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PHILCO Service Manual . . . . Model 680

BULLETIN No. 228

For Members of RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

General Specifications:

TYPE CIRCUIT: Superheterodyne with push pull Class "A" Triodes as power tubes. Variable selectivity accomplished by varying the coupling in the I.F. Stages. Manual controlled bass amplifier, amplified automatic volume control, built-in connections for all-wave aerial; aerial selector built into and operated by wave band switch. Separate bias voltage supply for audio stages.

TUBES USED: Fifteen (15) total: 1 type 78 R.F., 1 type 76 osc., 1 type 78, 1st det. and mixer, 2 type 78 I.F., 1 type 85, 2nd det. and 1st audio, 1 type 85, 2nd audio and audio A.V.C., 1 type 42 driver, 2 type 6A3 output, 1 type 6B7 amplified A.V.C., 1 type 6F7 automatic bass compensation, and bass amplifier, 1 type 85 shadow meter control, 1 type 80 fixed bias rectifier, 1 type 5Z3 main rectifier.

WAVE BANDS: Four: (1) short wave; (2) amateur and police; (3) standard; (4) long wave (weather).

FREQUENCY RANGES: Band (1), 7.2-22 mc.; Band (2), 2.3-7 mc.; Band (3), 550-1700 K.C.; Band (4), 150-400 K.C.

POWER SUPPLY: Alternating current, voltage and frequency as specified on name plate.

WAVE BAND INDICATOR: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

TUNING METER: Shadow type tuning meter mounted directly above scale and operated by a separate tube.

AUDIO OUTPUT: 20 watts undistorted output.

TUNING DRIVE: Dual Planetary, ball-bearing, 80 to 1 ratio for slow speed tuning. 10 to 1 normal.

INTERMEDIATE FREQUENCY: 460 K.C.

POWER CONSUMPTION: 142 watts.

SPEAKER: U-10.

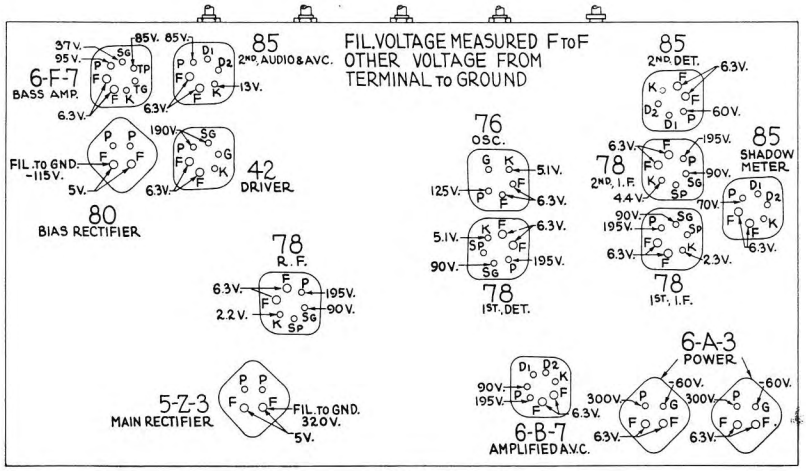

FIG. 1. Sockets Viewed from Bottom—Voltage Measurements to Ground, Unless Otherwise Shown—Line Voltage 115

Adjusting Compensating Condensers

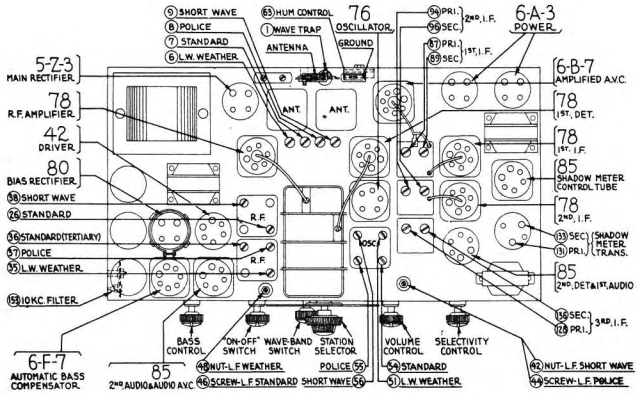

FIG. 2. Location of Compensating Condensers

Adjustment of compensating condensers in Model 680 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The **PHILCO Model 088 All-Wave Signal Generator,** having a continuous range of from 100 to 20,000 K.C. (all fundamental frequencies) will be ideal for this purpose.

