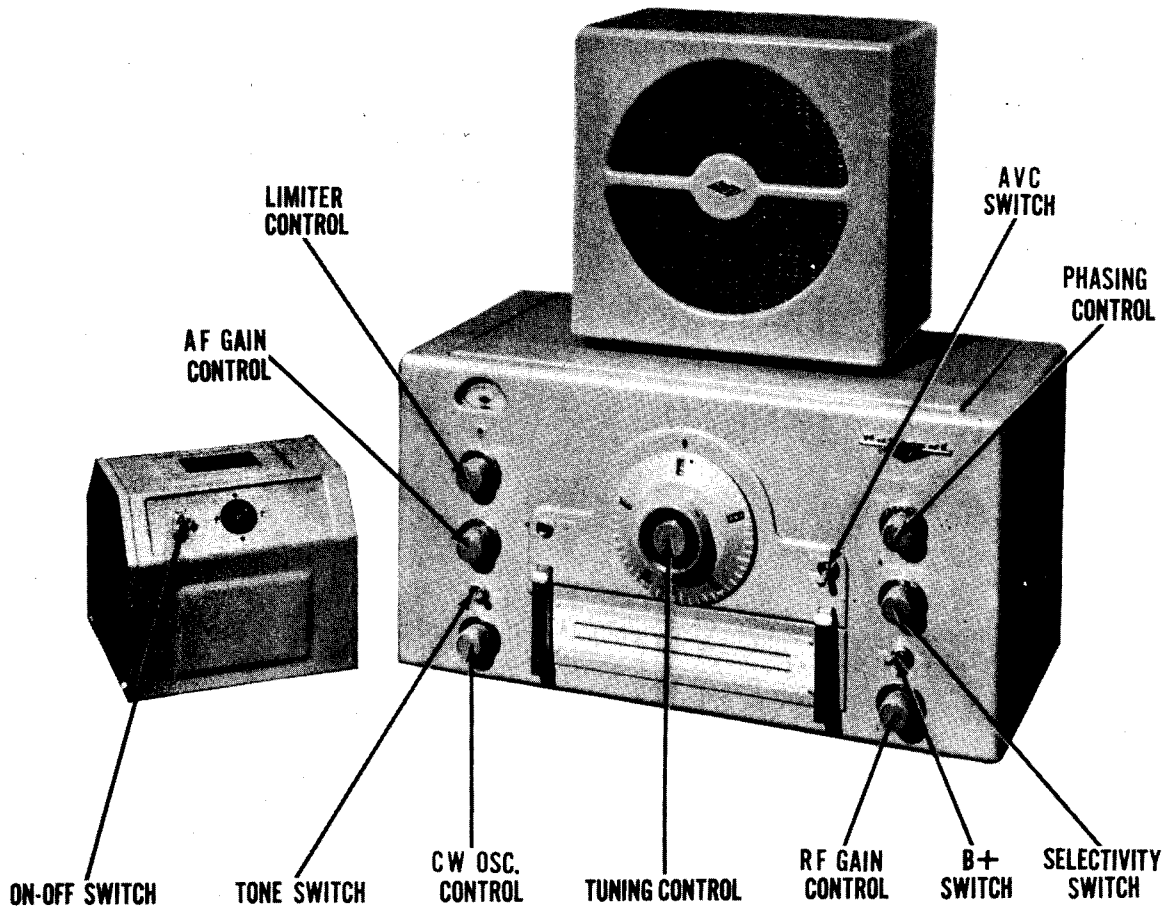
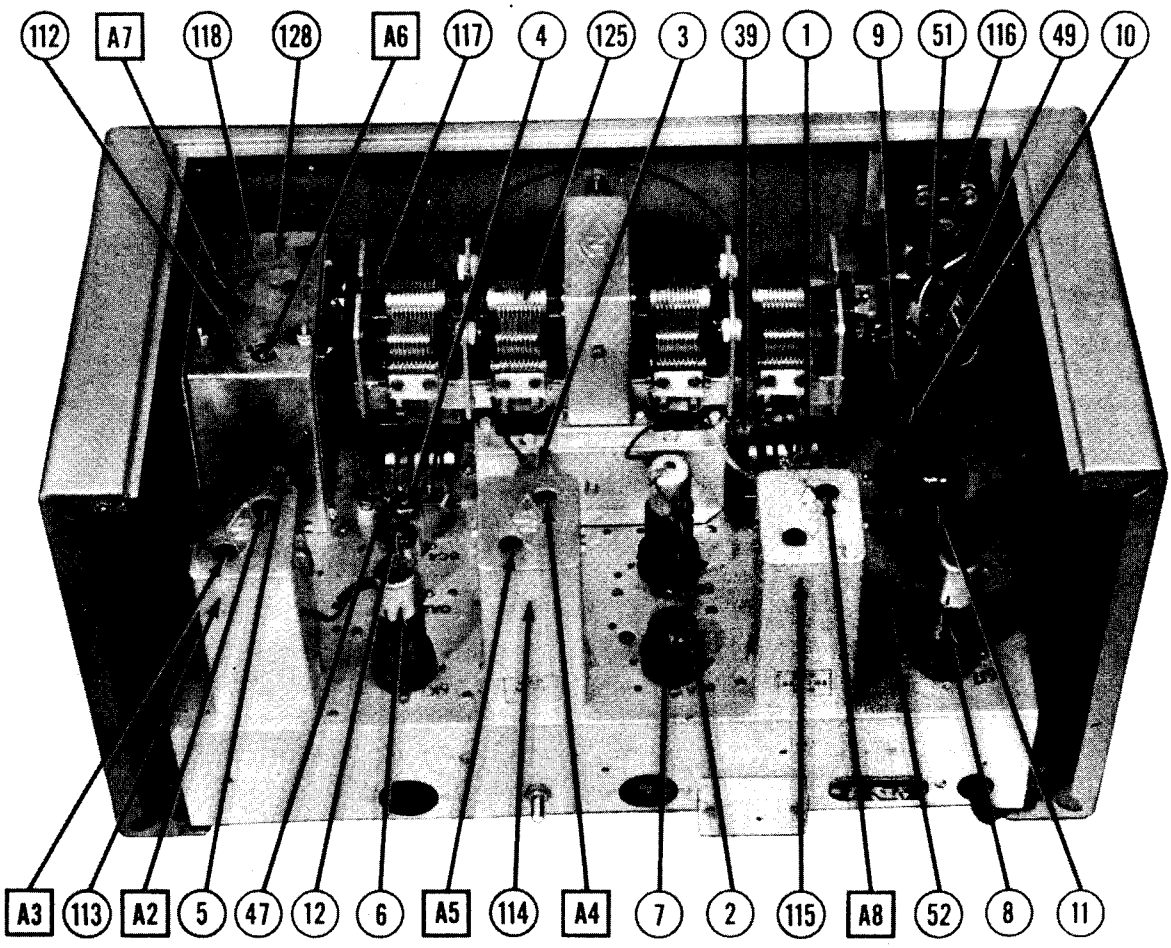
NATIONAL MODELS
HRO-7R, HRO-7T



