

ASTOR

RADIO CORPORATION PTY. LTD.

DIVISION OF ELECTRONIC INDUSTRIES LTD.

126-130 GRANT STREET, SOUTH MELBOURNE, S.C.A.

TECHNICAL BULLETIN

File: Receivers
Portable

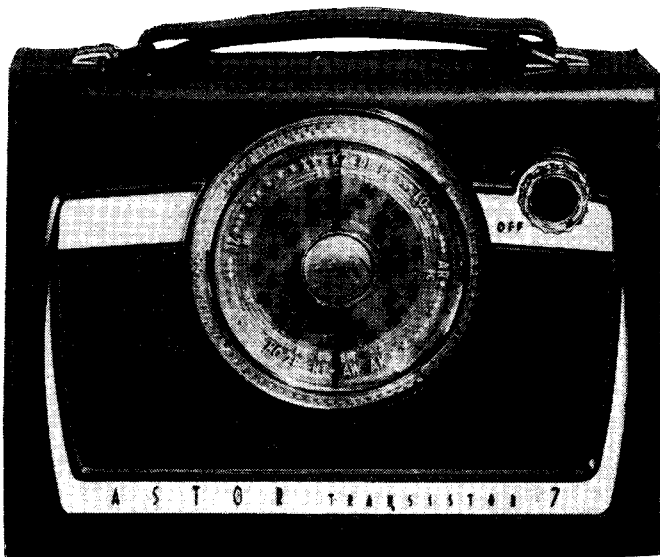
BULLETIN: BRP-1

Date: 7-10-59

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ASTOR MODEL "BRP"

TRANSISTOR MIDGET PORTABLE RECEIVER



THIS BULLETIN CONTAINS:

1. Alignment Instructions.
2. Circuit Diagram.
3. Component Parts List.
4. IF. & RF. Trans. Connections.
5. Transistor Placement Diagram.
6. Battery Replacement Instructions and Diagram.
7. Instruction for Removing Chassis from Leather Case.
8. Receiver Serial Number.
9. Receiver Servicing Precautions.
10. Instructions for Replacing Dial.

MODEL - BRP

FOR OPERATION FROM:

9 Volt battery

CURRENT CONSUMPTION:No signal - 10.5 mA.
250 mW Output - 63 mA.POWER OUTPUT:

250 Milliwatts

TUNING RANGE:535 to 1610 Kilocycles
560.7 to 186.3 Metres.INTERMEDIATE FREQUENCY:

455 Kilocycles

SERVICE INSTRUCTIONS (ELECTRICAL)

ALIGNMENT INSTRUCTIONS

<u>EQUIPMENT</u>		<u>ALIGNMENT CONDITIONS</u>
Signal Generator	: modulated 400 CPS.	Load Impedance: Sec. load imped. 4
Output Meter	:	Ohms (output
Mica Capacitor	: .01MF type PC145 for IFT. align- ment.	meter connected across speaker trans. sec.
Straight Align- ment Tool	: type PM581 for b/cast trim adj- ustment.	Output Level : 6 Milliwatts (voice coil open circuit)
Flexible Align- ment Tool	: type 48/712 for b/cast oscl. coil core adj.	Output Level : 2 Milliwatts (voice coil in circuit)
Hexagonal Align- ment Tool	: type 418/61 for IFT. core adj- ustment.	Volume control: Max. volume (fully clockwise)
		IF. Frequency : 455 Kc/s.
		Battery : 9 Volts.

INTERMEDIATE FREQUENCY TRANSFORMER ALIGNMENT

Remove the chassis from the leather case

Procedure for removing the chassis from the leather case is detailed in the Service Instructions (mechanical).

NOTE: 1. The iron core in the IF. transformers is the hexagonal bore type and may be adjusted with the hexagonal tip flexible alignment tool part No. 418/81 without removing the metal base plate from the chassis assy.

IMPORTANT If it is desired to remove the metal base plate, mark the position of the two screws on to the metal base plate to ensure correct position when refitting.

NOTE: 2. Two peaks may be obtained when adjusting the iron core in the IF. transformers. The correct peak is the peak obtained when the core is screwed furthest toward transformer base.

