, is located on the side of the i-f/a-f unit underneath the chassis (see Figure 5-1). The adjustment should be made as follows:

(1) Turn the "RECEPTION" knob to the "CW" position.

(2) Throw the "AUDIO SELECTIVITY" switch to the "SHARP" position.

(3) Turn the "NOISE LIMITER" knob to "OFF."

(4) Turn the "OUTPUT LEVEL," "SILENCER," "ANT. COMP.," and "FREQUENCY VERNIER" knobs to zero.

(5) Turn the "RADIO SELECTIVITY" knob to "BROAD."

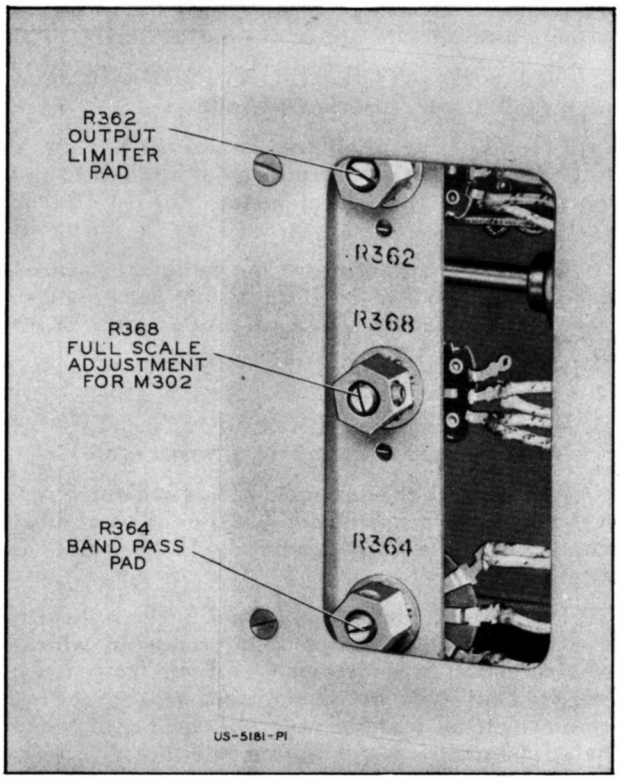


Figure 5-1 — Models RBB/RBC Radio Receivers (Side View of Chassis Showing R362, R364, and R368)

(6) Throw the "POWER" switch to "ON."

(7) While holding the "ADD DECIBELS" knob in the "DIRECT" position, adjust the "GAIN" control knob until the "OUTPUT" meter indicates zero db (i. e., 60 microwatts).

(8) Apply an unmodulated signal at the receiver input of such level as to produce six milliwatts (zero db on the "OUTPUT" meter with "ADD DECIBELS" switch at +20) output at 1000 cycles.

(9) Throw the "AUDIO SELECTIVITY" switch to "BROAD."

(10) Adjust potentiometer R364 to obtain an output 4 db lower than the output obtained in the "SHARP" position.

e. OUTPUT LIMITER PAD.—This adjustment, potentiometer R362, is located on the side of the i-f/a-f unit underneath the chassis (see Figure 5-1). The adjustment should be made as follows:

(1) Turn the "RECEPTION" knob to "CW."

(2) Turn the "OUTPUT LEVEL" control knob to maximum.

(3) While holding the "ADD DECIBELS" knob in the "DIRECT" position, adjust the "GAIN" control knob until the "OUTPUT" meter indicates zero db (i. e., 60 microwatts).

(4) Set the "ADD DECIBELS" switch at "+20."

(5) Apply an unmodulated signal at the receiver input of the proper level to produce an output of +16 db at 1000 cycles with a reference level of 60 microwatts.

(6) Turn the "RECEPTION" knob to "CW-OL."

(7) Adjust potentiometer R362 to obtain an output 4 db higher than the output obtained in the "CW" position.

f. REGULATOR TUBE (6-8B) ADJUSTMENT.—

(1) The adjustment for this tube is a potentiometer (R116 or R219) that is mounted on a bracket located on the under side of the r-f unit in the front right-hand corner. Connect an a-c voltmeter across the heater terminals of the heterodyne oscillator tube (V103 or V203). These terminals are numbers one and two of the terminal board on the oscillator coil box. Adjust R116 or R219 to obtain 6.3 volts ±5 percent oscillator heater voltage. Then vary the a-c line voltage plus and minus ten percent and note heater readings. Allow about five minutes for stabilization after each change before taking readings. One method of varying the line voltage is to change the link connector in the rectifier power unit from 110- to the 120-volt tap. Vary the adjustment of R116 or R219 to obtain as near constant heater voltage as possible for variations in the a-c supply voltage, keeping the heater voltage within the limits of 6.3 volts, ±5 percent. If the line voltage variation was accomplished by changing the rectifier power unit link position, be sure to return it to its proper position.

g. FIRST HETERODYNE OSCILLATOR ALIGNMENT. — To align the first heterodyne oscillator of the Models RBB/RBC radio receiving equipment, proceed as follows:

(1) Turn the receiver on its right side i. e., with the i-f/a-f section on the bottom.

(2) Turn the "RECEPTION" knob to the "MOD" position.

(3) Turn the "RADIO SELECTIVITY" knob to "SHARP."

(4) Turn the "GAIN" control knob to 95 (approximately).

(5) Turn the "ANT. COMP.," "OUTPUT LEVEL," "SILENCER," and "FREQUENCY VERNIER" knobs to zero.

(6) Turn the "NOISE LIMITER" knob to "OFF."

(7) Throw the "AUDIO SELECTIVITY" switch to "BROAD."

(8) Throw the "POWER" switch to "ON."

(9) Turn the "ADD DECIBELS" knob to the "20" position.

(10) Set the signal generator and receiver tuning dial to 0.84 megacycles (RBB) or 6.45 megacycles (RBC). Note: The "HF" adjustments should be made first, then the "LF" (see charts in Figures 5-2 and 5-3).

(11) Apply a modulated input signal (approximately 1,000 cycles) at the receiver antenna terminal, or second r-f box input terminal if the r-f system is misaligned.

(12) Adjust the output of the signal generator until the "output" meter of the receiver indicates zero db (6 milliwatts).

(13) Adjust capacitor C145 or C253, by means of the adjustment screw (see Figures 5-2 and 5-3 for location) until the indicator of the "OUTPUT" meter starts to rise. If the indicator starts to fall, reverse the rotation of the adjustment screw.

(14) Readjust the output of the signal generator until the receiver "OUTPUT" meter again indicates zero db (6 milliwatts).

(15) Repeat (13) and (14) above until the indicator of the "OUTPUT" meter no longer rises. Final adjustment should be made at the "HF" end of the band. Leave the indicator at zero db.

(16) Set the signal generator and receiver tuning dial to 0.5 megacycles (RBB) or 4.0 megacycles (RBC).

(17) Adjust the transformer T113 or T213, by means of the adjustment screw (see Figures 5-2 and 5-3) until the indicator of the "OUTPUT" meter starts to rise. If the indicator starts to fall, reverse the rotation of the adjustment screw.

(18) Readjust the output of the signal generator until the receiver "OUTPUT" meter again indicates zero db (6 milliwatts).

(19) Repeat (17) and (18) above until the indicator of the "OUTPUT" meter no longer rises. Final adjustment should be made at the "HF" end of the band.

(20) Align each band in the manner described above with reference to Figures 5-2 and 5-3 for the proper transformers and capacitors to be adjusted.

h. Note that two responses are obtainable, corresponding to oscillator frequency settings, either 400 KC above or below the signal frequency. The higher frequency setting is correct. This is checked in the following manner: After setting the oscillator, increase the input signal level and vary the input frequency 800 KC above or below the alignment frequency to obtain the image response. If the oscillator setting is correct, the image should be found at 800 KC above the alignment frequency.

i. NEUTRALIZING ADJUSTMENT (MODEL RBC).—This adjustment is made at 27 megacycles after aligning the Band No. 4 heterodyne oscillator (see Paragraphs 5g. and h. above). Proceed as follows:

(1) Turn the "RECEPTION" knob to "CW."

(2) Rotate the "GAIN" control knob to 95 (approximately).

(3) Turn the "ADD DECIBELS" knob to the "+20" position.

(4) Throw the "AUDIO SELECTIVITY" switch to "BROAD."

(5) Turn the "RADIO SELECTIVITY" knob to "BROAD."

(6) Turn the "NOISE LIMITER" knob to "OFF."

(7) Turn the "ANT. COMP.," "FREQUENCY VERNIER," "OUTPUT LEVEL," and "SILENCER" knob to zero.

(8) Turn the "POWER" switch "ON."

(9) Apply an unmodulated cw input signal to the receiver antenna connections of sufficient level to produce approximately 6 milliwatts output (zero db on the "OUTPUT" meter with the "ADD DECIBELS" switch at "+20").

(10) Tune capacitor C252 through resonance and note the output beat note variation.

(11) Adjust L201 for minimum beat note variation.

(12) After completing this adjustment, realign the heterodyne oscillator for Band No. 4 (see Paragraphs 5g. and h.).

j. R-F AMPLIFIER ALIGNMENT.—To align the r-f amplifier and antenna input stages, proceed as follows:

(1) Turn the "RECEPTION" knob to "MOD."

(2) Turn the "RADIO SELECTIVITY" knob to "SHARP."

(3) Turn the "FREQUENCY VERNIER," "OUTPUT LEVEL," and "SILENCER" knobs to zero.

(4) Turn the "NOISE LIMITER" to "OFF."

(5) Throw the "POWER" switch to "ON."

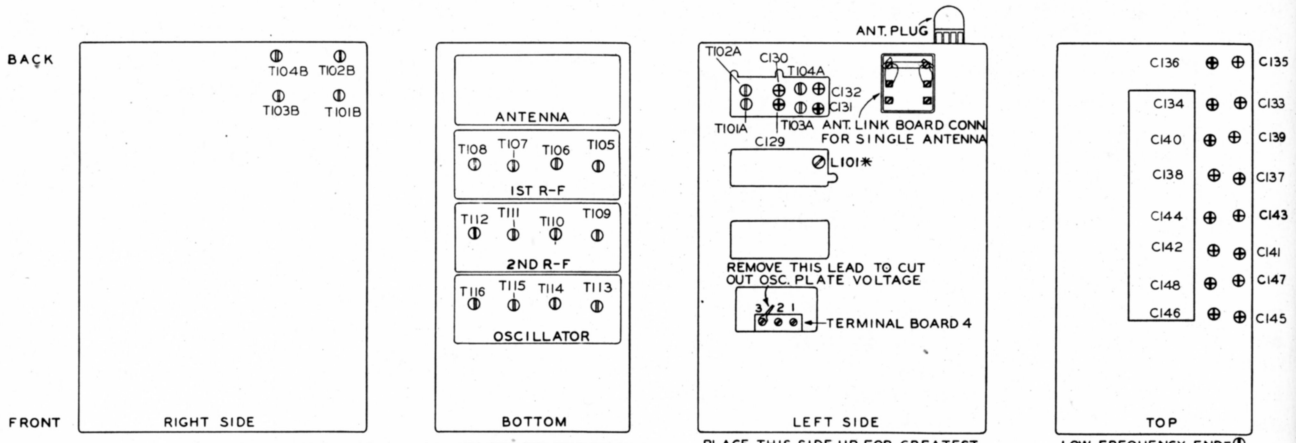
(6) Throw the "AUDIO SELECTIVITY" to "BROAD" or "SHARP."

(7) While holding the "ADD DECIBELS" knob in the "DIRECT" position, adjust the "GAIN" control knob until zero db (60 microwatts) is indicated on the "OUTPUT" meter. The setting of the "GAIN" control knob will be approximately 95.

(8) Turn the "ADD DECIBELS" knob to "+20."

(9) Turn the "ANT. COMP." knob to zero (center of scale).

(10) Set the receiver antenna link for single receiver operation from an antenna (see Figure 2-4).

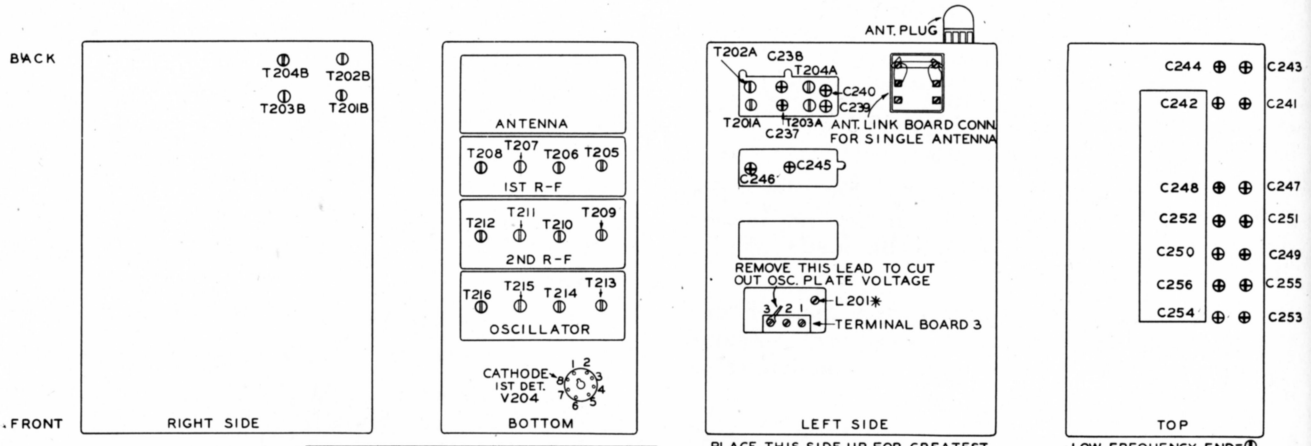


	BAND 1		BAND 2		BAND 3		BAND 4	
	LF 0.5	HF 0.84	LF 0.84	HF 1.41	LF 1.41	HF 2.37	LF 2.37	HF 4.00
1ST HETERODYNE OSCILLATOR	T113	C145	T114	C146	T115	C147	T116	C148
ANTENNA BOX ANTENNA LINK	T101A T101B	C129 C133	T102A T102B	C130 C134	T103A T103B	C131 C135	T104A T104B	C132 C136
1ST R-F BOX	T105	C137	T106	C138	T107	C139	T108	C140
2ND R-F BOX	T109	C141	T110	C142	T111	C143	T112	C144

PLACE THIS SIDE UP FOR GREATEST ACCESS TO ALL SIDES DURING ALIGNMENT.

