'diamond-dot'

CAR RADIO DIVISION, ELECTRONIC INDUSTRIES LTD.

ASTOR HOUSE: 161-173 STURT STREET, SOUTH MELBOURNE Phone: 69 0300

SERVICE DATA

MODEL PN - C7L

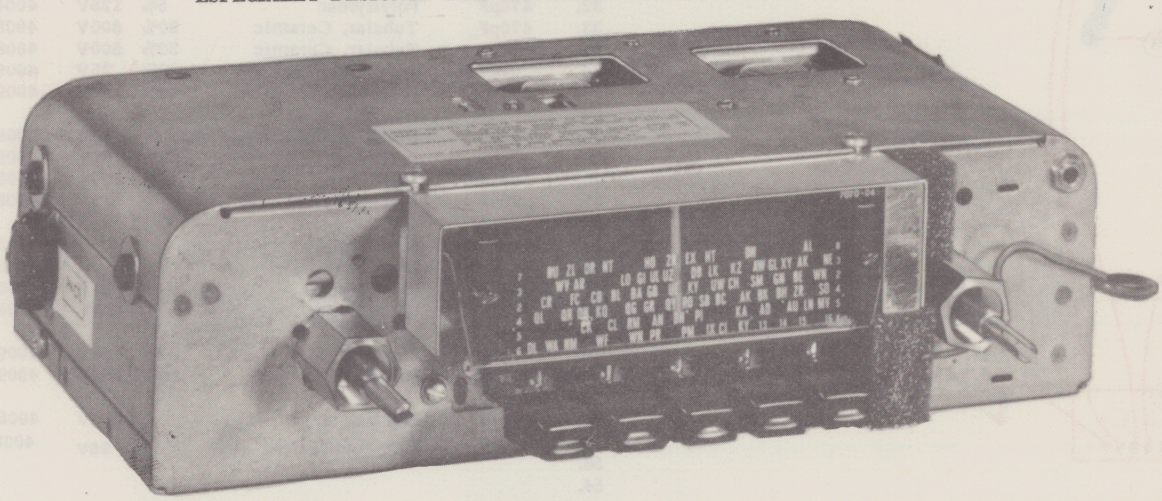
8 TRANSISTOR SUPERHETERODYNE

12 VOLT CAR RADIO

(Battery negative terminal connected to chassis)

Push Button and Manual Tuning

ESPECIALLY DESIGNED FOR 1965 DODGE PHOENIX "AP2"



TUNING RANGE - 525 - 1615 Kilocycles
POWER OUTPUT - 8 Watts
OUTPUT IMPEDANCE - 15 Ohms
CURRENT CONSUMPTION - No Input - 390mA (does not include dial lamp)

SETTING THE PUSH BUTTONS

1. Unlock push buttons by pulling outward.
2. Tune a desired station with the manual tuning knob.
3. Press one of the push buttons fully in.
4. Repeat above procedure to set remaining four buttons.

INTERFERENCE REDUCTION SWITCH

Interference and static which originate in power lines, trams, welders, electrical storms, etc., may be reduced through the use of the Interference Reduction Switch.
To reduce interference, make certain the radio is tuned accurately to the station, then turn the rear knob on the left of the dial anti-clockwise.
This switch should be returned to the clockwise position to obtain best sound quality under good reception conditions.
It should be noted that the switch over-rides the action of the tone control which is inoperative whilst the Interference Reduction Switch is in the anti-clockwise position.

ALIGNMENT PROCEDURE

EQUIPMENT

Signal Generator - modulated 400 cps
Output Meter - 15 Ohms Impedance
Generator Series Capacitor - .1uF. Part No. 4006-005-03. for IF alignment
IF Attenuator - Part No. 4121-014-01
Dummy Aerial - 65pF Part No. 4121-009-01
Alignment Tools

(a) Chisel Point Type: Part No. 4121-005-01 for trimmer capacitor adjustment

(b) Flat Metal Blade Type: Part No. 4121-001-01 for I. F. T. and Osc. shunt coil adjustment.

(c) Tuning Unit Iron Core Adjustor: Part No. 4121-008-01

(d) Alignment Gauge: Part No. 4121-022-02 for tuner 1000 Kc/s position.

Collector Current Meter Connection - Jack plug Part No. 7171-015-02

CONDITIONS

Remove screws and slide can off receiver.
Volume Control - maximum (fully clockwise)
Tone Control - maximum treble (fully clockwise)
Anti-ference Control - "Off" position, clockwise.
Output Level - 50 milliwatts, output meter reading with speaker voice coil disconnected.
Output Meter Connection - Socket adjacent to receiver battery lead entry. Use plug Part No. 7171-015-02 or use original plug and leads from speaker.