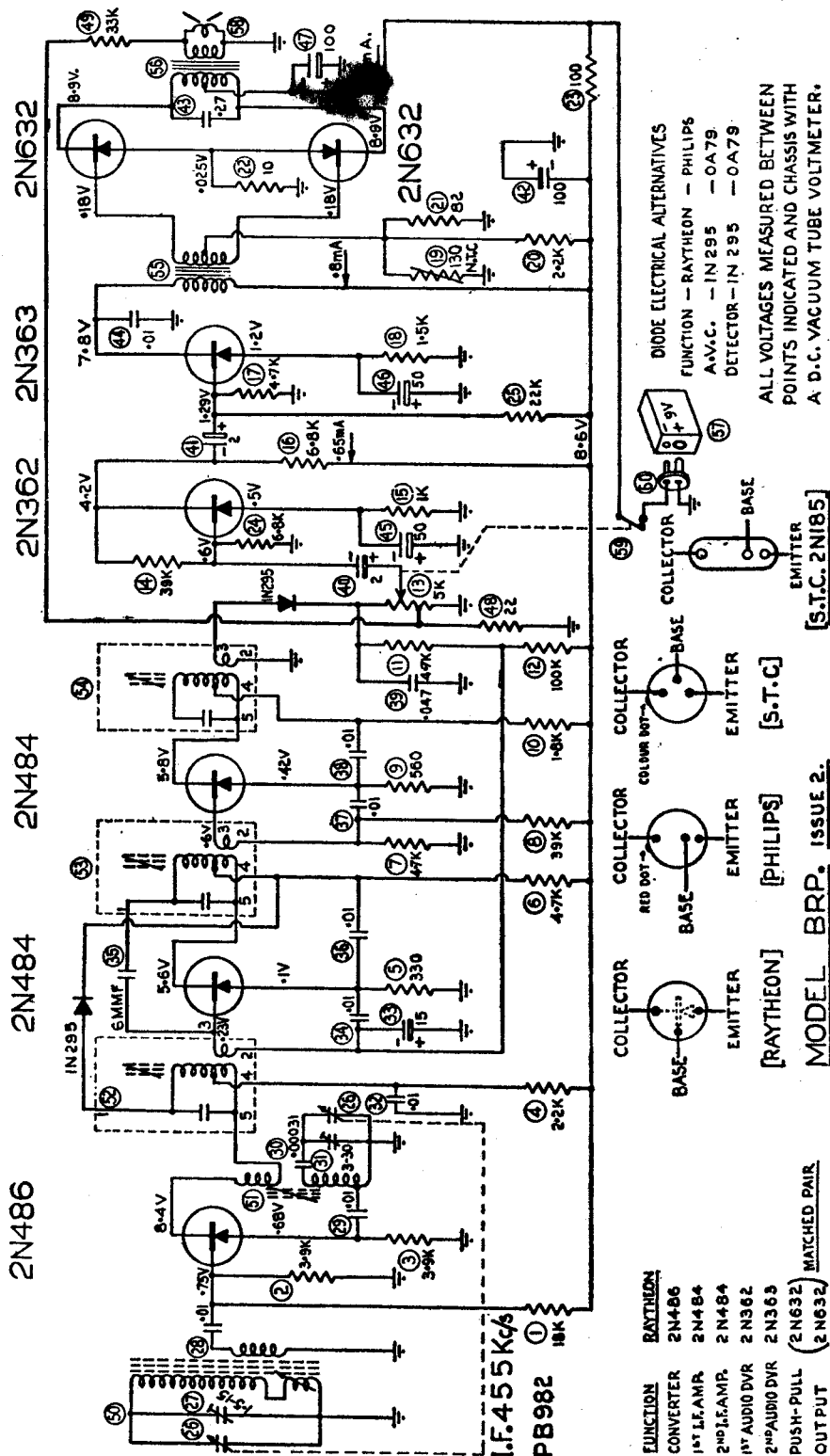
Operation No.	Generator Connection	Generator Frequency	Dummy Antenna	Instructions
1.	To converter transistor BASE lead: (junction of circuit No, 28, 1 and 2.)	455 Kc/s.	0.01MF mica condenser in series with generator.	Turn the cond. gang to the high frequency end of travel position. From top of 3rd IFT. peak iron core for max. output refer note 1 and 2 above.
2.	As operation No. 1	455 Kc/s.	"	From top of 2nd IFT. peak iron core for max. output.
3.	As operation No. 1	455 Kc/s.	"	From top of 1st IFT. peak iron core for max. output.
4.	Repeat operations No. 1, 2, and 3.			
5.	Refit the chassis into the cabinet.			