An output meter is also needed. **PHILCO Model 025 Circuit Tester** includes a high-grade output meter.

PHILCO No. 3164 Fibre Wrench and **No. 27-7059 Fibre Handled Screwdriver** complete the equipment needed for making these adjustments. The locations of the various compensating condensers are shown in Fig. 2. Connect the output meter to the plate contacts of the output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

Under no conditions attempt to adjust this receiver without these instruments.

Before attempting to adjust the I.F. stages, turn the condenser gang all the way in. The glowing arrow should then be between the two vertical lines at the extreme left of the low frequency calibrations. The Bass Control should be turned off (turn to left). The fidelity control in selective position (turn to left). Adjust the hum control (back of set) for minimum hum.

Attach the signal generator antenna lead to the grid of the 2nd I.F. 78 tube, and the ground lead to the ground post on set. Adjust the volume control of set to maximum (turn to right), tune the signal generator to 460 K.C., and adjust the attenuator of the signal generator for approximately ¼ scale output meter reading.

Turn condenser (133) (shadow meter compensator) approximately four turns to the left. Adjust condensers (136), (128), and (131) for maximum output meter reading. Adjust condenser (133) for minimum output meter reading.

Remove the signal generator antenna lead from the grid of the 2nd I.F., 78 tube and place it on the grid of the 1st I.F., 78 tube, again adjust the signal generator attenuator for approximately ¼ scale output meter reading and adjust condensers (96) and (94) for maximum output meter reading.

Remove the signal generator antenna lead from the grid of the 1st I.F., 78 tube and place it on the grid of the 1st detector, 78 tube. Regulate the signal generator attenuator as before for ¼ scale output meter reading. Adjust condensers (89) and (87) for maximum output meter reading.

Turn down the volume control of set and advance the signal generator attenuator until the shadow meter width decreases approximately fifty percent. Adjust condenser (123) for minimum shadow meter width.

Remove the signal generator antenna lead from the grid of 1st detector, 78 tube and couple it to the aerial post on the set through a 125 mmf. condenser. Turn the volume control of the set back to maximum (to right) and adjust the signal generator attenuator for approximately ½ scale output meter reading. Adjust the wave trap (condenser (1)) for minimum output meter reading.

Reconnect the signal generator antenna lead to the grid of the first detector 78 tube and adjust the signal generator attenuator for approximately ¼ scale output meter reading.

If the fidelity selectivity control is turned to the extreme right hand position, it will be found, upon varying the frequency of the signal generator, that two definite peaks will appear in the output meter reading—one at 452 K.C. and another at 468 K.C. These peaks in the output meter reading indicate peaks in the tuning curve. The amplitude of these peaks should be equal; that is, the same output meter reading should be obtained at both 452 K.C. and 468 K.C. Any variations in these two readings can be corrected by a slight readjustment of the shadow meter I.F. primary padder (131). If the peak at 452 K.C. is higher than the one at 468 K.C., the primary padder will have to be turned out. If the reverse is true, the capacity of this padder must be increased. In any case, the voltmeter readings must be made equal by dividing the differences through readjustment.

