

MODEL 40-2780, Code 121

SPECIFICATIONS

TYPE CIRCUIT: Model 40-2780, code 121, is an Eleven (11) Tube A. C. operated Superheterodyne radio. The features of design included in this model are three (3) tuning ranges for reception of standard, long wave and short wave broadcast stations; connections for attaching a high impedance electric phonograph pick-up; automatic volume control; continuously variable tone control; bass compensation and a degenerated push-pull audio output circuit.

POWER SUPPLY: 118 or 236 Volt, 50 to 60 Cycle A. C.
118 or 236 Volt, 25 to 40 Cycle A. C.

The receiver is adjusted for operation on either of the above operating voltages by inserting the plug as indicated on top of the power transformer.

TUNING RANGES:
150 to 390 K. C. 530 to 1720 K. C. 7.4 to 22 M. C.

I. F. FREQUENCY: 455 K. C.

PHILCO TUBES: 7C7E, R. F. Amplifier; 6J8EG, Detector Oscillator; 6K7EG, 1st I. F. Amplifier; 7C7, 2nd I. F. Amplifier; 7A6, 2nd Detector, A. V. C.; 6R7G, 1st Audio; two 6J5G, Phase Inverter; two 6V6EG, Audio Output; and 80, Rectifier.

AUDIO OUTPUT: 8 Watts.

AERIAL AND GROUND: To obtain maximum performance from this receiver, the Philco Safety Aerial, Part No. 40-6370, or Farm Radio Aerial, Part No. 40-6383, should be used. In addition a good ground connection is required to the nearest water pipe or any other ground source that is available.

CABINET DIMENSIONS:

	Height	Width	Depth
Type T	15 $\frac{3}{4}$ "	22"	13 $\frac{1}{4}$ "
Type XX	38"	30"	15 $\frac{1}{2}$ "

ALIGNING COMPENSATING CONDENSERS

EQUIPMENT REQUIRED

Signal Generator: In order to properly adjust the various R. F. and I. F. padders of this receiver, a calibrated signal generator such as Philco Model 077 A. C. operated or Model 177 battery operated is required. These signal generators cover a frequency range of 540 to 36000 K. C.

Aligning Indicating Device: A Vacuum Tube Voltmeter or Audio Output Meter, such as Philco Models 027 and 028 is required. Procedures for connecting these instruments are listed below.

Aligning Tools: Fiber handle screwdriver, Philco Part No. 45-2610 and Aligning Wrench, Part No. 7696.

CONNECTING ALIGNING INSTRUMENTS

Signal Generator: The signal generator is connected to the receiver as indicated in the tabulations below under "output connections to receiver." A Dummy Antenna is also required. This is listed under column, "Dummy Antenna, Note A."

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to the Det-Osc. tube grid (6J8EG). The resistor must be connected directly to the grid of the tube and the voltmeter wire attached to the other end of the resistor.

2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of one of the 6V6EG tubes. Adjust the meter of the 0 to 30 volt A. C. scale.

After connecting the aligning meters, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in the schematic diagram. If the aligning meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	6J8EG Grid	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	38A, 37A, 37B, 36A, 36C, 36B	Note D
2	Antenna to Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	27, 26B, 26A	Note B
3	Antenna to Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max. Range Switch "Brdcst"	31	Roll Gang
4	Antenna to Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Range Switch "Brdcst"	27, 26B, 26A	
5	Antenna to Ground	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	27A	
6	Antenna to Ground	200 mmfd.	175 K. C.	175 K. C.	Range Switch "L.W."	32	
7	Antenna to Ground	200 mmfd.	300 K. C.	300 K. C.	Range Switch "L.W."	27A	
8	Antenna to Ground	400 ohms	20 M. C.	20 M. C.	Range Switch "S.W."	33, 18, 5	Note C