DIAL POINTER SETTING.

1. Remove the push-in type metal insert from the centre of the transparent tuning knob.
2. Loosen the three $\frac{1}{4}$ " x $\frac{3}{32}$ " whit. csk. hd. screws fastening the washer in the centre of the tuning knob.
3. Fully mesh condenser gang plates, then set centre of end of travel spot near 535 Kc/s. on dial reading to align with centre of indicator line on the dial background.
4. Securely tighten the three $\frac{3}{32}$ " 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 movable winding end of the ferrite rod points to the 2 ft. of aerial wire. A distance of not less than 1 ft. is to be between the end of the ferrite rod and the 2 ft. of vertical aerial wire attached to the signal generator.

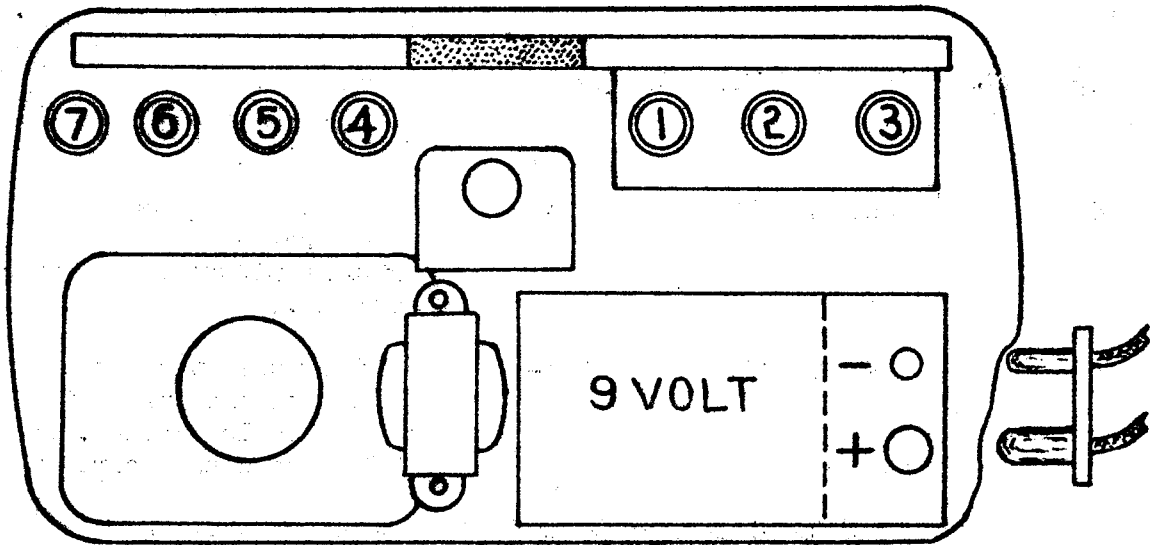
Operation No.	Generator Connection	Generator Frequency	Instructions
1.	Refer para. A and B.	600 Kc/s.	Turn cond. gang and dial until centre of 600 Kc/s spot on dial reading aligns with the centre of the indicator line on the dial background. Leave cond. gang and dial set in this position then peak oscl. coil ind. trim (iron core) for max. output. Also peak the movable winding on the ferrite rod for max. output.
2.	Refer para. A and B.	1470 Kc/s.	Turn cond. gang and dial until centre of 1470 Kc/s spot on dial reading aligns with indicator line on dial background. Adjust oscl. trim cond. for logging and peak ferrite rod aerial trimmer for max. output.
3.	Refer para. A and B.	600 Kc/s.	Turn cond. gang and dial until centre of 600 Kc/s spot on dial reading aligns with the centre of the indicator line on the dial background. Leave cond. gang and dial set in this position then peak oscl. coil ind. trim (iron core) and the movable winding on the ferrite rod aerial. Do not rock the cond. gang to and fro through the signal while adjusting the trimmers or move the 600 Kc/s spot on dial reading off the indicator line until after the trimmers have been adjusted for max. output.
4.	Refer para. A and B.	1470 Kc/s.	Turn cond. gang and dial until centre of 1470 Kc/s spot on dial reading aligns with indicator line on dial background. Readjust oscl. coil trim. cond. for logging and peak ferrite rod aerial trim. condenser for max. output.

