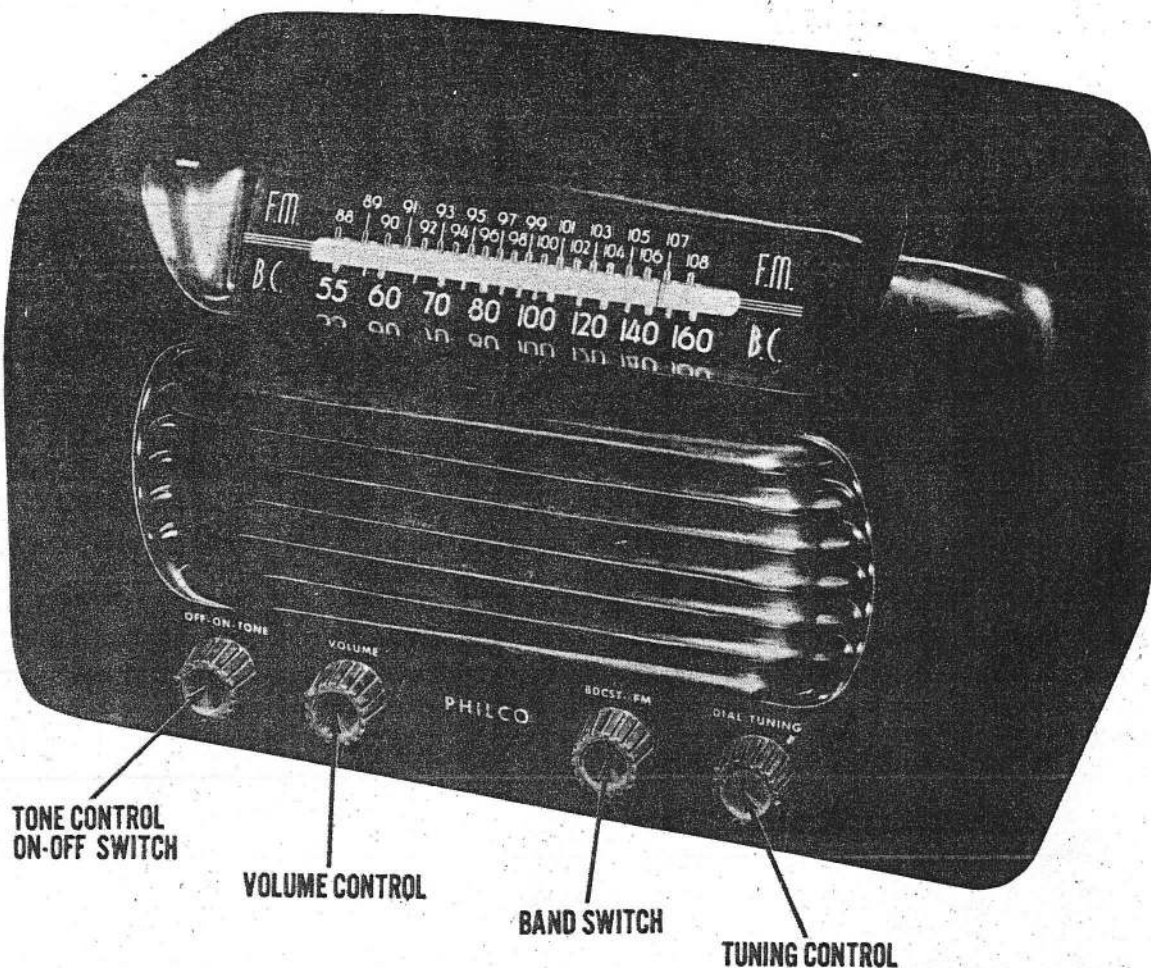


PHILCO MODEL
48-472 REVISED



PHILCO MODEL
48-472 REVISED

PHILCO MODEL 48-472

TRADE NAME	Philco, Model 48-472 (Revised)
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (EIGHT)	Types, 12AU6 FM RF Amp., 12AU7 AM Conv., 14F8 FM Conv., 6BJ6 1st IF Amp., 6BJ6 2nd IF Amp., 19T8 Det.-AVC-AF, 50A5 Power Output, 117Z3 Rectifier.
POWER SUPPLY	105-120 Volts AC-DC
RATING	.35 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	540-1620KC FREQ. MOD. 88-108MC

