PHILCO TRANSITONE
SERVICE BROADCAST

AUGUST, 1935

POLICE AUTO RADIO — MODELS 810PA, 810PB AND 810PV

THERE are two new types of Philco police auto radio Receivers, each designed to meet the special requirements of this particularly rigorous service: The Model 810PV, a variable tuning Police Receiver — and the Models 810PA and PB, crystal controlled, fixed frequency Receivers, the DeLuxe Police Auto Radio.

HOUSING, PLATING, FINISH All are single unit Receivers, housed in containers 11 inches long by 7⅜ inches wide by 7 inches deep. All corners are rounded, the chassis, housing and covers are all steel and are plated to prevent rusting. They are given an exterior black wrinkle finish.

MOUNTING BRACKETS The Receivers are furnished with metal mounting brackets. One bracket is bolted to the inside of the dash, the other bracket is fastened to back of the Receiver. The Receiver bracket engages on the dash bracket and is fastened by a single small screw. This makes the installation and removal of the Receiver a simple, rapid operation. The Receiver may be installed with the tubes upright or inverted, depending on the location of the Receiver in the car.

CONTROL SHAFTS, CONNECTIONS The volume control and (in case of 810 PV) the tuning control shaft, the "A" battery and the antenna connectors are located on one end of the housing. The shafts are the rapid coupling type with the locking gland nut at the Receiver end. The "A" battery and antenna connections are the quick, detachable bayonet locking type, with the "A" fuse placed in the "A" lead.

FLOATING CHASSIS AND CONDENSER The Receiver chassis is shock mounted within the housing, actually floating on live rubber bushings. The tuning condenser is likewise rubber mounted.

CONDENSER DRIVE The condenser drive gear ratio (Model 810PV) is 16:1. This eliminates practically all back lash and due to the mechanism used, prevents the tuning condenser from detuning from vibration. This high gear ratio also makes accurate tuning much easier.

CONTROL UNIT A steering column control unit, with illuminated dial (calibrated for the Model 810PV) is used.

SUPERHETERODYNE RANGE 810PV DRIFT A superheterodyne circuit is used for the 810PV, also the 810PA and PB. The frequency coverage of the Model 810PV is from 1575 K. C. to 2600 K. C. continuously in one band. The oscillator and I.F. circuits are especially designed to reduce frequency drift to a minimum. The Models

RANGE 810PA AND 810PB 810PA and 810PB, the fixed frequency Receiver, can be furnished adjusted for any one particular frequency within the limits of the regular police band, i.e. the Model PA covers from 1575 K.C. to 1750 K.C. and the Model

CRYSTAL CONTROL 810PB covers from 2100 K.C. to 2500 K.C. A crystal controlled oscillator circuit is employed in the Model 810PA and 810PB. The crystal control naturally holds the oscillator on the required frequency, and is responsible, in a large measure, for the greatly improved performance of this Receiver.

TUBE EQUIPMENT The tubes used in the 810PV and 810PA and 810PB are:

78 Tube— Tuned R. F. Amplifier with A. V. C.
6A7 Tube—First Detector—Oscillator Modulator with A.V.C.
78 Tube—I. F. Amplifier.
75 Tube—Second Detector and "Q" Relay Stage.
75 Tube—First A. F. Amplifier with "Q" Control.
41 Tube—Power Output Stage.
84 Tube—Full Wave Rectifier.

A. V. C. Both the R. F. stage and the first detector oscillator modulator stage have full automatic volume control supplied by the diode detector. In addition to this, the Receiver also has a "Q" or carrier relay circuit. The function of this circuit is to

"Q" CIRCUIT completely silence the Receiver when tuned off carrier, or when the carrier goes off the air. The correct values of the resistor network have been determined and used for satisfactory city operation where it is desirable to exclude street car noises, etc. A switch is provided on the face of the Receiver to open or close this circuit, since, when in remote sections of the territory, where the police transmitter signal might be very weak, slight additional sensitivity can be obtained with the "Q" circuit cut out. This "Q" circuit should not be confused with the convential squelch circuit. The "Q" relay circuit operates on a carrier field strength equivalent to approximately 3 microvolts in the antenna. A carrier below this strength is almost always of insufficient strength to give satisfactory reception, especially in noisy locations.

DYNAMIC SPEAKER SPECIAL AUDIO A full powered electro-dynamic speaker is used to give clarity of reproduction and better articulation. The audio and the speaker circuits are especially designed to give the best reproduction of the voice frequencies. The Receiver and speaker are capable of delivering considerably greater undistorted output than is normally required.

