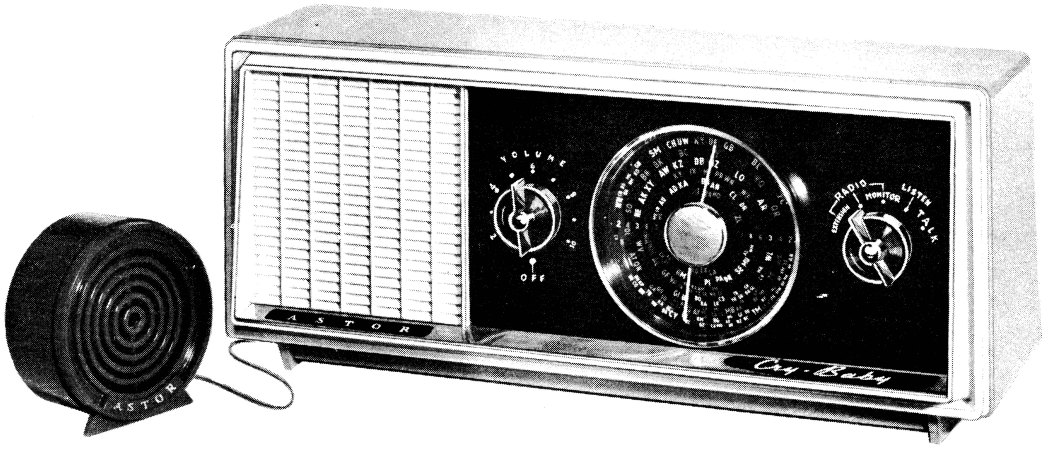
ASTOR

RADIO CORPORATION PTY. LTD.
DIVISION OF ELECTRONIC INDUSTRIES LTD.
Astor House, 161-173 Sturt Street, South Melbourne.

SERVICE DATA

ASTOR MODEL "M2A"

CORDLESS MANTEL
7 TRANSISTOR SUPERHETERODYNE BROADCAST RECEIVER
INCORPORATING INTERCOMMUNICATION FACILITIES



TUNING RANGE:	530-1630 Kilocycles
INTERMEDIATE FREQUENCY:	455 Kilocycles
BATTERY SUPPLY:	9 Volts DC. (internal battery)
BATTERY CONSUMPTION:	9.2 mA. (no signal)
POWER OUTPUT:	.5 Watt (undistorted)
TRANSISTOR COMPLEMENT:	2N412 Mixer-Oscillator
	2N410 I.F. Amp. 1.
	2N410 I.F. Amp. 2.
	2N406 Audio Amplifier
	2N406 Audio Driver
	OC74 Audio Output } 2-0C74
	OC74 Audio Output } Matched Pair
GERMANIUM DIODES:	IN295 AGC.
	IN295 Detector/AGC.

Operation

ON-OFF SWITCH AND VOLUME

By turning this knob in a clockwise direction you will hear a click, indicating that the radio is switched ON. Further turning of the knob will increase the volume.
You may switch the radio OFF by turning the knob in an anti-clockwise direction until the switch is heard to click off.

TUNING

Turn the tuning disc so that the coloured line indicates the desired station.
You will obtain the best reception if you tune slowly back and forth across the station to find the exact centre point.

FUNCTION SWITCH

RADIO — In this position the radio operates as a cordless broadcast receiver. You may operate the radio without the Remote Unit.

EXTENSION — In this position the Remote Unit operates as an additional loudspeaker for the radio.
The volume control is used to adjust the volume from both loudspeakers.

MONITOR — The radio operates normally in this position. In addition, any sounds picked up by the Remote Unit will be heard together with the radio programme.
You may use the volume control to adjust the volume of the radio programme, but it will not effect the volume of any sounds from the Remote Unit.

LISTEN — The radio programme is turned off in this position and you will hear, through the radio loudspeaker, the voice of any person speaking near the Remote Unit. You may adjust the volume by means of the volume control.

TALK — In this position your voice will be heard at the Remote Unit when you speak into the radio loudspeaker. The volume control will vary the loudness of your voice at the Remote Unit.