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

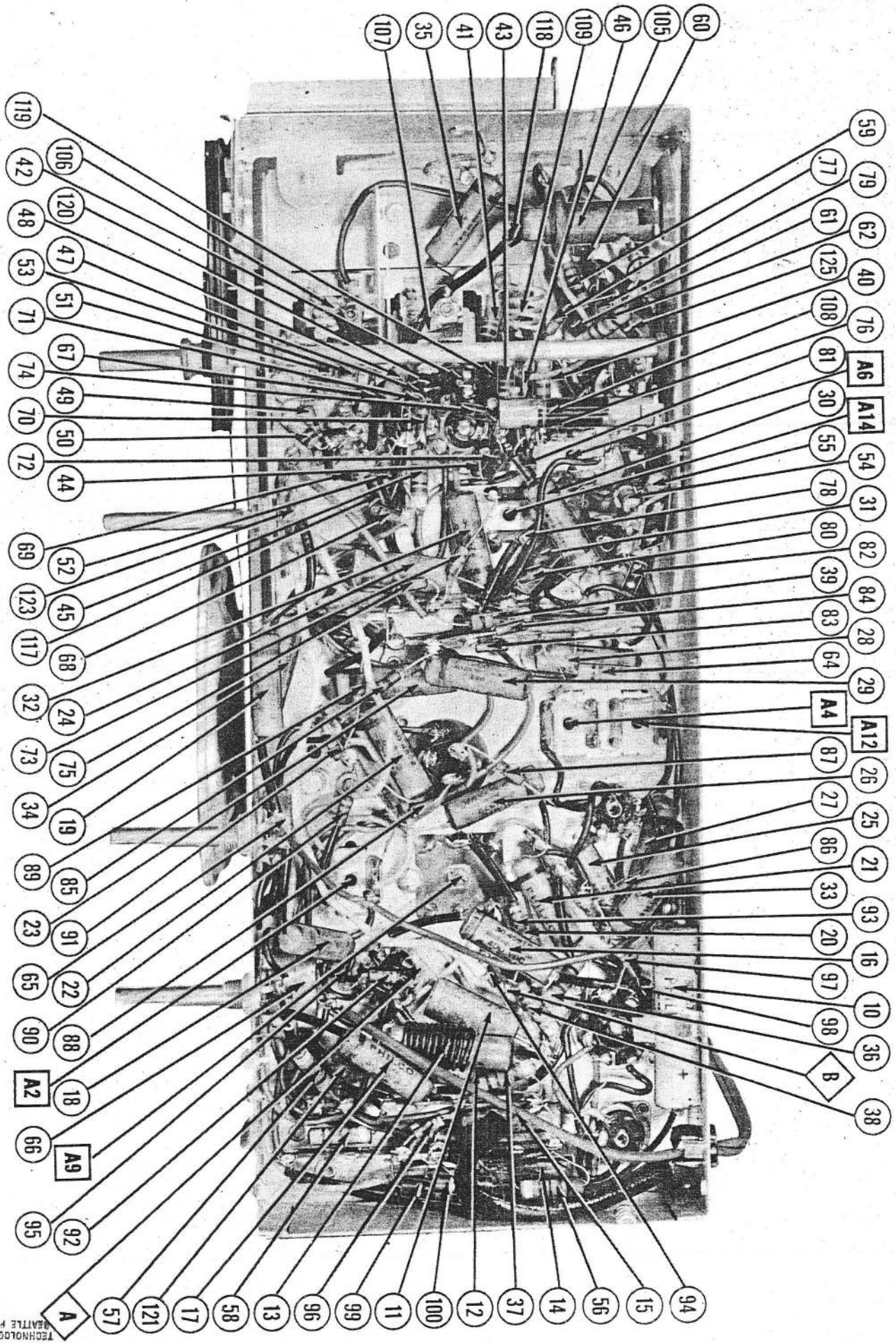
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DATE 10/48-#4818-18 SET #48-FOLDER #18