R. F. and Oscillator Adjustments

SHORT WAVE

Turn the fidelity control back to the extreme left and the wave band switch to the extreme right (band 1). Connect the signal generator antenna lead to the aerial post on set through a two-meg resistor. Tune the set and signal generator to 18 mc. Turn the signal generator attenuator to maximum and adjust the volume control of set for ¼ scale

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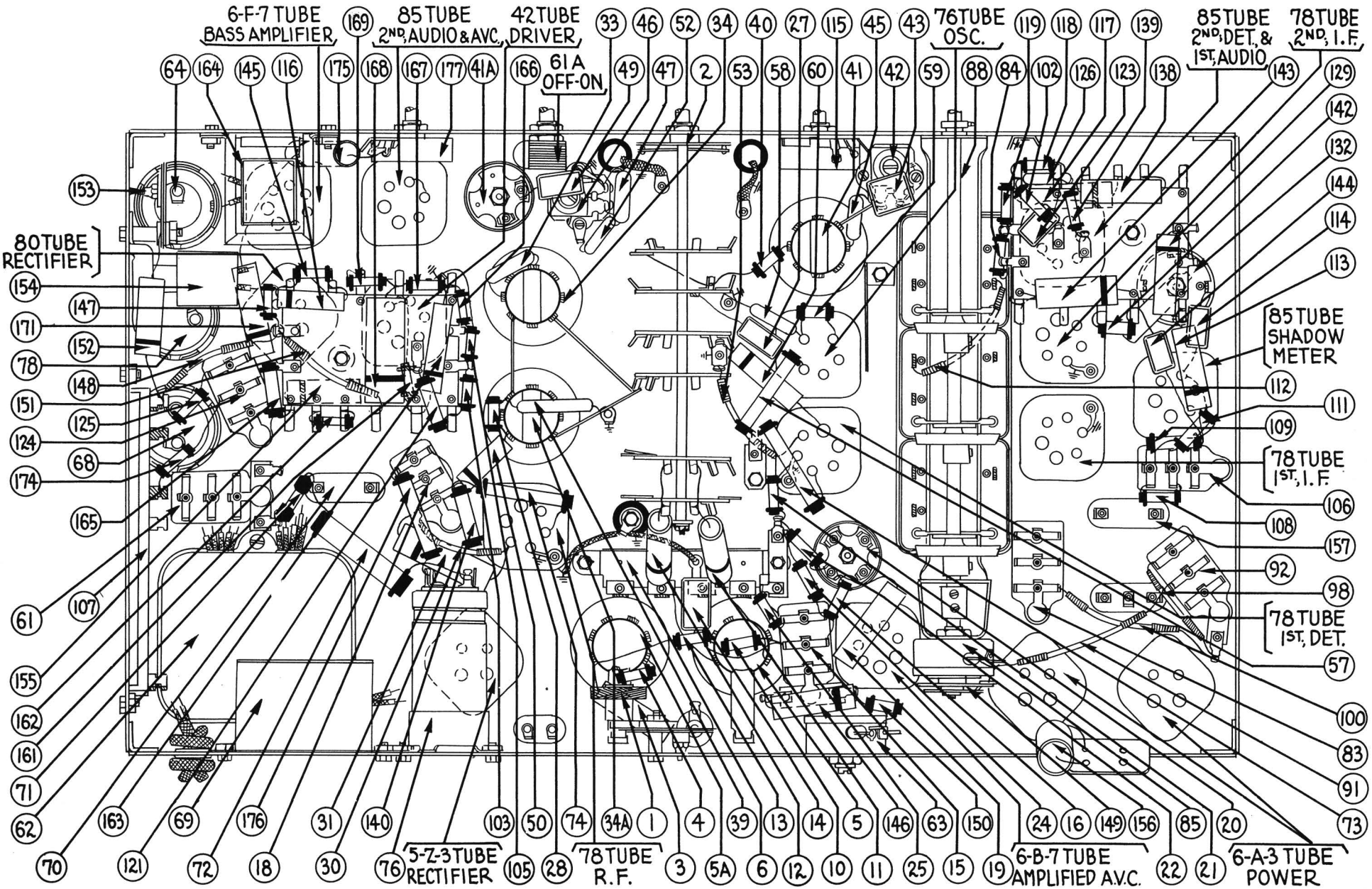