NOTE A—The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

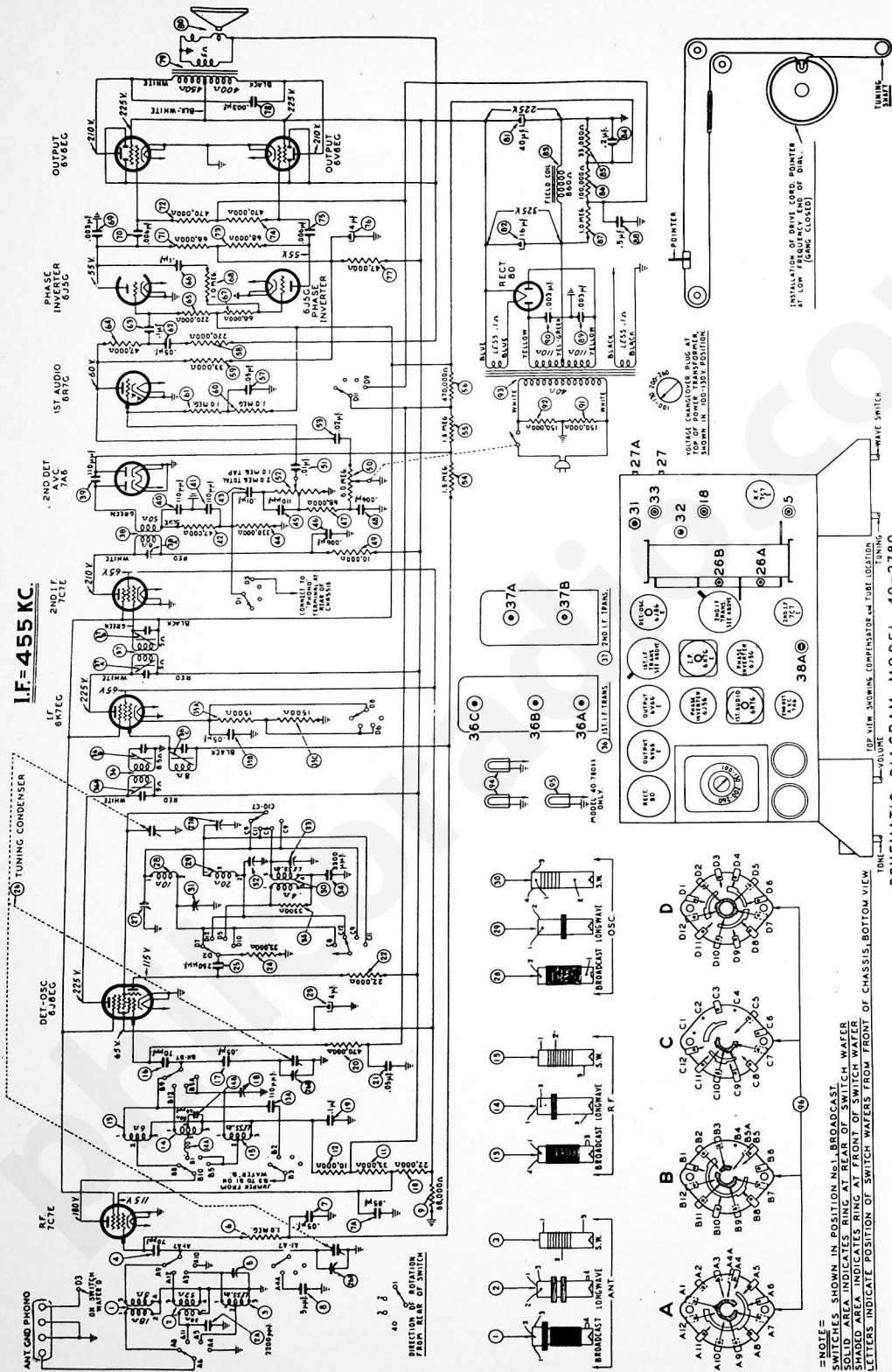
NOTE B—**DIAL CALIBRATION:** In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the

first mark on the left edge (low frequency end) of the broadcast scale. See Schematic Diagram for dial pointer cord adjustment.

NOTE C—When adjusting compensator (33) be sure to tune in the fundamental signal (20 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be 910 K. C. below the fundamental signal, which will be 19,090 M. C.

NOTE D—Before adjusting padders 38A, 37A, 37B, 36A, 36C, turn padder 36B all the way out. After the padders are adjusted to maximum, then adjust padder 36B for maximum.

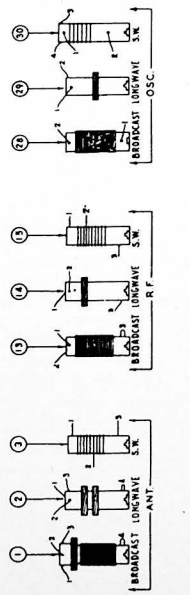
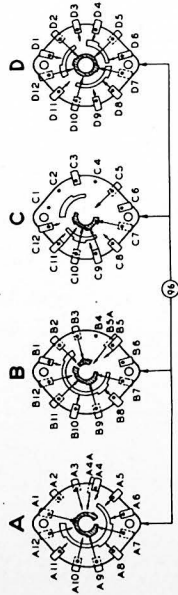
IF = 455 KC.



SCHEMATIC DIAGRAM AND COMPENSATOR LOCATIONS — MODEL 40-2780

D. C. VOLTAGES INDICATED IN THE ABOVE DIAGRAM WERE MEASURED WITH A 1000 OHMS PER VOLT-METER, PHILCO MODEL 027. LINE VOLTAGE 115 VOLTS A. C. NO SIGNAL BEING RECEIVED — RANGE SWITCH BROADCAST.