Set 48

Folder 18



PHILCO MODEL 224-48 REVISED PAGE 3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT	
1	FM RF Amp.	12AU6	7BK	
2	AM Conv.	12AU7	9A	
3	1st IF Amp.	14F6	8BM	
4	2nd IF Amp.	6BJ6	7CM	
5	Det.-AVC-AF	19T8	7CM	
6	Power Output	50A5	6AA	
7	Rectifier	11Z23	4BR	

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	REPLACEMENT DATA				IDENTIFICATION CODES AND INSTALLATION NOTES
		PHILCO PART No.	AEROVOX PART No.	CORNEIL-DUBILIER PART No.	SOLAR PART No.	
9A	40 CAP.	30-2568-10	AF888D ⁴ FRS150/40	UP64215 ⁴ BR2015	EL-340* UT-401	Filter
10	150	45-5001	FRS25/25	BR252A	TA-25	Cathode Bypass
11	25	30-2417-7	484-04	BR245	TC-14	Stabilizing Cap.
12	.04	45-3500	484-05	BR245	72P1	Line Filter
13	.05	38-9851-6	484-06	BR245	TC-11	Rectifier Bypass
14	.01	61-0120	484-01	BR245	TC-12	Output Plate Bypass
15	.02	61-0108	484-02	BR245	TC-25	Audio Coupling
16	.006	45-3500-7	484-006	BR245	TC-11	Tone Comp.
17	.01	61-0120	484-01	BR245	TC-26	Audio Coupling
18	.006	45-3500-7	484-006	BR245	TC-12	Diode Load Cap.
19	.02	61-0108	484-02	BR245	TC-11	RF Bypass
20	.01	61-0120	484-01	BR245	TC-11	RF Bypass
21	.01	61-0120	484-01	BR245	TC-11	Decoupling
22	.01	61-0120	484-01	BR245	TC-11	Decoupling
23	.05	61-0122	484-05	BR245	TC-13	2nd IF Screen Byp.
24	.03	45-3500-1	484-03	BR245	TC-11	2nd IF Cath. Bypass
25	.01	61-0120	484-01	BR245	TC-11	1st IF Plate Decoup.
26	.01	61-0120	484-01	BR245	TC-11	1st IF Screen Byp.
27	.01	61-0120	484-01	BR245	TC-11	AVC Filter
28	.01	61-0120	484-01	BR245	TC-11	AM Conv. Plate Decoup.
29	.01	61-0120	484-01	BR245	TC-11	FM Conv. Plate Decoup.
30	.01	61-0120	484-01	BR245	TC-11	FM Conv. Plate Decoup.
31	.01	61-0120	484-01	BR245	TC-11	FM Conv. Plate Decoup.
32	.01	61-0120	484-01	BR245	TC-11	FM Conv. Plate Decoup.
33	.01	61-0120	484-01	BR245	TC-11	FM Conv. Plate Decoup.
34	.01	61-0120	484-01	BR245	TC-11	FM Conv. Plate Decoup.
35	.01	61-0120	484-01	BR245	TC-11	FM Conv. Plate Decoup.
36	100	62-110009001	1468-0001	5MS71	FM-51	AM Osc. Tun. Cap. Isol.
37	100	62-110009001	1468-0001	5MS71	FM-51	Output Grid Filter-Cer.
38	1500	62-215001001	1467-0015	1MSD15	FM-215	AF Plate Byp.-Cer.
39	1500	62-215001001	1467-0015	1MSD15	FM-215	De-emphasis-Cer.
40	1500	62-215001001	1467-0015	1MSD15	FM-215	RF Byp. Pwr. Supply-Cer.
41	220	62-122001001	1469-0002	5RS72	MS-32	FM Conv. Plate Decoup.
42	100	62-110009001	1468-0001	5RS72	MS-32	Osc. Feedback-Cer.
43	220	62-122001001	1469-0002	5RS72	MS-32	Osc. Grid Cap.-Cer.
44	100	62-110009001	1468-0001	5MS71	FM-31	Osc. Feedback-Cer.
45	100	62-110009001	1468-0001	5MS71	FM-31	FM Conv. Cath. Byp.-Cer.
46	100	62-110009001	1468-0001	5MS71	FM-31	FM Conv. Fil. Byp.-Cer.
47	100	62-110009001	1468-0001	5MS71	FM-31	FM Conv. Fil. Byp.-Cer.
48	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Coupling
49	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Coupling
50	33	30-1224-2	1468-0004	5MS71	FM-31	FM RF Screen Byp.
51	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
52	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
53	51	30-1224-2	1468-0005	5MS71	FM-31	FM RF Cath. Byp.-Cer.
54	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
55	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
56	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
57	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
58	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
59	100	62-110009001	1468-0001	5MS71	FM-31	FM RF Cath. Byp.-Cer.
60	250	62-122001001	1469-0002	5RS72	MS-32	AM Osc. Feedback Cap.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS	REPLACEMENT DATA			INSTALLATION NOTES
		PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
102	VC IMP. 3-4Z	36-1625	ST-105T Mod. P5-X	5A15T	10r-111 and tap magnet frame.
103	VC DIA. 9/16"				

