AIR CHIEF

CAR RADIO DIVISION, ELECTRONIC INDUSTRIES LTD.

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

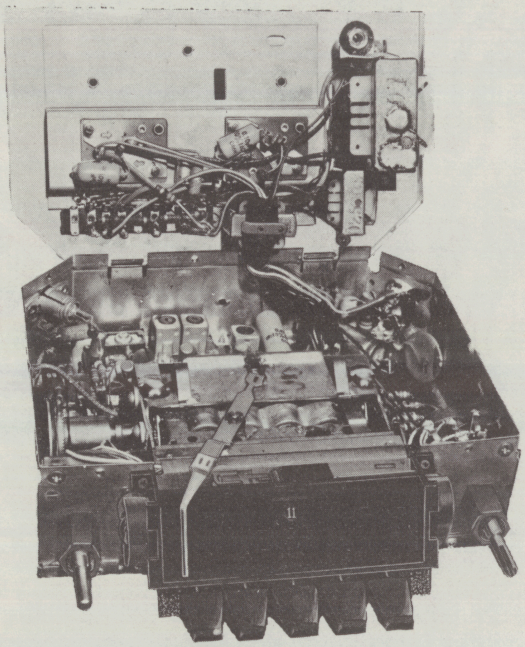
SERVICE DATA

MODEL PN-C12N and MN-C12N

PUSH BUTTON AND MANUALLY TUNED
11 TRANSISTOR 12 VOLT CAR RADIO RECEIVERS

Especially designed for Holden Models "HD" and "HR"

WARNING: BATTERY CONNECTION OF INCORRECT POLARITY WILL DAMAGE THE RECEIVER. BATTERY LEAD OF THESE RECEIVERS MUST BE CONNECTED TO THE POSITIVE TERMINAL OF SUPPLY. CONNECT NEGATIVE SUPPLY LEAD TO RECEIVER CHASSIS.



SETTING THE PUSH BUTTONS

1 Unlock the push buttons by pulling outward.

2 Tune a desired station with the manual tuning knob.

3 Press one of the push buttons fully in.

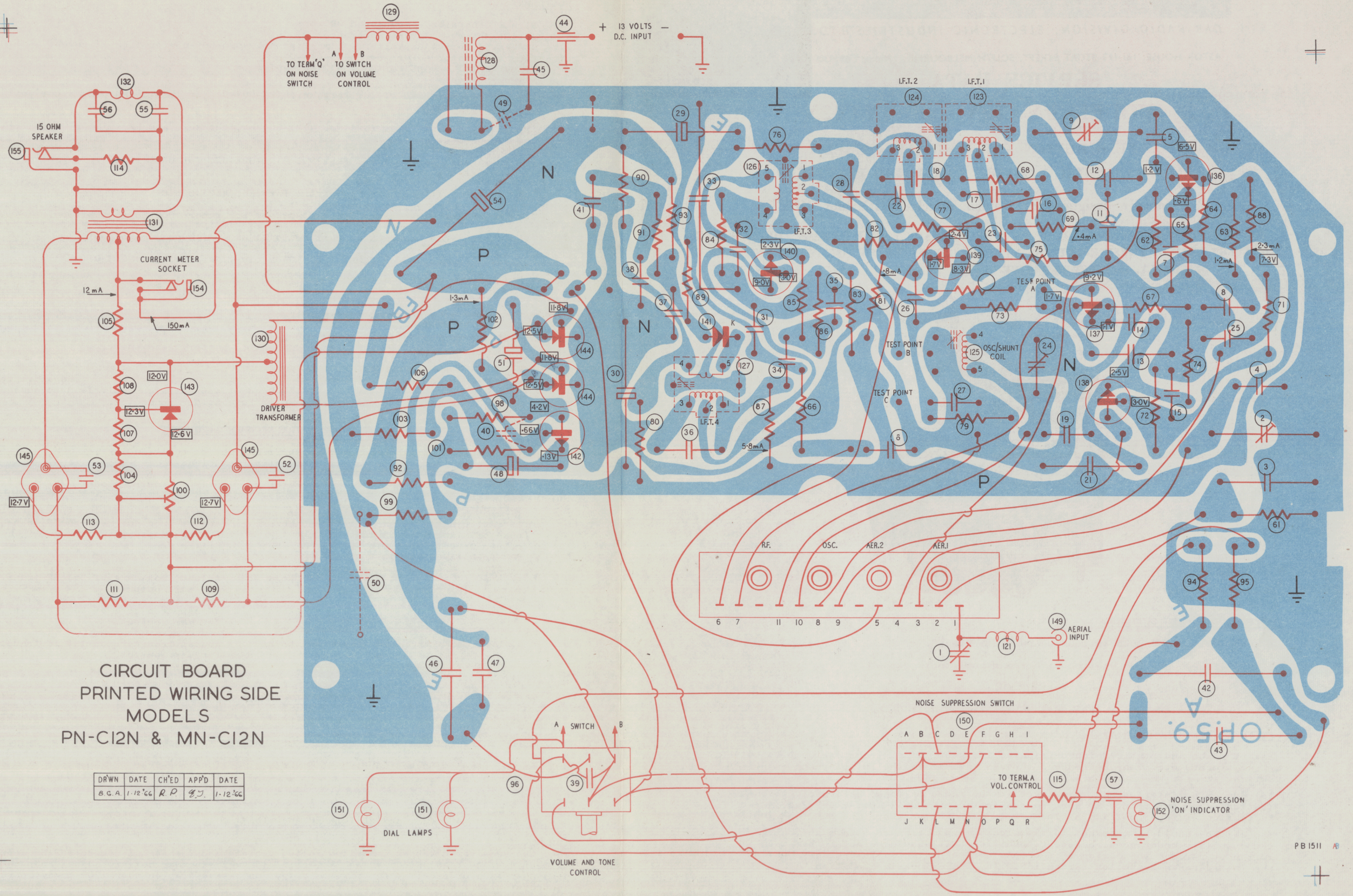
4 Repeat the above procedure to set remaining four buttons.

