NAVSHIPS 91469

INSTRUCTION BOOK

for

RADIO RECEIVING EQUIPMENT
NAVY MODELS
RBB - 5, RBB - 6, RBC - 5, RBC - 6

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Manufactured by

RADIO CORPORATION OF AMERICA
CAMDEN, N. J.

NAVSHIPS 91469

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RADIO RECEIVING EQUIPMENT

NAVY MODELS RBB-5, RBB-6, RBC-5 and RBC-6

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA
Camden, New Jersey, U. S. A.

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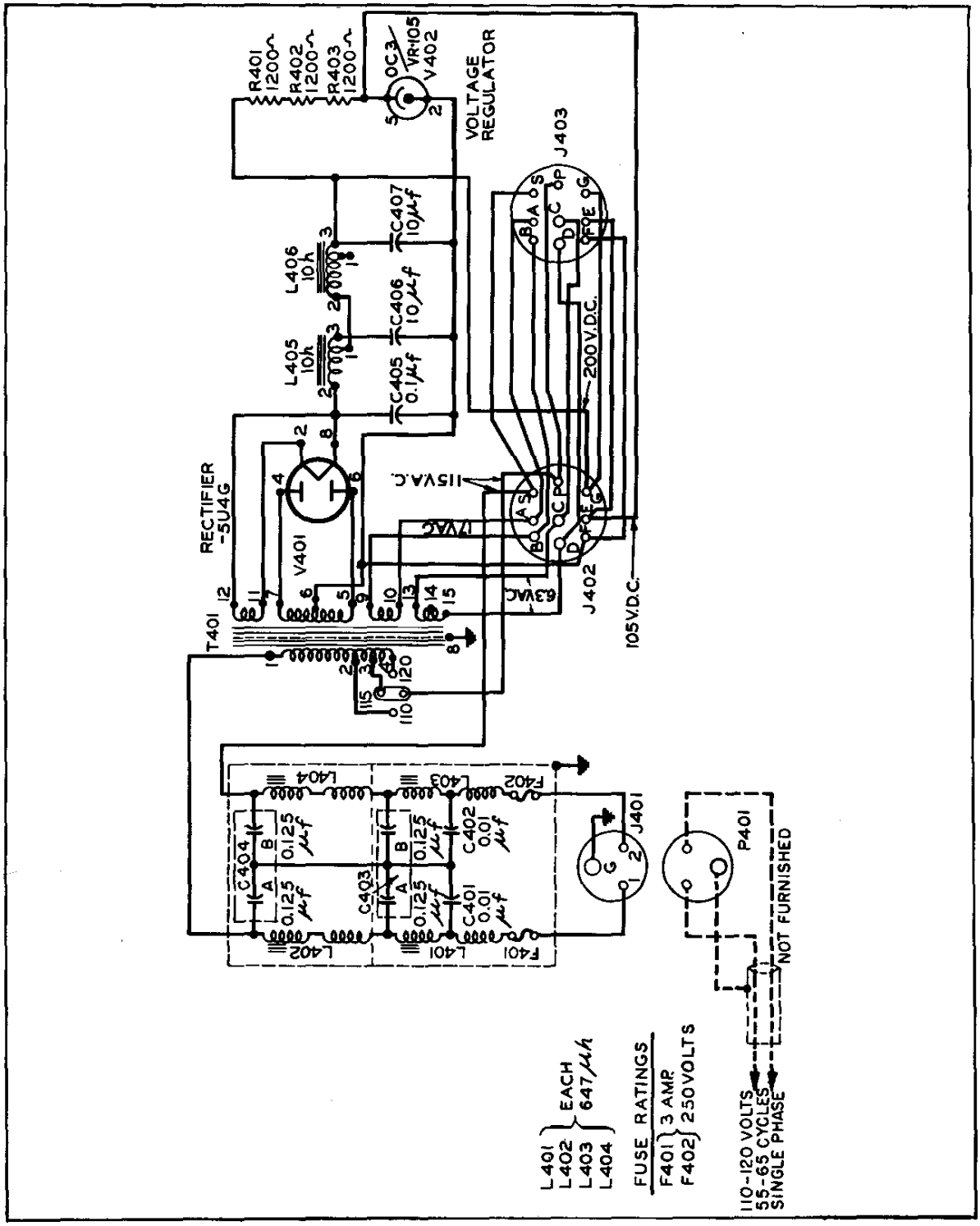


Figure 2-14. Schematic Diagram, Rectifier Power Unit

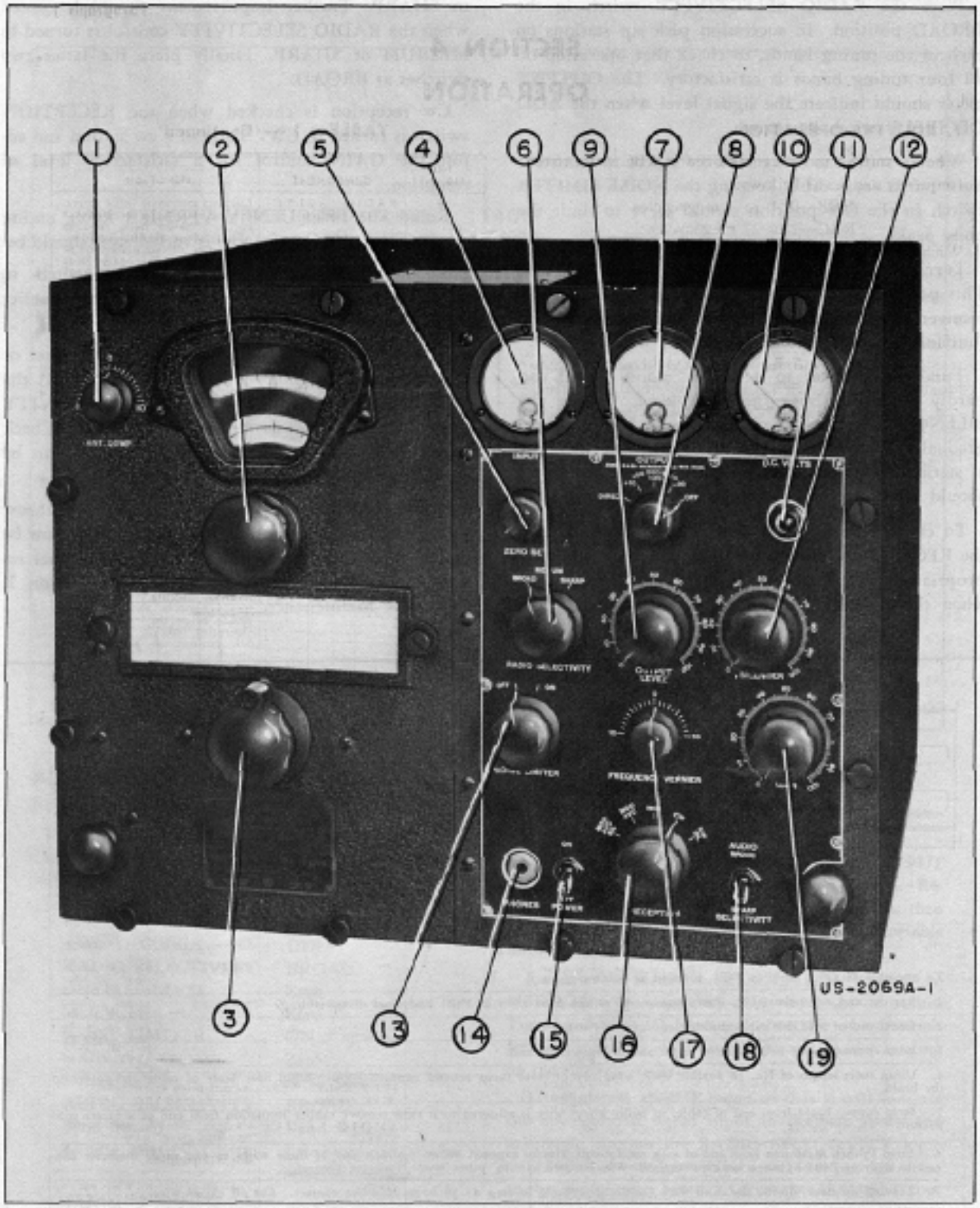


Figure 4-1. RBB/RBC Receivers, Front View

SECTION 4
OPERATION

1. ROUTINE OPERATION.

Four tuning bands in the RBB and RBC units cover frequency ranges as follows:

RBB—0.50 to 4 megacycles
RBC—4 to 27 megacycles

With the exception of the frequency range, operation is identical for both models.

Features in the RBB/RBC unit include control of overall sensitivity and selectivity, choice of agc, silencer and noise limiter circuits, and control of audio response. These featuers are utilized in varying combinations and degrees depending on local conditions and whether voice, mcw, or cw transmission is being received. In general, the RECEPTION switch controls selection of the specialized circuits. The various panel components and their purpose are listed in Table 4-1. Numbers in Table 4-1 refer to items similarly numbered on the RBB/RBC panel view, Figure 4-1.

For proper operation of the RBB/RBC receiver the significance of each panel component in Table 4-1 should be clearly understood. Of the items listed, only five controls are operative in (or have functions applicable to) certain receiving conditions as selected by the RECEPTION switch. Particular note should be made of these five controls; items 9, 12, 17, 18, and 19 in Table 4-1.

In any emergency, where one Rectifier Power Unit fails as part of a two-unit arrangement, it is possible to operate two receivers from the one operative power unit. To effect the emergency arrangement, disconnect the output cable from the disabled power unit. Remove the receptacle cap from the unused output

TABLE 4-1. RBB/RBC PANEL COMPONENT IDENTIFICATION

NO. (FIG. 4-1)	COMPONENT	FUNCTION
1	ANT COMP capacitor	Facilitates reception of distant stations. Should be readjusted on each band for difficult receiving conditions, as specified in operating instructions.
2	Band change switch	Selects choice of bands as follows: *RBB* *RBC* 1. 0.50-0.84 mc 4.00- 6.45 mc 2. 0.84-1.41 mc 6.45-10.30 mc 3. 1.41-2.37 mc 10.30-16.50 mc 4. 2.37-4.00 mc 16.50-27.00 mc
3	Tuning control	Selects frequency desired.
4	INPUT meter	Facilitates tuning by indicating input signal strength, but only when agc is selected.
5	ZERO SET control	Requires no adjustment during operation. Setting specified in Section 3, paragraph 3.

TABLE 4-1.—(Continued)

NO. (FIG. 4-1)	COMPONENT	FUNCTION
6	RADIO SELECTIVITY switch	Controls selectivity in i-f stages. Setting should be at BROAD unless excessive noise requires MEDIUM or SHARP position. Operation of auxiliary equipment such as Frequency Shift Converter requires BROAD setting.
7	OUTPUT meter	Indicates output in decibels. Not required during operation.
8	ADD DECIBELS switch	Connects OUTPUT meter and adjusts for varying levels during test and maintenance.
9	OUTPUT LEVEL control	Functions to control audio level when agc is selected and when output limiting (O. L.) is used during cw reception. Inoperative under other conditions. Substitutes for GAIN control.
10	D.C. VOLTS meter	Indicates presence of plate voltage, approximately 200 volts, and thus whether power unit is operating.
11	Panel light	Illumination, and indirectly as indication of tube heater voltage.
12	SILENCER control	Adjusts silencer circuit to quiet receiver during intermittent transmission by cutting off all signals below the level selected. Operative only in MOD-AVC-SIL position of RECEPTION switch.
13	NOISE LIMITER switch	Limits noise by blocking reception during noise peaks.
14	PHONES jack	For connecting headphones.
15	POWER switch	Controls input power to Rectifier Power Unit.
16	RECEPTION switch	Five switch positions are: MOD-AVC-SIL—For voice reception. Includes agc and silencer circuit. MOD-AVC— For voice reception. Includes agc. MOD— For mcw (tone) reception, although restricted voice reception is possible. CW— For cw reception. CW-O. L.— For cw reception. Includes output limiting action, which cuts off all inputs below the level selected by OUTPUT LEVEL control.
17	FREQUENCY VERNIER control	Adjusts pitch of cw note.
18	AUDIO SELECTIVITY	Used in SHARP position for restricted cw or mcw audio response. Otherwise used in BROAD position.
19	GAIN	Controls sensitivity when agc is not used; otherwise inoperative. Substitutes for OUTPUT LEVEL control.

TABLE 4-2. OPERATING INSTRUCTIONS

SEQUENCE	CONTROL AND POSITION	VOICE	MCW	CW	REMARKS
	STARTING THE EQUIPMENT				
1	ADD DECIBELS to OFF	x	x	x	
2	RADIO SELECTIVITY to BROAD	x	x	x	
3	OUTPUT LEVEL to zero	x		x	
4	SILENCER to zero	x		x	
5	NOISE LIMITER to ON	x	x	x	
6	GAIN to zero		x	x	
7	AUDIO SELECTIVITY to BROAD	x	x	x	
8	RECEPTION: MOD-AVC-SIL MOD-AVC MOD CW CW-OL	x x	 x	 x x	For excessive interference or for intermittent reception. For local reception. Voice reception also possible. For excessive interference.
9	Band Switch to proper band	x	x	x	
10	POWER switch to ON	x	x	x	
	OPERATING THE EQUIPMENT				
11	OUTPUT LEVEL	x			Rotate until background noise is heard.
12	Tuning knob to station	x			INPUT meter deflection should be maximum.
13	OUTPUT LEVEL	x			Readjust for desired level. For excessive noise, turn RADIO SELECTIVITY switch to MEDIUM. Retune as necessary. For distant stations use MOD-AVC-SIL setting of RECEPTION switch. After station is tuned in, turn up SILENCER control until noise disappears. Retune as necessary. Setting of the SILENCER control is critical: a division or two on the dial may cause loss of reception.
14	GAIN control		x		Rotate until background noise is heard.
15	Tuning knob to station		x		
16	GAIN control		x		Readjust for desired level. For excessive interference turn RADIO SELECTIVITY knob to MEDIUM or SHARP. Retune as necessary. For excessive noise, throw AUDIO SELECTIVITY switch to SHARP.
17	GAIN control			x	Rotate until background noise is heard.
18	Tuning knob to station			x	
19	GAIN control			x	Readjust for desired level.
20	FREQUENCY VERNIER			x	Adjust for loudest signal.
21	AUDIO SELECTIVITY to SHARP			x	
22	FREQUENCY VERNIER			x	Readjust for loudest signal. For excessive fading, use CW-OL setting of RECEPTION switch. Set OUTPUT LEVEL control to 100. Turn up GAIN until weak signal is heard. Decrease OUTPUT LEVEL setting until volume of signal begins to decrease. Leave control in that position.
23	ANT. COMP	x	x	x	For best distance reception on each band, tune in a signal at the extreme high-frequency end of the band and adjust the ANT. COMP. knob for greatest volume. If no signal is available, set the tuning dial at 860 for the RBB or at 870 for the RBC, and adjust for maximum noise output.
	STOPPING THE EQUIPMENT				
24	POWER switch to OFF	x	x	x	

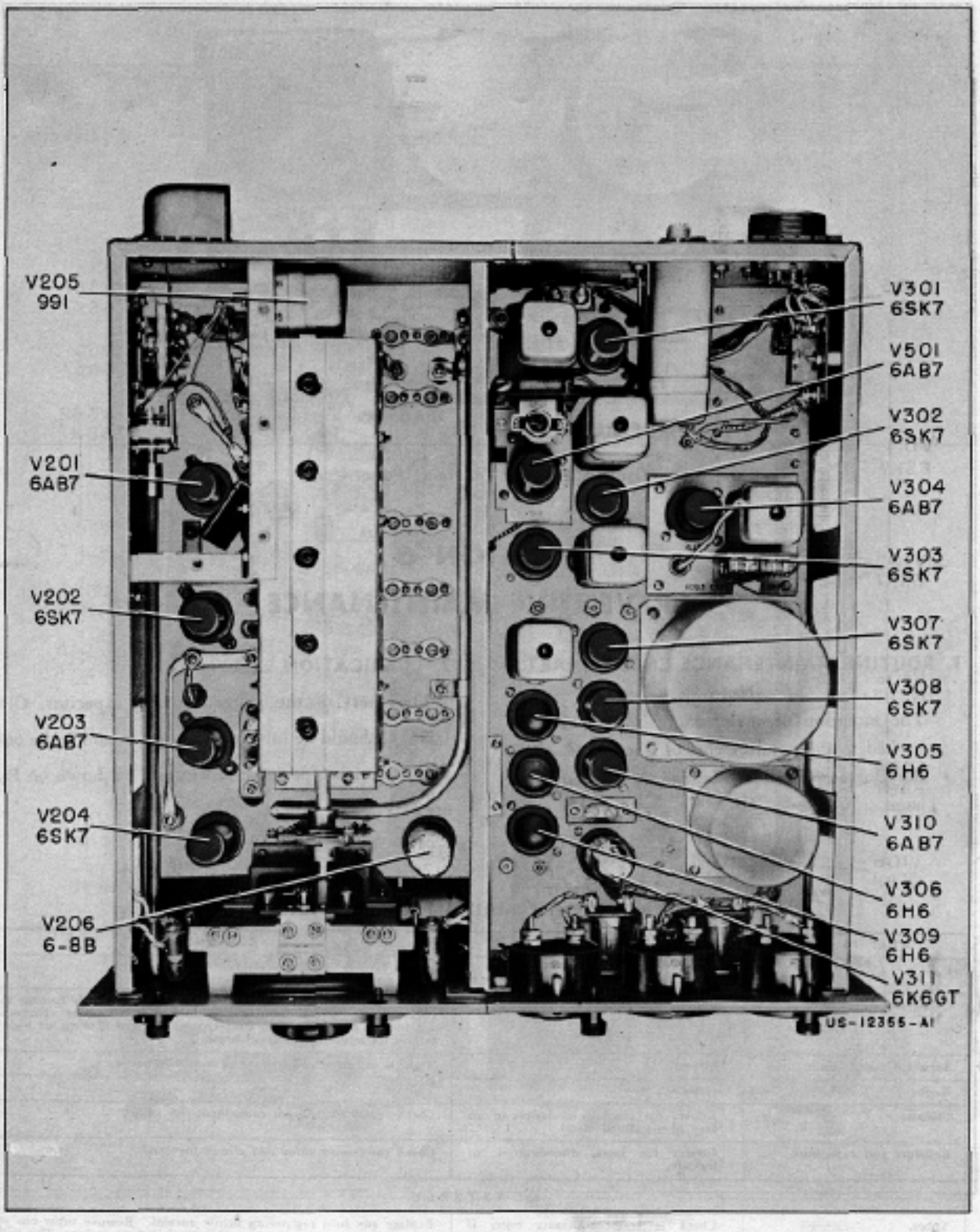


Figure 5-2. Tube Locations, RBC

SECTION 7

CORRECTIVE MAINTENANCE

1. TROUBLE SYMPTOMS AND CIRCUIT ANALYSIS.

First step in servicing of the RBB/RBC equipment should be to check the power unit fuses and make a visual inspection of the unit chassis. This inspection may reveal charred insulation or other evidence of abnormal operation. Resistors and capacitors should be inspected for discoloration or leakage. If components appear normal, tubes should be checked as specified in Section 6. When testing tubes remove them one at a time to insure replacement in the same socket. This procedure will avoid the possibility of disturbing circuit alignment.

