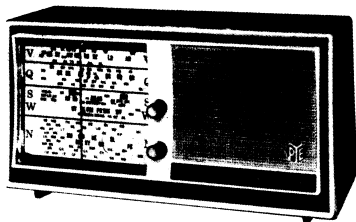




## RADIO SERVICE DATA

ISSUE 1

A9



### CHASSIS MODEL NO. R25-1A

#### A9 RADIO RECEIVER SPECIFICATIONS

TUNING RANGE	525-1640 Kc/s
INTERMEDIATE FREQUENCY	455 Kc/s
SIGNAL RANGE	20 $\mu$ V/metre to 500 mV/metre
AUDIO OUTPUT	500 mV
FREQUENCY RESPONSE	50 cps to 6000 cps with 9 dB bass boost at low listening levels.
POWER SUPPLY	9 volt 276-P Eveready Energiser Battery
POWER CONSUMPTION	Low levels 10 mW Normal listening level 30 mW
BATTERY LIFE	300 hours.

#### SUMMARY OF OPERATION

The radio section is a high sensitivity superheterodyne, using a large diameter loopstick aerial for increased signal pickup and incorporating two I.F. amplifiers for high sensitivity. Drift transistors are used throughout for high gain and stability.

The loopstick winding is matched to the self oscillating mixer for optimum signal to noise ratio and the I.F. signal is fed to the I.F. amplifier by means of a bottom capacitively coupled bandpass circuit consisting of L3, L4 and the coupling capacitor C8. The base circuit of both I.F. amplifiers is matched to the I.F. coils by means of a capacitive tap to ensure high transfer efficiency. The diode detector D2 is arranged to give positive output voltage, and A.V.C. is applied to the first I.F. amplifier and to the converter via the damping diode D1. The first I.F. amplifier also acts as D.C. amplifier for the damping diode and enables the audio output to be held constant over widely varying input signals.

A high resistance volume control is connected across the diode load RL4 to make low listening levels possible and to give the correct volume control law. A bass boost network, consisting of R16 and C21, is connected to the tap on the volume control to give loudness compensation at low volumes.

The audio preamplifier and driver are a D.C. coupled pair, with D.C. feed-back applied by means of R18, R22 and R21, giving good thermal stability. The output stage is connected in series push pull, so that the output transformer may be omitted, thus eliminating any power loss and giving greater battery economy, as well as extending the frequency range. The transistors are adjusted for B class operation and quiescent current is set by the base divider networks. Each transistor has an unbypassed emitter resistor to equalise their characteristics and they are thermally compensated by the N.T.C. resistors R27, R28, and the shunt resistors R25, R26. Negative feedback is also applied via the bias resistors R29, R30 and by C26, C27, allowing the output stage to run with very low distortion. To further reduce the distortion and to minimise gain variations, negative feedback is applied overall by R24 and the unbypassed emitter resistor R20.

Because of the large D.C. feedback and thermal compensation the receiver may be run at temperatures as high as 120° F.

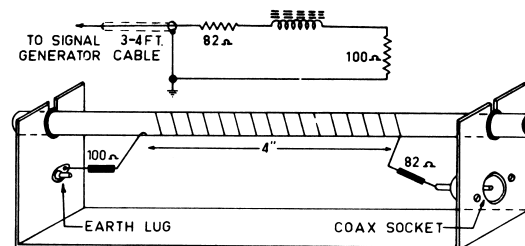
#### ALIGNMENT PROCEDURE.

Alignment should not be necessary unless repairs have been made to a tuned circuit. When alignment is necessary the following procedure should be followed.

Turn the volume control to maximum and connect a 15 ohm output meter in place of the loudspeaker. During alignment the output should be kept below 100mW to avoid A.V.C. action. To inject a signal into the loopstick it is necessary to radiate a signal from the generator. When measurements are not necessary a 2 ft. length of wire may be used, placed vertically and 2 feet from the receiver. If sensitivity measurements are to be taken the following radiator may be used with 1dB accuracy throughout the band.

17 turns of 22 to 26 B&S wire are wound over an 8" x 3/8" dia. loopstick rod and spaced to cover 4 inches about the centre of the rod. The generator is fed to one end of the winding via 82 ohms and the other end is returned to earth by 100 ohms. Both resistors should be carbon types.