INTERFERENCE REDUCTION SWITCH

Interference and static which originates in power lines, trams, welders, electrical storms, etc., may be reduced through the use of the Interference Reduction Switch.

To reduce the interference, make certain the radio is tuned accurately to the station, then turn the rear knob on the left of the dial anti-clockwise. As an indication of this position a blue bar is illuminated above the set "ON" indicator.

The switch should be returned to the clockwise position to obtain the best sound quality under good reception conditions. It should be noted that the switch over-rides the action of the tone control which is in-operative whilst the Interference Reduction Switch is in the anti-clockwise position.



CIRCUIT BOARD PRINTED WIRING SIDE MODELS PN-C12N & MN-C12N

DR'WN	DATE	CH'ED	APP'D	DATE
B.G.A.	1·12·66	R.P.	G.J.	1·12·66

CIR-CUIT NO.	VALUE	CAPACITORS DESCRIPTION	TOL ±	RATING V.DCW	PART NUMBER.
1	12-120pF	Trimmer - compression			4000-026-02
2	5-55pF	Trimmer - compression			4000-001-03
3	.0047uF	Polystyrene	5%	50	4004-019-06
4	82pF	Polystyrene	10%	100	4004-020-01
5	4.7pF	Disc Ceramic - NPO	.5pF	500	4008-042-02
6	.047uF	Disc Ceramic		25	4008-057-04
7	.47uF	Disc Ceramic		3	4008-059-02
8	.047uF	Disc Ceramic		25	4008-057-04
9	5-55pF	Trimmer - compression			4000-001-03
10					
11	680pF	Polystyrene	10%	100	4004-016-02
12	100pF	Polystyrene	10%	100	4004-008-06
13	.001uF	Polystyrene	10%	50	4004-001-09
14	.022uF	Disc Ceramic		25	4008-010-04
15	.022uF	Disc Ceramic		25	4008-010-04
16	.047uF	Disc Ceramic		25	4008-057-04
17	220pF	Polystyrene	5%	100	4004-005-03
18	2.7pF	Disc Ceramic - NPO	.25pF	500	4008-013-01
19	56pF	Polystyrene	10%	100	4004-025-02
20					
21	.0068uF	Polystyrene	10%	50	4004-013-04
22	220pF	Polystyrene	5%	100	4004-005-03
23	.047uF	Disc Ceramic		25	4008-057-04
24	3-30pF	Trimmer - air			4000-025-03
25	.047uF	Disc Ceramic		25	4008-057-04
26	.047uF	Disc Ceramic		25	4008-057-04
27	.047uF	Disc Ceramic		25	4008-057-04
28	220pF	Polystyrene	5%	100	4004-005-03
29	4uF	Electrolytic		10	4005-045-01
30	100uF	Electrolytic		12	4005-002-31
31	.1uF	Disc Ceramic		25	4008-004-04
32	.047uF	Disc Ceramic		25	4008-057-04
33	.47uF	Polyester	10%	160	4009-003-01
34	.047uF	Disc Ceramic		25	4008-057-04
35	.047uF	Disc Ceramic		25	4008-057-04
36	220pF	Polystyrene	5%	100	4004-005-03
37	.0022uF	Disc Ceramic	20%	500	4008-049-07
38	.0022uF	Disc Ceramic	20%	500	4008-049-07
39	.0068uF	Polyester	10%	400	4009-004-01
40	220pF	Disc Ceramic		500	4008-009-02
41	.1uF	Disc Ceramic		25	4008-004-04
42	.033uF	Polyester	10%	160	4009-019-05
43	.33uF	Polyester	10%	160	4009-005-06
44	.001uF	Ceramic Feed Thru			4008-040-08
45	.1uF	Disc Ceramic		100	4008-004-05
46	.047uF	Polyester	10%	160	4009-001-02
47	.22uF	Disc Ceramic		25	4008-053-01
48	5uF	Electrolytic		3	4005-018-07