POWER SUPPLY The power supply is self contained and is not polarized. The Receiver can be installed in any car without reversing battery connections. Philco's full-wave Vibrator (more than three-quarters of a million in successful operation during the past three years) is used.

These models are without peer and are the most modern police Receivers obtainable. They represent the best designing, engineering and production skill in the industry.

I. F. TRANSFORMERS

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figures 1 and 2.

If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1622 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

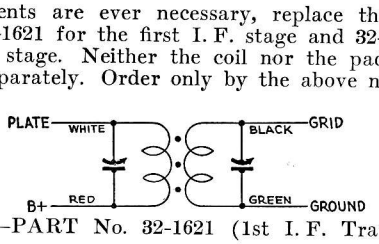

FIGURE 1—PART No. 32-1621 (1st I. F. Transformer)

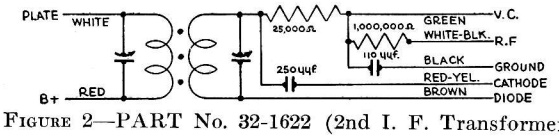

FIGURE 2—PART No. 32-1622 (2nd I. F. Transformer)

PHILCO POLICE AUTO RADIO — MODELS 810 PA, 810 PB AND 810 PV

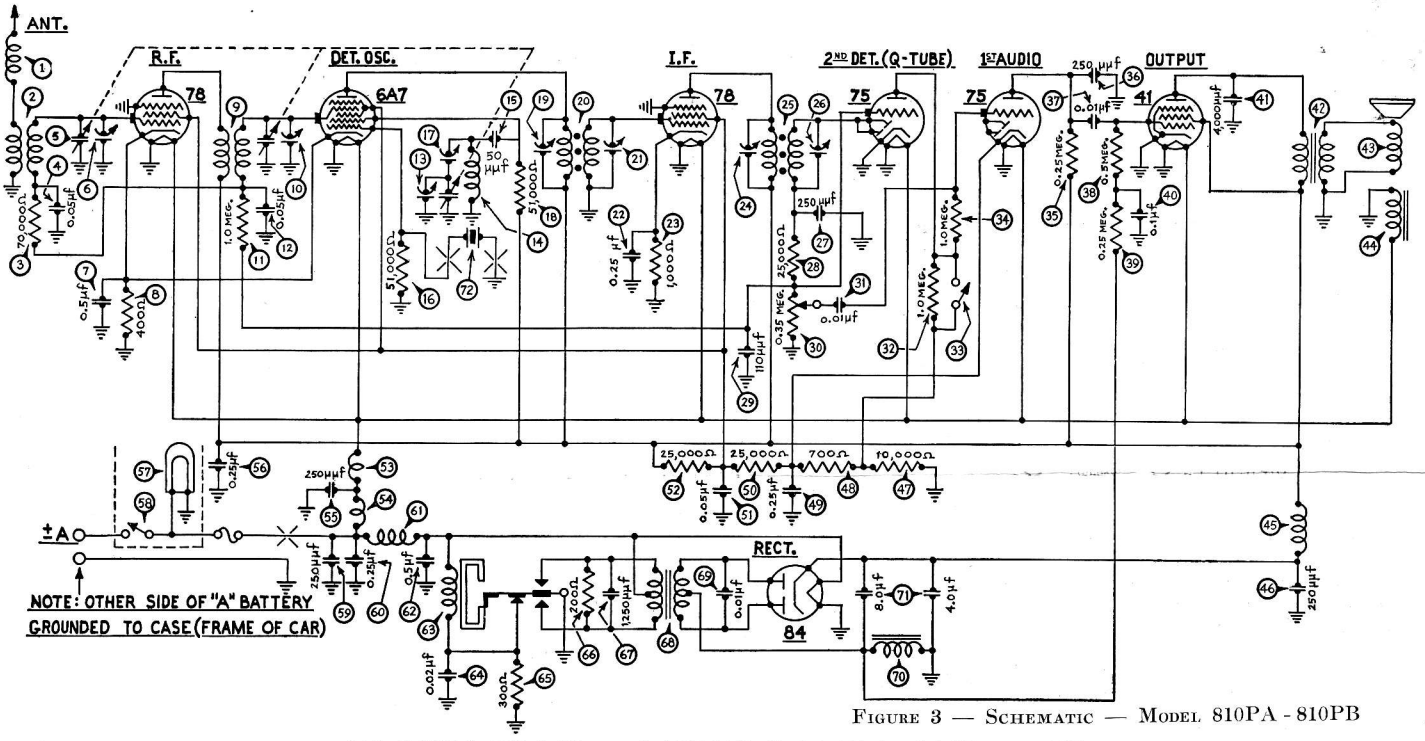

FIGURE 3 — SCHEMATIC — MODEL 810PA - 810PB

ADJUSTMENTS — MODELS 810PA AND 810PB

The fixed frequency Auto Radio Receivers are identical, except for the crystals used to obtain the various oscillator frequencies.