Ways to use your Cry-Baby

Baby Minding

You may listen to a radio programme and at the same time hear if the baby is in need of attention, if you place the Remote Unit in the baby's room near the baby and switch to MONITOR.

When baby needs attention you may switch to EXTENSION and so continue to enjoy your programme.

With older children, if they are disturbed you may reassure them by using the TALK position.

Remote Listening

While you are listening to the radio you may switch to the EXTENSION position to enable others to hear the programme from the Remote Unit, which then acts as an extension loudspeaker.

Talk-Back

You may operate this radio as an inter-communication system by using the TALK and LISTEN positions.

Door Answering

To hear if anyone comes to the door while you are listening to the radio, place the Remote Unit near the door and switch to MONITOR. By using the TALK and LISTEN positions you may converse with anyone at the door.

For the User

ECONOMY

More battery current is used as the volume is increased, therefore to obtain the longest battery life do not play at excessive volume.

AERIAL

This radio has a built-in ferrite rod aerial, therefore, under normal conditions an external aerial is not necessary. You may find it an advantage, however, to rotate the radio slightly for clearest reception of weak stations.

In localities where reception is weak, or if you wish to listen to distant stations, an external aerial and earth may be connected to the marked screws in the base of the cabinet.

BATTERY INSTALLATION

The battery compartment cover is located on the bottom of the cabinet. Slide this cover in the direction indicated, withdraw the battery plug and remove the battery. Install new battery by reversing above procedure.

The battery used is an Eveready 9-volt No. 276-P or equivalent.

Warning: Remove the battery immediately it is exhausted, since run-down batteries sometimes exude a corrosive chemical which may damage the receiver.

The battery should be replaced when radio reception becomes weak, distorted, or the receiver fails to operate.

It is advisable to remove the battery if the receiver is to remain unused for several months.

INSTALLATION OF THE REMOTE UNIT

Place the Remote Unit in the selected position.

Remove a short length of the covering of the two wires at one end of the twin connecting wire.

Clamp the two bared wires, one under each of the screws, at the back of the Remote Unit.

Place the twin connecting wire in position along skirting boards or under carpets until you reach the Radio unit.

Remove a short length of the covering of the two wires at this end.

Clamp the bared wires, one under each of the vacant screws, on the connecting block.

Insert the flexible-cable plug into the socket on the back of the radio.

If desired, you may screw the connecting block to the wall to hold it in place.

If you wish to move the radio at any time, simply remove the flexible-cable plug from the back of the cabinet.

Additional twin wire may be used for long runs up to a maximum of about 200 feet.

More than one line may be installed if desired, but a maximum of two Remote Units may be connected to the radio at one time. Alternatively, junctions may be taken off the one line at any point. In this case the wires should not be cut, just remove the covering insulation and clamp the bared part under the connecting screws on the back of the Remote Unit or the connecting block.

SERVICE INSTRUCTIONS—electrical

ALIGNMENT EQUIPMENT

Signal Generator - modulated 400 cps.
Output Meter - 15 ohms impedance
Series Capacitor - Sign. gen. for I.F.T. alignment .1mF Part No. 4006-005-03.

Alignment Tools

(a) Flat metal blade each end - Part No. A101/2076 for I.F.T. and osc. coil iron core adjustment.

(b) Chisel point type Part No. 4121-005-01 for trimmer cond. ajdustment.

ALIGNMENT CONDITIONS

Remove two screws from rear of cabinet and two screws (external aerial and earth terminals) from base of cabinet.

Remove cabinet from front section escutcheon. Note connections then disconnect remote speaker socket leads from circuit board pins.

Volume Control - maximum volume (fully clockwise)
Output Level - 50 milliwatts
Output Meter Connection - across speaker voice coil
Supply Voltage Source - 9 volt battery

INTERMEDIATE FREQUENCY TRANSFORMER ALIGNMENT

Oper. No.	Generator Connection	Generator Frequency	Dummy Aerial	Instructions
1.	To junction of term.4 of rod aerial and .01 cond. circuit No. 3.	455Kc/s	.1mF cond. in series with generator.	Turn tuning gang cond. to high freq. end stop, plates full open. Peak iron core of 3rd I.F. trans. for max. output.
2.	As oper. 1.	455Kc/s	As oper. 1.	Peak iron core of 2nd I.F. trans. for max. output.
3.	As oper. 1.	455Kc/s	As oper. 1.	Peak iron core of 1st I.F. trans. for max. output.
4.	Repeat operations 1, 2 and 3.			