49	.1uF	Disc Ceramic		100	4008-004-05
50	.47uF	Disc Ceramic		25	4008-059-01
51	5uF	Electrolytic		12	4005-018-08
52	.1uF	Polyester	10%	160	4009-008-01
53	.1uF	Polyester	10%	160	4009-008-01
54	640uF	Electrolytic		16	4005-046-01
55	.047uF	Disc Ceramic		25	4008-057-04
56	.047uF	Disc Ceramic		25	4008-057-04
57	.001uF	Ceramic Feed Thru			4008-040-08
58					
59					

ALIGNMENT PROCEDURE

EQUIPMENT

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

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

(b) Chisel Point Type: Part No. 4121-005-01, for Aer. and RF trimmer capacitor adjustment.

(c) Hexagonal Socket Type: Part No. 4121-028-02, for Osc. trimmer capacitor adjustment.

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

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

(f) Clutch Release Bracket: Part No. 4121-029-01, manual model only

Collector Current Meter Connection: Jack plug, Part No. 7171-015-01

CONDITIONS

Remove screws and hinge top lid upward.
Volume control - maximum, clockwise.
Tone Control - maximum, clockwise
Noise Suppression Switch - "OFF" clockwise
Output Meter Connection - Socket, adjacent to battery lead entry.
Output Level - 50 Milliwatts, speaker disconnected.
Supply voltage - 13.0V DC.
Supply Connection - Connect appropriate supply lead to chassis negative to chassis, and the other lead to fuse holder connector.

INTERMEDIATE FREQUENCY TRANSFORMER ALIGNMENT

Turn tuning control until cores of tuner unit are out of coil windings.
Insert .1uF. capacitor in series with generator "hot" lead.

Oper. No.	Generator Connection	Generator Frequency	Instructions
1	To test pin "A" (base of Mixer stage.) and return lead to test pin "C" (negative line.)	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	As oper. 1	455 Kc/s	Adjust iron core of 2nd.IF trans. for max. output.
4	As oper. 1	455 Kc/s	Adjust iron core of 1st IF trans. for max. output.
5	Repeat operations No. 3 and 4 until max. output is obtained.		

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

AERIAL TRIMMER ADJUSTMENT

IMPORTANT
When the receiver has been installed in the vehicle and the aerial connected the aerial trimmer must be readjusted. Raise the 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.) NOTE: If a fully retractable aerial is fitted pull the large outer rod upward against stop in aerial base.

OPERATION OF OUTPUT TRANSISTORS AS MATCHED PAIRS

The type AT1138 transistors are operated in matching 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 or a letter spamped on to the top of the transistor body. Various batch colours or letters are in use. Transistors which have different batch idents. must not be operated together. A matched pair of AT1138 transistors are supplied as:- 2-AT1138 Part No. 4128-004-02.