R F COILS

ITEM No.	USE	DC RES. PHI. SEC.	REPLACEMENT DATA		INSTALLATION NOTES
			PHILCO PART No.	MEISSNER PART No.	
104	Loop Ant. Coil	1.5Ω	32-4062-16		
105	Loading Coil	1Ω	32-4158-1		
106	FM RF Coil	0Ω	32-4158-1		
107	FM RF Coil	0Ω	32-4158-1		
108	EC Sec. Coil	11Ω	32-4221-1		
109	FM Sec. Coil	0Ω	32-4018-5		
110	AM 1st IF	8.5-20	32-4257		
111	FM 1st IF	1Ω	32-4257		
112	AM 2nd IF	1.2Ω	32-4160-3		
113	FM 2nd IF	1Ω	32-4257-1		
114	AM 3rd IF	16Ω	32-4240-2		
115	FM Det.	1.5Ω	32-4261-2		
116	Trans.	1Ω	32-4261-2		
117	RF Choke	.5Ω	32-4061-2		
118	RF Choke	.5Ω	32-4061-2		
119	"	.5Ω	32-4061-2		
120	"	.5Ω	32-4061-2		
121	FM Fil. Choke	1.5Ω	32-4143-4		

#Tertiary Winding Resistance

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.	PHILCO PART No.	
122	Screw	115-125			34-2477		Type #C7

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
123	Switch	42-1834	Band
124	Tuning Gang	31-2724-1	(14-512MFT, 8-240MFT)
A7	Trimmer Strip	31-6476-13	BC Osc. Adj.
A8	"		BC Ant. Adj.
A15	"		FM Osc. Adj.
A16	"		FM RF Adj.
A17	"		FM Ant. Adj.
	Cabinet	10666	Less Scale
	Dial Pointer	27-5954-2	
	Knob	28-8953	
		54-4376	

PARTS LIST AND DESCRIPTIONS (Continued)

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. VOLT	REPLACEMENT DATA				IDENTIFICATION CODES AND INSTALLATION NOTES
		PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
61	1500 300	62-2150001001	1467-0015	1W6D15	M4.5-215	IPM-213 AM Conv. Cath. Byp.-Cer.
62	100 300	62-110009001	1468-0001	SW6T1	MO.5-31	IPM-51 RF Coupling
63	10 500	62-010009001	1469-0001	SW6T1	POS.5-41	NS-41 Ext. Ant. Coup.
64	100 300	62-110009001	1468-0001	SW6T1	MO.5-31	IPM-31 RF Exp.

*Parallel sections to obtain desired capacity.
Note - Wind same number turns of wire around replacement capacitor as on original.