Supply Voltage and Connection - 13 OV DC. Connect negative supply lead to chassis and positive lead to fuse holder lead.

INTERMEDIATE FREQUENCY TRANSFORMER ALIGNMENT

Turn tuning control until perm. tuner iron cores are out of the coil formers. Insert . 1uF.capacitor in series with generator "hot" lead.

Oper. No.	Generator Connection	Generator Frequency	Instructions
1.	To test pin "B" (term 3 of 2nd I. F. T.)	455 Kc/s	Adjust iron core of 4th IF. trans. for max. output
2.	as Oper. 1.	455 Kc/s	Adjust iron core of 3rd IF. trans. for max. output
3.	Repeat operations 1 & 2		
4.	To Terminal 8. on tuner (mixer/osc. collector)	455 Kc/s	Adjust iron core of 2nd IF. trans. for max output
5.	To test pin "A" (RF. amp. collector)	455 Kc/s	Adjust iron core of 1st IF trans. for max. output

BROADCAST ALIGNMENT

If the receiver logging is satisfactory the signal circuits may be aligned as detailed.

1. Connect IF. attenuator to test pins "B" and "C" (resistor to pin "C")

2. Aerial Lead-in Socket - 65 pF. dummy in series — 1000 Kc/s — Tune receiver to generator frequency. Adjust RF. and both aerial trimmer capacitors for max. output.

IMPORTANT AERIAL TRIMMER ADJUSTMENT

When the receiver has been installed in the vehicle and the aerial connected the aerial trimmer must be readjusted. Raise aerial to half extended height. Adjust knob on passenger side of receiver for maximum output on a weak station near 1000 Kc/s (approx. centre of dial).

ALIGNMENT PROCEDURE

EQUIPMENT

Signal Generator - modulated 400 cps
Output Meter - 15 Ohms Impedance
Generator Series Capacitor - .1uF. Part No. 4006-005-03. for IF alignment
IF Attenuator - Part No. 4121-014-01
Dummy Aerial - 65pF Part No. 4121-009-01
Alignment Tools

(a) Chisel Point Type: Part No. 4121-005-01 for trimmer capacitor adjustment

(b) Flat Metal Blade Type: Part No. 4121-001-01 for I. F. T. and Osc. shunt coil adjustment.

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3.	Repeat operations 1 & 2		
4.	To Terminal 8. on tuner (mixer/osc. collector)	455 Kc/s	Adjust iron core of 2nd IF. trans. for max output
5.	To test pin "A" (RF. amp. collector)	455 Kc/s	Adjust iron core of 1st IF trans. for max. output

BROADCAST ALIGNMENT

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1. Connect IF. attenuator to test pins "B" and "C" (resistor to pin "C")