REPLACEMENT OF OUTPUT TRANSISTORS

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

Smear a thin film of silicone compound, Part No. 1036-001-09, on both sides of the mica and lead washers, also mount face of transistor and chassis.

Fit the insulating ferrules to the screw holes then fit mica washer, lead washer and transistor. Fasten each transistor securely with two ½"xNo. 6 screws.

OPERATION OF DRIVER TRANSISTORS AS MATCHED PAIRS

The type AX1130 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 batch "letter" printed on the side of transistor housing. Transistors with different "letters" nust not be operated together.

A matched pair of AX1130 transistors are supplied as:- 2-AX1130, Part No. 4128-102-01.

MEASUREMENT AND ADJUSTMENT OF OUTPUT TRANSISTORS 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: 13.0V DC.

CONDITIONS — Connect supply leads, negative lead to receiver chassis. Connect speaker to receiver socket adjacent to battery lead entry.
No signal applied to aerial socket.
Volume control: minimum position
Connect meter to receiver socket located near speaker transformer on top lid.

1 Switch receiver "ON" and allow to stabilize for at least five minutes.

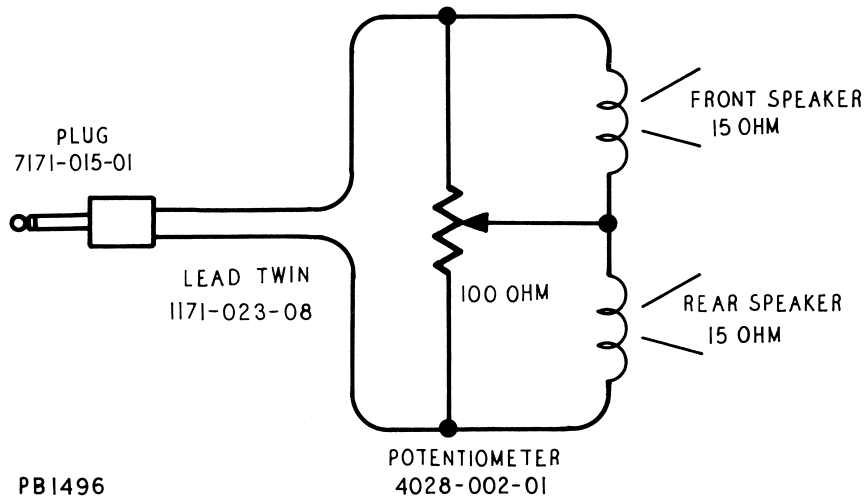
2 Adjust the bias potentiometer (circuit No.100) to obtain a reading of 150mA.

NOTE: If the supply source is below 13.0V DC. the meter readings are to be set as follows:

12.5V DC. input - 120mA meter indication
12.0V DC input - 85mA meter indication

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

CONNECTION OF A FADER CONTROL FOR USE WITH FRONT AND REAR SPEAKERS



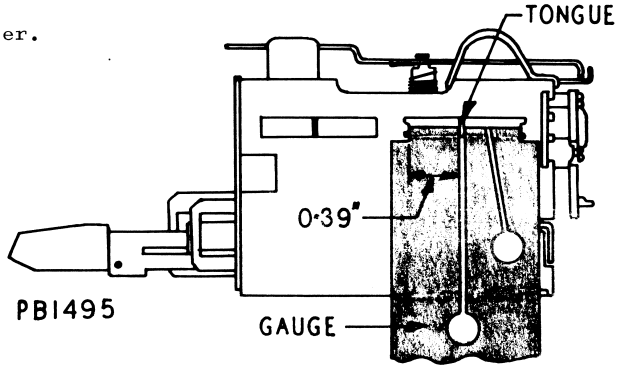
PB1496

PART NUMBER	DESCRIPTION
7111-036-01	Heat Sink (1) power transistors
7111-011-01	Heat Sink (1) temp. comp. transistor
7222-036-01	Socket (2) power transistors
7102-027-01	Gasket (2) lead, power transistor
7120-049-01	Gasket (2) mica, power transistor
7201-577-07	Screw (4) ½"xNo. 6 Phillips hd., power transistor
7031-050-01	Bush (4) insulator, screws
7027-622-01	Bracket (1) current measuring socket mount
7261-227-04	Washer (1) flat bakelite, socket mount
7263-002-02	Washer (1) formed insulator, socket mount
7120-026-01	Insulator (20) glass, transistor and diode mount
7167-058-01	Pin (19) circuit board terminations.
7231-143-01	Terminal Strip (1) 9 lug
7060-022-02	Contact (4) circuit board links
7215-095-01	Shield (1) tuner terminals
7222-115-01	Socket Body (3) lamps
7086-079-01	Contact Eyelet (3) lamp sockets
7031-146-02	Spacer (2) lamp sockets
7055-532-01	Clip (1) lamp sockets
7031-124-01	Spacer (2) volume control and tuning spindle bushes
7262-024-02	Washer (2) shakeproof, ⅜" int.
7055-412-01	Contact (2) tuner frame to can top
7185-021-02	Retainer (1) battery lead entry
7031-009-01	Bush (1) lead retainer
7169-636-01	Spacer (1) choke mount
7152-751-01	Speednut (2) trans. mount.
7201-526-14	Screw (2) ⅜"x No. 4 Phillips csk. hd., trans. mount
7201-533-11	Screw (12) ¼"x NO. 6 Phillips csk. hd., various
7204-576-15	Screw (17) ¼"x No. 4 Phillips pan. hd., various
7196-033-12	Screw (2) 5/16"x No. 8 BA csk. hd., suppression switch
7086-118-02	Eyelet (2) suppression switch, spacer
7027-571-01	Shield Plate (1) leads, top front of tuner
7224-377-02	Spindles and Bush Assy. (1) complete, includes tuning and switch spindles, pinion shaft and yoke assy., trunnion, mount bush and circlip.
7224-378-01	Pinion Shaft and Yoke Assy. (1)
7407-001-01	Trunnion (1)
7031-066-01	Bush (1)
7055-366-05	Circlip (1)
7005-064-01	Background Assy.
7209-107-10	Screw (2) 3/16"x No. 2 pan. hd. - background
7169-436-01	Dust Shield
7124-285-03	Knob (1) aerial trimmer
7124-366-01	Knob (5) push button
7070-088-02	Dial Reading (1)
7091-017-01	Light Filter (2) blue
7201-576-12	Screw (2) ¼"x No. 4 pan. hd. light filter.
4077-238-01	Lead - battery includes:
1169-052-04	Lead 13½" required
7291-003-01	Shroud (1)
7244-003-01	Terminal (1)

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 $\frac{1}{8}$" of shaft protrudes out through front panel of receiver.		
3	To aerial Lead-in Socket 65pF. dummy aerial in series.	1625 Kc/s	Adjust Osc. RF and both aerial trimmer capacitors for max. output.
4	PUSH BUTTON RECEIVER: Partly push in one of the push button knobs to release clutch before inserting gauge. MANUAL RECEIVER: Disengage clutch at crown wheel by utilizing clutch Release Bracket, before inserting gauge. In the side of tuning unit, opposite end to tuning spindle there are two slots; place the notched blade of gauge into the slot nearest rear of tuner. The 0.39" section of gauge is to be against the projection at front edge of slot. Spring fingers of gauge are to be at rear of tongue. Refer diagram.		
NOTE:	Do not strain or tilt core carriage.		
	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 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.		



