

MODEL 42-788, CODE 121-122

SPECIFICATIONS

Model 42-788T is a special service eleven (11) tube A. C. operated super-heterodyne radio employing nine (9) tuning bands. Four standard scales are mounted on the left of the grille. These cover the complete radio spectrum from 540 K. C. to 22 megacycles. The standard scales are tuned by a variable condenser which has tuning ratios of 80 to 1 for vernier tuning and 16 to 1 for coarse tuning. Five spread band scales on the right of the grille are designed to spread the short wave frequencies more than 20 times farther apart. This spread band tuning section of the radio is tuned by a three (3) gang permeability tuner with shunt aligning compensators for each spread band.

Each tuning band scale is printed on an individual glass section which is separately illuminated when in use. The ranges are selected by a "Band" switch.

Other features of design include tuned R. F. stage; two I. F. stages; variable tone control; variable Bass compensation; automatic volume control; phase inverted, push-pull Pentode audio system; sensitivity control in the I. F. circuit; balanced field electro-dynamic speaker; and permanent Phonograph connection controlled by band switch.

The code numbers (121, 122) of this model refer to the manner in which the power supply is connected for shipment. Code 121 is shipped with the voltage change switch in the 230 volts, 60 cycle A. C. position. Code 122 is shipped with the switch in the 115 volts, 60 cycle A. C. position.

Power Supply: 115 or 230 volts A. C., 50 to 60 cycle, 90 watts.

Intermediate Frequency: 455 K. C.

TUNING RANGES:

Standard Tuning—540 to 1720 K. C.; 1.45 to 2.6 M. C.; 2.3 to 7.3 M. C.; 7.2 to 22 M. C.

Spread Band Tuning—9.34 to 9.9 M. C.; 11.34 to 12 M. C.; 14.78 to 15.6 M. C.; 17.38 to 18.2 M. C.; 21.14 to 21.8 M. C.

Audio Output—8.2 watts.

Philco Tubes Used—7C7E, R. F. amplifier; 7J7E, converter; 78E, 1st I. F. amplifier; 7C7E, 2nd I. F. amplifier; 7A6, second detector, A. V. C.; 76, First audio; two 76, push-pull second audio, two 6V6EG, push-pull audio output and an 80 rectifier.

Cabinet Dimensions—Height 16-1/16. Width 23 3/8. Depth 11-1/16.

PRODUCTION CHANGE

On early chassis marked with serial numbers A80501 to A81000 and B08252 to B09251 the blue wire on the front side of the third wafer (Contact C5A) of the band switch is connected to the suppressor contact on the 78E socket. This lead should be removed from the suppressor contact and connected to the junction of Resistor 28X and Condenser 42 as shown in the diagram. The resistor and condenser are connected to a lug on the wire panel adjacent to them. See Fig. 3.

ADJUSTING SENSITIVITY OF RECEIVER

Sensitivity control No. 46 on diagram is used for adjusting the overall sensitivity of the receiver. In noisy locations it may be desirable to reduce the sensitivity of the receiver by turning the control counter-clockwise.

MECHANICAL ADJUSTMENTS—BAND SPREAD TUNING MECHANISM

1. Adjustment of Tuning Shaft

End play can be removed by adjusting the rear bearing No. (A), Fig. (1). Care should be taken when adjusting the screw so that shaft does not turn too tightly. In making this adjustment, the screw driver can be inserted in the chassis in line with shaft.

2. Reinstalling Tuning Shaft

- Remove tuning knob shaft and coupling.
- Loosen lock nut on rear bearing and remove adjusting screw and ball bearing.
- Remove cotter pin from stop assembly.
- Unscrew carriage as shaft is pulled out through front of R. F. tuner and chassis.
- When installing new shaft (B) adjust positions of stop

assembly and carriage, before inserting cotter pin, so that the carriage (C) is approximately 5 turns from the stop assembly (D) with shaft in extreme counterclockwise position from front. The stop assembly is rotated until all washers are in contact. The bottom washer should be located between the stops nearest together.

3. Adjusting Band Spread Tuning Core Assembly

- Coils are correctly located when the rear of the oscillator core (blue identification) is flush with the rear of oscillator transformer and the tuning shaft is in extreme counterclockwise position.
- The carriage clamp (E) must not be tightened excessively as this will bend the tuning core rod (F) and cause backlash.