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 deviation from normal operation of the equipment usually will assist in localizing the source of trouble. Possible causes of troubles which might develop, and the symptoms by which they may be recognized, are described in Table 7-1.

TABLE 7-1. 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 7-64 and 7-65, 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 Tables 7-2 to 7-8.
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 7-64 and 7-65, 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 3. 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.
Low Maximum Noise Output and No Signal Output.	Defect in heterodyne oscillator circuit. Replace oscillator tube V103 (or V203) with one of known condition. Refer to Figures 7-64 and 7-65, and check components of this circuit. Refer to Tables 7-9 and 7-10 and check to see that resistance measurements obtained agree with those given.

(Continued)

TABLE 7-1.—(Continued)

SYMPTOMS	CAUSES
Low Signal-to-Noise Ratio is Obtained with Normal Output Readings (see Paragraph 3).	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 Figures 3-11 and 3-12. **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 Tables 7-13 and 7-14.
No Output or Low Sensitivity for Particular Control Settings.	Defect in circuit affected by particular control setting. Refer to Figures 7-64 and 7-65, 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 Tables 7-15 to 7-18. 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.g.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.g.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.g.c. diode tube V305 and associated circuits. If the INPUT meter operates, but trouble is still evident in the a.g.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 by reference to Paragraph 2. 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 Paragraph 2. 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 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 5.

(Continued)

TABLE 7-1.—(Continued)

SYMPTOMS	CAUSES
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 3). Loose connections, imperfect shielding, or noisy tubes may be located by tapping various suspected parts.

As a further aid in locating difficulties, Figure 7-2 is provided. Switch positions on this trouble-shooting chart are supplied as a guide only: circuits associated with a particular switch setting should be checked. Table 2-1 in Section 2 lists the band switch positions and contacts. RECEPTION switch S304 panel settings and contacts are as follows:

MOD-AVC-SIL	S304, contacts 6-12
MOD-AVC	S304, contacts 5-11
MOD	S304, contacts 4-10
CW	S304, contacts 3-9
CW-OL	S304, contacts 2-8

The RADIO SELECTIVITY switches, S306, S307, and S308, are shown in the BROAD position on the if/af section schematic diagram, Figure 7-67.

In locating trouble, the servicing block diagram, Figure 7-63, should also be utilized.

CAUTION

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

Due to the many circuits involved in the five positions of S304, the servicing block diagram, Figure 7-63, should be utilized when localizing trouble. Figure 3-16, Section 3, is the primary power distribution diagram.

Only interconnection cable W401, between receiver and power unit, is supplied with the equipment. Details for cable W401 are shown on Figure 7-59. Other cables are shown on Figures 3-3 and 3-14 in Section 3.

2. VOLTAGES AND RESISTANCES.

Localizing a circuit fault is facilitated by checking the resistances and operating voltages throughout the equipment. A 20,000 ohms-per-volt meter such as Multimeter TS-352/U series is required for this purpose.

a. POWER UNIT.—Measurement of the power unit load voltages may be made at terminal board E301 or at the rear of receptacle J301. Values should be as listed in Table 7-2.

TABLE 7-2. RECTIFIER POWER UNIT, OUTPUT VOLTAGES

MEASUREMENTS AT E301	MEASUREMENTS AT J301	VOLTAGES LOAD—1 RBB OR 1 RBC RECEIVER
2 to 5	A to B	17 v. ac
7 to 8	C to D	6.3 v. ac
1 to 5	E to F	105 v. dc
3 to 5	F to G	200 v. dc
—	P to S	115 v. ac

Voltage tolerance, 20%.

No-load voltages from the power unit may be measured at the receiver end of cable W401 by connecting a jumper between pins S and P on the plug. These voltages are tabulated in Table 7-3. Before connecting the jumper remove input supply plug P401 from receptacle J401. Do not operate the power unit without load for more than a few minutes.

TABLE 7-3. RECTIFIER POWER UNIT, NO-LOAD OUTPUT VOLTAGES

MEASUREMENTS AT W401	VOLTAGES NO-LOAD
A to B	18 v. ac
C to D	7.3 v. ac
E to F	108 v. ac
F to G	240 v. dc

Voltage tolerance, 20%.

Resistances in the power unit are listed in Table 7-4. As an additional check, Figure 7-3 lists the tube socket resistances. Power unit components are identified on Figures 7-4 and 7-5.

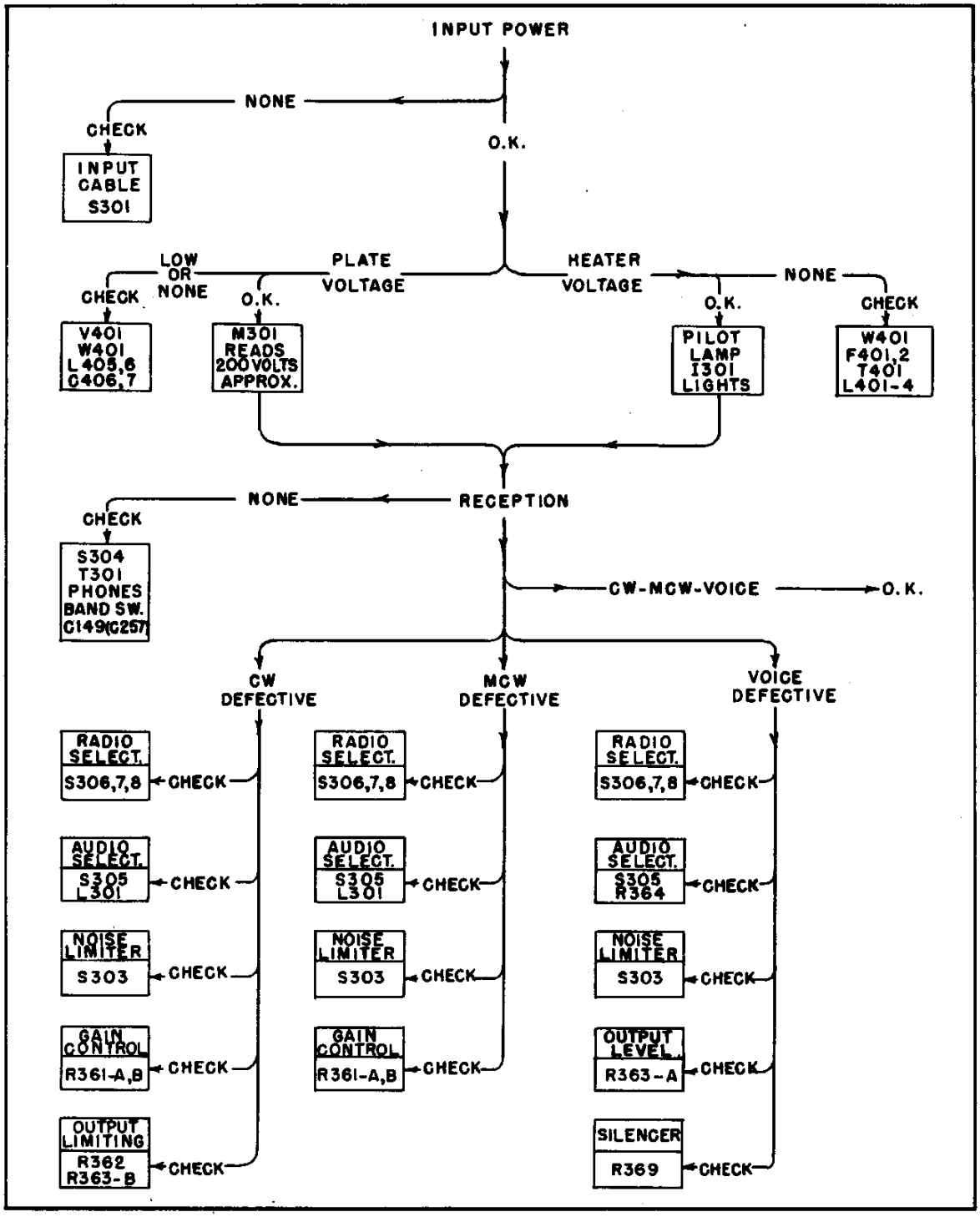
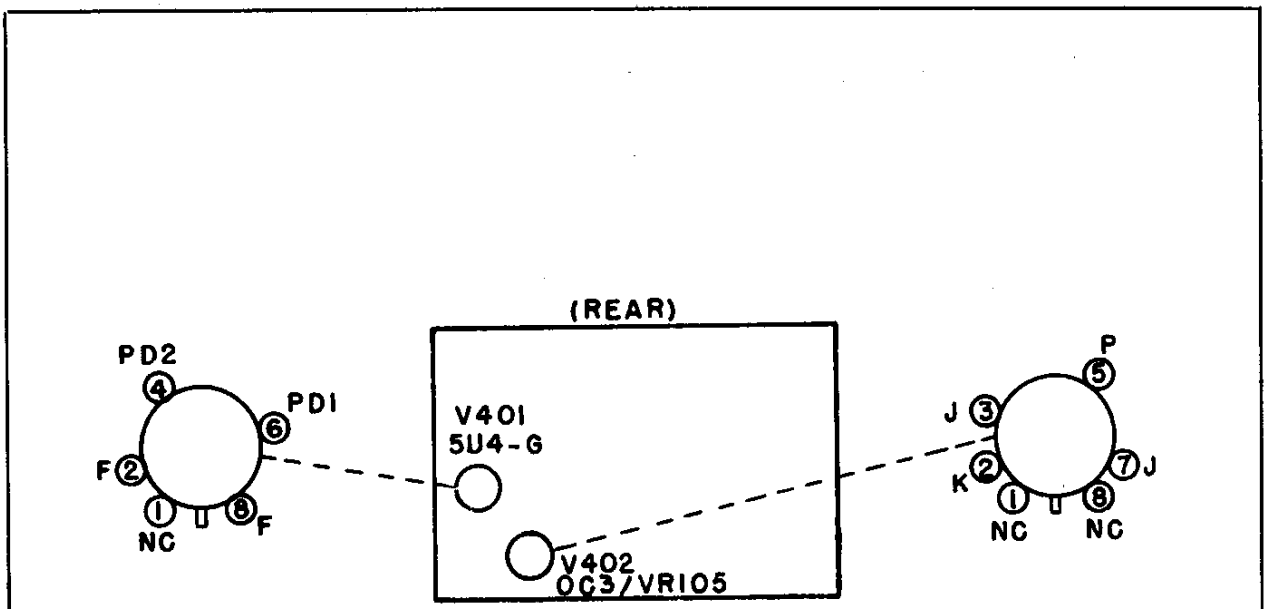


Figure 7-2. Trouble-Shooting Chart



TUBE SYMBOL NO.	PIN NUMBERS							
	1	2	3	4	5	6	7	8
V401	NC	open	NC	open	NC	open	NC	open
V402	NC	open	NC	NC	open	NC	NC	NC

All external cables disconnected.
All tubes in sockets.
All measurements made to ground.

Figure 7-3. Power Unit, Tube Socket Resistances

TABLE 7-4. RECTIFIER POWER UNIT, RESISTANCE MEASUREMENTS

MEASUREMENT POINTS	RESISTANCE
J401-2 to J403-S	1.63
J401-1 to T401-1	1.61
J401-1 to T401-2	2.68
J401-1 to T401-3	2.72
J401-1 to T401-4	2.75
J403-P to J401-1 (link on 115 v.)	2.75
V401-2 to V401-8 (tube out)	0.07
J403-F to V401-4 or T401-7	43.6
J403-F to V401-6 or T401-5	43.6
J403-A to J403-B	0.52
J403-C to J403-D	0.11
J403-G to T401-12	200
J403-G to J403-E	3600

All external cables disconnected.
All tubes in sockets unless otherwise noted.
All resistances in ohms.
Tolerance 20%.

Figures 7-58 and 7-59 are the power unit connection and schematic diagrams, respectively.

b. RBB/RBC RECEIVER.—Tube layout and identification for the RBB/RBC units are indicated on Figure 7-6.

CAUTION

When removing first heterodyne oscillator tube V103 (or V203), turn off power or remove regulator tube V106 (or V206), to avoid overload of the heater-shunt potentiometer, R116 (or R219).

Table 7-5 lists the tube operating characteristics.

