AIR CHIEF

CAR RADIO DIVISION, ELECTRONIC INDUSTRIES LTD.

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

SERVICE DATA

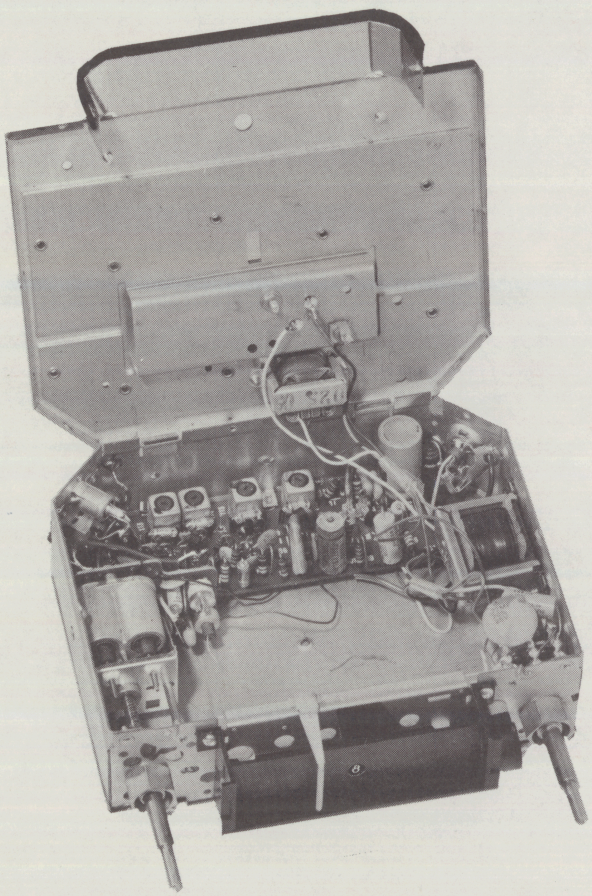
MODEL MN-C23P

MANUAL 8 TRANSISTOR 12 VOLT

NEGATIVE TO CHASSIS CAR RADIO RECEIVER

Especially designed for Holden Model "HT"

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



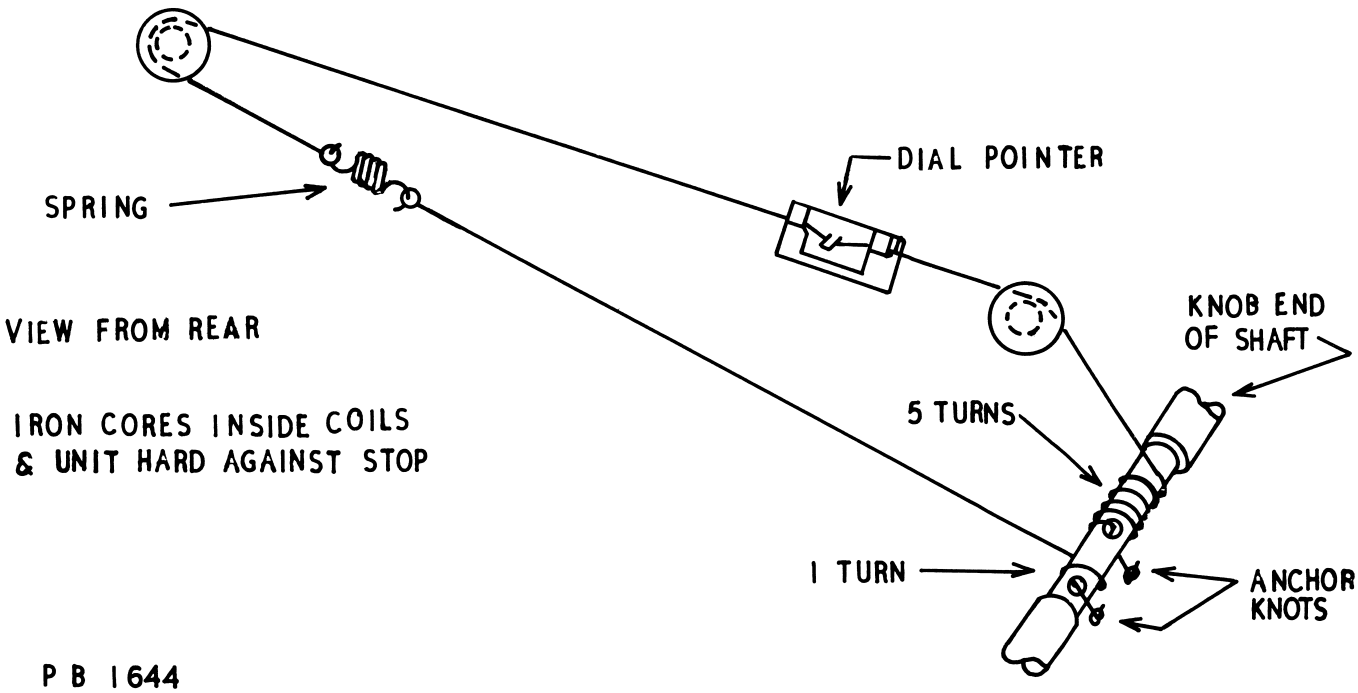
Tuning Range:	525 - 1615 KHz
Intermediate Frequency:	455 KHz
Supply Voltage:	13.0 Volts D.C.
Current Consumption:	650 MilliAmps
Power Output:	2 Watts
Speaker Impedance:	15 Ohms.