DIAL POINTER SETTING

1. Prise the push-in type metal insert from the centre of the transparent tuning knob.

2. Loosen the three ¼" x 3/32" Whit.csk.hd. screws fastening the washer in the centre of the tuning knob.

3. Fully mesh condenser gang plates, then set centre of indicator line on tuning knob to align with the end of travel spot near 530 Kc/s on dial reading.

4. Securely tighten the three 3/32" screws in centre washer then refit push-in metal insert.

BROADCAST ALIGNMENT

A. To inject a signal into the receiver rod aerial, connect to the active terminal of the signal generator approximately two feet of aerial wire, then fashion the wire into a vertical position.

B. Place receiver chassis so that ferrite rod aerial is uppermost and horizontal and so that the aerial coupling winding end of the ferrite rod points to the 2ft. of aerial wire. A distance of not less than 1ft. is to be between the end of the ferrite rod and the 2ft. of vertical aerial wire attached to the signal generator.

Oper. No.	Generator Connection	Generator Frequency	Instructions
1.	Refer para. A & B	600 Kc/s	Turn tuning gang until centre of indicator line on pointer aligns with centreof 600Kc/s spot on dial reading. Peak iron core of oscillator coil for max.output while rocking gang to and fro through signal.
2.	As oper. 1.	1400 Kc/s	Set centre of indicator line with 1400 Kc/s spot on dial. Peak oscillator and aerial trimmer condenser for maximum output.
3.	Repeat oper. 1.		
4.	Repeat oper. 2.		

Tuning range after alignment - 530:1630 Kilocycles.

PRECAUTIONS WHEN TESTING TRANSISTOR RECEIVERS

A. A screwdriver or similar instrument must not be used to short components together or to the common positive. The use of this method of checking for the existance of voltage or signal clicks may result in permanent damage to the transistors and components.

B. A transistor is extremely sensitive to heat. If a soldering iron is to be used close to a transistor move the transistor or place non-conductive material between the iron and transistor.
When making soldered connectionsto the leads of the transistors hold the lead which is being soldered between the heat source and transistor body with pliers; excessheat will be dissipated away into the pliers. Use a soldering iron which supplies just the requirement of heat for satisfactory soldering of connections.

C. When checking components, cut the long pigtail of the component in preference to unsoldering from the circuit board. Components checked in this way may be returned into the circuit by pressing the ends of the pigtail together then solder. Faulty components should be removed from the circuit board by cutting through the body of the component leaving two short stubs of wire protruding (approx. $\frac{1}{8}$") above the circuit board. The pigtail leads of the new component are to be soldered to these stubs.

D. A continuity meter must not be applied to the receiver wiring with the transistor in circuit. A transistor must not be checked for continuity with an ohmmeter as the applied voltage and resultant excess current flow may result in permanent damage to the transistor. A voltmeter of at least 20,000 ohms/volt or a high impedance vacuum tube type voltmeter is a safe means of measuring circuit voltage.

FAULT LOCATION GUIDE - CLICK TEST

Connect one end of 6.8K ohm resistor to common positive. Touch the other end on and off the following points and listen for clicks.

CHECKPOINT Transistor Base	LOCATION Circuit Numbers at Junction Point	STRENGTH OF CLICK
Volume control at minimum		
OC74 Output	No. 28 & Driver secondary	very weak
OC74 Output	No. 29 & Driver secondary	weak
2N406 Driver	Nos. 55, 59, 24	loud
2N406 First Audio	Nos. 23, 52	loud
Volume control at maximum		
2N410 I.F.2	Pin 4 I.F.T. 2	very weak
2N410 I.F.1	Pin 4 I.F.T. 1	weak
2N412 Converter	Nos. 33, 34, 3	loud

FAULT LOCATION GUIDE - GENERATOR TEST

Connect generator through a 0.1 mfd. capacitor to the following points:-
CAUTION: Always start with low generator output. Strong signals, may, overload the receiver, or cause the AGC to function. Set volume control at maximum.