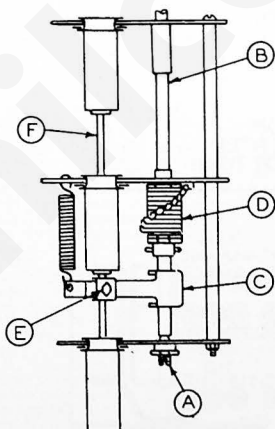


FIG. 1—BAND SPREAD TUNING MECHANISM

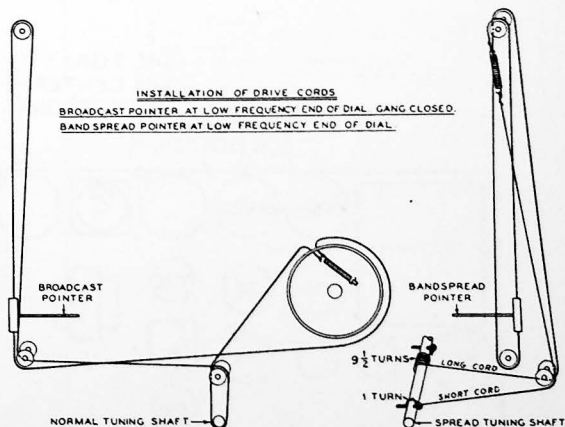


FIG. 2—INSTALLING TUNING DRIVE CORDS

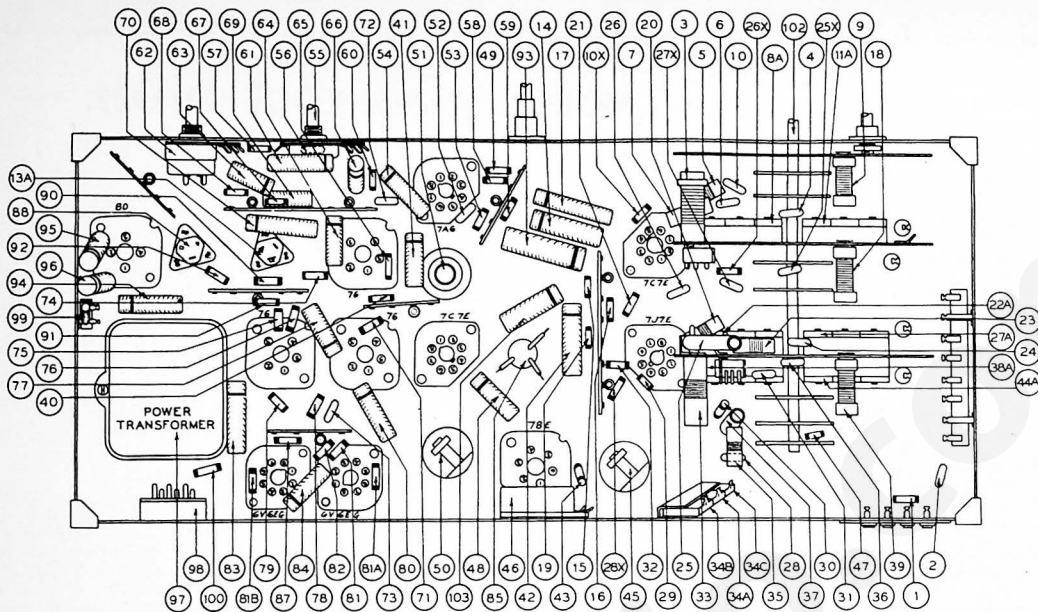


FIG. 3—PART LOCATIONS, UNDERSIDE OF CHASSIS

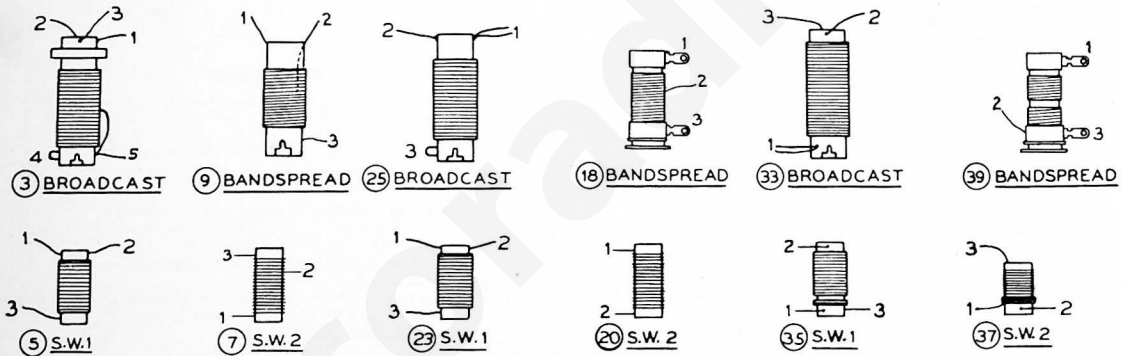


FIG. 4—R. F. TRANSFORMER WIRING LOCATIONS

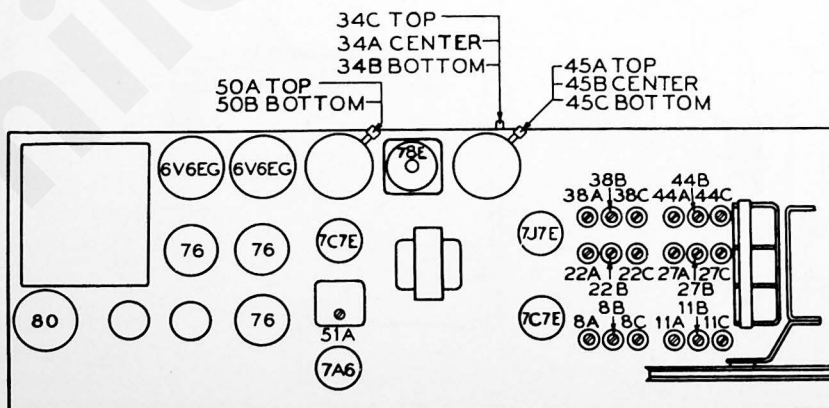