NATIONAL MODEL HRO-7T

TRADE NAME	National, Models HRO-7R, HRO-7T
MANUFACTURER	National Co., Inc., 61 Sherman St., Malden, Mass.
TYPE SET	AC or Battery Operated Commercial Type Multi-Band Superheterodyne Receiver
TUBES (THIRTEEN)	Types, 6K7 1st RF Amp., 6K7 2nd RF Amp., 6J7 Mixer, 6C4 Oscillator, 6J7 or 6K7 1st IF Amp., 6K7 2nd IF Amp., 6H6 Det.-AVC, 6J7 BFO, 6H6 Noise Limiter, 6SJ7 AF Amp., 6V6GT Power Output, 0A2 Voltage Regulator, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC, 220-240 Volts AC (697 Power Unit) or 6 Volt Storage Battery (686S Power Unit).
TUNING RANGE -	Band "A"-14.0-30.0MC, Band "B"-7.0-14.4MC, Band "C"-3.5-7.3MC, Band "D"-1.7-4.0MC (Following Bands available if desired) Band "E"-900-2050KC, Band "F"-480-960KC, Band "G"-180-430KC, Band "H"-100-200KC, Band "J"-50-100KC.

HOWARD W. SAMS & CO., INC. • 2924 East Washington Street • Indianapolis 7, Indiana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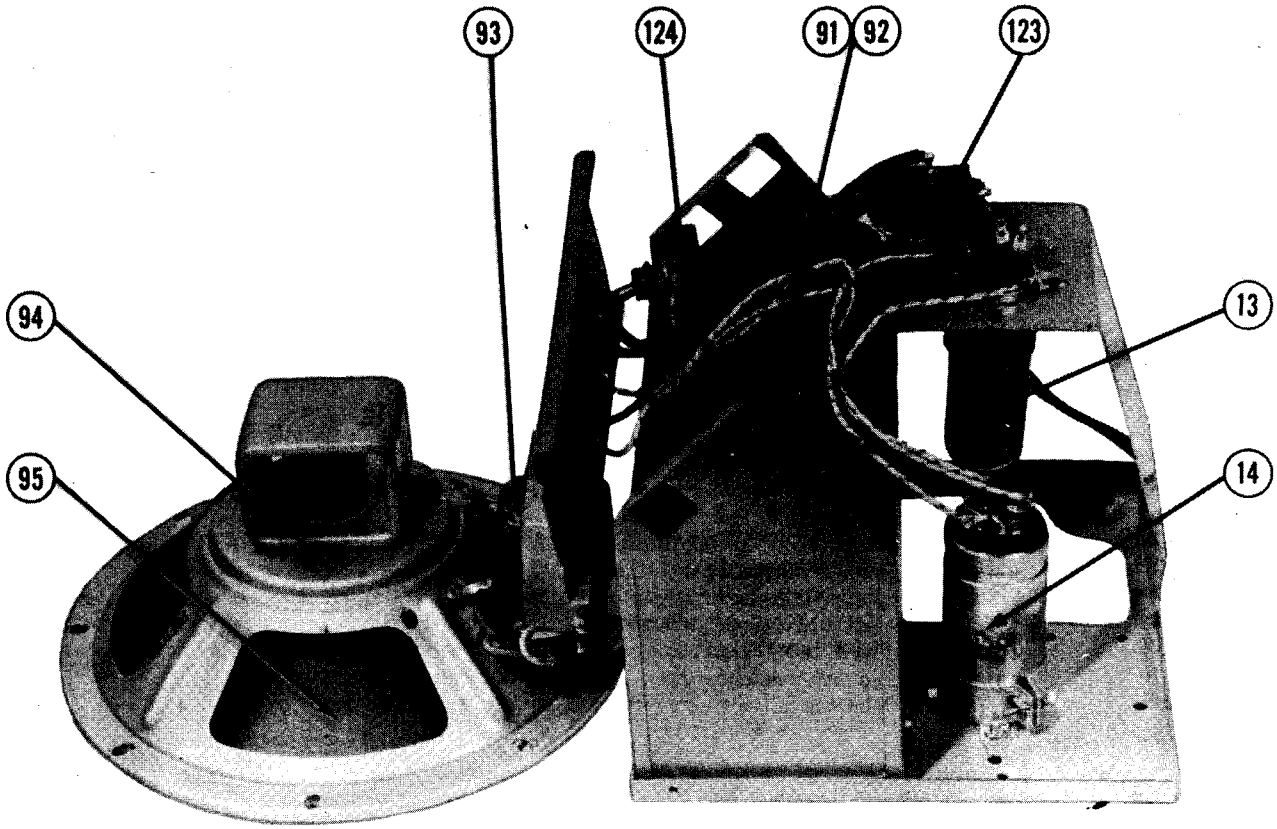
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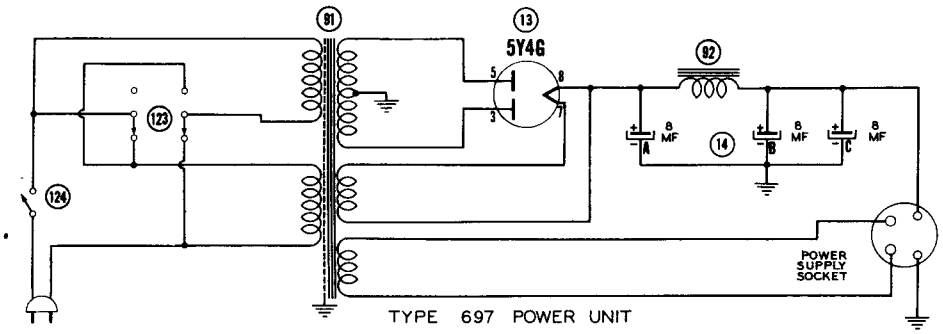
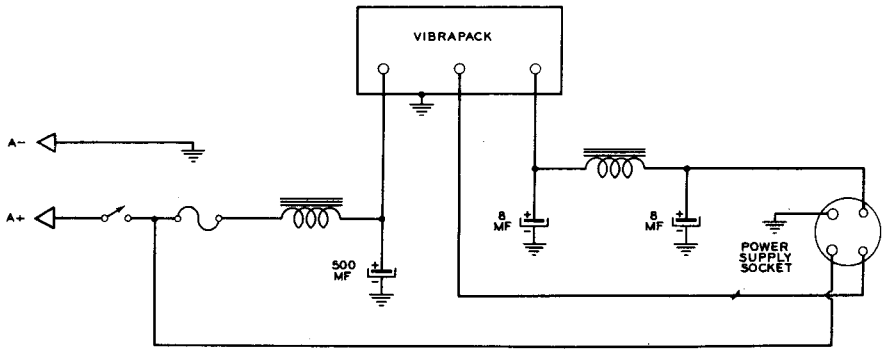


