"HIS MASTER'S VOICE"

SERVICE MANUAL

for

7-TRANSISTOR - 12-VOLT

CAR RADIOS

Models S1 and S2

■

Manufactured and Distributed by

E.M.I. (AUSTRALIA) LIMITED

(Incorporated in N.S.W.)

HOMEBUSH - N.S.W.

■

PART No. 683-3411

GENERAL DESCRIPTION

S1 and S2 Car Radio's are comprised of 7-transistor, high-sensitivity, permeability tuned, superheterodyne, medium-wave receivers with push-pull audio output stages, tuned by pre-set push-buttons and/or manual control.

SPECIFICATIONS

FREQUENCY RANGE:
525 - 1,630 Kc/s.

INTERMEDIATE FREQUENCY:
455 Kc/s.

EARTHING POLARITY:
Reversible.

Earthing polarity is selected by pulling polarity plug out of its socket, and rotating it to bring either the Red or the Black dot on the plug adjacent to the arrow-head stamped on the receiver case.

Red dot to arrow head: Positive earth.

Black dot to arrow head: Negative earth.

Note: The correct vehicle polarity position is given in the kit installation instructions.

OPERATING VOLTAGE
Models S1 and S2: 12-14 volts.

AERIAL INPUT

The aerial input circuits have been designed to operate with up to 150 pF total aerial and lead capacity, i.e., with standard lead (10 pF per foot) up to a maximum of ten feet. Lengths greater than ten feet can be accommodated by changing the value of the capacitor in series with CH1 from 330 pF to 150 pF.

The aerial trimmer should be adjusted on a weak signal at approximately 1,300 Kc/s.

Where a fully retractable aerial is used, the bottom segment of the aerial should be fully extended before adjusting the aerial trimmer.

MODEL S1

Model S1 is a manually-tuned, single unit receiver, with separate loudspeaker, and is designed for universal fitting.

The circuitry contains the following elements:

A tuned aerial stage, a tuned R.F. stage, a frequency converter stage, two I.F. amplifying stages, a detector diode, an audio driver stage and a push-pull output stage.

AGC voltage is derived from the detector diode and is applied to the RF and IF stages.

A continuously variable tone control is provided, to allow adjustment for individual preference.

Negative feedback is provided in the emitter circuit of the driver transistor to reduce distortion and improve the audio frequency response.

RECEIVER CONTROLS

ON/OFF SWITCH: Consists of two push-buttons below the dial scale. When the left-hand 'ON' button is pushed in, the receiver will be switched on, and the button will remain in. When the right-hand 'OFF' button is pushed in, the receiver will be switched off, and both buttons will return to the 'out' position.

VOLUME CONTROL: Is the smaller of the concentric knobs to the left of the dial scale.

TONE CONTROL: Is the larger knob concentric with the volume control. This control provides continuously variable tone adjustment, from a flat frequency response in the maximum clockwise position, with progressive treble-cut as the control is rotated anti-clockwise.

TUNING CONTROL: Is the knob to the right of the dial scale, and provides completely variable station selection.

DIMENSIONS:
Height: 2 inches.
Width: 7 inches.
Depth: $5\frac{3}{4}$ inches.
Weight: $3\frac{3}{4}$ lbs.

TRANSISTORS
AF 116NS—R.F. Amplifier
AF 116N—Frequency Converter
AF 117N—First IF Amplifier
AF 117N—Second IF Amplifier
AC 125—Audio Driver
2/AC 128—Audio Output (matched pair)
AA 119—Detector and AGC Diode.

CONSUMPTION (including lamp)
Approximately 200 mA under no-signal conditions.

FUSE
2 amps.

DIAL LAMP
16 volts, 0.2 amps., Philips BA 95.

LOUDSPEAKER IMPEDANCE
3.7 ohms at 400 c.p.s.

UNDISTORTED POWER OUTPUT
Approximately 1.5 watts.

MODEL S2

Model S2 is a push-button or manually-tuned receiver, physically divided into two sections, comprised of a Control Unit and an Amplifying Unit, with a separate loudspeaker, and is designed for universal fitting.

CONTROL UNIT

Contains the following stages:

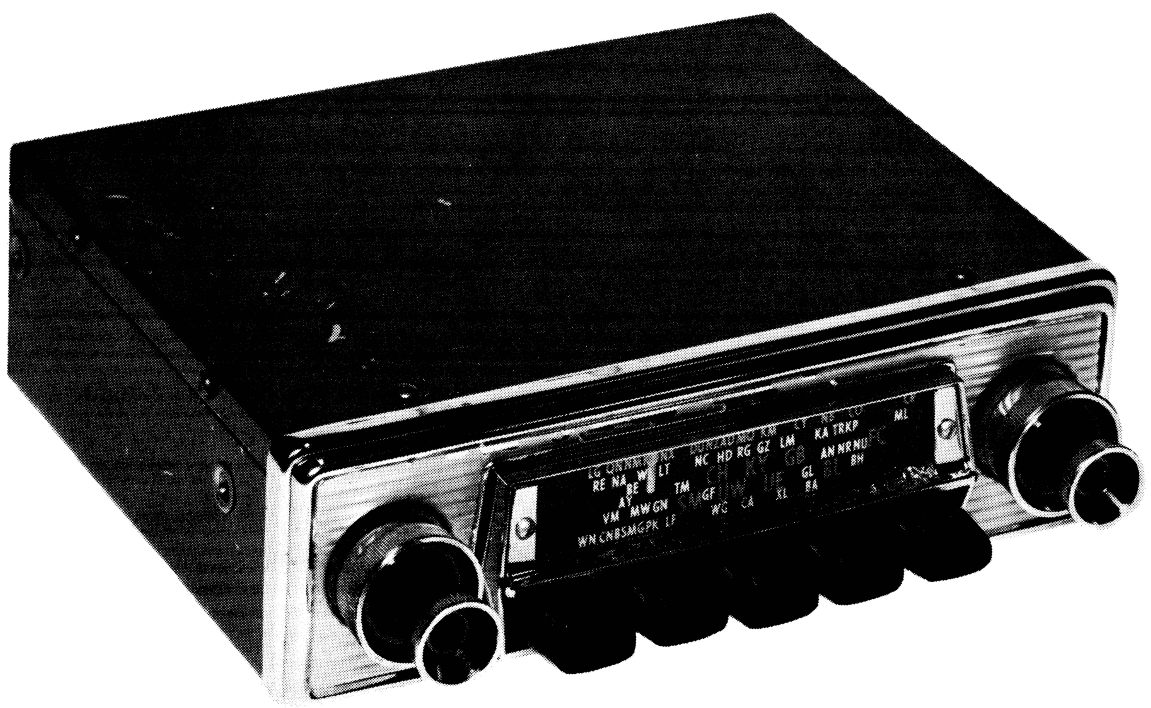
A tuned aerial circuit, a double tuned RF stage, a frequency converter stage, two IF amplifying stages, and a detector diode.