Fig. 3. Bottom View of Chassis

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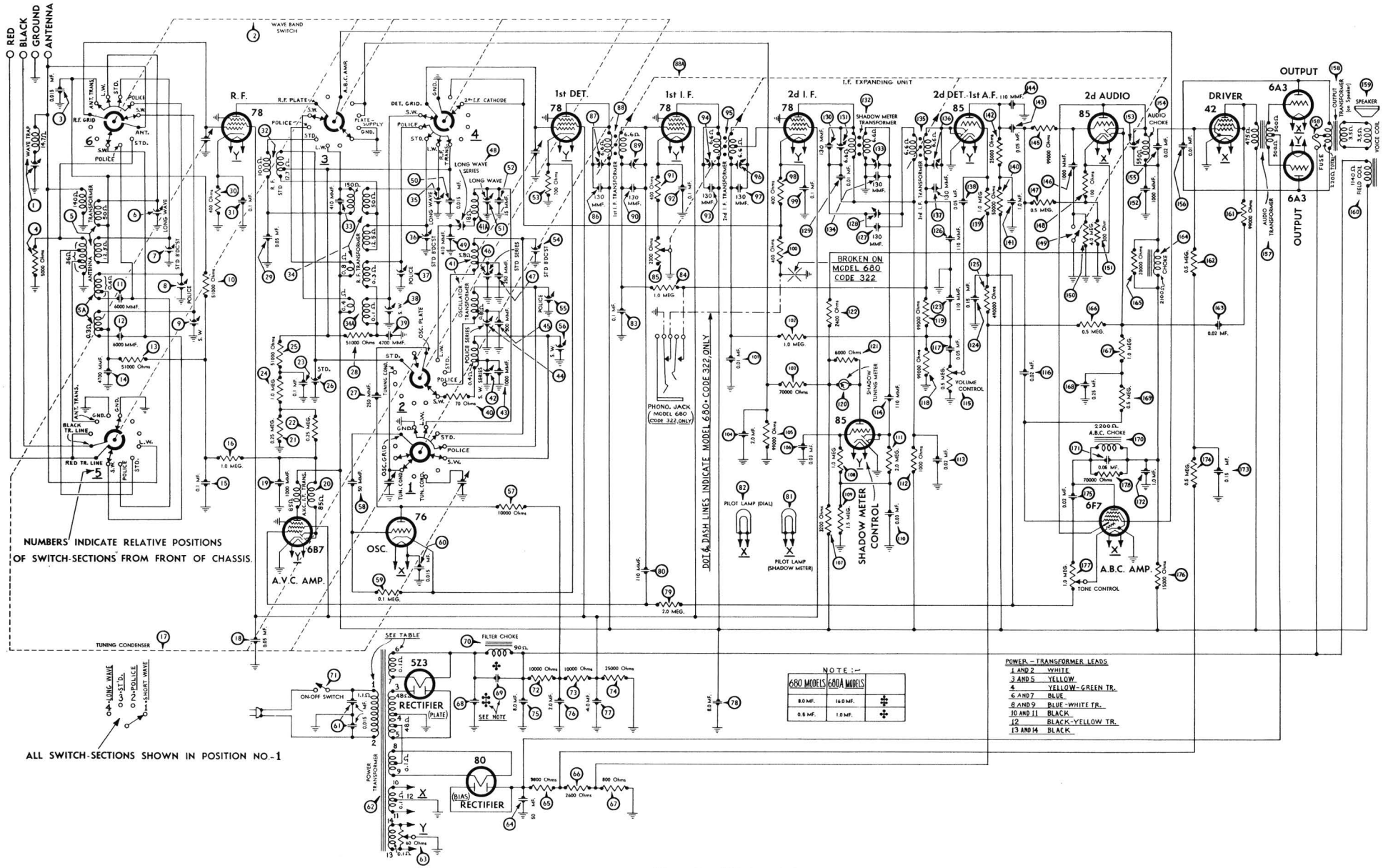

Fig. 4. Wiring Diagram

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Adjusting Compensating Condensers

(Continued from first page)

reading on the output meter. Adjust condenser ㊻ for maximum output meter reading. Turn the dial of the set to approximately 17.1 mc. and check the image frequency.

