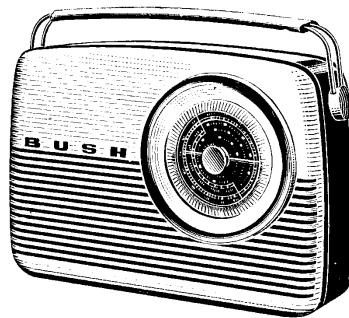


# BUSH RADIO

## Service Information

### Models TR.82B & TR.82C Transistor-portable Radios



2398

#### GENERAL DESCRIPTION

##### GENERAL

The TR.82B and TR.82C are electrically the same and except where otherwise stated the information contained in this manual applies to both. Both are two-waveband battery-operated receivers using seven transistors and one crystal diode.

##### CABINET

Both receivers have a moulded 3-piece plastic cabinet.

The TR.82B is finished in brown and brass.

The TR.82C is finished in blue and chrome.

##### DIMENSIONS (including handle)

Height 10 $\frac{3}{4}$  in. (27.3 cm.)  
Width 13 $\frac{1}{2}$  in. (34 cm.)  
Depth 3 $\frac{3}{4}$  in. (9.5 cm.)  
Weight 7 $\frac{1}{4}$  lb (3.3 kg)

#### SPECIFICATION

##### CONTROLS

In the recess at the top of the case: From left to right: Volume control, two-push-button wave-change switch, Tone control and On/off switch.

The tuning control is on the front.

##### BATTERY

Ever Ready PP9 or  
Vidor T6009 or  
Drydex DT9

##### CONSUMPTION

20–30 mA on an average programme and varying according to Volume control setting (class B output stage).

##### INTERMEDIATE FREQUENCY

470 kc/s.

##### SOUND OUTPUT

220 mW at 10% distortion.

##### LOUDSPEAKER

5 in. circular, 10,000 lines flux density. (There is no provision for the connection of an external speaker.)

##### WAVEBANDS

M.W. 187 to 570 metres (1,605 to 525 kc/s)  
L.W. 1,070 to 1,900 metres (280 to 158 kc/s)

##### AERIAL

An internal ferrite-rod aerial is fitted for use on both wavebands.

There is also provision for connecting an external aerial. This is intended to be used for connecting to the car aerial when the receiver is used in a car.

##### TRANSISTORS

Mullard Type:—

OC44 mixer/oscillator  
OC45 i.f. amplifier  
OC45 i.f. amplifier  
OC72 audio amplifier  
OC72 driver  
OC72 } push-pull output  
OC72 }

##### CRYSTAL DIODE

OA70 detector

Audio Transistors used in later models are

OC81D driver  
OC81 } push-pull output  
OC81 }

## TRANSISTORS

### GENERAL

Transistors may be expected to last indefinitely if used under the correct conditions and handled carefully.

The transistors may be damaged if the junction temperature rises above certain limits. Generally these limits are 75°C for continuous operation or 90°C for intermittent operation.

The junction temperature is the resultant of (1) the heat generated at the junction and (2) the ambient temperature.

This receiver is designed so that it may be safely operated over long periods in an ambient temperature of up to 40°C (105°F) without any risk of damage to the transistors. This represents a safe margin for a receiver used in the United Kingdom.

### SERVICING HINTS

When soldering transistors grip the lead between the joint and the transistor with a pair of pliers as a heat sink. Use a small iron with a small thermal capacity. Do not bend the leads close to the transistor.

Do not remove or attach a transistor with the potential applied.

Exceeding the rated dissipation can produce a rise in temperature sufficient to destroy the junction. When checking the operating point of a transistor it is advisable to meter the collector current and the collector to emitter voltage.

It is not advisable to use an ohmmeter to check transistors. Some ohmmeters will cause excessive collector current and destroy the transistor. But if it is necessary to use an ohmmeter the correct polarity must be observed and the full-scale current of the range used must be 1 mA or less. To illustrate this, the consumption on the  $\times 100\Omega$  range on an AVO model eight at full-scale deflection is approximately 70mA.