*SEE PARAGRAPH 5L

Figure 5-2 — Model RBB Radio Receiver, Circuit Alignment (T-617625)



	BAND 1		BAND 2		BAND 3		BAND 4	
	LF 4.0	HF 6.45	LF 6.45	HF 10.3	LF 10.3	HF 16.5	LF 16.5	HF 27.0
1ST HETERODYNE OSCILLATOR	T213	C253	T214	C254	T215	C255	T216	C256
ANTENNA BOX ANTENNA LINK	T201A T201B	C237 C241	T202A T202B	C238 C242	T203A T203B	C239 C243	T204A T204B	C240 C244
1ST R-F BOX	T205	C245	T206	C246	T207	C247	T208	C248
2ND R-F BOX	T209	C249	T210	C250	T211	C251	T212	C252

PLACE THIS SIDE UP FOR GREATEST ACCESS TO ALL SIDES DURING ALIGNMENT.

*THIS ADJUSTMENT IS MADE AT 27MC AFTER ALIGNING THE BAND #4 HETERODYNE OSCILLATOR. (SEE PARAGRAPH 5L)

Figure 5-3 — Model RBC Radio Receiver, Circuit Alignment (T-617618)

(11) Apply a modulated input signal (approximately 1,000 cycles) at the receiver input through the standard dummy antenna.

(12) Adjust the output of the signal generator until zero db (6 milliwatts reads zero db with the "ADD DECIBELS" switch set at "+20") is indicated on the "OUTPUT" meter.

(13) The alignment frequencies and adjustments are listed in Figures 5-2 and 5-3. The "HF" adjustments should be made first, followed by the "LF" adjustment. Make final adjustment at the "HF" end.

(14) Adjust the proper transformers and capacitors as previously described in Paragraph 5g. (see charts in Figures 5-2 and 5-3).

NOTE 1

MODEL RBB

Connect a 1,000-ohm resistor in parallel with capacitor C149-B while making "ANT." adjustments, and in parallel with capacitor C149-A while making "LINK" adjustments.

NOTE 2

MODEL RBC

For final accurate alignment of the second r-f trimmer capacitor (C252) for Band 4, a d-c voltmeter should be connected from the cathode of detector tube V204 to ground (see Figure 5-3). Remove the oscillator plate voltage. Apply a sufficient input to obtain a slight change in the indication on the voltmeter. Adjust capacitor C252 until a maximum indication is obtained on the voltmeter.

k. BAND SPREAD ADJUSTMENT (MODEL RBB).—

(1) After aligning Band 1, set the receiver dial at 0.5 mc, and adjust the knobs and input signal as described in Paragraph 5j. above. Turn the adjustment screw of transformer T105 clockwise until the receiver output is decreased 1 db. Turn the adjustment screw of transformer T109 counter-clockwise until the receiver output is decreased 1 db. Realign capacitors C137 and C141 at 0.84 mc.

l. I-F REJECTION (MODEL RBB). —

(1) After the adjustments of Paragraphs 5j. and k. above have been made, reset the receiver dial to 0.5 mc and the other controls as specified in Paragraph 5j. Apply a 400 KC input, which is 30 percent modulated at 1000 cycles, to the receiver antenna terminal through the standard dummy antenna. The input level should be approximately two volts. Adjust the inductance L101 for minimum output.

m. "INPUT" METER ADJUSTMENT.—

(1) Check the "INPUT" meter adjustment frequently if the instrument is used to measure signal input voltages.

(2) Input readings and adjustments are made with the "RADIO SELECTIVITY" knob on "SHARP" and the "RECEPTION" knob on "MOD-AVC."

(3) Turn the "ANT. COMP.," "FREQUENCY VERNIER," "GAIN," "SILENCER," and "OUTPUT LEVEL" knobs to zero.

(4) Turn the "NOISE LIMITER" and "ADD DECIBELS" knobs to "OFF."

(5) Throw the "POWER" switch to "ON."

(6) With no signal input, adjust the "ZERO SET" knob for zero meter reading.

(7) With a 10,000 microvolt unmodulated signal applied to the receiver antenna connection through the standard dummy antenna (see Paragraph 2b. of this section), adjust potentiometer R368 for a deflection of 80 db. The potentiometer R368 is located on the side of the i-f/a-f unit underneath the chassis (see Figure 5-1). Repeat the above procedure until the meter readings are correct at both of these points.

6. MECHANICAL MAINTENANCE.

a. GENERAL.—

(1) The Models RBB/RBC radio receivers normally require very little mechanical adjustment. However, when it becomes necessary to separate or remove any section of the receivers, refer to the following paragraphs (b. to j.).

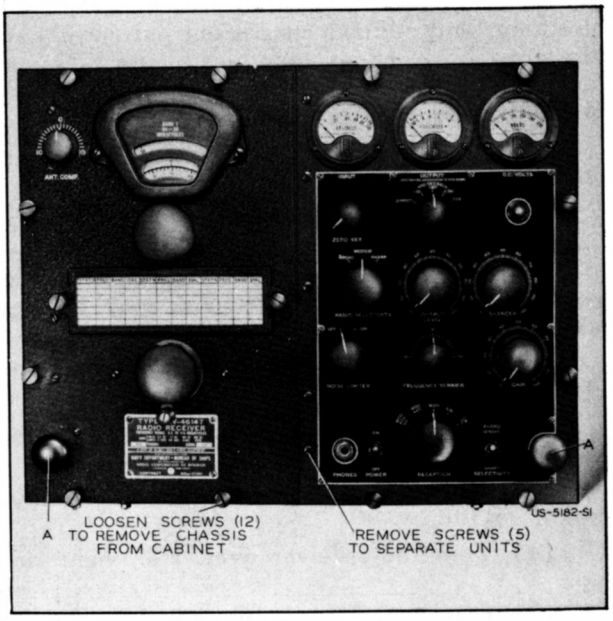


Figure 5-4 — Models RBB/RBC Radio Receivers (Front Panel View)

b. REMOVAL OF CHASSIS FROM CABINET.—

(1) Disconnect the antenna, audio output, and interconnecting cable plugs from their receptacles at the rear of the receiver.

(2) Loosen the twelve panel thumbscrews by turning them approximately six turns. These thumbscrews are of the captive type and do not release entirely (see Figure 5-4).

(3) Take hold of the two round knobs, located on the front of the receiver (see A of Figure 5-4), and pull the chassis out part way, until the stops strike. These stops (see Figure 5-5) may be released by pressing them through the holes on both sides, near the bottom.

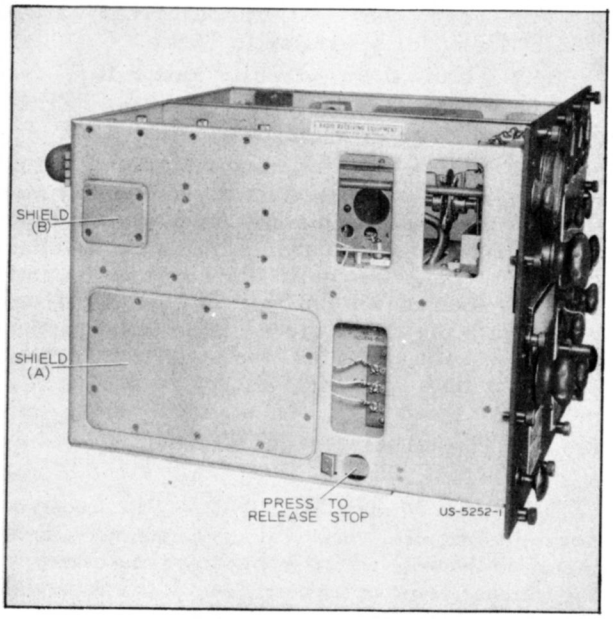


Figure 5-5 — Models RBB/RBC Radio Receivers (Left Side of Chassis)

(4) Pull the chassis completely out and set it on a level surface.

c. SEPARATION OF I-F/A-F AND R-F UNITS.—In the following discussion, it is assumed that the receiver chassis has been removed from the cabinet. The i-f/a-f and r-f units may be separated in the following manner:

(1) Turn the receiver chassis over, i. e., with the r-f boxes on top.

(2) Remove the two shields that are now on top (see Figure 5-5).

(3) Disconnect the power leads on terminal board TB308.

(4) Turn the receiver over, i. e., right side up.

(5) Disconnect the lead located on top of the receiver (see Figure 5-6).

(6) Disconnect the link connecting the two units (see Figure 5-6).

(7) Remove the two screws in each of the two support brackets.

(8) Remove the five screws located on the left-hand side of the i-f/a-f front panel (see Figure 5-4).

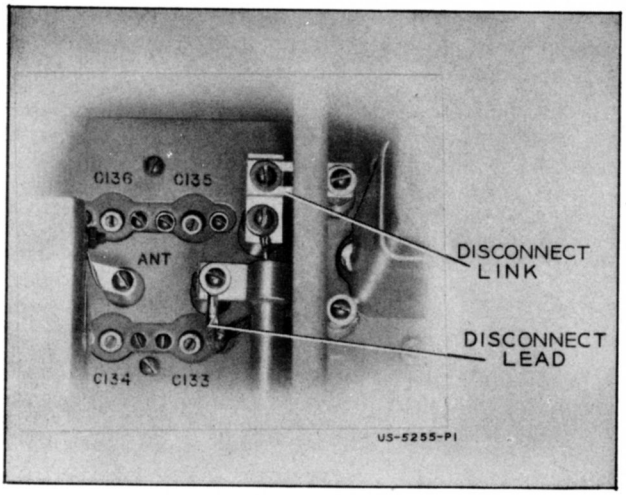


Figure 5-6 — Models RBB/RBC Radio Receivers (Top View. of Chassis, Center Rear Section)

(9) Remove the four encircled screws located on the rear center of the receiver (see Figure 5-7). This will allow the two units to be separated. The intermediate partition should remain on the r-f unit.

d. REMOVAL OF R-F BOX SUB-ASSEMBLIES.—To remove any or all of the r-f box subassemblies from the r-f unit proceed as follows:

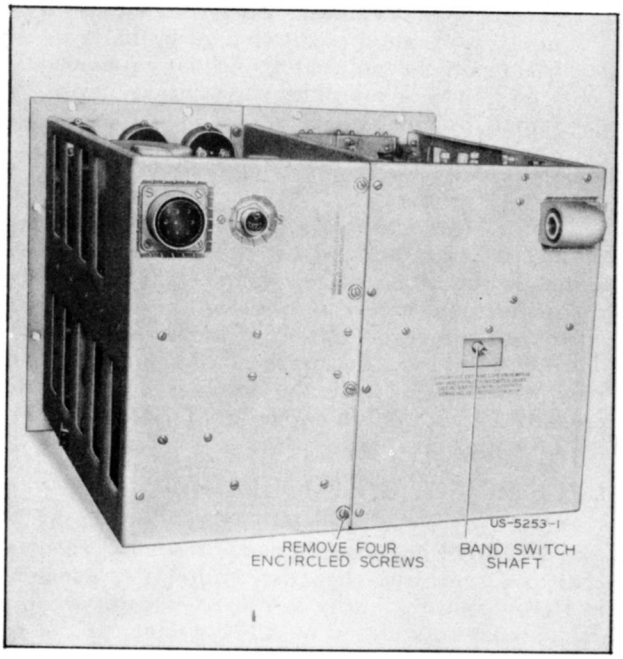


Figure 5-7 — Models RBB/RBC Radio Receivers (Rear View of Chassis)

(1) Remove the receiver chassis from its cabinet (see Paragraph 6b.).

(2) Place the receiver chassis on its right side (with the i-f/a-f unit on the bottom).

(3) Remove the bottom shield plate on the r-f unit.

(4) Turn the band switch to Band 2.

(5) Loosen the band switch coupling set-screw.

(6) Pull out the square band switch shaft located at the rear of the receiver chassis (see Figure 5-7). Use a No. 6-32 screw for the tapped hole in the end of the shaft.

CAUTION

Do not twist or turn the shaft while removing it.

(7) Remove the larger cover (A of Figure 5-5) on the side of the preselector unit frame. It is necessary to remove only this cover when removing the r-f boxes on the Model RBC receiver and removing the r-f boxes or antenna box on the RBB equipment.

(8) Loosen the screws on the terminal boards (TB1, TB2, TB3, and TB4) enough to allow removal of the spade terminals.

(9) Remove the screws connecting the gang capacitor and interbox straps to the box posts. There are from three to six screws per box.

(10) The above steps do not necessarily have to be followed in the order given, but the four screws holding each box to the chassis should be removed last, allowing the box to be removed from the bottom of the set.

e. REPLACEMENT OF R-F BOX SUB-ASSEMBLIES.—To replace any or all of the r-f box sub-assemblies in the preselector unit, the following procedure is necessary:

(1) Make sure that the dial mechanism is set on Band No. 2 and the switch rotor is in Band No. 2 position as shown in Figure 5-8.

CAUTION

Switches must be properly oriented in accordance with the above instructions before removing or inserting the switch shaft.

(2) Insert the box against the bottom of the chassis and put in the four mounting screws from the top, but do not tighten them completely. Carefully insert the switch shaft through the boxes, but do not rotate the shaft more than a few degrees, or sufficient to go through the wafers in different boxes and enter the coupling in the dial mechanism. It may be necessary to shift the box sideways slightly, to allow the shaft to go through freely. After the shaft is in place the four mounting screws and coupling set-screw must be tightened.