AGC voltage is derived from the detector diode and applied to the RF and IF stages.

A second diode prevents overloading of the IF amplifier due to strong signals.

A continuously variable tone control is provided to allow adjustment for individual preference.

MANUAL MODEL S1



PUSH-BUTTON MODEL S2

AMPLIFIER UNIT

Contains the audio driver stage and the push-pull audio output stage.

A winding on the output transformer provides negative feedback, which is applied back to the driver stage to reduce distortion and improve the audio frequency response.

Current feedback is utilised in the emitter circuit of the driver stage to stabilise audio gain.

RECEIVER CONTROLS

VOLUME CONTROL AND ON/OFF SWITCH: Is the smaller of the concentric knobs to the left of the dial scale.

Clockwise rotation switches the receiver 'ON,' and further clockwise rotation increases the volume.

TONE CONTROL: Is the larger knob concentric with the Volume Control On/Off Switch.

The control provides continuously variable tone adjustment from a flat frequency response in the maximum clockwise position, with progressive treble-cut as the control is rotated anti-clockwise.

TUNING CONTROL

MANUAL tuning is carried out using the knob to the right of the dial scale.

AUTOMATIC tuning to five pre-set stations is provided for by the five push-buttons.

TO SET UP THE TUNING PUSH-BUTTONS

(1) Tune-in the required station by means of the manual tuning control.

(2) With the station accurately tuned-in, pull out the push-button to its full extent ($\frac{1}{4}$-inch movement), to release the locking mechanism, then push the button fully home, thus locking the mechanism in the required position.

(3) The push-button is now set to the required station and is independent of the manual tuning control.

(4) The remaining push-buttons can now be set, in the same manner, to four different stations.

DIMENSIONS

Control Unit:

Height: 2 inches.
Width: 7 inches.
Depth: $5\frac{3}{4}$ inches.
Weight: $3\frac{3}{4}$ lbs.

Amplifier Unit:

7inches x $3\frac{1}{4}$ inches x $1\frac{7}{8}$ inches.
Weight: $2\frac{1}{4}$ lbs.

TRANSISTORS

Control Unit:

OC170S/AF116NS—RF Amplifier
OC170/AF116N—Frequency Converter
OC169/AF117N—First IF Amplifier
OC169/AF117N—Second IF Amplifier
Diode—0A91—Overload Diode
Diode—0A90—Detector & AGC Diode

Amplifier Unit:

AC125—Audio Driver
2/2N301—Audio Output (matched pair)
or 2/2N669

CONSUMPTION (including Lamp)

Approximately 400 mA under no-signal conditions.

FUSE

2 amps.

DIAL LAMP

16 volts, 0.2 amps., Philips BA95.

LOUDSPEAKER IMPEDANCE

3.7 ohms at 400 c.p.s.

UNDISTORTED POWER OUTPUT

Approximately 4.5 watts.

SERVICING

(1) DIAL LAMP REPLACEMENT: Remove the receiver from the vehicle and remove the top of the receiver case. This will allow access to the dial lamp and its socket, which is mounted behind the dial scale.

(2) Regardless of the stated complaint, the following preliminary checks should be made:

(a) Current drain with no-signal input (13v. Battery):
200 mA $\pm$ 30 mA—Model S1.
400 mA $\pm$ 50 mA—Model S2.

(b) Check for intermittent connections by gently probing components and soldered connections with an insulated tool.

(c) Check sensitivity by listening test.

(d) Check for distortion by listening test.

(e) Check for short-circuits by operating the receiver under both — ve earth and + ve earth conditions. In each case, ensure that the polarity selection plug is correctly set.

(3) (a) Circuit checks with an ohmmeter will give misleading results and transistors may be damaged by excessive conduction caused by the ohmmeter battery.

(b) Faulty components can usually be located by means of DC voltage checks in conjunction with standard signal tracing procedure.

(c) Because of the difficulties associated with making operational tests, a suspect transistor should be checked by substitution, but only after all other possibilities have been eliminated.

(d) Circuit tracing and component identification is simplified by reference to the wiring pattern printed on the component side of the circuit boards.

Reference should also be made to the component location daigrams reproduced in this manual.

(4) PRINTED CIRCUIT BOARD REMOVAL

MODEL S1: Remove top and rear sections of the receiver case.

Remove the two P.K. screws from the top corners of the RF/IF board (at rear of chassis), then pull the bottom edge of the circuit board out of the slots in the plastic support blocks to free the board from the chassis. Note: Do not strain tuner leads.

The audio board is mounted on top of the On/Off Switch assembly and can be freed from the chassis by removing the P.K. screws located at three corners of the board.

To replace the boards, reverse the above procedures.

MODEL S2: The RF/IF board is removed in the same manner as for Model S1. When replacing the board ensure that lead shieldings do not cause short-circuits across the printed board.

Removal of the cover from the amplifier unit will give access to the audio board, which is mounted on the aluminium heat sink, by means of three 6BA screws and nuts, and three spacers.

(5) REPLACING COMPONENTS ON THE PRINTED CIRCUIT BOARDS

(a) When replacing transistors or diodes, use a small iron and work quickly, to prevent overheating these components.

(b) To unsolder multi-terminal components (IF transformers, etc.), it is best to apply heat simultaneously to all terminals, using a special soldering iron tip. If a normal iron tip is used, apply the iron to each joint in turn and brush away the solder with a stiff brush. It may be found necessary to remelt and brush several times.

