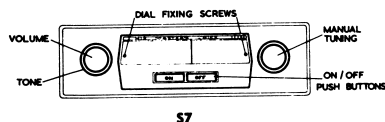


SERVICE MANUAL

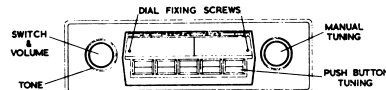
CAR RADIO RECEIVERS MODELS S7, S8 AND S9



"HIS MASTER'S VOICE"



S7



S8, S9

GENERAL SPECIFICATION

S7 and S8 Car Radios are 7-transistor, high sensitivity, permeability tuned, superheterodyne, medium-wave receivers with class A output stages, tuned by pre-set push-buttons and/or manual control.

Model S9 is a 10-transistor de luxe version of S8.

OPERATING VOLTAGE:

12-14 volts, positive and negative earth.

CONSUMPTION:

S7 and S8: 650 mA (no signal).
S9: 400 mA (no signal).

FREQUENCY RANGE:

520-1620 Kc/s.

INTERMEDIATE FREQUENCY:

455 Kc/s.

OUTPUT IMPEDANCE:

3.7 ohms.

UNDISTORTED POWER OUTPUT:

S7 and S8: 2 watts.
S9: 4 watts.

EARTHING POLARITY:

Reversible. Earthing polarity is selected by setting the polarity switch to positive or negative earth as marked on the chassis.

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

DIMENSIONS:

Height 2"
Width 6½"
Depth 5½"

WEIGHT:

S7 3½ lb.
S8 3¾ lb.
S9 3¾ lb.

VOLTAGE TABLES*

Due to the fast time constant of the planar silicon transistors used in these receivers, extreme care should be exercised when taking voltage measurements at the transistor terminals. For this reason, it is not recommended that base voltage measurements are taken, and, in consequence, these voltages have been omitted from the circuit diagrams and the following tables.

MODELS S7 AND S8

Transistor Type	Function	Emitter	Collector
SE1010	RF Amplifier	3.1	10.3
SE1001	Oscillator	3.5	12.2
SE1002	Mixer	3.0	12.3
SE1002	IF Amplifier	3.0	11.0
SE4001	Audio Pre-Amplifier	3.3	11.0
AY1108	Audio Driver	12.0	0
2N301	Output	12.2	1.0

MODEL S9

Transistor Type	Function	Emitter	Collector
BF115	RF Amplifier	1.1	3.6
SE1001	Oscillator	1.1	9.8
SE1002	Mixer	1.1	10.3
SE1002	1st IF Amplifier	1.1	10.1
SE1002	2nd IF Amplifier	.75	9.4
SE4001	Audio Pre-Amplifier	3.0	6.5
SE2002	Audio Driver	6.3	9.9
2/AY8103	Output	.03	12.5
2N3641	Electronic Filter	10.5	13.0

*Supply voltage monitored at 13 volts DC. Voltages measured with respect of point P, using a 20,000 ohms/volt meter under no-signal conditions.

Total current drain under no-signal conditions:

Models S7 and S8: 650 mA \pm 50 mA; Model S9: 400 mA \pm 50 mA, depending on quiescent current of the output transistors and lamp current variations.

ALIGNMENT

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

IF Alignment, Models S7 and S8:

- (1) Remove top and heat sink section of receiver case.
- (2) Connect a 47K resistor across the primary of IFT1A.
- (3) Connect signal generator, via a .1 uF capacitor, to point C adjacent to RF trimmer.
- (4) Turn volume and tone controls fully clockwise.
- (5) Tune to extreme LF end of the band (tuning carriage fully in).
- (6) With signal generator tuned to 455 Kc/s., adjust the cores of IFT2B, IFT2A, IFT1B and IFT1A in that order for maximum reading on the output meter. Start alignment of each IF transformer by first screwing its core well out, and then screwing the core into the coil until resonance is obtained.
- (7) Repeat sequence for optimum alignment.
- (8) Disconnect 47K resistor.

IF Sensitivity: Less than 60 uV (S7) and 90 uV (S8).

Note: These transformers are a very high Q miniature type. It will be appreciated that the amount of travel for the 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 should be a small plastic screwdriver with a tip which fits cleanly into the tuning core.
- (b) When tuning the core, do not use any downward pressure, as the threaded former has enough resilience to de-tune the circuit, after the pressure is released.