(3) The steps (9), (8), (7), (5), (3), and (1) of Paragraph 6d. should then be reversed, completing the reassembly.

f. REPLACEMENT OF BAND SWITCH WAFER IN R-F BOX.—

(1) To replace or repair a band switch wafer

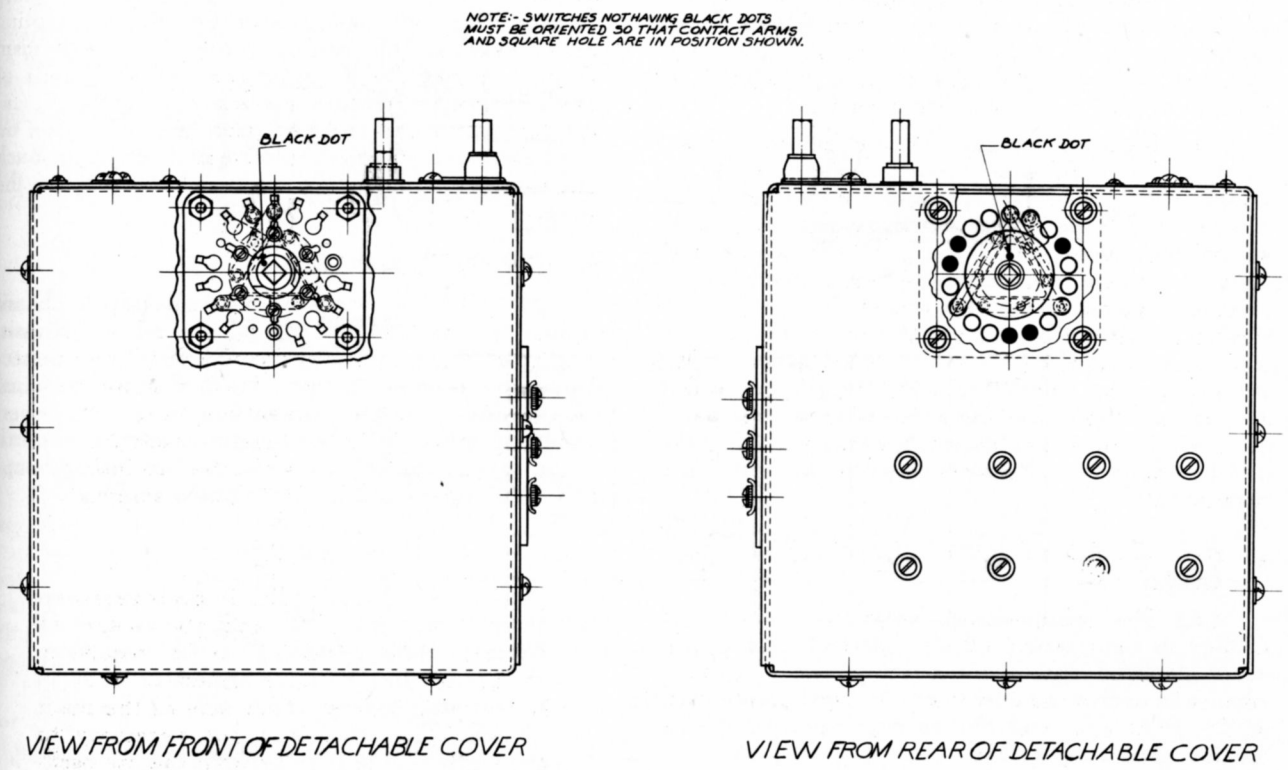


Figure 5-8 — Models RBB/RBC Radio Receivers, Preselector Unit Orientation of Range Switch Rotor Band for No. 2 Position (P-721574)

in an r-f box, it is necessary to remove the box as outlined in Paragraph 6d. and remove the screws which hold the cover on the box. The number of wafers per box varies from one per box for the r-f boxes, two per box for the oscillator and Model RBB antenna box, to three per box for the Model RBC antenna box.

(2) Most switch rotor repairs may best be accomplished by removing most of the component parts from the box completely wired, by removing the mounting screws. This requires unsoldering only a few wires such as those connected to the r-f terminal screws which go through the top of the box.

(3) The switch rotors may then be removed by pushing the "C" washer from the rotor hub. Twisted rotor contact arms should be reformed and bent in such a manner that the contact face of the silver button is between 1/4 and 9/32 of an inch from the mounting surface of the contact arm. This insures sufficient contact pressure when the rotor is replaced. The silver contacts on the rotor arms must all seat near the center of the stator contact.

(4) If the switch wafer is replaced as a unit, unsolder all connections to the wafer, noting the dress of the wires so that they may be replaced as near the same as possible.

(5) When reassembling a switch, check to see that the double contact rotor section is on the stator segment having five contact buttons. The longer contact arm contact should be on the center stator contact; in this position, Band 2, the square shaft hole in the rotor center has the diagonals or corners of the square holes parallel to or at right angles to the top of the wafer.

(6) Reassemble all the component parts, leaving the mounting screws slightly loose in order to permit alignment of the switch wafer or wafers with those in the rest of the set. The wafer mounting screws should be tight enough to just hold the wafers. Assemble the box in place in the receiver chassis, using two screws, and insert the shaft through the boxes, shifting the wafer or box as necessary to align the wafer rotor. Remove the shaft and box carefully, and tighten the wafer screws and those for the remainder of the components. If an entire wafer is replaced this procedure should be followed before the leads are resoldered.

g. R-F GANG TUNING CAPACITOR ASSEMBLY.—

(1) The gang tuning capacitor (C149 or C251) is constructed of low temperature coefficient material and is mounted on an aluminum chassis in such a manner that it is rigidly mounted at the front end and has an expansion or spring tension mounting at the rear.

(2) To remove the gang capacitor, set the tuning dial at zero and loosen the coupling set-screws. The screw connections to the r-f boxes and the three mounting screws should be removed. Loosen the screws holding the spring contact at the top rear. Lift the capacitor out of the receiver chassis.

(3) Extreme care must be exercised in handling the tuning capacitor assembly so as not to disturb its precision capacity alignment. Inspection openings fitted with snap covers are provided along the sides of the unit. The external shield-cover cannot be removed without disturbing the alignment.

CAUTION

Do not remove the external shield cover from the tuning capacitor.

(4) To replace the gang capacitor, set it carefully in place and the mounting screws inserted, leaving the front two slightly loose. Mount the front of the capacitor in such a manner that the coupling will slide without binding from the dial shaft to the capacitor shaft. Be sure to replace shims if any were used.

(5) To reset the coupling, tighten the set-screws on the capacitor shaft with approximately half of the coupling over the end of each shaft. Set the dial mechanism against the zero stop, and rotate the capacitor shaft slowly clockwise until it stops. Do not rotate the dial mechanism far enough to force it beyond this stop. Lift the dial mechanism stop arm roller from the lower outside edge of the large dial and set the linear dial two divisions beyond the stop point. With the dial mechanism in this position, hold the gang capacitor against its stop and tighten the coupling set-screws. In this position, the dial mechanism should engage the stops located at both ends of the linear scale, before the limits of the gang capacitor travel are reached, and the indication on the calibrated scales should be correct. Turn back the dial mechanism beyond zero to re-engage the stop.

h. CW OSCILLATOR.—

(1) The cw oscillator is on a separate chassis which is mounted on top of the i-f/a-f chassis, and may be removed by unsoldering two connections and a shield ground from a small terminal board and a single connection from the lower, inner terminal of the resistor-capacitor board. Then loosen the set-screws in the insulating coupling, and take out the four chassis screws.

NOTE

On Models RBB-1/RBC-1 radio receivers from Serial No. 1001 and above and all Models RBB-2/RBC-2 radio receivers, the cw oscillator tuning capacitor (C301) is mounted on the under side of the main chassis. Therefore it is not necessary to uncouple this unit to remove the cw oscillator chassis. However, it is necessary to unsolder the two connections to this capacitor.

(2) Replace the chassis in the reverse order, tightening the coupling set-screw, and turning the control knob to insure line-up before tightening the four mounting screws.

(3) With the "FREQUENCY VERNIER" knob set to "10" in the counter-clockwise position the plates of the cw oscillator variable capacitor should be at maximum capacity.

i. BAND-PASS FILTER.—

(1) The i-f/a-f portions of the receivers are identical, except for electrical characteristics of the band-pass filters. These are interchangeable mechanically and may be changed by loosening the three terminal screws, removing the spade terminals, and removing the four mounting screws.

j. TUBE SOCKETS AND SPARE CONTACTS.—

(1) Spare tube sockets and spare contacts are furnished for all but the one four-pin socket where only a spare socket is furnished. If any octal type tube socket contact needs replacement, it is necessary only to unsolder the connections to that contact, clean off any excess solder, straighten the contact, and remove it from the top of the socket.. In putting in the new contact, insert it through the top, and give it a slight bend at the bottom of the socket.

k. LUBRICATION.—

(1) Some parts of the dial mechanism may require cleaning and lubricating periodically. Remove dirt or dust from the gears. Lubricate the gear teeth by coating them lightly with oil or grease. Oil may be added to the control shaft bearing, and a small amount of oil may be added to the ends of the idler gear hub and the hubs of the concentric dial bearing, and condenser drive shaft bearing.

(2) Apply a small quantity of lubrication to the bevel gears and shaft bearings of the cw oscillator drive approximately once a year.

NOTE

On Models RBB-1/RBC-1 radio receivers Serial No. 1001 and up and on all Models RBB-2/RBC-2 radio receivers the bevel gears have been removed and replaced with a direct drive.

(3) The main gang tuning capacitor and the antenna and cw oscillator trimmer capacitor will seldom require oiling.

(4) The band change switch wafers have some lubrication on the center hubs at manufacture which will last for the useful life of the equipment. The silver-faced contacts must not be lubricated with ordinary oil or grease. If undue cuttings should appear, put a minute quantity of vaseline on the contacts.

(5) Use a good grade of non-gumming oil or grease, such as Grade I of Navy Specification 14 G1, in lubricating.

CAUTION

Under no circumstances should any abrasive material such as emery cloth, steel wool, etc., be used in or about any part of the receiver.

l. DIAL MECHANISM.—If it is necessary to take the dial mechanism apart, remove it from the chassis along with the front panel (see Paragraph 6c.). In order to remove the front panel, loosen the set-screws of the antenna trimmer shaft coupling, set-screws of the main tuning capacitor, and the band switch shaft coupling. Remove the three screws that secure the dial support casting to the chassis. Remove the dial lamps from their brackets, and the resistor board from the front panel, allowing them both to be supported by the wiring only. If it is necessary to reach the screw that mounts the resistor board, remove the nameplate. Remove the six screws and the pull-knob. After the panel has been removed from the chassis, detach the dial mechanism from the panel by the following steps:

(1) Remove the dial escutcheon, band-switch knob, the tuning-shaft knob, and the four mounting screws.

(2) Set the linear scale at zero, and mark the meshing teeth with a pencil line.

(3) Remove the two screws that hold the thin plate on each side of the tuning knob shaft, and remove the taper pin through the mask hub.

(4) Detach the mask from its shaft.

(5) Lay the index line and plate over the top of the housing, or remove it entirely. (This will protect the wire from possible damage.)

(6) Pull out the center dial and gear assembly, which will expose all the gears and mechanism parts.

m. REASSEMBLY.—To reassemble the center gears and dials, reset the split gear tensions as follows:

(1) Compress the gear springs approximately one tooth.

(2) Carefully remesh the teeth at the former setting. This will cause the stop to operate at zero on the linear scale.

(3) Reassemble the index plate, making sure that the mounting hole clears the hub bushing.

(4) Adjust the wire tension taut, and repin the dial mask.

(5) Assemble the dial mechanism to the front panel with all the screws left loose; the panel should be assembled to the chassis. The switch and capacitor shafts must then be lined up. This may be accomplished by moving the mechanism slightly until the gang capacitor coupling slides readily over the shafts, and the square switch shaft slides directly into its coupling. Both the dial drive and band switch drive should turn without evidence of binding, after tightening all of the mounting screws.

7. METER REPLACEMENTS.

a. The following list indicates types of meters suitable for replacement in Models RBB/RBC equipments:

AWS or Navy Type No.	Symbol Desig.	Description	RCA Dwg. No.
– 22354	M301	Voltmeter 0-250 v dc	M-421740-2
MR25Y300DCVV	M301	Voltmeter 0-300 v dc	K-883928-2
– 22355	M302	Input meter 0-120 db	M-421740-1
	M302	Input meter 0-120 db AWS case	
MR25Y1R5DCVV	M302	Voltmeter 0-1.5 v dc	
– 22353	M303	Output meter 0.6 v zero level, –10/0/5 db	K-864314-1
MR25Y126SPEC	M303	Output meter 0.6 v zero level, –10/0/5 db	K-883928-1

b. Note that A.W.S. meter cases are slightly larger in diameter than the alternate Navy Types listed:

	Case Body Dia.	Mounting Hole Circle Radius
AWS Types	2.21 in.	1.218 in.
Navy Types	2 1/16 in.	1.156 in.

c. When it becomes necessary to replace a Navy Type with an A.W.S. Type (including meter M-427798-1 above which has an A.W.S. case), the dimensions necessitate enlarging the receiver panel openings and deepening the mounting screws slots. This applies to equipments where the mountings have not previously been adapted for the A.W.S. case dimensions.

d. If MR25Y1R5DCVV type is used for replacement, note that this meter employs an 0–1.5 v scale which may be translated into db by use of the table given below. In making calibration adjustments with this type meter, the procedure of Paragraph 6m. is followed, except that R368 is adjusted for a deflection of 0.84 volts instead of 80 db.

Volts	Db
.00	0
.10	10
.28	20
.41	30
.52	40
.62	50
.70	60
.77	70
.84	80
.89	90
.94	100
.975	110
1.00	120

8. RECTIFIER POWER UNIT.

a. GENERAL.—

(1) The rectifier power unit has been carefully constructed and tested by the manufacturer before shipment and should remain in an operative condition over a reasonably long period of time. However, in case service is required at any time, every effort should be made to perform the work in a laboratory properly equipped with the necessary servicing tools. Moreover, the service man should refrain from disturbing the wiring of the unit until he has definitely determined that the difficulty being experienced is not the result of external or normal deteriorating influences, such as worn-out vacuum tubes, improper operating voltages, blown fuses, external noises, etc. Furthermore, in view of the fact that in actual use, the rectifier power unit becomes an integral part of the complete receiving system, it is obvious that to a great extent, trouble location and remedy is largely dependent on symptoms manifested in the receiver section of the installation. When trouble-shooting, therefore, additional reference should be made to Paragraphs 1 to 7 of this section.

(2) Equipment tests required for the accurate diagnosis of trouble may be made with the Model OE Radio Receiver Analyzing equipment or the following:

(a) Multi-range D-C Voltmeter, 0-300 volts, 1000 ohms-per-volts or higher.

(b) Multi-range A-C Voltmeter, 0-150 volts.