## REMOVING CHASSIS FROM CABINET

Loosen the large screw in the centre of the cabinet back and remove the back.

Disconnect and remove the battery.

Remove the Tuning knob and the pointer from the front of the cabinet.

The Tuning knob is difficult to grip with the hand and a useful tool for this purpose is a rubber suction-pad sink cleaner. The pad is pressed on the knob and the knob may then be removed without straining it unduly.

Loosen and remove the four chassis-retaining screws.

Lift the chassis out of the cabinet from the bottom allowing the control knobs and tuning spindle to clear their respective holes.

When the pointer is replaced turn the tuning-capacitor spindle until the vanes are fully meshed and then line up the pointer with the datum line on the scale.

## ALIGNMENT PROCEDURE

### PRELIMINARY NOTES

1 Equipment required:—

- 1 A signal generator with a frequency range of 214 kc/s to 1,500 kc/s modulated 30 per cent at 400 c/s.
- 2 An output wattmeter with a range of 0–200 mW.
- 3 A special non-ferrous trimming tool suitable for adjusting the IFT and oscillator cores.
- 4 ~~A short length of lead with crocodile clips.~~

2 The r.f. and oscillator circuits must be aligned with the chassis in the case. For i.f. alignment the chassis must be taken out of the case.

3 The signal generator should be switched on about 15 minutes before beginning the alignment.

4 Set the receiver Volume control to maximum and the Tone control to maximum top response and use the lowest input from the signal generator consistent with a reasonable output from the receiver.

## I.F. ALIGNMENT

*NOTE* The outer peak is the correct one for all IFT adjustments.

1 Switch the receiver to M.W. band and set the Tuning control to approximately 300 metres.

2 Set the signal generator to 470 kc/s modulated 30 per cent at 400 c/s. Connect the output via a 0.1 $\mu$ F blocking capacitor to the test point located on the chassis above TR1 and align IFT3, IFT2 and IFT1 in that order for maximum audio output.

~~Remove the short on the oscillator trimmer.~~ Align each IFT once only.

## R.F. ALIGNMENT

*NOTE:* For r.f. alignment the signal generator should be coupled to the receiver by a loop of insulated wire placed about 3 feet from the chassis and with its plane at right angles to the ferrite rod aerial.

Operation	Waveband	Signal Generator Frequency	Receiver Setting	Adjustment (for maximum output)
1	M.W.	600 kc/s	500 metres	Core of L6/7/8 (osc.)
2	M.W.	1,500 kc/s	200 metres	TC4 (osc.) and TC2 (aerial)
3	Repeat operations 1 and 2.			
4	L.W.	214 kc/s	1,400 metres	TC1 & TC3 (osc.) and TC5 & TC6 (aerial)
5	Check calibration.			

The ferrite-rod aerial is unlikely to require adjustment but if necessary the former of the M.W. coil (L4) may with care, be adjusted with the chassis in the cabinet for maximum output with a 600 kc/s signal. TC2 should then be re-checked, with a 1,500 kc/s signal applied. The L.W. coil (L2) should not be moved.