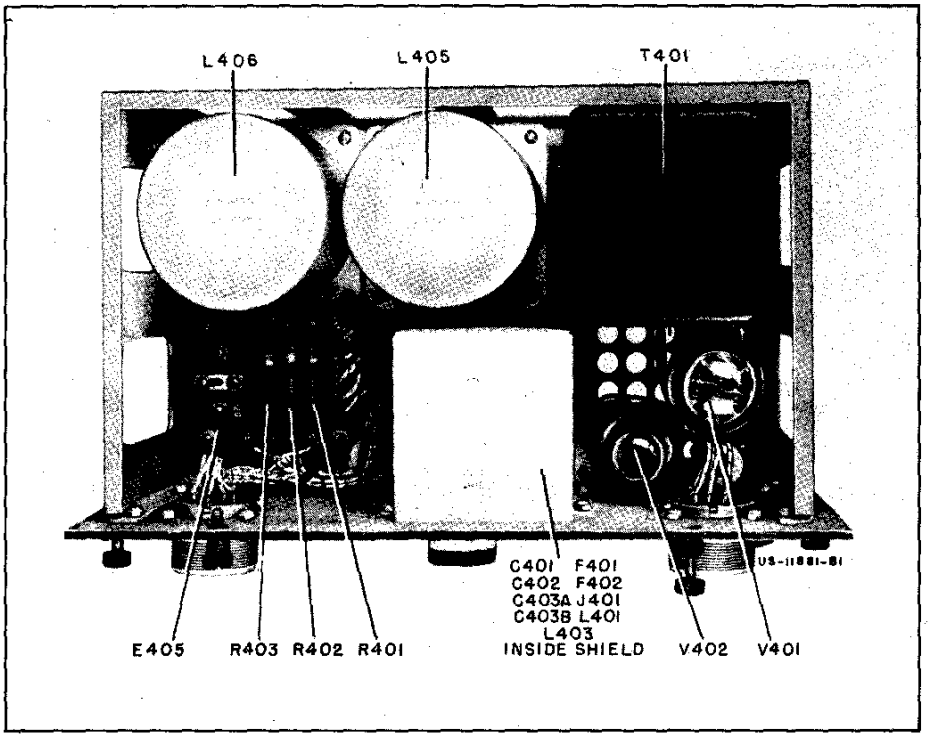


Figure 7-4. Power Unit Component Identification, Above Chassis

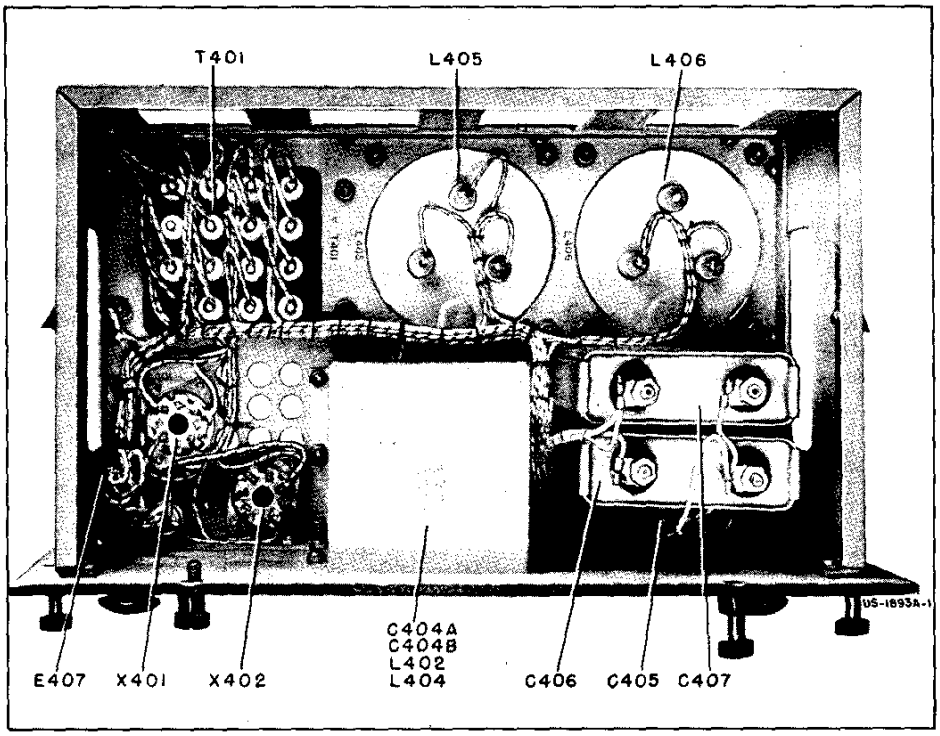


Figure 7-5. Power Unit Component Identification, Below Chassis

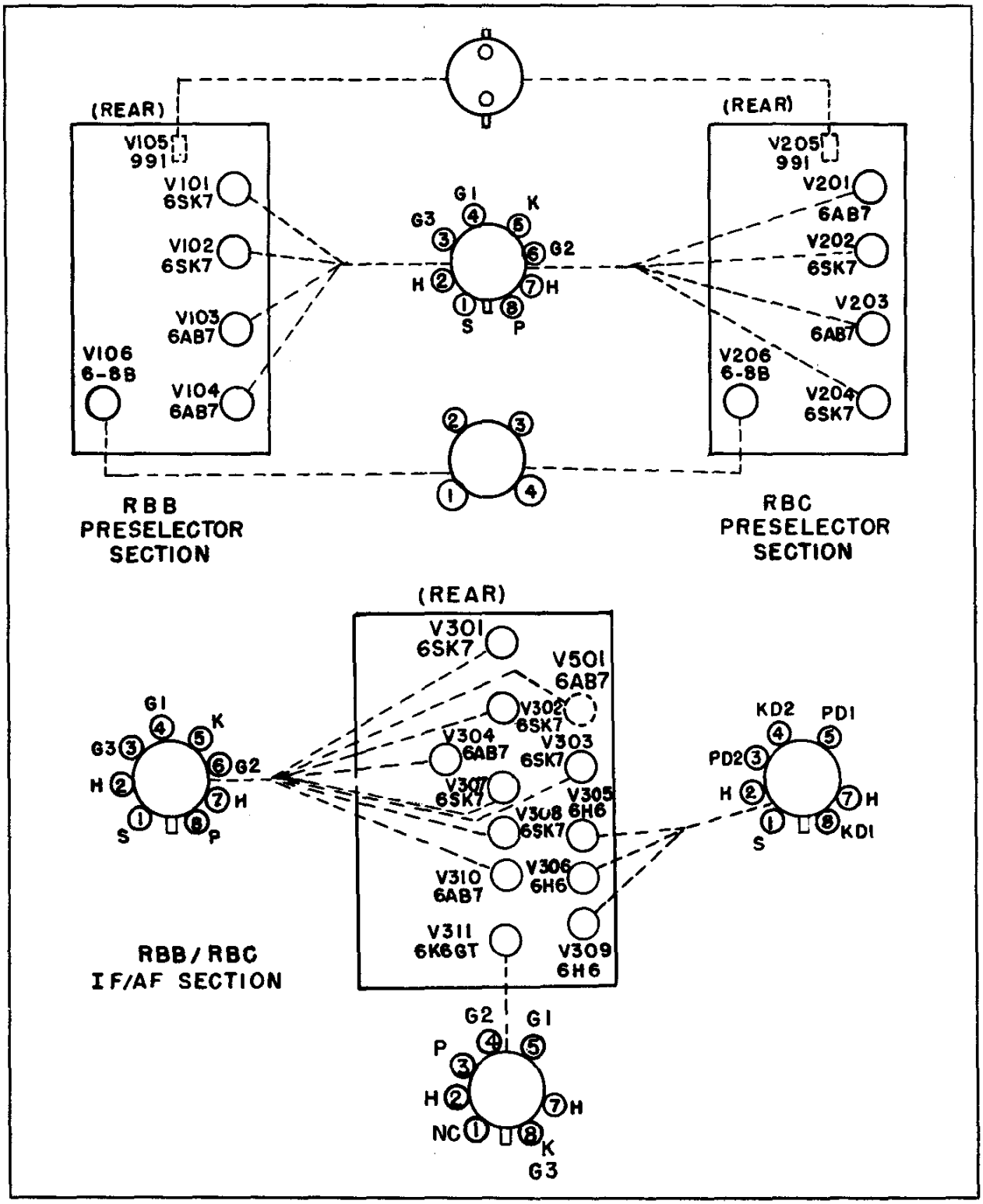


Figure 7-6. RBB/RBC, Tube Socket Layout and Identification

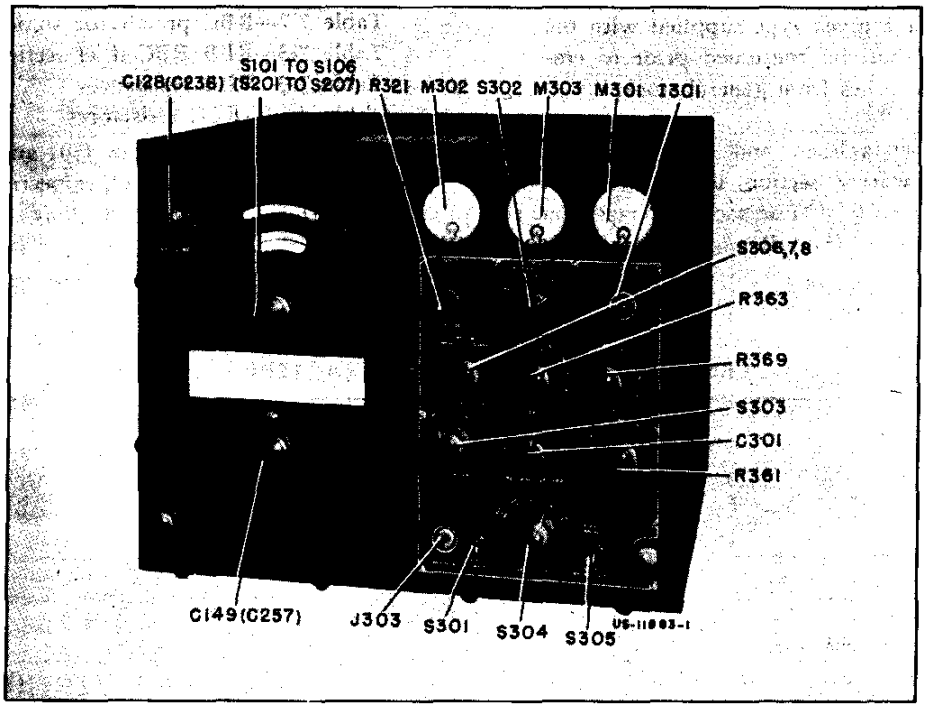


Figure 7-7. RBB/RBC Panel Component Identification

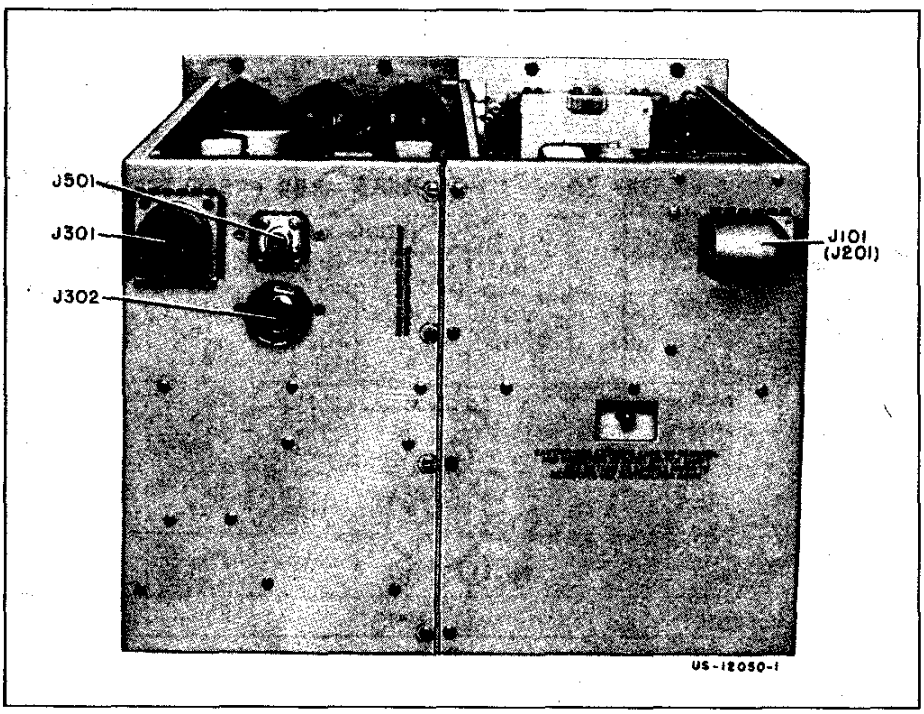


Figure 7-8. RBB/RBC Receptacle Identification, Rear View

Note

All tubes of a given type supplied with the equipment shall be consumed prior to employment of tubes from general stock.

To facilitate voltage and resistance measurements, the preselector section is shown separately from the if/af section. Tube socket voltages and resistances are given in the following tables:

Table 7-6—RBB preselector section, voltages
Table 7-7—RBC preselector section, voltages
Table 7-8—RBB/RBC if/af section, voltages
Table 7-9—RBB resistances
Table 7-10—RBC resistances

Resistances at receptacles J301 and J302 are supplied in Tables 7-11 and 7-12, respectively. Tube operating currents are supplied along with the socket voltages.

TABLE 7-5. RATED TUBE CHARACTERISTICS

TUBE TYPE	FILAMENT VOLTAGE (V)	FILAMENT CURRENT (A)	PLATE VOLTAGE (V)	GRID BIAS (V)	SCREEN VOLTAGE (V)	PLATE CURRENT (MA)	SCREEN CURRENT (MA)	A-C PLATE RESISTANCE (OHMS)	VOLTAGE AMPLIFICATION FACTOR (MU)	TRANSCONDUCTANCE (MICROMHOS)		EMISSION	
										NORMAL	MINIMUM	I, (MA)	TEST VOLTS
5U4-G	5.0	3.0										225	75
6AB7	6.3	0.45	300	-3	200	12.5	3.2	700,000	3,500	5,000	4,000	20	65
6H6	6.3	0.3	117			8						15	20
6K6-GT	6.3	0.4	250	-18	250	33	10	90,000	207	2,300	1,800	40	30
6SK7	6.3	0.3	250	-3	100	9.2	2.6	800,000	1,600	2,000	1,600	65	30
6-8B†													
991			59*			2							
OC3/VR105			105**			5-40							

† Amperite regulating tube, 6-8 volts, 0.5 ampere capacity.
* 67-87 volts starting.
** 115 volts starting.

TABLE 7-6. TUBE SOCKET VOLTAGES—RBB PRESELECTOR

TUBE SYMBOL	TUBE TYPE	UNIT	PIN NUMBER								GAIN CONTROL SETTING
			1	2	3	4	5	6	7	8	
V101	6SK7	volts	0	6.1 ac	0.76	0	2.1	66	0	180	*max.
		ma	0		0	0	6.0	1.4		5.0	*max.
		volts	0	6.1 ac	18	0	18	85	0	208	min.
		ma	0		0	0	0.5	0.1	0	0.4	min.
V102	6SK7	volts	0	6.1 ac	0.7	0	2.0	66	0	180	*max.
		ma	0		0	0	5.7	1.3		4.6	*max.
		volts	0	6.1 ac	13.5	0	13.5	85	0	208	min.
		ma	0		0	0	0.34	0.06	0	0.3	min.
V103	6AB7	volts	0	6.3 ac	0	0	0	90	0	40	*max.
		ma	0		0	0	14	3.7		11	*max.
V104	6AB7	volts	0	0	0	0	7.8	160	6.1 ac	195	max.
		ma	0	0	0	0	1.2	0.2		1.1	max.
V106	6-8B	volts	6.3†			17 ac†					

All voltages measured to ground.
All voltages dc unless otherwise noted. Variation 20%.
All measurements made on 20,000 ohms-per-volt meter, scale used having maximum range not more than three times value given.
* Grid must be grounded while measuring.
† 10 volts ac between pins 1-4 of V106.
RECEPTION switch S304 at CW setting.

TABLE 7-7. TUBE SOCKET VOLTAGES—RBC PRESELECTOR

TUBE SYMBOL	TUBE TYPE	UNIT	PIN NUMBER 1	2	3	4	5	6	7	8	GAIN CONTROL SETTING
V201	6AB7	volts	0	6.1 ac	1.3	0	1.3	73	0	182	*max.
		ma	0		0	0	5.6	1.1		4.7	*max.
		volts	0	6.1 ac	23	0	23	208	0	211	min.
		ma	0		0	0	0	0		0	min.
V202	6SK7	volts	0	6.1 ac	1.25	0	1.25	55	0	182	*max.
		ma	0		0	0	5.5	1.2		4.3	*max.
		volts	0	6.1 ac	23.5	0	23.5	155	0	206	min.
		ma	0		0	0	1.55	0.34		1.2	min.
V203	6AB7	volts	0	6.3 ac	0	0	0	85	0	66	*max.
		ma	0		0	0	8.8	2.15		8	*max.
V204	6SK7	volts	0	0	13	0	13	140	6.1 ac	194	max.
		ma	0	0	0	0	2.8	0.64		2.2	max.
V206	6-8B	volts	6.3 act†			17 act†					

All voltages measured to ground.
All voltages dc unless otherwise noted. Variation 20%.
All measurements made on 20,000 ohms-per-volt meter, scale used having maximum range not more than three times value given.
* Grid must be grounded while measuring.
† 10 volts ac between pins 1-4 of V206.
RECEPTION switch at CW setting.

TABLE 7-8. TUBE SOCKET VOLTAGES—RBB/RBC IF/AF SECTION

TUBE SYMBOL	TUBE TYPE	UNIT	PIN NUMBER 1	2	3	4	5	6	7	8	CONTROL SETTINGS GAIN	RECEPTION	SILENCER	OUTPUT LEVEL
V301	6SK7	volts	0	0	4.5	0	4.5	95.0	6.1 ac	202	*max.	CW		
		ma	0		0	0	5.8	1.35		4.8	*max.			
		volts	0	0	23.5	0	23.5	120.0	6.1 ac	212	*min.			
		ma	0		0	0	0.24	0.04		0.2	*min.			
V302	6SK7	volts	0	0	3.5	0	3.5	80.0	6.1 ac	182	*max.	CW		
		ma	0		0	0	5.8	1.27		4.8	*max.			
		volts	0	0	23.5	0	23.5	120.0	6.1 ac	212	*min.			
		ma	0		0	0	0.27	0.05		0.22	*min.			
V303	6SK7	volts	0	0	2.9	0	2.9	70.0	6.1 ac	180	max.	CW		
		ma	0		0	0	5.6	1.25		4.4	min.			
		volts	0	0	24.5	0	24.5	170	6.1 ac	205	min.			
		ma	0		0	0	1.8	0.35		1.5	max.			
V304	6AB7	volts	0	0	125	0	4.2	125	6.1 ac	145	max.	CW		
		ma	0		0.08	0	1.85	0.34		1.5	max.			
V305	6H6	volts	0	6.1 ac	0	30	−0.3		0	0.02	max.	MOD	max.	max.
		ma	0	0	0	0	0		0	0	max.	MOD	max.	max.
V306	6H6	volts	0	0	0.4	60.0	−4.61		6.1 ac	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 ac	0.2	max.	CW-OL	....	min.
		ma	0		0.11	0.11	0			0	max.	CW-OL	....	min.
V307	6SK7	volts	0	0	0	0	1.55	28.0	6.1 ac	68.0	max.	MOD	max.	....
		ma	0		0	0	1.45	0.36		1.1	max.	MOD	max.	....
V308	6SK7	volts	0	0	0	0	1.4	15.0	6.1 ac	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 ac	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 ac	180	max.	MOD-AVC-SIL	min.	....
		ma	0		0		0	0		0	max.	MOD-AVC-SIL	min.	....

(Continued)

TABLE 7-8. TUBE SOCKET VOLTAGES—RBB/RBC IF/AF SECTION—Continued

TUBE SYMBOL	TUBE TYPE	UNIT	PIN NUMBER 1	2	3	4	5	6	7	8	CONTROL SETTINGS GAIN	RECEPTION	SILENCER	OUTPUT LEVEL
V309	6H6	volts	0	0	0	0.4	0		6.1 ac	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 ac	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 ac	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 ac	160	max.	MOD-AVC-SIL	min.	min.
		ma	0		0.02	0.02	0.02			0.02	max.	MOD-AVC-SIL	min.	min.
V310	6AB7	volts	0	0	0	0	1.35	47.0	6.1 ac	68.0	max.	MOD	max.	....
		ma	0		0	0	1.56	0.32		1.25	max.	MOD	max.	....
V311	6K6-GT	volts		0	192	200			6.1 ac	13.5	max.	MOD	max.	....
		ma			18.5	2.8				22	max.	MOD	max.	....
V501	6AB7	volts	0	0	0	0	2.7	135	6.1 ac	135	....	.....	....	....
		ma	0	0	0	0	5.75	5.75		5.75	....	.....	....	....