CHECKPOINT	LOCATION Circuit Nos. at Junction Point	SIGNAL GENERATOR FREQUENCY	SIGNAL STRENGTH
OC74 Output Base	No. 28 Driver sec.	Audio	Weak
OC74 Output Base	No. 29 & Driver sec.	Audio	Weak
2N406 Driver Base	Nos. 55, 59, 24	Audio	Increased level
2N406 First Audio Base	Nos. 23, 52	Audio	Further increase
Det.output at vol.cont.	Nos. 20, 52	Audio	Further increase
Turn tuning capacitor fully open.			
Det.output at Diode	Pin 5 I.F.T. 3	455Kc/s	Weak
2N410 I.F.2. Base	Pin 5 I.F.T. 2	455Kc/s	Increased level
2N410 I.F.1. Base	Pin 5 I.F.T. 1	455Kc/s	Further increase
2N412 Converter Base	No.3 and aerial sec.	455Kc/s	Further increase
Tune receiver to generator at broadcast frequency.			
2N412 Converter Base	No.3 and aerial sec.	Sign.Freq.	Same level as at 455Kc/s.

SERVICE INSTRUCTIONS — mechanical

1. TO REMOVE RECEIVER FROM CABINET

   A. Remove two screws from rear of cabinet.

   B. Remove two screws (external aerial and earth terminal) from base of cabinet.

   C. Pull or price cabinet away from front section. Note connections then disconnect remote speaker socket leads from circuit board pins.

2. CLEANING AGENT FOR CABINET

Do not polish the moulded plastic or metal sections with an abrasive material, motor car polish, boot polish or similar household cleaning fluids as permanent damage may result to the finish of the cabinet. To restore the lustre of the cabinet wipe with a soft cloth dampened with water and lightly polish with a neutral wax.

3. RECEIVER SERIAL NUMBER

Serial number is visible through the hand grip aperture at the top in the rear of the cabinet.

4. BATTERY REMOVAL: Detailed on Page 2.

5. STORAGE WHEN OUT OF USE: Detailed on Page 2.

Circuit No.		Capacitors Description	Tol ±	Rating	Part No.
1	Tuning	Two gang			4000-028-03
2	5-30pF	Trimmer compression			4000-023-01
3	.01mF	Ceramic disc		25V	4008-039-06
4	.01mF	Ceramic disc		25V	4008-039-06
5	220pF	Polystryene	5%	125V	4004-005-03
6	.01mF	Ceramic disc		25V	4008-039-06
7	8.2pF	Ceramic disc, NPO	.5pF	500V	4008-012-01
8	.01mF	Ceramic disc		25V	4008-039-06
9	10mF	Electrolytic		6V	4005-007-02
10	.01mF	Ceramic disc		25V	4008-039-06
11	3-30pF	Trimmer, wire wound			4000-025-01
12					
13	220pF	Polystyrene	5%	125V	4004-005-03
14	.01mF	Ceramic disc		25V	4008-039-06
15	27pF	Ceramic disc, NPO	5%	500V	4008-031-04
16	220pF	Polystyrene	5%	125V	4004-005-03
17	.01	Ceramic disc	5%	25V	4008-039-06
18	.01	Ceramic disc	5%	25V	4008-039-06
19	.01	Ceramic disc	5%	25V	4008-039-06
20	2mF	Electrolytic		6V	4005-005-04
21					
22					
23	2mF	Electrolytic		6V	4005-005-04
24	.005mF	Ceramic disc		25V	4008-058-01
25	50mF	Electrolytic		3V	4005-001-02
26	100mF	Electrolytic		12V	4005-002-15
27	100mF	Electrolytic		6V	4005-002-10
28	.01mF	Ceramic disc		25V	4008-039-06
29	.01mF	Ceramic disc		25V	4008-039-06
30	.01mF	Ceramic disc		25V	4008-039-06
31	100mF	Electrolytic		12V	4005-002-15
32					