FIG. 5—TUBE AND COMPENSATOR LOCATIONS—TOP OF CHASSIS

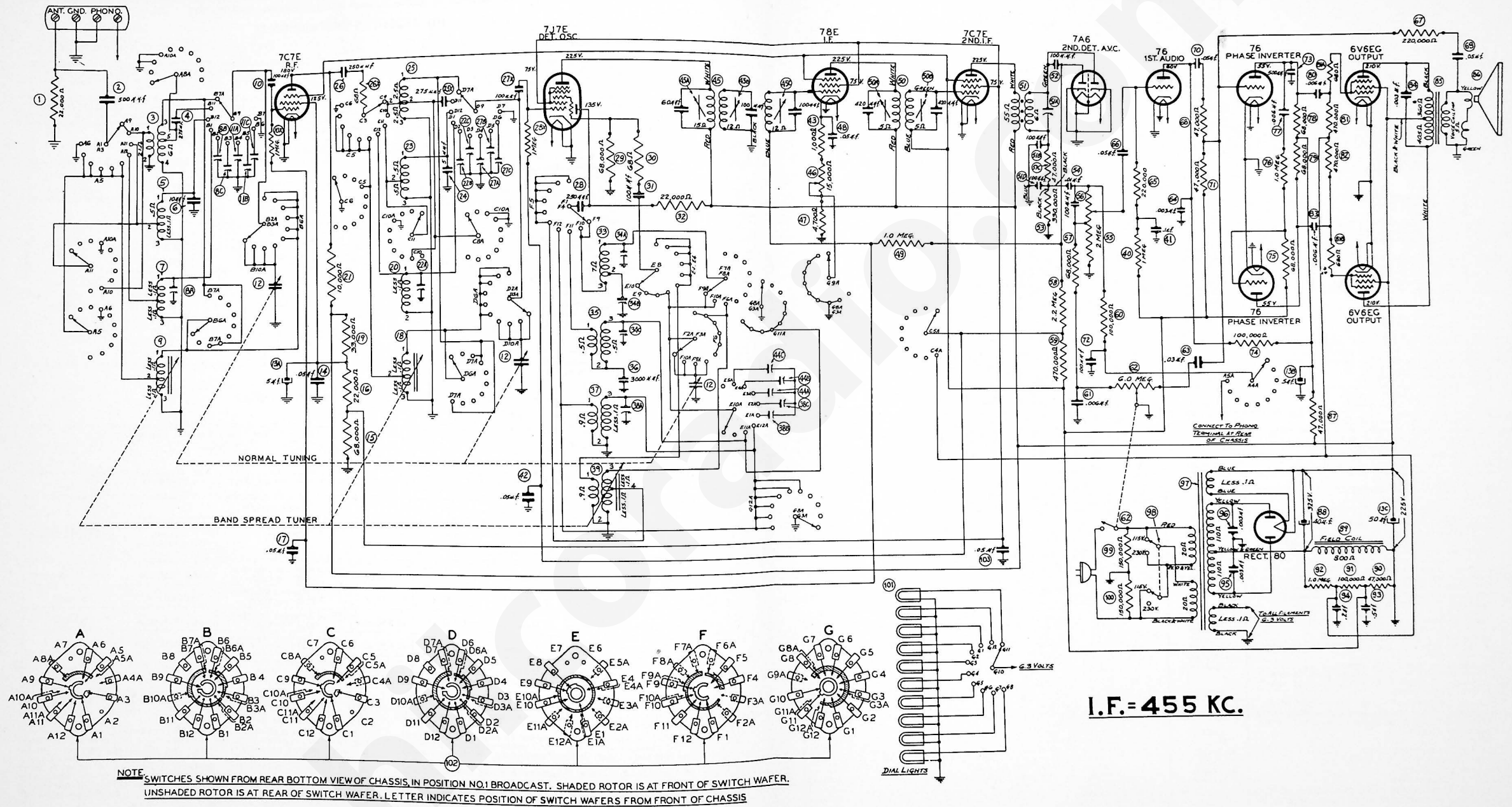


FIG. 6—SCHEMATIC DIAGRAM—MODEL 42-788, CODE 121

The voltages indicated at the tube elements above were measured with a 1000 ohms per volt voltmeter, Philco Model 027. Line voltage 117 volts, A. C. Band switch (broadcast), no station being received.