All voltages measured to ground.
All voltages dc unless otherwise noted. Variation 20%.
All measurements made on 20,000 ohms-per-volt meter, scale used having maximum range not more than three times value given.
* Grid grounded of tube being checked.

TABLE 7-9. TUBE SOCKET RESISTANCES—RBB (PRESELECTOR AND IF/AF SECTIONS)

TUBE SYMBOL	TYPE TUBE	PIN NUMBER 1	2	3	4	5	6	7	8	RECEPTION SWITCH SETTING
V101	6SK7	0	0.3	120	300,000	340	15,000	0	15,000	MOD
V102	6SK7	0	0.3	120	300,000	340	15,000	0	15,000	MOD
V103	6AB7	0	40	0	47,000	0	open*	0	open*	MOD
V104	6AB7	0	0	0	100,000	6,000	110,000	0.3	15,000	MOD
V106	6-8B	open*	no conn.	no conn.	4.5					....
V301	6SK7	0	0	680	220,000	680	8,000	0.3	10,000	MOD
V302	6SK7	0	0	470	100,000	470	18,000	0.3	15,000	MOD
V303	6SK7	0	0	470	1,500,000	470	110,000	0.3	15,000	MOD
V304	6AB7	0	0	140,000	68,000	1,950	140,000	0.3	47,000	CW
V305	6H6	0	0.3	700,000	7,800	540,000	no conn.	0	15,000	MOD
V306	6H6	0	0	open	25,000	270,000	no conn.	0.3	2,300,000	MOD
V307	6SK7	0	0	0	3,200,000	1,000	480,000	0.3	120,000	MOD
V308	6SK7	0	0	0	50,000	3,900	2,200,000	0.3	500,000	CW-OL
		0	0	0	50,000	950	500,000	0.3	120,000	MOD
V309	6H6	0	0	0	open	1,600,000	no conn.	0.3	1,100,000	MOD
V310	6AB7	0	0	0	2,700,000	3,900	250,000	0.3	500,000	MOD-AVC-SIL
V311	6K6-GT	no conn.	0	10,000	10,000	1,000,000	no conn.	0.3	680	MOD
V501	6AB7	0	0	0	1,000,000	470	20,000	0.3	20,000	....

* Open only when power unit is disconnected.
All resistances in ohms. Variation 20%.
All resistances measured to ground.
All cables disconnected.
Tube removed from socket under test; all other tubes in place.

TABLE 7-10. TUBE SOCKET RESISTANCES—RBC (PRESELECTOR AND IF/AF SECTIONS)

TUBE SYMBOL	TUBE TYPE	PIN NUMBER								RECEPTION SWITCH SETTING
		1	2	3	4	5	6	7	8	
V201	6AB7	0	0.3	220	1,300,000	220	140,000	0	20,000	MOD
V202	6SK7	0	0.3	220	1,300,000	220	140,000	0	20,000	MOD
V203	6AB7	0	40	0	47,000	0.1	open*	0.15	open*	MOD
V204	6SK7	0	0	4,700	1,000,000	4,700	120,000	0.3	20,000	MOD
V206	6-8B	4.5	no conn.	no conn.	open*					....
V301	6SK7	0	0	680	220,000	680	11,000	0.3	15,000	MOD
V302	6SK7	0	0	470	100,000	470	21,000	0.3	20,000	MOD
V303	6SK7	0	0	470	1,500,000	470	115,000	0.3	20,000	MOD
V304	6AB7	0	0	140,000	68,000	1,950	140,000	0.3	52,000	CW
V305	6H6	0	0.3	700,000	7,800	540,000	no conn.	0	15,000	MOD
V306	6H6	0	0	open	25,000	270,000	no conn.	0.3	2,300,000	MOD
V307	6SK7	0	0	0	3,200,000	1,000	480,000	0.3	125,000	MOD
V308	6SK7	0 0	0 0	0 0	50,000 2,700,000	3,900 3,900	2,200,000 250,000	0.3 0.3	500,000 500,000	CW-OL MOD-AVC-SIL
V309	6H6	0	0	0	open	1,600,000	no conn.	0.3	1,100,000	MOD
V310	6AB7	0	0	0	50,000	950	500,000	0.3	125,000	MOD
V311	6K6-GT	no conn.	0	15,000	15,000	1,000,000	no conn.	0.3	680	MOD
V501	6AB7	0	0	0	1,000,000	470	20,000	0.3	20,000	....

* Open only when power unit is disconnected.
All resistances in ohms. Variation 20%.
All resistances measured to ground.
All cables disconnected.
Tube removed from socket under test; all other tubes in place.

TABLE 7-11. RESISTANCES, J301

TERMINAL J301	RESISTANCES	
	RBB	RBC
A	7	7
B	0	0
C	0	0
D	0.3	0.3
E	open	open
F	0	0
G	10,000	15,000
S	open	open
P	open	open

All resistances in ohms. Variations 20%
All resistances measured to ground

TABLE 7-12. RESISTANCES, J302

TERMINAL J302	RESISTANCES RBB/RBC
1	0
2	1.3
3	1.3

All resistances in ohms. Variations 20%
All resistances measured to ground

Where servicing requires separation of the two receiver sections or where disassembly operations are required, reference should be made to paragraph 5, "Mechanical Maintenance," in this section.

Components on the RBB/RBC chassis are identified on Figures 7-9 to 7-16.

Figures 7-60 and 7-61 are the RBB and RBC preselector connection diagrams while Figures 7-64 and 7-65 are the corresponding schematic diagrams.

The RBB/RBC if/af section connection and schematic diagrams are supplied on Figures 7-66 and 7-67

3. RBB/RBC NOISE LEVEL AND SENSITIVITY.

Curves on operation of the RBB/RBC are supplied as follows:

Figure 7-38	— Dial calibration, RBB/RBC
Figure 7-39	— Cw sensitivity, RBB/RBC
Figures 7-40 to 7-43	— Selectivity, bands 1-4, RBB
Figures 7-44 to 7-47	— Selectivity, bands 1-4, RBC
Figure 7-48	— I-f selectivity, RBB/RBC
Figure 7-49	— Image selectivity, RBB/RBC
Figure 7-50	— Audio fidelity, RBB
Figure 7-51	— Audio fidelity, RBC
Figure 7-52	— Resonant overload, RBB
Figure 7-53	— Resonant overload, RBC
Figure 7-54	- Agc, RBB
Figure 7-55	— Agc, RBC
Figure 7-56	— Output limiter, RBB
Figure 7-57	— Output limiter, RBC

a. NOISE LEVEL.—To locate the source of excessive receiver noise, first disconnect the antenna. If noise is not reduced, tap suspected parts to check for loose connections, imperfect shielding, or noisy tubes. Power supply line filters may also be defective.

Normal receiver noise values are tabulated in Tables 7-13 and 7-14 for the RBB and RBC units, respectively. Values shown are indicated on the OUTPUT meter and require that the receiver input be disconnected from the antenna and terminated in a standard dummy antenna, such as Antenna Simulator SM-35/URM-25 unit furnished with RF Signal Generator Set AN/URM-25. The GAIN control knob should be at maximum, the RADIO SELECTIVITY control knob in the BROAD position, and the RECEPTION knob in the MOD position. Considerable variation may be expected in the values given due to normal tube and circuit variations.

TABLE 7-13. NOISE OUTPUT VOLTAGES—RBB

Noise Output in DB (Zero Level=60 Microwatts)

BAND	DIAL SETTING	OVERALL NOISE	V101 REMOVED	V102 REMOVED	V203 PLATE VOLTAGE REMOVED
1	0.5 mc 0.84 mc	22 30	16 24	11 14	0 0
2	0.84 mc 1.41 mc	20 26	16 20	13 14	0 0
3	1.41 mc 2.37 mc	22 29	15 21	11 14	0 0
4	2.37 mc 4.00 mc	23 31	16 23	12 18	0 0

TABLE 7-14. NOISE OUTPUT VOLTAGES—RBC

Noise Output in DB (Zero Level=60 Microwatts)

BAND	DIAL SETTING	OVERALL NOISE	V201 REMOVED	V202 REMOVED	V203 PLATE VOLTAGE REMOVED
1	4.0 mc 6.45 mc	26 28	18 22	13 20	1 1
2	6.45 mc 10.3 mc	25 28	16 24	11 20	1 1
3	10.3 mc 16.5 mc	14 27	11 20	6 17	1 1
4	16.5 mc 27.0 mc	16 21	6 16	4 16	1 1

b. A-F, I-F, AND R-F SENSITIVITY.—Standard RBB/RBC output or sensitivity is obtained when, with a 600-ohm non-inductive load connected to J302 and the ADD DECIBELS switch in the +20 position, the OUTPUT meter indicates zero db. This reading is equivalent to 6 milliwatts signal input. Noise output must have previously been checked to insure the proper signal-to-noise ratio.

To check the response in the a-f, i-f, and r-f portions of the receiver, the following equipment is required:

R.F. Signal Generator Set AN/URM-25 or Navy Model LP.

Navy Model LAJ series Audio Oscillator Equipment.

Navy type 60107 DC Microammeter.

Multimeter ME-25/U series.

Signal application points and values are listed in Tables 7-15 to 7-18. In all four tabulations the standard output, defined in the preceding paragraph, must be obtained or the equipment is not operating satisfactorily.

TABLE 7-15. A-F INPUTS FOR STANDARD OUTPUT—RBB/RBC

GENERATOR CONNECTION POINT	GENERATOR OUTPUT AT 1,000 CYCLES
V307, pin 4 V310, pin 4 V311, pin 5	0.15 volts 0.8 volts 1.5 volts

Conditions:
RECEPTION switch at MOD.
AUDIO SELECTIVITY switch at BROAD.

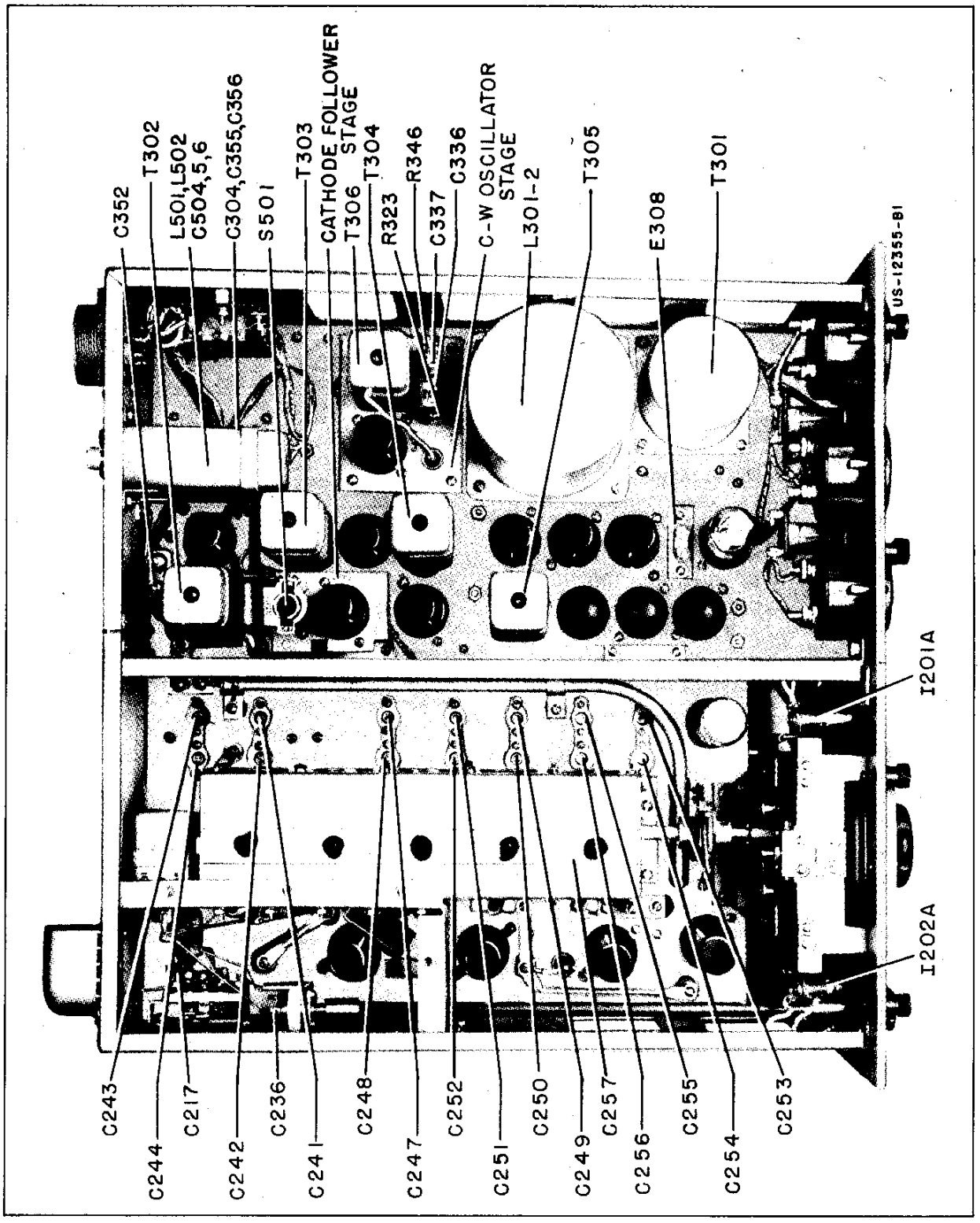


Figure 7-9. RBB Component Identification, Above Chassis

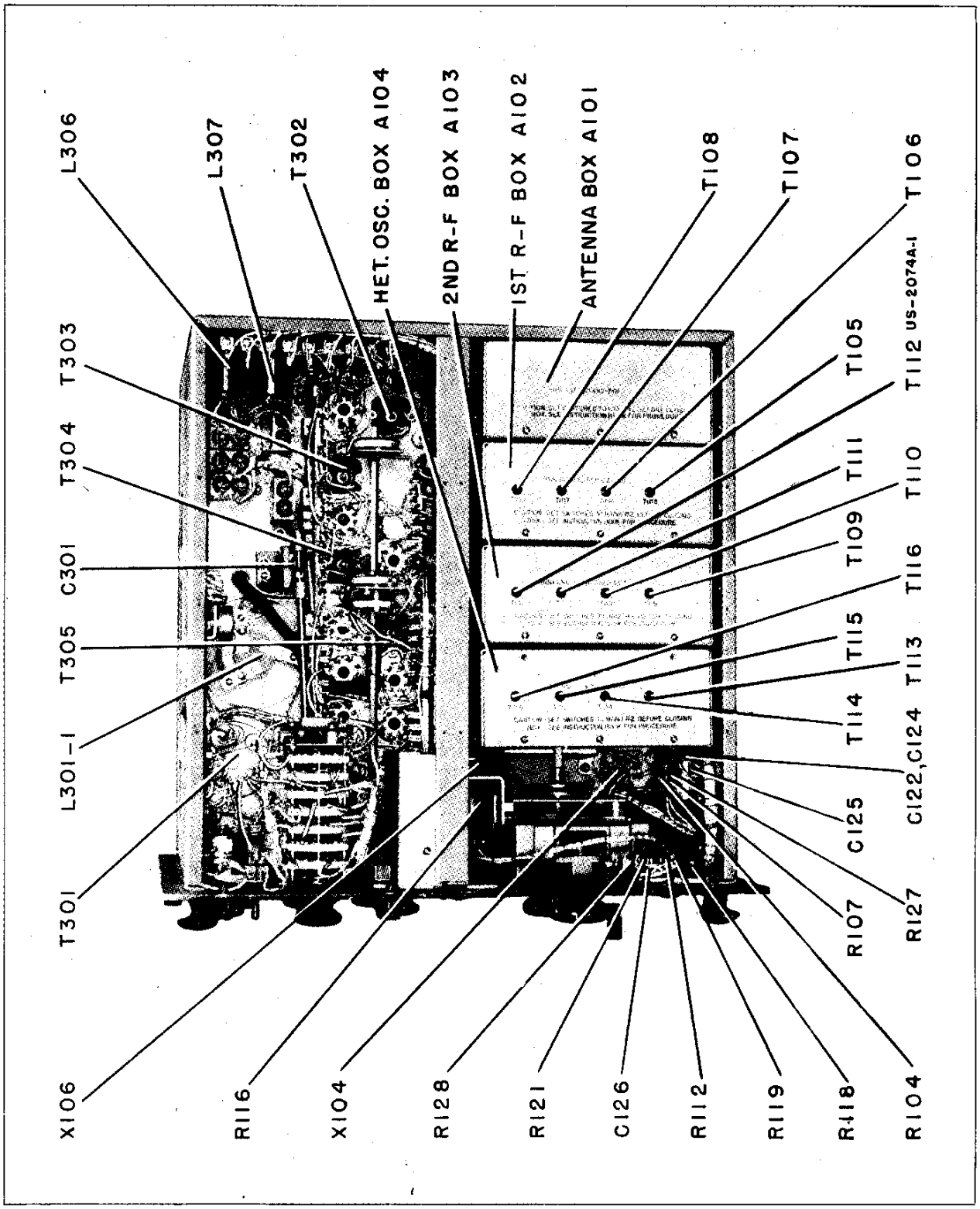


Figure 7-10. RBB Component Identification, Below Chassis

TABLE 7-16. I-F INPUTS FOR STANDARD OUTPUT—RBB/RBC

GENERATOR CONNECTION POINT	400 KC GENERATOR OUTPUT, MODULATED 30% AT 1,000 CYCLES		
	RADIO SELECT. SWITCH AT BROAD	RADIO SELECT. SWITCH AT MED.	RADIO SELECT. SWITCH AT SHARP
V104 (V204), pin 4	38 microvolts	40 microvolts	25 microvolts
V301, pin 4	190 microvolts	290 microvolts	220 microvolts
V302, pin 4	4,800 microvolts	10,300 microvolts	9,200 microvolts
V303, pin 4	115,000 microvolts	90,000 microvolts	84,000 microvolts

Conditions:
RECEPTION switch at MOD.
GAIN control at maximum.
Band 1.
Plate voltage removed from V103 (V203). Refer to Figure 7-11 or 7-14.