The Receivers, when used with the proper crystals, can be adjusted for any specified frequency between the limits of 1575 K. C. and 1750 K. C. (Model 810PA) and 2100 K. C. and 2500 K. C. (Model 810PB). Six crystals are used to obtain these frequencies. The crystal frequency, however, is no indication of the Receiver frequency adjustment.

The frequency of the crystal required for any Receiver frequency within the range of frequencies quoted above, is between 210 K. C. and 310 K. C. higher than the desired frequency. The crystal frequencies, together with the frequency coverage of the Receiver with each crystal, are:

FREQ. OF CRYSTAL	RANGE OF RECEIVER	PART No. CRYSTAL
1875 K. C.	1565-1665 K. C.	45-2101
1970 K. C.	1660-1760 K. C.	45-2102
2410 K. C.	2100-2200 K. C.	45-2103
2510 K. C.	2200-2300 K. C.	45-2104
2610 K. C.	2300-2400 K. C.	45-2105
2710 K. C.	2400-2500 K. C.	45-2106

The I. F. frequency used in each Receiver is the difference between the frequency of the crystal in the Receiver and the frequency of the transmitter, i.e.: the transmitter frequency is 2422 K. C., the crystal used is 2710 K. C., the difference is 288 K. C., which is the frequency to which the I. F. amplifier must be tuned.

The Receivers are carefully adjusted to the required frequency at the factory and ordinarily need no readjustments except when the transmitter frequency is changed. Then the Receiver must be padded while warm and repadded after the Receiver has operated for several hours.

The Receiver must be set up for operation and the volume control set at maximum. The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit. Use a quality modulated oscillator or signal generator for the test signal, with an output meter connected across the output stage. The signal from the signal generator should be attenuated so that the output signal is just sufficient to actuate the output meter. The signal should not be strong enough to operate the automatic volume control.

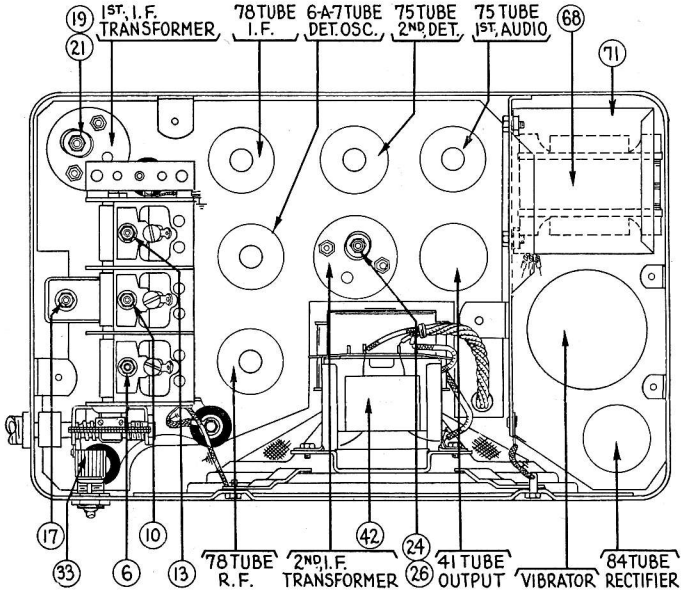

FIGURE 4 — TOP VIEW

I. F. STAGES— The padding condensers are placed in the top of the I. F. coil shield can. The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

Remove the grid lead from the 78 I. F. amplifier tube. The signal generator must be set exactly on the predetermined frequency and the output connected to the grid of the amplifier tube. Adjust the padders (24), (26) on the second I. F. transformer for maximum output. Reconnect the grid lead.

In like manner, connect the signal generator output to the grid of the 6A7 detector oscillator tube and adjust the padders (19) and (21) on the first I. F. transformer.