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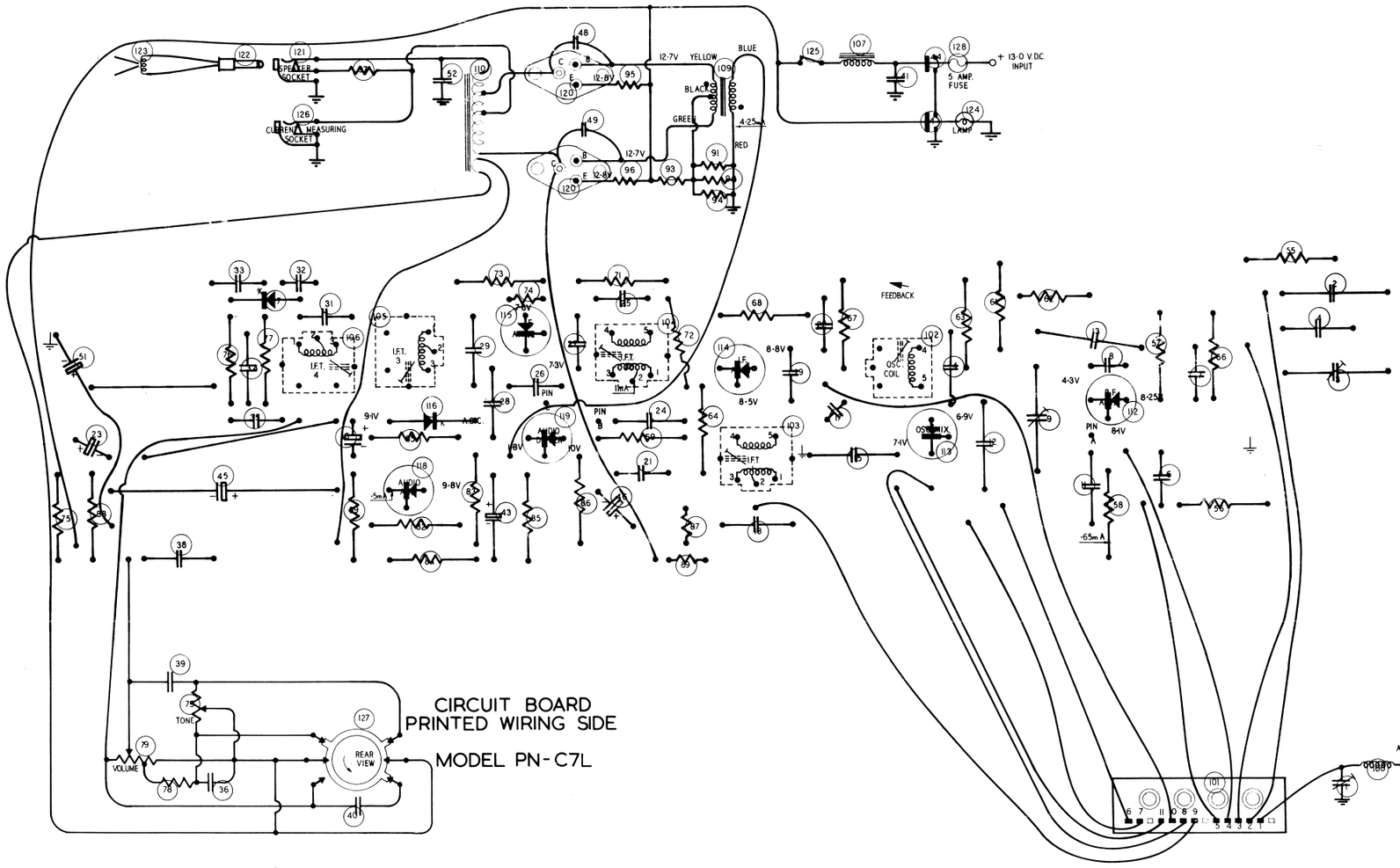


PB1391 A

FAULT LOCATION GUIDE - GENERATOR TEST

Connect generator through a 0.1 mF capacitor to the following points:- NOTE Always start with a low generator output. Strong signals may overload the receiver or cause the AGC to function.

No.	VOLUME CONTROL	CHECK POINT	SIG. GEN. FREQ.	SIGNAL STRENGTH
1.	Set at minimum	Each output transistor base	Audio	Adjust generator to provide a low signal
2.	" " "	Audio driver transistor base	"	Increase in level of check No. 1.
3.	" " "	Audio amp. transistor base	"	Increase in level of check No. 2.
4.	Set at maximum	Top of volume control	"	Same level as check No. 3.
5.	" " "	Detector input	455 Kc/s	Adjust generator to provide a low signal
6.	" " "	2nd IF transistor base	"	Increase in level of check No. 5.
7.	" " "	1st IF transistor base	"	Increase in level of check No. 6.
8.	" " "	Osc/mix transistor base	"	Increase in level of check No. 7.
9.	" " "	Osc/mix transistor base	Sig. Freq.	Adjust generator to provide a low signal
10.	" " "	RF transistor base	" "	Increase in level of check No. 9.
11.	" " "	Dummy aerial	" "	Small decrease in level of check No. 10.