TABLE 7-17. R-F INPUTS FOR STANDARD OUTPUT—RBB

BAND	DIAL SETTING	GENERATOR OUTPUT FREQUENCY MODULATED 30% AT 1,000 CYCLES	GENERATOR OUTPUT VALUE AND CONNECTION POINTS			
			V104, PIN 4	V102, PIN 4	V101, PIN 4	*DUMMY ANTENNA
1	0.5	0.5 mc	320 microvolts	100 microvolts	24 microvolts	2.3 microvolts
	0.84	0.84 mc	1100 microvolts	150 microvolts	28 microvolts	3.2 microvolts
2	0.84	0.84 mc	290 microvolts	100 microvolts	25 microvolts	2.5 microvolts
	1.41	1.41 mc	670 microvolts	100 microvolts	28 microvolts	3.1 microvolts
3	1.41	1.41 mc	360 microvolts	104 microvolts	26 microvolts	2.4 microvolts
	2.37	2.37 mc	1000 microvolts	130 microvolts	37 microvolts	4.9 microvolts
4	2.37	2.37 mc	460 microvolts	110 microvolts	26 microvolts	3.9 microvolts
	4.0	4.0 mc	1200 microvolts	120 microvolts	28 microvolts	5.3 microvolts

* 70 ohms shunt resistance. Signal applied through dummy antenna.
Conditions:
RECEPTION switch at MOD.
RADIO SELECTIVITY switch at BROAD.
GAIN control set to produce 60 microwatts noise output. (In the DIRECT position of the ADD DECIBELS switch, zero db on the OUTPUT meter is equal to 60 microwatts.)

TABLE 7-18. R-F INPUTS FOR STANDARD OUTPUT—RBC

BAND	DIAL SETTING	GENERATOR OUTPUT FREQUENCY MODULATED 30% AT 1,000 CYCLES	GENERATOR OUTPUT VALUE AND CONNECTION POINTS		
			V202, PIN 4	V201, PIN 4	*DUMMY ANTENNA
1	4.0	4.0 mc	111 microvolts	15 microvolts	6.8 microvolts
	6.45	6.45 mc	140 microvolts	20 microvolts	7.0 microvolts
2	6.45	6.45 mc	110 microvolts	10 microvolts	7.2 microvolts
	10.3	10.3 mc	160 microvolts	15 microvolts	7.4 microvolts
3	10.3	10.3 mc	100 microvolts	9.5 microvolts	8.8 microvolts
	16.5	16.5 mc	150 microvolts	13 microvolts	6.8 microvolts
4	16.5	16.5 mc	130 microvolts	12 microvolts	8.4 microvolts
	27	27 mc	95 microvolts	12 microvolts	8.0 microvolts

* Signal applied through dummy antenna.
Conditions:
RECEPTION switch at MOD.
RADIO SELECTIVITY switch at BROAD.
GAIN control set to produce 60 microwatts noise output. (In the DIRECT position of the ADD DECIBELS switch, zero db on the OUTPUT meter is equal to 60 microwatts.)

Note

Inputs to the first detector grid have been omitted from Table 7-18 since the oscillator excitation is fed into the first detector grid circuit. If a low-impedance generator output is applied to the first detector grid, the oscillator excitation is so reduced as to preclude measurement.

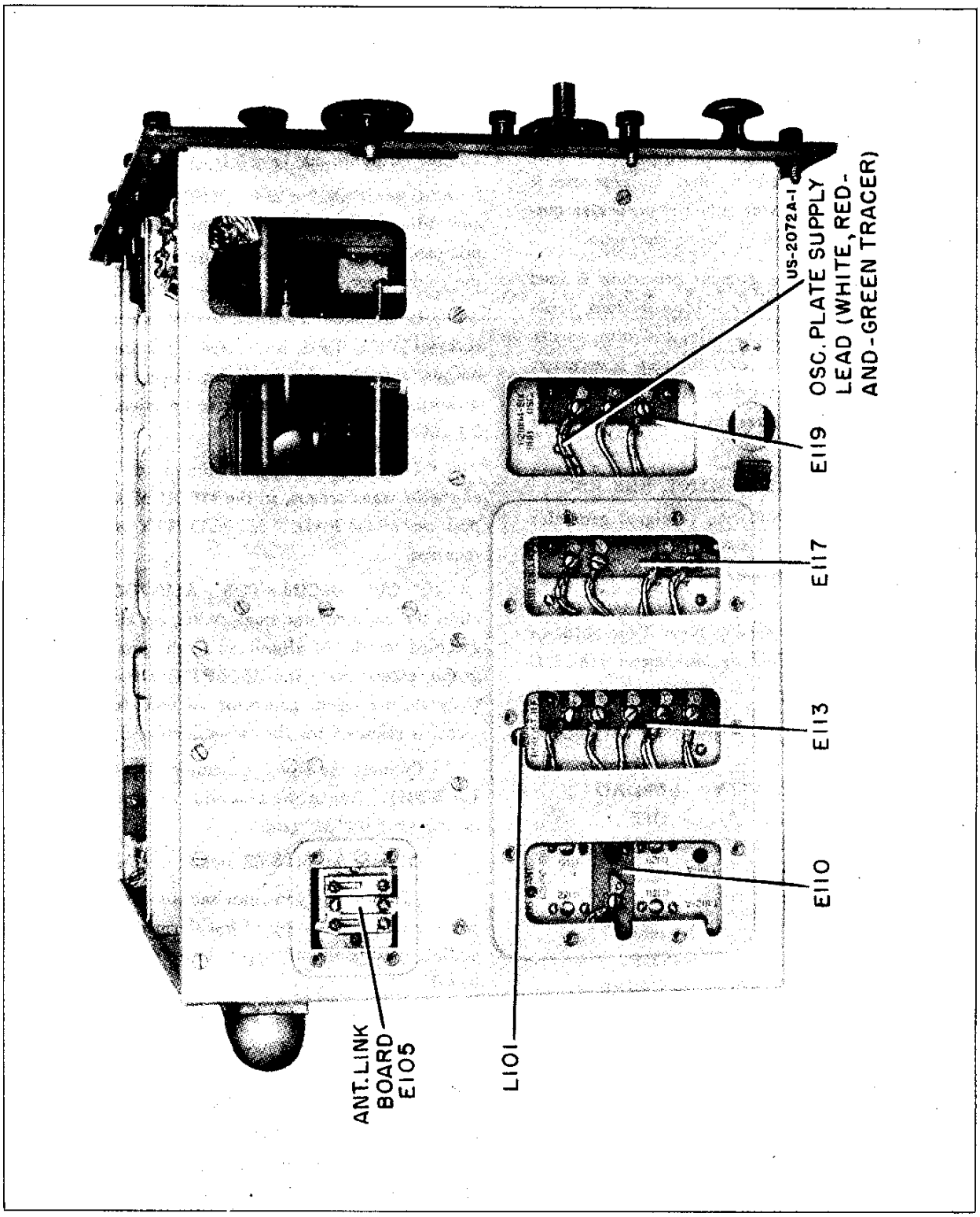


Figure 7-11. RBB Terminal Board Identification, Left Side—Shield Covers Removed

4. CIRCUIT ALIGNMENT.

Under normal operating conditions the RBB/RBC equipments will maintain adjustment over long periods of time. A periodic check, however, is advisable to insure realization of full-performance capabilities of the equipment. A recheck of circuit alignment and adjustment is advisable after replacements have been made in components or wiring. In most cases it will be necessary to readjust only the particular portions of the circuit affected by the replacements.

In general, the same alignment procedure is used for both the RBB and RBC preselector sections, variations occurring only in frequencies and components. However, in addition, a neutralizing step is necessary following adjustment of the RBC heterodyning oscillator, while the RBB unit requires bandspread and i-f rejection adjustments.

a. IF/AF SECTION ALIGNMENT, RBB/RBC.

(1) I-F ALIGNMENT.—An r-f signal generator capable of an unmodulated 400 kc output is required for alignment of the i-f stages. R-F Signal Generator Set AN/URM-25 or Navy Model LP is satisfactory. A 50-microampere meter such as Navy Type 60107 or an electronic voltmeter such as Multimeter ME-25/U is also required.

Controls and switches should be set as follows:

POWER	— OFF
AUDIO SELECTIVITY	— BROAD
NOISE LIMITER	— OFF
FREQUENCY VERNIER	— zero
OUTPUT LEVEL	— zero
ANT. COMP.	— zero
SILENCER	— zero
ADD DECIBELS	— OFF
RADIO SELECTIVITY	— SHARP
GAIN	— 95 (approx.)
RECEPTION	— MOD

Refer to Figure 7-11 or 7-14, whichever is appropriate, and disconnect the oscillator plate supply lead, white wire with red-and-green tracer.

If using Navy Type 60107 microammeter, remove the link connector on terminal board E308 located between V310 and V311, and connect the microammeter in place of the link.

If using Multimeter M-25/U connect it between the junction of R347-R348 and the chassis (ground).

Connect the output of the signal generator to pin 4 of V104 (or V204). Adjust the generator for a signal output of 400 kc ±0.1 per cent.

Operate the receiver POWER switch to ON, and adjust the generator for a reading of seven microamperes on the microammeter or 2.1 volts on the multimeter.

In the order listed, adjust the top and bottom cores of T305, T304, T303, and T302 for maximum output, reducing the generator output as necessary to keep the meter reading at seven microamperes or 2.1 volts.

This completes the i-f alignment. Adjustment of the i-f transformers, in the MEDIUM and BROAD positions of the RADIO SELECTIVITY switch, is not required.

(2) CW OSCILLATOR ALIGNMENT. — To align the cw oscillator stage, V304, set all controls as specified for the i-f alignment in the preceding paragraph, except place the RECEPTION switch at CW. Only the r-f signal generator, as used for i-f alignment, is required for the cw oscillator adjustment.

Connect the signal generator to pin 4 of V104 (or V204). Adjust the generator for a signal output of 400 kc ±0.1 per cent.

Operate the POWER switch to ON.

Advance the generator output slightly and adjust the screw at the top of transformer T306 until an audible beat note of approximately 1000 cycles is heard.

When the note is audible, turn the inductance adjustment screw of T306 in whichever direction is necessary to obtain zero beat. Zero beat is the setting from which an audible note will be heard when the adjustment screw is turned in either direction.

Now turn the adjusting screw clockwise until a note of approximately 1000 cycles is heard. When near 1000 cycles, throw the AUDIO SELECTIVITY switch to SHARP and turn the adjustment screw until the loudest signal is heard in the headphones.

This completes alignment of the cw oscillator.

If an accurate source of 400 kc input signal is not available, the input signal should first be accurately tuned to the center of the SHARP i-f band, with the AUDIO SELECTIVITY switch in the BROAD position. Then use the SHARP position of the AUDIO SELECTIVITY switch to determine the correct adjustment of T306 for a 1000 cycle output, as previously described.

(3) ADJUSTMENT OF BAND-PASS FILTER PAD R364.—Band-pass filter potentiometer, R364, is situated on the side of the if/af section, below the chassis. Location of R364 is indicated on Figures 7-15 and 7-17. An r-f signal generator is required capable of supplying an unmodulated signal at any reception frequency.

Set the panel controls and switches as follows:

RECEPTION	—CW
AUDIO SELECTIVITY	—SHARP
NOISE LIMITER	—OFF
OUTPUT LEVEL	—zero
ANT. COMP.	—zero
FREQUENCY VERNIER	—zero
RADIO SELECTIVITY	—BROAD

Operate the POWER switch to ON. Holding the ADD DECIBELS switch in the DIRECT position, adjust the GAIN control for a zero reading on the OUTPUT meter.

Place the ADD DECIBELS switch in the +20 position.

Connect a signal generator to the receiver input receptacle, and apply an unmodulated r-f signal. Signal should be of a level sufficient to produce zero reading on the OUTPUT meter.

Throw the AUDIO SELECTIVITY switch to BROAD.

Loosen the lock nut on R364 and, with a screwdriver, adjust R364 for a reading 4 DB lower than that obtained under the SHARP condition.

Tighten the lock nut on R364.

(4) ADJUSTMENT OF OUTPUT LIMITER PAD R362.—Potentiometer R362, which sets the level to the output limiter circuit, may be adjusted as follows. This control is shown on Figures 7-14 and 7-16. A generator is required capable of supplying an unmodulated r-f signal, at any input frequency.

Adjust the panel controls to the following positions:

RECEPTION	— CW
OUTPUT LEVEL	— maximum

Operate the POWER switch to ON. Hold the ADD DECIBELS switch in the DIRECT position and adjust the GAIN knob for zero reading on the OUTPUT meter.

Set the ADD DECIBELS switch to +20.

Apply an unmodulated signal to the receiver input receptacle. Any frequency in the reception band is satisfactory. Signal level should be sufficient to produce a reading of +16 db on the OUTPUT meter.

Now operate the RECEPTION switch to CW-OL. Loosen the lock nut on R362 and adjust the shaft for a reading four db higher than that obtained in the preceding paragraph.

Tighten the lock nut on R362.

b. PRESELECTOR SECTION ALIGNMENT, RBB/RBC.—The following instructions apply to both the RBB and RBC units except for band-spread, neutralization, and i-f rejection adjustments which are indicated as being applicable to a particular unit.

(1) HETERODYNE OSCILLATOR HEATER ADJUSTMENT, RBB/RBC.—Potentiometer R116 (or R219) adjusts the voltage through regulator tube V106 (or V206) and thus functions to regulate the heater voltage on oscillator tube V103 (or V203). Location of R116 (R219) is indicated on Figure 7-10 or 7-13. An a-c voltmeter is required for adjustment.

Connect the a-c voltmeter across the heater terminals of oscillator tube V103 (or V203). These terminals are numbers one and two of the terminal board on the oscillator coil box, shown on Figure 7-11 or 7-14. Apply power to the receiver and adjust R116 (or R219) to obtain a 6.3 volt ±5 per cent meter reading. Then vary the a-c line voltage plus and minus ten per cent by varying the link connections with Rectifier Power Unit and note the readings. Allow about five minutes for stabilization after each change, before taking readings.

Now vary the adjustment of R116 (or R219) to obtain as constant heater voltage as possible for the variations in the a-c supply voltage, keeping the heater voltage within the limits of 6.3 volts, ±5 per cent.

If the line voltage variation was accomplished by changing the rectifier power unit link position, be sure to return it to its proper position.

(2) HETERODYNE OSCILLATOR ALIGNMENT, RBB/RBC.—An r-f signal generator capable of 30% modulation at 1,000 cycles is required for alignment of the heterodyne oscillator stage, V103 (V203). Generator frequencies are listed in Tables 7-19 and 7-20.

Panel controls should be adjusted as follows, after first placing the receiver so that it rests on the if/af side:

RECEPTION	— MOD
RADIO SELECTIVITY	— SHARP
GAIN	— 95 (approx.)
ANT. COMP.	—zero
OUTPUT LEVEL	— zero
SILENCER	— zero
FREQUENCY VERNIER	— zero
NOISE LIMITER	— OFF
AUDIO SELECTIVITY	— BROAD
ADD DECIBELS	— +20

Throw the POWER switch to ON.

In the following procedure, each band should be aligned in succession, first at the high-frequency (HF) end, then at the low-frequency (LF) end, followed by a final adjustment at the high-frequency end.