(Continued on Page Four)

PHILCO POLICE AUTO RADIO — MODELS 810 PA, 810 PB AND 810 PV

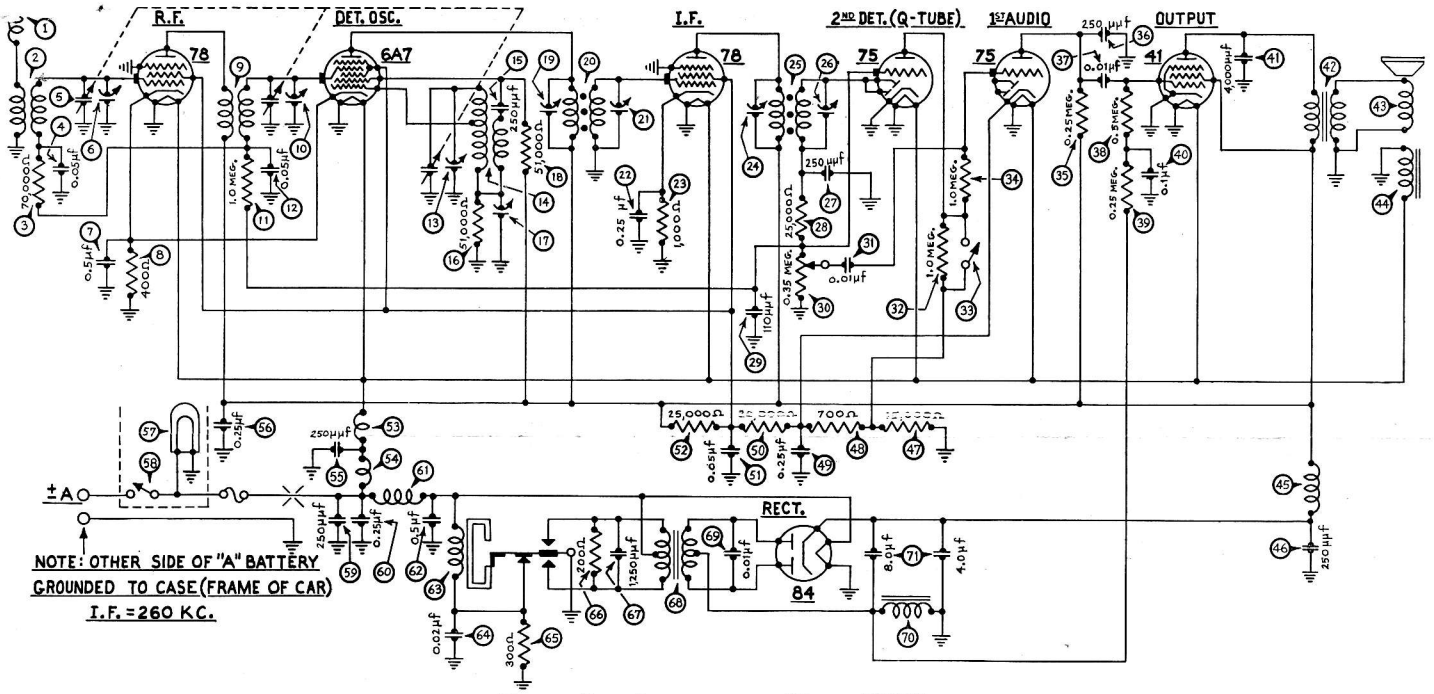

FIGURE 5 — SCHEMATIC — MODEL 810PV

PARTS LIST — MODELS 810PA, 810PB and 810PV

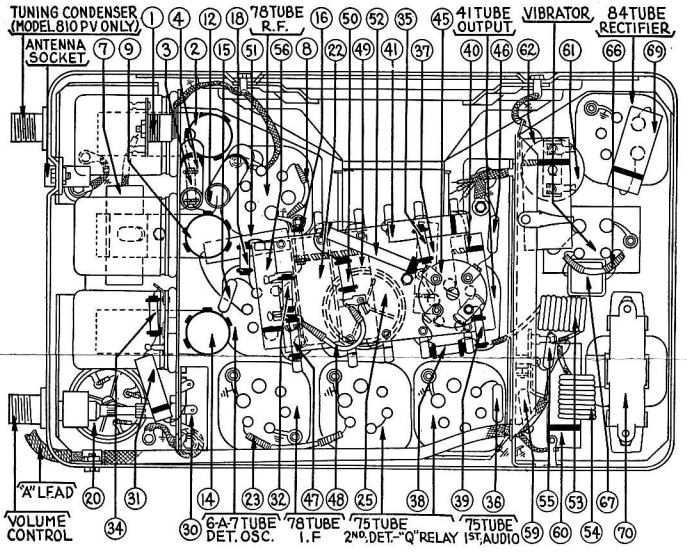

FIGURE 6 — BASE VIEW

No.	Description	Part No.
(1)	Antenna Choke	32-1673
(2)	Antenna Transformer	32-1778
(3)	Resistor (70,000 ohms)	33-1115
(4)	Condenser (.05 mfd.)	30-4020
(5)	Tuning Condenser	31-1595
(6)	First Padder (on tun. cond.)	
(7)	Condenser (.5 mfd.)	30-4227
(8)	Resistor (400 ohms)	33-3016
(9)	R. F. Transformer	32-1779
(10)	Second Padder (on tun, cond.)	
(11)	Resistor (1,000,000 ohms)	33-1096
(12)	Condenser (.05 mfd.)	30-4020
(13)	Third Padder (on tun. cond.)	
(14)	(810PA & PB) Oscillator Transformer	32-1804
(14)	(810PV) Oscillator Transformer	32-1780
(15)	(810PA & PB) Condenser (50 mmfd.)	30-1029
(15)	(810 PV) Condenser (250 Mmfd.)	30-1032
(16)	Resistor (51,000 ohms)	6098
(17)	Fourth Padder (on tun. cond.)	
(18)	Resistor (51,000 ohms)	6098
(19)	Padder (Pri. 1st I. F. Transf.)	
(20)	First I. F. Transformer	32-1621
(21)	Padder (Sec. 1st I. F. Transf.)	
(22)	Condenser (.25 mfd.)	30-4146
(23)	Resistor (1,000 ohms)	33-3017
(24)	Padder (Pri. 2nd. I. F. Transf.)	
(25)	Second I. F. Transformer	32-1622
(26)	Padder (Sec. 2nd I. F. Transf.)	
(27)	Condenser (250 mmfd.)	30-1032
(28)	Resistor (25,000 ohms)	33-1013
(29)	Condenser (110 mmfd.)	30-1031
(30)	Volume Control (350,000 ohms)	38-6605
(31)	Condenser (.01 mfd.)	30-4169
(32)	Resistor (1,000,000 ohms)	33-1096
(33)	Switch	3253
(34)	Resistor (1,000,000 ohms)	33-1096
(35)	Resistor (250,000 ohms)	33-1097
(36)	Condenser (250 mmfd.)	30-1032
(37)	Condenser (.01 mfd.)	30-4145
(38)	Resistor (500,000 ohms)	6097