Tuning range after alignment 535 to 1610 Kc/s.

PRECAUTIONS WHEN TESTING TRANSISTOR RECEIVERS

- A. A transistor is extremely sensitive to heat. When a defective transistor is being replaced, use a soldering iron which supplies just the required heat for unsoldering the connections. The connection leads of the transistor should be held by a pair of long-nose pliers as close as possible to the point of soldering. In this way excess heat is dissipated away from the internal elements of the transistor.

SERVICE INSTRUCTIONS (MECHANICAL)

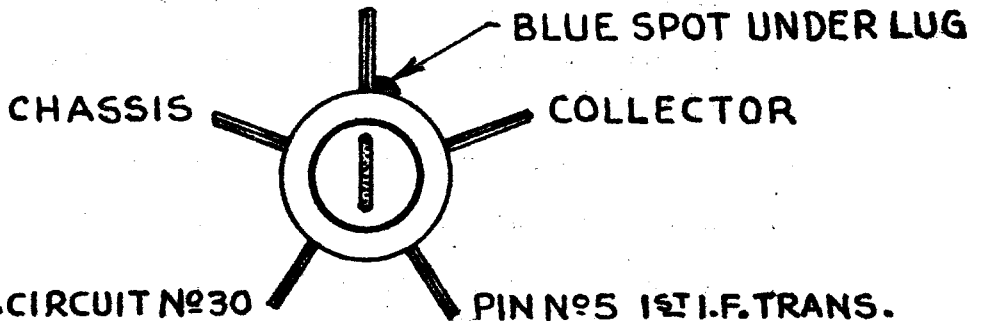


TRANSISTOR FUNCTIONS

NO.	FUNCTION	NO.	FUNCTION
1	CONVERTER	5	2 ND AUDIO DRIVER
2	1 ST I.F. AMPLIFIER	6	} PUSH-PULL OUTPUT
3	2 ND I.F. AMPLIFIER	7	
4	1 ST AUDIO DRIVER		

COIL AND TRANSFORMER CONNECTIONS

•01 MF. COND.
CIRCUIT N^o 29



OSCILLATOR COIL VIEWED FROM LUG END

- B. A continuity meter must not be applied to the receiver wiring with the transistors in circuit. A transistor must not be checked for continuity with an ohm meter as applied voltage and resultant excess current flow may result in permanent damage to the transistor. A voltmeter of the high impedance vacuum tube type is a safe means of measuring circuit voltages.
- C. A screwdriver or similar instrument must not be used to short components together or to the metal chassis. The use of this method of checking for the existance of voltage or signal clicks will result in permanent damage to the transistors and components.
- D. The receiver must not be operated at maximum power with the speaker voice coil open circuit. However, operation under open circuit conditions for short periods at low power levels is permissible.

ROD AERIAL CONNECTIONS

- 56 TURN FIXED PRIMARY WINDING:- Lead from end turn furthest from movable $4\frac{1}{2}$ turn winding. Connect to the tuning condenser and the trimmer condenser.
- $4\frac{1}{2}$ TURN MOVABLE PRIMARY WINDING:- Lead from end turn furthest from 56 turn winding. Connect to the chassis.
- 4 TURN FIXED SECONDARY WINDING:- (Interwound at end of primary); lead from end nearest to $4\frac{1}{2}$ turn movable winding. Connect to the chassis.
- 4 TURN FIXED SECONDARY WINDING:- (Interwound at end of primary); Lead from end furthest from $4\frac{1}{2}$ turn movable winding. Connect to O.OIMF condenser circuit No. 28.