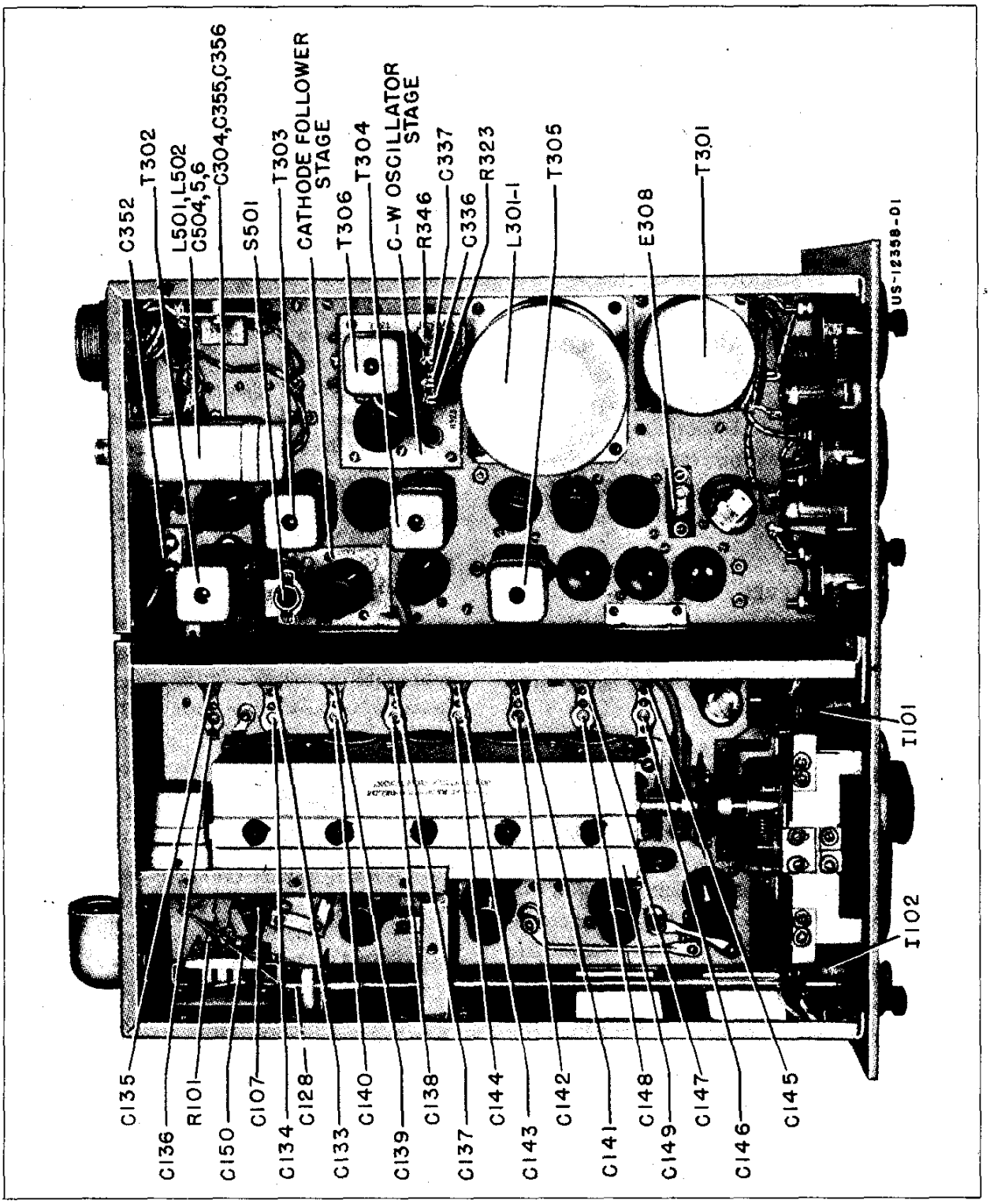


Figure 7-12. RBC Component Identification, Above Chassis

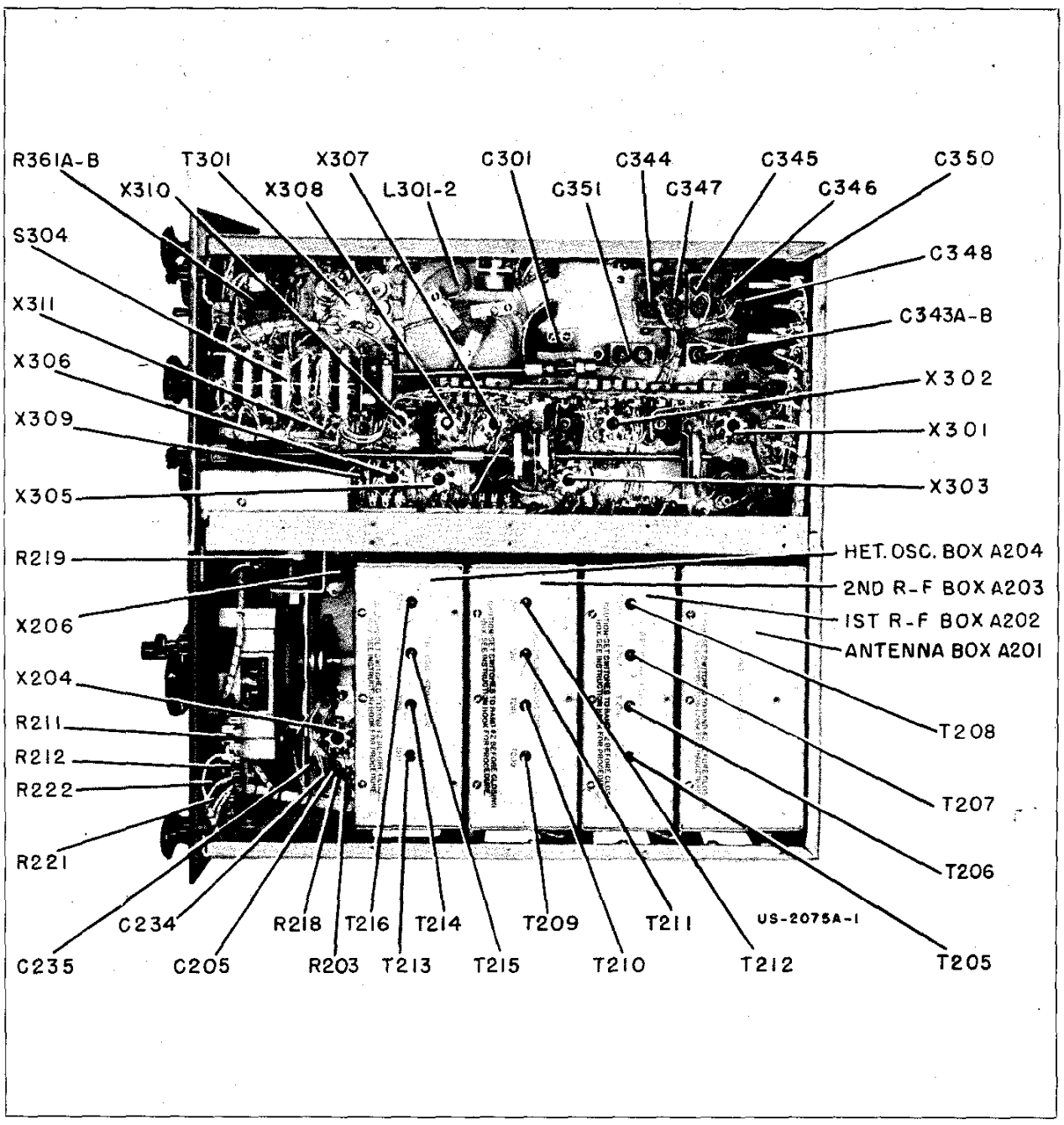


Figure 7-13. RBC Component Identification, Below Chassis

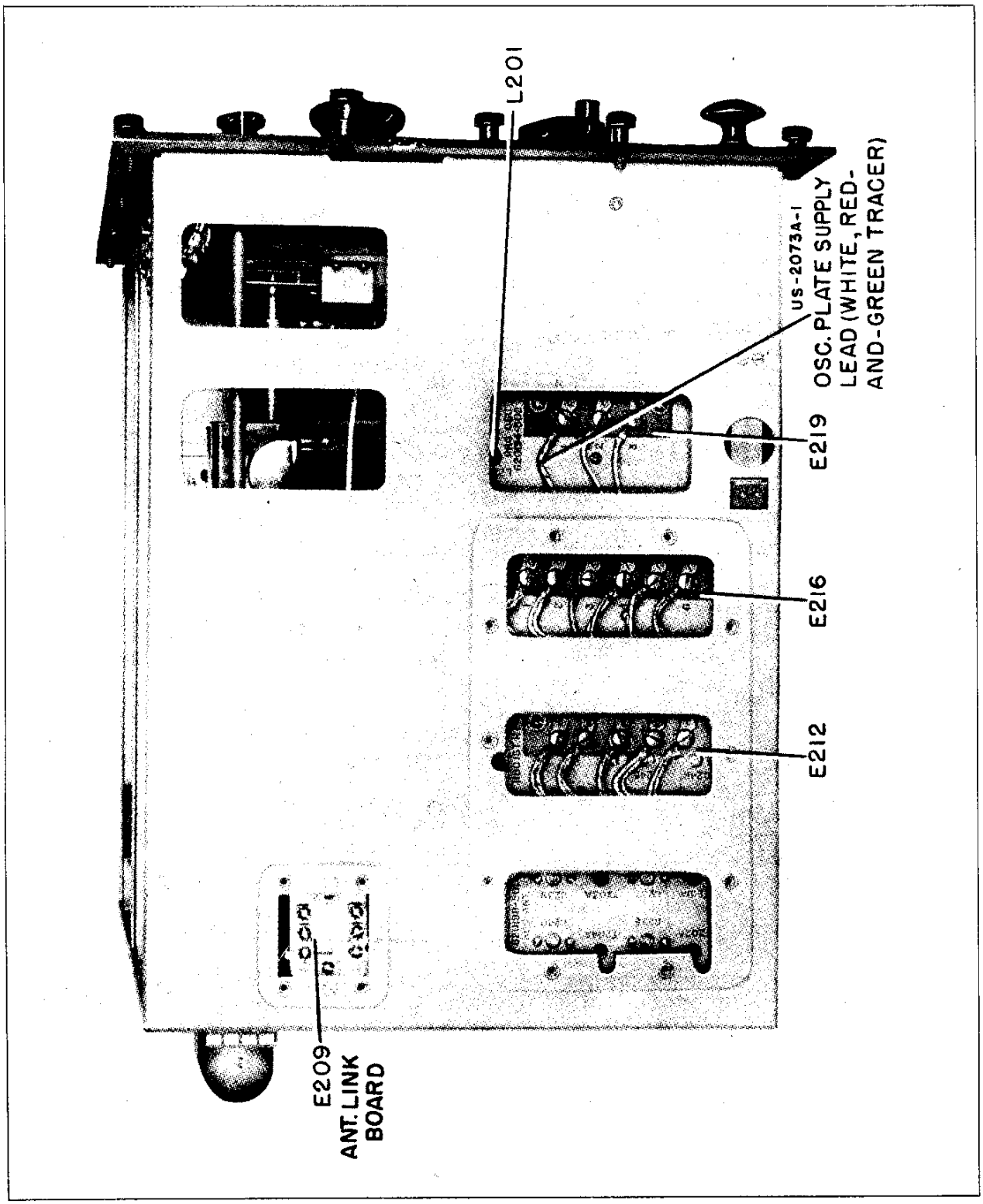


Figure 7-14. RBC Terminal Board Identification, Left Side—Shield Covers Removed

TABLE 7-19. HETERODYNE OSCILLATOR ALIGNMENT DATA—RBB

BAND	REC. DIAL AND GENERATOR FREQ.	ITEM ADJUSTED
1 HF	0.84 mc	C145
1 LF	0.5 mc	T113
2 HF	1.41 mc	C146
2 LF	0.84 mc	T114
3 HF	2.37 mc	C147
3 LF	1.41 mc	T115
4 HF	4.0 mc	C148
4 LF	2.37 mc	T116

TABLE 7-20. HETERODYNE OSCILLATOR ALIGNMENT DATA—RBC

BAND	REC. DIAL AND GENERATOR FREQ.	ITEM ADJUSTED
1 HF	6.45 mc	C253
1 LF	4.0 mc	T213
2 HF	10.3 mc	C254
2 LF	6.45 mc	T214
3 HF	16.5 mc	C255
3 LF	10.3 mc	T215
4 HF	27.0 mc	C256
4 LF	16.5 mc	T216

It will be noted on Tables 7-19 and 7-20 that the capacitor adjustments (HF) are above the chassis while the transformer core adjustments (LF) are below the chassis. Figures 7-9, 7-10, 7-12, and 7-13 indicate location of the components referenced.

Referring to Table 7-19 or 7-20, set the signal generator and the receiver dial to the high-frequency (0.84 mc or 6.45 mc) for Band 1. Adjust the generator for 1000-cycle modulation and connect the output to the antenna terminal. If the r-f system is misaligned it may be necessary to connect the generator output to the second r-f box input terminal. This terminal is located above the chassis, adjacent to V102 (V202), and is the ceramic-mounted terminal nearest to the ANT. COMP. shaft.

Adjust the output of the signal generator until the OUTPUT meter indicates zero db.

Adjust capacitor C145 (or C253) until the OUTPUT meter reading starts to rise. If the reading starts to fall, reverse the rotation of the adjustment screw.

Readjust the output of the signal generator until the OUTPUT meter again indicates zero db.

Repeat the two preceding steps until the OUTPUT meter indication fails to rise. Leave the indicator at zero db.

Set the signal generator and receiver tuning dial to the LF for Band 1, 0.5 megacycles (RBB) or 4.0 megacycles (RBC).

Adjust transformer T113 (or T213) until the OUTPUT meter reading starts to rise. If the reading starts to fall, reverse the rotation of the adjustment screw.

Readjust the output of the signal generator until the receiver OUTPUT meter again indicates zero db.

Repeat the two preceding steps until the OUTPUT meter indicator no longer rises.

Recheck alignment at the HF end of the band. This completes alignment of Band 1 in the oscillator stage.

In a similar manner align bands 2, 3, and 4, referring to the previously-mentioned illustrations and Tables 7-19 and 7-20. While aligning the oscillator, 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 and may be checked in the following manner: After setting the oscillator, increase the input signal level and vary the input frequency 800 kc above and 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.

(3) NEUTRALIZATION, HETERODYNE OSCILLATOR, RBC.—After aligning Band 4 in the RBC oscillator stage, a neutralizing adjustment is required. Panel control settings are the same as for oscillator alignment, except that the RECEPTION knob should be turned to CW and the RADIO SELECTIVITY switch to BROAD.

Throw the "POWER" switch to the ON position.

Apply an unmodulated, cw, 27-mc signal to the receiver antenna connection, of sufficient level to produce zero reading on the OUTPUT meter.

In the second r-f box, tune capacitor C252 through resonance, observing the output beat note variation.

Adjust L201 for minimum beat note variation. The core-adjusting screw of L201 is located on the side of the chassis, adjacent to terminal board E219, and is identified on Figure 7-14.

After completing this adjustment, realign the heterodyne oscillator for Band 4, as described in the preceding instructions for oscillator alignment.

(4) R-F AMPLIFIER ALIGNMENT, RBB/RBC.—The following notes cover instructions for alignment of the antenna input components and the r-f amplifier stages. Components to be adjusted are located in the antenna box and the first and second r-f boxes. A d-c voltmeter and an r-f signal generator are required, the generator capable of 1,000-cycle modulation at the frequencies specified in Tables 7-21 and 7-22.

Panel control settings for r-f amplifier alignment are as follows:

RECEPTION	— MOD
RADIO SELECTIVITY	— SHARP
FREQUENCY VERNIER	— zero
OUTPUT LEVEL	— zero
SILENCER	— zero
NOISE LIMITER	— OFF
AUDIO SELECTIVITY	— BROAD or SHARP
ANT. COMP.	— zero

Set the RBB and RBC antenna link board connections for single receiver operation from an antenna, as specified on Figure 3-11 or 3-12, in Section 3.

Operate the POWER switch to ON and, holding the ADD DECIBELS switch in the DIRECT position, adjust the GAIN control for zero reading on the OUTPUT meter. The GAIN setting should be approximately 95.

Now turn the ADD DECIBELS knob to +20.

Apply an r-f signal, at 1,000-cycle modulation, to the receiver input through a standard dummy antenna.

Adjust the generator output for zero reading on the OUTPUT meter.

Refer to Tables 7-21 and 7-22 and make the alignment adjustments listed. Location of items to be adjusted is shown on Figures 7-9 to 7-14.

(5) BAND-SPREAD ADJUSTMENTS, RBB.—After aligning Band 1 in the RBB, set the generator output and the tuning dial to 0.5 mc.

Turn the adjusting screw of T105 clockwise until the receiver output is decreased 1 db.

Turn the adjustment screw T109 counterclockwise until the receiver output is decreased 1 db.

Realign capacitors C137 and C141 at 0.84 mc.

This procedure supplies the necessary band spread in the RBB.

(6) I-F REJECTION ADJUSTMENT, RBB.—After the adjustments in preceding paragraphs (4) and (5) have been completed, the RBB i-f rejection adjustment should be made.

TABLE 7-21. R-F AMPLIFIER ALIGNMENT DATA—RBB

(Make HF adjustment first, then LF, and final adjustment at HF)

BAND	REC. DIAL AND GENERATOR FREQ.	ITEM ADJUSTED			
		ANTENNA BOX		1ST R-F BOX	2ND R-F BOX
		*ANTENNA	**LINK		
1 HF	0.84 mc	C129 T101A	C133 T101B	C137 T105	C141 T109
1 LF	0.5 mc				
†2 HF	1.41 mc	C130 T102A	C134 T102B	C138 T106	C142 T110
†2 LF	0.84 mc				
3 HF	2.37 mc	C131 T103A	C135 T103B	C139 T107	C143 T111
3 LF	1.41 mc				
4 HF	4.0 mc	C132 T104A	C136 T104B	C140 T108	C144 T112
4 LF	2.37 mc				

* Connect a 1,000-ohm resistor in parallel with C149-B while making the "Antenna" adjustments. (Section "A" of C149 is furthest from panel.)