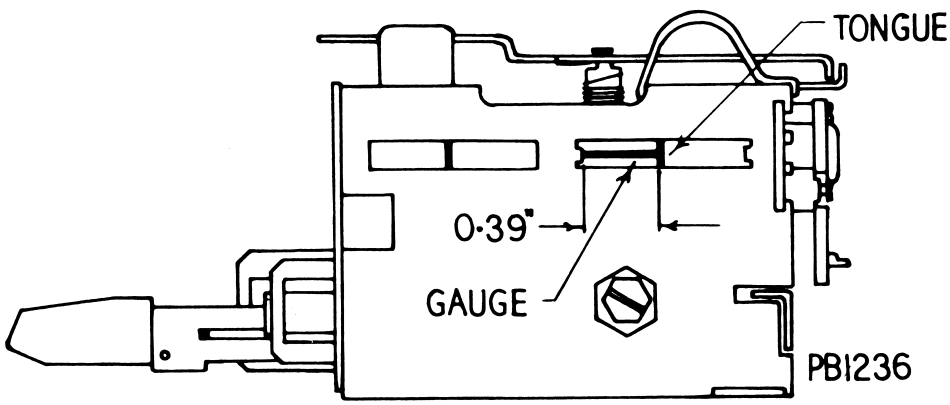
Circuit No.	Value	Capacitors Description	To. ±	Rating DCW	Part Number
1.	6-75pF	Trimmer, Compression			4000-017-02
2.	.0047uF	Polystyrene	5%	200V	4004-019-01
3.	5-55pF	Trimmer, Compression			4000-001-03
4.	82pF	Polystyrene	10%	125V	4004-020-01
5.					
6.	.22uF	Disc, Ceramic		25V	4008-053-01
7.	.047uF	Disc, Ceramic		25V	4008-057-03
8.	39pF	Disc, Ceramic N750	10%	500V	4008-025-01
9.	5-55pF	Trimmer, Compression			4000-001-03
10.					
11.	680pF	Polystyrene	10%	125V	4004-016-02
12.	120pF	Polystyrene	10%	125V	4004-010-01
13.	.0022uF	Polystyrene	10%	200V	4004-015-03
14.	56pF	Tubular, Ceramic, N470	10%	500V	4008-030-05
15.	.0027uF	Polystyrene	10%	200V	4004-003-03
16.	10uF	Electolytic		12V	4005-007-14
17.	3-30pF	Trimmer-Wire wound			4000-025-01
18.	220pF	Polystyrene	5%	125V	4004-005-03
19.	.047uF	Disc, Ceramic		25V	4008-057-03
20.					
21.	3.3pF	Disc, Ceramic, N.P.O.	.25pF	500V	4008-014-01
22.	.1uF	Disc, Ceramic		25V	4008-004-04
23.	100uF	Electrolytic		12V	4005-002-31
24.	220pF	Polystyrene	5%	125V	4004-005-03
25.	.047uF	Disc, Ceramic		25V	4008-057-03
26.	3.3pF	Disc, Ceramic, N.P.O.	.25pF	500V	4008-014-01
27.	.047uF	Disc, Ceramic		25V	4008-057-03
28.	150pF	Polystyrene	10%	125V	4004-017-01
29.	470pF	Polystyrene	5%	125V	4004-002-04
30.					
31.	33pF	Disc, Ceramic, N750	5%	500V	4008-007-08
32.	470pF	Polystyrene	5%	125V	4004-002-04
33.	470pF	Tubular, Ceramic	20%	500V	4008-052-05
34.	470pF	Tubular, Ceramic	20%	500V	4008-052-05
35.	.01uF	Disc, Ceramic	20%	25V	4008-039-07
36.	.068uF	Polyester	10%	160V	4009-013-01
37.					
38.	.22uF	Disc, Ceramic		25V	4008-053-01
39.	.01uF	Polyester	10%	160V	4009-014-01
40.	.0068uF	Polyester	10%	400V	4009-004-03
41.	.22uF	Disc, Ceramic		25V	4008-053-01
42.					
43.	30uF	Electrolytic		6V	4005-031-01
44.	3x.001uF	Feed Thru.			4008-040-05
45.	100uF	Electrolytic		18V	4005-002-27
46.	320uF	Electrolytic		2.5V	4005-028-01
47.					
48.	.015uF	Polyester	10%	160V	4009-018-02
49.	.015uF	Polyester	10%	160V	4009-018-02
50.					
51.	500uF	Electrolytic		16V	4005-014-13
52.	.01uF	Disc, Ceramic N.P.O.		25V	4008-039-10
53.					
54.					