	Value Ohms	Resistors Description	Tol ±	Rating Watts	Part No.
33	56K	Carbon	10%	½	4022-003-03
34	8.2K	Carbon	10%	½	4022-027-02
35	2.2K	Carbon	10%	½	4022-021-02
36	1.8K	Carbon	10%	½	4022-030-01
37	330	Carbon	10%	½	4022-011-01
38	100K	Carbon	10%	½	4022-013-02

Circuit No.	Value Ohms	Resistors . Description	Tol ±	Rating Watts	Part No.
39	4.7K	Carbon	10%	½	4022-005-01
40	2.2K	Carbon	10%	½	4022-021-02
41	18K	Carbon	10%	½	4022-018-01
42					
43	560	Carbon	10%	½	4022-010-01
44	Volume Control 10K ohms SP.ST. Switch				4032-007-07
45	470	Carbon	10%	½	4022-016-01
46	4.7K	Carbon	10%	½	4022-005-01
47	150K	Carbon	10%	½	4022-038-01
48	220	Carbon	10%	½	4022-017-01
49	470	Carbon	10%	½	4022-016-01
50	4.7K	Carbon	10%	½	4022-005-01
51					
52	4.7K	Carbon	10%	½	4022-005-01
53	2.7K	Carbon	10%	½	4022-043-01
54	10	Carbon	10%	½	4022-035-01
55	12K	Carbon	10%	½	4022-029-01
56	330	Carbon	10%	½	4022-011-01
57	680	Carbon low noise type	10%	½	4022-028-03
58	220	Carbon	10%	½	4022-017-01
59	100K	Carbon	10%	½	4022-013-02
60					
61					
62	10K	Carbon	10%	½	4022-004-01
63	4.7K	Wire wound	5%	½	4024-012-01
64	220	Disc NTC	20%	1.25	4021-020-01
65	560	Carbon	10%	½	4022-010-01
66	15K	Carbon	10%	½	4022-001-02
67					

Miscellaneous Description

68	Aerial loading coil	4036-051-01
69	Rod aerial	4074-011-01
70	Oscillator coil	4043-019-01
71	No. 1 I.F. transformer 455 Kc/s	4044-009-04
72	No. 2 I.F. transformer 455 Kc/s	4044-009-07
73	No. 3 I.F. transformer 455 Kc/s	4044-009-06
74	Microphone Transformer 15:2K ohm impedance	4042-041-01
75	Driver Transformer 5K:625+625 ohm impedance	4042-043-01
76	Speaker Transformer 60 + 60:15 or 8 ohm impedance	4042-045-01
77		
78	Transistor - mixer/oscillator - type 2N412	4128-011-02
79	Diode - overload - type 1N295	4127-001-01
80	Transistor - I.F. amp. No.1 - type 2N410 green spot	4128-010-03
81	Transistor - I.F. amp. No.2 - type 2N410 red spot	4128-010-04
82	Diode - detector/A.G.C. - type 1N295	4127-001-01
83	Transistor - audio amp - type 2N406	4128-009-02
84	Transistor - audio driver - type 2N406	4128-009-02
85	Transistor - audio output - type OC74) matched	4128-012-02
86	Transistor - audio output - type OC74) pair	

Circuit No.	Description	Part No.
87		
88	Switch - function	4059-052-01
89	Switch - battery on/off Part of circuit No.44	-
90	Speaker - local 5" dia. permag. type 5F00/87/15 15 ohm V.C. impedance.	4056-006-11
91	Socket - remote speaker plug	7222-033-01
92	Plug - two pin, battery	7171-010-01
93	Battery - 9 volt Eveready 276P or equivalent	4062-002-01
94	Speaker - remote, 2¾" dia. permag. type 2C00/1/15 15 ohm V.C. impedance.	4056-009-01
95	Plug - remote speaker lead	7171-015-01
96	Junction block - remote speaker lead	7020-004-01
97	Lead - 75 feet, hanked	4077-137-01