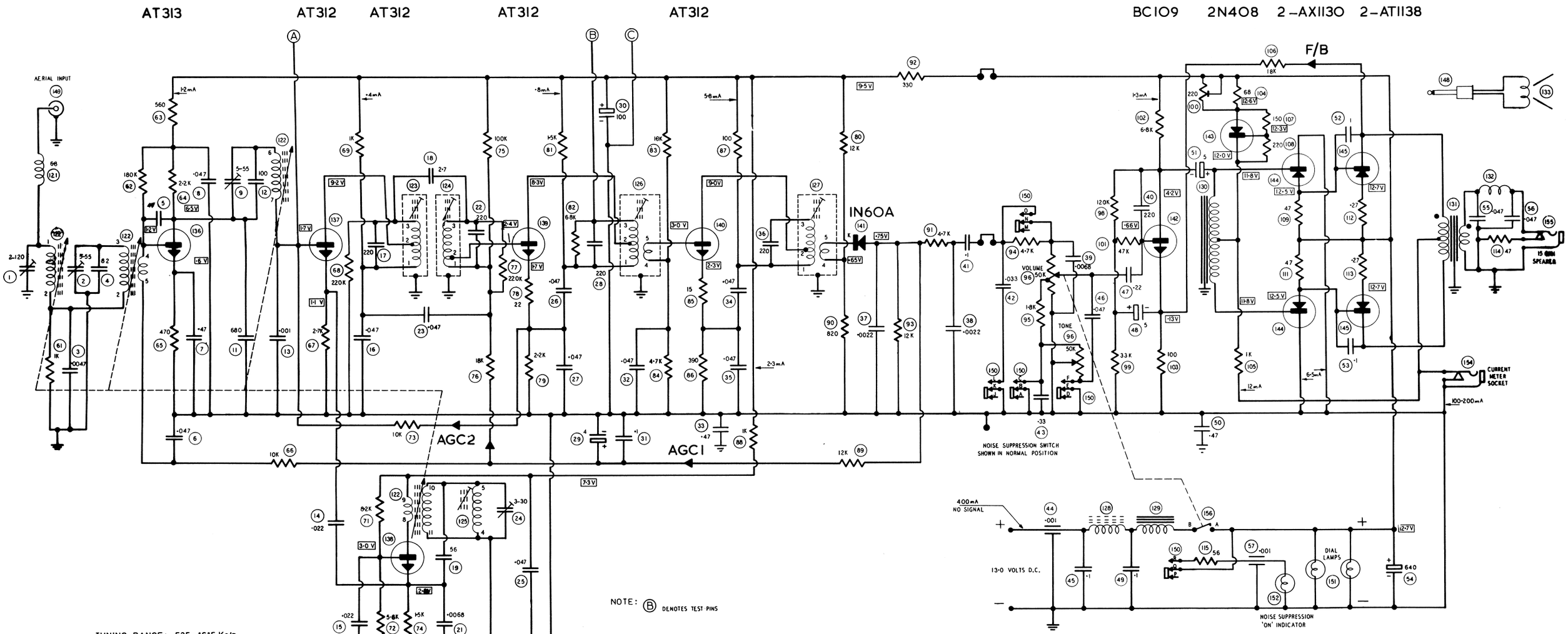
SETTING OF DIAL POINTER

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 the pointer coincides with the centre of the tuned station call sign.

Check dial logging and if necessary readjust pointer carriage arm.

MISCELLANEOUS		PART NUMBER
120		
121	Choke - 6.8uH	4048-032-01
122a	Permeability Tuner Unit - complete, PUSH BUTTON	4050-047-02
122b	Permeability Tuner Unit - complete, MANUAL	4050-048-02
	Iron sleeve (3)	4065-037-01
	Iron sleeve (1) oscillator	4065-038-01
	Iron Core (4)	4065-039-02
These tuners consist of the following parts.	Coil Assy. includes:	4036-053-01
	Aerial Coil	4036-057-01
	Aerial Transformer	4043-033-01
	R.F. Coil	4036-057-01
	Osc. transformer	4043-033-01
123	No.1 I.F. Transformer - Yellow/black	4044-032-01
124	No.2 I.F. Transformer - Yellow/green	4044-032-02
125	Oscillator Shunt Coil	4036-044-02
126	No.3 I.F. Transformer - Yellow/blue	4044-032-03
127	No.4 I.F. Transformer - Yellow/violet	4044-032-04
128	Choke - ferrite core	4048-033-01
129	Choke - iron core	4048-025-05
130	Driver Transformer	4042-125-01
131	Speaker Transformer	4042-128-01
132	Choke	4048-043-02
133	Speaker - 9"x6" Permag type C96L36/69/15 - refer installation instructions for baffle details.	4056-004-18
134		
135		
136	Transistor - Type AT313 - RF Amp.	4128-095-01
137	Transistor - Type AT312 - Mixer	4128-094-01
138	Transistor - Type AT312 - Oscillator	4128-094-01
139	Transistor - Type AT312 - IF Amp.	4128-094-01
140	Transistor - Type AT312 - IF Amp.	4128-094-01
141	Diode - type 1N60A - Detector	4127-032-01
142	Transistor - Type BC109 - Audio Driver	4128-077-01
143	Transistor - Type 2N408 - Temperature Compensation	4128-008-03
144	Transistor - Type 2-AX1130 - Audio Output, matched pair	4128-102-01
145	Transistor - Type 2-AT1138 - Audio Output, matched pair	4128-004-02
146		
147		
148	Plug - speaker lead	7171-015-01
149	Aerial Socket	7222-037-01
150	Noise Suppression Switch	4059-187-01
151	Dial Lamp (2)	4068-003-04
152	Indicator Lamp	4068-003-04
153		
154	Socket - Current Meter	7222-033-01
155	Socket - Speaker	7222-033-01
156	ON/OFF Switch, part of volume control	