CONTROLS

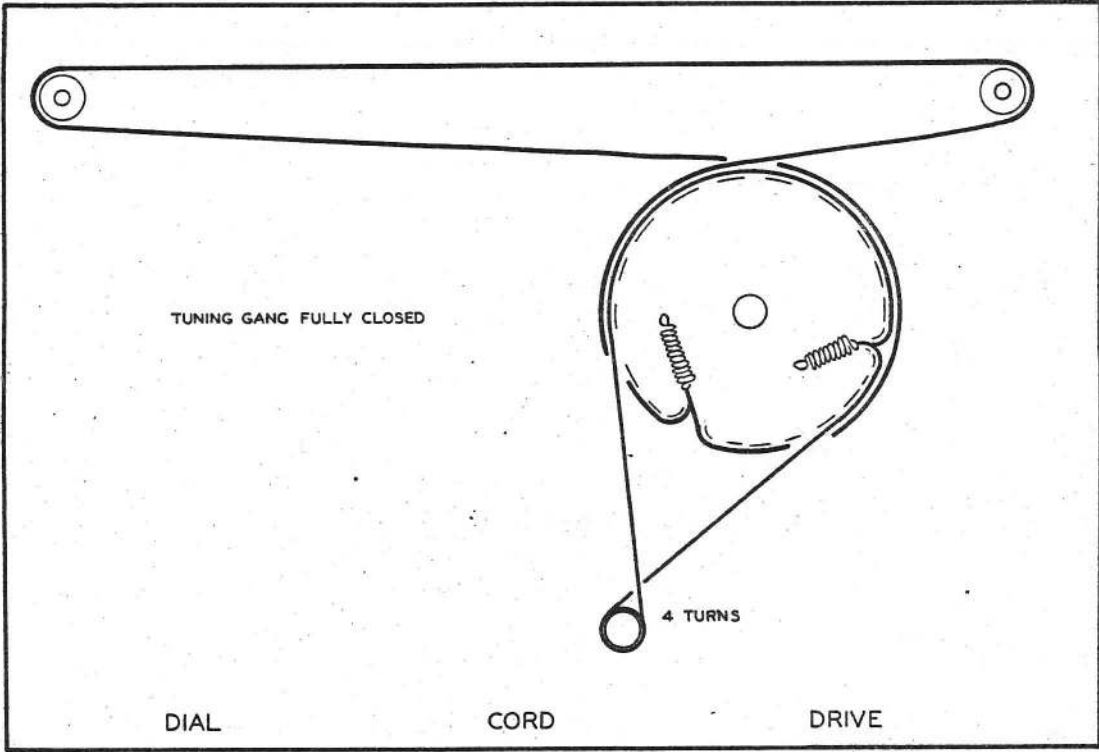
ITEM No.	RATING RESIST. ANCE WATTS	REPLACEMENT DATA			INSTALLATION NOTES
		PHILCO PART No.	IRC PART No.	CLAROSTAR PART No.	
65	2 Meg.	33-5539-19		M-83-S	Volume Control
66	500KΩ	33-5539-11			Tone Control