(c) Continuity tester, preferably ohmmeter.

b. OUTPUT (LOAD) VOLTAGES.—

(1) If trouble has been traced to the rectifier power unit, the output voltages at the receiver end of the cable should be measured and compared with the following table (5-22):

TABLE 5-22
OUTPUT VOLTAGES
RECTIFIER POWER UNIT

Output Voltages Measured Across	Single Type RBB or RBC Receiver Load
C - D	6.3 v. a-c
A - B	17.0 v. a-c
F - G	200.0 v. d-c
F - E	105.0 v. d-c

(2) The above voltages should check within ±20% including usual tube variations and meter inaccuracies. Failure of these voltages to check indicates a fault in the receiver, interconnecting cable, or power unit. The receiver may be eliminated by a check of the above voltages using a receiver unit known to be in good operating condition or by measurement of no load voltages (see following paragraph). The interconnecting cable can be checked by a continuity test or by recheck of the above voltages at the power unit

end of the cable. Note that the voltage between terminals C-D should measure approximately 0.3 volts higher than the values stated for the receiver end of the cable due to the cable voltage drop.

c. OUTPUT (NO LOAD) VOLTAGES.—

(1) Since the output voltages are dependent upon load conditions, it may be found necessary to measure the power unit output voltages with no load on the output. For operation of the power unit with the receiver unit disconnected, it is necessary to close the a-c supply circuit by means of a short insulated wire jumper connected between terminals S and P of J402 or J403.

CAUTION

Before connecting terminals S and P, remove a-c supply plug P401. Ascertain that the type CRV-VR105 tube and circuit are functioning. Do not operate power unit without load on the output for more than a few minutes.

(2) Replace a-c plug P401 and compare output voltages with the following table, using 110/115/120-volt, 60-cycle supply with the corresponding primary tap connection:

TABLE 5-23
OUTPUT VOLTAGES
RECTIFIER POWER UNIT

Output Voltages Measured Across:	Value
C - D	7.3 v. a-c
A - B	18 v. a-c
F - G	240 v. d-c
F - E	108 v. d-c

(3) If these voltages fail to check within ±2%, the power unit circuits should be checked with reference to the resistance table in the following paragraph (see also schematic Fig. 4-16). If vacuum tube faults are indicated, install tubes which are known to be good.

d. POWER UNIT CIRCUIT RESISTANCES.—

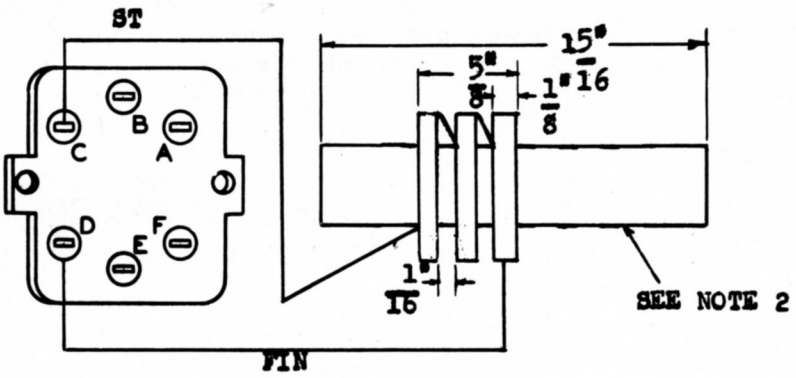
(1) For locating circuit faults, the following resistance measurements may be made to check various portions of the circuit. These measurements should be made with all cables removed from the rectifier power unit receptacles:

(2) Conditions of excessive a-c hum in the receiver unit output may be caused by failure of some portion of the power unit ripple filter circuit. If equipment is available for measurement of a-c ripple voltage, the ripple voltage measured between output terminals F and G with a single receiver load should not exceed 40 millivolts. If a fault is indicated in the ripple filter, the circuit should be checked and the components L405, L406, C406, and C407 checked against the values specified in the winding data and in the parts list.

(3) Excessive r-f interference from local transmitters may be traceable to a defective line filter in the power unit or imperfect ground connections or shielding. The following points should be checked: ground connections to a-c input cable, connection of cable shield to terminal G of P401, connection of terminal G of J401 to power unit panel, tightness of thumbscrews in power unit panel, connection of terminal No. 8 of T401 to ground, line filter shield, line filter circuit and components.

TABLE 5-24
POINT TO POINT RESISTANCE
RECTIFIER POWER UNIT

Points	Resistance Ohms	Circuit
J401-2 to J403-S	1.63	Line filter
J401-1 to T401-1	1.61	Line filter
J401-1 to T401-2	2.68	Line filter and power trans. pri.
J401-1 to T401-3	2.72	Line filter and power trans. pri.
J401-1 to T401-4	2.75	Line filter and power trans. pri.
J403-P to J401-1 (link on 115 v.)	2.75	Line filter and power trans. pri.
V401-2 to V401-8 (tube out)	0.07	Rect. heater winding
J403-F to V401-4 or T401-7	43.6	Half of rectifier plate winding
J403-F to V401-6 or T401-5	43.6	Half of rectifier plate winding
J403-A to J403-B	0.52	17 v. winding and wiring
J403-C to J403-D	0.11	6.3 v. winding and wiring
J403-G to T401-12	200	Ripple filter chokes
J403-G to J403-E	3600	Regulator dropping resistors



COMPONENT
WAVE TRAP
SYMBOL DESIGNATION
L101
REF. DWG. 856759-501

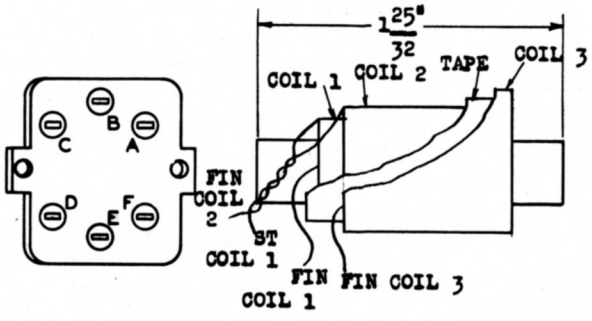
ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	3	AWG.44,Litz	Single Silk	Universal, 4 crosses/turn	50

NOTE 1: Impregnate with wax.

NOTE 2: Polystyrene coil form.

Figure 5-9 — Winding Data, L101 (M-439735)



COMPONENT
OSC. HEATER COIL
SYMBOL DESIGNATION
L201
REF. DWG. 865480-501

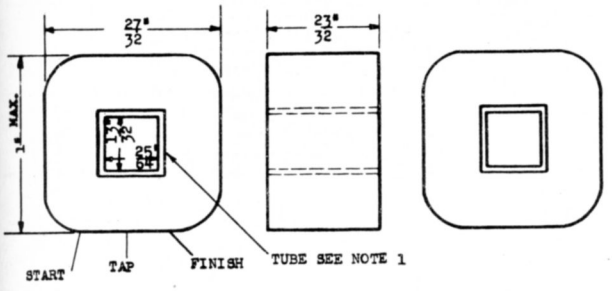
ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	1	AWG. #30	ES	Single Layer, R.H., Close Wound.	12-1/2
2	1	AWG.#24	ES		29-1/2
3	1	AWG.#24	ES	Close Wound	29-1/2

NOTE 1: Start and finish leads to extend one inch beyond terminal board.

NOTE 2: Coil form - polystyrene bakelite.

Figure 5-10 — Winding Data, L201 (M-439736)

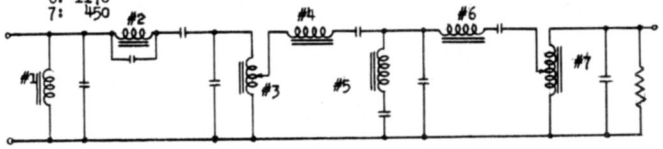


D.C. RESISTANCE (OHMS) AT 25°C

COIL 1: 450
2: 1170
3: 275
4: 1170
5: 275
6: 1170
7: 450

INDUCTANCE

COIL 1: 4.72 Henrys
2: 11.4 Henrys
3: 2.42 Henrys
4: 11.9 Henrys
5: 2.68 Henrys
6: 11.9 Henrys
7: 4.63 Henrys



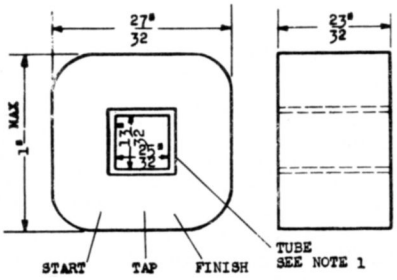
IMPREGNATE COILS AND CORE WITH

NAME OF COIL	COIL IS WOUND ON (OR OVER)	WIRE SIZE A.W.G.	WIRE INSULATION	WT. OF WIRE (LBS.)	TOTAL TURNS ON COIL	TAP AT TURN NO.	TURNS PER LAYER	WIRE TRAV.	INSULATION BETWEEN LAYERS	INSULATION OVER COILS
1	Tube	#38	E	0.034	3500	—	107	0.531	1 Layer 0.0006 Kraft Paper	1 Layer 0.005 Kraft; 1 Layer Acetite.
2	Tube	#40	E	0.031	5400	—	136	0.531	1 Layer 0.0006 Kraft Paper	
3	Tube	#37	E	0.033	2700	900	97	0.531	1 Layer 0.001 Kraft Paper	
4	Tube	#40	E	0.031	5400	—	136	0.531	1 Layer 0.0006 Kraft Paper	
5	Tube	#37	E	0.033	2700	—	97	0.531	1 Layer 0.001 Kraft Paper	
6	Tube	#40	E	0.031	5400	—	136	0.531	1 Layer 0.0006 Kraft Paper	
7	Tube	#38	E	0.034	3500	1170	107	0.531	1 Layer 0.0006 Kraft Paper	

NOTE 1: Tube consists of 2-1/4 turns of 0.010 Kraft Press Board, wrapped with 0.002 celulose acetate.

COMPONENT
BAND PASS FILTER
SYMBOL DESIGNATION
L301-1
REF. DWG. E-901008-501

Figure 5-11 — Winding Data, L301-1 (M-439737)

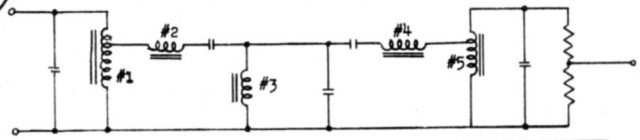


D. C. RESISTANCE (OHMS) AT 25°C.

COIL 1: 718
2: 1750
3: 45
4: 1750
5: 718

INDUCTANCE

COIL 1: 5.65 H
2: 16.9 H
3: 0.506 H
4: 16.9 H
5: 5.65 H



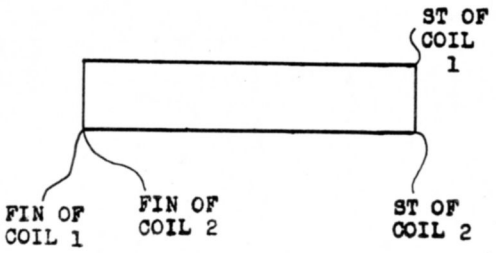
IMPREGNATE COILS AND CORE WITH MS 41

NAME OF COIL	COIL IS WOUND ON (OR OVER)	WIRE SIZE A.W.G.	WIRE INSULATION	WT. OF WIRE (LBS.)	TOTAL TURNS ON COIL	TAP AT TURN NO.	TURNS PER LAYER	WIRE TRAV.	INSULATION BETWEEN LAYERS	INSULATION OVER COILS
1	Tube	#39	E	0.032	4300	1830	120	0.531	1 Layer 0.0006 Kraft Paper	1 Layer 0.005 Kraft; 1 Layer Acetite
2	Tube	#41	E	0.031	6600	—	152	0.531	1 Layer 0.0006 Kraft Paper	
3	Tube	#33	E	0.033	1100	—	62	0.531	1 Layer 0.0015 Kraft Paper	
4	Tube	#41	E	0.031	6600	—	152	0.531	1 Layer 0.0006 Kraft Paper	
5	Tube	#39	E	0.032	4300	1830	120	0.531	1 Layer 0.0006 Kraft Paper	

NOTE 1: Tube consists of 2-1/4 turns of 0.010 Kraft Press Board, wrapped with 0.002 celoluse acetate.

COMPONENT
BAND PASS FILTER
SYMBOL DESIGNATION
L-301-2
REF. DWG. E-901009-501

Figure 5-12 — Winding Data, L301-2 (M-439738)



COMPONENT
PHONE LEAD FILTER
SYMBOL DESIGNATION
L303-A & B
REF. DWG. K-865413-501

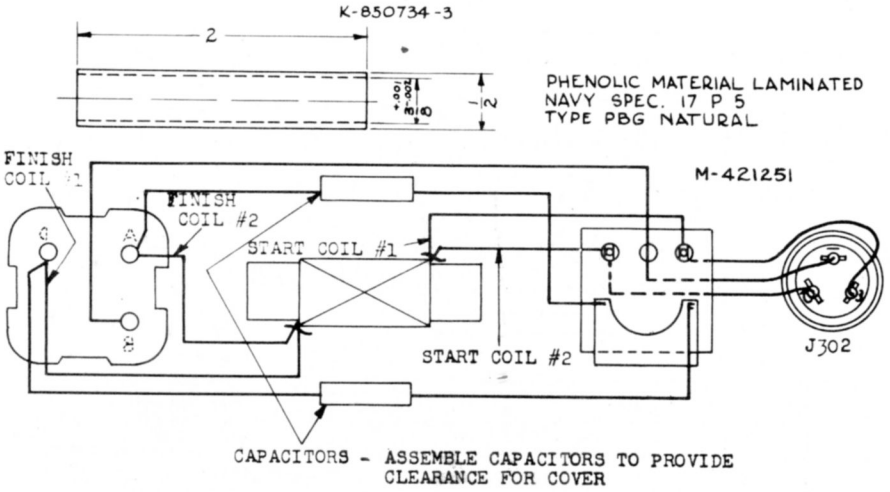
ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	--	AWG.#28	DC	Wind together in Bifilar, single layer, R.H., close wound	30
2	--	AWG.#28	DC		30

NOTE 1: Strip and tin ends of leads 1/2-inch and solder to terminals.

NOTE 2: Coil form; laminated phenolic, 1-5/8" long, 3/8" I.D., 1/2" O.D.