INTERMEDIATE FREQUENCY TRANSFORMER CONNECTIONS

Connections for IF transformer base lugs are shown on the circuit diagram. The numbers correspond to the numbers on the transformer moulded base.

CHASSIS SERIAL NUMBER.

The chassis serial number is stamped into the metal chassis above the battery and is visible when the rear flap of the leather case is opened.

Three captive screws at the lower edge fasten the rear flap in position.

1. TO REMOVE CHASSIS ASSY. FROM LEATHER CASE

- A. Remove the metal insert from the centre of the tuning knob.
- B. Remove the three $3/32$ " Whit. screws fastening the metal washer into the centre of the tuning knob.
- C. Remove the metal washer and the tuning knob from the condenser gang bush.
- D. Remove the push-on type knob from the volume control spindle.
- E. Remove the two screws from the base of the leather case.
- F. Remove the two Phillip head screws fastening the leather handle loop covers in position.
- G. Unscrew the three captive screws fastening the rear flap of the leather case.
- H. Fully mesh the condenser gang then lift the chassis attached to moulded housing out of the leather case.

- I. Refitting the assembly into the cabinet is the reverse procedure to removing it.
To set the tuning dial knob in the correct position refer to the Broadcast alignment procedure.

2. TO REMOVE CHASSIS FROM MOULDED HOUSING

- A. Remove the chassis assy. from the leather case as detailed in paragraph 1.
- B. Disconnect the plug from battery socket, unfasten the clip and remove the battery.
- C. NOTE: The metal base plate does not have to be removed from the lower edge of the moulded housing. If it is desired to remove the metal base plate, mark the position of the two screws on to the base plate to ensure correct position when refitting.
- D. At the ends of the chassis remove the screw fastening the chassis to the moulded housing.
- E. Remove the two screws fastening the transformer situated central in the chassis below the condenser gang.
- F. Slightly lift chassis and unsolder leads from speaker terminals.
- G. Lift chassis and transformer off the moulded housing.
- H. Refitting the chassis to the moulded housing is the reverse procedure to removing it.

3. TO CHANGE DIAL READING

- A. Remove the tuning dial knob from the condenser gang bush as detailed in paragraphs 1A, B, and C.
- B. The dial reading is a press fit into the tuning knob and is located by four spigots.
- C. Carefully pull or prise the dial reading out of the knob.
- D. Locate the slots in the new dial reading with the spigots of the tuning knob then press the dial reading into the knob.
- E. Refit the tuning dial knob to the condenser gang bush then the centre washer and the three 3/32" Whit. screws. Do not tighten the screws.
- F. To set the tuning dial knob in the correct position refer to the Broadcast alignment procedure.

4. TO REMOVE THE BATTERY

- A. Switch the receiver OFF.
- B. Unscrew the three captive screws fastening the rear flap of the leather case.