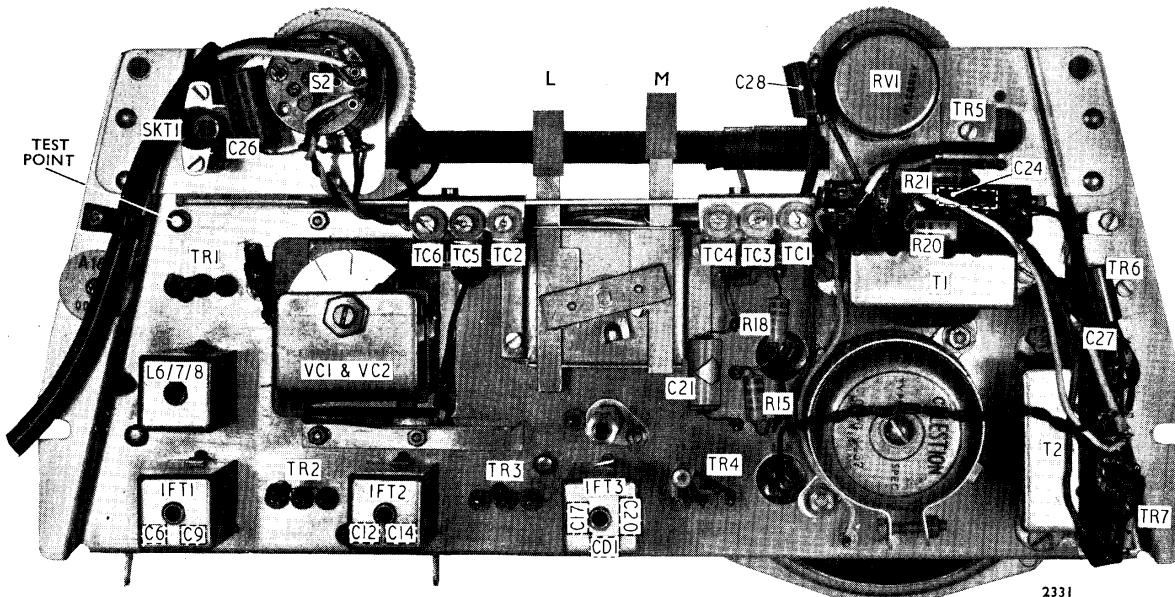
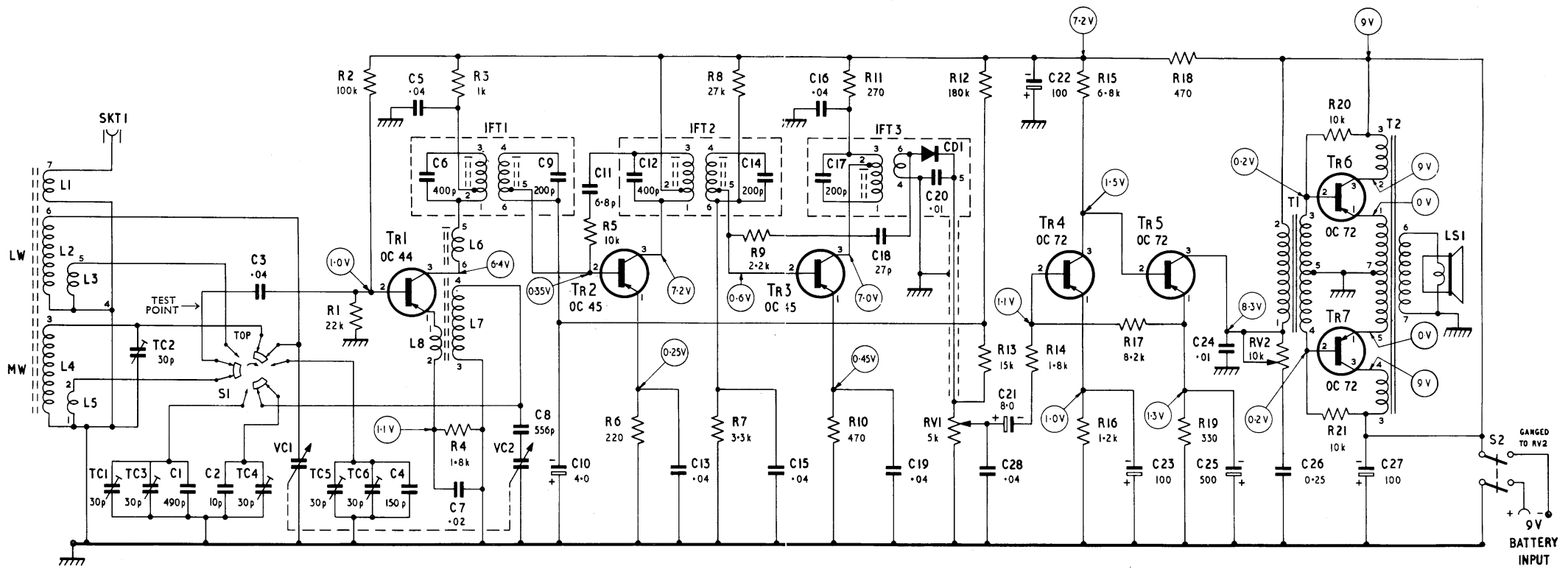