IF Alignment, Model S9:

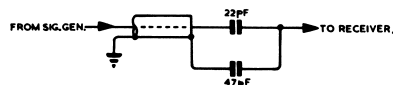
- (1) Remove top and heat sink section of receiver case.
- (2) Connect a 47K resistor across the primary of IFT3A.
- (3) Connect signal generator, via a .1 uF capacitor, to point D adjacent to RF trimmer.
- (4) Turn volume and tone controls fully clockwise.
- (5) Tune to extreme LF end of the band (tuning carriage fully in).
- (6) With signal generator tuned to 455 Kc/s., adjust the cores of IFT3A, IFT3B, IFT2A, IFT2B, IFT1A and IFT1B, in that order, for maximum reading on the output meter. Start alignment of each IF transformer by first screwing its core well out, and then screwing the core into the coil until resonance is obtained.
- (7) Repeat sequence for optimum alignment.
- (8) Disconnect 47K resistor.

IF Sensitivity: Less than 30 uV for 50 mW output.

See 'Note' under IF Alignment, Models S7 and S8.

RF Alignment, all models.

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



- (2) Turn volume and tone controls fully clockwise.

RF ALIGNMENT TABLE

MODELS S7 - S8 - S9

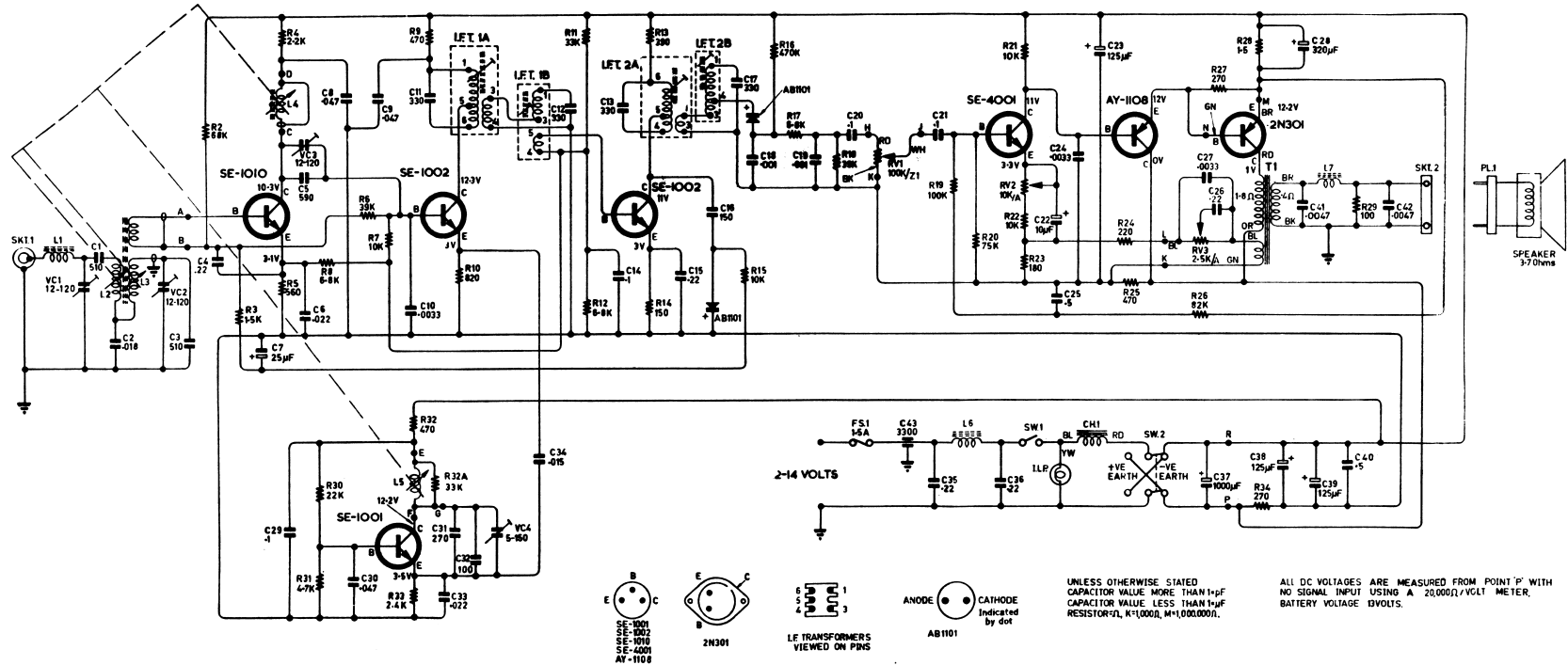
Operation	Set Generator To	Set Receiver To	Adjust for Maximum Output
1	1620 Kc/s	HF end of band	VC4 Oscillator Trimmer.
2	1550 Kc/s (S7-S9) 1600 Kc/s (S8)	1550 Kc/s (S7-S9) 1600 Kc/s (S8)	VC1, VC3, VC2 Aerial and RF Trimmers.
3	600 Kc/s	600 Kc/s	L2, L3, L4 Aerial and RF Tuning Cores*
4	Between limits: 510-525 Kc/s (S7-S9) 516-530 Kc/s (S8)	LF end of band	L5, Oscillator Tuning Core*
5	1620 Kc/s	HF end of band	VC4, Oscillator Trimmer.
6	Repeat operations 2-5 for optimum alignment.		
7	1000 Kc/s	1000 Kc/s	Adjust Pointer; on S8 by twisting the inner end of the pointer, on S9 by twisting the inner end of the pointer, using a screw-driver in the slot provided.