REPLACEMENT PARTS—MODEL 42-788

Sch. No.	Description	Part No.	Sch. No.	Description	Part No.
1.	Resistor (22,000 ohms)	33-322339	55.	Volume Control	33-5399
2.	Mica Condenser (500 mmfd)	60-150257		Mtg. Nut	W-2157
3.	Aerial Transformer (Broadcast, SW1)	32-3677	56.	Mica Condenser (100 mmfd)	60-110457
4.	Mica Condenser (275 mmfd)	20-027511	57.	Resistor (68,000 ohms)	33-368339
5.	Aerial Transformer (SW-2)	32-3679	58.	Resistor (2.2 megohms)	33-522339
6.	Mica Condenser (10 mmfd)	60-010337	59.	Resistor (470,000 ohms)	33-447339
7.	Aerial Transformer (SW-3)	32-3682	60.	Resistor (100,000 ohms)	33-410339
8A.	Compensator (Short Wave—Aerial)	31-6356	61.	Condenser (.006 mfd, 400 volts)	30-4591
8B.	Compensator (Aerial—31M Band), Part of 8A		62.	Tone Control and Power Switch	33-5400
8C.	Compensator (Aerial—25M Band), Part of 8A			Mtg. Nut	W-2157
9.	Band Spread Aerial Transformer	32-3670	63.	Condenser (.03 mfd, 400 volts)	30-4517
	Mtg. Clip	57-0985	64.	Condenser (.003 mfd, 600 volts)	30-4582
	Iron Core Assembly	76-1281	65.	Resistor (220,000 ohms)	33-422339
10.	Mica Condenser (100 mmfd)	60-110457	66.	Condenser (.05 mfd, 200 volts)	30-4519
10X.	Resistor (1 megohm)	31-2468	67.	Resistor (220,000 ohms)	33-422339
11A.	Compensator (Aerial—19M Band)	31-6357	68.	Resistor (47,000 ohms)	33-347339
11B.	Compensator (Aerial—16M Band), Part of 11A		69.	Condenser (.05 mfd, 200 volts)	30-4519
11C.	Compensator (Aerial—13M Band), Part of 11A		70.	Condenser (.05 mfd, 200 volts)	30-4609
12.	Tuning Condenser	31-2466	71.	Resistor (47,000 ohms)	33-347339
	Coupling Assembly	31-2291	72.	Mica Condenser (100 mmfd)	60-110457
	Drive Cord (Tuning Cond.)	31-2468	73.	Mica Condenser (500 mmfd)	60-150257
	Spring	28-8913	74.	Resistor (100,000 ohms)	33-410339
	Drive Drum	31-2453	75.	Resistor (68,000 ohms)	33-368339
	Rubber Grommet (Mtg. Cond.)	27-4596	76.	Resistor (1 megohm)	33-510339
	Vernier Tuning Shaft	31-2467	77.	Condenser (.006 mfd, 400 volts)	30-4610
	Mtg. Screw	W-2196	78.	Resistor (68,000 ohms)	33-368339
13A.	Electrolytic Condenser (5 mfd)	33-322339	79.	Resistor (68,000 ohms)	33-368339
13B.	Electrolytic Condenser (5 mfd), Part of 13A		80.	Condenser (.006 mfd, 400 volts)	30-4510
13C.	Electrolytic Condenser (50 mfd), Part of 13A		81.	Resistor (470,000 ohms)	33-447339
	Mtg. Plate	56-1643	N.A.	Resistor (680 ohms)	33-168339
14.	Condenser (.05 mfd, 400 volts)	30-4518	N.B.	Resistor (680 ohms)	33-168339
15.	Resistor (68,000 ohms)	33-368339	82.	Resistor (470,000 ohms)	33-447339