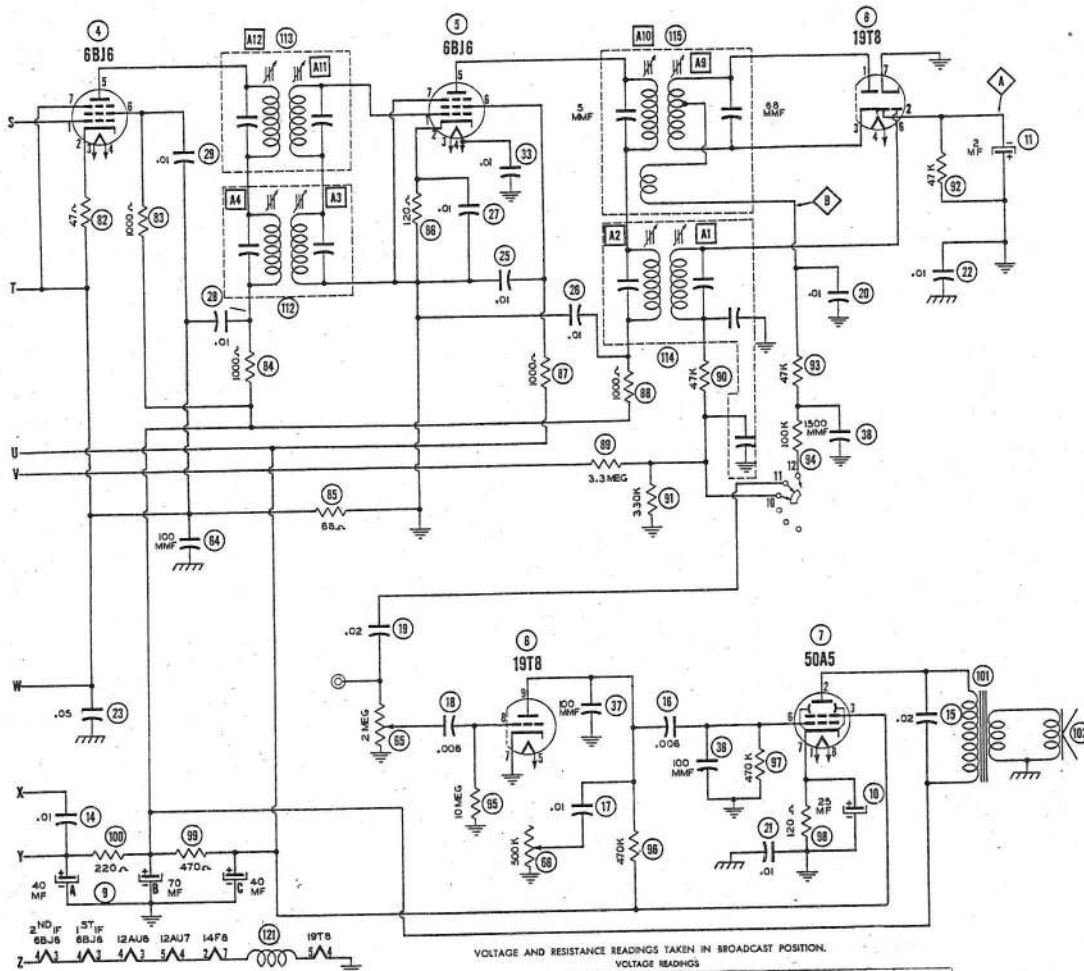
RESISTORS

ITEM No.	RATING RESISTANCE WATTS	REPLACEMENT DATA		IDENTIFICATION CODES
		PHILCO PART No.	IRC PART No.	
67	1 Meg.	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. FM RF Grid
68	1000Ω	66-2103340	BTS-1000	Br.-Blk.-Red FM RF Screen
69	68Ω	66-0683340		Blue-Gray-Blk. FM RF Cathode
70	68Ω	66-0683340		Blue-Gray-Blk. Decoupling
71	10KΩ	66-2103340		Br.-Blk.-Or. FM Conv. Grid
72	1500Ω	66-2153340	BTS-1500	Br.-Grn.-Red FM Conv. Cathode
73	33KΩ	66-3333340	BTS-33K	Or.-Or.-Or. FM Conv. Plate Decou.
74	15KΩ	66-3153340	BTS-15K	Or.-Grn.-Or. FM Osc. Grid
75	4700Ω	66-2473340	BTS-4700	Yl.-Vl.-Red FM Osc. Plate Decou.
76	1 Meg.	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AM Conv. Grid
77	2200Ω	66-2223340	BTS-2200	Red-Red-Red AM Conv. Cathode
78	33KΩ	66-3333340	BTS-33K	Or.-Or.-Or. AM Conv. Plate Decou.
79	15KΩ	66-3153340	BTS-15K	Br.-Grn.-Or. AM Osc. Plate Load
80	68Ω	66-0683340		Blue-Gray-Blk. Decoupling
81	1 Meg.	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
82	47Ω	66-0473340		Yl.-Vl.-Blk. 1st IF Cathode
83	1000Ω	66-2103340	BTS-1000	Br.-Blk.-Red 1st IF Screen
84	1000Ω	66-2103340	BTS-1000	Br.-Blk.-Red 1st IF Plate Decou.
85	68Ω	66-0683340		Blue-Gray-Blk. Decoupling
86	120Ω	66-1123340		Br.-Red-Br. 2nd IF Cathode
87	1000Ω	66-2103340	BTS-1000	Br.-Blk.-Red 2nd IF Screen
88	1000Ω	66-2103340	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decou.
89	3.3 Meg.	66-3333340	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
90	47KΩ	66-3473340	BTS-47K	Yl.-Vl.-Or. Diode Filter
91	330KΩ	66-3303340	BTS-330K	Yl.-Vl.-Or. Diode Load
92	47KΩ	66-3473340	BTS-47K	Yl.-Vl.-Or. Ratio Det. Diode Load
93	47KΩ	66-3473340	BTS-47K	Yl.-Vl.-Or. De-emphasis
94	100KΩ	66-1003340	BTS-100K	Br.-Blk.-Vl. Tone Comp.
95	10 Meg.	66-5103340	BTS-10 Meg.	Br.-Blk.-Blus AF Grid
96	470KΩ	66-4473340	BTS-470K	Yl.-Vl.-Yl. AF Plate Load
97	470KΩ	66-4473340	BTS-470K	Yl.-Vl.-Yl. Output Grid
98	120Ω	66-1123340	BM-120	Br.-Red-Br. Output Cathode
99	470Ω	66-1474340	BM-470	Yl.-Vl.-Br. Filter
100	220Ω	66-1224340	BM-220	Red-Red-Br.
101	15KΩ	66-3533340	BTS-15K	Br.-Grn.-Or. AM Oscillator Grid