Circuit No.	Value	Capacitors Description	Tol ±	Rating V.DCW	Part Number
1	5-55pF	Trimmer, compression			4000-001-05
2	22pF	Ceramic disc, NPO	5%	500	4008-003-06
3	150pF	Polystyrene	5%	100	4004-017-03
4					
5	4.7pF	Ceramic disc, NPO	.5pF	500	4008-042-02
6					
7	.047uF	Polyester	20%	160	4009-001-25
8	.047uF	Polyester	20%	160	4009-001-25
9					
10					
11	5-55pF	Trimmer, compression			4000-001-03
12	100pF	Polystyrene	10%	100	4004-008-06
13	680pF	Polystyrene	10%	100	4004-016-02
14	.001uF	Polystyrene	10%	50	4004-001-09
15	.022uF	Ceramic disc		25	4008-010-03
16	.022uF	Ceramic disc		25	4008-010-03
17	.047uF	Polyester	20%	160	4009-001-25
18	220pF	Polystyrene	5%	100	4004-005-03
19	2.2pF	Ceramic disc, NPO	.25pF	500	4008-033-04
20					
21	.047uF	Polyester	20%	160	4009-001-25
22	56pF	Ceramic tubular, N470	10%	500	4008-030-05
23	.0068uF	Polystyrene	10%	50	4004-013-04
24	5.5-65pF	Trimmer, compression			4000-057-01
25	.047uF	Ceramic disc		25	4008-010-03
26	220pF	Polystyrene	5%	100	4004-005-03
27	.047uF	Polyester	20%	160	4009-001-25
28	.047uF	Polyester	20%	160	4009-001-25
29	4uF	Electrolytic		40	4005-045-02
30	180pF	Polystyrene	5%	100	4004-018-02
31	220pF	Polystyrene	5%	100	4004-005-03
32	.47uF	Ceramic disc		25	4008-059-01
33	.047uF	Ceramic disc		25	4008-057-03
34	.047uF	Polyester	20%	160	4009-001-25
35	.047uF	Ceramic Disc		25	4008-057-03
36	220pF	Polystyrene	5%	100	4004-005-03
37	100uF	Electrolytic		12	4005-002-46
38	.0033uF	Polyester	20%	270	4009-006-14
39	.0033uF	Polyester	20%	270	4009-006-14
40	.068uF	Polyester	20%	270	4009-013-17
41	.001uF	Ceramic feed-thru		500	4008-040-08
42	.1uF	Polyester	10%	160	4008-008-31
43	.22uF	Ceramic Disc	20%	25	4008-053-03
44	.033uF	Polyester	20%	160	4009-019-18
45	.01uF	Polyester	20%	160	4009-014-29
46	.047uF	Ceramic Disc		25	4008-057-04
47	.047uF	Ceramic Disc		25	4008-057-04
48					
49	10uF	Electrolytic		12	4005-007-23
50					
51	30uF	Electrolytic		3	4005-033-09
52	640uF	Electrolytic		16	4005-046-04
53					
54					
55					
56					
57					
58					