Circuit No.	Value Ohms	Resistors Description	Tol ±	Rating	Part Number
55.	1K	Carbon	10%	½	4022-008-01
56.	120K	Carbon	10%	½	4022-031-01
57.	560	Carbon	10%	½	4022-010-01
58.	6.8K	Carbon	10%	½	4022-002-02
59.	560	Carbon	10%	½	4022-010-01
60.					
61.	5.6K	Carbon	10%	½	4022-022-02
62.	18K	Carbon	10%	½	4022-018-02
63.	2.7K	Carbon	10%	½	4022-043-01
64.	180K	Carbon	10%	½	4022-014-03
65.	5.6K	Carbon	10%	½	4022-022-02
66.	1.5K	Carbon	10%	½	4022-007-01
67.	150K	Carbon	10%	½	4022-038-01
68.	330	Carbon	10%	½	4022-011-01
69.	120K	Carbon	10%	½	4022-031-01
70.					
71.	3.9K	Carbon	10%	½	4022-020-01
72.	15K	Carbon	10%	½	4022-001-02
73.	1K	Carbon	10%	½	4022-008-01
74.	27	Carbon	10%	½	4022-068-01
75.	820	Carbon	10%	½	4022-009-01
76.	8.2K	Carbon	10%	½	4022-027-02
77.	68K	Carbon	10%	½	4022-048-01
78.	8.2K	Carbon	10%	½	4022-027-02
79.	Volume and tone control concentric shaft potentiometers Front Section 250K ohms. Rear Section 250K ohms tapped 100K ohms with SP. ST. Switch attached.				4030-026-12

BROADCAST ALIGNMENT

When iron cores or tuning unit coil assy. have been replaced or if station logging is outside limits.

Oper. No.	Generator Connection	Generator Frequency	Instructions
1.	Connect IF. attenuator to test pins "B" and "C" (resistor to pin "C").		
2.	Turn perm. tuner against high frequency end of travel stop. Set all iron cores so that not less than 1/8" of shaft protrudes out through front panel of receiver.		
3.	To aerial Lead-in Socket. 65pF. dummy aerial series	1625 Kc/s	Adjust Osc. RF and both Aerial trimmer capacitors for max. output.
4.	In the side of tuning unit, opposite end to tuning spindle there are two slots; place a gauge in the form of a flat piece of metal 0·39" wide into slot nearest rear of tuner. The 0·39" gauge is to be against projection at front edge of slot. Refer diagram. NOTE. Do not strain or tilt core carriage. Gently turn tuning spindle until the metal tongue touches the gauge.		
	As oper. 3.	1000 Kc/s	With tuner set in position detailed, adjust Osc., RF. and both Aerial iron cores for maximum output.
5.	As oper. 3.	600 Kc/s	Rock tuning control through signal, adjust Osc. shunt coil iron core for max. output.
6.	Turn tuning control to low freq. end of travel (iron cores full in). Tune signal generator to receiver. The low freq. tuning limit should be between 510 and 528 Kc/s.		
7.	Repeat operation 4.		
8.	Align dial pointer.		



SETTING OF DIAL POINTER

Disconnect the IF attenuator.
Disconnect the generator cable from dummy aerial then connect 20 ft., of aerial wire to the dummy aerial terminal.
Accurately tune the receiver to a station marked on the dial near 1000 Kc/s. Using a screwdriver, adjust by bending the pointer carriage arm so that pointer coincides with the centre of the tuned station call sign.

Check dial logging and if necessary readjust pointer carriage arm.

PN - C7L

OPERATION OF OUTPUT TRANSISTORS AS MATCHED PAIRS

The type AT1138 transistors are operated in matched pairs, replacements MUST be made accordingly. and NOT as single units.

Matched pairs as used in this receiver are identified by a colour dot or stripe on top of transistor body. Various batch colours are in use. Transistors which have different coloured dots must not be operated together.

REPLACEMENT OF OUTPUT TRANSISTORS

When refitting or replacing transistors check that the mount positions and mount faces are clean and free from dust, grit or metal particles.

Smear a thin film of silicone compound Part No. 1036-001-04 on both sides of the mica and lead washers, also mount face of transistor and chassis.

Fit the insulating ferrules to the screw holes in chassis then fit mica washer lead washer and transistor. Fasten each transistor securely with two $\frac{1}{2}$" x No. 6 screws.

MEASUREMENT AND ADJUSTMENT OF COLLECTOR CURRENT

EQUIPMENT — Current Meter: 0-1 Amp. DC Leads terminated with Jack Plug, Part No: 7171-015-02; positive terminal lead to tip contact.
Supply Source: 13V DC