CAUTION: Before using a soldering iron, ensure that:

(1) The set is switched off.

(2) All testing and earthing leads are removed.

(3) The soldering iron gives adequate but not too much heat. A low voltage soldering iron is preferred. Apply soldering iron for only a short period of time, bearing in mind that the copper on the board can easily be damaged. If the copper has been damaged, it may be repaired by bridging the gap with tinned copper wire.

(6) Ensure that all screws removed during servicing are replaced.

(7) CARE OF TRANSISTORS

(a) If the voltage polarisation is reversed without regard to the setting of the polarity plug, the transistors, or electrolytic capacitors, may be damaged.

(b) Always switch the receiver OFF before connecting or disconnecting the leads of the output transistors.

(c) If continuity tests must be made, disconnect all transistors first.

(d) Never switch on the receiver while the loudspeaker is disconnected.

IMPORTANT: An accumulator, 12-14 volts, should be used, unless a well regulated, ripple-free, mains-powered unit is available.

When servicing a transistor set, always use positive earth connection. Afterwards, check that the receiver operates satisfactorily on negative earth connection, before returning to customer.

(8) OUTPUT TRANSISTOR REPLACEMENT

Note: Do not switch the receiver on with only one output transistor in circuit.

(a) Type 2/AC128 in Model S1:

(i) Unsolder the three leads, unscrew heat sink, and slide suspect transistor out of its heat sink.

(ii) Slip Nylex tubing over leads of new transistor. (Red—Collector, Green—Base, Brown—Emitter).

(iii) Slide new transistor with application of silicon grease into heat sink, screw heat sink into position and connect leads into circuit, making use of a pair of long-nose pliers as a heat shunt.

(b) Type 2/2N301 or 2/2N669 in Model S2:

(i) Disconnect base and emitter leads (pull off), undo screws and remove the suspect transistor from the heat sink.

(ii) Check that lead washer is free of burrs which could pierce the mica insulator, as this will earth the collector and result in blowing the fuse.

(iii) Apply a coating of silicone grease to each side of the mica insulator to ensure maximum heat transfer.

(iv) Place mica insulator in position on heat sink. Place lead washer in position on top of the mica insulator. Place the transistor in position and firmly tighten the fixing screws to ensure maximum heat transfer. Ensure that the fixing screws are insulated from the heat sink by the sleeves provided.

(v) Check for short-circuits—collector to heat sink with polarity plug removed from socket.

VOLTAGE TABLES

Model S1

Transistor Type	*Function*	*Emitter*	*Base*	*Collector*
AF 116NS	R.F. Amplifier	–0.7	–0.8	–5.5
AF 116N	Frequency Converter	–1.4	–1.6	–9.5
AF 117N	1st I.F. Amplifier	–0.75	–0.85	–9.8
AF 117N	2nd I.F. Amplifier	–0.7	–0.9	–9.5
AC 125	Audio Driver	–2.4	–2.5	–10.0
2/AC 128	Audio Output	—	–0.15	–12.8
	Point J	–10.3		

Supply voltage monitored at 13 volts DC.

Voltages measured with respect to point "G" (tuner positive line) using a 20,000 ohms/volt meter under no-signal conditions.

Total current drain under no-signal conditions: 200 mA ± 30 mA, depending on quiescent current of the output transistors and lamp current variations.

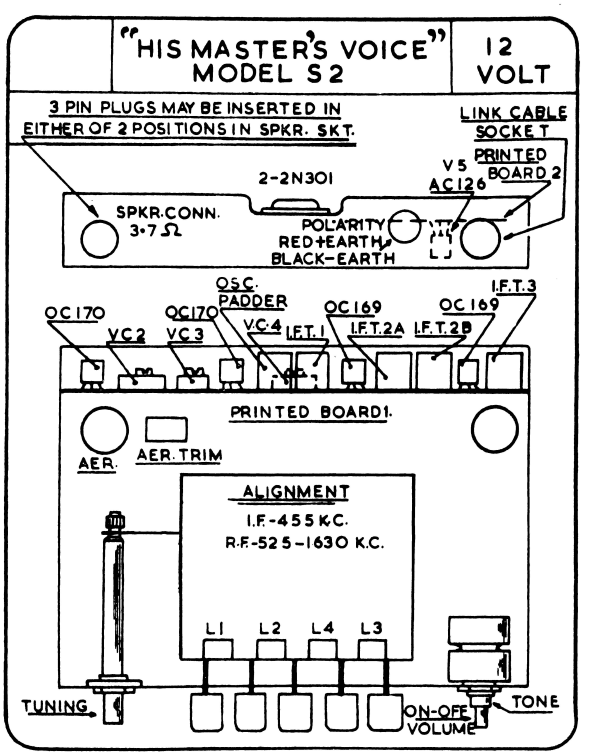
Model S2

Transistor Type	*Function*	*Emitter*	*Base*	*Collector*
OC170S/AF116NS	R.F. Amplifier	–0.7	–0.8	–4.0
OC170/AF116N	Frequency Converter	–1.6	–1.7	–10.0
OC169/AF117N	1st I.F. Amplifier	–0.6	–0.8	–7.5
OC169/AF117N	2nd I.F. Amplifier	–0.7	–0.9	–9.7
AC125	Audio Driver	–2.4	–2.5	–10.0
2/2N301 *or* 2/2N669	Audio Output	—	–0.2	–12.8
	Point J	–10.3		

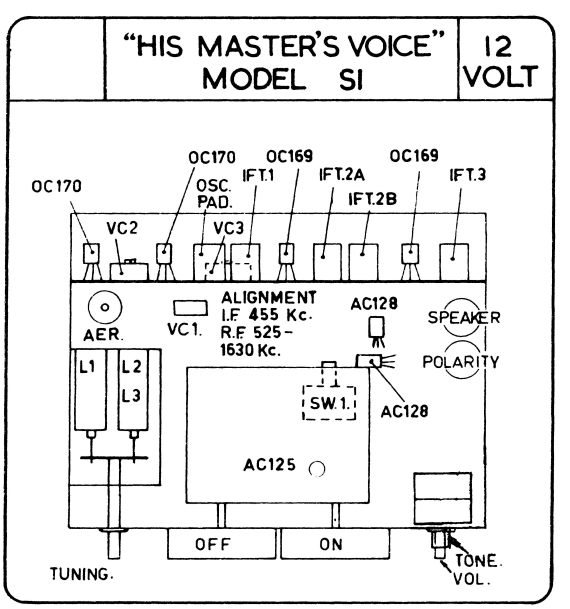
Supply voltage monitored at 13 volts DC.