Circuit No.	Value Ohms	Resistors Description	Tol ±	Rating Watts	Part Number
60	100K	Carbon	10%	1/2	4022-013-02
61	560	Carbon	10%	1/2	4022-010-01
62	2.7K	Carbon	10%	1/2	4022-043-01
63	680	Carbon	10%	1/2	4022-028-02
64	10K	Carbon	10%	1/2	4022-004-01
65	2.7K	Carbon	10%	1/2	4022-043-01
66	8.2K	Carbon	10%	1/2	4022-027-02
67	5.6K	Carbon	10%	1/2	4022-022-02
68	1K	Carbon	10%	1/2	4022-008-01
69	100K	Carbon	10%	1/2	4022-013-02
70	39K	Carbon	10%	1/2	4022-023-01
71	10K	Carbon	10%	1/2	4022-004-01
72	1.5K	Carbon	10%	1/2	4022-007-01
73	150K	Carbon	10%	1/2	4022-038-01
74	100K	Carbon	10%	1/2	4022-013-02
75	47K	Carbon	10%	1/2	4022-051-03
76	22	Carbon	10%	1/2	4022-033-01
77	2.2K	Carbon	10%	1/2	4022-021-02
78	1.5K	Carbon	10%	1/2	4022-007-01
79	68K	Carbon	10%	1/2	4022-048-01
80					
81	10K	Carbon	10%	1/2	4022-004-01
82	4.7K	Carbon	10%	1/2	4022-005-01
83	15	Carbon	10%	1/2	4022-053-01
84	390	Carbon	10%	1/2	4022-058-04
85	1K	Carbon	10%	1/2	4022-008-01
86	100	Carbon	10%	1/2	4022-062-01
87					
88					
89	10K	Carbon	10%	1/2	4022-004-01
90					
91	12K	Carbon	10%	1/2	4022-029-01
92	330	Carbon	10%	1/2	4022-011-01
93	4.7K	Carbon	10%	1/2	4022-005-01
94					
95	50K	Volume and tone Control SP. ST. Switch attached			4030-030-13
96	39K	Carbon	10%	1/2	4022-023-01
97	4.7K	Carbon	10%	1/2	4022-005-01
98	27K	Carbon	10%	1/2	4022-073-01
99	560	Carbon	10%	1/2	4022-010-01
100	1.5K	Carbon	10%	1/2	4022-007-01
101	1.5K	Carbon	10%	1/2	4022-007-01
102					
103	4.7K	Carbon	10%	1/2	4022-005-01
104	33	Carbon	10%	1/2	4022-072-01
105	100	Carbon	10%	1/2	4022-062-01
106	27	Carbon	10%	1	4022-068-04
107					
108					
109					