TYPE 697 POWER UNIT



TYPE 686S POWER UNIT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

4820-12

MAIN TUNING DIAL

The main tuning dial should normally give no trouble. If, however, the dial should become removed from the Receiver it should NOT be operated until mounted on the condenser shaft WITH SET-SCREWS TIGHT. This is because the dial is only designed to rotate for ten revolutions (0 to 500) and if turned farther than this the mechanism will be damaged. When mounted on the condenser, limit stops protect the dial provided the assembly is properly done. The procedure for re-mounting the dial is as follows:

(a) Place dial on condenser shaft, tighten set-screws and turn dial counter-clockwise to fully mesh condenser rotor plates so that the tips of the rotor plates are flush with the edge of the stator plates.

(b) Loosen set-screws and rotate dial slowly until dial reading has decreased to zero.

(c) Tighten the set-screws.

(d) Check position of rotor plates at zero. The tips of the rotor plates should be flush with the edge of the stator plates at zero. A slight adjustment may be necessary and this is done by loosening the set-screws, adjusting the position of the dial and tightening the set-screws again.

If it is necessary to remove the dial at any future time, turn to 250 before removing the dial, and do not disturb the setting of either the dial or condenser until reassembled. If in doubt about the correct position, inspect the springs on the back of the dial. When the dial reads 250 these springs should be straight-up-and-down, they must not be tipped to one side.

It is important that the backplate and dial do not become separated.

The backplate is held in place by two springs so that its gear teeth mesh with the dial gear teeth in correct relationship for proper dial operation. If this backplate should be sprung out of place, it may return to an incorrect position and the proper dial numbers will not appear in the windows when the dial is used. To ascertain that the two parts are in correct position, proceed as follows:

(a) Locate small window near outer periphery of dial backplate and also locate dial number window on face of dial which is 180° removed from the small backplate window.

(b) Hold dial so backplate lies flat in palm of left-hand and with right hand rotate dial knob until 250 appears in previously located dial window.

(c) If dial is properly adjusted it will be noted that the pointer at the outer edge of the small window lines up with a marked tooth on the dial itself. It will be found that the dial and backplate can be moved so that the backplate pointer will mesh between teeth at points equi-distant from marked tooth in either direction.

(d) If by checking as in paragraph,(c), the dial is found not properly adjusted, it will be necessary to separate the backplate from the dial far enough to bring the two gears out of mesh and then re-mesh the two parts until the proper setting is found. A number of trials may be required before the correct mesh is found.

BANDSPREAD SWITCHING PROCEDURE

The bandspread switch for bands A, B, C and D are located on each coil set. Inspection of the coil set terminal panels will show several small rectangular metal pieces. There are two of these metal pieces or terminal blocks on each coil which are tapped and countersunk for a flat-head machine screw. It will be noted that these terminal blocks correspond to contacts numbered 1 and 2 on the antenna and RF coils and to contacts numbered 2 and 3 on the oscillator coils. Looking at the coil forms from the front and top the bandswitch screws must be in the left-hand position (in line with contact #2 of the antenna and RF coils and contact #3 of the oscillator coil) for general coverage tuning. On the schematic diagram and the circuit diagrams of the individual coils this position is designated with the letter "B". The coil range will be shown on the top scale of the calibration chart on the front of each coil set. To change to bandspread it is necessary to move the screw to the right-hand position (in line with contact #1 on the antenna and RF coils and contact #2 on the oscillator coil). On the schematic diagram and the circuit diagrams of the individual coils this position is designated with the letter "A". The coil range will be shown on the bottom scale of the calibration chart on the front of each coil set. The numbers shown on the schematic diagram and the circuit diagrams of the individual coils correspond to the contacts as they are numbered on each coil set.

VOLTAGE AND RESISTANCE TAKEN WITH AC LINE SET AT 115V AC.
VOLTAGE AND RESISTANCE TAKEN ON BAND "D".
SELECTIVITY CONTROL IN OFF POSITION.
TONE CONTROL SET AT HIGH POSITION.
RF GAIN SET AT MAXIMUM. AF GAIN SET AT MINIMUM.
PHASING CONTROL AT 0. AVC ON. B+ SWITCH ON.
RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6K7	0V.	0V.	220VDC	85VDC	2.6VDC	0V.	6.2VAC	2.6VDC
2	6K7	0V.	0V.	220VDC	85VDC	2.6VDC	0V.	6.2VAC	2.6VDC
3	6J7	0V.	0V.	220VDC	180VDC	8VDC	0V.	6.2VAC	8VDC
4	6C4	150VDC	0V.	0V.	6.2VAC	150VDC	-25VDC§	0V.	-
5	6J7	0V.	0V.	205VDC	85VDC	4VDC	0V.	6.2VAC	4VDC
6	6K7	0V.	0V.	205VDC	85VDC	2.6VDC	0V.	6.2VAC	2.6VDC
7	6H6	0V.	0V.	0V.	0V.	-.1VDC	-.1VDC	5VAC	0V.
# 8	6J7	0V.	0V.	50VDC	20VDC	0V.	0V.	6.2VAC	0V.
* 9	6H6	0V.	0V.	0V.	0V.	0V.	0V.	5VAC	0V.
10	6SJ7	0V.	0V.	0V.	0V.	1.6VDC	45VDC	6.2VAC	115VDC
11	6V6GT	0V.	0V.	210VDC	220VDC	0V.	0V.	6.2VAC	12.5VDC
12	0A2	150VDC	0V.	0V.	0V.	150VDC	0V.	0V.	-
13	5Y3GT	0V.	250VDC	0V.	295VAC	0V.	295VAC	0V.	250VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6K7	0Ω	0Ω	40KΩ	30KΩ	330Ω	INF.	.1Ω	330Ω
2	6K7	0Ω	0Ω	40KΩ	30KΩ	330Ω	INF.	.1Ω	330Ω
3	6J7	0Ω	0Ω	40KΩ	140KΩ	4.7KΩ	INF.	.1Ω	4.7KΩ
4	6C4	40KΩ	INF.	0Ω	.1Ω	40KΩ	22KΩ	.4Ω	-
5	6J7	0Ω	0Ω	40KΩ	30KΩ	1.2KΩ	INF.	.1Ω	1.2KΩ
6	6K7	0Ω	0Ω	40KΩ	30KΩ	330Ω	INF.	.1Ω	330Ω
7	6H6	0Ω	0Ω	1.5 Meg.	0Ω	120KΩ	120KΩ	4.4Ω	0Ω
# 8	6J7	0Ω	0Ω	130KΩ	100KΩ	0Ω	INF.	.1Ω	0Ω
* 9	6H6	0Ω	0Ω	220KΩ	700KΩ	460KΩ	1.5 Meg.	4.4Ω	220KΩ
10	6SJ7	0Ω	0Ω	0Ω	500KΩ	2.2KΩ	1 Meg.	.1Ω	170KΩ
11	6V6GT	0Ω	0Ω	40KΩ	40KΩ	470KΩ	INF.	.1Ω	330Ω
12	0A2	40KΩ	0Ω	INF.	0Ω	40KΩ	0Ω	0Ω	-
13	5Y3GT	INF.	40KΩ	INF.	340Ω	INF.	355Ω	INF.	40KΩ