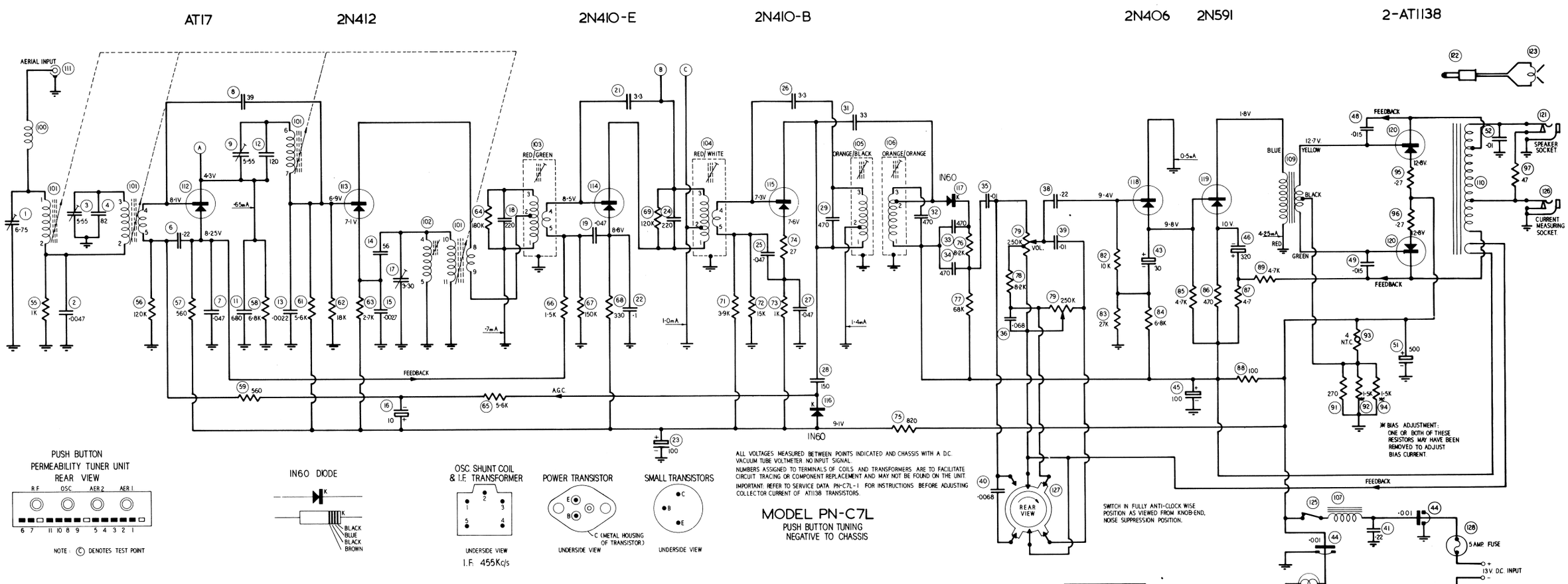
CONDITIONS — Connect receiver to 13V DC. NEGATIVE lead to chassis and POSITIVE lead to fuse block lead. Set Volume control at minimum.
No signal applied to aerial input.
Disconnect speaker from receiver socket.
Connect meter to receiver socket located on the rear and covered protector insert.

1. Switch receiver "ON" and allow to stabilize for at least five minutes.
2. If the collector current indicated on meter, are outside of the limits of 160-290 mA., adjust the bias by adding or removing the 1.5K ohm resistors (circuit numbers 92 & 94) to or from the circuit until the current reading lies within the 160-290 mA range.

NOTE. 1. It is essential that the supply voltage is maintained at 13.0V when measuring current.

NOTE. 2. After a long period of operation it will be noted the collector current will decrease slightly. This is normal and is caused by the warming of the negative temperature co-efficient components.