NOTE —
 SWITCHES SHOWN IN POSITION NO. 1. BROADCAST.
 SWITCHES SHOWN IN POSITION NO. 2. LONG WAVE.
 SOLID LINE INDICATES BING AT FRONT OF SWITCH WAFER
 DOTTED LINE INDICATES BING AT REAR OF SWITCH WAFER
 LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS, BOTTOM VIEW

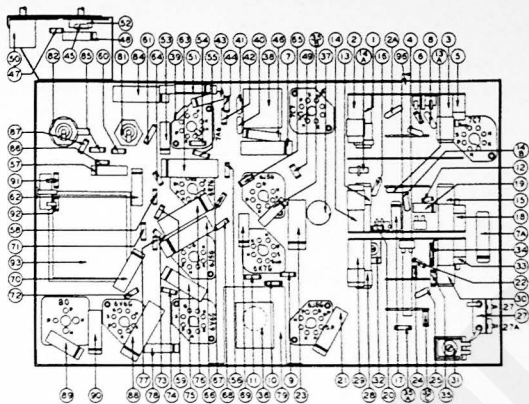


SCHEMATIC DIAGRAM MODEL 40-2780

REPLACEMENT PARTS

Model 40-2780

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Trans. (Brdct)	32-2588
2	Ant. Tran. (Long Wave)	32-3368
2A	Mica Cond. (2200 mmfd.)	30-1125
3	Antenna Trans. (S.W.2)	32-3196
4	Mica Cond. (70 mmfd.)	30-1117
5	Compensator	31-6288
6	Resist. (1.0 meg., 1/2 watt)	33-510339
7	Tubular Cond. (.05 mfd.)	30-4609
7A	Tubular Cond. (.05 mfd.)	30-4518
8	Mica Cond. (5 mmfd.)	30-1120
9	Resistor (68,000 ohms, 1/2 watt)	33-368339
10	Resistor (22,000 ohms, 1/2 watt)	33-322339
11	Resistor (33,000 ohms, 1/2 watt)	33-333339
12	Resistor (10,000 ohms, 1 watt)	33-310439
13	R. F. Trans. (Broadcast)	32-3189
13A	Mica Cond. (110 mmfd.)	30-1118
14	R. F. Tran. (Long Wave)	32-3369
14A	Suppressor Coil	32-3352
14B	Mica Cond. (60 mmfd.)	30-1040
15	R. F. Trans. (S.W2)	32-3197
16	Mica Cond (70 mmfd.)	30-1117
17	Tubular Cond. (.05 mfd.)	30-4519
18	Compensator	31-6288
19	Tubular Cond. (.1 mfd.)	30-4611
20	Resistor (470,000 ohms, 1/2 watt)	33-447339
21	Tubular Cond. (.05 mfd.)	30-4609
22	Resistor (22,000 ohms, 1/2 watt)	33-322339
23	Electrolytic Condenser (4 mfd., 300 V.)	30-2415
24	Resistor (33,000 ohms, 1/2 watt)	33-333339
25	Mica Cond. (250 mmfd.)	30-1119
26	Tuning Cond. Assy.	31-2386
27	Compensator (2 section)	31-6337
28	Oscillator Trans. (Brdct)	32-3254
29	Osc. Tran. (Long Wave)	32-3137
30	Oscillator Trans. (S.W.2)	32-3102
31	Compensator	31-6289
32	Compensator	31-6297
33	Compensator	31-6288
34	Tracking Condenser (3300 mmfd.)	31-6311
35	Resistor (3300 ohms, 1/2 watt)	33-233339
35A	Resistor (1500 ohms, 1/2 watt)	33-215339
35B	Tubular Cond. (.05 mfd.)	30-4519
35C	Resistor (1500 ohms, 1/2 watt)	33-215339
36	1st I. F. Trans. Assy.	32-3284
37	2nd I. F. Trans. Assy.	32-3285
38	3rd I. F. Trans. Assy.	32-3286
39	Mica Cond. (110 mmfd.)	30-1118
40	Mica Cond. (110 mmfd.)	30-1118
41	Mica Cond. (110 mmfd.)	30-1118
42	Resistor (47,000 ohms, 1/2 watt)	33-347339
43	Tubular Cond. (.01 mfd.)	30-4581
44	Resistor (330,000 ohms, 1/2 watt)	33-433339
45	Mica Cond. (110 mmfd.)	30-1118
46	Tubular Con. (.006 mfd.)	30-4591
47	Resistor (68,000 ohms, 1/2 watt)	33-368339
48	Tubular Con. (.006 mfd.)	30-4583
49	Resistor (10,000 ohms, 1/2 watt)	33-310339
50	Tone Control and On-Off Switch	33-5335