*LIMITER CONTROL ON.
#CWO ON.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	1st RF Amp.	6K7	6K7	7R	
2	2nd RF Amp.	6K7	6K7	7R	
3	Mixer	6J7	6J7	7R	
4	Oscillator	6C4	6C4	6BG	
5	1st IF Amp.	6J7	6J7	7R	6K7 Alternate
6	2nd IF Amp.	6K7	6K7	7R	
7	Det.-AVC	6H6	6H6	7Q	
8	Beat Freq. Osc.	6J7	6J7	7R	
9	Noise Limiter	6H6	6H6	7Q	
10	AF Amp.	6SJ7	6SJ7	8N	
11	Power Output	6V6GT	6V6GT	7AC	
12	Voltage Reg.	0A2	0A2	5BO	
13	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
14A	8	475		E450-8-16	UP111145†	D1-3x8-450#	D9059	Filter
B	8	475						"
C	8	475						"
15	10	50		PRS50/10	BR105	M-10-50	TA-510	Output Cathode Bypass
16	25	50		PRS50/25	BR255	M-25-50	TA-525	AF Cathode Bypass
17	.01	600		684-01	DT6S1	ST-6-01	TC-11	RF Bypass Pwr. Supply
18	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Audio Coupling
19	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AF Plate Decoupling
20	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AF Screen Bypass
21	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
22	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Limiter Filter
23	.1	400		484-.1	DT4P1	ST-4-1	TC-1	" "
24	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Audio Coupling
25	.01	600		684-01	DT6S1	ST-6-01	TC-11	BFO Screen Bypass
26	.1	400		484-.1	DT4P1	ST-4-.1	TC-1	2nd IF Cath. Bypass
27	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
28	.1	400		484-.1	DT4P1	ST-4-1	TC-1	1st IF Cathode Bypass
29	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
30	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Osc. Plate Bypass
31	.01	600		684-01	DT6S1	ST-6-01	TC-11	Osc. Coupling
32	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Mixer Cathode Bypass
33	.1	600		684-.1	DT6P1	ST-6-.1	TC-1	RF Byp. Pwr. Supply
34	.1	400		484-.1	DT4P1	ST-4-1	TC-1	2nd RF Cath. Byp.
35	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
36	.1	600		684-.1	DT6P1	ST-6-1	TC-1	RF Byp. Pwr. Supply
37	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
38	.1	400		484-.1	DT4P1	ST-4-1	TC-1	1st RF Cath. Byp.
39	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
40	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
41	.25	600		684-.25	DT6P25	ST-6-25	TC-2	IF Plate Decoup.
42	3300	600		1467-003	1W5D3	MW.5-23	1FM-23	Tone Compensation
43	3	500						BFO Coupling-Cer.
44	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling-Cer.
45	270	500		1468-00025	5W5T25	MO.5-325	1FM-325	Diode Filter-Cer.
46	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.-Cer.
47	10	500						Osc. Comp.-Cer.-Note 1
48	160	500		1468-00015	5W5T15	MO.5-315	1FM-315	Output Grid Byp.-Cer.
127	1	400		484-.1	DT4P1	ST-4-.1	TC-1	Screen Bypass-Note 2

#Parallel sections to obtain desired capacity.
†Omit one section.
Note1-Special tolerance-(minus .00077 mmf./mmf./°C)
Note2-Not used in all models.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
93	2900Ω	3.2Ω	217Ω	.6Ω		A-3825	T22S60	A-2902	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: NATIONAL PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
94	FIELD / PM	VC IMP. 3.2Ω		ST-117 Mod. P8-T	8A31	
95	CONE DIA. 7-3/4"	VC DIA. 3/4"				

R F COILS

ITEM No.	USE	Band	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	MEISSNER PART No.
96	Ant. Coil	D	.6Ω	.9Ω		
97	" "	C	.3Ω	.1Ω		
98	" "	B	.2Ω	.1Ω		
99	" "	A	.2Ω	.1Ω		
100	1st RF	D	14Ω	.8Ω		
101	" "	C	6.4Ω	.2Ω		
102	" "	B	3.2Ω	.1Ω		
103	" "	A	.9Ω	0Ω		
104	2nd RF	D	13.8Ω	.9Ω		
105	" "	C	6.3Ω	.2Ω		
106	" "	B	.2Ω	0Ω		
107	" "	A	.9Ω	0Ω		
108	Osc. Coil	D		.8Ω		
109	" "	C		.2Ω		
110	" "	B		.1Ω		
111	" "	A		0Ω		
112	1st IF		8Ω	9.5Ω		
113	2nd IF		8Ω	8Ω		
114	3rd IF		8.2Ω	8Ω		
115	BF Osc.					

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: NATIONAL PART No.		INSTALLATION NOTES
116	Screw	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
117	Switch		AVC
118	"		Crystal Selectivity
119	"		B+
120	"		Tone
121	"		Radio-Phono
122	"		CW Osc.
123	"		115-230 Volt
124	"		Power
125	4 Gang Var. Cap		(13-231MMF) each section
126	BFO Tuning Cap.		
128	Crystal Resonator		

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	
49A	500KΩ	½		D13-133	M-60-Z	AF Gain Control
B	Shaft			A	Not Req.	Attach to 49A per instructions
50	10KΩ	1.5		W-10K*	43-10K*	RF Gain Control & "S" Meter Sw.
51	500KΩ	½				Limiter Control & Sw.
52	1000Ω	1		W-1000	43-1000	"S" Meter Control

*Use center & right hand terminals only.