7031-173-01	Bush (1) tuning spindle
7150-901-03	Spacer (2) tuning and volume bushes
7262-024-01	Washer (2) shakeproof, 3/8" int.
7224-463-02	Spindle (1) tuning
7228-015-01	Collar (1) spindle
7055-303-01	Clip (1) spindle retainer
7198-076-12	Screw (2) 3/8" x 1/8" Whit. power transistor mt.
7031-036-01	Bush (2) insulator, power transistor mt.
7120-049-01	Gasket (1) mica
7138-070-22	Lug (1) collector terminal, power transistor mt.
7148-302-11	Nut (2) 1/8" Whit., power transistor mt.
7262-008-02	Washer (2) shakeproof 1/8" int.
7201-533-11	Screw - 1/4" x No.6 Phillips Csk. Hd., various
7204-576-15	Screw - 1/4" x No.4 Phillips pan hd., various
7201-526-14	Screw - 3/8" x No.4 Phillips Csk. Hd., various
7124-285-03	Knob - aerial trimmer
7070-088-31	Dial reading - all States
7005-064-03	Dial Background (1)
7209-107-03	Screw (2) 3/16" x No.2 pan Hd., dial background fastening
7173-086-01	Dial Pointer (1)
7091-017-11	Filter (1) dial lamp
1107-002-03	Dial Cord - 20" required
7225-129-01	Spring (1) dial cord
7060-022-02	Contact (4) Shorting tape connection pins
7167-058-01	Pin (8) circuit board
7120-026-01	Insulator (21) glass - transistor and diode mount
7222-115-01	Socket (1) dial lamp
7086-095-02	Eyelet (1) dial lamp socket
7169-677-02	Dust shield (1)

DIAL CORDING DIAGRAM



REPLACEMENT OF OUTPUT TRANSISTOR

NOTE: A Power Transistor Replacement Accessory Package, Part No. 7001-104-01 is available and contains sufficient hardware to service two transistors.

When refitting or replacing an output transistor, check that the mount position and faces are clean and free from dust, grit or metal particles.

After removing the mount screws or having drilled out the eyelets, carefully wipe the heat sink clean.

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

MEASUREMENT AND ADJUSTMENT OF OUTPUT TRANSISTOR COLLECTOR CURRENT.

EQUIPMENT: Current Meter: 0-1 Amp. D.C.
Supply Source: 13.0 Volts D.C.

CONDITIONS: Connect positive supply lead to receiver lead. Connect negative to chassis. Disconnect lead from collector terminal solder lug. Connect positive meter lead to solder lug and negative meter lead to free lead. No signal applied to aerial socket.
Set volume control to minimum position.

Switch receiver ON and allow to stabilize for at least two minutes.

Meter readings will vary with temperature. The following table shows permissable current ranges.

TEMPERATURE		COLLECTOR CURRENT MIN. mA.		MAX. mA.
Less than 60°F	-	450	-	500
60° - 80°F	-	440	-	490
Greater than 80°F	-	430	-	480

TE 1. It is essential that the supply voltage be maintained at 13.0V when measuring output stage current.

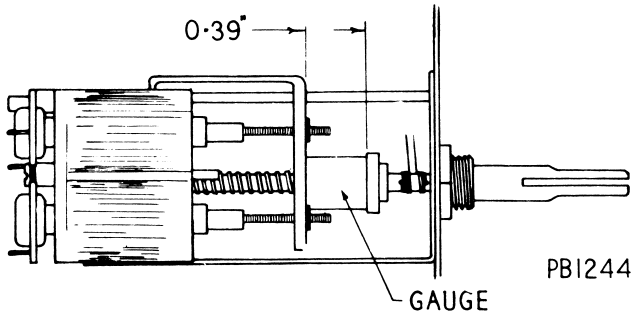
TE 2. A 1.5Kohm resistor may be connected in parallel with circuit No. 65 when the collector current exceeds the maximum limits by up to 30 mA.