Figure 5-13 — Winding Data, L303-A, B (M-439741)

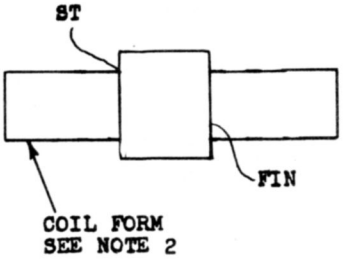


STRIP AND TIN ENDS OF ALL LEADS 1/2 INCH. SOLDER ALL CONNECTIONS.

COIL NO.	CONDUCTOR	METHOD OF WINDING	NUMBER OF TURNS
1	#28 DC	WIND TOGETHER IN BIFILAR SINGLE LAYER, RIGHT HAND CLOSE WOUND	25
2	#28 DC	WIND TOGETHER IN BIFILAR SINGLE LAYER, RIGHT HAND, CLOSE WOUND	25

NOTE #1: AFTER ASSEMBLY OF COILS AND TAPE ON COIL FORM TREAT WITH SUPERLA WAX.

Figure 5-14 — Winding Data, L304-A, B (K-893107)



COMPONENT
VOLTMETER FILTER CHOKE
SYMBOL DESIGNATION
L305
REF. DWG. K-865458-501

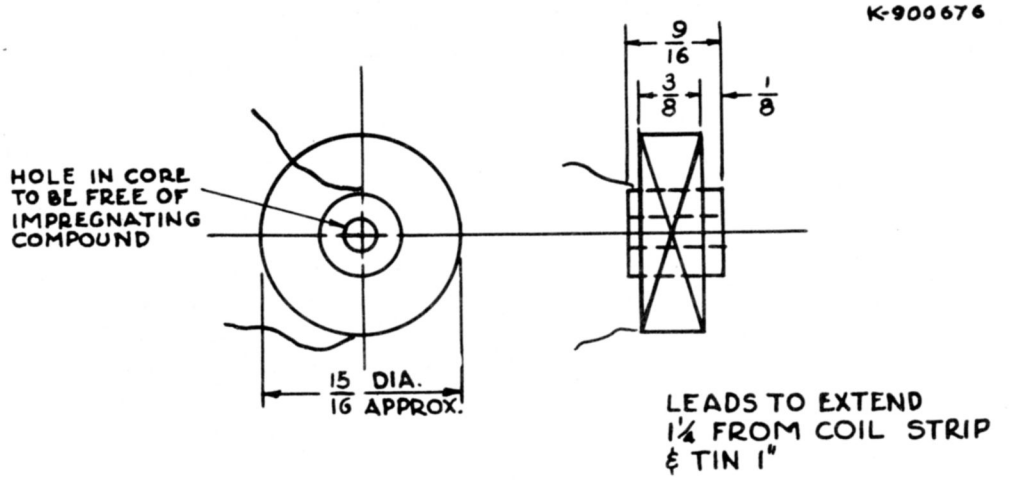
ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	1	AWG. #28	DC	Single Layer, R.H., Close Wd.	25

NOTE 1: Extend leads 1-1/4-inch from finish end of coil form; strip and tin 1/2-inch.

NOTE 2: Coil form; phenolic lamination, 1-3/8" long, 3/8" I.D., 1/2" O.D.

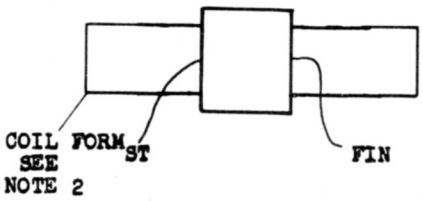
Figure 5-15 — Winding Data, L305 (M-439706)



TREAT CORE & COIL PER MS. 41, & WHEN NECESSARY MS. 124 MAY BE SUBSTITUTED

PART	CONDUCTOR		NO. OF TURNS	NO. OF LAYERS	TURNS PER LAYER	D.C. RES. AT 25°C OHMS	
	BARE DIA.	WT. LBS.					
1	#16 E	.04	23½	4	6	.019	

Figure 5-16 — Winding Data, L306, L307 (K-893105)



COMPONENT
INPUT METER FILTER CHOKE
SYMBOL DESIGNATION
L308-A & B
REF. DWG. K-865458-502

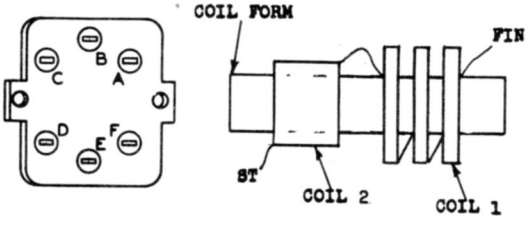
ST - START WINDING
FIN - FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	1	AWG. #28	DC	Single Layer, R.H., Close Wound.	24

NOTE 1: Extend leads 1-1/4-inch from finish end of coil form; strip and tin 1/2-inch.

NOTE 2: Coil form; phenolic lamination, 1-3/8" long, 3/8" I.D., 1/2" O.D.

Figure 5-17 — Winding Data, L308-A, B (M-439740)



COMPONENT
LINE FILTER CHOKE
SYMBOL DESIGNATION
L401, 402, 403, 404
REF. DWG. K-826863-502

ST - START WINDING
FIN - FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	3	AWG. #22E	Single Silk	Universal, 2 crosses/turn	50
2	1	AWG. #22E	Single Silk	Single Layer, Close Wound	40

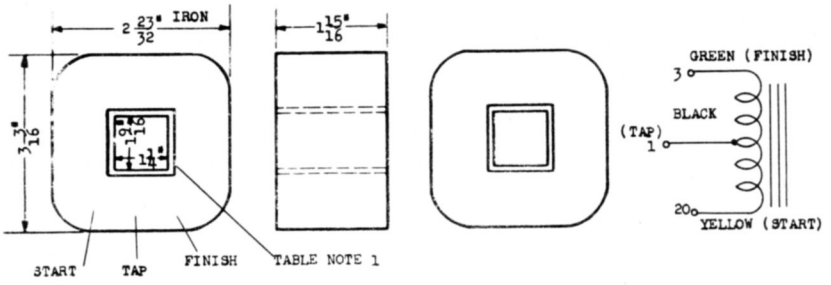
NOTE 1: Coil Sections to be wound in series without a break or splice in connecting wire and all windings to be same direction.

NOTE 2: Start lead to extend 1-1/2-inches from coil, strip and tin end 1/2-inch.

NOTE 3: Finish lead to extend 3 inches from coil; strip and tin end 1/2-inch.

NOTE 4: Coil form; Laminated insulation, 4-1/2" long, 5/8" I.D., 3/4" O.D.

Figure 5-18 — Winding Data, L401, L402, L403, and L404 (M-439742)



IMPREGNATE COILS AND CORE WITH MS 147-1

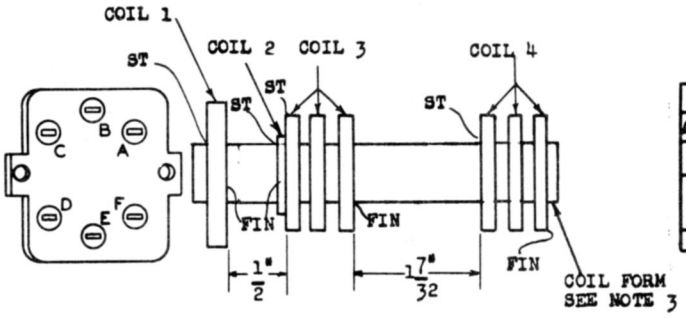
NAME OF COIL	COIL IS WOUND ON (OR OVER)	WIRE SIZE A.W.G.	WIRE INSULATION	WT. OF WIRE (LBS.)	TOTAL TURNS ON COIL	TAP AT TURN NO.	TURNS PER LAYER	WIRE TRAV	INSULATION BETWEEN LAYERS	INSULATION OVER COILS
1	*SPOOL	#27	E	1.25	3150	3081	102	1.688	1 Layer 0.003 Kraft Paper	3 Layers 0.005 Kraft; 1 Layer Acetate

*NOTE 1: Tube consists of 0.030 Kraft Spool, wrapped with 0.002 celulose acetite.

NOTE 2: D.C. Resistance at 25°C; 106 ohms.

COMPONENT
REACTOR
SYMBOL DESIGNATION
L405, 406
REF. DWG. X-900934-502

Figure 5-19 — Winding Data, L405, L406 (M-439734)



COMPONENT
ANTENNA TRANS. BAND 1
SYMBOL DESIGNATION
T101
REF. DWG. F-720559-501

ST-START WINDING
FIN-FINISH WINDING

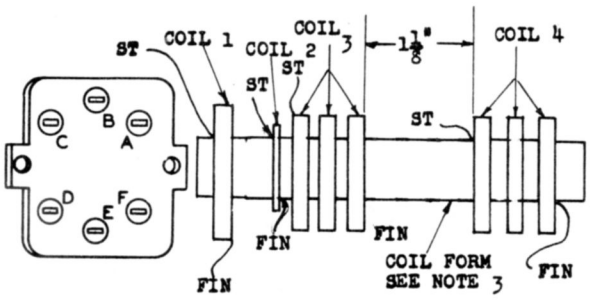
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START*	FINISH*
1	1	AWG. #30E	DS	Universal, 4 crosses/turn	177	C-D	C-D
2	1	AWG. #30E	DS	Close, Single Layer	6	C-D	C-D
3	3	30 Strands AWG. #44Litz	ES	Universal, 6 crosses/turn	57	A-F	A-F
4	3	30 Strands AWG. #44Litz	ES	Universal, 6 crosses/turn	57	A-F	A-F

* NOTE 1: Terminal limits for lead take-off.

NOTE 2: Start and finish leads to extend one inch beyond flange of nearest terminal board.

NOTE 3: Coil form; two coil forms, polystyrene, each 2-21/64" long.

Figure 5-20 — Winding Data, T101 (M-439729)



COMPONENT
ANTENNA TRANS. BAND 2
SYMBOL DESIGNATION
T102
REF. DWG. P-720559-502

ST - START WINDING
FIN - FINISH WINDING

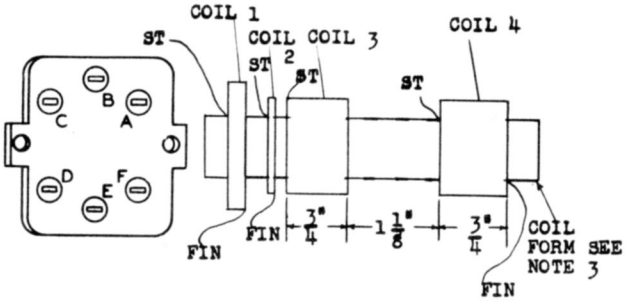
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START *	FINISH *
1	1	AWG. #30E	DS	Universal, 4 crosses/turn	113	C-D	C-D
2	1	AWG. #30E	DS	Close, Single Layer	5	C-D	C-D
3	3	30 Strands AWG. #44 Litz	ES	Universal, 6 crosses/turn	33	A-F	A-F
4	3	30 Strands AWG. #44 Litz	ES	Universal, 6 crosses/turn	33	A-F	A-F

* NOTE 1: Terminal limits for lead take-off.

NOTE 2: Start and finish leads to extend one inch beyond flange of nearest terminal board.

NOTE 3: Coil form; 2 coil forms, polystyrene, each 2-21/64" long.

Figure 5-21 — Winding Data, T102 (M-439711)



COMPONENT
ANTENNA TRANS., BAND 3
SYMBOL DESIGNATION
T103
REF. DWG. P-720559-503

ST - START WINDING
FIN - FINISH WINDING

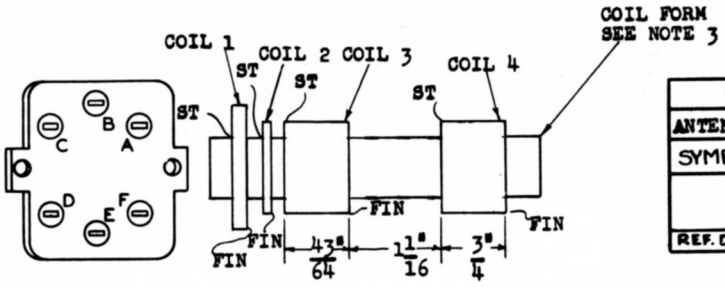
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START *	FINISH *
1	1	AWG. #30E	DS	Universal, 4 crosses/turn	65	C-D	C-D
2	1	AWG. #30E	DS	Close, Single Layer	5	C-D	C-D
3	1	30 Strands AWG. #44 Litz	ES	Progressive, 100 Turns/in., 172 throw, 6 crosses/turn	75	A-F	A-F
4	1	30 Strands AWG. #44 Litz	ES		75	A-F	A-F

*NOTE 1: Terminal limits for lead take-off.

NOTE 2: Start and finish leads to extend one inch beyond flange of nearest terminal board

NOTE 3: Coil form; 2 coil forms, polystyrene, each 2-21/64" long, wax impregnated.

Figure 5-22 — Winding Data, T103 (M-439730)



COMPONENT
ANTENNA TRANS. BAND 4
SYMBOL DESIGNATION
T104
REF. DWG. P-720559-504

ST - START WINDING
FIN - FINISH WINDING

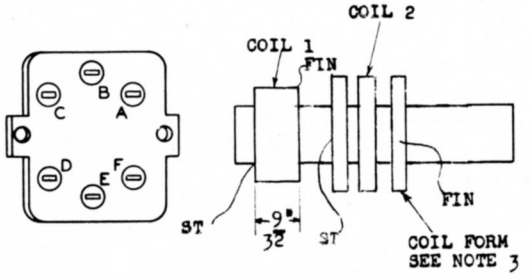
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START *	FINISH *
1	1	AWG. #30E	DS	Universal, 4 crosses/turn	35	C-D	C-D
2	1	AWG. #30E	DS	Close, Single Layer	6	C-D	C-D
3	1	30 Strands AWG. #44 Litz	ES	Single Layer	40	A-F	A-F
4	1	30 Strands AWG. #44 Litz	ES	Single Layer	45	A-F	A-F

* NOTE 1: Terminal limits for lead take-off.

NOTE 2: Start and finish leads to extend one inch beyond flange of nearest terminal board.

NOTE 3: Coil form; 2 coil forms, polystyrene, each 2-21/64" long.