Fig. 1 Back view of chassis



2375

Fig. 2 Circuit diagram

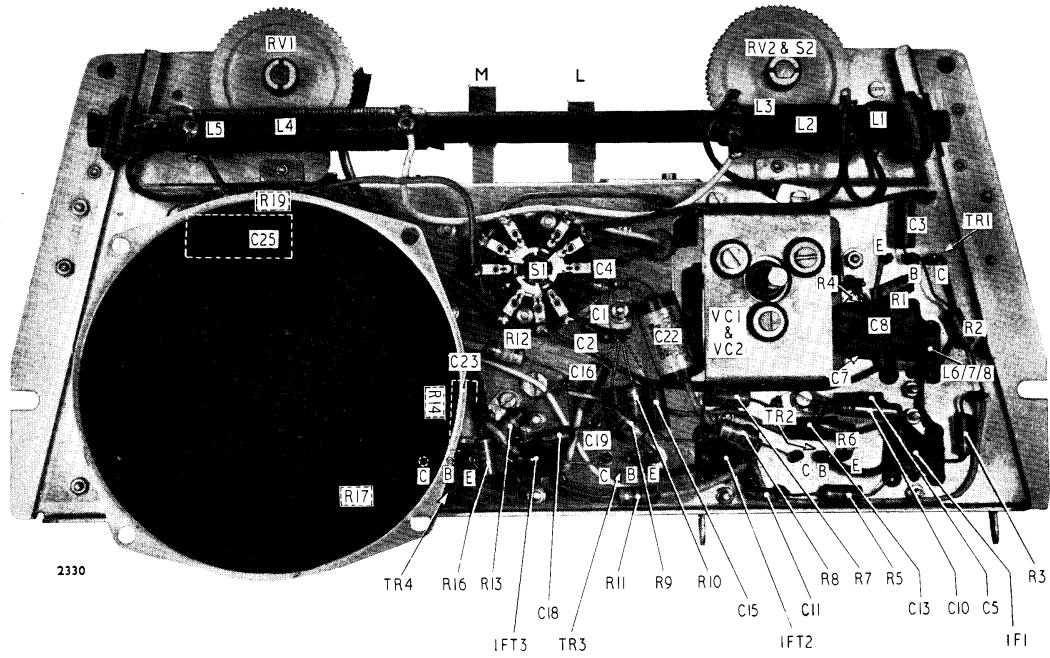
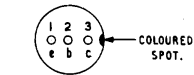
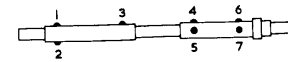


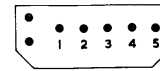
Fig. 3 Front view of chassis



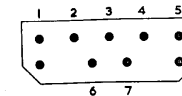
BASE OF TRANSISTOR.



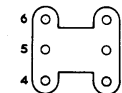
FERRITE AERIAL.



DRIVER TRANSFORMER.



OUTPUT TRANSFORMER.



IFT. & OSC. COIL BASE  
VIEWED FROM BELOW.

NOTES.

ALL VALUES OF RESISTANCE IN OHMS.  
ALL VALUES OF CAPACITANCE IN  $\mu$ F  
UNLESS OTHERWISE STATED.