Knob - tuning	7124-073-02
Insert - tuning knob	7119-002-02
Bush - tuning knob mount	7031-043-01
Screw - grub, bush, tuning knob	7198-802-04
Screw - (3) ¼" x 3/32" Whit. csk. hd. tuning knob to bush	7198-125-07
Washer - Tuning knob clamping	7261-008-02
Knob - (2) Volume and Function switch	7124-084-01
Ring - (2) compression, volume and function switch knobs	7186-010-01
Barrel nut - (2) chrome	7150-354-28
Washer - (2) Chrome	7261-484-01
Screw - (4) ⅜" x No.6 hex. hd. speaker mount	7204-027-05
Screw - (2) ⅜" x No.5 pan. hd. circuit board mount	7209-116-12
Washer - (6) speaker and circuit board	7261-138-05
Spacer nut - (2) volume and function switch	7150-901-11
Washer - (2) volume and function switch	7261-562-08
Mount plate - tuning gang mount	7169-088-01
Bush - (4) brass gang mount plate	7031-017-01
Bush - (4) P.V.C. gang mount plate	7031-042-01
Screw - (4) 4BA x ⅜" csk. hd. gang mount plate	7196-067-15
Pillar - (2) aerial rod mount	7166-001-01
Screw - (2) ⅜" x ⅛" whit. rd. hd.	7198-176-33
Nut plate - (2) rod aerial pillar	7279-005-02
Spring locking - (2) rod aerial	7225-078-01
Speed nut - (2) ext. aerial and earth contact	7152-754-03
Screw - (2) ⅝" x No.10 bdr. hd.	7204-080-09
Screw - (2) ⅜" x ⅛" whit. truss. hd. cabinet back	7198-301-14
Contact - (2) remote speaker socket to circuit board	7060-022-01
Pin - (6) circuit board	7167-058-01

Front panel assembly - complete	7084-045-01
includes:-	
Front panel	7084-042-01
Pillar assy. (2) includes thread inserts	7166-005-01
Name panel	7186-005-01
Dial reading panel	7160-016-01
Thread insert (2)	7031-059-01

CABINET STYLING

Colour	Cabinet Part No. less Battery Slide	Battery Slide Part No.
Wattle	7039-003-03	7221-001-03
Charcoal	7039-003-04	7221-001-04
Cherry	7039-003-05	7221-001-05
Flamingo	7039-003-09	7221-001-09
Squirrel	7039-003-10	7221-001-10

Remote Speaker Assembly Complete With 75 ft. Lead In A Carton.

Colour - Wattle	4085-067-03
- Charcoal	4085-067-04
- Cherry	4085-067-05
- Flamingo	4085-067-09
- Squirrel	4085-067-10

The Above Assembly Consists Of:-

Lead - 75 ft. hank.	4077-137-01
Speaker Assy.	
Colour - Wattle	7296-006-03
- Charcoal	7296-006-04
- Cherry	7296-006-05
- Flamingo	7296-006-09
- Squirrel	7296-006-10