Figure 5-23 — Winding Data, T104 (M-439731)



COMPONENT
R-F TRANS., BAND 1
SYMBOL DESIGNATION
T-105, 109
REF. DWG. M-420939-501

ST - START WINDING
FIN - FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START *	FINISH *
1	1	AWG. #30	DSE	In space indicated, Single Layer	20	A-C	A-C
2	3	30 Strands AWG. #44 Litz	SS	Universal, 6 crosses/turn	57	A-F	A-F

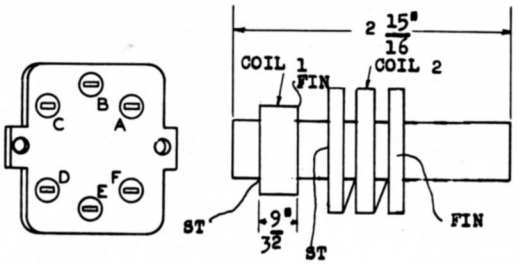
NOTE 1: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 2: Coil #2 - Sections to be wound in series without a break or splice in connecting wire.

NOTE 3: Coil form - polystyrene bakelite, 2-15/16" long.

*NOTE 4: Terminal limits for lead take-off.

Figure 5-24 — Winding Data, T105, T109 (M-439739)



COMPONENT
R-F TRANS. BAND 2
SYMBOL DESIGNATION
T106, 110
REF. DWG. M-420939-502

ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START *	FINISH *
1	1	AWG. #30	DSE	In space indicated, Single Layer	20	A-C	A-C
2	3	30 Strands AWG. #44 Litz	SS	Universal, 6 crosses/turn	33	A-F	A-F

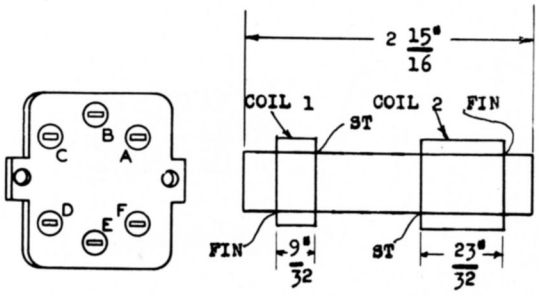
NOTE 1: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 2: Coil #2 - Sections to be wound in series without a break or splice in connecting wire.

NOTE 3: Coil form - polystyrene bakelite.

*NOTE 4: Terminals limits for lead take-off.

Figure 5-25 — Winding Data, T106, T110 (M-439710)



COMPONENT
R-F TRANS., BAND 2
SYMBOL DESIGNATION
T107, 111
REF. DWG. M-420939-503

ST-START WINDING
FIN-FINISH WINDING

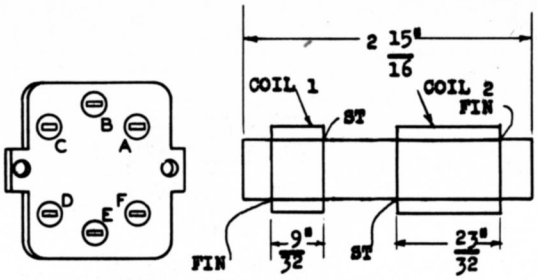
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START *	FINISH *
1	1	AWG. #30	DSE	In space indicated, Single Layer	20	A-C	A-C
2	1	30 Strands AWG. #44 Litz	SS	Progressive, 100 turns/in., 6 crosses/ turn, 0.172 throw	70 ± 1	A-F	A-F

NOTE 1: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 2: Coil form - polystyrene bakelite.

*NOTE 3: Terminal limits for lead take-off.

Figure 5-26 — Winding Data, T107, T111 (M-439732)



COMPONENT
R-F TRANS., BAND 4
SYMBOL DESIGNATION
T106, 112
REF. DWG. M-420939-504

ST - START WINDING
FIN - FINISH WINDING

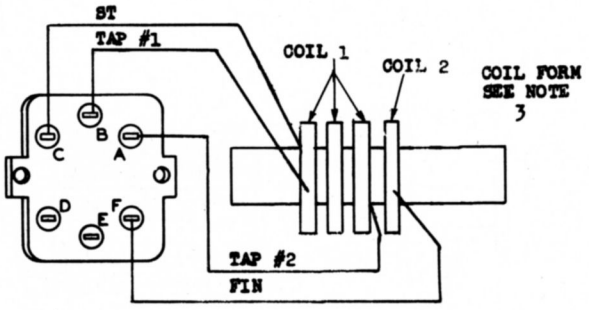
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	FINISH*
1		AWG. #30	DSE	In space indicated, Single Layer	20	A-C	A-C
2		30 Strands AWG. #44 Litz	SS		40	A-F	A-F

NOTE 1: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 2: Coil Form - polystyrene bakelite.

*NOTE 3: Terminal limits for lead take-off.

Figure 5-27 — Winding Data, T108, T112 (M-439733)



COMPONENT
OSC. TRANS., BAND 1
SYMBOL DESIGNATION
T113
REF. DWG. M-420951-505

ST - START WINDING
FIN - FINISH WINDING

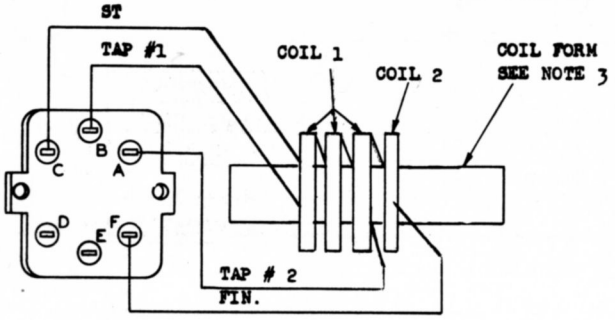
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO 1 TURNS FROM START	TAP NO. 2 TURNS FROM START
1	3	30 Strands AWG. #44 Litz	SS	Universal, 4 crosses/turn	31	10	70
2	1		SS	Universal, 4 crosses/turn	30 ≠ 1		

NOTE 1: Start and finish leads to extend one inch beyond flange of coil form bring out conductor and twist to form tap.

NOTE 2: Coils to be wound without a break except at taps.

NOTE 3: Coil form: polystyrene bakelite, 2-15/16" long, 5/8" O.D., 3/8" I.D.

Figure 5-28 — Winding Data, T113 (M-439709)



COMPONENT
OSC. TRANS., BAND 2
SYMBOL DESIGNATION
T114
REF. DWG. M-420951-506

ST - START WINDING
FIN - FINISH WINDING

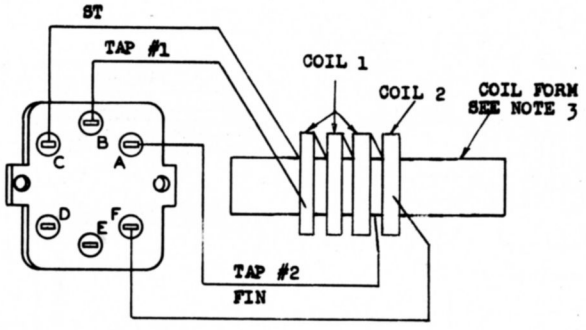
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO 1 TURNS FROM START	TAP NO. 2 TURNS FROM START	TOTAL INDUCTANCE OF COIL
1	3	30 Strands AWG. #44 Litz	SS	Universal, 4 Layers/turn	20	6	48	
2	1		SS	Same as No. 1	22 ∠ 1			

NOTE 1: Start and finish leads to extend one inch beyond flange of coil form; bring out conductor and twist to form tap.

NOTE 2: Coils to be wound without a break except at taps.

NOTE 3: Coil form; polystyrene bakelite, 2-15/16" long, 5/8" O.D., 3/8" I.D.

Figure 5-29 — Winding Data, T114 (M-439707)



COMPONENT
OSC. TRANS., BAND 3
SYMBOL DESIGNATION
T115
REF. DWG. M-420951-507

ST - START WINDING
FIN - FINISH WINDING

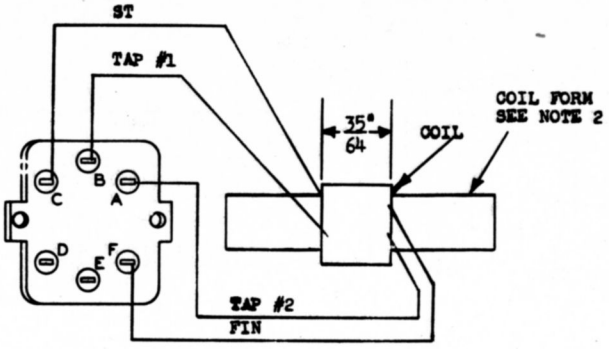
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO 1 TURNS FROM START	TAP NO. 2 TURNS FROM START
1	3	30 Strands AWG. #44 Litz	SS	Universal, 4 crosses/turn	13	6	30
2	1		SS	Universal, 4 crosses/turn	15 ∠ 1/2		

NOTE 1: Start and finish leads to extend one inch beyond flange of coil form; bring out conductor and twist to form tap.

NOTE 2: Coils to be wound without a break except at taps.

NOTE 3: Coil form; polystyrene bakelite, 2-15/16" long, 5/8" O.D., 3/8" I.D.

Figure 5-30 — Winding Data, T115 (M-439708)



COMPONENT
OSC, TRANS. BAND 4
SYMBOL DESIGNATION
T116
REF. Dwg. M-420951-508

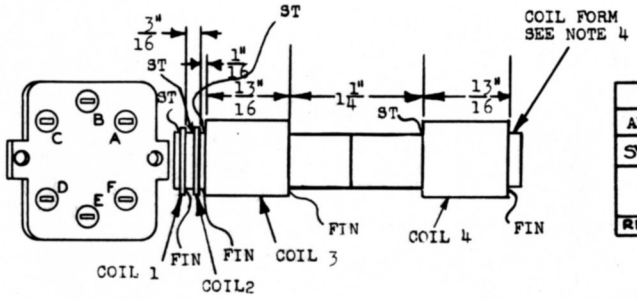
ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO 1 TURNS FROM START	TAP NO. 2 TURNS FROM START
1	1	30 STRANDS AWG. #44 LITZ	SS	SINGLE LAYER	32	4	16

NOTE 1: Start and finish leads to extend one inch beyond flange of coil form; bring out conductor and twist to form tap.

NOTE 2: Coil form; polystyrene bakelite, 2-15/16" long.

Figure 5-31 —Winding Data, T-116 (M-439728)



COMPONENT
ANT. TRANS., BAND 1
SYMBOL DESIGNATION
T201
REF. Dwg. P-720560-501

ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30	DSE	Close, Single Layer	7	C-D	C-D
2	1	AWG. #30	DSE	Close, Single Layer	3	C-D	C-D
3	1	AWG. #24	DC	Single Layer	27	A-F	A-F
4	1	AWG. #24	DC	Single Layer	26	A-F	A-F

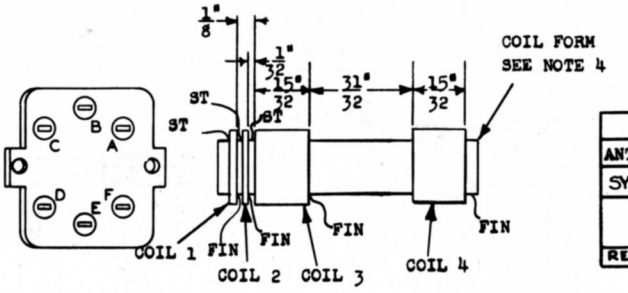
NOTE 1: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 2: All dimensions must be taken directly in line with "E" terminals.

*NOTE 3: Terminal limits for lead take-off.

NOTE 4: Coil form; 2 coil forms, mounted in line, polystyrene bakelite, each 2-21/64" long, 5/8" O.D., 3/8" I.D.

Figure 5-32 — Winding Data, T201 (M-439704)



COMPONENT
ANT. TRANS., BAND 2
SYMBOL DESIGNATION
T202
REF. DWG. F-720560-502

ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #24	DC	Single Layer	16	A-F	A-F
2	1	AWG. #24	DC	Single Layer	16	A-F	A-F
3	1	AWG. #30	DSE	Close Single Layer	4	C-D	C-D
4	1	AWG. #30	DSE	Close Single Layer	2	C-D	C-D

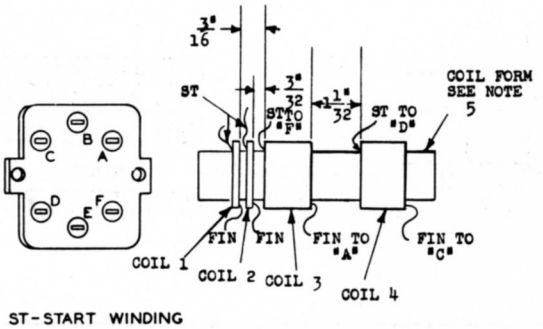
* NOTE 1: Terminal limits for lead take-off.

NOTE 2: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 3: All dimensions must be taken directly in line with "E" terminals.

NOTE 4: Coil form; 2 coil forms mounted in line, polystyrene bakelite, each 2-21/64" long.

Figure 5-33 — Winding Data, T202 (M-439721)



COMPONENT
ANT. TRANS., BAND 3
SYMBOL DESIGNATION
T203
REF. DWG. F-720560-503

ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30	DSE	Close, Single Layer	4	C-D	C-D
2	1	AWG. #30	DSE	Close, Single Layer	2	C-D	C-D
3	1	AWG. #14	E	12 Thds/inch	10-3/4	See dwg	See dwg
4	1	AWG. #14	E	12 Thds/inch	10-3/4	See dwg	See dwg

* NOTE 1: Terminal limits for lead take-off.

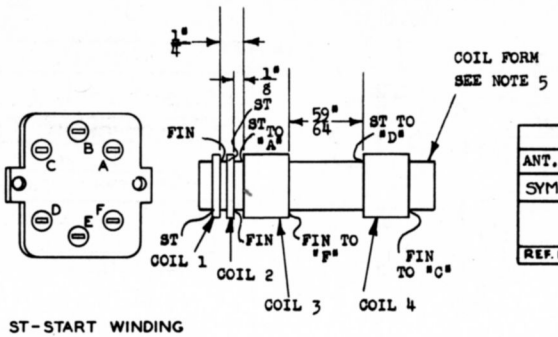
NOTE 2: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 3: Strip ends of coils 3 and 4, 1/2-inch, and tin completely.