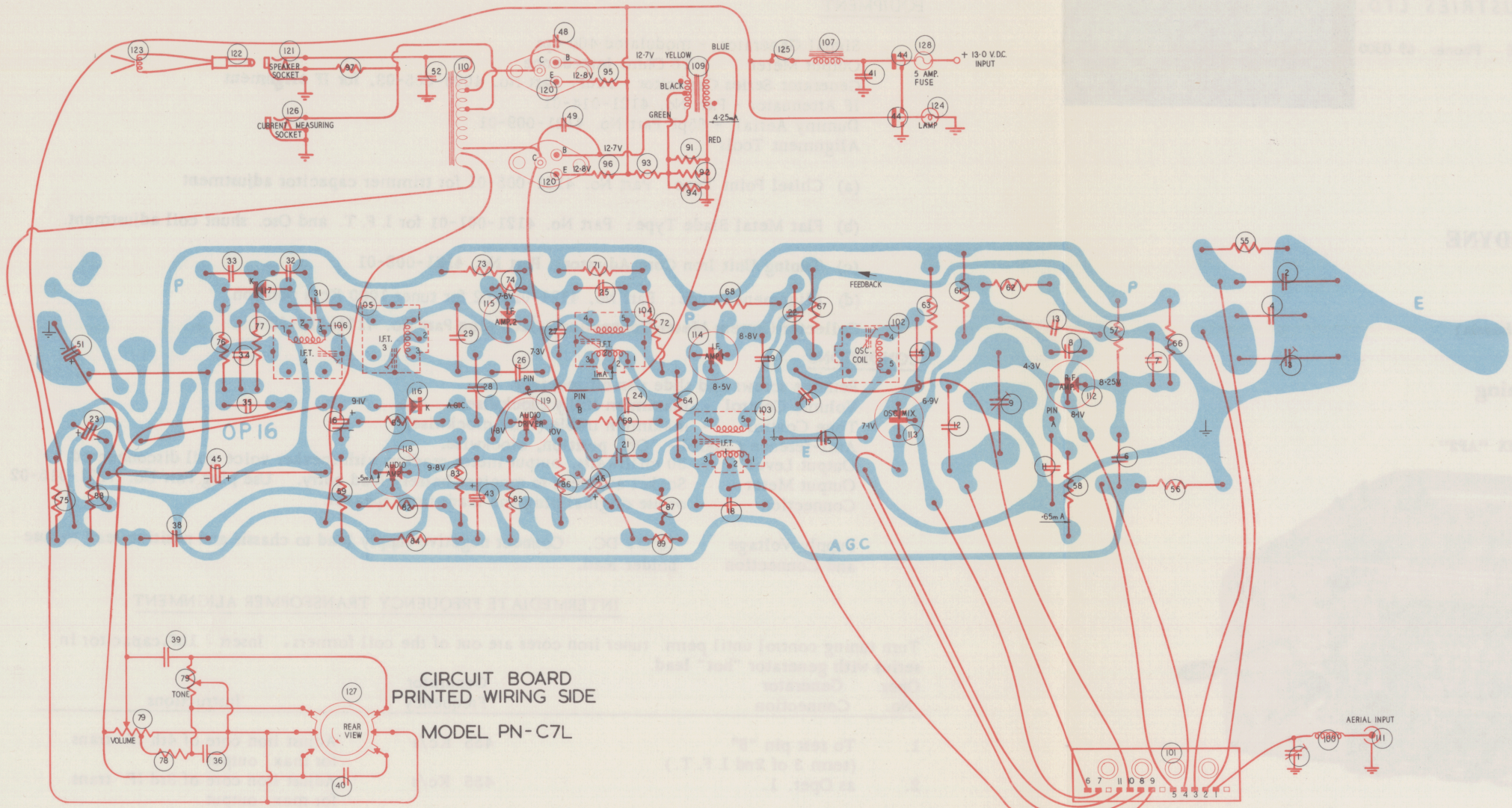
NOTE. 3. No further adjustment of the bias should be necessary unless output transistors or associated componentry are replaced.



Circuit No.					Part Number
80.					
81.					
82.	10K	Carbon	10%	½	4022-004-01
83.	27K	Carbon	5%	½	4022-073-05
84.	6.8K	Carbon	5%	½	4022-002-07
85.	4.7K	Carbon	10%	½	4022-005-01
86.	470	Carbon	5%	½	4022-016-06
87.	4.7	Wire Wound	10%	½	4024-012-03
88.	100	Carbon	10%	½	4022-062-01
89.	4.7K	Carbon	10%	½	4022-005-01
90.					
91.	270	Wire Wound	5%	5	4024-048-01
92.	1.5K	Carbon	10%	½	4022-007-01
93.	4	Disc Thermistor, NTC	10%	1.5	4021-001-03
94.	1.5K	Carbon	10%	½	4022-007-01
95.	.27	Wire Wound	10%	½	4024-007-02
96.	.27	Wire Wound	10%	½	4024-007-02
97.	47	Carbon	10%	1	4022-041-03
98.					
99.					