Turn the dial of the set back to 18 mc. and connect a variable condenser (approximately 250 mmf.) across the oscillator section of the gang (2nd from front of chassis). Turn the variable shunt condenser in until the 18 mc. signal gives a reading on the output meter. Adjust condensers ⑨ and ㊳ for maximum output meter reading.

Removing the shunt condenser, turn the dial of the set and signal generator to 8 mc. and adjust condenser ㊷ for maximum output meter reading. Readjust condenser ㊻ with the set and signal generator tuned to 18 mc.

POLICE

Turn the wave band switch to position 2 and tune the set and signal generator to 6 mc. Adjust condensers ⑧, ㉟ and ㊺ for maximum output meter reading.

Turn the dial of the set and signal generator to 2.4 mc. and adjust condenser ㊹ for maximum output meter reading. Turn the dial of the set and signal generator back to 6 mc. and readjust condenser ㊺.

STANDARD

Turn the wave band switch to position 3 and tune the set and signal generator to 1500 K.C. and adjust condensers ⑦, ㉖, ㉚ and ㊹ for maximum output meter reading.

Turn the dial of the set and signal generator to 580 K.C., and remove the two meg. resistor from the antenna lead. Turn the volume control to maximum and adjust the signal generator attenuator for approximately ¼ scale output meter reading. Adjust condenser ㊵ for maximum output meter reading.

WEATHER

Turn the wave band switch to position 4, and tune the set and signal generator to 340 K.C. Adjust condensers ⑥, ㉝ and ㊶ for maximum output meter reading.

Turn the dial of the set and signal generator to 175 K.C. and adjust condenser ㊽ for maximum output meter reading. Readjust condenser ㊶ at 340 K.C.

Turn the wave band switch back to position ③ and tune the set and signal generator to 580 K.C. Adjust condenser ㊵ for maximum output meter reading. Tune the set and signal generator to 1500 K.C. and adjust condenser ㊹ for maximum output meter reading. Turn down (to left) the volume control and turn up (to right) the signal generator attenuator. Then adjust condenser ㉚ for maximum output meter reading.

Adjustment of 10 K. C. Filter

The 10 K.C. filter in the audio circuit will rarely require readjustment. As the proper adjustment of this padder (㊸ on diagram) requires an accurately calibrated audio oscillator, it should be reset only in the event that it has been tampered with or in cases where it has become necessary to replace one of the elements of this filter.

Instructions covering an emergency adjustment of this filter can be obtained from your Philco distributor.