RESISTORS

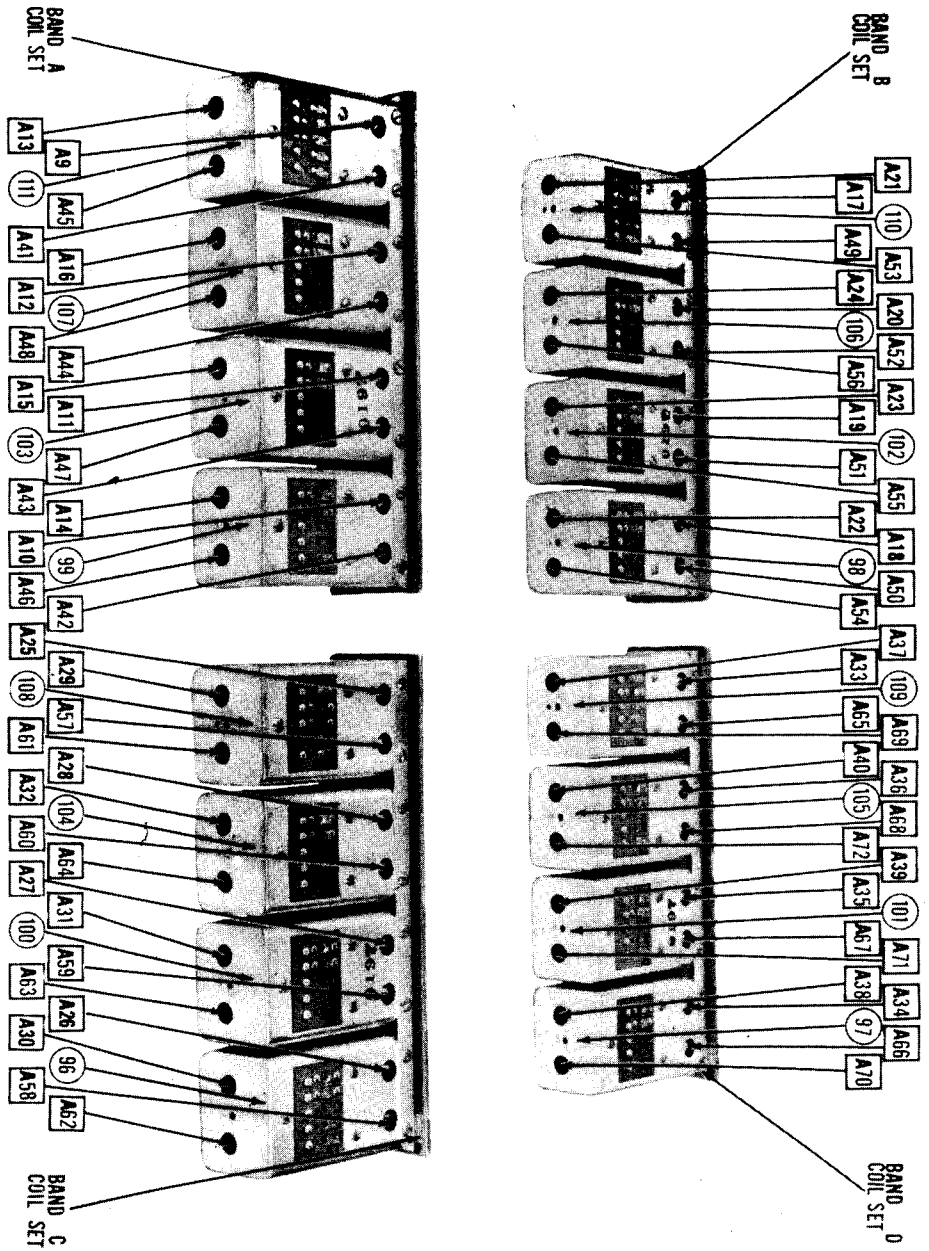
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	
53	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
54	330Ω	½			Or.-Or.-Br. 1st RF Cathode
55	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
56	330Ω	½			Or.-Or.-Br. 2nd RF Cathode
57	4700Ω	½		BTS-4700	Yl.-Vi.-Red Mixer Cathode
58	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Mixer Screen
59	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
60	2500Ω	5		AB-2500	Voltage Dropping
61	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
62	27KΩ	½		BT-2-27K	Red-Vi.-Or. Screen Bleeder
63	1200Ω	½		BTS-1200	Br.-Red-Red 1st IF Cathode
64	330Ω	½		BW-½-330	Or.-Or.-Br. 2nd IF Cathode
65	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
66	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. " "
67	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. " "
68	4.3Ω	1		BW-1-4.3	Yl.-Or.-Gold Fil. Dropping
69	220KΩ	½		BTS-220K	Red-Red-Yl. BFO Voltage Dropping
70	100KΩ	½		BTS-100K	Br.-Blk.-Yl. BFO Screen Dropping
71	100KΩ	½		BTS-100K	Br.-Blk.-Yl. BFO Voltage Bleeder
72	15KΩ	2		BT-2-15K	Br.-Grn.-Or. Screen Dropping
73	1800Ω	½		BTS-1800	Br.-Gray-Red "S" Meter Network
74	270Ω	½		BW-½-270	Red-Vi.-Br. "S" Meter Shunt
75	2200Ω	½		BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
76	22KΩ	½		BTS-22K	Red-Red-Or. Diode Load
77	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Diode Load
78	220KΩ	½		BTS-220K	Red-Red-Yl. Limiter Plate
79	220KΩ	½		BTS-220K	Red-Red-Yl. Limiter Threshold Filter
80	4.3Ω	1		BW-1-4.3	Yl.-Or.-Gold Limiter Filament Dropping
81	220KΩ	½		BTS-220K	Red-Red-Yl. Limiter Cathode
82	220KΩ	½		BTS-220K	Red-Red-Yl. AF Voltage Divider
83	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Lim. Plate Load
84	820KΩ	½		BTS-820K	Gray-Red-Yl. Lim. Plate Decoupling.
85	2200Ω	½		BTS-2200	Red-Red-Red AF Cathode
86	820KΩ	½		BTS-820K	Gray-Red-Yl. AF Screen
87	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Plate Load
88	47KΩ	½		BTS-47K	Yl.-Vi.-Or. AF Decoupling
89	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
90	330Ω	2		BW-2-330	Or.-Or.-Br. Output Cathode

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	NATIONAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
91	230V AC tapped @ 117V AC @ .65A	590V CT .095A DC	5.1V AC @ 2.0A	6.2V AC @ 3.3A				

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000∿)	NATIONAL PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
92	.095A.	290Ω	17 Henries					



DATE 11/48-#4820-12
SET #50-FOLDER #12

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Controls should be set as follows except where noted otherwise: Limiter control to "Off" AF Gain at "10", tone switch at "High", CWO control at "OFF", RF Gain control at "9", B+ switch at "ON", Selectivity switch at "Off", Phasing control at "Zero" and AVC switch at "OFF".

Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment tool for all adjustments.

IF ALIGNMENT "CHECK" TO BE MADE PRIOR TO ALIGNMENT.

(a) Set Selectivity Switch to 5, AVC to "Off", RF Gain at "9", Phasing Control at zero and CWO Control to "On". Vary CWO Control to point of lowest background noise and note setting, which should occur near 9.
(b) Set Selectivity Switch to "Off" and vary CWO control to point of lowest background noise and note setting which should occur near 9.
(c) If IF Alignment is correct the two settings from (a) to (b) should coincide and Steps 1, 2 and 3 may be omitted.

IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	Direct	High side to grid cap. of 6J7 Mixer Tube (3). Low side to chassis.	Approx. 456KC (Unmodulated)	Band "B"	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4 A5	Set selectivity switch at "5". Turn CWO "ON". Adjust sig. gen. frequency for maximum output. Adjust "CWO" control to give approximately 400 ~ note. Adjust A1 thru A5 for maximum output.
2	Direct	"	Tune 3 or 4KC to either side of freq. determined in Step 1.	"	"	"	A6	Set selectivity switch to 1. Adjust A6 for maximum output. Return selectivity switch to "OFF".
3	Direct	"	Exact freq. determined in Step 1	"	"	"	A7,A8	Adjust A7 for maximum output. Check CWO tuning per part (B) of IF Alignment check in prealignment instructions. If setting of CWO control does not occur near "9" set CWO control at "9" and adjust A8 for lowest background noise. If setting is at or near "9" then A8 is adjusted correctly.

GENERAL COVERAGE ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4	400Ω carbon res.	High side to ant. terminal "A". Low side to center ant. terminal with link connected.	30.0MC	Band "A"	485	Across voice coil	A9	Adjust for maximum output. Tune sig. gen. to 30.9MC. If signal is not heard, retune sig. gen. to 30.0 MC and open A9 to next peak. Adjust for maximum output.and recheck for image.
5	"	"	"	"	Tune for maximum output.	"	A10, A11,A12	Rock tuning cap. and adjust for maximum output.
6	"	"	14.4MC	"	54	"	A13,A14, A15,A16	Adjust for maximum output. Repeat Steps 4, 5 & 6 until no further improvement can be made, making Step 5 last step.
7	"	"	"	Band "B"	485	"	A17	Adjust for maximum output. Tune sig. gen. to 15.3MC. If signal is not heard, retune sig. gen. to 14.4 MC and open A17 to next peak. Adjust for maximum output and recheck for image.
8	"	"	"	"	Tune for maximum output.	"	A18, A19,A20	Rock tuning cap. and adjust for maximum output.
9	"	"	7.0MC	"	28	"	A21,A22 A23,A24	Adjust for maximum output. Repeat Steps 7, 8 & 9 until no further improvement can be made, making Step 8 last step.
10	"	"	7.3MC	Band "C"	490	"	A25	Adjust for maximum output. Tune sig. gen. to 8.2MC. If signal is not heard, retune sig. gen. to 7.3 MC and open A25 to next peak. Adjust for maximum output and recheck for image.
11	"	"	"	"	Tune for maximum output.	"	A26,A27 A28	Rock tuning cap. and adjust for maximum output.
12	"	"	3.5MC	"	23	"	A29,A30 A31,A32	Adjust for maximum output. Repeat Steps 10, 11 & 12 until no further improvement can be made, making Step 11 last step.
13	"	"	4.0MC	Band "D"	490	"	A33	Adjust for maximum output. Tune sig. gen. to 4.9MC. If signal is not heard, retune sig. gen. to 4.0MC and open A33 to next peak. Adjust for maximum output and recheck for image.
14	"	"	"	"	Tune for maximum output.	"	A34, A35,A36	Rock tuning cap. and adjust for maximum output.
15	"	"	1.8MC	"	36	"	A37,A38, A39,A40	Adjust for maximum output. Repeat Steps 13, 14 & 15 until no further improvement can be made, making Step 14 last step.

BANDSPREAD ALIGNMENT

General coverage alignment should be completed before bandspread alignment. Tracking of RF stages at low frequency end of each band may be checked as follows: After adjustments of padders is completed attempt to peak each stage with its associated high freq. trimmer. Any change in capacitance should cause a decrease in output if that stage is tracking correctly. This checking procedure will misalign the high frequency trimmers, therefore they should be repeaked at the high frequency end of the band per alignment instructions.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
16	400Ω carbon res.	High side to ant. terminal "A". Low side to center ant. terminal with link connected.	30.0MC	Band"A"	450	Across voice coil	A41	Adjust for maximum output. Tune sig. gen. to 30.9MC. If signal is not heard retune sig. gen. to 30.0 MC and open A41 to next peak. Adjust for maximum output and recheck for image.
17	"	"	"	"	Tune for maximum output.	"	A42, A43, A44	Rock tuning cap. and adjust for maximum output.
18	"	"	27.2MC	"	61	"	A45, A46 A47, A48	Adjust for maximum output. Repeat Steps 16, 17 & 18 until no further improvement can be made, making Step 17 last step.
19	"	"	14.4MC	Band"B"	450	"	A49	Adjust for maximum output. Tune sig. gen. to 15.3MC. If signal is not heard, retune sig. gen. to 14.4 MC and open A49 to next peak. Adjust for maximum output and recheck for image.
20	"	"	"	"	Tune for maximum output.	"	A50, A51, A52	Rock tuning cap. and adjust for maximum output.
21	"	"	14.0MC	"	50	"	A53, A54 A55, A56	Adjust for maximum output. Repeat Steps 19, 20 & 21 until no further improvement can be made, making Step 20 last step.
22	"	"	7.3MC	Band"C"	450	"	A57	Adjust for maximum output. Tune sig. gen. to 8.2MC. If signal is not heard, retune sig. gen. to 7.3MC and open A57 to next peak. Adjust for maximum output and recheck for image.
23	"	"	"	"	Tune for maximum output.	"	A58, A59, A60	Rock tuning cap. and adjust for maximum output.
24	"	"	7.0MC	"	50	"	A61, A62 A63, A64	Adjust for maximum output. Repeat Steps 22, 23 and 24 until no further improvement can be made, making Step 23 last step.
25	"	"	4.0MC	Band"D"	450	"	A65	Adjust for maximum output. Tune sig. gen. to 4.9MC. If signal is not heard. retune sig. gen. to 4.0 MC and open A65 to next peak. Adjust for maximum output and recheck for image.
26	"	"	"	"	Tune for maximum output	"	A66, A67, A68	Rock tuning cap. and adjust for maximum output.
27	"	"	3.5MC	"	50	"	A69, A70 A71, A72	Adjust for maximum output. Repeat Steps 25, 26 & 27 until no further improvement can be made, making Step 26 last step.