Circuit No.	Miscellaneous	Part Number
100.	Spark Filter Choke 6.8 uH	4048-032-01
101.	Push-button permeability tuner unit complete	4050-039-10
	Consists of:	
	Iron Sleeve (3)	4065-037-01
	Iron Sleeve (1) - Oscillator	4065-038-01
	Iron Core (4)	4065-039-01
	Coil Assy.	4036-053-01
	Includes	
	Aerial coil	4036-057-01
	Aerial transformer	4043-033-01
	R.F. coil	4036-057-01
	Oscillator transformer	4043-033-01
102.	Oscillator shunt coil	4036-044-02
103.	No. 1 IF transformer, 455 Kc/s (Red Green)	4044-009-04
104.	No. 2 IF transformer, 455 Kc/s (Red White)	4044-009-08
105.	No. 3 IF transformer, 455 Kc/s (Orange Black)	4044-022-01
106.	No. 4 IF transformer, 455 Kc/s (Orange Orange)	4044-022-02
107.	Filter choke, iron cored	4048-025-01
108.		
109.	Driver transformer, 3,900 to 108+108 ohms imped.	4042-042-01
110.	Speaker transformer, 7.75+7.75:15 ohms imped.	4042-046-01
111.	Aerial input socket	7222-037-01
112.	R.F. Amplifier transistor type AT17	4128-034-01
113.	Converter transistor type 2N412	4128-011-02
114.	First IF amp. transistor type 2N410-E (Green spot)	4128-010-03
115.	Second IF amp. transistor type 2N410-B (Red spot)	4128-010-04
116.	AGC Control diode type 1N60	4127-032-01
117.	Detector diode type 1N60	4127-032-01
118.	Audio Amp. transistor type 2N406	4128-009-02
119.	Audio Driver transistor type 2N591	4128-017-02
120.	Push-pull output transistors type 2-AT1138 (matched pair) refer back page	4128-004-02
121.	Socket - speaker	7222-033-01
122.	Plug - speaker lead	7171-015-02
123.	Speaker - 8" x 4" oval permag type C84L00/127/15	4056-015-02
124.	Dial Lamp (1) 12-16 Volt 7mm bulb BA7S Base Stanley A1271	4068-003-06
125.	Switch, part of circuit No. 79	
126.	Socket - Collector current adjustment	7222-033-01
127.	Switch, part of circuit No. 101	4059-111-04
128.	Fuse (1) 5 Amp	4071-001-02

Part No.	Mechanical
7222-036-01	Socket (2) audio output transistors
7111-012-01	Heat sink (2) audio output transistors
7102-027-01	Lead washer (2) audio output transistors
7120-049-01	Mica washer (2) audio output transistors
7031-050-01	Insulator (4) audio output transistors
7201-577-07	Screw (4) ½" x No. 6 Phillips Hd. - Audio output transistors
7222-065-01	Socket (1) dial lamp
7086-079-01	Eyelet (1) dial lamp socket
7120-087-01	Bush (1) dial lamp socket
7261-246-02	Washer (1) bakelite-collector current socket
7263-002-02	Washer (1) moulded-collector current socket
7262-016-02	Washer (2) ¼" Int. S/P. - Speaker socket
7231-101-01	Terminal strip (1) 2 lug type 1E
7231-232-51	Terminal strip (1) 8 lug type 2E2E2
7201-576-11	Screw (4) 3/8" x No. 4 Phillips Hd. - Transformer mount
7152-751-01	Speednut (4) No. 4 - Transformer mount
7201-577-12	Screw (14) ¼" x No. 6 Phillips Hd. - Various
7167-058-01	Pin (21) printed circuit board
7120-072-01	Mica insulator (1) thermistor
7120-026-01	Glass bead (16) transistor and diode mount spacer
7198-961-11	Screw (4) ¼" x 1/8" Whit. Ch. Hd. - Perm tuner to can
7262-024-02	Washer (1) shakeproof, 3/8" int.
7065-151-01	Cover (1) top
7065-027-01	Cover (1) bottom of can
7031-129-04	Hexagonal Spacer Nut (2) 7/8" long, control bushes
7113-035-01	Plastic Holder (1) battery lead entry
7059-001-01	Terminal (1) on end of battery lead
7220-002-01	Shroud (1) terminal
7173-056-52	Dial Pointer (1)
7169-498-02	Dust Shield (1) top front of receiver
7005-055-11	Dial Background Assy (1)
7204-075-18	Screw (4) 5/16" x No. 2 bdr. hd., background and dial mount
7070-045-71	Dial Reading
7124-285-02	Knob (1) aerial trimmer
7124-377-01	Knob (2) antiference and tone, rear
7124-224-02	Knob (2) tuning and volume, front
7309-002-02	Barrel Screw (2)
7261-531-02	Washer (2) barrel screw
4059-111-04	Suppression Switch (1) includes tuning spindle
7028-526-01	Bracket (1) suppression switch mount
7225-085-01	Tension Spring (1) pinion spindle



CIRCUIT BOARD PRINTED WIRING SIDE

MODEL PN-C7L

PB1391 A