Replacement Parts for Model 680

Schematic No.	Part and Description	Part No.	List Price
①	Wave Trap	38-6850	$1.10
②	Wave Band Switch	42-1127	2.85
③	Condenser (0.015 mf.)	39-4358	.20
④	Resistor (5,000 ohms)	6096	.20
⑤	Antenna Transformer (Bdcst. 3 and 4)	32-1811	1.75
⑤a	Antenna Transformer (Bdcst. 1 and 2)	32-1812	1.10
⑥	Padder (Antenna Band 4)		
⑦	Padder (Antenna Band 3)		
⑧	Padder (Antenna Band 2)	31-6047	.50
⑨	Padder (Antenna Band 1)		
⑩	Resistor (51,000 ohms)	6098	.20
⑪	Condenser (6,000 mmf.)	30-4125	.20
⑫	Condenser (6,000 mmf.)	30-4125	.20
⑬	Resistor (51,000 ohms)	6098	.20
⑭	Condenser (4,700 mmf.)	30-1052	.55
⑮	Condenser (0.1 mf.)	4989-ODG	.40
⑯	Resistor (1.0 meg.)	33-1096	.20
⑰	Condenser Gang	31-1619	7.00
⑱	Condenser (0.05 mf.)	3615-ODG	.40
⑲	Condenser (1,000 mmf.)	30-4201	.20
⑳	I.F. Transformer (AVC)	32-1837	.70
㉑	Resistor (0.25 meg.)	6097	.20
㉒	Resistor (0.25 meg.)	6097	.20
㉓	Condenser (0.1 mf.)	Part of ⑮	....
㉔	Resistor (1.0 meg.)	33-1096	.20
㉕	Resistor (51,000 ohms)	6098	.20
㉖	Padder (R.F. Std.)	Part of ㉞a	....
㉗	Condenser (250 mmf.)	30-1032	.25
㉘	Resistor (51,000 ohms)	6098	.20
㉙	Condenser (0.05 mf.)	Part of ⑱	....
㉚	Resistor (400 ohms)	33-3016	.20
㉛	Condenser (0.1 mf.)	30-4122	.20
㉜	Transformer	Part of ㉞a	....
㉝	Condenser (410 mmf.)	30-1000	.20
㉞	Detector Transformer (Bdcst. 4 and 2)	32-1813	2.60
㉞a	Detector Transformer (Bdcst. 1 and 3)	32-1814	2.10
㉟	Padder (Det., Weather)		
㊱	Padder (Det., Tertiary)	31-6058	.60
㊲	Padder (Det., Police)		
㊳	Padder (Part of ㊴a)	61-6059	.50
㊴	Condenser (4,700 mmf.)	30-1052	.55
㊵	Resistor (70 ohms)	33-1129	.20
㊶	Oscillator Transformer (Bdcst. 1, 2 and 3)	32-1815	2.50
㊶a	Oscillator Transformer (Bdcst. 1)	32-1816	.30
㊷	Padder (S.W. Series)	31-6027	.70
㊸	Condenser (1,000 mmf.)	30-1063	.30
㊹	Padder (Police Series)	Part of ㊷	....
㊺	Condenser (900 mmf.)	30-1060	.25
㊻	Padder (Standard)	31-6033	.50
㊼	Condenser (250 mmf.)	30-1032	.25
㊽	Padder (Weather Srs.)	Part of ㊻	....
㊾	Condenser (410 mmf.)	30-1000	.25
㊿	Condenser (0.015 mf.)	30-4358	.20
(51)	Padder (Osc. Weather)	Part of ㊶a	....
(52)	Condenser (15 mmf.)	30-1030	.20
(53)	Resistor (700 ohms)	33-3124	.25
(54)	Padder (Osc. Standard)		
(55)	Padder (Osc. Police)	31-6057	.70
(56)	Padder (Osc. Short Wave)		
(57)	Resistor (10,000 ohms)	3524	.20
(58)	Condenser (50 mmf.)	4587	.20
(59)	Resistor (100,000 ohms)	6099	.20
(60)	Condenser (0.015 mf.)	30-4358	.20
(61)	Condenser (0.015-0.015 mf.)	3793-ODG	.40
(62)	Power Transformer	32-7455	8.00
(63)	Potentiometer (Hum Adj.)	33-5111	.70
(64)	Condenser (50.0 mf.)	30-2128X	1.80
(65)	Resistor (9,800 ohms)		
(66)	Resistor (2,600 ohms)	33-3216	.60
(67)	Resistor (800 ohms)		
(68)	Condenser (8.0 mf.) double	30-2028M	2.15
(69)	Condenser (0.6 mf.)	30-4384	.50