Circuit No.	Miscellaneous	Part Number
110	Choke - 6.8 uH	4048-032-01
111	Permeability tuner unit	4050-059-04
	consists of :	
	Iron core (3)	4065-039-02
	Iron sleeve (2)	4065-037-01
	Iron sleeve (1) oscillator	4065-038-01
	Tuner board and coil assy	7389-006-02
	includes :	
	Aerial coil	4036-057-01
	Oscillator transformer	4043-033-01
	R.F. coil	4036-057-01
112	Oscillator shunt coil	4036-044-02
113	No. 1 IF transformer - yellow/black	4044-032-01
114	No. 2 IF transformer - yellow/green	4044-032-02
115	No. 3 IF transformer - yellow/blue	4044-032-03
116	No. 4 IF transformer - yellow/violet	4044-032-04
117		
118	Choke	4048-025-05
119	Transformer - speaker	4042-153-01
120	Choke, speaker filter	4048-043-02
121	Speaker socket	7222-033-11
123	Transistor - type AT320 - RF amp	4128-199-01
124	Transistor - type AT321 - Converter	4128-119-01
125	Transistor - type AT321 - Oscillator	4128-119-01
126	Transistor - type AT321 - IF amp	4128-119-01
127	Transistor - type AT321 - IF amp	4128-119-01
128	Transistor - type AT337 - Audio amp	4128-133-01
129	Transistor - type AT492 - Driver	4128-190-01
130		
131	Transistor - type AT1138 - Output	4128-004-01
132	Diode - type 1N60A - Detector	4127-032-01
133	Diode - type AD411 - A.G.C.	4127-094-01
134	Socket - aerial	7222-037-01
135		
136	Switch - ON/OFF part of circuit No. 95	
137		
138	Lamp 12 - 16 volt	4068-003-04
139	Speaker Plug	7171-015-01
140	Speaker - 9" x 6" Type C96L36/69/15	4056-004-18

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 "B").		
2	Turn perm. tuner against high frequency end of travel stop. Set all iron cores so that not less than 3/8" of adjusting shafts protrude forward of front face of core carriage.		
3	To aerial Lead-in Socket. 65pF dummy aerial in series	1625 Kc/s	Adjust Osc. RF and Aerial trimmer capacitors for maximum output.
4	Refer diagram. Place the 1000 Kc/s alignment gauge Part No. 4121-023-01 or alternatively a flat piece of metal 0.39" wide between the core carriage and loose collar. Gently turn tuning spindle until gauge is located squarely between collar and carriage.		
5	As oper. 3	1000 Kc/s	With tuner set in position detailed adjust Osc., R.F. and Aerial iron cores for maximum output.
6	As oper. 3	600 Kc/s	Rock tuning control through signal, adjust Osc., shunt coil iron core for maximum output.
7	Turn tuning control to low frequency end of travel (iron cores full in). Tune signal generator to receiver. The low frequency tuning limit should be between 510 and 528 Kc/s.		
8	Repeat operations 4 and 5.		
9	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.

Slip dial pointer carriage assy. along guide rail until the centre of the pointer coincides with centre of the tuned station call sign.

Check dial logging, and if necessary, readjust pointer carriage.

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 RF Trimmer capacitor adjustment.

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

d Tuning Unit Iron Core Adjustment: Part No. 4121-008-01.

e Alignment Gauge: Part No. 4121-023-02, for tuner 1000 Kc/s position.

CONDITIONS

Remove screws and hinge top lid upward.
Volume control - maximum clockwise.
Output Meter Connection - Speaker socket.
Output Level - 25 Milliwatts, speaker connected.
Supply Voltage - 13.0V DC and Connection — Connect positive supply lead to receiver lead. Connect negative supply lead to receiver can.

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 "B".	455Kc/s	Adjust iron core of 3rd IF trans. for max. output.
2	As oper. 1	455Kc/s	Adjust iron core of 2nd IF trans. for max. output.
3	As oper. 1	455Kc/s	Adjust iron core of 1st IF trans. for max. output.
4	Repeat operations 1, 2 and 3 until max. output is obtained.		

BROADCAST ALIGNMENT

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

1	Connect I.F. Attenuator to test pins "B" and "C" (resistor to pin "B")		
2	Aerial Lead-in Socket-65pF. dummy aerial in series.	1000Kc/s	Tune receiver to generator frequency. Adjust RF and 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 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.