S1 SHOWN IN M.W. POSITION, VIEWED  
FROM FRONT OF RECEIVER. "TOP"  
INDICATES THOSE CONTACTS WHICH  
ARE NEAREST THE OPERATING KEYS.

VOLTAGES INDICATED ARE NEGATIVE WITH  
RESPECT TO CHASSIS & MEASURED WITH  
AVO No. 8 UNDER NO SIGNAL CONDITIONS  
& WITH VOLUME CONTROL SET TO ZERO.

## PARTS LISTS

*NOTE:* Ordering to these part numbers will give the right type and rating of component. When fitting replacements from stock always use the same type as that of the component being replaced.

### CAPACITORS

Reference	Value		Tolerance (±%)	Rating (volts)	Part Number
	μF	pF			
C1	—	490	2	125	AP62698
C2	—	10	5	750	AP24629
C3	0.04	—	20	150	AP61237
C4	—	150	2	125	AP61925
C5	0.04	—	20	150	AP61237
C6	—	400	2	125	AP62650
C7	0.02	—	20	150	AP22251
C8	—	556	1	125	AP62364
C9	—	200	2	125	AP61842
C10	4.0	—	−20 +100	12	AP62174
C11	—	6.8	½p	750	AP62168
C12	—	400	2	125	AP62650
C13	0.04	—	20	150	AP61237
C14	—	200	2	125	AP61842
C15	0.04	—	20	150	AP61237
C16	0.04	—	20	150	AP61237
C17	—	200	2	125	AP61842
C18	—	27	½p	750	AP62169
C19	0.04	—	20	150	AP61237
C20	0.01	—	20	150	AP62551
C21	8.0	—	−20 +100	12	AP62173
C22	100	—	−20 +100	12	AP62170
C23	100	—	−20 +100	3	AP62171
C24	0.01	—	20	400	AP21909
C25	500	—	−20 +100	6	AP62172
C26	0.25	—	20	150	AP21244
C27	100	—	−20 +100	12	AP62170
C28	0.04	—	20	150	AP61237
TC1, 3 & 4	—	3-30	—	—	AP102119
TC2, 5 & 6	—	3-30	—	—	AP102119
VC1 } VC2 } ganged	523p	—	—	—	CP62145

C20 Part No. should be AP62651 or AP24117

### RESISTORS

Reference	Value (ohms)	Tolerance (±%)	Rating (watts)	Part Number
R1	22k	5	¼	P6707
R2	100k	5	¼	P6875
R3	1k	10	¼	P6365
R4	1.8k	10	¼	P6425
R5	10k	10	¼	P6617
R6	220	5	¼	P6203
R7	3.3k	5	¼	P6497
R8	27k	5	¼	P6725
R9	2.2k	10	¼	P6449
R10	470	5	¼	P6287
R11	270	10	¼	P6215
R12	180k	5	¼	P6935
R13	15k	5	¼	P6665
R14	1.8k	10	¼	P6425
R15	6.8k	10	¼	P6575
R16	1.2k	5	¼	P6389
R17	8.2k	5	¼	P6599
R18	470	10	¼	P6281
R19	330	5	¼	P6245
R20	10k	5	¼	P6623
R21	10k	5	¼	P6623
RV1	5k log	20	—	BP62033
BV2	10k inv. log	20	—	BP61950

## COILS AND TRANSFORMERS

<i>Reference</i>	<i>Description</i>	<i>Resistance (ohms)</i>	<i>Part Number</i>
L1	Aerial coupling coil	0.8	} AP61784
L2	} L.W. ferrite aerial coils	12.0	
L3		1.5	
L4	} M.W. ferrite aerial coils	0.5	
L5		much less than 1.0	
L6		much less than 1.0	
L7	} M.W. & L.W. oscillator	2.0	} BS62607*
L8		much less than 1.0	
IIFT1	1st i.f. transformer	—primary 5.5 —secondary 8.0	BS62606*
IIFT2	2nd i.f. transformer	—primary 5.5 —secondary 8.0	BS62606*
IIFT3	3rd i.f. transformer	—primary 9.0 —secondary 0.8	BS62605*
T1	Driver transformer	—primary 170 —secondary 200 + 200	BS62191 (BS62190 with C & R's)
T2	Output transformer	—tags 2 & 4 2.6 tags 1 & 5 20.0 tags 6 & 7 0.19	CS62187

\* Iron dust core AP61784.