Circuit No.	Description	Tol ⁺	Rating	Part No.
21.	82 Ohm wire wound resistor	10%	$\frac{1}{2}$ W	RI 57
22.	10 Ohm wire wound resistor	10%	$\frac{1}{2}$ W	PR 553
23.	100 Ohm " " "	10%	$\frac{1}{2}$ W	PR262
24.	6,800 Ohm carbon resistor	10%	$\frac{1}{2}$ W	R6822
25.	22,000 Ohm " "	10%	$\frac{1}{2}$ W	R2232
26.	Two gang variable condenser			C393
27.	1.5 - 15 MMF trimmer condenser			PC928
28.	.01 MF paper condenser	20%	200V DCW	E1033
29.	.01 MF paper condenser	20%	200V DCW	E1033
30.	310 MMF silvered mica condenser	2 $\frac{1}{2}$ %	500V DCW	C155
31.	3-30 MMF wire wound trimmer condenser			PC663
32.	.01 MF paper condenser	20%	200V DCW	E1033
33.	15 MF Electrolytic condenser	+100%-10%	15V DCW	C282
34.	.01 MF Paper condenser	20%	200V DCW	E1033
35.	6 MMF Silvered mica condenser	.25 MMF	500V DCW	C288
36.	.01 MF Paper condenser	20%	200V DCW	E1033
37.	.01 MF Paper condenser	20%	200V DCW	E1033
38.	.01 MF Paper condenser	20%	200V DCW	E1033
39.	.047 MF Paper condenser	20%	200V DCW	E4733
40.	2 MF Electrolytic condenser	+100%-10%	150V DCW	C281
41.	2 MF " "	+100%-10%	150V DCW	C281
42.	100MF " "	+100%-10%	150V DCW	C284
43.	.27 MF Paper condenser	20%	200V DCW	E2743
44.	.01 MF " "	20%	200V DCW	E1033
45.	50 MF Electrolytic condenser	+250%-10%	3V DCW	C307
46.	50 MF " "	+250%-10%	3V DCW	C307
47.	100 MF " "	+100%-10%	12V DCW	C284
48.	22 Ohm carbon resistor	10%	$\frac{1}{2}$ W	R2202
49.	33,000 Ohm carbon resistor	10%	$\frac{1}{2}$ W	R3332
50.	Ferrite rod aerial			L330
51.	Oscillator coil			L329
52.	No. 1 IF. transformer - 455 Kc/s red spot on lug 4			L331
53.	No. 2 IF. transformer - 455 Kc/s white spot on lug 4			L332
54.	No. 3 IF. transformer - 455 Kc/s blue spot on lug 4			L333
55.	Driver transformer - Pri. 4300 : Sec. CT 1250 Ohms impedance			L233
56.	Speaker input transformer - Pri. CT270 : 3.5 Ohms impedance			T234
57.	Battery - 9 volt, Eveready type 276-P			M470
58.	Speaker - 3" permag. type 3C. Cone No. F94			K118
59.	ON/OFF switch - SP.ST. part of vol. control circuit No. 13.			
60.	Plug - 2 pin, battery leads			482/30C
	Terminal strip assy. - 7 lug type 2E3E			A596/30C
	Terminal strip assy. - 2 lug type E1			A599/30C
	Terminal strip assy. - 9 lug type 1E4E2			A620/30C
	Terminal strip assy. - 7 lug type 4E2			A631/30C
	Terminal strip assy. - 9 lug type E6E1			A640/30C
	Terminal strip assy. - 8 lug type 2E3E1			A593/30C
	Aerial rod mount pillar (2)			278/81
	Clip (2) aerial rod mt.			453/250
	Clip - oscl. coil mt.			6/622
	Clip (3) IF. transformer mt.			510/250
	Wire clip - battery retainer			59/849
	Tuning knob - includes gold finish metal ring.			A114/849
	Insert - gold finish metal - centre of tuning knob.			50/849

- C. Open the flap and release the wire retaining clip from the battery.
- D. Lift the battery upward and disconnect the two pin plug from the battery.
- E. Fitting of a new battery is the reverse procedure to removing it.

STORAGE WHEN OUT OF USE

It is not advisable to leave an exhausted battery in the receiver. If the receiver is stored away or not required for long periods, even partly-used batteries should be removed and stored in a dry cool place. This is a precautionary measure against the swelling and corroding action of worn-out batteries, which applies to all battery operated devices, such as torches, etc.

CLEANING AGENT FOR CABINET

Do not polish the leather case or plastic 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 case and plastic sections.

To restore the lustre of the case and plastic sections, wipe with a soft cloth dampened with water and lightly polish with 'PEPCO' furniture polish.