Voltages measured with respect to point "G" (tuner positive line) using a 20,000 ohms/volt meter under no-signal conditions.

Total current drain under no-signal conditions: 400 mA ± 50 mA dependent on quiescent current of the output transistors and lamp current variations.



AC126 SHOULD READ AC125



ALIGNMENT

Use a Signal Generator modulated 30% at at 400 c.p.s.

I.F. ALIGNMENT

(1) Remove top and rear sections of receiver case, and remove RF/IF board.

(2) Connect a 33K ohm resistor across the primary of IFT 2B.

(3) Connect signal generator, via a 0.1 uF capacitor, to point *E,* adjacent to RF trimmer.

(4) Turn Volume and Tone controls fully clockwise.

(5) Tune to extreme HF end of the band (tuning carriage fully out).

(6) With signal generator tuned to 455 Kc/s., tune IFT3, IFT2B, IFT2A and IFT1, in that order, for maximum response.

(7) Repeat sequence for optimum alignment.

(8) Disconnect 33K ohm resistor.

I.F. SENSITIVITY

Model S1: Less than 70 uV for 50 mW output.
Model S2: Less than 50 uV for 50 mW output.

NOTE: These transformers are a very high Q miniature type. It will be appreciated that the amount of travel for the tuning core to cover its tuning range is much smaller than in normal IF transformers. Tuning the IF thus becomes more critical, and the following hints will prove useful.

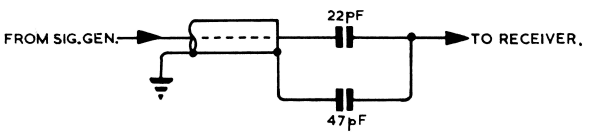
(a) The tuning tool used should be a small metal screwdriver whose tip fits cleanly into the tuning core.

(b) When turning the core, do not use any downward pressure, as the threaded former has enough resilience to detune the IF after the pressure is relieved.

(c) The thread in the former may be damaged if the core is wound in and forced against the circuit board. A light torque should be all that is normally required to turn the core.

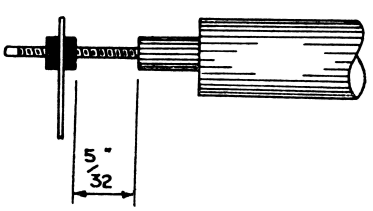
R.F. ALIGNMENT

(i) Connect signal generator to aerial input socket via dummy aerial as shown below.

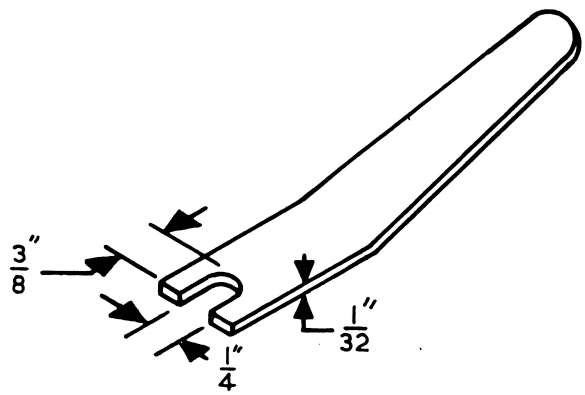


(ii) Rotate Volume and Tone controls fully clockwise.

R.F. ALIGNMENT TABLE
Model S1

Operation	*Tune Generator To*	*Tune Receiver To*	*Adjust for Maximum Output*
1	Set position of cores in carriages as shown below. 		
2	1,630 Kc/s.	Tuning carriage fully out	VC3 Osc. Trimmer
3	1,500 Kc/s.	1,500 Kc/s.	VC1 and VC2, Aerial and R.F. Trimmers
4	1,000 Kc/s.	1,000 Kc/s.	L1 and L2, Aerial and R.F. Tuning Cores
5	600 Kc/s.	600 Kc/s.	L4, Osc. Padder Core
6	Check that receiver tunes to 525 Kc/s. on low frequency end of band. If not, adjust.		L3, Osc. Tuning Core
7	Repeat operations 2-5 as necessary, to obtain optimum alignment.		
8	1,000 Kc/s.	1,000 Kc/s.	Adjust Pointer to Set Mark on Dial Scales
9	Seal oscillator, and R.F. trimmers, with wax. Ensure that excess wax does not fall on chassis around oscillator and R.F. trimmers. DO NOT SEAL AERIAL TRIMMER.		

R.F. ALIGNMENT TABLE
Model S2

Operation	*Tune Generator To*	*Tune Receiver To*	*Adjust for Maximum Output*
1	Tune receiver, manually, to the high frequency end of the band (pointer extreme left), then depress the left-hand tuning push-button until the clutch is disengaged, and then release.		
2	1,630 Kc/s.		VC4, Osc. Trimmer
3	1,500 Kc/s.	1,500 Kc/s.	VC1, Aerial Trimmer and VC2 & VC3, RF Trimmers
4	600 Kc/s.	600 Kc/s. Rock through signal.	L5, Osc. Padder (black and black dots)
5	Check that receiver tunes between 525-535 Kc/s. on low frequency end of band. If not, adjust.		See Note re IFT's
6	Repeat operations 2-5 as necessary, to obtain optimum alignment.		L4, Osc. Tuning Core
7	1,000 Kc/s.	1,000 Kc/s.	
	Check that pointer lies behind 1,000 Kc/s. calibration mark on dial scale when receiver is tuned for maximum output. If there is a calibration error greater than one pointer width, set the centre tuning push-button on 1,000 Kc/s. and adjust the eccentric at rear end of pointer arm with tool shown below.		
			