16.	Resistor (22,000 ohms)	33-322339	83.	Condenser (.006 mfd, 400 volts)	30-4510
17.	Condenser (.05 mfd, 200 volts)	30-4609	84.	Condenser (.003 mfd, 600 volts)	30-4582
18.	Band Spread R. F. Transformer	32-3671	85.	Output Transformer	32-8111
	Mtg. Clip	57-0985	86.	Speaker	36-1459
	Tuning Cores	76-1281		Cone Assembly (For Speaker 36-1459)	36-4106
19.	Resistor (33,000 ohms)	33-322339		Cable	41-3535
20.	R. F. Transformer (S. W. 3)	32-3683	87.	Resistor (47,000 ohms)	33-347339
21.	Resistor (10,000 ohms)	33-310339	88.	Electrolytic Condenser (40 mfd)	30-2511
22A.	Compensator (R. F.—Short Wave 3)	31-6356		Cardboard Tube	27-9506
22B.	Compensator (R. F.—31M Band), Part of 22A			Mtg. Plate	27-9508
22C.	Compensator (R. F.—25M Band), Part of 22A		89.	Field Coil (Replace Speaker 36-1459)	
23.	R. F. Transformer (S. W. 2)	32-3680	90.	Resistor (47,000 ohms)	33-347339
24.	Mica Condenser (5 mmfd)	60-005357	91.	Resistor (100,000 ohms)	33-410339
25.	R. F. Transformer (Broadcast—S. W. 1)	32-3678	92.	Resistor (1 megohm)	33-510339
25X.	Mica Condenser (275 mmfd)	20-027511	93.	Condenser (.5 mfd, 100 volts)	61-0137
26.	Mica Condenser (250 mmfd)	60-125457	94.	Condenser (.2 mfd, 200 volts)	30-4587
26X.	Resistor (68 ohms)	33-068339	95.	Condenser (.003 mfd, 1500 volts)	30-4608
27A.	Compensator (R. F.—19M Band)	31-6357	96.	Condenser (.003 mfd, 1500 volts)	30-4608
27B.	Compensator (R. F.—16M Band), Part of 27A		97.	Power Transformer (115-230 volts, 50 cycle)	32-8109
27C.	Compensator (R. F.—13M Band), Part of 27A		98.	Power Transformer (115 volts, 25 cycles)	32-8091
27X.	Mica Condenser (100 mmfd)	60-110457	99.	Power Changeover Switch	42-1569
28.	Mica Condenser (250 mmfd)	60-125457	100.	Resistor (150,000 ohms)	33-415339
28X.	Resistor (1 megohm)	33-510339	101.	Resistor (150,000 ohms)	33-415339
29.	Resistor (68,000 ohms)	33-368339		Dial Lamps	34-2064
30.	Resistor (68 ohms)	33-068339		Socket Assembly	76-1414
31.	Mica Condenser (100 mmfd)	60-110457	102.	Band Switch Assembly	42-1661
32.	Resistor (22,000 ohms)	33-322339	103.	Condenser (.05 mfd, 400 volts)	30-4518
33.	Oscillator Transformer (Broadcast S. W. 1)	32-3663		Cable (Power)	L-3274
34A.	Compensator (OSC, Broadcast)	31-6350		Cabinet	10479B
34B.	Compensator (OSC, 530 K Broadcast), Part of 34A			Cabinet Back	27-9655
34C.	Compensator (OSC, S. W. 2), Part of 34A			Mtg. Screw	W-2076
35.	Oscillator Transformer (S. W. 2)	32-3681		Dial Assembly (Standard Tuning)	76-1253