Circuit No.	Description	Tol ⁺	Rating	Part No.
1	18,000 Ohm carbon resistor	10%	$\frac{1}{2}W$	R1832
2	3,900 Ohm carbon resistor	10%	$\frac{1}{2}W$	R3922
3	3,900 Ohm carbon resistor	10%	$\frac{1}{2}W$	R3922
4	2,200 Ohm carbon resistor	10%	$\frac{1}{2}W$	R2222
5	330 Ohm carbon resistor	10%	$\frac{1}{2}W$	R3312
6	4,700 Ohm carbon resistor	10%	$\frac{1}{2}W$	R4722
7	4,700 Ohm carbon resistor	10%	$\frac{1}{2}W$	R4722
8	39,000 Ohm carbon resistor	10%	$\frac{1}{2}W$	R3932
9	560 Ohm carbon resistor	10%	$\frac{1}{2}W$	R5612
10	1800 Ohm carbon resistor	10%	$\frac{1}{2}W$	R1822
11	4,700 Ohm carbon resistor	10%	$\frac{1}{2}W$	R4722
12	100,000 Ohm carbon resistor	10%	$\frac{1}{2}W$	R1042
13	5,000 Ohm tapped at 600 Ohms SP.ST. switch attached			R213
14	39,000 Ohm carbon resistor	10%	$\frac{1}{2}W$	R3932
15	1,000 Ohm carbon resistor	10%	$\frac{1}{2}W$	R1022
16	6,800 Ohm carbon resistor	10%	$\frac{1}{2}W$	R6822
17	4,700 Ohm carbon resistor	10%	$\frac{1}{2}W$	R4722
18	1,500 Ohm carbon resistor	10%	$\frac{1}{2}W$	R1522
19	130 Ohm disc type negative temperature coefficient resistor	10%	1W	R167
20	2,200 Ohm carbon resistor	10%	$\frac{1}{2}W$	R2222

Dial reading - N.S.W.	676/81-2
Dial reading - VIC/TAS.	676/81-3
Dial reading - QLD	676/81-4
Dial reading - SA./WA.	676/81-5
Dial background	713/250
Volume control knob assy.	A110/785-5
includes	
Insert - gold finish	59/785-6
Circlip	22/755
Bush - cond. gang shaft	52/849
Escutcheon	57/849
Grille	58/849
Grille background - rubber	75/849
Speed nut (8) grille fastening	627/250-12
Screw (3) leather case rear flap	256/415
Clip (3) rear flap screws	700/250-2
Metal base plate - chassis mt.	61/849
Speed nut (3) base plate, rear flap screws, 4BA	476/250-1
Speed nut (2) " " , leather case base screws	476/250-4
Screw (2) leather case base, $\frac{1}{2}$ " x No. 4 oval csk.	37/560-39
Cup washer (2) base screws	293/250-2
Handle loop (2) gold finish	62/849
Mount plate (2) handle loop	63/849
Cover plate (2) gold finish, loop mt. plate	65/849
Screw (2) gold finish, cover plate, $\frac{1}{2}$ " x No. 4 Phillips hd.	97/560-5
Speednut (2) cover plate screws	476/250-4
Moulded housing - chassis mt.	60/849
Speednut (4) fastens speaker to moulded housing	627/250-1
Nut - vol. control bush	41/161
Washer - $\frac{3}{8}$ " int. shakeproof	1/562-15

STYLING.

Leather case and handle - Flame	A121/849-1
consists of -	
Case -	55/849-1
Handle -	56/849-1
Leather case and handle - Tan	A121/849-2
consists of -	
Case -	55/849-2
Handle -	56/849-2
Leather case and handle - Flight Blue	A121/849-3
consists of -	
Case -	55/849-3
Handle -	56/849-3
Leather case and handle - Dove Grey	A121/849-4
consists of -	
Case -	55/849-4
Handle -	56/849-4

TRANSISTOR ELECTRICAL ALTERNATIVES

The Model 'BRP' receiver is designed to use a Raytheon brand transistor complement as detailed below in group 1.

Other transistor complements which may be used are detailed in groups 2 to 11.

<u>GROUP 1.</u>	Converter	2N486	Raytheon	
	1st IF.	2N484	"	
	2nd IF.	2N484	"	
	1st Audio	2N362	"	
	Driver	2N363	"	
	Output	2N632	"	} Matched pair
	Output	2N632	"	

<u>GROUP 2.</u>	Converter	OC44	Philips	
	1st IF.	OC45	"	
	2nd IF.	OC45	"	
	1st Audio	OC75	"	
	Driver	OC71	"	
	Output	OC72	"	} 2-OC72 matched pair
	Output	OC72	"	

* <u>GROUP 3.</u>	Converter	2N486	Raytheon	
	1st IF.	2N308	S.T.C.	
	2nd IF.	2N309	"	
	1st Audio	2N362	Raytheon	
	Driver	TS2	S.T.C.	
	Output	2N185	"	} Matched pair
	Output	2N185	"	

* Circuit No. 35. 6 MMF neutralizing condenser is deleted when using the IF. amplifier transistors of this group.