L1 to 5 Ferrite aerial assembly Part No. should  
be DS62194

## MISCELLANEOUS

<i>Description</i>	<i>Part Numbers</i>	
	<b>TR.82B</b>	<b>TR.82C</b>
Cabinet body, less trim	BS62430	BS62431
Cabinet back	AP62344	AP62347
Cabinet front, less trim	AP62343	AP62346
Cabinet, bezel	AP60190	AP62336
Cabinet, edge trim	AP60196	AP62342
Control panel, moulded	AP62345	AP62348
Felt strip for tuning knob	AP60607	AP60607
Handle	DP62401	DP62349
Knob, Long	AP62354	CP60214
Knob, Medium	AP62353	CP60215
Knob, Tuning	BS62436	BP62437
Knob, Volume or Tone	AP62352	CP60204
Long and Medium Knobs—metal connecting piece	AP62157	AP62157
Long and Medium Knobs—plastic connecting sleeve	AP62158	AP62158
Pointer	AP60276	AP60276
Socket, coaxial type CRS 300	AP61162	AP61162
Speaker (5-in. round)	AP62244	AP62244
Tuning scale	DP60514	DP60514

## MODIFICATIONS

On models, serial numbers 1-100,

C1 was 470pF, 2%, 125V, AP62166.

C2 was 22pF, 10%, 750V, AP61169.

### Page 2 :—Alignment Procedure

1. Equipment required, item 4 delete—" A short length of lead with crocodile clips".

### Page 3 :—I.F. Alignment

After operation 2, delete—" Remove the short on the oscillator trimmer".

#### TR.82B & TR.82C SERVICE INFORMATION

##### MODIFICATION

The transistor line-up is now :-

OC44	mixer / oscillator
OC45	i. f. amplifier
OC45	i. f. amplifier
OC71	audio amplifier
OC78D	driver
OC78	push-pull output
OC78	push-pull output

The average audio sensitivity of the receivers is not affected.

#### BUSH RADIO LIMITED, LONDON

TP1224/1/11/59/50

Printed in England

#### Model TR.82 SERVICE INFORMATION

##### MODIFICATIONS

On models from serial No. 20,001 onwards,

C10 is 8 $\mu$ F, -20+100%, 6V. wkg, Pt. No. AP63021

R15 is 5.6k, 10%, 1/4W, Pt. No. P6551

R17 is 7.5k, 5%, 1/4W, Pt. No. P6587

On some models from serial No. 20,001 onwards,

R20 was 12k, 5%, 1/4W. Pt. No. P6641

R21 was 12k, 5%, 1/4W, Pt. No. P6641

On later models,

R20 is 9.1k, 5%, 1/4W, Pt. No. P6605

R21 is 9.1k, 5%, 1/4W, Pt. No. P6605

On some models a 0.1 $\mu$ F  $\pm$ 20% capacitor, 400V wkg. paper dielectric, Pt. No. AP21909 may be connected between pins 4 and 5 of the driver transformer.

##### Erratum

Ferrite aerial part No. should be AP62194

## SPARES AND SERVICE

When ordering replacement components, please give the following information:—

- 1 The model number and serial number of the receiver.
- 2 Description and part number of the components and the quantity required.

To avoid unnecessary delay, orders for replacement parts and requests for technical information should be addressed to:—

THE SERVICE DEPARTMENT

## BUSH RADIO LIMITED

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