36.	Mica Condenser (3,000 mmfd)	60-230124		Dial Assembly (Band Spread)	76-1252
37.	Oscillator Transformer (S. W. 3)	32-3684		Dial Clamp	56-1795
38A.	Compensator (OSC, S. W. 3)	31-6419		Dial Pointer	56-1804
38B.	Compensator (OSC, 31M Band), Part of 38A			Mtg. Screw	W-333
38C.	Compensator (OSC, 25M Band), Part of 38A			Knob (Tuning)	27-4882
39.	Oscillator Transformer (Band Spread)	32-3676		Knob (Tuning)	27-4330
	Mtg. Clip	57-0985		Knob (Volume—Band Switch)	27-4332
40.	Resistor (220,000 ohms)	33-422339		Plug (Power)	L-3275
41.	Condenser (.1 mfd, 400 volts)	30-4527		Rubber Grommet (Chassis Mtg.)	27-4564
42.	Condenser (.05 mfd, 200 volts)	30-4609		Rubber Washer (Chassis Mtg.)	27-4571
43.	Resistor (1000 ohms)	33-210339		Screw (Chassis Mtg.)	W-1345
44A.	Compensator (OSC, 19M Band)	31-6420		Socket (76 Tube)	27-6035
44B.	Compensator (OSC, 16M Band), Part of 44A			Socket (78 Tube)	27-6036
44C.	Compensator (OSC, 13M Band), Part of 44A			Socket (80 Tube)	27-6044
45.	1st I. F. Transformer	32-3443		Socket (6V8G Tube)	27-6053
45A.	Primary Compensator (Iron Core—Part of 45)			Socket (7JE Tube)	27-6129
45B.	Secondary Compensator (Iron Core—Part of 45)			Socket (7CE, 7A6 Tube)	27-6152-2
45C.	Tertiary Compensator (Iron Core—Part of 45)			Mtg. Eyelets	W-1650
46.	Sensitivity Control	33-5401		Tuning Drive Shaft (Band Spread—Outside Chassis)	76-1248
	Mtg. Nut	W-2157		Rubber Disc	27-4272
47.	Resistor (4700 ohms)	33-247339		Mtg. Screw	W-2295
48.	Condenser (.05 mfd, 200 volts)	30-4519		Tuning Drive Shaft (Band Spread—Inside R. F. Unit)	76-1241
49.	Resistor (1 megohm)	33-510339		Shaft Bushing (Threaded)	56-2152
50.	2nd I. F. Transformer	32-3444		Carriage (Tuning Cores)	56-2145
50A.	Primary Compensator (Iron Core—Part of 50)			Core Clamp	56-2151
50B.	Secondary Compensator (Iron Core—Part of 50)			Screw	37-0054
51.	3rd I. F. Transformer	32-3445		Cotter Pin	W-2196
51A.	Secondary Compensator, Part of 51			Drive Cord (Band Spread—Short Section)	31-2469
51B.	Condenser (100 mmfd), Part of 51A			Drive Cord (Band Spread—Long Section)	31-2470
51C.	Resistor (47,000 ohms), Part of 51			Spring	28-8751
51D.	Condenser (100 mmfd), Part of 51A			Tube Shield Base	28-2726
52.	Mica Condenser (100 mmfd)	60-110457		Tube Shield (78-2 Tube)	28-2725
53.	Resistor (330,000 ohms)	33-433339		Wire Panel (4 lug)	33-9809
54.	Condenser (.01 mfd, 400 volts)	30-4572		Wire Panel (2 lug)	33-9877
				Wire Panel (8 lug)	33-9817
				Wire Panel (6 lug)	33-9929