<u>GROUP 4.</u>	Converter	2N486	Raytheon	
	1st IF.	2N484	"	
	2nd IF.	2N484	"	
	1st Audio	2N362	"	
	Driver	TS2	S.T.C.	
	Output	2N185	"	} Matched pair
	Output	2N185	"	

* <u>GROUP 5.</u>	Converter	2N486	Raytheon	
	1st IF.	2N308	S.T.C.	
	2nd IF.	2N309	"	
	1st Audio	2N362	Raytheon	
	Driver	2N363	"	
	Output	2N185	S.T.C.	} Matched pair
	Output	2N185	"	

* Circuit No. 35. 6 MMF neutralizing condenser is deleted when using the IF. amplifier transistors of this group.

GROUP 11 TRANSISTOR COMPLEMENT.

Group 11 transistor complement was used only in the first production run.

Some receivers which incorporate this group of transistors were found to develop excessive audio background noise after a period of use.

The excessive background noise may be remedied by fitting a type 2N362 transistor in place of the type TS3 in the first audio stage.

NEGATIVE TEMPERATURE COEFFICIENT RESISTOR

Due to a shortage of the 130 Ohm Negative Temperature Coefficient resistor, part No. R167 circuit No. 19, the components listed below will be used until the 130 Ohm Neg. Temp. Coefficient resistor is available.

Circuit No. 19 ----- 130 Ohm N.T.C. resistor changed to a 350 Ohm tubular type N.T.C. resistor part No. R259.

Circuit No. 20 ----- 2200 Ohm resistor changed to a 6800 Ohm 10% $\frac{1}{2}W$ carbon resistor part No. R6822.

Circuit No. 21 ----- 82 Ohm resistor changed to a 330 Ohm 10% $\frac{1}{2}W$ carbon resistor part No. R3312.

The above three circuit changes must all be used in conjunction with one another.

<u>GROUP 6.</u>	Converter	2N486	Raytheon	
	1st IF.	2N484	"	
	2nd IF.	2N484	"	
	1st Audio	2N362	"	
	Driver	TS2	S.T.C.	
	Output	2N632	Raytheon	} Matched pair
	Output	2N632	"	

<u>GROUP 7.</u>	Converter	2N486	Raytheon	
	1st IF.	2N484	"	
	2nd IF.	2N484	"	
	1st Audio	2N362	"	
	Driver	TS3	S.T.C.	
	Output	2N632	Raytheon	} Matched pair
	Output	2N632	"	

<u>GROUP 8.</u>	Converter	2N486	Raytheon	
	1st IF.	2N484	"	
	2nd IF.	2N484	"	
	1st Audio	2N363	"	
	Driver	2N363	"	
	Output	2N185	S.T.C.	} Matched pair
	Output	2N185	"	

<u>GROUP 9.</u>	Converter	2N486	Raytheon	
	1st IF.	2N308	S.T.C.	
	2nd IF.	2N309	"	
	1st Audio	2N363	Raytheon	
	Driver	2N363	"	
	Output	2N185	S.T.C.	} Matched pair
	Output	2N185	"	

* Circuit No. 35. 6 MMF neutralizing condenser is deleted when using the IF. amplifier transistors of this group.

<u>GROUP 10.</u>	Converter	OC44	Philips	
	1st IF.	OC45	"	
	2nd IF.	OC45	"	
	1st Audio	OC71	"	
	Driver	OC71	"	
	Output	OC72	"	} 2-OC72 matched pair
	Output	OC72	"	

<u>GROUP 11.</u>	Converter	2N486	Raytheon	
	1st IF.	2N484	"	
	2nd IF.	2N484	"	
	1st Audio	TS3	S.T.C.	
	Driver	TS2	"	
	Output	2N185	"	} Matched pair
	Output	2N185	"	

// Refer page 14 for details on this group.