** Connect a 1,000-ohm resistor in parallel with C149-A while making the "Link" adjustments.

† After aligning Band 1, and before aligning Band 2, perform the adjustments in the following notes, paragraph (5), "Band-Spread Adjustments, RBB."

TABLE 7-22. R-F AMPLIFIER ALIGNMENT DATA—RBC

(Make HF adjustment first, then LF, and final adjustment at HF)

BAND	REC. DIAL AND GENERATOR FREQ.	ITEM ADJUSTED			
		ANTENNA BOX		1ST R-F BOX	2ND R-F BOX
		ANTENNA	LINK		
1 HF	6.45 mc	C237 T201A	C241 T201B	C245 T205	C249 T209
1 LF	4.0 mc				
2 HF	10.3 mc	C238 T202A	C242 T202B	C246 T206	C250 T210
2 LF	6.45 mc				
3 HF	16.5 mc	C239 T203A	C243 T203B	C247 T207	C251 T211
3 LF	10.3 mc				
4 HF	27.0 mc	C240 T204A	C244 T204B	C248 T208	*C252 T212
4 LF	16.5 mc				

* For accurate alignment of C252, a d-c voltmeter should be connected from pin 5 of V204 to ground. Referring to Figure 7-14, remove the oscillator plate voltage. Apply a sufficient generator input to obtain a slight change in the indication on the voltmeter. Adjust capacitor C252 until maximum indication is obtained on the voltmeter.

After checking that the panel control settings are as specified in paragraph (4), reset the receiver dial to 0.5 mc.

Apply a 400-kc generator output, modulated 30% at 1000 cycles, to the receiver antenna input, through the dummy antenna. Generator output level should be approximately two volts.

Adjust the core of L101 for minimum output. Coil L101 is identified on Figure 7-11.

This completes the r-f amplifier alignment.

c. INPUT METER ADJUSTMENTS.—When the INPUT meter is used to measure signal input voltages, the meter adjustments should be checked frequently. Potentiometer R368, indicated on Figures 7-17 and 7-18, is used to set the operating level of the meter. An unmodulated r-f signal, at any reception frequency, is required for meter adjustment.

Controls and switches on the panel should be set as follows:

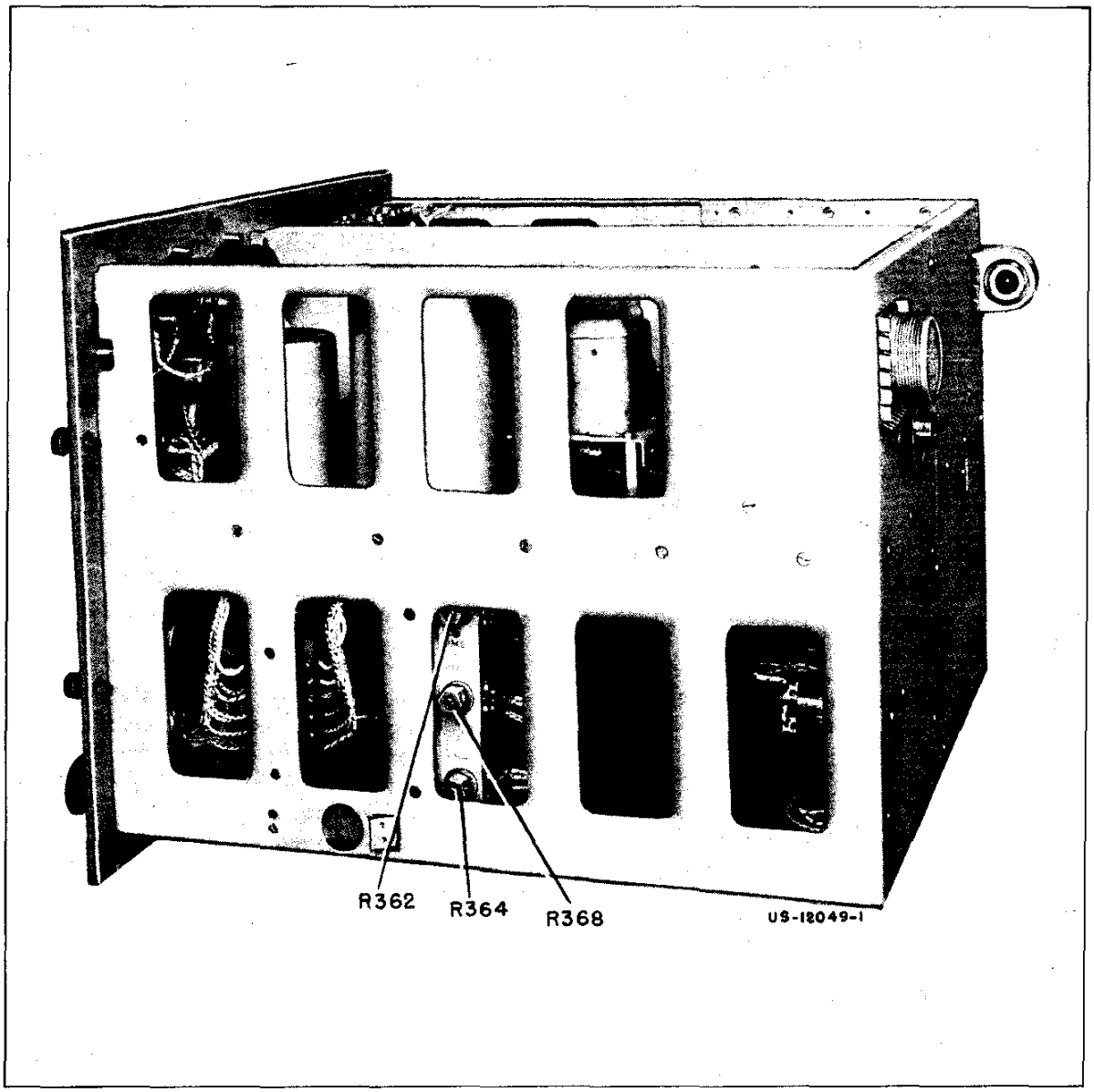


Figure 7-17. RBB/RBC Component Identification, Right Side

RADIO SELECTIVITY	— SHARP
RECEPTION	— MOD-AVC
ANT. COMP.	— zero
FREQUENCY VERNIER	— zero
GAIN	— zero
SILENCER	— zero
OUTPUT LEVEL	zero
NOISE LIMITER	— OFF
ADD DECIBELS	— OFF

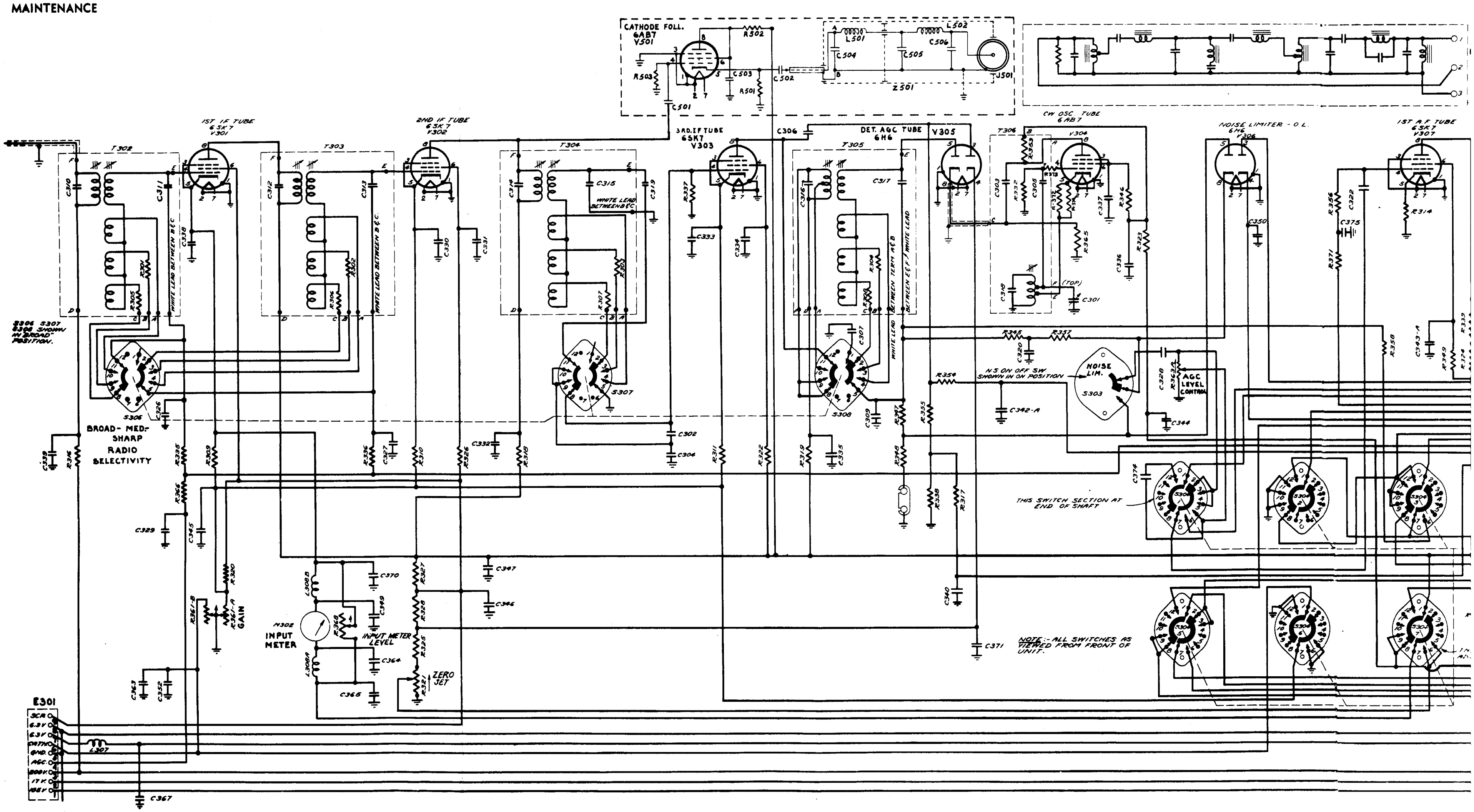
Operate the POWER switch to ON.

Without a signal input, adjust the ZERO SET knob (R321) for zero reading on the INPUT meter.

Connect an r-f signal generator to the antenna terminal, through a dummy antenna. Adjust the generator for a 10,000-microvolt output at any reception frequency.

After unlocking the shaft nut on R368, Figure 7-17, rotate the shaft for a deflection of 80 db on the INPUT meter. Tighten the lock nut.

Repeat the two preceding adjustments until the meter reading is correct at both points.


CATHODE FOLL.
6AB7
V501
1ST IF TUBE
6SK7
V301
2ND IF TUBE
6SK7
V302
3RD. IF TUBE
6SK7
V303
DET. AGC TUBE
6H6
V305
CW OSC. TUBE
6AB7
V304
NOISE LIMITER - O.L.
6H6
V306
1ST A.F. TUBE
6SK7
V307
T302
T303
T304
T305
T306
Z501
J501
S306 S307
S308 SHOWN
IN BROAD
POSITION.
WHITE LEAD BETWEEN B & C
WHITE LEAD BETWEEN E & F
WHITE LEAD BETWEEN TERM A & B
BROAD- MED.-
SHARP
RADIO
SELECTIVITY
N.S ON OFF SW.
SHOWN IN ON POSITION
NOISE
LIM.
S303
AGC
LEVEL
CONTROL
THIS SWITCH SECTION AT
END OF SHAFT
NOTE:- ALL SWITCHES AS
VIEWED FROM FRONT OF
UNIT.
GAIN
INPUT
METER
INPUT METER
LEVEL
ZERO
SET
E301