NOTE 4: All dimensions must be taken directly in line with "E" terminals.

NOTE 5: Coil form; 2 coil forms mounted in line, polystyrene bakelite, each 2-21/64" long.

Figure 5-34 — Winding Data, T203 (M-439712)



COMPONENT
ANT. TRANS., BAND 4
SYMBOL DESIGNATION
T204
REF. DWG. P-720560-504

ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30	DSE	Close, Single Layer	1-3/4	C-D	C-D
2	1	AWG. #30	DSE	Close, Single Layer	2-1/2	C-D	C-D
3	1	AWG. #12	Tinned Copper	8 THDS./INCH	5-1/4	See dwg.	See dwg.
4	1	AWG. #12	Tinned Copper	8 THDS./INCH	4-3/4	See dwg.	See dwg.

* NOTE 1: Terminal limits for lead take-off.

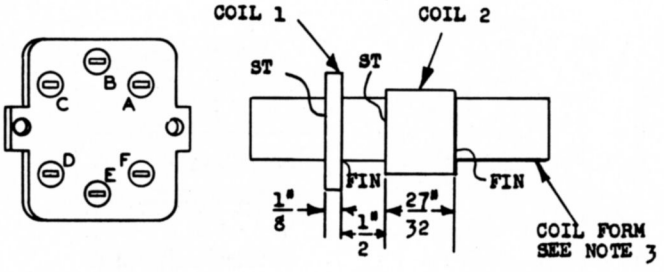
NOTE 2: All dimensions must be taken directly in line with "E" terminals.

NOTE 3: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 4: Strip ends of coils 3 and 4, 1/2-inch, and tin completely.

NOTE 5: Coil form; 2 coil forms mounted in line, polystyrene bakelite, each 2-21/64" long.

Figure 5-35 — Winding Data, T204 (M-439726)



COMPONENT
R-F TRANS., BAND 1
SYMBOL DESIGNATION
T205, 209
REF. DWG. M-420940-501

ST-START WINDING
FIN-FINISH WINDING

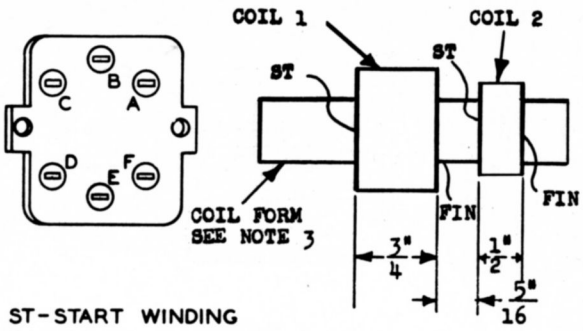
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30E	DS	Universal, 4 crosses/turn	96	A-C	A-C
2	1	AWG. #24 Magnet	DC	Single Layer	27	A-F	A-F

* NOTE 1: Terminal limits for lead take-off.

NOTE 2: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 3: Coil form - polystyrene bakelite, 2-15/16" long, 5/8" O.D., 3/8" I.D.

Figure 5-36 — Winding Data, T205, T209 (M-439725)



COMPONENT
R-F TRANS., BAND 2
SYMBOL DESIGNATION
T206, 210
REF. DWG. M-420940-502

ST - START WINDING
FIN - FINISH WINDING

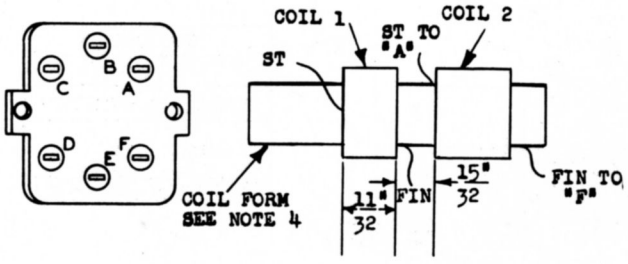
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30E	DS	Progressive, 150 turns/in. 6 crosses/ turn, 1/8 throw	110	A-C	A-C
2	1	AWG. #24 Magnet	DC	Single Layer	16	A-F	A-F

* NOTE 1: Terminal limits for lead take-off.

NOTE 2: All start and finish leads to extend one inch beyond flange of coil form.

NOTE 3: Coil form - polystyrene bakelite, 2-15/16" long.

Figure 5-37 — Winding Data, T206, T210 (M-439724)



COMPONENT
R-F TRANS., BAND 3
SYMBOL DESIGNATION
T207, 211
REF. DWG. M-420940-503

ST - START WINDING
FIN - FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30E	DS	Progressive, 150 turns/in. crosses/turn, 1/8 throw.	49	A-C	A-C
2	1	AWG. #16	EC	16 Thds/in.	11-1/4	See dwg	See dwg

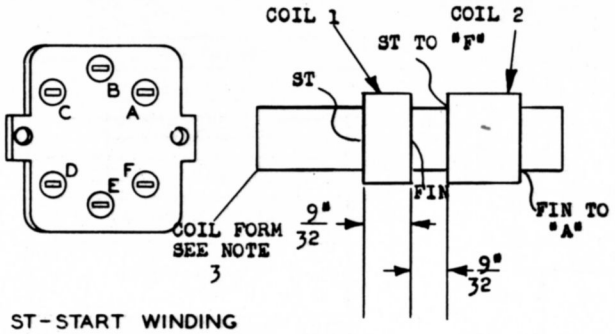
* NOTE 1: Terminal limits for lead take-off.

NOTE 2: Start and finish lead of coil 1 should extend one inch beyond flange of coil form.

NOTE 3: Strip and tin ends of coil 2 for 1/2-inch.

NOTE 4: Coil form - polystyrene bakelite, 2-15/16" long.

Figure 5-38 — Winding Data, T207, T211 (M-439722)



COMPONENT
1ST R-F TRANS. BAND 4
SYMBOL DESIGNATION
T208
REF. DWG. M-420940-504

ST - START WINDING
FIN - FINISH WINDING

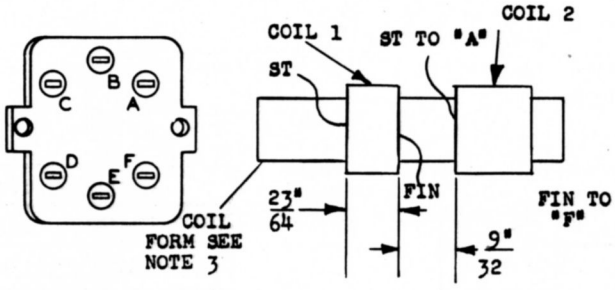
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30E	DS	Single Layer	21	A-C	A-C
2	1	AWG. #12	Copper Tinned	8 THDS./INCH	4-3/4	See dwg	See dwg

* NOTE 1: Terminal limits for lead take-off.

NOTE 2: Start and finish leads of coil 1 to extend one inch beyond flange of coil form.

NOTE 3: Coil form - polystyrene bakelite, 2-15/16" long.

Figure 5-39 — Winding Data, T208 (M-439727)



COMPONENT
2ND. R-F TRANS. BAND 4
SYMBOL DESIGNATION
T212
REF. DWG. M-420940-505

ST - START WINDING
FIN - FINISH WINDING

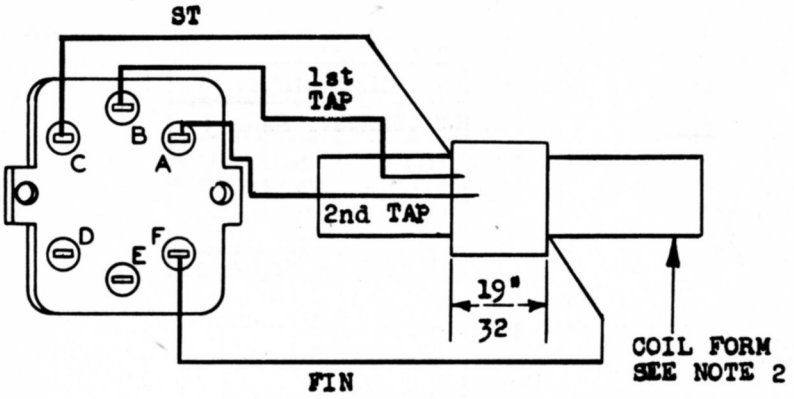
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	*START	*FINISH
1	1	AWG. #30E	DS	Single Layer	27	A-C	A-C
2	1	AWG. #12	Copper Tinned	8 Thds./inch	4-1/4	See dwg	See dwg

* NOTE 1: Terminal limits for lead take-off.

NOTE 2: Start and finish leads of coil 1 to extend one inch beyond flange of coil form.

NOTE 3: Coil form - polystyrene bakelite, 2-15/16" long.

Figure 5-40 — Winding Data, T212 (M-439723)



COMPONENT
OSC. TRANS., BAND 1
SYMBOL DESIGNATION
T213
REF. DWG. M-420957-505

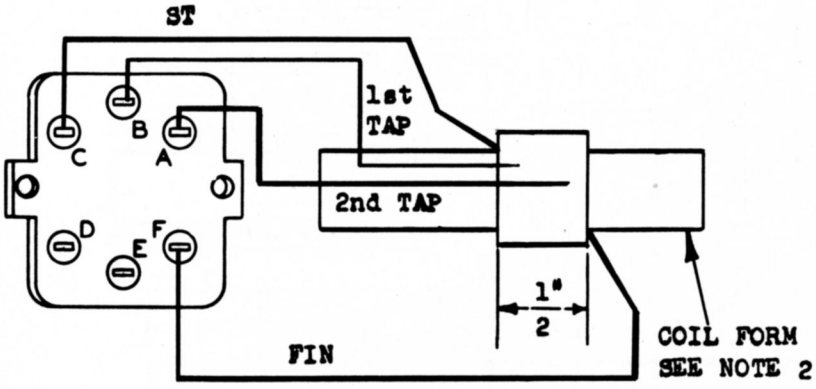
ST - START WINDING
FIN - FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO 1 TURNS FROM START	TAP NO2 TURNS FROM START	TOTAL INDUCTANCE OF COIL
1	1	AWG. #28	DC	Single Layer	28-1/2	7-3/4	17-3/4	

NOTE 1: All leads to extend one inch beyond flange of coil form.

NOTE 2: Coil form - polystyrene bakelite, 2-15/16" long.

Figure 5-41 — Winding Data, T213 (M-439705)



COMPONENT
OSC. TRANS., BAND 2
SYMBOL DESIGNATION
T214
REF. DWG. M-420957-506

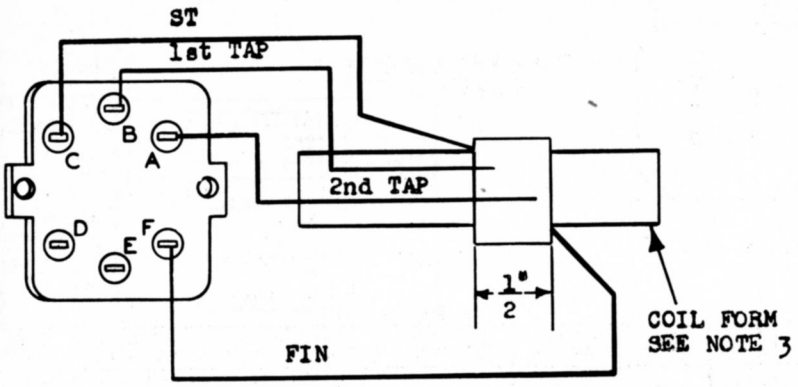
ST - START WINDING
FIN - FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO.1 TURNS FROM START	TAP NO. 2 TURNS FROM START
1	1	AWG. #24	DC	Single Layer	15-1/2	3-3/4	8-3/4

NOTE 1: All leads to extend one inch beyond flange of coil form.

NOTE 2: Coil form - polystyrene bakelite, 2-15/16" long.

Figure 5-42 — Winding Data, T214 (M-439719)



COMPONENT
OSC. TRANS., BAND 3
SYMBOL DESIGNATION
T215
REF. DWG. M-420957-507

ST - START WINDING
FIN - FINISH WINDING

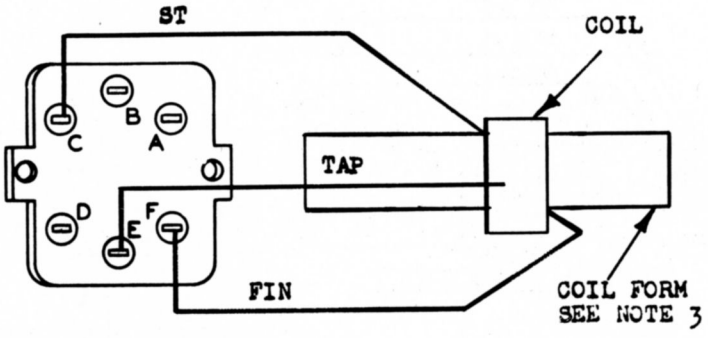
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO.1 TURN FROM START	TAP NO.2 TURN FROM START
1	1	AWG. #18	DC	Single Layer	9-1/2	2-3/4	6-3/4

NOTE 1: Wrap tape around tap leads after soldering.

NOTE 2: All leads to extend one inch beyond flange of coil form.

NOTE 3: Coil form - polystyrene bakelite, 2-15/16" long.

Figure 5-43 — Winding Data, T215 (M-439718)



COMPONENT
OSC. TRANS., BAND 4
SYMBOL DESIGNATION
T216
REF. DWG. M-420957-508

ST - START WINDING
FIN - FINISH WINDING

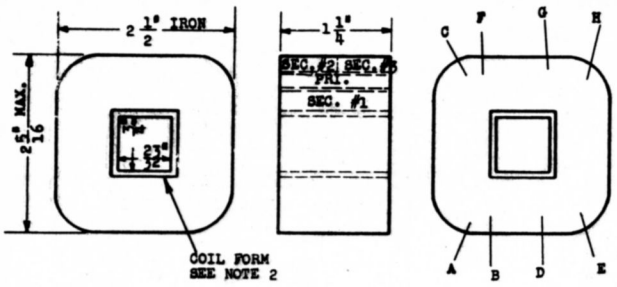
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO.1 TURNS FROM START
1	1	AWG. #14	DC	Close, Single Layer	3-1/2	1-7/8

NOTE 1: Wrap tape around tap leads after soldering.