In use the radiating loop is placed parallel to the receiver loopstick and 24 inches away from it, keeping the centres of the loops roughly in line. The equivalent field strength at the receiver is then found by dividing the generator reading by 20 i.e., 20 mV on the generator gives a field strength of 1 mV/metre at the receiver.



#### I.F. ALIGNMENT

Connect the signal generator to the base of the converter V1 via an 0.047  $\mu$ F capacitor and set its frequency to 455 Kc/s. Set the receiver dial to the extreme low frequency end and tune all I.F. coils for maximum output, keeping the output below 100mW by adjusting the generator.

For 50 mW output the input should be 2  $\mu$ V  $\pm$  3dB.

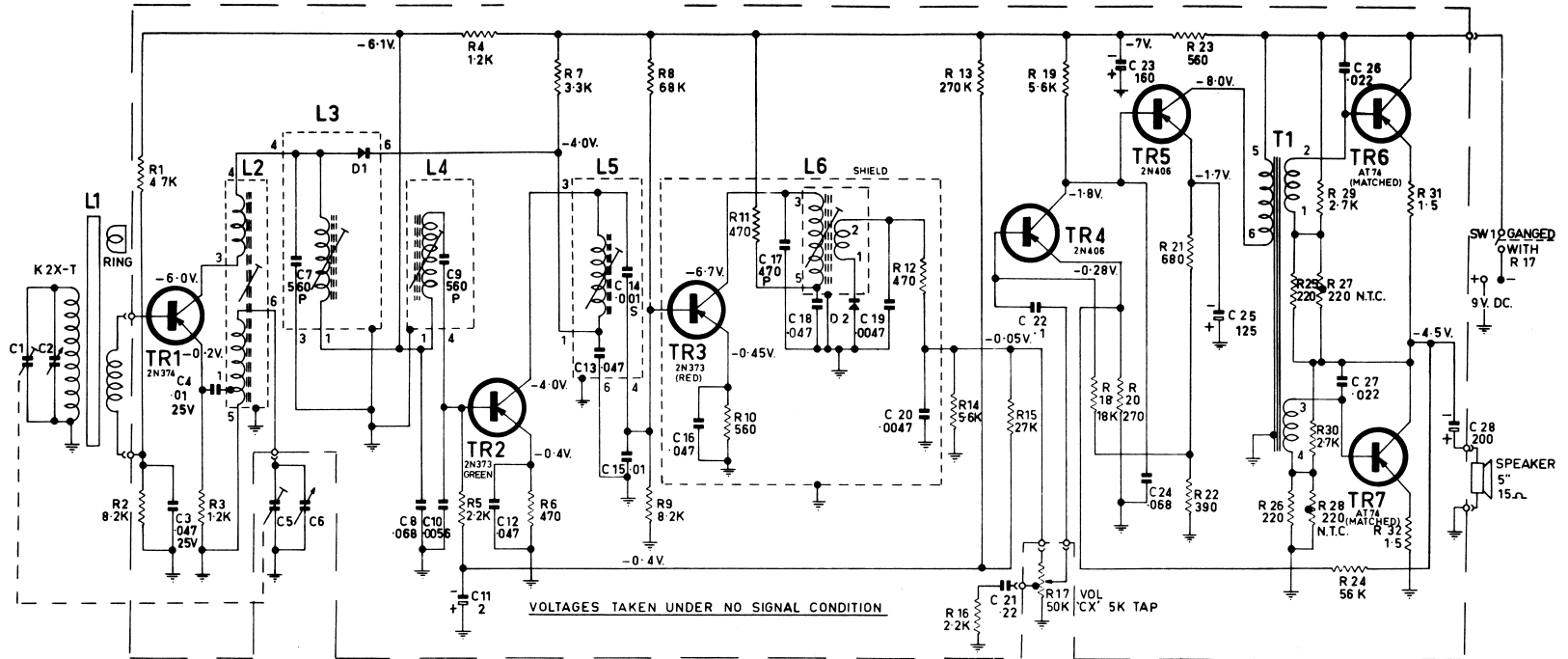
#### R.F. ALIGNMENT AND SCALE CALIBRATION

If the gang is replaced it may be necessary to recalibrate the dial scale. To do this first fully mesh the gang and adjust the pointer so that it lies over the band limit mark on the scale. This mark and the calibration marks are along the bottom of the dial and cannot easily be seen when the chassis is on its front plate.