(39)	Resistor (250,000 ohms)	33-1097
(40)	Condenser (.1 mfd.)	30-4122
(41)	Condenser (4000 mmfd.)	30-4185
(42)	Output Transformer	32-7019
(43)	Cone and Voice Coil	36-3406
(44)	Field Coil Assembly	36-3405
(45)	"B" Choke	32-1281
(46)	Condenser (250 mmfd.)	30-1032
(47)	Resistor (10,000 ohms)	4412
(48)	Resistor (700 ohms)	33-3019
(49)	Condenser (.25 mfd.)	30-4146
(50)	Resistor (25,000 ohms)	4516
(51)	Condenser (.05 mfd.)	30-4020
(52)	Resistor (25,000 ohms)	3656
(53)	"A" Choke	32-1348
(54)	"A" Choke	32-1644
(55)	Condenser (250 mmfd.)	30-1032
(56)	Condenser (.25 mfd.)	30-4134
(57)	Pilot Lamp	34-2040
(58)	On and Off Switch Assembly Model 810P only	42-5362
(59)	Condenser (250 mmfd.)	30-1032
(60)	Condenser (.25 mfd.)	30-4146
(61)	Vibrator Choke	32-1377
(62)	Condenser (.5 mfd.)	30-4227
(63)	Vibrator	38-5036
(64)	Condenser (.02 mfd.)	30-40[illegible]
(65)	Resistor (300 ohms)	33-3010
(66)	Resistor (200 ohms)	7217
(67)	Condenser (1250 mmfd.)	5886
(68)	Power Transformer	32-7352
(69)	Condenser (.01 mfd.)	30-4051
(70)	Filter Choke	32-7351
(71)	Filter Condenser (4—8 mfd.)	30-2109
(72)	Cystal (Model 810PA) 1875 K. C. Receiver Range 1565 K.C. to 1665 K.C.	45-2101
	1970 K.C. Receiver Range 1660 K.C. to 1760 K.C.	45-2102
(72)	Crystal (Model 810PB) 2410 K. C. Receiver Range 2100 K.C. to 2200 K.C.	45-2103
	2510 K.C. Receiver Range 2200 K.C. to 2300 K.C.	45-2104
	2610 K.C Receiver Range 2300 K.C. to 2400 K.C.	45-2105
	2710 K. C. Receiver Range 2400 K.C. to 2500 K.C.	45-2106
	Receiver Mtg. Bracket	29-1791
	Receiver Mtg. Plate	29-1792
	Mtg. Bolt	W1316A
	Nut	W55A
	Control Mtg. Strap	04344
	Control Mtg. Bracket	6035
	Key	6091
	Dial (Model 810PV only)	27-5126
	Knobs	27-4058
	Screens (Cover Mtg.)	W274B
	Fuse	7227
	Fuse Insulators	27-7729