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI. SEC.	DC RES. PRI. SEC.	REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	STANCOR PART No.	THORDARN PART No.	
101	3.4Ω 230Ω	.7Ω	32-8206-4	A-3676	T22845	A-2928





VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap.
1	12AU6	.5VDC	2.4VDC	45VAC	60VAC	95VDC	95VDC	2.8VDC	-	-
2	12AU7	45VDC	-1.5VDC	2VDC	32VAC	45VAC	80VDC	-.6VDC	4VDC	32VAC
3	14F8	-.5VDC	32VAC	80VDC	2VDC	3.2VDC	55VDC	18VAC	1.5VDC	-
4	6BQ6	OV.	1.8VDC	80VAC	65VAC	95VDC	100VAC	1.4VDC	-	-
5	6BJ6	OV.	.1VDC	65VAC	70VAC	65VDC	80VDC	OV.	-	-
6	19T8	-.4VDC	-1VDC	OV.	OV.	18VAC	-.5VDC	OV.	-.8VDC	44VDC
7	50A5	117VAC	95VDC	95VDC	OV.	OV.	OV.	5.8VDC	70VAC	-
8	117Z3	117VAC	OV.	OV.	117VAC	117VAC	120VDC	OV.	-	-

* 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	Cap.
1	12AU6	1 M Ω .	200 Ω	40 Ω	50 Ω	80K Ω	81K Ω	270 Ω	-	-
2	12AU7	65K Ω	16K Ω	130 Ω	30 Ω	40 Ω	110K Ω	4.8 M Ω .	2.3K Ω	36 Ω
3	14F8	15K Ω	30 Ω	85K Ω	130 Ω	1.6K Ω	110K Ω	20 Ω	10K Ω	-
4	6BQ6	4.8 M Ω .	115 Ω	50 Ω	54 Ω	80K Ω	80K Ω	68 Ω	-	-
5	6BJ6	11 Ω	47 Ω	54 Ω	58 Ω	80K Ω	80K Ω	0 Ω	-	-
6	19T8	INF.	47K Ω	1 Ω .	0 Ω	20 Ω	380K Ω	0 Ω	10 M Ω .	550K Ω
7	50A5	60 Ω	80K Ω	80K Ω	0 Ω	0 Ω	470K Ω	180 Ω	58 Ω	-
8	117Z3	80 Ω	INF.	0 Ω	80 Ω	80 Ω	80K Ω	INF.	-	-

* VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
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 per volt.
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 $\pm 10\%$ in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer 2-3/4" from left edge of dial mounting bracket.
Use insulated alignment screwdriver for all adjustments.
Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
.1 MFD.	High side to Pin 1 (grid) of 6BJ6 ant. terminal strip. Low side to B-.	455KC	AM (Counter clockwise)	Tuning cap. fully closed	Across voice coil	A1, A2, A3, A4, A5, A6	Adjust for maximum output in order given. Do not repeat. If isolation transformer is not used reduce dummy antenna to .001 MFD to reduce hum modulation. Adjust for maximum output.
	Connect sig. gen. to radiation loop (Loop of receiver must be connected to chassis).	1600KC	"	8-7/16" from left edge of dial mtg. bracket.	"	A7	"
	Loop	1500KC	"	Tune for maximum output.	"	A8	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR, VTVM & OUTPUT METER

If VTVM is not available a 20,000Ω per volt DC voltmeter may be used.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT	ADJUST	REMARKS
.1 MFD.	High side to Pin 1 (grid) of 6BJ6 1st IF Tube (4). Low side to B-.	9.1MC (400 VAM modulation)	FM (Clockwise)	Tuning cap. fully closed	DC probe to Point A. Common to B-.	A9, A10, A11, A12	Adjust for maximum deflection. Attenuate output of sig. gen. to maintain deflection of approx 10 volts once these adjustments are satisfactory do not disturb again with exception of A9 in Step 6.
.1 MFD.	High side to Pin 1 (grid) of 14F8. Low side to B-.	"	"	"	"	A13, A14	Adjust for maximum deflection. Repeat until no further improvement can be made. Once they are satisfactory do not change either of them.
.1 MFD.	High side to Pin 1 (grid) of 14F8. Low side to B-.	9.1MC (400 VAM Modulation)	FM (Clockwise)	Tuning cap. fully closed	Output meter across voice coil	A9	Adjust for minimum output. Make this adjustment very carefully as misalignment will result in distortion on FM reception. Continue with FM RF Alignment in Step 7.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILSCOPE

Use freq. modulated signal with 50 V modulation & 45KC sweep. Use 120 V sawtooth voltage in scope for horizontal deflection.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
.01 MFD	High side to Pin 1 (grid) of 6BJ6 1st IF Tube (4). Low side to B-.	10.7MC (Freq. Mod.)	FM (Clockwise)	Tuning cap. fully closed	Vertical input to Point A. Ground to B-.	A10, A11, A12	Disconnect 2 MFD cap. from Point A. Adjust A10, A11 & A12 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
.01 MFD	High side to Pin 8 (grid) of 14F8. Low side to B-.	"	"	"	"	A13, A14	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Reconnect 2 MFD cap. to Point A.
.01 MFD	"	"	"	"	Vertical input to Point A. Ground to B-.	A9	Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 7.

FM RF ALIGNMENT

Use tuning wand for checking adjustment of FM coils. If deflection increases when the end of wand is inserted in coil, compress the turns slightly. If deflection increases when the brass end of wand is inserted in coil, spread the turns slightly. Correct adjustment is indicated when insertion of either end of wand causes a decrease in deflection.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT	ADJUST	REMARKS
Direct	High side to Pin 2 of FM Ant. socket. Low side to B-.	105MC	FM (Clockwise)	7-7/16" from left edge of dial mtg. brkt.	DC probe to Point A. Common to B-.	A15	Adjust for maximum deflection.
Direct	"	"	"	Tune for maximum deflection.	"	A16	Rock tuning cap. and adjust for maximum deflection.
Direct	"	"	"	"	"	A17	Adjust for maximum deflection.
Direct	"	92MC	"	4-3/8" from left edge of dial mtg. bracket.	FM Osc. Adjust for maximum deflection. (see pre-alignment notes).	"	"
Direct	"	"	"	Tune for maximum deflection.	"	"	"

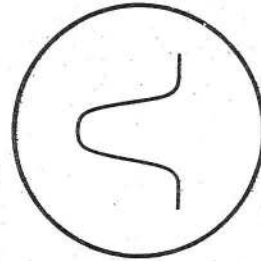


FIG. 1

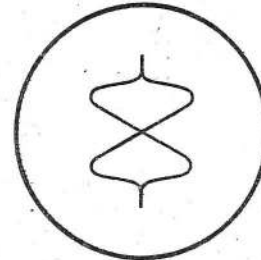


FIG. 2