Connect the signal generator to the radiating loop and set the frequency to 640 Kc/s. Tune the receiver to the first calibration mark under 5CK and adjust the oscillator coil L2, and the loopstick tuning ring for maximum output.

Set the generator to 1470 Kc/s and tune the receiver to the third calibration mark under 3MA and adjust the oscillator and aerial trimmers for maximum output. Repeat these adjustments until no further improvement can be achieved.

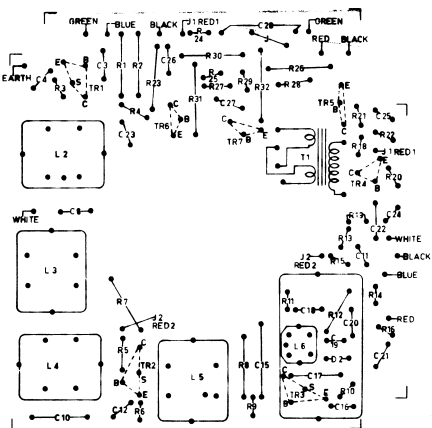
Set the generator to 980 Kc/s and tune the receiver to this signal. Check that the pointer is within 1/16" of the second calibration mark under 2KM.



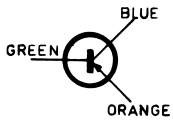
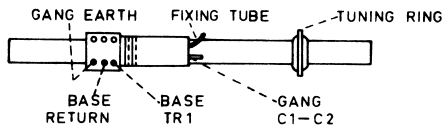
VOLTAGES TAKEN UNDER NO SIGNAL CONDITION

VOL 'CX' 5K TAP

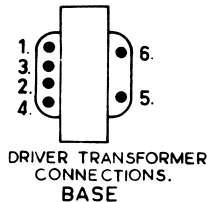
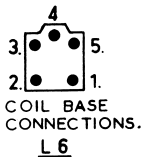
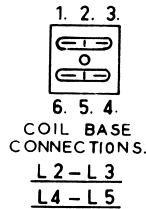
PRINTED CIRCUIT BOARD



FERRITE ROD AERIAL



**NOTE.** TRANSISTOR SHOULD NOT BE SUBSTITUTED FOR OTHER TYPES THIS WILL RESULT IN INEFFICIENT OPERATION.



PERFORMANCE FIGURES

These are taken at 980 Kc/s and with 30% modulation on the generator.

- I.F. SENSITIVITY:**  
For 50 mW output with the generator connected to the base of V1 via an 0.047 uF capacitor 2 uV ± 3dB.
- SIGNAL TO NOISE RATIO:**  
For 200 uV/metre input note the audio output and then remove the modulation. The audio output should fall at least 19 dB.
- A.G.C. CHARACTERISTICS:**  
20 uV/metre -10dB max.  
1 mV/metre 0dB  
300mV/metre +10dB max.

**NOTE:** To achieve 300mV/metre the loop should be placed 10" from the receiver loopstick. The generator now reads field strength directly i.e., 100 mV gives a field strength of 100 mV/metre.

DO NOT USE AN IRON OVER 60W-EXCESS SOLDER-UNDUE PRESSURE. REPLACE COMPONENTS BY WITHDRAWING SOLDER FROM THE CRIMPED LEADS WHILE LIFTING THE LEAD FROM THE FOIL BY THE INSERTION OF A KNIFE EDGE. CUT OFF THE CRIMPED SECTION AND WITHDRAW COMPONENT. OR-CUT OUT COMPONENT, UNSOLDER REMAINING TERMINATIONS AND PUSH THROUGH. REPAIR FOIL BREAKS BY FLOWING SOLDER, OR SOLDERING TINNED COPPER WIRE ACROSS, REPLACE DAMAGED SECTIONS WITH A JUMPER OF WIRE.