ADJUSTMENTS — MODELS 810PA AND 810PB

(Continued from Page Two)

Check the adjustments of the second I. F. transformer and the first I. F. transformer.

R. F. — Tune the signal generator to the frequency of the transmitter and connect the output of the generator to the Receiver antenna lead, through a 200 mmfd. dummy antenna.

The variable condenser is locked in place with two set screws. Adjust these and tune the variable condenser to the input frequency. If the crystal oscillator circuit does not function at first, loosen the padder ⑬ on the oscillator section of the tuning condenser and also the series padder ⑰. If the oscillator output is low, it can be increased by adjusting the padder ⑬ for the higher frequencies and the padder ⑰ for the lower frequencies.

Adjust the R. F. and detector padders ⑥ and ⑩ for maximum output. If after adjusting, they are loose, back out the tuning condenser slightly — or if they are too tight, turn the condenser in slightly. Then readjust the padders.

On the Model 810PA (lower frequency band) adjust the series padder ⑰ for maximum output reading and on the Model 810PB (higher frequency band) adjust the high frequency padder ⑬. The adjustment will not give a sharp peak, but it is possible to adjust for the maximum output. After this is obtained, back off the adjusting nut a half turn.

After completing these adjustments, recheck all the padders. This time, using a carefully calibrated signal generator, or better still, test tone from the police transmitter, connected to the Receiver antenna lead through a 200 mmfd. dummy antenna, Recheck the padders ⑥, ⑩, ⑬ and ⑰ on the gang condenser. Using the same signal, adjust the second I. F. and first I. F. padders for maximum output.

DO NOT OPEN THE CRYSTAL HOLDER. If, for any reason whatever it has been opened, the crystal and plates should be very carefully cleaned with carbon tetrachloride. After cleaning, the crystal must not be touched by the fingers. Use a clean cloth for handling.

ADJUSTMENTS — MODEL 810PV

The Model 810PV is a variable Auto Radio Receiver with a frequency range of 1560 K. C. to 2600 K. C. The scale is calibrated only between 1575 K. C. and 1750 K. C., and between 2100 K.C. and 2500 K. C., since these are the conventional emergency police bands. The Model 810PV has an intermediate frequency of 260 K. C. and does not employ crystal control.

The Receiver must be set up for operation and the volume control set at maximum. The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit. Use a quality modulated oscillator or signal generator for the test signal, with an output meter connected across the output stage. The signal from the signal generator should be attenuated so that the output signal is just sufficient to actuate the output meter. The signal should not be strong enough to operate the automatic volume control.

I. F. — The padding condensers are placed in the top of the I. F. coil shield can. The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

Remove the grid lead from the 78 I.F. amplifier tube. Connect a 260 K. C. signal to the grid of the amplifier tube and adjust the padders ㉔ and ㉖ on the second I. F. transformer for maximum output. Reconnect the grid lead.

In a like manner, connect the 260 K. C. signal to the grid of the 6A7 detector oscillator tube and adjust the padders on the first I. F. transformer.

R. F. — Connect a 2600 K. C. signal to the grid of the 78 R. F. amplifier tube. Set the tuning condenser at minimum capacity, using a strip of bond paper as a guage under the heel of the rotor plates.

Adjust the first detector and oscillator padders ⑩ and ⑬ for maximum output.

Reset the signal generator for a 1600 K. C. signal. Tune in the signal and roll the variable condenser while adjusting the oscillator series padders ⑰.

Recheck the oscillator padder adjustment at 2600 K. C. Connect the signal generator to the Receiver antenna lead, using a 200 mmfd. condenser dummy antenna and adjust the antenna padder ⑥ at 2600 K. C.

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