1ST RF STAGE ALIGNMENT WITH LOW IMPEDANCE TRANSMISSION LINE.

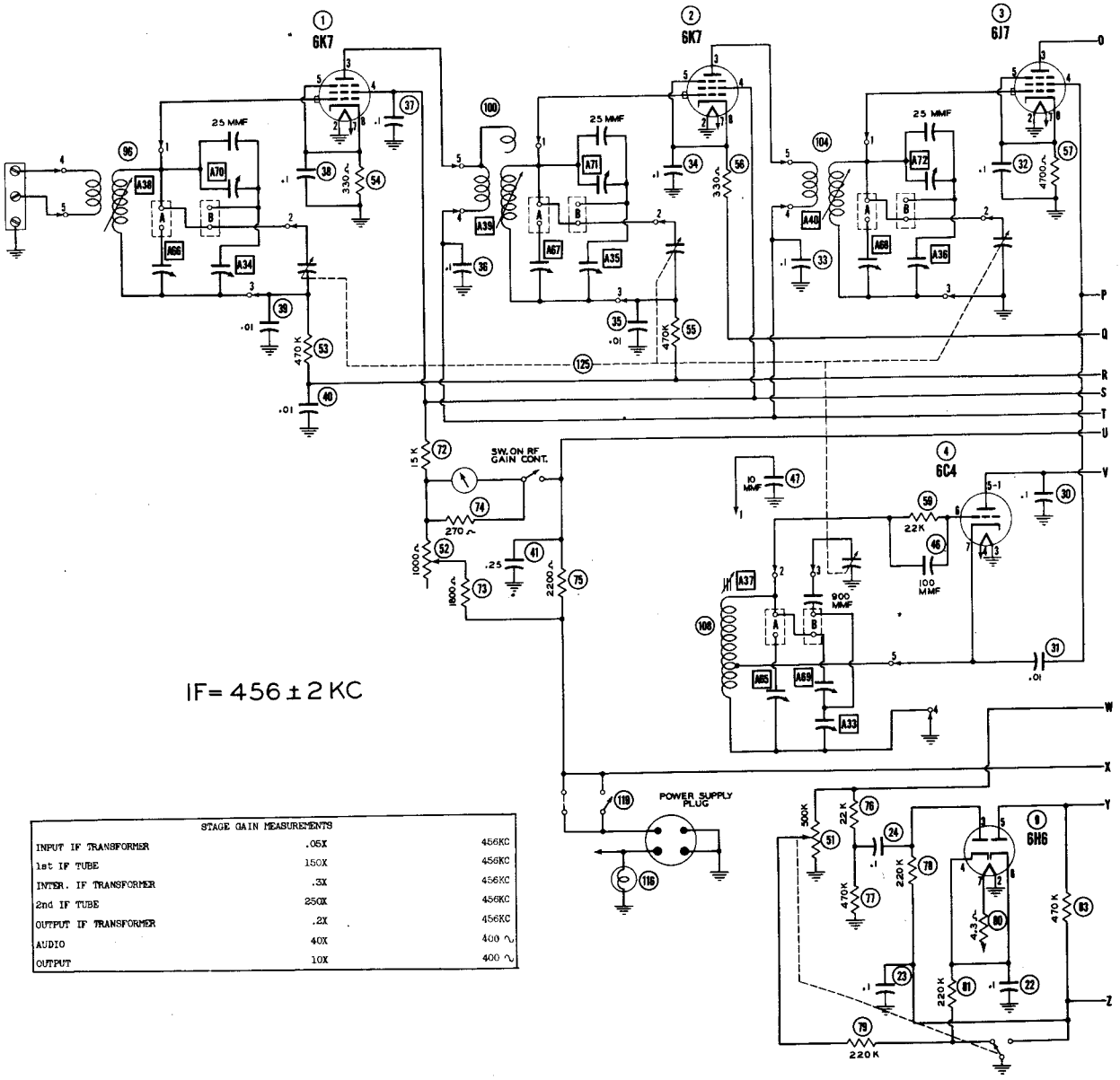
If a low impedance trasmission line is to be used with the receiver it may be necessary to realign the first RF amplifier at the high frequency end of each band.

GENERAL COVERAGE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
28		Antenna feeders must be connected. (Use radiated signal from sig. gen. with no direct connection)	30.0MC	Band"A"	Tune for maximum output.	Across voice coil	A10	Adjust for maximum output.
29		"	14.4MC	Band"B"	"	"	A18	" " " "
30		"	7.3MC	Band"C"	"	"	A26	" " " "
31		"	4.0MC	Band"D"	"	"	A34	" " " "