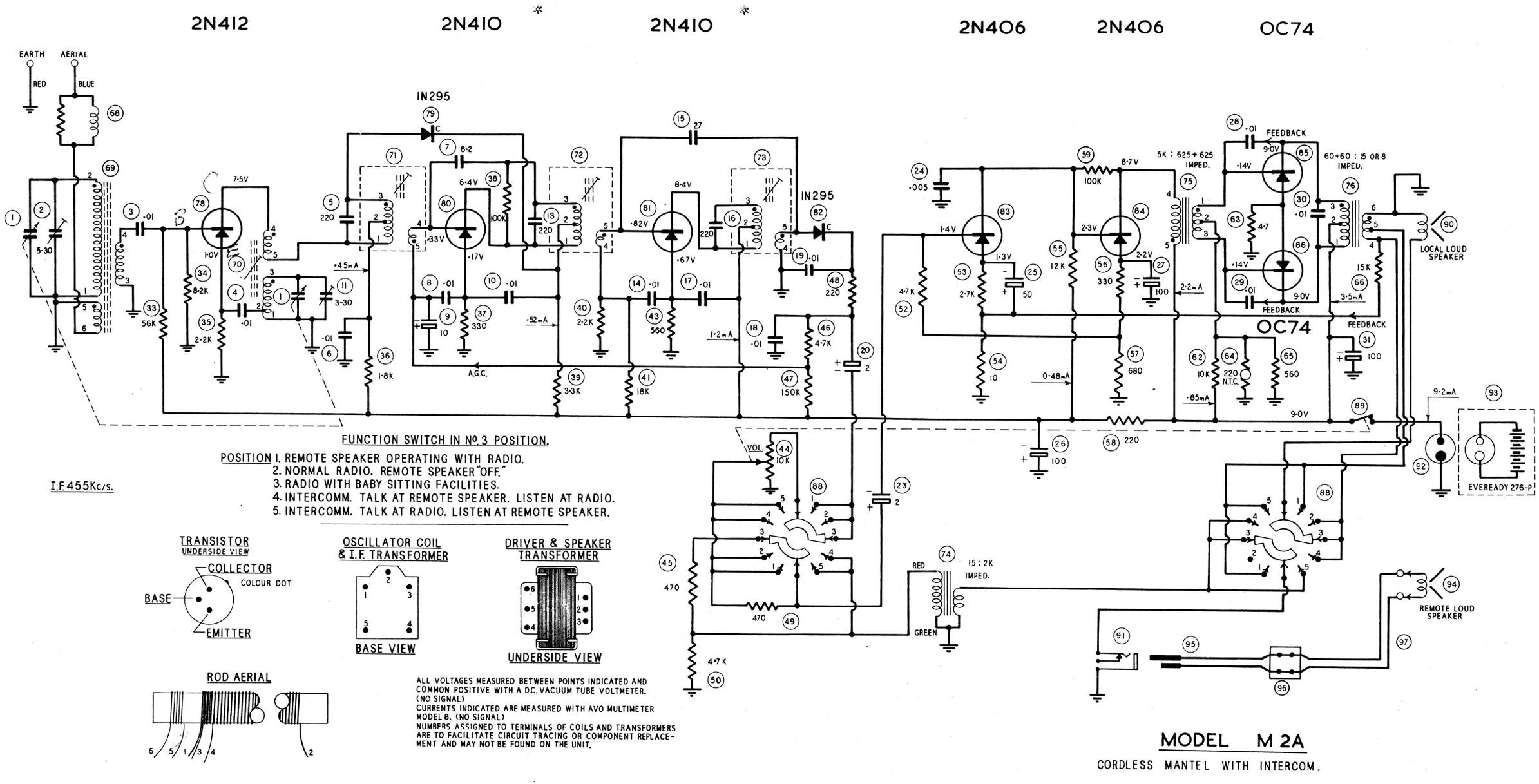
The Remote Speaker Assembly Consists Of:- Grille, Housing Assy., Speaker, Screws and Speednuts.

Colour	Speaker Grille	Speaker Housing Assy.
Wattle	7104-010-03	7116-021-03
Charcoal	7104-010-04	7116-021-04
Cherry	7104-010-05	7116-021-05
Flamingo	7104-010-09	7116-021-09
Squirrel	7104-010-10	7116-021-10

Speaker - $2\frac{3}{4}$" Dia. per.mag. type 2C00/1/15	4056-009-01
Screw (3) 5/16" x No.3	7209-110-11
Screw (2) $\frac{3}{8}$" x 4BA	7196-813-12
Speednut (2)	7152-757-02

The Speaker Housing Assembly Consists Of - Housing, Speaker Holder, and Eyelets.