	This operation may slightly detune the receiver. Re-tune accurately to 1,000 Kc/s. by depressing centre tuning push-button and re-check calibration.		
8	Seal Oscillator and both R.F. trimmers with wax. DO NOT SEAL AERIAL TRIMMER.		
	Input to receiver should not be greater than 8 microvolts at 1,500 Kc/s., 5 uV at 1,000 and 600 Kc/s., to obtain 1.92 volts (1 watt) output.		
	If sensitivity cannot be achieved at all frequencies by alignment as described, the tuning coil slugs may require adjustment. These are adjustable from the front of the chassis:		
9	1,000 Kc/s.	1,000 Kc/s.	L1, Aerial Tuning Core and L2 and L3, RF Tuning Core

NOISE SUPPRESSION

Normal suppression requirements are:

(1) A 15K ohms resistor, fitted into the HT lead from the ignition coil to the distributor, fitted as close as possible to the distributor cap.

Most modern cars have this ignition suppressor built into the HT cable and the cable marked "Radio Suppressed."

(2) A 0.5 uF condenser connected between the armature (large) terminal, on the generator, and the generator frame, or car chassis within 3 inches of the generator.

DO NOT CONNECT CONDENSER TO THE FIELD TERMINAL.

This condenser usually is not required on cars fitted with an alternator in place of a generator.

(3) A 0.5 uF condenser should be connected to the ignition coil, from the LT lead to the ignition switch, to earth or the coil frame.

Should further suppression he required:

(1) Distributor rotor contacts and spark plug gaps should be cleaned and set.

(2) Suppressor resistors capable of withstanding high temperatures may be placed in each HT spark plug lead and should be fitted as close as possible to the spark plug.

(3) Electrical equipment such as windscreen wipers, petrol pumps, clocks and gauges, can be suppressed by connecting a 0.5 uF condenser between the live terminal of the unit and earth.

(4) Earthing: In some cases it may be necessary to earth the motor directly to the chassis at the same point as the battery earth lead.

It may also be necessary to earth the bonnet to the chassis, using a heavy copper braid.

In extreme cases, it may be found necessary to repack the hub cap on wheel bearings, using Grade "G" Graphite, to prevent wheel and brake noise.

In bad cases, it may be necessary to fit springs between wheel bearings and grease caps, to overcome the insulation effect of the grease in the bearings between the axles and the hubs.

(5) Aerial.

Aerial lead-in should be soldered to the connectors at each end and the connectors secured properly in their sockets. Loose connections, poor earthing or dirty contacts will cause intermittent, weak and noisy reception.

Great care should be taken when soldering aerial leads, as excessive heat will damage the insulation.

IMPORTANT:

Be sure to clean back to bare metal to obtain a good earth at the aerial mount and at all earth points for suppressors.

Also make sure that the aerial lead shielding makes connection to the aerial socket. In some cases it may be necessary to distort the fluting on the Benjamin aerial plug.

PARTS LIST - MODEL S1

RESISTORS

½ Watt BTS type except where noted

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
R1	740-0302	1.8K ohms ± 10%	R18	740-0012	470 ohms ± 10%
R2	740-0412	820 ohms ± 10%	R19	740-0132	82K ohms ± 10%
R3	740-0072	4.7K ohms ± 10%	R20	740-0792	8.2K ohms ± 10%
R4			R21		
R5	740-0242	33K ohms ± 10%	R22		
R6	740-0252	1.5K ohms ± 10%	R23	740-0272	150 ohms ± 10%
R7	740-0012	470 ohms ± 10%	R24	740-0732	12K ohms ± 10%
R8	740-0102	22K ohms ± 10%	R25	740-0072	4.7K ohms ± 10%
R9	740-0072	4.7K ohms ± 10%	R26	740-0282	220 ohms ± 10%
R10	740-0392	330K ohms ± 10%	R27	740-0682	680 ohms ± 10%
R11	740-0302	1.8K ohms ± 10%	R28	740-1242	6.8 ohms ± 10%
R12	740-0012	470 ohms ± 10%	R29	746-0341	3.3 ohms ± 5% BW½
R13	740-0022	1K ohm ± 10%	R29a	746-0341	3.3 ohms ± 5% BW½
R14	740-0242	33K ohms ± 10%	R30	740-0042	2.7K ohms ± 10%
R15	740-0052	3.3K ohms ± 10%	R31	740-0602	68 ohms ± 10%
R16	740-0012	470 ohms ± 10%	R32	740-0712	47 ohms ± 10%
R17	740-0012	470 ohms ± 10%	R33	740-0402	47 ohms ± 20%

CAPACITORS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
C1	271-0731	.047 uF + 80% — 20% 25V Redcap	C21	280-3081	330 pF ± 5% 125V
C2	280-0271	1500 pF ± 10% 200V Styroseal	C22	280-3081	330 pF ± 5% 125V
C3	280-3081	330 pF ± 5% 125V Styroseal	C23	271-0731	.047 uF + 80% — 20% 25V Redcap
C4	283-0271	.0033 uF ± 10% 400VW Poyester	C24		
C5			C25	271-0751	.022 uF + 80% — 20% 25 Redcap
C6			C26	271-0751	.022 uF + 80% — 20% 25 Redcap
C7	280-2051	100 pF ± 10% 125V Styroseal	C27	271-0871	.47 uF + 80% — 20% 25V Redcap
C8	283-0051	.027 uF ± 10% 125 Polyester	C28	271-0741	.01 uF + 80% — 20% 25VW Redcap
C9	271-0731	.047 uF + 80% — 20% 25V Redcap			
C10	280-3081	330 pF ± 5% 125V Styroseal	C29	271-0761	.1 uF + 80% — 20% 25VW Redcap
C11	280-2051	100 pF ± 125V Styroseal	C30	269-0991	3.2 uF 6.4VW Philips
C12	283-0271	.0033 uF ± 10% 400V Polyester	C31	271-0761	.1 uF + 80% — 20% 25VW Redcap
C13			C32	269-0871	100 uF 16VW Electro Philips
C14	271-0731	.047 uF + 80% — 20% 25V Redcap	C33	269-0881	500 uF 16VW Electro Ducon ETO 131
C15	280-3081	330 pF ± 5% 125V Styroseal			
C16			C34	269-0861	100 uF 4VW Electro Philips
C17	271-0731	.047 uF + 80% — 20% 25V Redcap	C35	269-0881	500 uF 16VW Electro Ducon ETO 131
C18	271-0731	.047 uF + 80% — 20% 25V Redcap			
C19	271-0731	.047 uF + 80% — 20% 25V Redcap	C36	271-0441	500 pF Lead thru Ducon CBB
C20	269-0811	20 uF 6.4VW Electro Philips	C37	282-0241	.1 uF ± 10% 125V Polyester Philips