SCHE. No.	DESCRIPTION	PART No.	SCHE. No.	DESCRIPTION	PART No.
51	Tubular Cond. (.01 mfd.)	30-4581	85	Resistor (33,000 ohms, 1/2 watt)	33-333339
52	Vol. Control (2.0 meg.)	33-5334	86	Resistor (100,000 ohms, 1/2 watt)	33-410339
53	Tubular Cond. (.02 mfd.)	30-4516	87	Resistor (1.0 meg., 1/2 watt)	33-510339
54	Resistor (1.5 meg., 1/2 watt)	33-515339	88	Tubular Cond. (.5 mfd.)	30-4590
55	Resistor (1.5 meg., 1/2 watt)	33-515339	89	Tubular Con. (.003 mfd.)	30-4608
56	Resistor (470,000 ohms, 1/2 watt)	33-447339	90	Tubular Con. (.003 mfd.)	30-4608
57	Tubular Cond. (.05 mfd.)	30-4519	91	Resistor (150,000 ohms, 1/2 watt)	33-415339
58	Resistor (220,000 ohms, 1/2 watt)	33-422339	92	Resistor (150,000 ohms, 1/2 watt)	33-415339
59	Resistor (33,000 ohms, 1/2 watt)	33-333339	93	Power Trans. (100-130 V., 200-260 V., 50-60 cycles)	32-8007
60	Resistor (1.0 meg., 1/2 watt)	33-510339	94	Pilot Lamps (Dial)	34-2064E
61	Resistor (1.0 meg., 1/2 watt)	33-510339	95	Pilot Lamp (XX Cabinet only)	34-2210E
62	Tubular Cond. (.05 mfd.)	30-4518	96	Wave Switch	42-1525
63	Tubular Cond. (.1 mfd.)	30-4611	MISCELLANEOUS PARTS		
64	Resistor (47,000 ohms, 1/2 watt)	33-347339	Bezel		56-1222
65	Resistor (220,000 ohms, 1/2 watt)	33-422339	Cable and Plug (Power Supply)		L-3238
66	Tubular Cond. (.1 mfd.)	30-4611	Spec. Export A.C. Plug		L-1367
67	Resistor (68,000 ohms, 1/2 watt)	33-368339	Cabinet (40-2780T)		10419B
68	Resistor (1.0 meg., 1/2 watt)	33-510339	Cabinet (40-2780XX)		10421B
69	Tubular Con. (.003 mfd.)	30-4582	Dial		27-5558
70	Tubular Con. (.006 mfd.)	30-4610	Drive Cord Assy. (Dial)		31-2407
71	Resistor (68,000 ohms, 1/2 watt)	33-368339	Felt Strip (Bezel Mtg.)		27-8225
72	Resistor (470,000 ohms, 1/2 watt)	33-447339	Gasket (Dial Mtg.)		27-9258
73	Resistor (68,000 ohms, 1/2 watt)	33-368339	Knob (Tuning)		27-4330
74	Resistor (470,000 ohms, 1/2 watt)	33-447339	Knob (Tuning)		27-4862
75	Tubular Con. (.006 mfd.)	30-4610	Knob (Volume and Wave Switch)		27-4332
76	Electrolytic Condenser (4 mfd., 300 V.)	30-2415	Knob (Tone Control)		27-4872
77	Resistor (47,000 ohms, 1/2 watt)	33-347339	Pointer		56-1276
78	Tubular Con. (.003 mfd.)	30-4582	Socket (4 prong, type 80 tube)		27-6044
79	Output Transformer	32-8058	Socket (6 prong, type 6J5G, 6K7G, 6R7G tubes)		27-6086
80	Cone and Voice Coil Assy. (Spr. Pt. No. 36-1459-2)	36-4106	Socket (8 prong, type 6J8G, 6V6G tubes)		27-6058
	(Spr. Pt. No. 36-1460-3)	36-4105	Socket (Loktal type)		27-6131
81	Electrolytic Condenser (40 mfd., 450 V.)	30-2445	Spkr. (Model 40-2780T)		36-1459
82	Electrolytic Condenser (16 mfd., 300 V.)	30-2412	Spkr. (Model 40-2780XX)		36-1460
83	Field Coil (Replace Spkr.)		Spring Clip (Coil Mtg.)		28-5002
84	Tubular Cond. (.2 mfd.)	30-4587	Spring (Drive Cord)		28-8913
			Station Card Holder		56-1273
			Tube Shield		28-2726
			Tube Shield Base		28-2725
			Tuning Drum and Coupling Assy.		31-2327
			Vernier Drive (Tuning)		31-2406
			Washer ("C" type, Shaft Mtg.)		28-2043