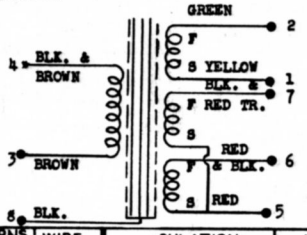
NOTE 2: All leads to extend one inch beyond flange of coil form.

NOTE 3: Coil Form - Polystyrene Bakelite, 2-15/16" long

Figure 5-44 — Winding Data, T216 (M-439717)



NOTE 1: NUMBERS ON SCHEMATIC REFER TO NUMBERS STENCILED ON TRANSFORMER.



A	SEC. #1 ST	BROWN
B	SEC. #1 FIN	BLK. & BROWN
C	E.S.S.#1 & E.S.S. #2	BLK.
D	PRI. ST.	YELLOW
E	PRI. FIN.	GREEN
F	SEC.#2 ST. & SEC.#3ST.	RED
G	SEC.#2 FIN.	RED&BLK.
H	SEC. #3 FIN.	BLK. & RED TR.

IMPREGNATE COILS AND CORE WITH MS 41

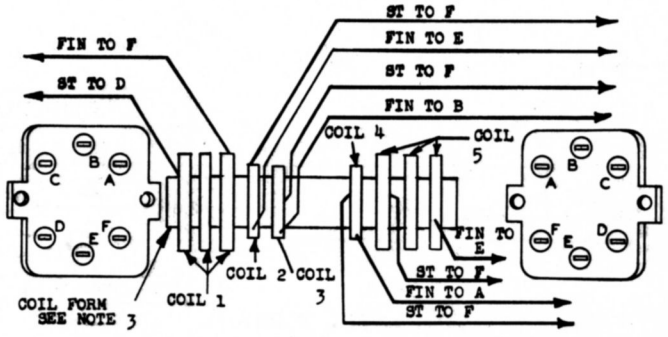
NAME OF COIL	COIL IS WOUND ON (OR OVER)	WIRE SIZE A.W.G.	WIRE INSULATION	WT. OF WIRE (LBS.)	TOTAL TURNS ON COIL	TAP AT TURN NO.	TURNS PER LAYER	WIRE TRAV.	INSULATION BETWEEN LAYERS	INSULATION OVER COILS	D.C. RES. AT 250°C. OHMS
SEC. #1	*TUBE	#31	E	0.030	450	---	94	1.000	1 LAYER 0.008 KRAFT PAPER	2 LAYERS 0.005 KRAFT PAPER LAYER ACETITE.	16.5
E.S.S.#1	SEC. #1	COPPER, 0.002" x 4-5/8" x 1"	---	---	1	---	1	---	------		------
PRI.	E.S.S.	#35	E	0.128	3600	---	146	1.000	1 LAYER 0.001 KRAFT PAPER		45.0
E.S.S. #2	PRI.	COPPER, 0.002" x 6" x 1"	---	---	1	---	1	---	------		------
SEC. #2	E.S.S.	#25	E	0.031	71	---	19	0.406	1 LAYER 0.003 KRAFT PAPER		1.1
SEC. #3	E.S.S.	#25	E	0.031	71	---	19	0.406	1 LAYER 0.003 KRAFT PAPER		1.1

* NOTE 2: 2-1/4 turns of 0.010 Kraft press board.

NOTE 3: Polarity of coils to be additive.

COMPONENT
OUTPUT TRANS.
SYMBOL DESIGNATION
T301
REF. DWG. E-901010-501

Figure 5-45 — Winding Data, T301 (M-439713)



ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	3	Same as No.5	SS	Universal, 4 crosses/turn	50
2	1	AWG.#30E	SS	Universal, 6 crosses/turn	14
3	1	AWG. #30E	SS	Universal, 6 Crosses/turn	14
4	1	AWG. #30E	SS	Close Wound	3
5	3	30 Strands AWG.#44 Litz	SS	Universal, 4 crosses/turn	50

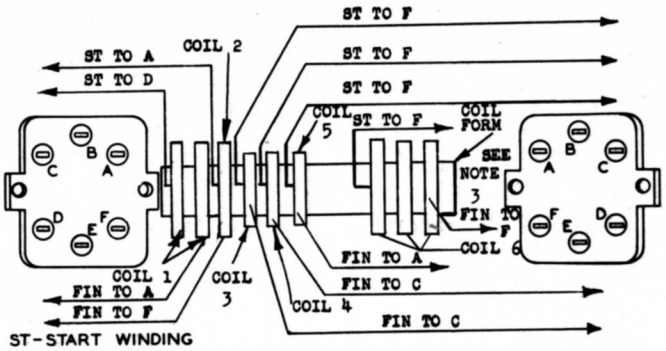
NOTE 1: Start and finish leads to be extended 3# long from coil form.

NOTE 2: Wind coils so that start and finish leads are opposite terminals on side of coils as shown.

NOTE 3: Coil form - polystyrene bakelite, 3.256" long, 0.500" O.D., 0.378" I.D.

COMPONENT
I-F TRANS.
SYMBOL DESIGNATION
T302, 303, 304
REF. DWG. P-720561-504, 505, 506

Figure 5-46 — Winding Data, T302, T303, T304 (M-439716)



COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	START	FINISH	TOTAL INDUCTANCE OF COIL
1	2	Same as No. 6	SS	Universal, 4 crosses/turn	50	—	—	—
2	1	30 Strands AWG. #44 Litz	SS	Universal, 4 crosses/turn	50	—	—	—
3	1	AWG. #30E	SS	Universal, 6 crosses/turn	14	—	—	—
4	1	AWG. #30E	SS	Universal, 6 crosses/turn	14	—	—	—
5	1	AWG. #30E	SS	Universal, 6 crosses/turn	13	—	—	—
6	3	30 Strands AWG. #44 Litz	SS	Universal, 4 crosses/turn	50	—	—	—

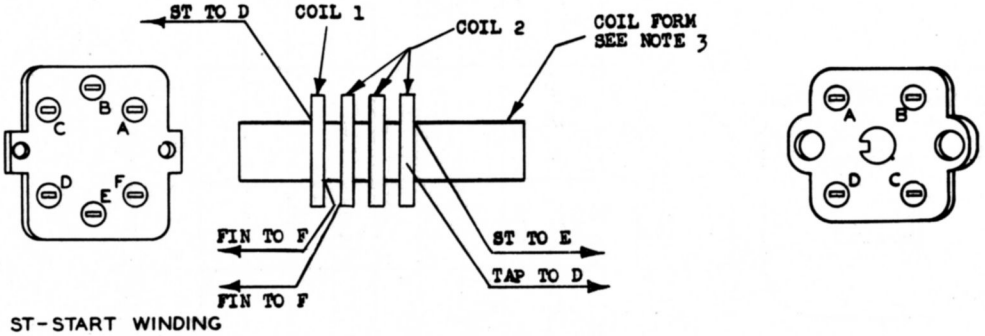
NOTE 1: Start and finish leads to be extended 3" long from coil form.

NOTE 2: Wind coils so that start and finish leads are opposite terminals on side of coils as shown.

NOTE 3: Coil form - polystyrene bakelite, 3.256" long, 0.500" O.D., 0.378" I.D.

COMPONENT
DIODE TRANS.
SYMBOL DESIGNATION
T305
REF. DWG. P-720561-503

Figure 5-47 — Winding Data, T305 (M-439703)



COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION	TAP NO. 1 TURNS FROM START
1	1	30 Strands AWG. #44 Litz	SS	Universal, 4 crosses/turn	54	
2	3		SS		44	21

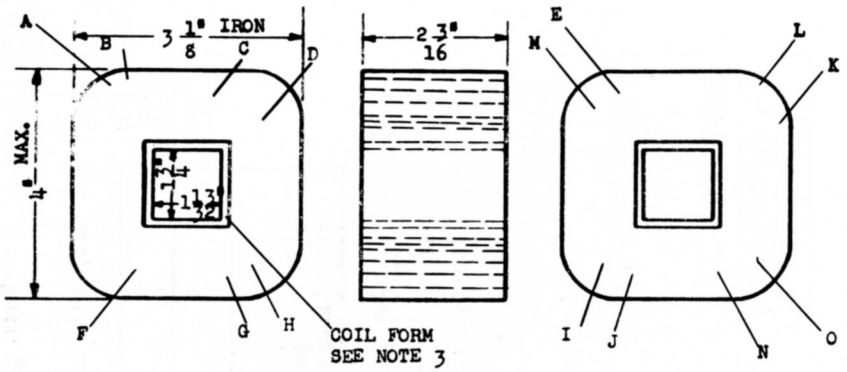
NOTE 1: Wind coils so that start and finish leads are opposite terminals on side of coils as shown.

NOTE 2: Start, tap, and finish leads to be 1-1/4" long, strip and completely tin 1/2".

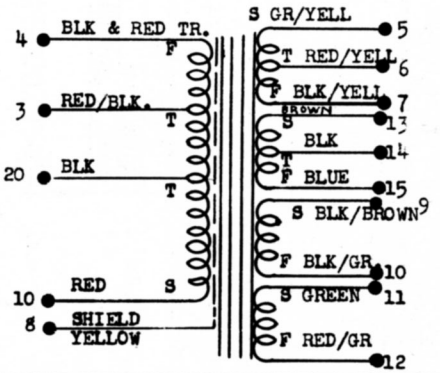
NOTE 3: Coil Form - polystyrene bakelite, 2.187" long, 0.500" O.D., 0.378" I.D.

COMPONENT
CW OSC. TRANS.
SYMBOL DESIGNATION
T306
REF. DWG. P-720561-502

Figure 5-48 — Winding Data, T306 (M-439743)



NOTE 1: NUMBERS ON SCHEMATIC REFER TO NUMBERS STENCILLIED ON TRANSFORMER.



A	PRI. ST.	RED
B	PRI. 248 TAP	BLK.
C	PRI. 260 TAP	RED/BLK
D	PRI. FIN.	BLK/RED TR
E	SHIELD	YELLOW
F	PLATE ST.	GR/YELLOW
G	PLATE TAP	RED/YELL.
H	PLATE FIN.	BLK/YELL
I	FIL. #2 ST.	BLK/BROWN
J	FIL. #2 FIN.	BLK/GR
K	FIL. #1 ST	BROWN
L	FIL. #1 TAP	BLK.
M	FIL. #1 FIN.	BLUE
N	FIL. #3 ST	GREEN
O	FIL. #3 FIN.	RED/GR.

IMPREGNATE COILS AND CORE WITH

NAME OF COIL	COIL IS WOUND ON (OR OVER)	WIRE SIZE A.W.G.	WIRE INSULATION	WT. OF WIRE (LBS.)	TOTAL TURNS ON COIL	TAP AT TURN NO.	TURNS PER LAYER	WIRE TRAV.	INSULATION BETWEEN LAYERS	INSULATION OVER COILS	D.C. RES. AT 25°C. OHMS
PRI.	*TUBE	#18	E	0.66	272	248 - 260	44	1.97	1 LAYER 0.005 KRAFT PAPER	2 LAYERS 0.005 KRAFT. 1 LAYER ACETATE	1.02
SHIELD	PRI.	COPPER, 1-15/16" x 10" x 0.002"		—	1	—	1	—	—		—
PLATE	SHIELD	#29	E	0.300	1350	675	150	1.97	1 LAYER 0.003 KRAFT PAPER		0.95
FIL. #1	PLATE	D.C.C., 0.095" x 0.095"		0.340	16	8	16	1.76	—		—
FIL. #2	FIL. #1	#20	E	0.111	41	—	41	1.48	—		—
FIL. #3	FIL. #2	#18 2 PARAL.	E	0.103	12	—	12	1.07	—		—

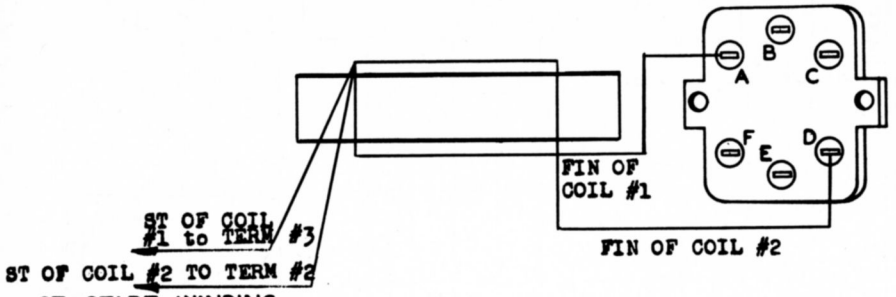
NOTE 2: POLARITY OF COILS TO BE ADDITIVE.

NOTE 3: COIL FORM - 2-1/4 TURNS OF 0.015 THICK KRAFT PRESS BOARD.

COMPONENT
POWER TRANS.
SYMBOL DESIGNATION
T401
REF. DWG K-901013-501

Figure 5-49 — Winding Data, T401 (M-439714)

RESTRICTED



COMPONENT
OUTPUT FILTER
SYMBOL DESIGNATION
Z301
REF. DWG. M-421251-501

ST-START WINDING
FIN-FINISH WINDING

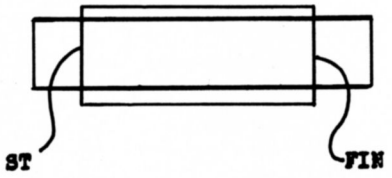
COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	--	AWG. #28	DC	Wind Together in Bifilar Single Layer, R.H., Close wound	25
2	--	AWG. #28	DC		25

NOTE 1: Strip and tin ends of all leads 1/2-inch, solder all connections.

NOTE 2: Impregnate with Superla wax

NOTE 3: Coil form - laminated phenolic, 1/2" long.

Figure 5-50 — Winding Data, Z301 (M-439715)



COMPONENT
METER FILTER
SYMBOL DESIGNATION
Z302
REF. DWG. M-865456-501

ST-START WINDING
FIN-FINISH WINDING

COIL	NO. OF SECTIONS (PIS)	TYPE OF WIRE	WIRE INSULAT'N	TYPE OF WINDING	TURNS PER SECTION
1	--	AWG. #28 Magnet	DC	Single Layer R.H., Close Wound	25

NOTE 1: Extend leads 1-1/4" from finish end of coil form, strip and tin 1/2".

NOTE 2: Coil form - laminated phenolic, 1-3/8" long.

Figure 5-51 — Winding Data, Z302 (M-439720)