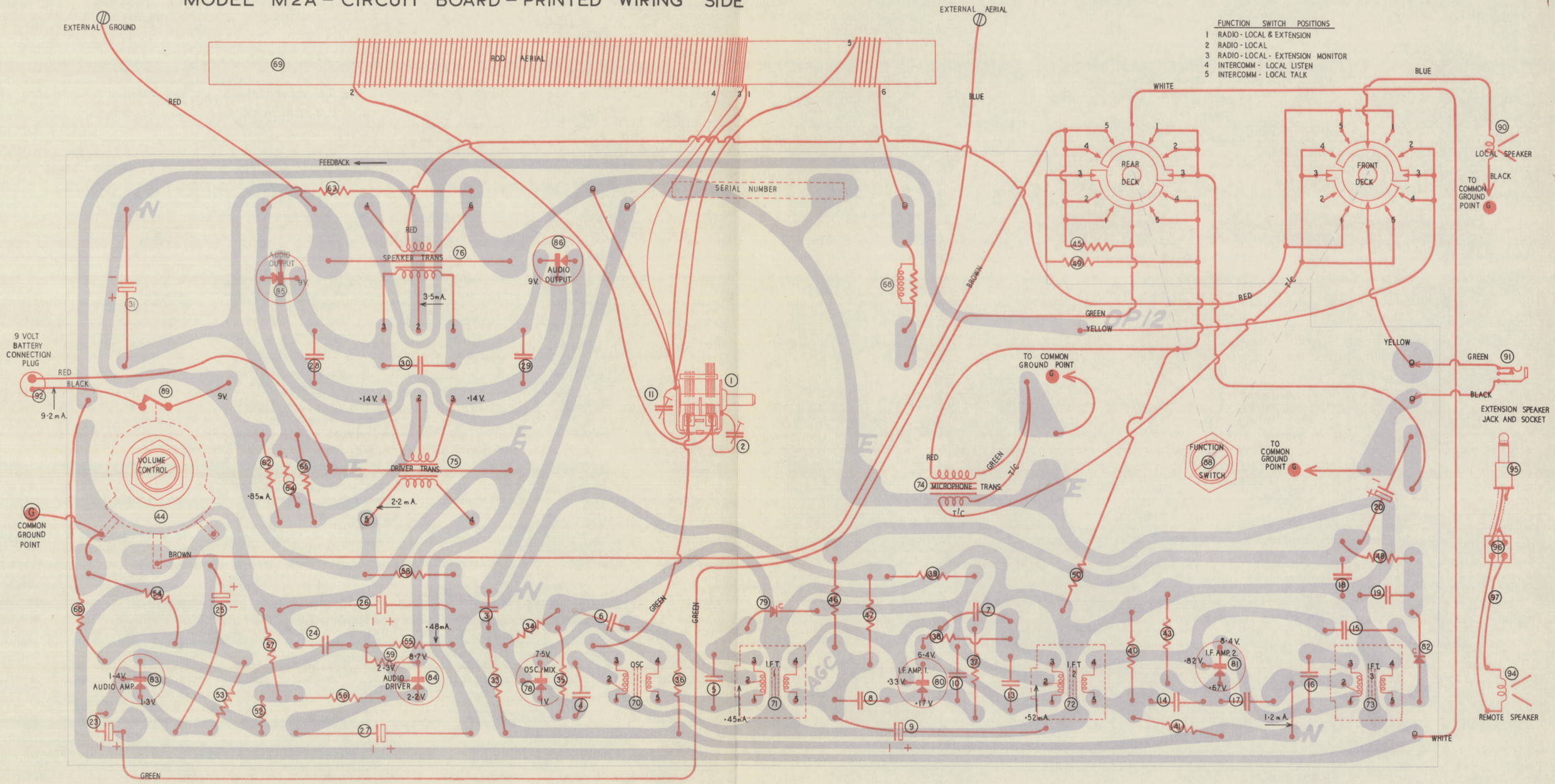
Colour - Wattle	7116-013-03
- Charcoal	7116-013-04
- Cherry	7116-013-05
- Flamingo	7116-013-09
- Squirrel	7116-013-10
Speaker Holder Clip	7055-374-02
Eyelet (2)	7086-088-03



NOTE 1: Circuit No. 39. 3.3K has been changed to 4.7K. ohms to provide uniformity of gain.

* NOTE 2: Type 2N410 Transistors are graded into Gain Groups identified by a colour spot located on top of Transistor Case; for optimum performance replacement Transistors should be of the same Gain Grouping.

MODEL M2A – CIRCUIT BOARD – PRINTED WIRING SIDE



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