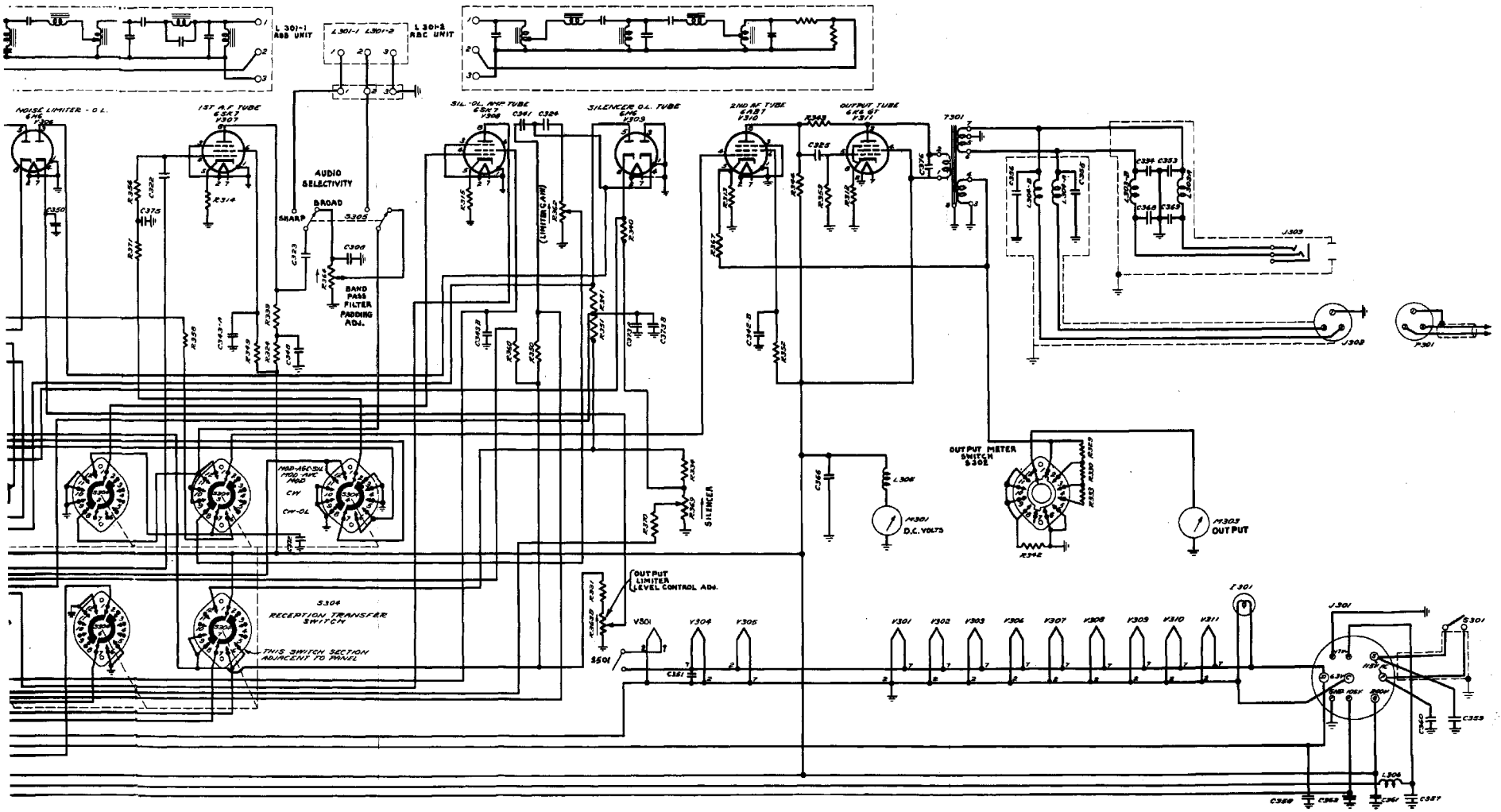


Figure 7-67. RBB/RBC–IF/AF Section Schematic Diagram

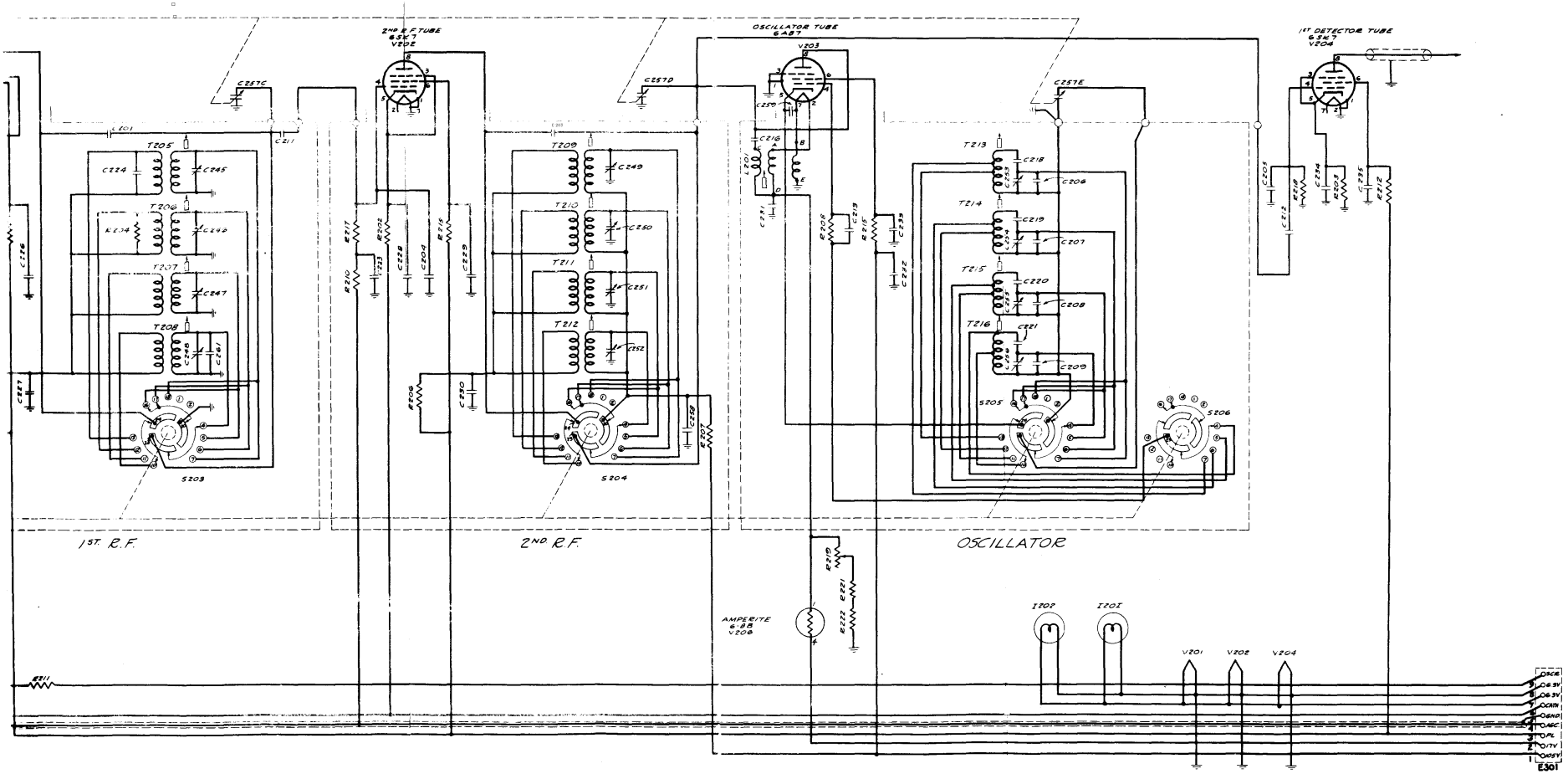
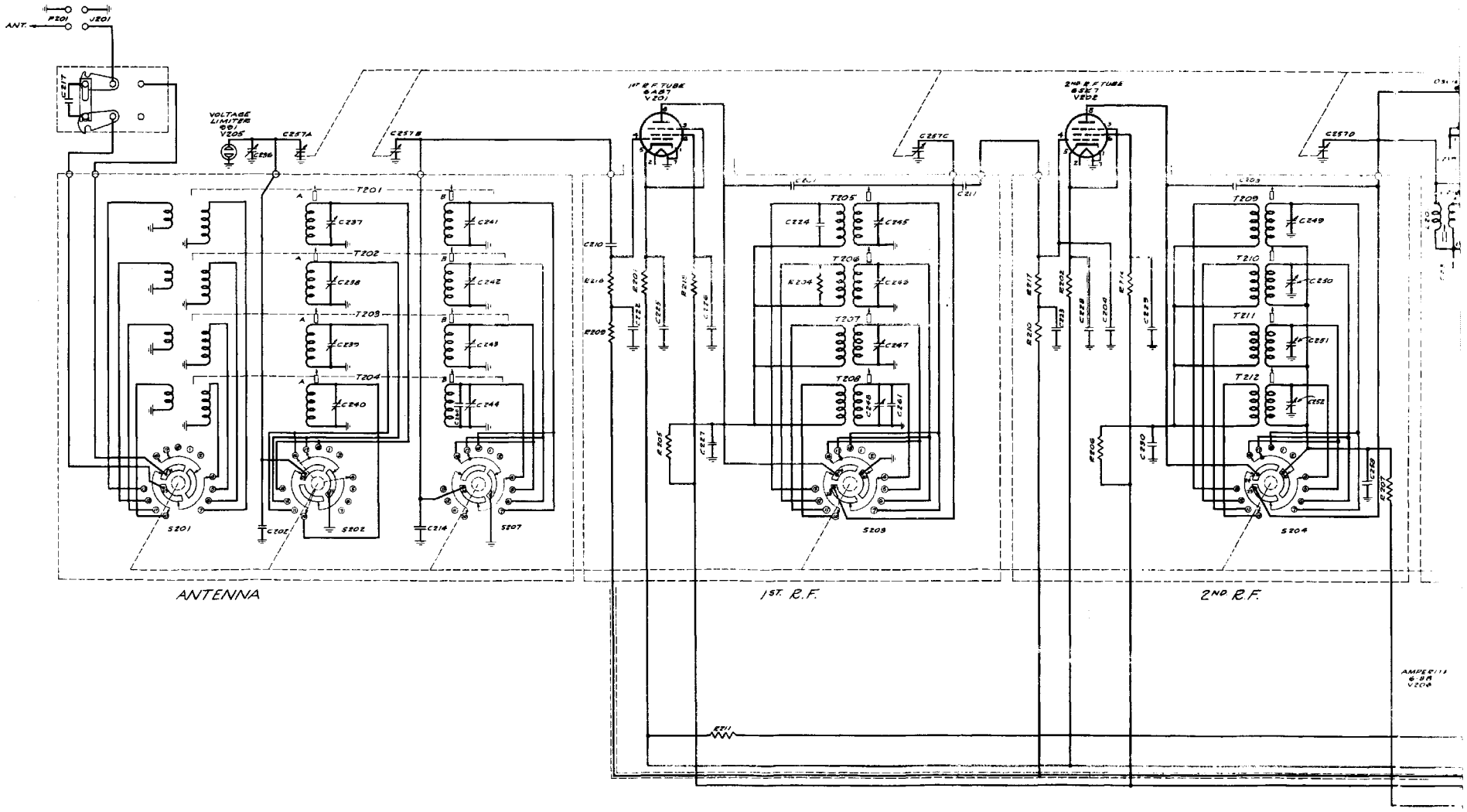


Figure 7-65. RBC Preselector Section Schematic Diagram


ANT.
P201
J201
VOLTAGE LIMITER 991 V205
C257A
C257B
C257C
C257D
1ST R.F. TUBE 6AG7 V203
2ND R.F. TUBE 6SK7 V202
T201
T202
T203
T204
T205
T206
T207
T208
T209
T210
T211
T212
C237
C238
C239
C240
C241
C242
C243
C244
C245
C246
C247
C248
C249
C250
C251
C252
S201
S202
S207
S209
S204
ANTENNA
1ST R.F.
2ND R.F.
AMPEX 11 6-BA V204

RBC Component Values (R,C)

RBB/RBC Components (R and C)

C-101	15 mmf	ceramic, temperature comp.
C-102	10 mmf	cermaic, temperature comp.
C-103	same as C-102	
C-104	12 mmf	ceramic, temperature comp.
C-105	50 mmf	mica
C-106	500 mmf	mica
C-107	500 mmf	mica
C-108	260 mmf	mica
C-109	415 mmf	mica
C-110	630 mmf	mica
C-111	980 mmf	mica
C-112	5000 mmf	mica
C-113	same as C-112	
C-114	same as C-112	
C-115	10000 mmf	mica
C-116	same as C-115	
C-117	same as C-115	
C-118	same as C-115	
C-119	same as C-115	
C-120	same as C-115	
C-121	same as C-115	
C-122	same as C-115	
C-123	10000 mmf	mica
C-124	same as C-115	
C-125	same as C-115	
C-126	same as C-115	
C-127	same as C-115	
C-128	15 mmf	air variable
C-129	2.7 mmf	air variable
C-130	same as C-129	
C-131	same as C-129	
C-132	same as C-129	
C-133	same as C-129	
C-134	same as C-129	
C-135	same as C-129	
C-136	same as C-129	
C-137	same as C-129	
C-138	same as C-129	
C-139	same as C-129	
C-140	same as C-129	
C-141	same as C-129	
C-142	same as C-129	
C-143	same as C-129	
C-144	same as C-129	
C-145	same as C-129	
C-146	same as C-129	
C-147	same as C-129	
C-148	same as C-129	
C-149	13 - 142.2 mmf	5 section air variable
C-150	1000 mmf	mica
C-201	5 mmf	mica
C-202	15 mmf	mica
C-203	same as C-201	
C-204	10 mmf	mica
C-205	same as C-201	
C-206	16 mmf	ceramic

C-207	20 mmf ceramic
C-208	24 mmf ceramic
C-209	12 mmf ceramic
C-210	50 mmf mica
C-211	same as C-210
C-212	same as C-210
C-213	same as C-210
C-214	same as C-202
C-215	not used
C-216	2 mmf ceramic
C-217	100 mmf mica
C-218	2000 mmf mica
C-219	2700 mmf mica
C-220	3000 mmf mica
C-221	same as C-218
C-222	same as C-112
C-223	same as C-112
C-224	same as C-210
C-225	same as C-115
C-226	same as C-115
C-227	same as C-115
C-228	same as C-115
C-229	same as C-115
C-230	same as C-115
C-231	same as C-115
C-232	same as C-115
C-233	same as C-123
C-234	same as C-115
C-235	same as C-115
C-236	same as C-128
C-237	same as C-129
C-238	same as C-129
C-239	same as C-129
C-240	same as C-129
C-241	same as C-128
C-242	same as C-129
C-243	same as C-129
C-244	same as C-129
C-245	same as C-129
C-246	same as C-128
C-247	same as C-129
C-248	same as C-129
C-249	same as C-129
C-250	same as C-129
C-251	same as C-128
C-252	same as C-129
C-253	same as C-129
C-254	same as C-129
C-255	same as C-129
C-256	same as C-129
C-257	13 - 142.2 mmf 5 section air variable
C-258	10000 mmf mica
C-259	5000 mmf mica
C-260	same as C-204
C-261	same as C-204
C-301	same as C-128
C-302	3 mmf ceramic temperature comp.
C-303	same as C-217

C-304	7 mmf ceramic temperature comp.	
C-305	same as C-105	
C-306	same as C-217	
C-307	20 mmf mica	
C-308	1500 mmf mica	
C-309	same as C-217	
C-310	same as C-107	
C-311	same as C-107	
C-312	same as C-107	
C-313	same as C-107	
C-314	same as C-107	
C-315	same as C-107	
C-316	same as C-107	
C-317	same as C-107	
C-318	500 mmf mica	
C-319	same as C-106	
C-320	same as C-323	
C-321	not used	
C-322	same as C-115	
C-323	2000 mmf mica	
C-324	same as C-112	
C-325	same as C-112	
C-326	same as C-112	
C-327	same as C-112	
C-328	same as C-115	
C-329	same as C-112	
C-330	same as C-115	
C-331	same as C-115	
C-332	same as C-115	
C-330	same as C-115	
C-331	same as C-115	
C-332	same as C-115	
C-333	same as C-115	
C-334	same as C-115	
C-335	same as C-115	
C-336	same as C-115	
C-337	same as C-115	
C-338	same as C-115	
C-339	same as C-123	
C-340	same as C-259	
C-341	100000 mmf	2 section paper
C-342	50000 mmf	2 section paper
C-342A	part of C-342	
C-342B	part of C-342	
C-343	125000 mmf	2 section paper
C-343A	part of C-343	
C-343B	part of C-343	
C-344	1 mf	2 section paper
C-345	same as C-344	
C-346	same as C-344	
C-347	same as C-344	
C-348	same as C-344	
C-349	same as C-115	
C-350	same as C-344	
C-351	same as C-344	
C-352	same as C-344	
C-353	same as C-112	
C-354	same as C-112	

C-355	same as C-123	
C-356	same as C-123	
C-357	same as C-115	
C-358	same as C-115	
C-359	same as C-115	
C-360	same as C-115	
C-361	same as C-115	
C-362	same as C-115	
C-363	same as C-115	
C-364	same as C-115	
C-365	same as C-115	
C-366	same as C-115	
C-367	same as C-115	
C-368	same as C-112	
C-369	same as C-112	
C-370	same as C-115	
C-371	same as C-106	
C-372	same as C-115	
C-373	same as C-343	
C-373A	part of C-373	
C-373B	part of C-373	
C-374	same as C-115	
C-375	same as C-112	
C-376	same as C-106	
C-501	100 mmf	mica
C-502	10000 mmf	mica
C-503	same as C-502	
C-504	5100 mmf	mica
C-505	10000 mmf	mica
C-506	same as C-504	
R-101	100 ohms	ww
R-102	120 ohms	composition
R-103	same as R-102	
R-104	1000 ohms	composition
R-105	4700 ohms	composition
R-106	same as R-105	
R-107	same as R-105	
R-108	47000 ohms	composition
R-109	100000 ohms	composition
R-110	same as R-109	
R-111	same as R-109	
R-112	same as R-109	
R-113	22000 ohms	composition
R-114	same as R-113	
R-115	2200 ohms	composition
R-116	40 ohms	variable, WW, linear taper
R-117	not used	
R-118	15 ohms	ww, 2 watts
R-119	same as R-118	
R-120	330 ohms	composition
R-121	same as R-105	
R-122	33000 ohms	composition
R-123	same as R-122	
R-124	220 ohms	ww, 1/2 watt
R-125	same as R-124	
R-126	same as R-115	
R-127	1500 ohms	composition

R-128	33000 ohms	composition
R-129	same as R-102	
R-201	same as R-124	
R-202	same as R-124	
R-203	same as R-105	
R-204	5600 ohms	composition
R-205	same as R-105	
R-206	same as R-105	
R-207	same as R-105	
R-208	same as R-108	
R-209	same as R-109	
R-210	same as R-109	
R-211	same as R-128	
R-212	same as R-109	
R-213	120000 ohms	composition
R-214	same as R-213	
R-215	10000 ohms	composition
R-216	1 meg ohm	composition
R-217	same as R-216	
R-218	same as R-216	
R-219	same as R-216	
R-220	not used	
R-221	same as R-218	
R-222	same as R-218	
R-301	10 ohms	ww, 1/2 watt
R-302	same as R-301	
R-303	same as R-301	
R-304	same as R-301	
R-305	22 ohms	ww, 1/2 watt
R-306	same as R-305	
R-307	same as R-305	
R-308	same as R-305	
R-309	680 ohms	composition
R-310	470 ohms	composition
R-311	same as R-310	
R-312	same as R-309	
R-313	same as R-104	
R-314	same as R-104	
R-315	3900 ohms	composition
R-316	same as R-105	
R-317	same as R-216	
R-318	same as R-105	
R-319	same as R-105	
R-320	39000 ohms	composition
R-321	3000 ohms	composition
R-322	same as R-109	
R-323	same as R-215	
R-324	same as R-215	
R-325	6800 ohms	composition
R-326	same as R-215	
R-327	10000 ohms	composition
R-328	22000 ohms	composition
R-329	1100 ohms	composition
R-330	3600 ohms	composition
R-331	same as R-128	
R-332	68000 ohms	composition
R-333	12000 ohms	composition
R-334	same as R-109	

R-335	2200000 ohms	composition
R-336	same as R-109	
R-337	1.5 meg ohms	composition
R-338	180000 ohms	composition
R-339	aame as R-109	
R-340	same as R-216	
R-341	same as R-216	
R-342	560 ohms	composition
R-343	same as R-335	
R-344	same as R-335	
R-345	same as R-216	
R-346	120000 ohms	composition
R-347	270000 ohms	composition
R-348	same as R-347	
R-349	470000	composition
R-350	same as R-349	
R-351	same as R-349	
R-352	same as R-349	
R-353	27000 ohms	composition
R-354	390000 ohms	composition
R-355	same as R-349	
R-356	2.2 meg ohms	composition
R-357	820000 ohms	composition
R-358	same as R-356	
R-359	same as R-216	
R-360	same as R-356	
R-361	5000 ohms	2 section, variable, ww, linear taper
R-361A	part of R-361	
R-361B	part of R-361	
R-362	500000 ohms	variable, composition,, linear taper
R-363	25000, 1 meg ohm	variable,composition lin, log taper
R-363A	part of R-363	
R-363B	part of R-363	
R-364	100000 ohms	variable, composition, linear taper
R-365	15000 ohms	composition
R-366	same as R-335	
R-367	same as R-328	
R-368	25000 ohms	variable, composition, linear taper
R-369	100000 ohms	variable, composition, linear taper
R-370	same as R-335	
R-371	same as R-216	
R-372	2400 ohms	composition
R-373	same as R-101	
R-374	same as R-215	
R-501	same as R-310	
R-502	same as R-215	
R-503	same as R-216	

Vacuum Tubes

V-101	6SK7	
V-102	same as V-101	
V-103	6AB7	
V-104	same as V-103	
V-105	991	
V-106	6-8B	Amperite Ballast tube
V-201	same as V-103	
V-202	same as V-101	

V-203	same as V-103
V-204	not used
V-205	same as V-105
V-206	same as V-106
V-301	same as V-101
V-302	same as V-101
V-303	same as V-101
V-304	same as V-103
V-305	6H6
V-306	same as V-305
V-307	same as V-101
V-308	same as V-101
V-309	same as V-305
V-310	same as V-103
V-311	6K6GT
V-501	same as V-103

Power Supply Components

C-401	same as C-115	
C-402	same as C-115	
C-403	same as C-343	
C-403A	part of C-403	
C-403B	part of C-403	
C-404	same as C-343	
C-404A	part of C-404	
C-404B	part of C-404	
C-405	100000 mmf	paper
C-406	10 mf	paper
C-407	same as C-406	
L-405	10 Hy	choke, 170 ma, 106 ohms DC resistance
L-406	same as L-405	
T-401	Power Transformer	550vct@120 ma, 6.3v@11.1a, 17v@1.2 a

Vacuum Tubes

V-401	5U4G
V-402	OC3/VR105