* Cores of S7-S9 tuned from the front; those of S8 from the rear.

Minimum RF Sensitivities for 1W Output:

S7		S8		S9	
1550 Kc/s	10uV	1600 Kc/s	14uV	1550 Kc/s	6uV
1000 Kc/s	5uV	1000 Kc/s	7uV	1000 Kc/s	3uV
600 Kc/s	5uV	600 Kc/s	7uV	600 Kc/s	3uV

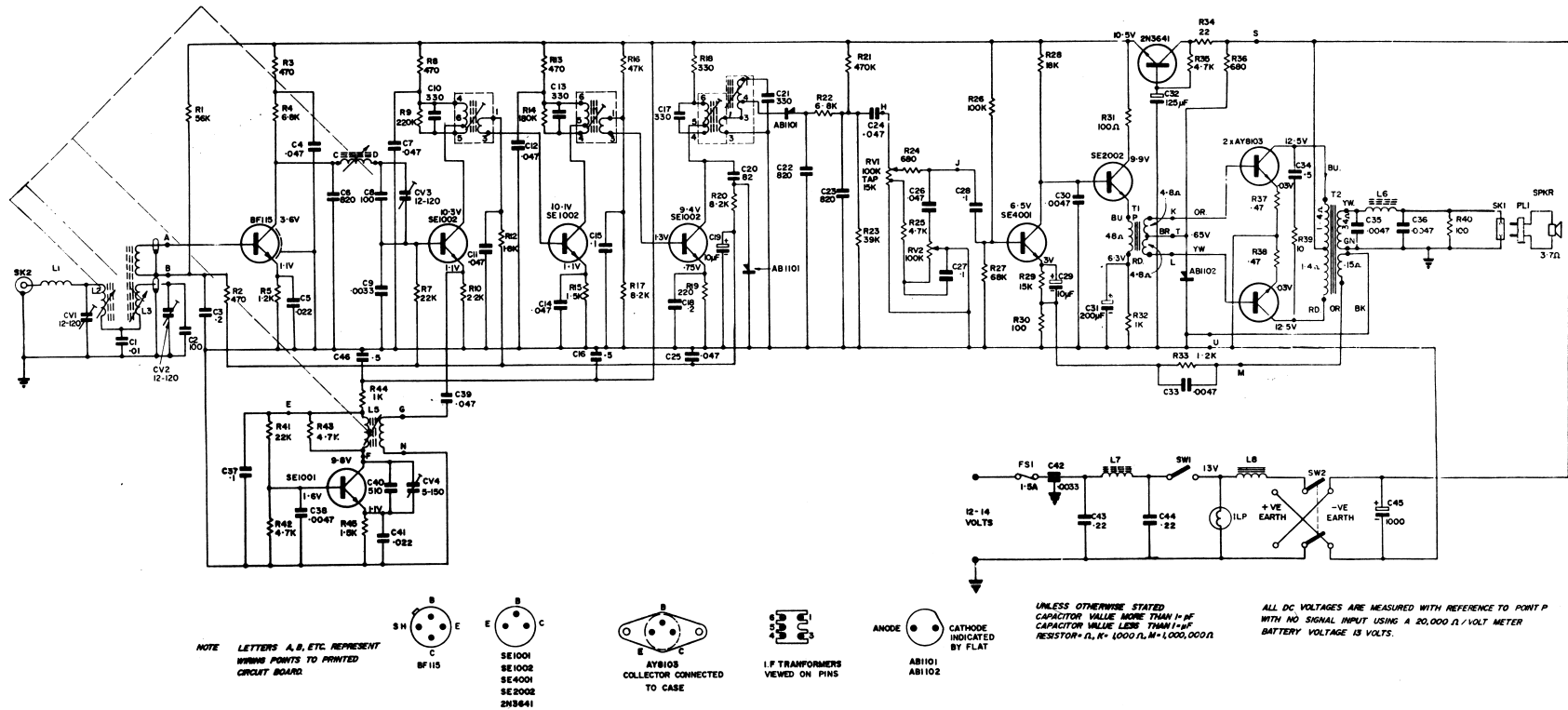
Note: Due to the fact that no padders are incorporated in the oscillator circuits of these receivers, tuning of the oscillator core L5 is critical, and should therefore only be attempted when absolutely necessary, e.g., when a new core is fitted. In this case, check that the pointer coincides with the LF and HF datum marks on the dial, and align the circuit at these point with L5 and VC4, respectively. Then proceed as per above table.