MISCELLANEOUS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
RV1)		(10K ohms Curve 'C' Potentio-		932-2151	Transistor type 2—AC 128 (matched pair)—Audio Output
)	677-1171	(meter—Volume		932-2271	Diode type AA119—Audio Detector
)		(5K ohms Curve 'J' Potentio-	PLP	932-1601	Lamp—16V 0.2A Philips BA95
RV2)		(meter—Tone	SW1	855-0621	Switch Assembly
RT1	752-0111	Thermistor 47 ohms ± 10% Ducon		517-2101	Knob (Small) Volume and Tuning
VC1	281-0321	Trimmer Capacitor 12 —120 pF, Chassis mounting aerial		517-2111	Knob (Large) Tuning
				244-0951	Knob retaining clip—Tuning
VC2	281-0211	Trimmer capacitor 12 — 120 pF — RF		517-2121	Knob (Large) Tone
				244-0941	Knob retaining clip—Tone
VC3	281-0211	Trimmer capacitor 5 — 150 pF— Osc.		517-2221	Knob, black push button "ON"
				517-2231	Knob, black push button "OFF"
L1)		(Aerial Coil		517-2251	Knob, ivory push button "ON"
L2)	909-0061	(RF Coil		517-2261	Knob, ivory push button "OFF"
L3)		(Oscillator Coil		517-2271	Knob, Aerial trimmer
L4	259-1242	Oscillator Padder Coil (Black and black dots)		803-0371	Screw, push button fixing, 2PK x ¼ Csk.
CH1	259-1371	Coil—Aerial Filter		668-0591	Polarity Plug
CH2	232-0242	Choke—LT		794-1471	Dial Scale: N.S.W., S.A., W.A.
CH3	232-0291	Choke—RF		794-1491	Dial Scale: QLD., VIC., TAS.
IFT1	906-0551	1st IF Transformer (black and brown dots)		160-0121	Insulating bush, lamp socket
				406-0271	Eyelet 188, lamp socket
IFT2A	906-0561	2A IF Transformer (black and red dots)		824-0691	Lamp socket A/NCO/8495/17
				820-1611	Lamp Shield
IFT2B	906-0571	2B IF Transformer (black and orange dots)		840-0781	Dial cord spring
				297-0011	Dial cord
IFT3	906-0581	3rd IF Transformer (black and yellow dots)		671-0661	Pointer
				824-0831	Aerial socket
T1	908-0651	Driver Transformer		824-0891	Socket, 7 pin McMurdo, (Polarity Plug Socket)
T2	905-0521	Audio Output Transformer			
	932-1951	Transistor type AF 116NS—RF Amplifier		824-0941	Socket, 4 pin (speaker connection)
				828-0591	Tuner mounting spacer
	932-1681	Transistor type AF 116N—Converter		852-0241	R.F. printed board support
				132-0201	Audio printed wiring board
	932-1691	Transistor type AF 117N—1st IF Amplifier		132-0211	R.F. printed wiring board
				132-0221	Printed wiring board. 132-0201 and 132-0211 joined together
	932-1691	Transistor type AF 117N—2nd IF Amplifier			
	932-2141	Transistor type AC 125—Audio Driver			