(70)	Choke (Filter)	32-7056	2.20
(71)	Off-On Switch	42-1129	.50
(72)	Resistor (10,000 ohms)	33-1024	.35
(73)	Resistor (10,000 ohms)	3524	.20
(74)	Resistor (25,000 ohms)	3656	.20
(75)	Condenser (8.0 mf.)	Part of (68)	....
(76)	Condenser (2.0, 2.0, 1.0, 1.0 mf.)	30-2130	2.15
(77)	Condenser (4.0 mf.)	30-2129	1.65
(78)	Condenser (8.0 mf.)	Part of (75)	....
(79)	Resistor (2.0 meg.)	33-1025	.20
(80)	Condenser (110 mmf.)	30-1031	.20
(81)	Pilot Lamp (Shadowmeter)	6608	.09
(82)	Pilot Lamp (Dial Scale)	34-2039	.15
(83)	Condenser (0.1 mf.)	4989-ODG	.40
(84)	Resistor (1.0 meg.)	33-1096	.20
(85)	Potentiometer (2300 ohms)	33-5124	1.00
(86)	Condenser (130 mmf.)	30-1036	.20
(87)	Padder (Primary)	31-6055	.50
(88)	1st I.F. Transformer Part of I.F. Unit (88)a		....
(88)a	I.F. Expander Unit	38-7013	15.00
(89)	Padder (Secondary)	Part of (87)	....
(90)	Condenser (130 mmf.)	30-1036	.20
(91)	Resistor (400 ohms)	33-3016	.20
(92)	Condenser (0.1 mf.)	4989-ODG	.40
(93)	Condenser (130 mmf.)	30-1036	.20
(94)	Padder (Primary)	31-6055	.50
(95)	2nd I.F. Transformer Part of I.F. Unit (88)a		....
(96)	Padder (Secondary)	Part of (94)	....
(97)	Condenser (130 mmf.)	30-1036	.20
(98)	Resistor (400 ohms)	33-3016	.20
(99)	Condenser (0.1 mf.)	Part of (92)	....
(100)	Resistor (400 ohms)	33-3016	.20
(101)	Condenser (0.01 mf.)	Part of (83)	....
(102)	Resistor (1.0 meg.)	33-1096	.20
(103)	Resistor (70,000 ohms)	33-1115	.20
(104)	Condenser (2.0 mf.)	Part of (76)	....
(105)	Resistor (99,000 ohms)	6099	.20
(106)	Condenser (0.03 mf.)	8318-OSG	.35
(107)	Resistor (3,200 ohms)	33-3215	.70
(108)	Resistor (1.0 meg.)	33-1096	.20
(109)	Resistor (1.5 meg.)	33-1188	.20
(110)	Condenser (0.03 mf.)	Part of (106)	....
(111)	Resistor (2.0 meg.)	33-1025	.20
(112)	Resistor (1,000 ohms)	33-3017	.20
(113)	Condenser (0.02 mf.)	30-4113	.20
(114)	Condenser (110 mmf.)	30-1031	.20
(115)	Volume Control (0.5 meg.)	33-5117	1.00
(116)	Condenser (0.02 mf.)	30-4215S	.20
(117)	Condenser (0.05 mf.)	30-4020P	.20
(118)	Resistor (99,000 ohms)	6099	.20
(119)	Resistor (99,000 ohms)	6099	.20
(120)	Shadow Meter	45-2088	2.50
(121)	Resistor (6,000 ohms)	7352	.20
(122)	Resistor (2,400 ohms)	Part of (105)	....
(123)	Condenser (110 mmf.)	30-1031	.20
(124)	Condenser (0.15 mf.)	6287-ODG	.40
(125)	Resistor (490,000 ohms)	6097	.20
(126)	Condenser (110 mmf.)	30-1031	.20
(127)	Condenser (130 mmf.)	30-1036	.20
(128)	Padder (Primary)	31-6055	.50
(129)	Condenser (0.01 mf.)	30-4124P	.25
(130)	Condenser (130 mmf.)	30-1036	.20
(131)	Padder (Primary)	31-6055	.50
(132)	I.F. Transformer (Shadow Meter)	32-1838	.90
(133)	Padder (Secondary)	Part of (132)	....
(134)	Condenser (130 mmf.)	30-1036	.20
(135)	3d I. F. Transformer Part of I.F. Unit (88)a		....
(136)	Padder (Secondary)	Part of (135)	....