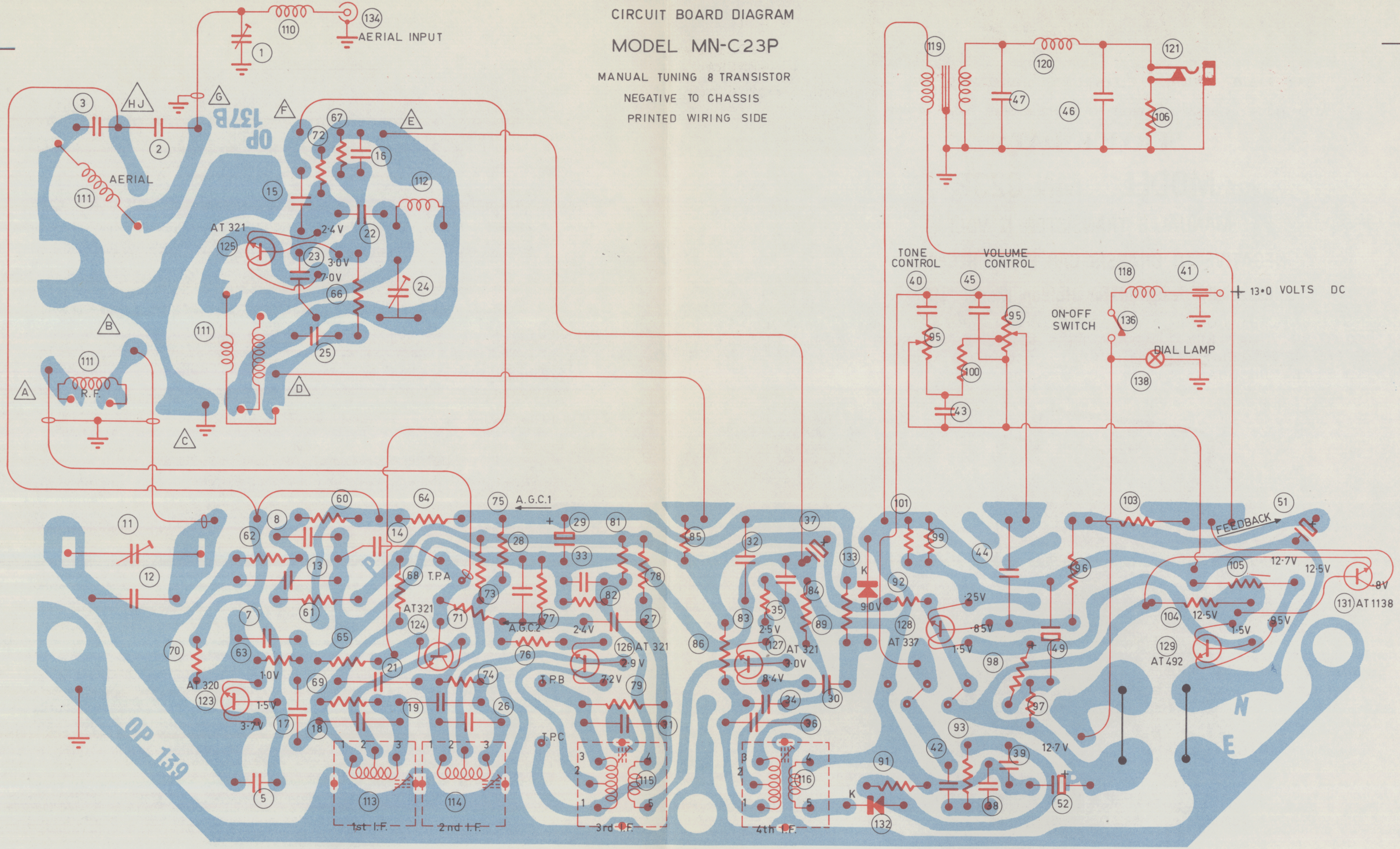
CIRCUIT BOARD DIAGRAM

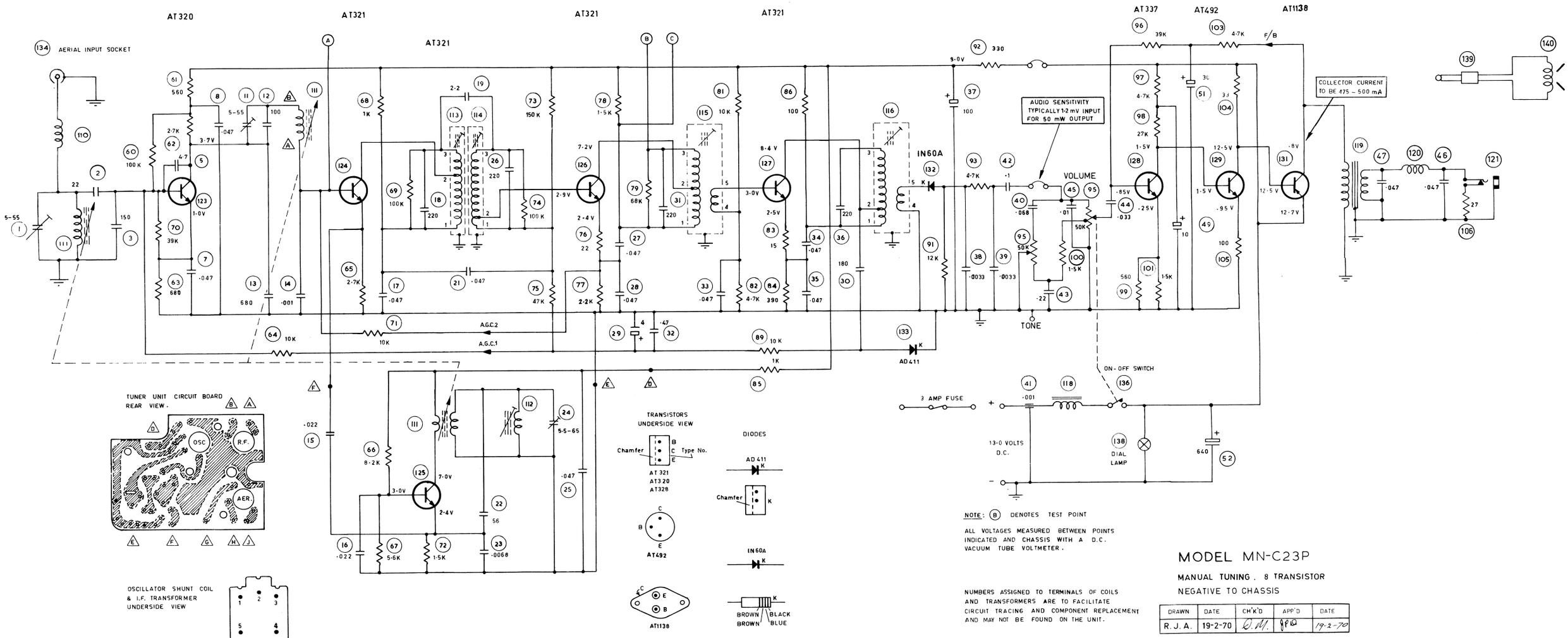
MODEL MN-C23P

MANUAL TUNING 8 TRANSISTOR

NEGATIVE TO CHASSIS

PRINTED WIRING SIDE





NOTE: (B) DENOTES TEST POINT

ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND CHASSIS WITH A D.C. VACUUM TUBE VOLTMETER.

NUMBERS ASSIGNED TO TERMINALS OF COILS AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING AND COMPONENT REPLACEMENT AND MAY NOT BE FOUND ON THE UNIT.

MODEL MN-C23P

MANUAL TUNING . 8 TRANSISTOR

NEGATIVE TO CHASSIS

DRAWN	DATE	CH'K'D	APP'D	DATE
R. J. A.	19-2-70	D. M.	RPD	19-2-70