PARTS LIST - MODEL S2

RESISTORS

½ Watt BTS type except where noted

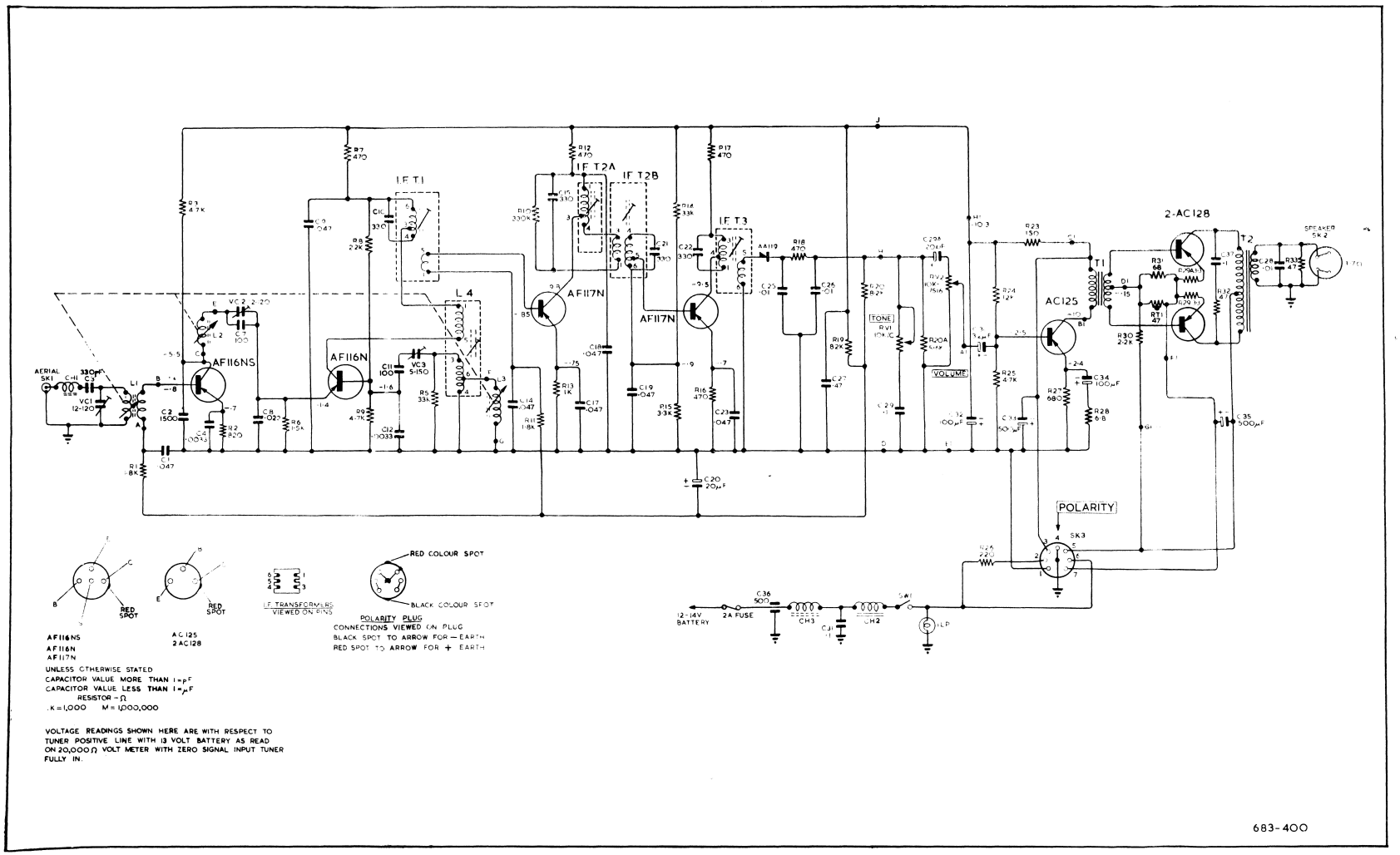
REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
R1	740-0302	1.8K ohms ± 10%	R18	740-1392	470 onms ± 20%
R2	740-0412	820 ohms ± 10%	R19	740-0132	82K ohms ± 10%
R3	740-1392	470 ohms ± 20%	R20	740-0792	8.2K ohms ± 10%
R4	740-0792	8.2K ohms ± 10%	R21		
R5	740-0072	4.7K ohms ± 10%	R22		
R6	740-0252	1.5K ohms ± 10%	R23	740-0692	150 ohms ± 20%
R7	740-1162	180 ohms ± 10%	R24	740-0862	18K ohms ± 10%
R8	740-0102	22K ohms ± 10%	R25	740-0382	6.8K ohms ± 10%
R9	740-0072	4.7K ohms ± 10%	R26	740-0282	220 ohms ± 10%
R9a	740-0242	33K ohms ± 10%	R27	740-0682	680 ohms ± 10%
R10	740-0392	330K ohms ± 10%	R28	740-1402	15 ohms ± 10% Morganite or Ducon
R11	740-0302	1.8K ohms ± 10%			
R12	740-0062	3.9K ohms ± 10%	R29	740-0012	470 ohms ± 10%
R13	740-0022	1K ohms ± 10%	R30	742-1042/3	220 ohms ± 10% 1 watt. Morganite or Ducon
R14	740-0242	33K ohms ± 10%			
R15	740-0052	3.3K ohms ± 10%	R31	740-1322	6.8 ohms ± 5% Ducon
R16	740-1392	470 ohms ± 20%	R32		
R17	740-1392	470 ohms ± 20%	R33	740-0403	47 ohms ± 20%