(137)	Condenser (130 mmf.)	30-1036	.20
(138)	Condenser (0.05 mf.)	30-4020M	.20
(139)	Resistor (1.0 meg.)	33-1096	.20
(140)	Resistor (50,000 ohms)	4518	.20
(141)	Condenser (1.0 mf.)	Part of (76)	....
(142)	Resistor (25,000 ohms)	33-1013	.20
(143)	Condenser (0.05 mf.)	30-4020M	.20
(144)	Condenser (110 mf.)	30-1031	.20
(145)	Resistor (99,000 ohms)	6099	.20
(146)	Condenser (1,000 mmf.)	30-1063	.30
(147)	Resistor (0.5 meg.)	6097	.20
(148)	Resistor (100 ohms)	33-3187	.20
(149)	Switch Part of (88)a I.F. Exp. Unit		....
(150)	Resistor (4.0 meg.)	33-1002	.20
(151)	Resistor (300 ohms)	33-3121	.25
(152)	Condenser (1,000 mmf.)	30-1063	.30
(153)	Padder	04000-T	.35
(154)	Transformer (10KC Filter)	32-7368	.60
(155)	Condenser (0.02 mf.)	30-4215S	.20
(156)	Condenser (0.01 mf.)	30-4051P	.25
(157)	Input Transformer	32-7446	1.75
(158)	Output Transformer	32-7461	2.00
(158)a	Fuse	45-2113	.16
(159)	Speaker Cone Assembly	36-3381	1.75
(160)	Field Coil Assembly	36-3162	8.00
(161)	Resistor (99,000 ohms)	6099	.20
(162)	Resistor (0.5 meg.)	6097	.20
(163)	Condenser (0.02 mf.)	6097	.20
(164)	Choke	32-7476	1.25
(165)	Resistor (20,000 ohms)	6650	.20
(166)	Resistor (0.5 meg.)	6097	.20
(167)	Resistor (1.0 meg.)	33-1096	.20
(168)	Condenser (0.25 mf.)	6097	.20
(169)	Resistor (0.5 meg.)	6097	.20
(171)	Choke (Bass)	32-7478	1.50
(171)	Condenser (0.06 mf.)	30-4373	.20
(172)	Condenser (1.0 mf.)	Part of (76)	....
(173)	Condenser (0.15 mf.)	Part of (124)	....
(174)	Resistor (0.5 meg.)	6097	.20
(175)	Condenser (0.02 mf.)	30-4113X	.20
(176)	Resistor (15,000 ohms)	5278	.20
(177)	Potentiometer (1.0 meg.)	33-5118	.70
(178)	Resistor (70,000 ohms)	33-1182	.20
	Dial Mask Assembly	31-1575	.40
	Dial Mask Bearing	28-6307	.05
	Dial Mask Bearing Nut	28-6308	.10
	Cord Take-up Slide	28-7134	.10
	Mask Drive Cord	31-1580	.05
	Drive Cord Spring	28-8386	.01
	Dial Scale	27-5127	.40
	R.F. Shield Assembly	38-6938	.35
	R.F. Shield Assembly	38-6793	.35
	I.F. Shield Assembly	38-6986	.20
	Coil Shield (Oscillator-Long-Wave)	5840	.10
	5-Prong Socket	27-6035	.11
	6-Prong Socket	27-6036	.11
	7-Prong Socket	27-6037	.11
	4-Prong Socket	27-6044	.10
	Speaker Socket	27-6043	.08
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03
	Knob (Station Selector)	27-4206	.12
	Knob (Slow Tuning)	27-4207	.10
	Knob (Off-On, Fidelity, Volume, Bass)	27-4225	.10
	Bezel	28-3165	.50
	Bezel Gasket	27-7982	.90C
	Bezel Glass	27-7890	.60
	Acoustic Compensator	36-1155	1.25
	Speaker Cable	02722	.30
	Shadow Screen	27-5120	1.50C
	Mounting Foot	29-2957	.06
	Wave Switch Shaft (Coupling)	28-7121	1.80C
	Bottom Shield Assembly	38-7042	.60
	Mounting Clamp (Electrolytic Condenser)	6440	.05
	Insulator	27-7194	.01
	Fahnestock Clip (Antenna and Ground)	L-1126	1.25C