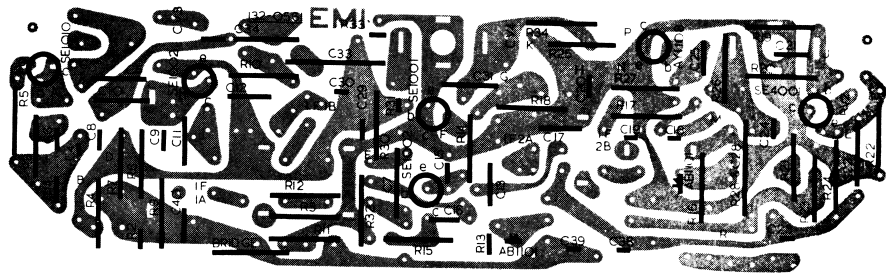
CORRECTION TO CIRCUIT DIAGRAM:

Secondary connection to T1 should be reversed, i.e., Black to L7 and Brown to Earth.

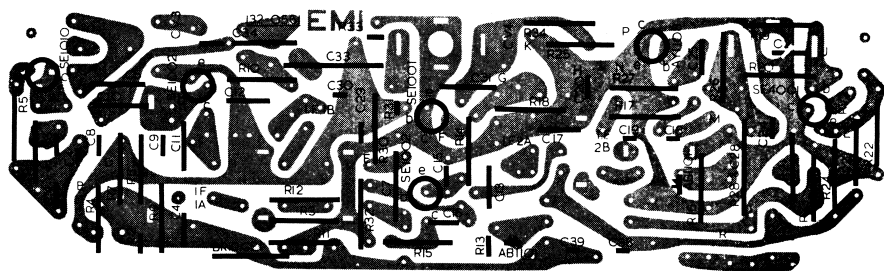
CIRCUIT DIAGRAM — MODEL S8



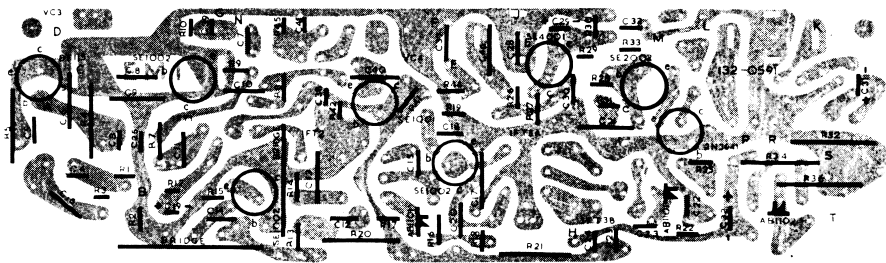
CIRCUIT DIAGRAM — MODEL S9



COMPONENT LAYOUT (LOOKING ON COPPER SIDE) — S7



COMPONENT LAYOUT (LOOKING ON COPPER SIDE) — S8



COMPONENT LAYOUT (LOOKING ON COPPER SIDE) — S9



TECHNICAL DATA SHEET

Date 1st September, 1966

NO. CR8

ORIGIN : Car Radio Engineering

MODELS S7, S8 and S9

In some installations the power and speaker leads are too long, and it has been common practice to wind the excess lengths into a neat package, taping it onto the set. Care should be taken when folding the wires, to leave a distance of at least 2" from the output transistor and the aerial input. The concentrated field from the wiring may induce motor interference through the output transistor or the aerial input.

MODEL S9

To gain equalisation and to reduce possibility of instability C5 (.022uF $\pm 20\%$ Polyester) has been changed to .0033 $\pm 10\%$ 50V Styroseal (E.M.I. Part No. 280-3331).

To take mechanical load off the switch and to stabilise the set in extreme noise conditions, two capacitors have been added: C46a - .22uF $\pm 80\%$ -20% 25V Redcap (E.M.I. Part No. 271-0711) has been added from point P to point U.

C47 - .47uF $\pm 10\%$ 160V Polyester (E.M.I. Part No. 282-0321) has been added in parallel with C45.

For better oscillator stability R45 (1.5K ohms $\pm 10\%$) has been changed to 1.2K ohms $\pm 10\%$ $\frac{1}{2}W$ (E.M.I. Part No. 740-0322).