ALIGNING R. F. AND I. F. 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 070 is required. The signal generator covers the frequencies necessary for adjusting the radio.

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 any grid return connection in the A. V. C. circuit.

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 to the 0 to 30 volt A. C. scale.

After connecting the aligning meters, adjust the compensators in the order 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.

ADJUSTING NORMAL TUNING RANGES

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	Tuning Condenser Stator Lug Middle Section	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Band Selector "Brdest"	45A, 45C, 50A, 50B, 51A	Note D
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Band Selector "Brdest"	34A	Note B Roll Gang
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	34B	Roll Gang
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	34A	Roll Gang
5	Antenna and Ground	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max. Band Selector "S.W.2"	34C	Roll Gang
6	Antenna and Ground	400 ohms	20 M. C.	20 M. C.	Vol. Max. Band Selector "S.W.3"	38A, 22A, 8A	Note C

NOTE—S.W.1 Tuning Band requires no adjustment.

ADJUSTING BAND SPREAD TUNING RANGES

Mechanical Adjustments: Before the padders of the band spread tuning ranges are adjusted, the iron cores of the antenna, R. F. and oscillator transformers must be mechanically set as follows:

1. Turn the band spread tuning control to the extreme counter-clockwise position (lowest frequency).

2. Adjust location of "OSC" iron cores so that the end of the iron core is flush with the end of the transformer. With the "OSC" iron core in this position the antenna R. F. cores will be correctly

located.

3. When installing a new oscillator transformer or core, make sure that the iron core slides freely in the transformer. It is important to do this to eliminate backlash in the tuning mechanism. If adjustment is necessary slightly move transformer in the direction required.

After mechanically setting the transformers and iron cores, adjust the padders as given in the following tabulation:

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	Antenna and Ground	400 ohms	9.7 M. C.	9.7 M. C.	Band Selector Position "31M" on Dial	38B, 22B, 8B	Note E—Note F
2	Antenna and Ground	400 ohms	11.7 M. C.	11.7 M. C.	Band Selector Position "25M" on Dial	38C, 22C, 8C	Note F
3	Antenna and Ground	400 ohms	15.2 M. C.	15.2 M. C.	Band Selector Position "19M" on Dial	44A, 27A, 11A	Note F
4	Antenna and Ground	400 ohms	17.8 M. C.	17.8 M. C.	Band Selector Position "16M" on Dial	44B, 27B, 11B	Note F
5	Antenna and Ground	400 ohms	21.5 M. C.	21.5 M. C.	Band Selector Position "13M" on Dial	44C, 27C, 11C	Note F

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.

NOTE C—When adjusting "OSC" compensator be sure to tune in the fundamental signal (20 MC) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the signal generator dial 910 KC above the fundamental signal, which will be 20.910 MC.

NOTE D—Before adjusting padders 45A, 45C, 50A, 50B, 51A, turn padder 45B to full clockwise position (all the way out). After the padders are adjusted to maximum, then adjust padder 45B for maximum.

NOTE E—Before adjusting padders, turn the band spread tuning knob to its extreme counter-clockwise position. Set the band spread dial pointer on the first MARK on the left edge (low frequency end) of the 31 meter scale.

NOTE F—To make sure that the dial reads properly after adjusting the compensator with the signal generator as outlined above, a known station on each band near the adjusting frequency should be tuned in with the spread band tuning control. If the dial reading is incorrect, adjust the oscillator compensators on each band until the stations are heard at the correct points on the dial. After adjusting the oscillator compensators to the correct frequency of the known station, the "antenna" and "R. F." compensators should be adjusted to maximum signal.

ALTERNATIVE METHOD—Locate a known station near the center of each spread band and "Zero Beat" the signal generator with it at the time of aligning band. This makes available a signal of adjustable strength and known frequency. This method will be found to be simpler when conditions make its use possible because it is much easier to align a receiver to a strong signal.