CAPACITORS

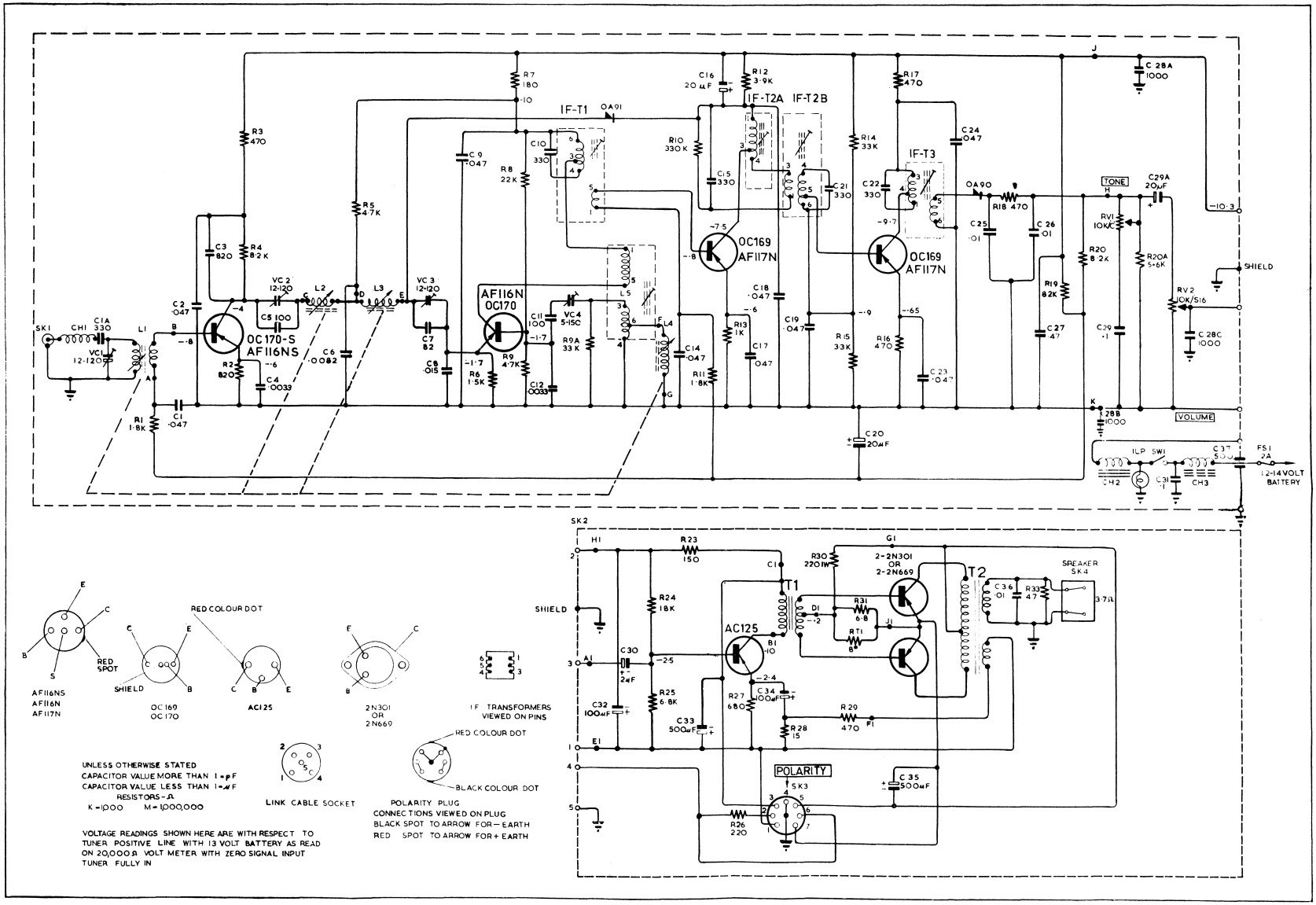
REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
C1	271-0731	.047 uF + 80% — 20% 25V. Redcap	C22	280-3081	330 pF ± 5% 125V. Styroseal
C1a	280-3081	330 pF + 5% 125V. Styroseal	C23	271-0731	.047 uF + 80% — 20% 25V. Redcap
C2	271-0731	.047 uF + 80% — 20% 25V. Redcap	C24	271-0731	.047 uF + 80% — 20% 25V. Redcap
C3	280-3151	820 pF ± 10% 125V. Styroseal	C25	271-0751	.022 uF + 80% — 20% 25V. Redcap
C4	283-0271	.0033 uF ± 10% 400V. Polyester Ducon DFH412	C26	271-0751	.022 uF + 80% — 20% 25V. Redcap
			C27	271-0871	.47 uF + 80% — 20% 25V. Redcap
C5	280-3051	100 pF ± 10% 125V. Styroseal	C28a)		3x1000 pF Spark plate lead through type CBB
C6	283-0321	.0082 uF ± 10% 400V. Polyester Ducon DFH422	C28b)	271-0611	
			C28c)		
C7	280-3161	82 pF ± 5% 125V. Styroseal	C29	271-0761	0.1 uF + 80% — 20% 25V. Redcap
C8	283-0021	.015 uF ± 10% 125V. Polyester Ducon DFH104	C30	269-0891	2 uF 10VW. Electro Philips
			C31	271-0761	0.1 uF + 80% — 20% 25V. Redcap
C9	271-0731	.047 uF + 80% — 20% 25V. Redcap	C32	269-0871	100 uF 16VW. Electro Philips
C10	280-3081	330 pF ± 5% 125V. Styroseal	C33	269-0881	500 uF 16VW. Electro ET0131
C11	280-3051	100 pF ± 10% 125V. Styroseal	C34	269-0861	100 uF 4VW. Electro Type C426 A/100 Philips
C12	283-0271	.0033 uF ± 10% 400V. Polyester Ducon DFH412			
			C35	269-0881	500 uF 16VW Electro ET0131
C13			C36	271-0741	.01 uF + 80% — 10% 25V. Redcap
C14	271-0731	.047 uF + 80% — 20% 25V. Redcap	C37	271-0441	500 pF lead thru. Hi-K Ducon CBB
C15	280-3081	330 pF ± 5% 125V. Styroseal	VC1	281-0321	12—120pF trimmer. Simplex chassis mounting with spindle
C16	269-0811	20 uF 6.4V. Electro Philips			
C17	271-0731	.047 uF + 80% — 20% 25V. Redcap	VC2	281-0301	12—120 pF trimmer. Simplex
C18	271-0731	.047 uF + 80% — 20% 25V. Redcap	VC3	281-0301	12—120 pF trimmer. Simplex
C19	271-0731	.047 uF + 80% — 20% 25V. Redcap	VC4	281-0211	5—150 pF trimmer. DPS21041
C20	269-0811	20 uF 6.4V. Electro Philips			
C21	280-3081	330 pF ± 5% 125V. Styroseal			

MISCELLANEOUS

REF.	PART No.	DESCRIPTION	REF.	PART No.	DESCRIPTION
L1)				932-2041	Transistor Type 2/2N301 or 2/2N669—(Matched Pair)
L2)	909-0051	Tuning unit—push button (M.S.P.)			
L3)				932-2031	Diode Type OA91—Overload Diode
L4)					
L5	259-1241	Oscillator padder coil. Black and black dots		932-0971	Diode Type OA90—Detector and A.G.C. Diode
CH1	259-0045	Aerial hash filter coil	PL1	932-1601	Lamp 16 volt, 0.2 amp. Philips BA 95
CH2	232-0242	Choke L.T.			
CH3	232-0291	Choke		517-2101	Knob, small, On/Off Volume and Tuning
I.F.T. 1	906-0551	Transformer I.F.T.1. Black and brown dots		517-2111	Knob, large, Tuning
				517-2121	Knob, large, Tone
I.F.T. 2a	906-0561	Transformer I.F.T.2a. Black and red dots		517-1841	Knob, push-button, Black
				517-1851	Knob, push-button, Ivory
I.F.T. 2b	906-0571	Transformer I.F.T.2b. Black and Orange dots		803-0731	Screw, No. 2P.K. x ¼ Csk. Hd, push-button fixing
I.F.T. 3	906-0581	Transformer I.F.T.3. Black and yellow dots		668-0591	Polarity Plug. (Red and Black dots)
T1	908-0602	Transformer—Audio Driver			
T2	905-0501	Transformer—Audio Output		794-1481	Dial Scale (Qld., Vic., Tas.)
	932-1951	Transistor Type OC170S or AF116NS—R.F.Amplifier		794-1501	Dial Scale (N.S.W., S.A., W.A.)
				244-0911	Clip, dial retaining
	932-1681	Transistor Type OC170 or AF117N—Frequency Changer		824-0691	Lamp socket (A/NCO-8495/17)
				824-0831	Aerial socket
	932-1691	Transistor Type OC169 or AF117N—1st. I.F. Amplifier		852-0241	R.F. and I.F. Printed circuit board support
	932-1691	Transistor Type OC169 or AF117N—2nd I.F. Amplifier		132-0111	Printed circuit board, audio stage
				132-0131	Printed circuit board, R.F. and I.F. stages
	932-2141	Transistor Type AC125—Audio Driver			



CIRCUIT DIAGRAM S1



CIRCUIT DIAGRAM S2

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