CIR-CUIT NO.	VALUE OHMS	RESISTORS DESCRIPTION	TOL ±	RATING WATTS	PART NUMBER
60					
61	1K	Carbon	10%	.5	4022-008-01
62	180K	Carbon	10%	.5	4022-014-03
63	560	Carbon	10%	.5	4022-010-01
64	2.2K	Carbon	10%	.5	4022-021-02
65	470	Carbon	10%	.5	4022-016-01
66	10K	Carbon	10%	.5	4022-004-01
67	2.7K	Carbon	10%	.5	4022-043-01
68	220K	Carbon	10%	.5	4022-063-01
69	1K	Carbon	10%	.5	4022-008-01
70					
71	8.2K	Carbon	10%	.5	4022-027-02
72	5.6K	Carbon	10%	.5	4022-022-02
73	10K	Carbon	10%	.5	4022-004-01
74	1.5K	Carbon	10%	.5	4022-007-01
75	100K	Carbon	10%	.5	4022-013-02
76	18K	Carbon	10%	.5	4022-018-01
77	220K	Carbon	10%	.5	4022-063-01
78	22	Carbon	10%	.5	4022-033-01
79	2.2K	Carbon	10%	.5	4022-021-02
80	12K	Carbon	10%	.5	4022-029-01
81	1.5K	Carbon	10%	.5	4022-007-01
82	68K	Carbon	10%	.5	4022-048-01
83	10K	Carbon	10%	.5	4022-004-01
84	4.7K	Carbon	10%	.5	4022-005-01
85	15	Carbon	10%	.5	4022-053-01
86	390	Carbon	10%	.5	4022-058-04
87	100	Carbon	10%	.5	4022-062-01
88	1K	Carbon	10%	.5	4022-008-01
89	12K	Carbon	10%	.5	4022-029-01
90	820	Carbon	10%	.5	4022-009-01
91	4.7K	Carbon	10%	.5	4022-005-01
92	330	Carbon	10%	.5	4022-011-01
93	12K	Carbon	10%	.5	4022-029-01
94	4.7K	Carbon	10%	.5	4022-005-01
95	1.8K	Carbon	10%	.5	4022-030-01
96		Volume and tone controls concentric shaft Potentiometer Front section 50K ohm. Rear section 50K ohm. tapped at 20K ohm. SP.ST. push-push switch attached.			4030-030-03
97					
98	120K	Carbon	10%	.5	4022-031-01
99	33K	Carbon	10%	.5	4022-059-02
100	220	Potentiometer preset	10%	.5	4025-034-02
101	47K	Carbon	10%	.5	4022-051-03
102	6.8K	Carbon	10%	.5	4022-002-02
103	100	Carbon	10%	.5	4022-062-01
104	68	Carbon	10%	.5	4022-024-01
105	1K	Carbon	10%	.5	4022-008-01
106	18K	Carbon	10%	.5	4022-018-01
107	150	Carbon	10%	.5	4022-052-01
108	220	Carbon	10%	.5	4022-017-01
109	47	Carbon	10%	.5	4022-041-01
110					
111	47	Carbon	10%	.5	4022-041-01
112	.27	Wire Wound	10%	.5	4024-007-02
113	.27	Wire Wound	10%	.5	4024-007-02
114	47	Carbon	10%	1	4022-041-03
115	56	Carbon	10%	.5	4022-049-01
116					
117					
118					
119					



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.