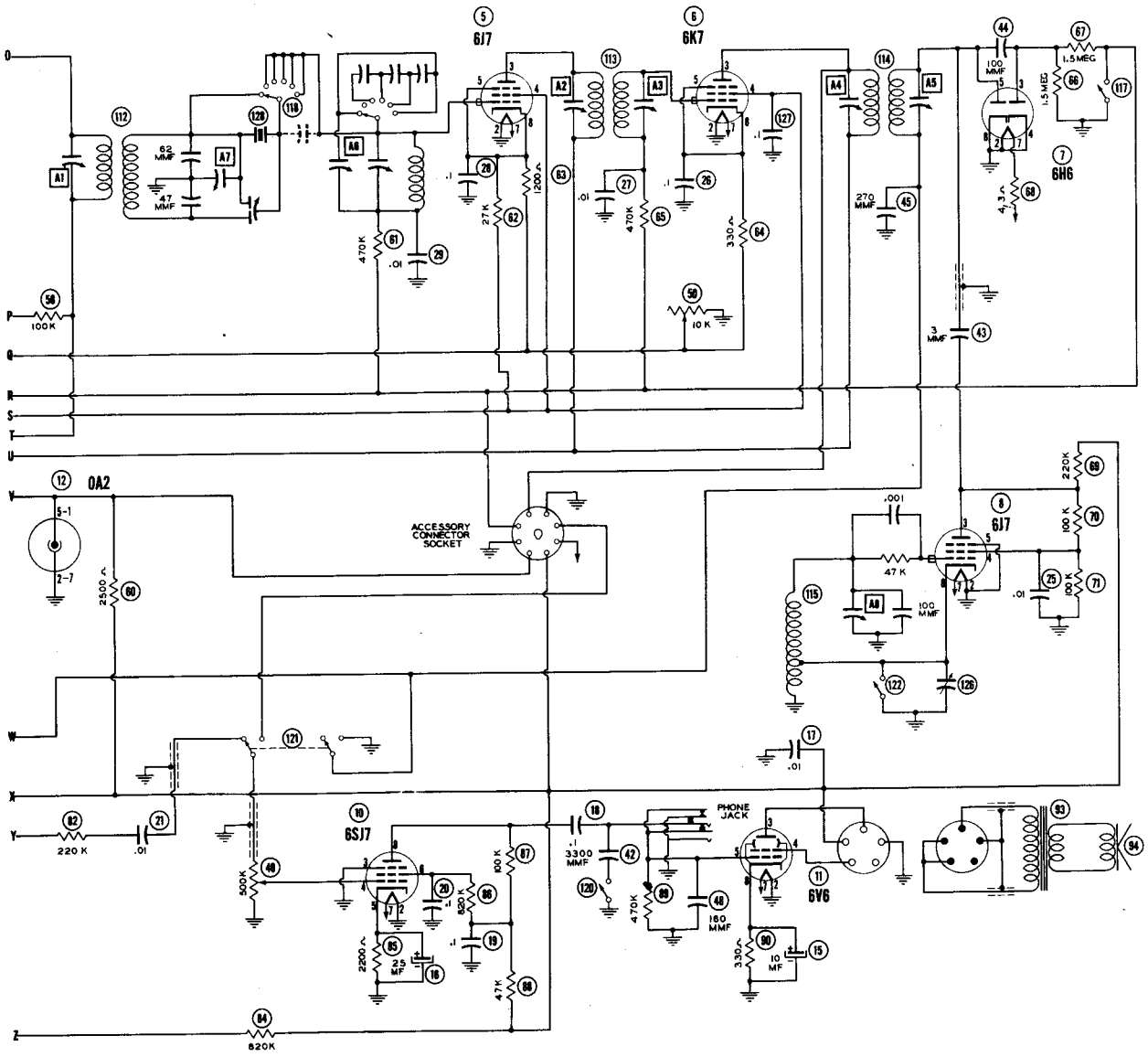
BANDSPREAD ALIGNMENT

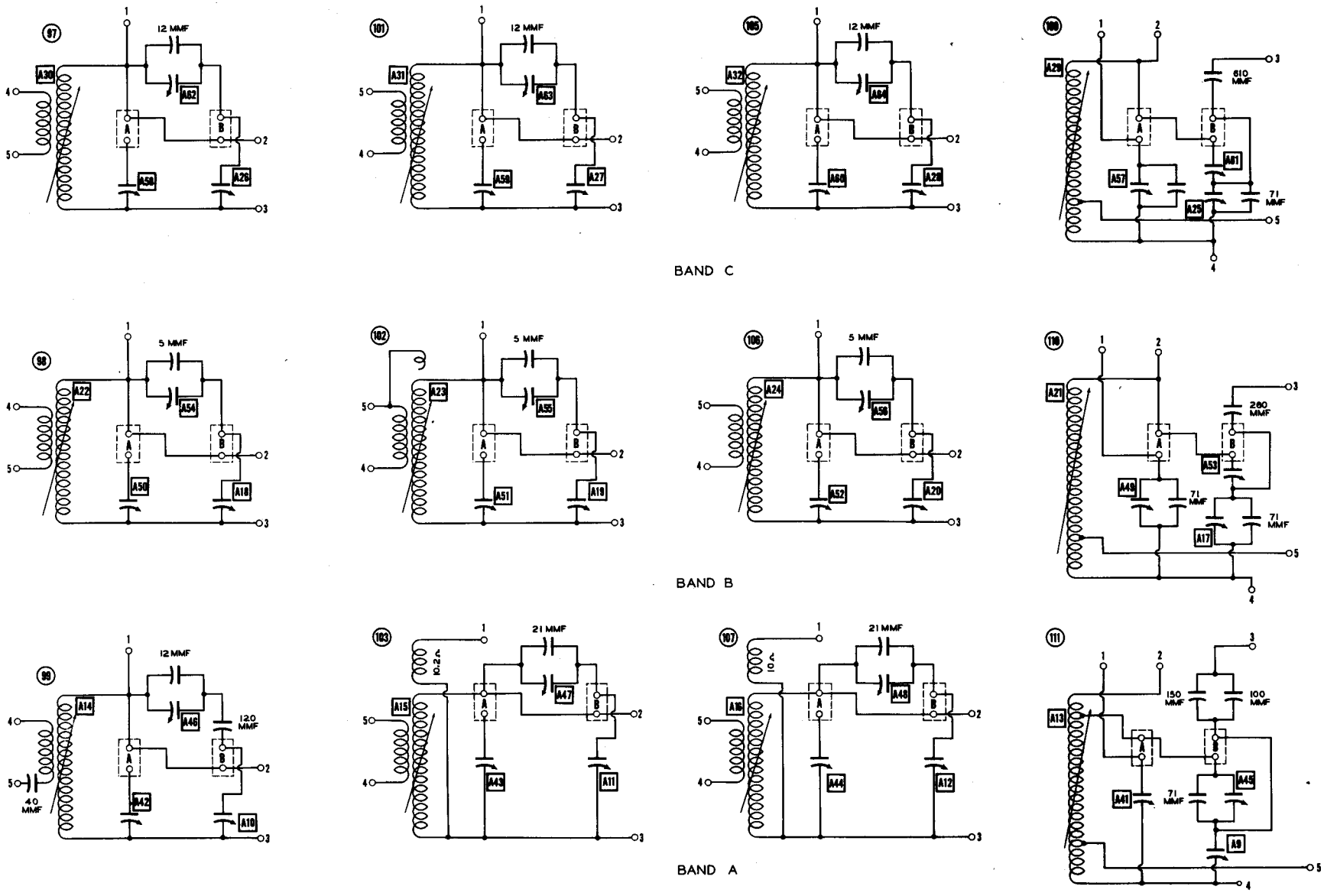
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	COIL SET	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
32		Antenna feeders must be connected. (Use radiated signal from sig. gen. with no direct connection)	30.0MC	Band"A"	Tune for maximum output.	Across voice coil	A42	Adjust for maximum output.
33		"	14.4MC	Band"B"	"	"	A50	" " " "
34		"	7.3MC	Band"C"	"	"	A58	" " " "
35		"	4.0MC	Band"D"	"	"	A66	" " " "



STAGE GAIN MEASUREMENTS		
INPUT IF TRANSFORMER	.05X	456KC
1st IF TUBE	150X	456KC
INTER. IF TRANSFORMER	.3X	456KC
2nd IF TUBE	250X	456KC
OUTPUT IF TRANSFORMER	.2X	456KC
AUDIO	40X	400 ∿
OUTPUT	10X	400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.





A PHOTOFACT STANDARD NOTATION SCHEMATIC

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